



O*NET Data Collection Program

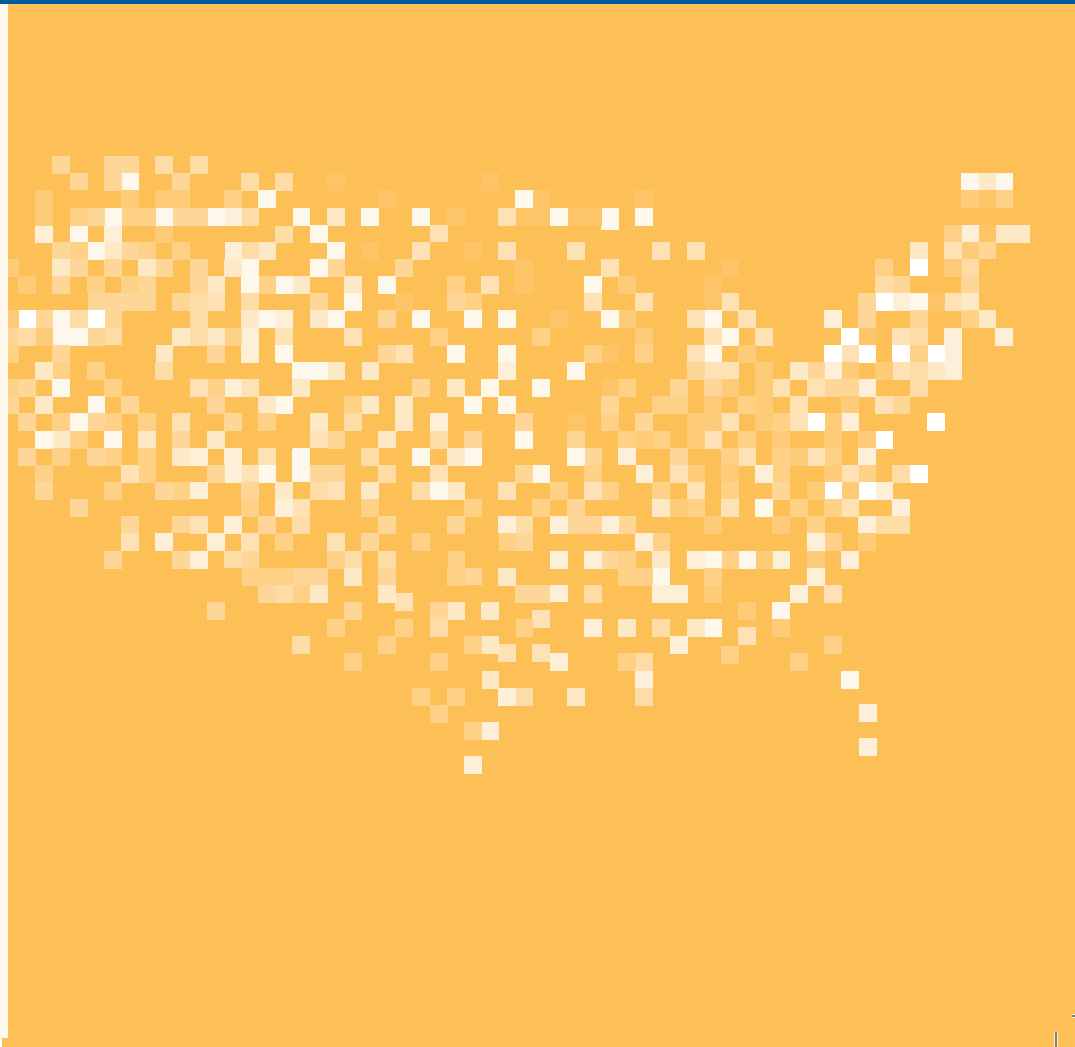
Office of Management and
Budget Clearance Package
Supporting Statement

Volume 2 of 2: Appendices

August 29, 2008

Submitted by:
U.S. Department of Labor
Employment and Training
Administration

Submitted to:
Office of Management and
Budget



Appendix A: Questionnaires

**Questionnaire Changes Since
September 2, 2005, OMB Submission**

List of Questionnaire Modifications Since the September 2, 2005, OMB Submission

Questionnaire	Part that was changed	Description of change
All questionnaires	Text on inside front cover	The address for the Department Of Labor was updated
Establishment Method Questionnaires	Association Membership Question Number 1	Instructions were reworded to address the listing of multiple associations
Establishment Method Questionnaires	Association Membership Question Number 1	Routing text was added for situations where there are no associations listed
Occupation Expert Knowledge Questionnaire	General Questionnaire Instructions	The term "Occupational Expert" was changed to "Occupation Expert"
Occupation Expert Work Activities Questionnaire	General Questionnaire Instructions	The term "Occupational Expert" was changed to "Occupation Expert"
Occupation Expert Work Context Questionnaire	General Questionnaire Instructions	The term "Occupational Expert" was changed to "Occupation Expert"
Establishment Method and Occupation Expert Skills Questionnaires	NA	The Skills Questionnaire was omitted, as it is now being completed by job analysts rather than incumbants.

Establishment Method Questionnaires

- Knowledge Questionnaire
- Work Activities Questionnaire
- Work Context Questionnaire

As mentioned in the Supporting Statement, each sampled employee or association member will be asked to complete only one of the following three questionnaires. The “Specific Tasks Performed on Your Job” and “Your Association Memberships” sections of these questionnaires are different for each O*NET occupation. The following three sampled questionnaires are for the occupation of Registered Nurses.

Spanish versions of these questionnaires are available upon request.

Form E
OMB#1205-0421
Expires: 12/31/2008
Ver.: 9/05

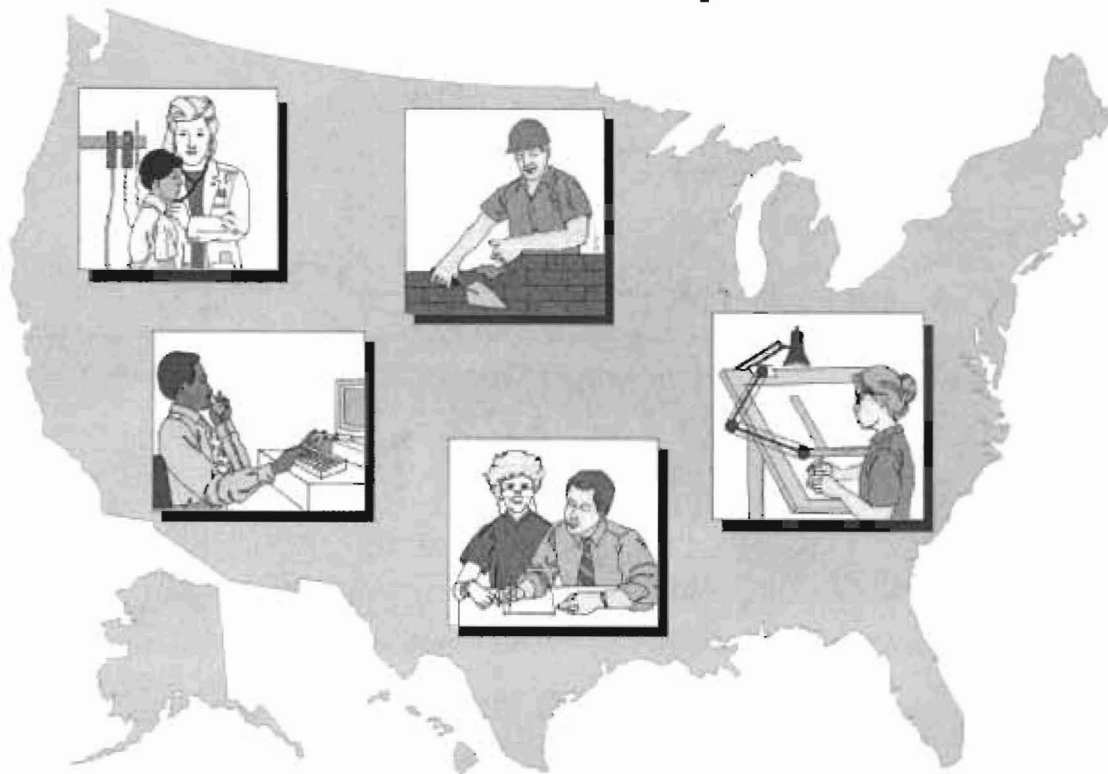
O=15642 C=62891 B=2619

(OCCUPATION NAME, ROSTER LINE NUMBER)

Web site username: (USERNAME)

Web site password: (PASSWORD)

Some Important Questions About The *Knowledge* Required For Your Occupation



Please return your completed questionnaire in the enclosed envelope to:

Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 2770

Sponsored by: The U.S. Department of Labor and the National O*NET Consortium

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number. Respondents' obligation to reply to these reporting requirements is voluntary. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the U.S. Department of Labor, Office of Workforce Investment, Attn: O*NET Project, Frances Perkins Building, Mail Stop S4231, 200 Constitution Ave., NW, Washington, DC 20210 (OMB Control Number 1205-0421).

Return to: Research Triangle Institute, PO Box 12194
Research Triangle Park, North Carolina, 27709-2194

Instructions for Making Knowledge Ratings

These questions are about work-related areas of knowledge. **Knowledge areas** are sets of facts and principles needed to address problems and issues that are part of a job. You will be asked about a series of different areas of knowledge and how they relate to *your current job* - that is, the job you hold now.

Each knowledge area in this questionnaire is named and defined.

For example:

Economics and Accounting

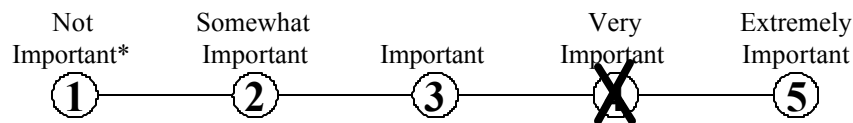
Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.

You are then asked two questions about each knowledge area:

A How important is the knowledge area to the performance of your current job?

For example:

How important is ECONOMICS AND ACCOUNTING knowledge to the performance of your current job?



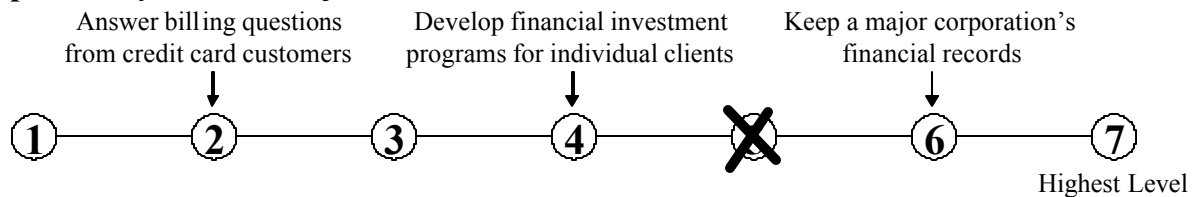
Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

***If you rate the knowledge area as Not Important to the performance of your job, mark the one [1] then skip over question B and proceed to the next knowledge area.**

B What level of the knowledge is needed to perform your current job?

To help you understand what we mean by level, we provide you with examples of job-related activities at different levels. For example:

What level of ECONOMICS AND ACCOUNTING knowledge is needed to perform your current job?

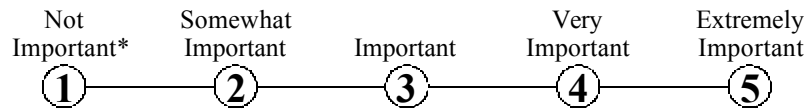


Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

1. Administration and Management

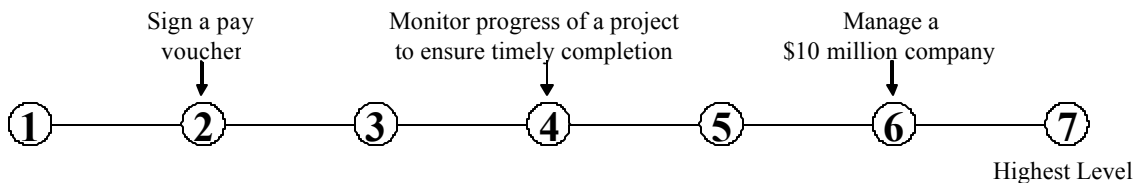
Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

A. How important is ADMINISTRATION AND MANAGEMENT knowledge to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

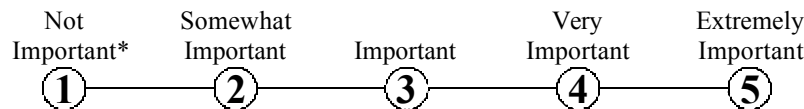
B. What level of ADMINISTRATION AND MANAGEMENT knowledge is needed to perform *your current job*?



2. Clerical

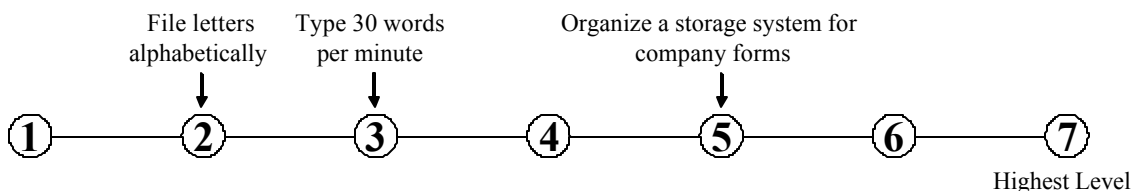
Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.

A. How important is CLERICAL knowledge to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

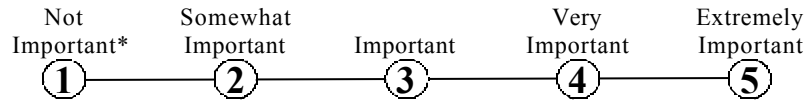
B. What level of CLERICAL knowledge is needed to perform *your current job*?



3. Economics and Accounting

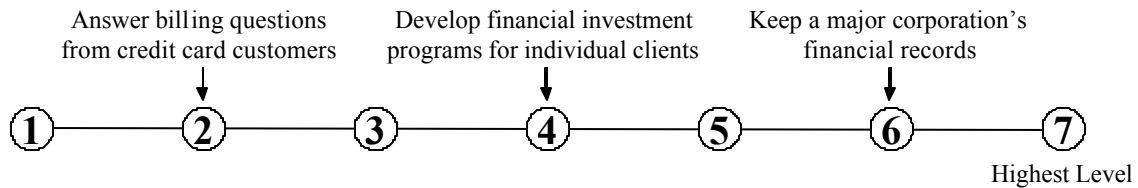
Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.

A. How important is ECONOMICS AND ACCOUNTING knowledge to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

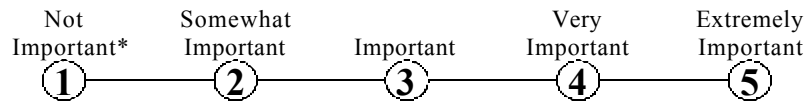
B. What level of ECONOMICS AND ACCOUNTING knowledge is needed to perform *your current job*?



4. Sales and Marketing

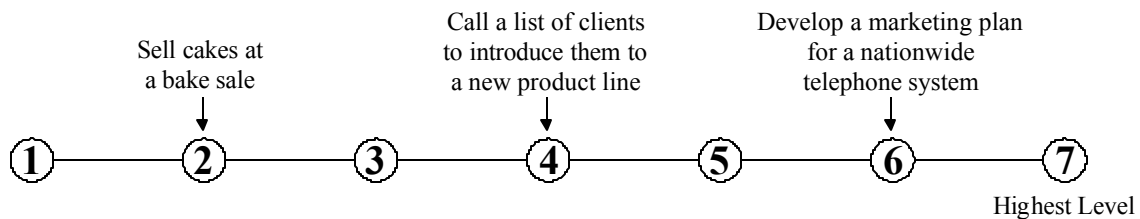
Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

A. How important is SALES AND MARKETING knowledge to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

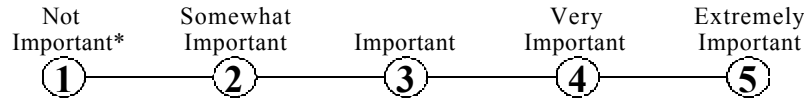
B. What level of SALES AND MARKETING knowledge is needed to perform *your current job*?



5. Customer and Personal Service

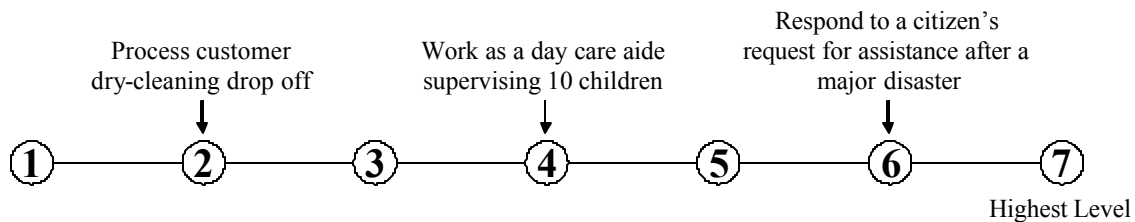
Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

A. How important is CUSTOMER AND PERSONAL SERVICE knowledge to the performance of your current job?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

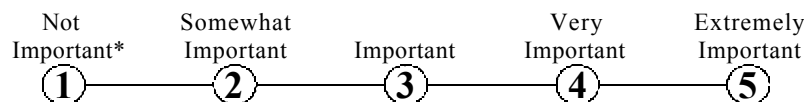
B. What level of CUSTOMER AND PERSONAL SERVICE knowledge is needed to perform your current job?



6. Personnel and Human Resources

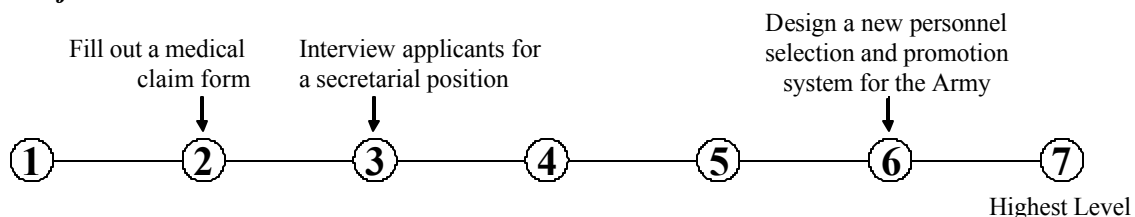
Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.

A. How important is knowledge of PERSONNEL AND HUMAN RESOURCES to the performance of your current job?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

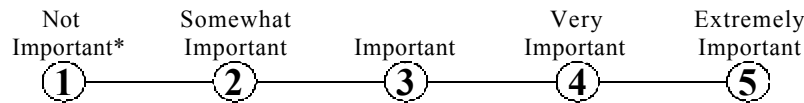
B. What level of PERSONNEL AND HUMAN RESOURCES knowledge is needed to perform your current job?



7. Production and Processing

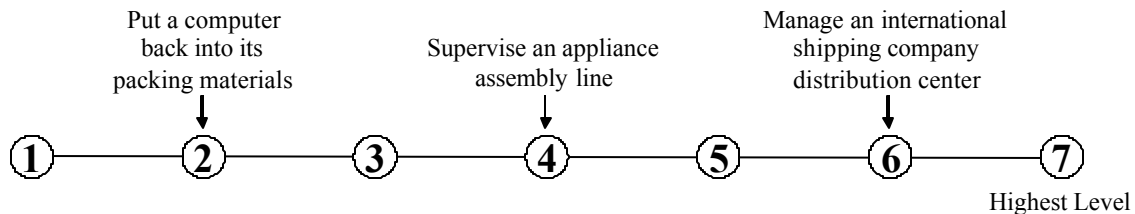
Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

A. How important is knowledge of PRODUCTION AND PROCESSING to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

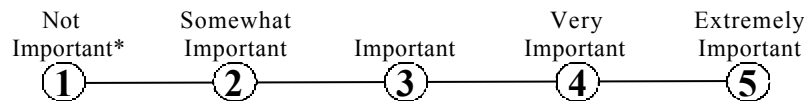
B. What level of PRODUCTION AND PROCESSING knowledge is needed to perform *your current job*?



8. Food Production

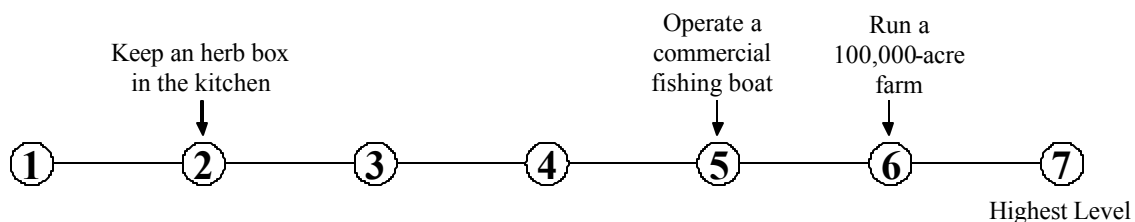
Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.

A. How important is knowledge of FOOD PRODUCTION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

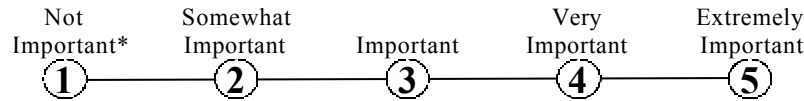
B. What level of FOOD PRODUCTION knowledge is needed to perform *your current job*?



9. Computers and Electronics

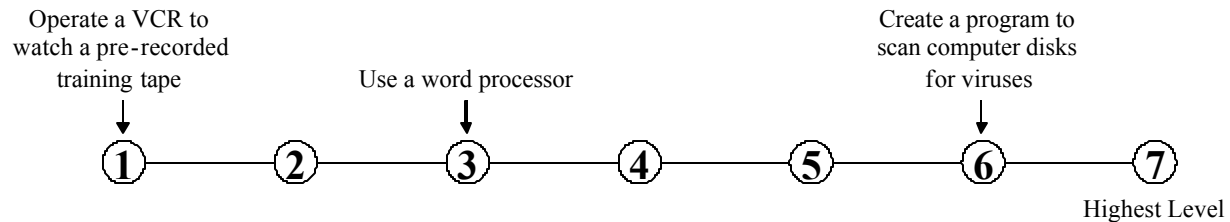
Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

A. How important is knowledge of COMPUTERS AND ELECTRONICS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

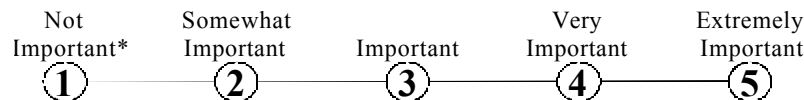
B. What level of knowledge of COMPUTERS AND ELECTRONICS is needed to perform *your current job*?



10. Engineering and Technology

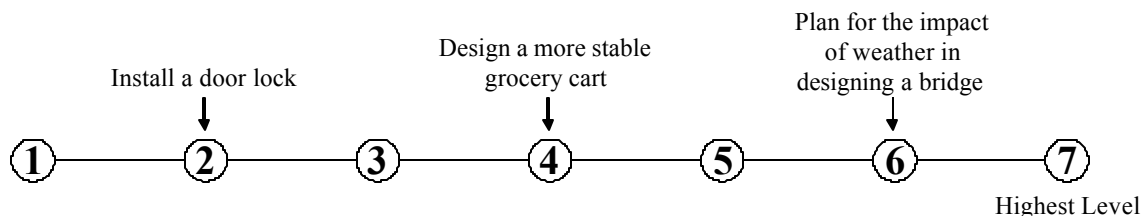
Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

A. How important is knowledge of ENGINEERING AND TECHNOLOGY to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

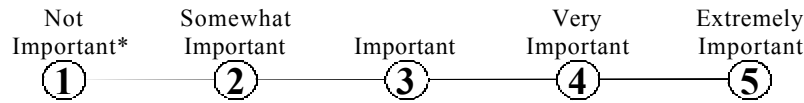
B. What level of knowledge of ENGINEERING AND TECHNOLOGY is needed to perform *your current job*?



11. Design

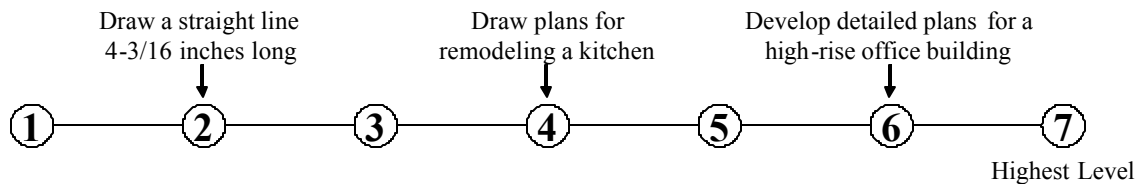
Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

A. How important is knowledge of DESIGN to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

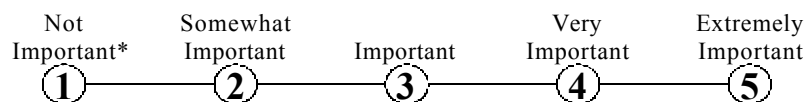
B. What level of knowledge of DESIGN is needed to perform *your current job*?



12. Building and Construction

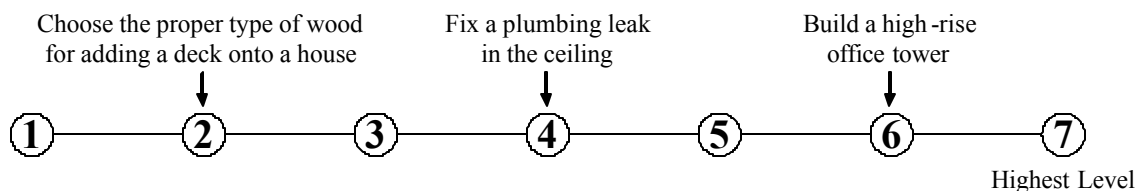
Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

A. How important is knowledge of BUILDING AND CONSTRUCTION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

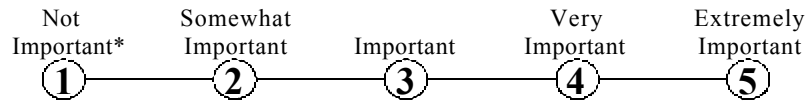
B. What level of BUILDING AND CONSTRUCTION knowledge is needed to perform *your current job*?



13. Mechanical

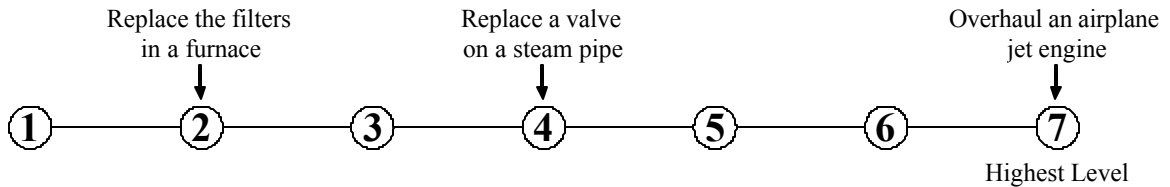
Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

A. How important is MECHANICAL knowledge to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

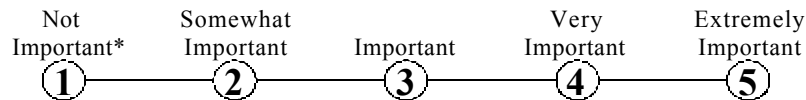
B. What level of MECHANICAL knowledge is needed to perform *your current job*?



14. Mathematics

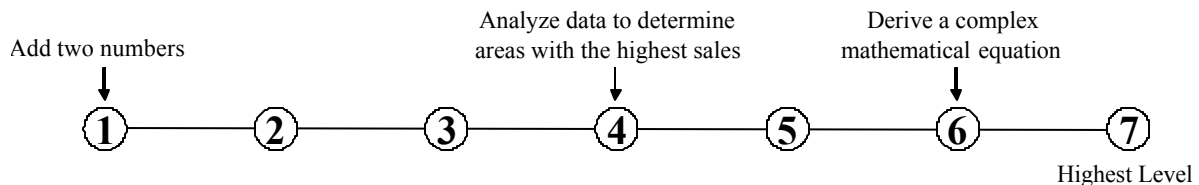
Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

A. How important is knowledge of MATHEMATICS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

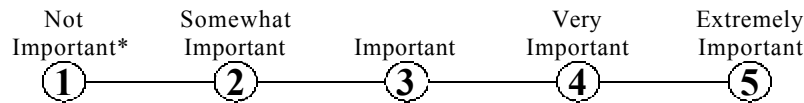
B. What level of knowledge of MATHEMATICS is needed to perform *your current job*?



15. Physics

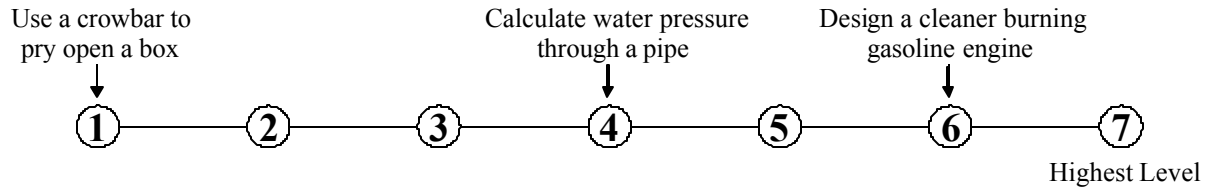
Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.

A. How important is knowledge of PHYSICS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

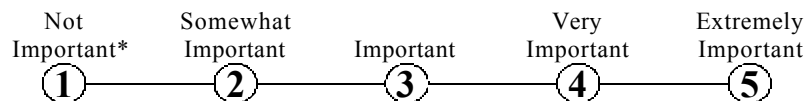
B. What level of PHYSICS knowledge is needed to perform *your current job*?



16. Chemistry

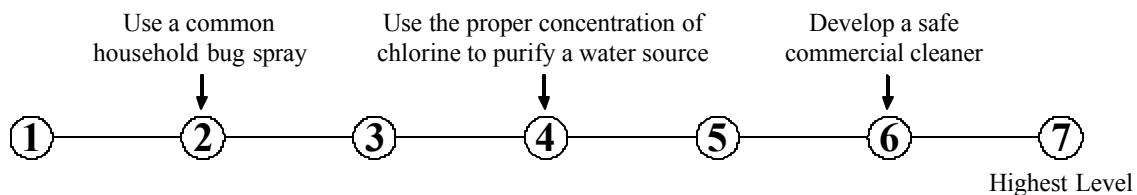
Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.

A. How important is knowledge of CHEMISTRY to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

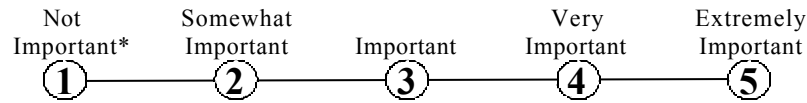
B. What level of CHEMISTRY knowledge is needed to perform *your current job*?



17. Biology

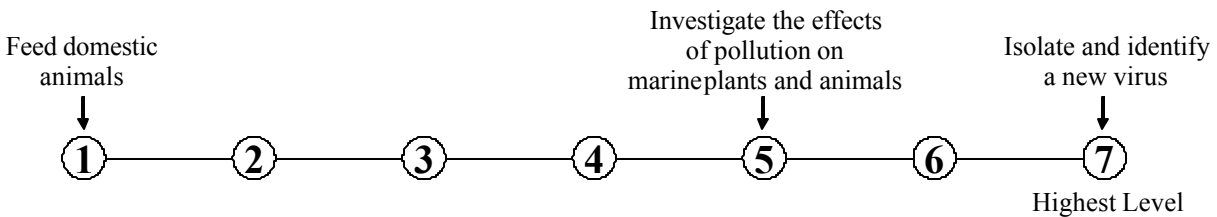
Knowledge of plant and animal organisms and their tissues, cells, functions, interdependencies, and interactions with each other and the environment.

A. How important is knowledge of **BIOLOGY** to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

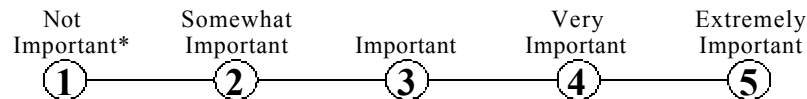
B. What level of **BIOLOGY** knowledge is needed to perform *your current job*?



18. Psychology

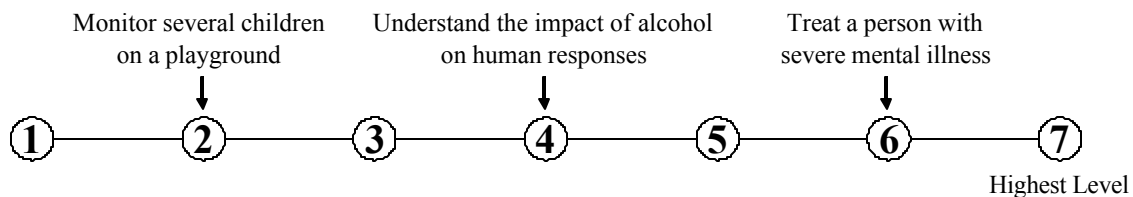
Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.

A. How important is knowledge of **PSYCHOLOGY** to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

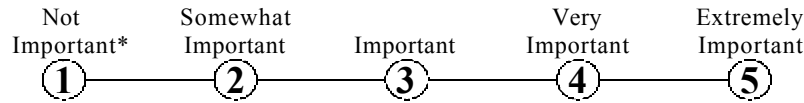
B. What level of **PSYCHOLOGY** knowledge is needed to perform *your current job*?



19. Sociology and Anthropology

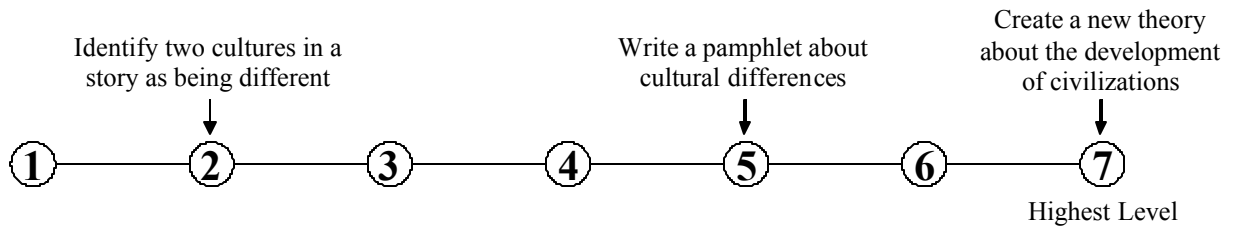
Knowledge of group behavior and dynamics, societal trends and influences, human migrations, ethnicity, cultures, and their history and origins.

- A. How important is knowledge of SOCIOLOGY AND ANTHROPOLOGY to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

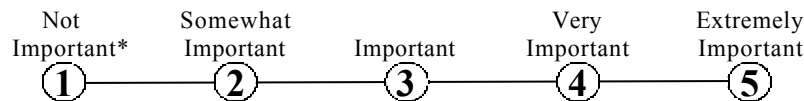
- B. What level of knowledge of SOCIOLOGY AND ANTHROPOLOGY is needed to perform *your current job*?



20. Geography

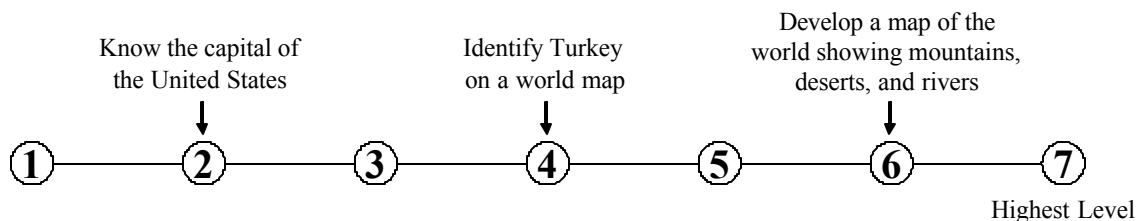
Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.

- A. How important is knowledge of GEOGRAPHY to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

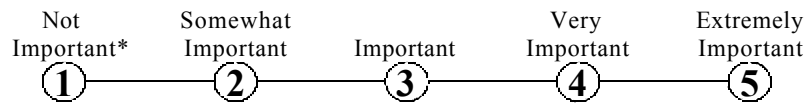
- B. What level of knowledge of GEOGRAPHY is needed to perform *your current job*?



21. Medicine and Dentistry

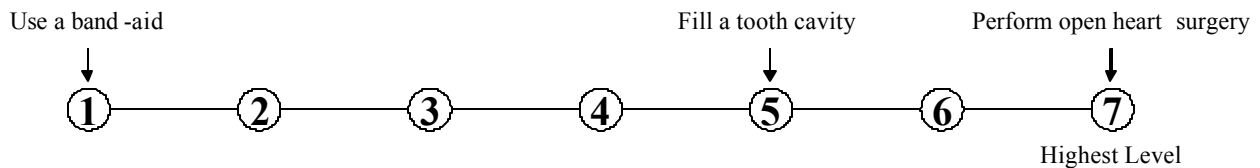
Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.

- A. How important is knowledge of MEDICINE AND DENTISTRY to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

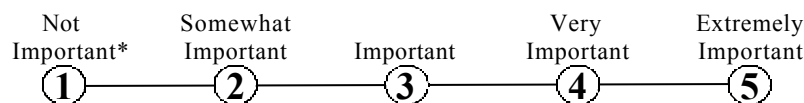
- B. What level of MEDICINE AND DENTISTRY knowledge is needed to perform *your current job*?



22. Therapy and Counseling

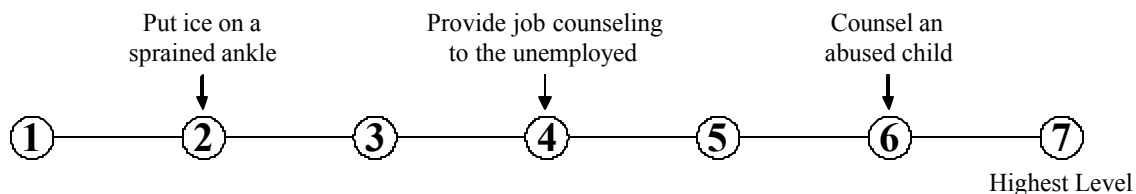
Knowledge of principles, methods, and procedures for diagnosis, treatment, and rehabilitation of physical and mental dysfunctions, and for career counseling and guidance.

- A. How important is knowledge of THERAPY AND COUNSELING to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

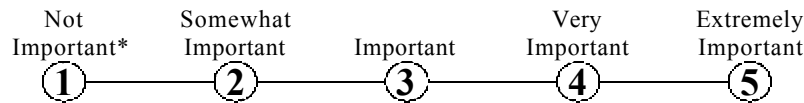
- B. What level of THERAPY AND COUNSELING knowledge is needed to perform *your current job*?



23. Education and Training

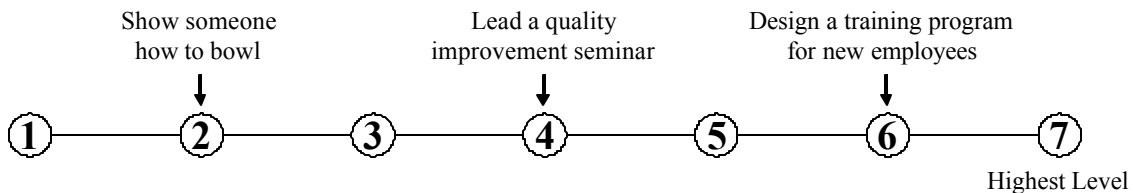
Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.

A. How **important** is knowledge of EDUCATION AND TRAINING to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

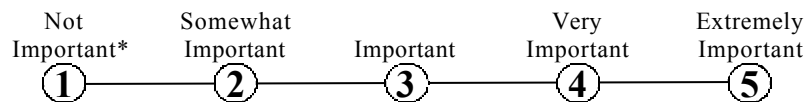
B. What **level** of EDUCATION AND TRAINING knowledge is needed to perform *your current job*?



24. English Language

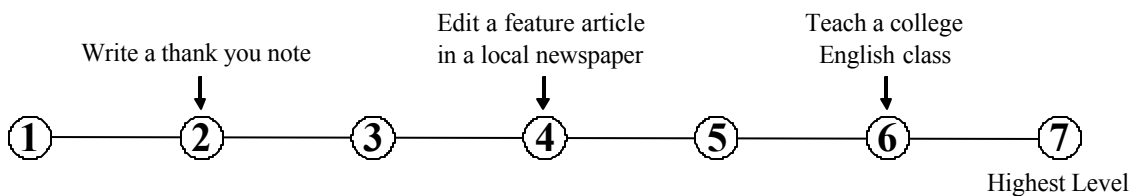
Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

A. How **important** is knowledge of the ENGLISH LANGUAGE to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

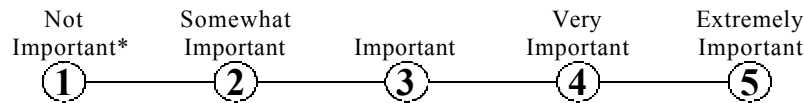
B. What **level** of ENGLISH LANGUAGE knowledge is needed to perform *your current job*?



25. Foreign Language

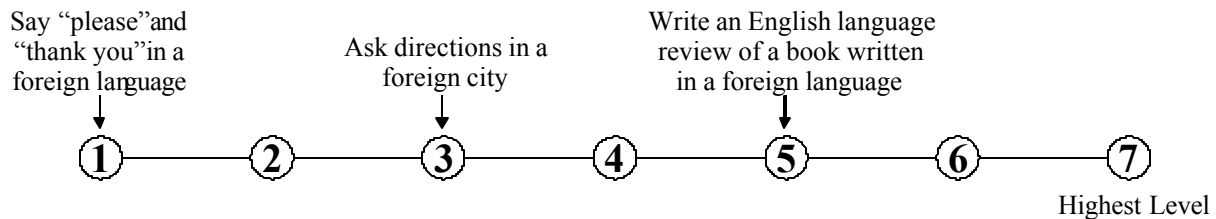
Knowledge of the structure and content of a foreign (non-English) language including the meaning and spelling of words, rules of composition and grammar, and pronunciation.

A. How important is knowledge of a FOREIGN LANGUAGE to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

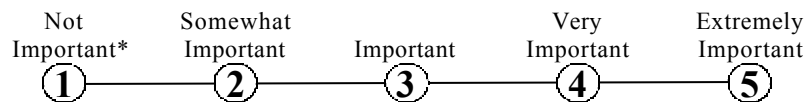
B. What level of FOREIGN LANGUAGE knowledge is needed to perform *your current job*?



26. Fine Arts

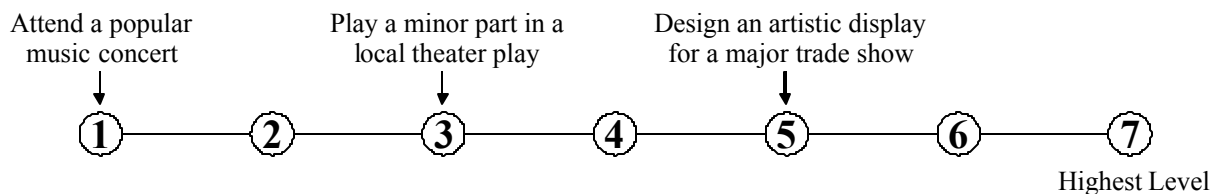
Knowledge of the theory and techniques required to compose, produce, and perform works of music, dance, visual arts, drama, and sculpture.

A. How important is knowledge of FINE ARTS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

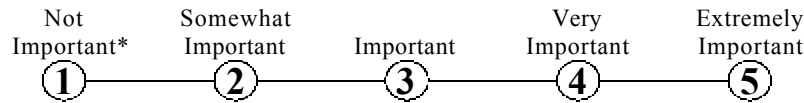
B. What level of FINE ARTS knowledge is needed to perform *your current job*?



27. History and Archeology

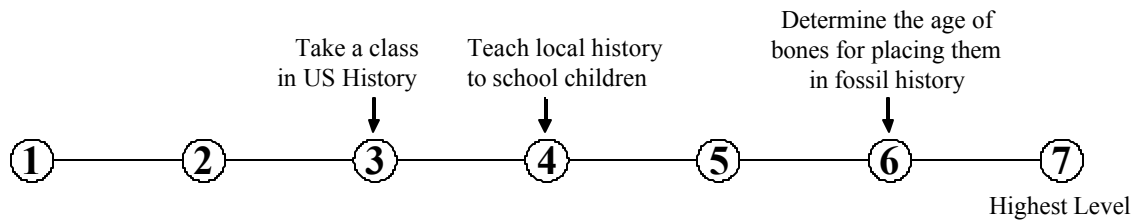
Knowledge of historical events and their causes, indicators, and effects on civilizations and cultures.

- A. How important is knowledge of HISTORY AND ARCHEOLOGY to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

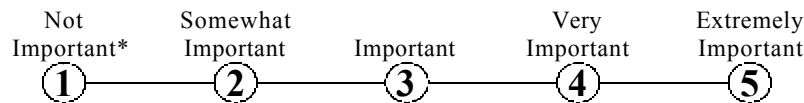
- B. What level of knowledge of HISTORY AND ARCHEOLOGY is needed to perform *your current job*?



28. Philosophy and Theology

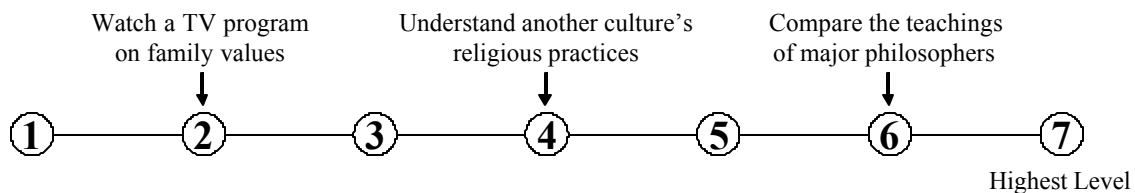
Knowledge of different philosophical systems and religions. This includes their basic principles, values, ethics, ways of thinking, customs, practices, and their impact on human culture.

- A. How important is knowledge of PHILOSOPHY AND THEOLOGY to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

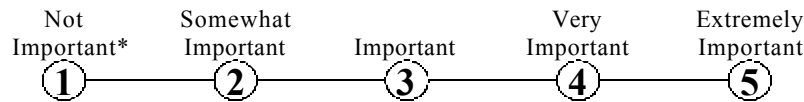
- B. What level of knowledge of PHILOSOPHY AND THEOLOGY is needed to perform *your current job*?



29. Public Safety and Security

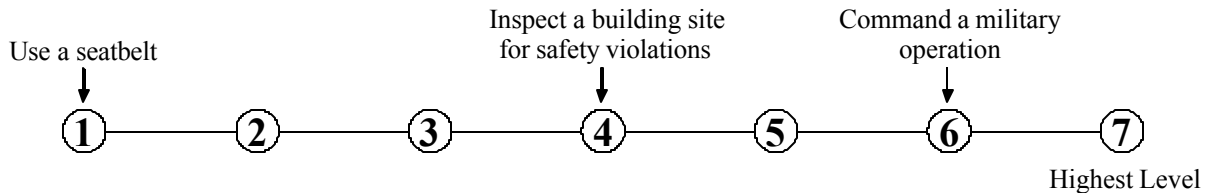
Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

- A. How important is PUBLIC SAFETY AND SECURITY knowledge to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

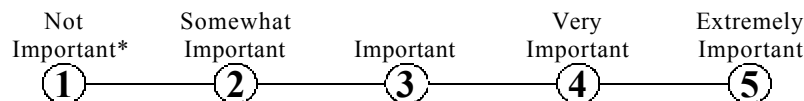
- B. What level of PUBLIC SAFETY AND SECURITY knowledge is needed to perform *your current job*?



30. Law and Government

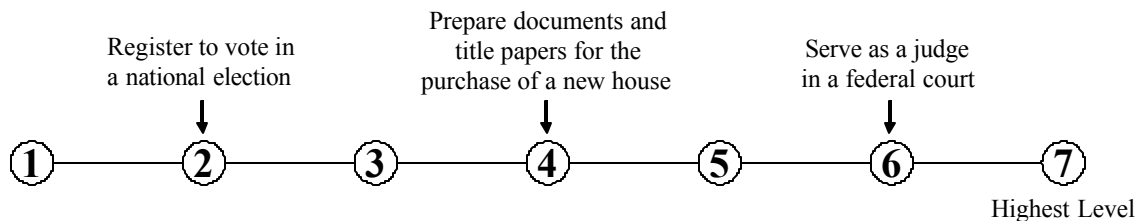
Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.

- A. How important is knowledge of LAW AND GOVERNMENT to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

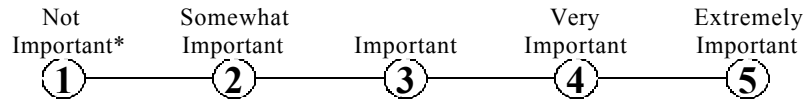
- B. What level of knowledge of LAW AND GOVERNMENT is needed to perform *your current job*?



31. Telecommunications

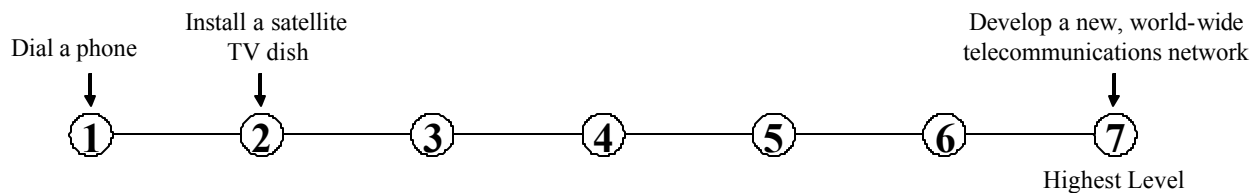
Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

- A. How important is knowledge of TELECOMMUNICATIONS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

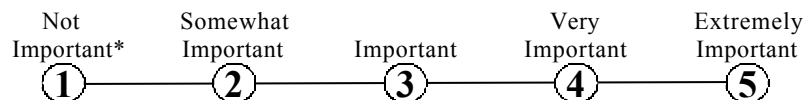
- B. What level of TELECOMMUNICATIONS knowledge is needed to perform *your current job*?



32. Communications and Media

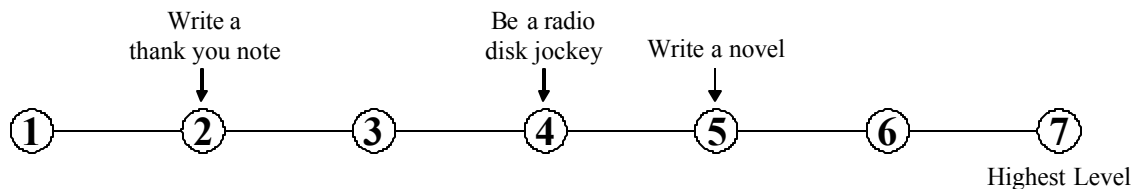
Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

- A. How important is knowledge of COMMUNICATIONS AND MEDIA to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

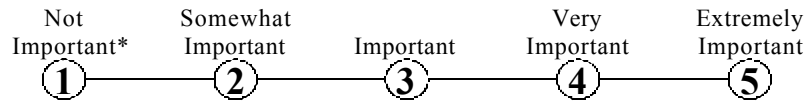
- B. What level of COMMUNICATIONS AND MEDIA knowledge is needed to perform *your current job*?



33. Transportation

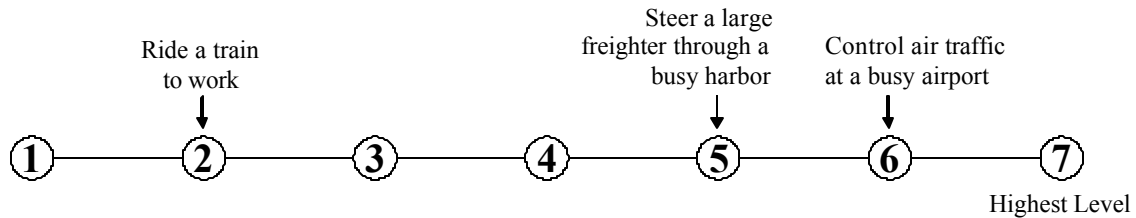
Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.

A. How important is knowledge of TRANSPORTATION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

B. What level of TRANSPORTATION knowledge is needed to perform *your current job*?



PLEASE CONTINUE ON NEXT PAGE

Instructions for Completing Education and Training Questions

In these questions, you are asked about the education and experience requirements for this job. Please read each question carefully and mark your answer by putting an **X** in the box beside your one best answer.

REQUIRED LEVEL OF EDUCATION

34. If someone were being hired to perform this job, indicate the level of education that would be required (please check only one box):

(Note that this does not mean the level of education that you personally have achieved.)

- Less than a High School Diploma**
- High School Diploma** (or GED or High School Equivalence Certificate)
- Post-Secondary Certificate** - awarded for training completed after high school (for example, in Personnel Services, Engineering-related Technologies, Vocational Home Economics, Construction Trades, Mechanics and Repairers, Precision Production Trades)
- Some College Courses**
- Associate's Degree** (or other 2-year degree)
- Bachelor's Degree**
- Post-Baccalaureate Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Baccalaureate degree but do not meet the requirements of academic degrees carrying the title of Master.
- Master's Degree**
- Post-Master's Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Master's degree but do not meet the requirements of academic degrees at the doctoral level.
- First Professional Degree** - awarded for completion of a program that
 - requires at least 2 years of college work before entrance into the program,
 - includes a total of at least 6 academic years of work to complete, and
 - provides all remaining academic requirements to begin practice in a profession.
- Doctoral Degree**
- Post-Doctoral Training**

35. If someone were being hired to perform this job, how much RELATED WORK EXPERIENCE would be required? (That is, having other jobs that prepare the worker for the job.)

- None
- Up to and including 1 month
- Over 1 month, up to and including 3 months
- Over 3 months, up to and including 6 months
- Over 6 months, up to and including 1 year
- Over 1 year, up to and including 2 years
- Over 2 years, up to and including 4 years
- Over 4 years, up to and including 6 years
- Over 6 years, up to and including 8 years
- Over 8 years, up to and including 10 years
- Over 10 years

36. If someone were being hired to perform this job, how much ON-SITE OR IN-PLANT TRAINING would be required? (That is, organized classroom study provided by the employer.)

- None
- Up to and including 1 month
- Over 1 month, up to and including 3 months
- Over 3 months, up to and including 6 months
- Over 6 months, up to and including 1 year
- Over 1 year, up to and including 2 years
- Over 2 years, up to and including 4 years
- Over 4 years, up to and including 10 years
- Over 10 years

37. If someone were being hired to perform this job, how much ON-THE-JOB TRAINING would be required? (That is, serving as a learner or trainee on the job under instruction of a more experienced worker.)

- None or short demonstration
- Anything beyond short demonstration, up to and including 1 month
- Over 1 month, up to and including 3 months
- Over 3 months, up to and including 6 months
- Over 6 months, up to and including 1 year
- Over 1 year, up to and including 2 years
- Over 2 years, up to and including 4 years
- Over 4 years, up to and including 10 years
- Over 10 years

38. If someone were being hired to perform this job, how much APPRENTICESHIP would be required? (That is, having served in a registered US Department of Labor program and received a certificate of completion.)

- None
- Up to and including 1 year
- Over 1 year, up to and including 2 years
- Over 2 years, up to and including 3 years
- Over 3 years, up to and including 4 years
- Over 4 years, up to and including 5 years
- Over 5 years, up to and including 6 years

Instructions for Making Work Style Ratings

These questions are about work styles. A **Work Style** is a personal characteristic that can affect how well someone does a job. You will be asked about a series of different work styles and how they relate to *your current job* – that is, the job you hold now.

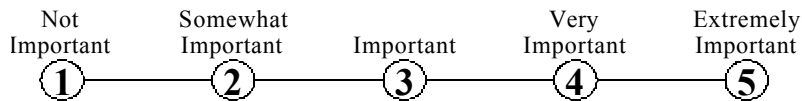
First, each work style is named and defined. For example:

Stress Tolerance

Job requires accepting criticism and dealing calmly and effectively with high-stress situations.

Then you are asked *How important is this characteristic to the performance of your current job?* For example:

How important is **STRESS TOLERANCE** to the performance of *your current job*?

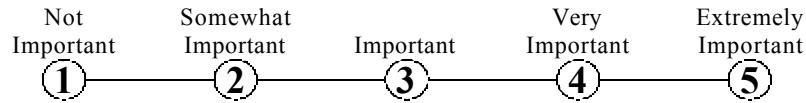


Mark your answer by putting an **X** through the number that represents your answer. Do not mark on the line between the numbers.

39. Achievement/Effort

Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.

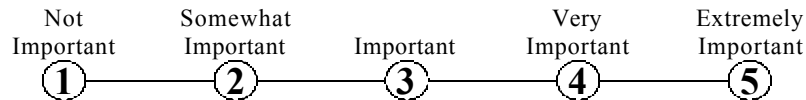
How important is ACHIEVEMENT/EFFORT to the performance of *your current job*?



40. Persistence

Job requires persistence in the face of obstacles.

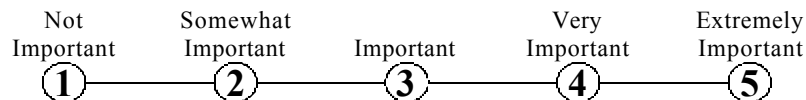
How important is PERSISTENCE to the performance of *your current job*?



41. Initiative

Job requires a willingness to take on responsibilities and challenges.

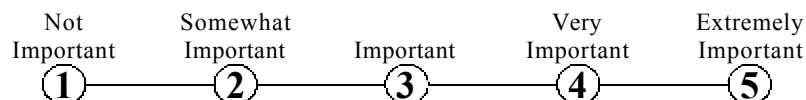
How important is INITIATIVE to the performance of *your current job*?



42. Leadership

Job requires a willingness to lead, take charge, and offer opinions and direction.

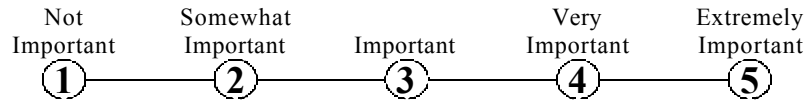
How important is LEADERSHIP to the performance of *your current job*?



43. Cooperation

Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

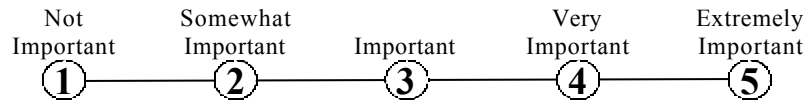
How important is COOPERATION to the performance of *your current job*?



44. Concern for Others

Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others on the job.

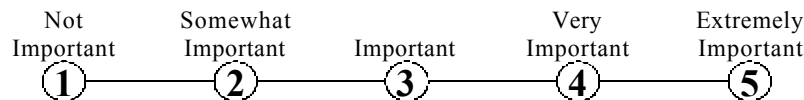
How important is CONCERN FOR OTHERS to the performance of *your current job*?



45. Social Orientation

Job requires preferring to work with others rather than alone, and being personally connected with others on the job.

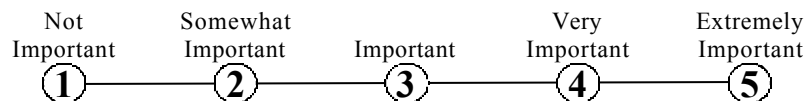
How important is SOCIAL ORIENTATION to the performance of *your current job*?



46. Self-Control

Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.

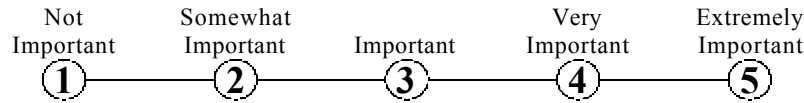
How important is SELF-CONTROL to the performance of *your current job*?



47. Stress Tolerance

Job requires accepting criticism and dealing calmly and effectively with high-stress situations.

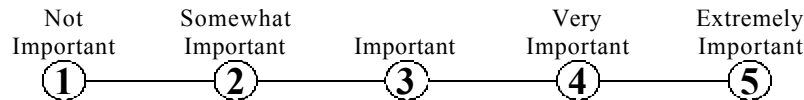
How important is STRESS TOLERANCE to the performance of *your current job*?



48. Adaptability/Flexibility

Job requires being open to change (positive or negative) and to considerable variety in the workplace.

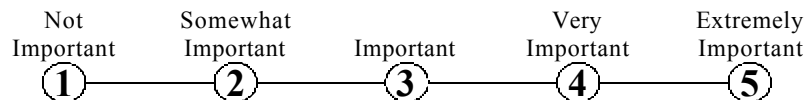
How important is ADAPTABILITY/FLEXIBILITY to the performance of *your current job*?



49. Dependability

Job requires being reliable, responsible, and dependable, and fulfilling obligations.

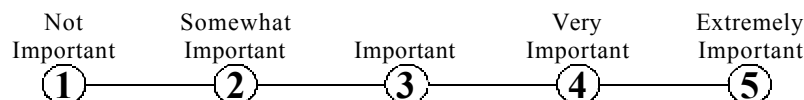
How important is DEPENDABILITY to the performance of *your current job*?



50. Attention to Detail

Job requires being careful about details and thorough in completing tasks.

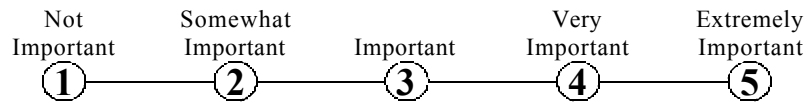
How important is ATTENTION TO DETAIL to the performance of *your current job*?



51. Integrity

Job requires being honest and ethical.

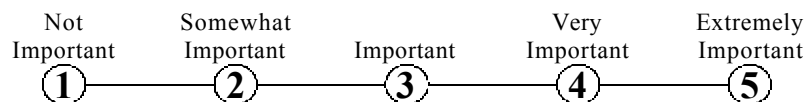
How important is INTEGRITY to the performance of *your current job*?



52. Independence

Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

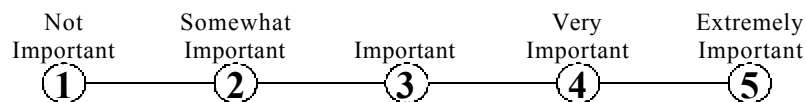
How important is INDEPENDENCE to the performance of *your current job*?



53. Innovation

Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems.

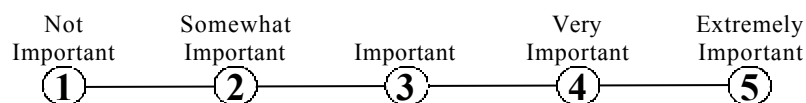
How important is INNOVATION to the performance of *your current job*?



54. Analytical Thinking

Job requires analyzing information and using logic to address work-related issues and problems.

How important is ANALYTICAL THINKING to the performance of *your current job*?



Specific Tasks Performed on Your Job

Instructions: Please read the following position description and then answer the question that follows it by marking an X in the appropriate box below.

Registered Nurses

Assess patient health problems and needs, develop and implement nursing care plans, and maintain medical records. Administer nursing care to ill, injured, convalescent, or disabled patients. May advise patients on health maintenance and disease prevention or provide case management. Licensing or registration required. Include advance practice nurses such as: nurse practitioners, clinical nurse specialists, certified nurse midwives, and certified registered nurse anesthetists. Advanced practice nursing is practiced by RNs who have specialized formal, post-basic education and who function in highly autonomous and specialized roles.

Which of the following best describes how closely this description matches the duties and responsibilities of your current job?

- It describes almost exactly what I do.
- Most of it matches, but there are a few things that don't match what I do.
- Some things match, but most of it does not match what I do.
- It does not at all describe what I do.

Please proceed to the next page.

Specific Tasks Performed on Your Job (continued)

Instructions: The next section presents a list of tasks. A task is an action or set of actions performed together to accomplish an objective. This list is specific to the job you are describing.

For each task, please make the following three ratings: **Relevance, Frequency, and Importance.** These ratings are described as follows:

RELEVANCE. If the task is NOT RELEVANT at all to performance on the job, mark through the "0" in the NOT RELEVANT column. Carefully read the task before deciding whether it is RELEVANT or NOT RELEVANT to this job. If you select the "0" in the NOT RELEVANT column, however, there is no need to complete the IMPORTANCE and FREQUENCY ratings described below. If the task is part of this job, rate IMPORTANCE and FREQUENCY.

FREQUENCY. (Do not complete if NOT RELEVANT was selected.) Ask yourself, "How often is this task performed on this job?" For example, "Interact with potential customers" is a task that an employee in one job might perform only "once per week or less," but an employee in another job might perform "hourly or more often."

Rate the FREQUENCY with which a task is performed by marking through the appropriate number, from 1 (indicating that the task is performed once per year or less often) to 7 (indicating that the task is performed hourly or more often) on the FREQUENCY scale.

IMPORTANCE. (Do not complete if NOT RELEVANT was selected.) Ask yourself, "How important is this task to performance on this job?" For example, "Develop objectives and strategies to guide the organization" might be very important for an employee in one job, but less important for another job. For the second job, however, "Provide performance feedback to subordinates" might be very important.

Rate importance of the task for performance on the job by marking through the appropriate number, from 1 (indicating that the task is of no importance) to 5 (indicating that the task is extremely important) on the IMPORTANCE scale.

Please proceed to the next page.

Frequency

Importance

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
1. Consult and coordinate with health care team members to assess, plan, implement and evaluate patient care plans.	0	1	2	3	4	5	6	7	1	2	3	4	5
2. Maintain accurate, detailed reports and records.	0	1	2	3	4	5	6	7	1	2	3	4	5
3. Modify patient treatment plans as indicated by patients' responses and conditions.	0	1	2	3	4	5	6	7	1	2	3	4	5
4. Monitor all aspects of patient care, including diet and physical activity.	0	1	2	3	4	5	6	7	1	2	3	4	5
5. Monitor, record and report symptoms and changes in patients' conditions.	0	1	2	3	4	5	6	7	1	2	3	4	5
6. Observe nurses and visit patients to ensure that proper nursing care is provided.	0	1	2	3	4	5	6	7	1	2	3	4	5
7. Prepare patients for, and assist with, examinations and treatments.	0	1	2	3	4	5	6	7	1	2	3	4	5
8. Prepare rooms, sterile instruments, equipment and supplies, and ensure that stock of supplies is maintained.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
9. Provide health care, first aid, immunizations and assistance in convalescence and rehabilitation in locations such as schools, hospitals, and industry.	0	1	2	3	4	5	6	7	1	2	3	4	5
10. Record patients' medical information and vital signs.	0	1	2	3	4	5	6	7	1	2	3	4	5
11. Assess the needs of individuals, families and/or communities, including assessment of individuals' home and/or work environments to identify potential health or safety problems.	0	1	2	3	4	5	6	7	1	2	3	4	5
12. Conduct specified laboratory tests.	0	1	2	3	4	5	6	7	1	2	3	4	5
13. Consult with institutions or associations regarding issues and concerns relevant to the practice and profession of nursing.	0	1	2	3	4	5	6	7	1	2	3	4	5
14. Direct and supervise less skilled nursing/health care personnel, or supervise a particular unit on one shift.	0	1	2	3	4	5	6	7	1	2	3	4	5
15. Hand items to surgeons during operations.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
16. Instruct individuals, families and other groups on topics such as health education, disease prevention and childbirth, and develop health improvement programs.	0	1	2	3	4	5	6	7	1	2	3	4	5
17. Order, interpret, and evaluate diagnostic tests to identify and assess patient's condition.	0	1	2	3	4	5	6	7	1	2	3	4	5
18. Prescribe or recommend drugs, medical devices or other forms of treatment, such as physical therapy, inhalation therapy, or related therapeutic procedures.	0	1	2	3	4	5	6	7	1	2	3	4	5
19. Provide or arrange for training/instruction of auxiliary personnel or students.	0	1	2	3	4	5	6	7	1	2	3	4	5
20. Refer students or patients to specialized health resources or community agencies furnishing assistance.	0	1	2	3	4	5	6	7	1	2	3	4	5
21. Work with individuals, groups, and families to plan and implement programs designed to improve the overall health of communities.	0	1	2	3	4	5	6	7	1	2	3	4	5

Frequency

Importance

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
22. Administer local, inhalation, intravenous, and other anesthetics.	0	1	2	3	4	5	6	7	1	2	3	4	5
23. Contract independently to render nursing care, usually to one patient, in hospital or private home.	0	1	2	3	4	5	6	7	1	2	3	4	5
24. Deliver infants and provide prenatal and postpartum care and treatment under obstetrician's supervision.	0	1	2	3	4	5	6	7	1	2	3	4	5
25. Direct and coordinate infection control programs, advising and consulting with specified personnel about necessary precautions.	0	1	2	3	4	5	6	7	1	2	3	4	5
26. Engage in research activities related to nursing.	0	1	2	3	4	5	6	7	1	2	3	4	5
27. Inform physician of patient's condition during anesthesia.	0	1	2	3	4	5	6	7	1	2	3	4	5
28. Perform administrative and managerial functions, such as taking responsibility for a unit's staff, budget, planning, and long-range goals.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
	0	1	2	3	4	5	6	7	1	2	3	4	5
29. Perform physical examinations, make tentative diagnoses, and treat patients en route to hospitals or at disaster site triage centers.		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important

Frequency

Importance

	Not Relevant	Once per year or less More than once per year More than once per month More than once per week Daily Several times per day Hourly or more often	Not Important Somewhat Important Important Very Important Extremely Important
<p>Additional Relevant Tasks Please write in additional relevant tasks and provide a rating.</p> <p>1. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>2. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>3. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>4. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>5. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5

Information About You

Many workers are being asked to complete this survey. Your answers to these questions will help us know that workers with differing amounts of experience and different backgrounds are included.

Please read each question carefully and mark your answer by putting an **X** in the box beside your answer, or by writing an answer on the line provided.

1. What is the title of your current job? (PLEASE PRINT)

2. For how long have you worked at this job? (Mark one box)

- Ten years or more
- At least 6 years, but less than 10 years
- At least 3 years, but less than 6 years
- At least 1 year, but less than 3 years
- At least 3 months, but less than 12 months
- At least 1 month, but less than 3 months
- Less than 1 month

3. In your current job, are you employed by (Mark one box)

- Government
- Private for-profit company
- Nonprofit organization including tax exempt and charitable organizations
- Self-employed
- Family business

4. **If you are working in the family business, is this business incorporated?**

Yes

No

Not working in a family business

5. **In what year were you born?** 1 9

6. **Are you male or female?** (Mark one box)

Male

Female

7. **Are you Hispanic or Latino?** (Mark one box)

Yes

No

8. **What is your race?** (Mark one or more boxes)

American Indian or Alaska Native

Asian

Black or African American

Native Hawaiian or Other Pacific Islander

White

9. Do you have any of the following long-lasting conditions?

Yes No

- a. Blindness, deafness, or a severe vision or hearing impairment?.....

- b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?.....

10. Because of a physical, mental, or emotional condition lasting 6 months or more, do you have any difficulty doing any of the following activities?

Yes No

- a. Learning, remembering, or concentrating?

- b. Dressing, bathing, or getting around inside the home?

- c. Going outside the home alone to shop or visit a doctor's office?

- d. Working at a job or business?

11. Indicate the highest level of education that you have completed
(please check only one box):

- Less than a High School Diploma**
- High School Diploma** (or GED or High School Equivalence Certificate)
- Post-Secondary Certificate** - awarded for training completed after high school (for example, in Personnel Services, Engineering-related Technologies, Vocational Home Economics, Construction Trades, Mechanics and Repairers, Precision Production Trades)
- Some College Courses**
- Associate's Degree** (or other 2-year degree)
- Bachelor's Degree**
- Post-Baccalaureate Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Baccalaureate degree but do not meet the requirements of academic degrees carrying the title of Master.
- Master's Degree**
- Post-Master's Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Master's degree but do not meet the requirements of academic degrees at the doctoral level.
- First Professional Degree** - awarded for completion of a program that
 - requires at least 2 years of college work before entrance into the program,
 - includes a total of at least 6 academic years of work to complete, and
 - provides all remaining academic requirements to begin practice in a profession.
- Doctoral Degree**
- Post-Doctoral Training**

Your Association Memberships

Finally, we would like to know about the professional associations to which you belong.

1. Are you currently a member of the following professional association(s)? (Please respond for each association listed; if none are listed below, please skip to Question 2.)

American Nurses Association Yes No (13995)

Federation of Nurses and Health Professionals Yes No (14073)

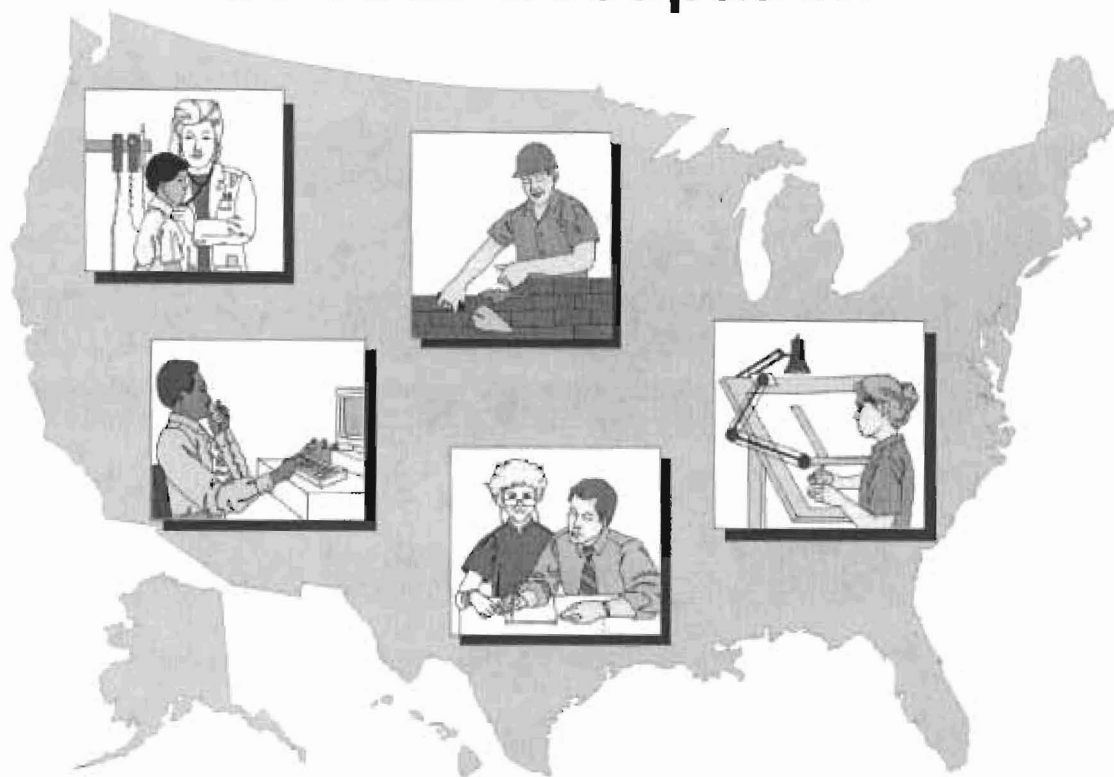
2. Please write in the names of any job-related associations to which you belong that are not listed above:

- a. _____
- b. _____
- c. _____

Form B
OMB#1205-0421
Expires: 12/31/2008
Ver.: 9/05

O=15642 C=62891 B=2619
(OCCUPATION NAME, ROSTERLINE NUMBER)
Web site username: (USERNAME)
Web site password: (PASSWORD)

Some Important Questions About The *Work Activities* Of Your Occupation



Please return your completed questionnaire in the enclosed envelope to:
Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 2770
Sponsored by: The U.S. Department of Labor and the National O*NET Consortium

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number. Respondents' obligation to reply to these reporting requirements is voluntary. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the U.S. Department of Labor, Office of Workforce Investment, Attn: O*NET Project, Frances Perkins Building, Mail Stop S4231, 200 Constitution Ave., NW, Washington, DC 20210 (OMB Control Number 1205-0421).

Return to: Research Triangle Institute, PO Box 12194
Research Triangle Park, North Carolina, 27709-2194

Instructions for Making Work Activities Ratings

These questions are about work activities. A *work activity* is a set of similar actions that are performed together in many different jobs. You will be asked about a series of different work activities and how they relate to *your current job* - that is, the job you hold now.

Each activity in this questionnaire is named and defined.

For example:

Getting Information

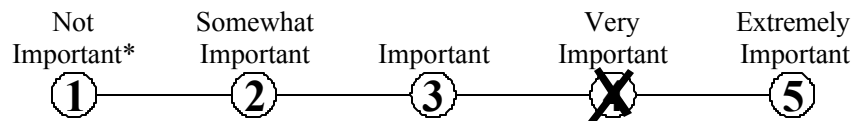
Observing, receiving, and otherwise obtaining information from all relevant sources.

You are then asked to answer two questions about that activity:

A How important is the activity to your current job?

For example:

How important is GETTING INFORMATION to the performance of *your current job*?



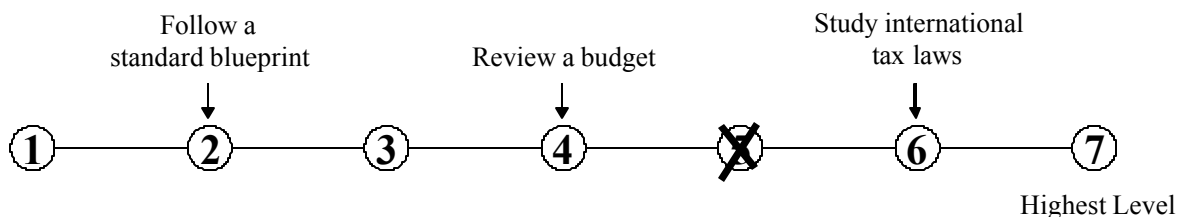
Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

***If you rate the activity as Not Important to the performance of your job, mark the one [X] then skip over question B and proceed to the next activity.**

B What level of the activity is needed to perform your current job?

To help you understand what we mean by **level**, we provide you with examples of job-related activities at different levels. For example:

What level of GETTING INFORMATION is needed to perform *your current job*?

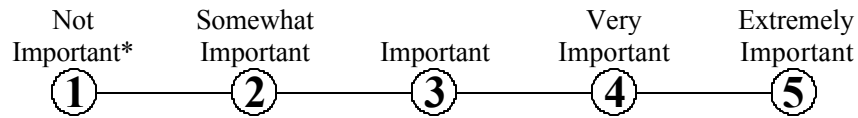


Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

1. Getting Information

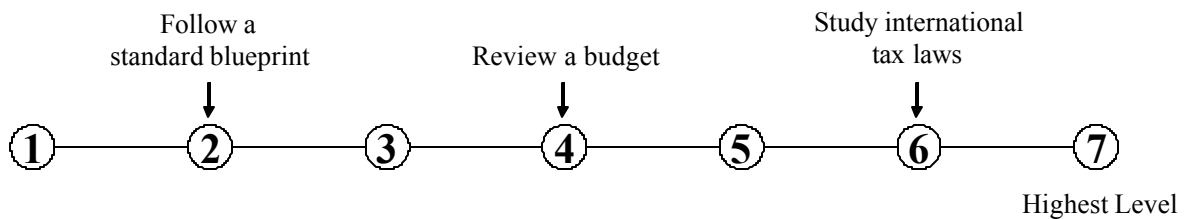
Observing, receiving, and otherwise obtaining information from all relevant sources.

A. How important is GETTING INFORMATION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

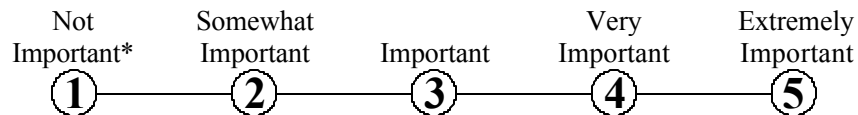
B. What level of GETTING INFORMATION is needed to perform *your current job*?



2. Identifying Objects, Actions, and Events

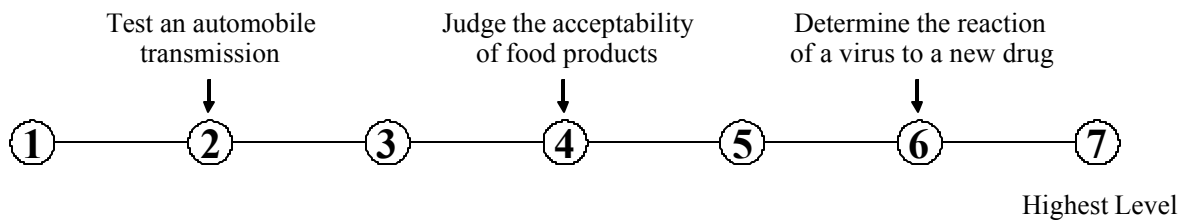
Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

A. How important is IDENTIFYING OBJECTS, ACTIONS, AND EVENTS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

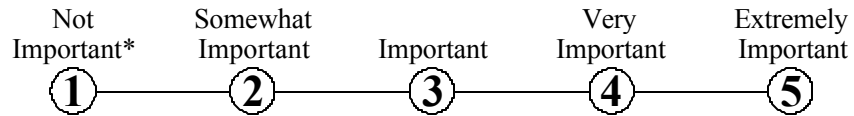
B. What level of IDENTIFYING OBJECTS, ACTIONS, AND EVENTS is needed to perform *your current job*?



3. Monitoring Processes, Materials, or Surroundings

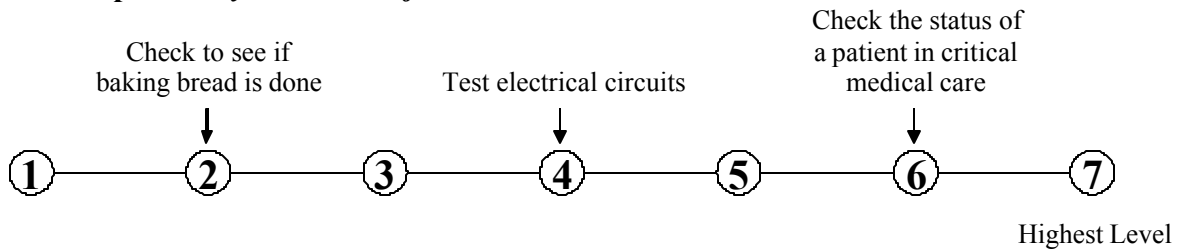
Monitoring and reviewing information from materials, events, or the environment to detect or assess problems.

A. How important is MONITORING PROCESSES, MATERIALS, OR SURROUNDINGS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

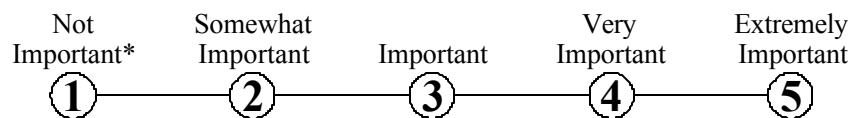
B. What level of MONITORING PROCESSES, MATERIALS, OR SURROUNDINGS is needed to perform *your current job*?



4. Inspecting Equipment, Structures, or Materials

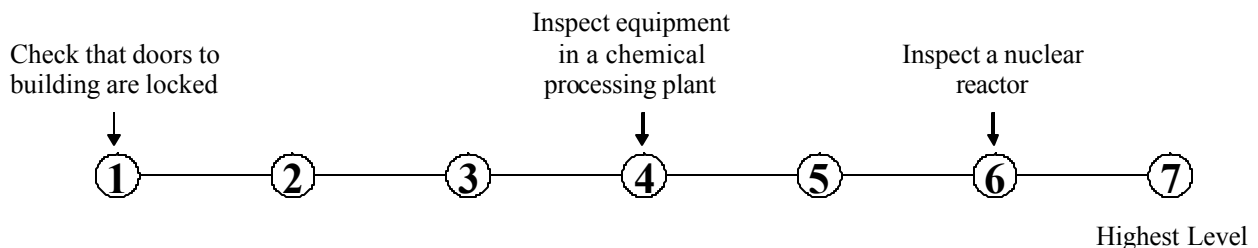
Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.

A. How important is INSPECTING EQUIPMENT, STRUCTURES, OR MATERIALS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

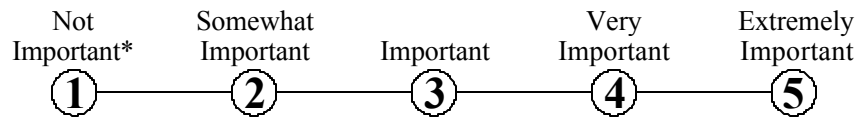
B. What level of INSPECTING EQUIPMENT, STRUCTURES, OR MATERIALS is needed to perform *your current job*?



5. Estimating the Quantifiable Characteristics of Products, Events, or Information

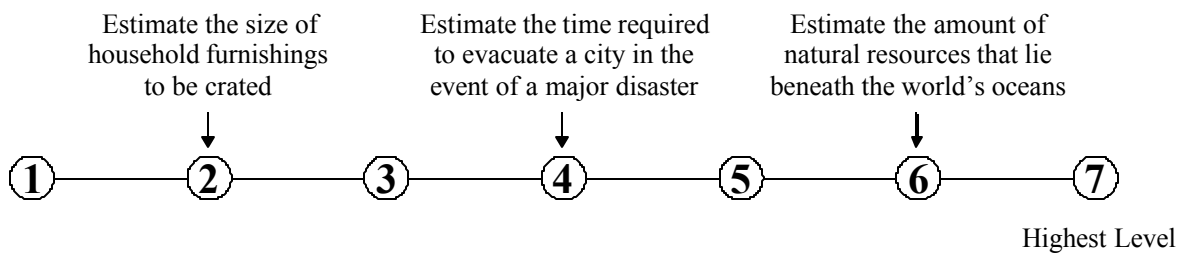
Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.

A. How important is ESTIMATING THE QUANTIFIABLE CHARACTERISTICS OF PRODUCTS, EVENTS, OR INFORMATION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

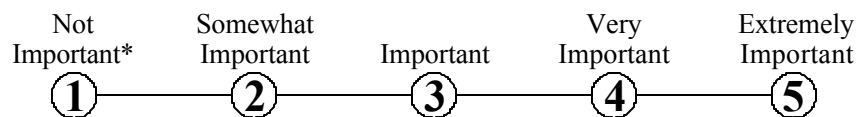
B. What level of ESTIMATING THE QUANTIFIABLE CHARACTERISTICS OF PRODUCTS, EVENTS, OR INFORMATION is needed to perform *your current job*?



6. Judging the Qualities of Objects, Services, or People

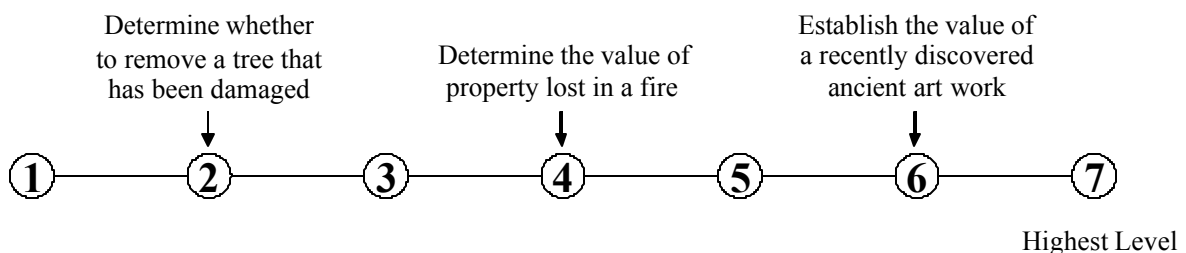
Assessing the value, importance, or quality of things or people.

A. How important is JUDGING THE QUALITIES OF OBJECTS, SERVICES, OR PEOPLE to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

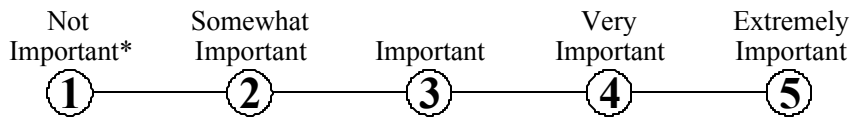
B. What level of JUDGING THE QUALITIES OF OBJECTS, SERVICES, OR PEOPLE is needed to perform *your current job*?



7. Evaluating Information to Determine Compliance with Standards

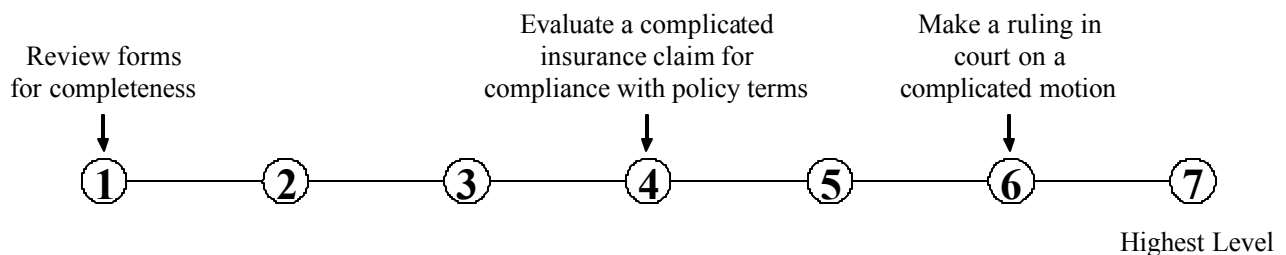
Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

A. How important is EVALUATING INFORMATION TO DETERMINE COMPLIANCE WITH STANDARDS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

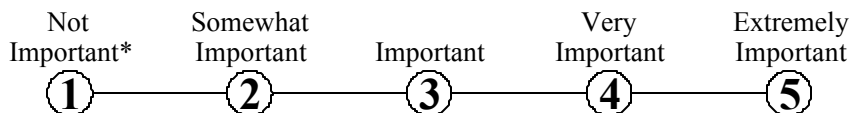
B. What level of EVALUATING INFORMATION TO DETERMINE COMPLIANCE WITH STANDARDS is needed to perform *your current job*?



8. Processing Information

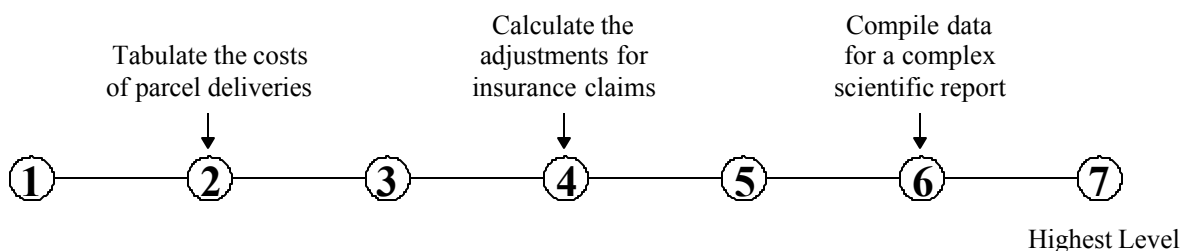
Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

A. How important is PROCESSING INFORMATION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

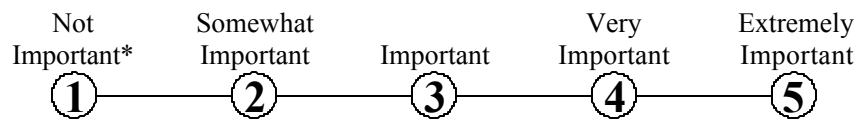
B. What level of PROCESSING INFORMATION is needed to perform *your current job*?



9. Analyzing Data or Information

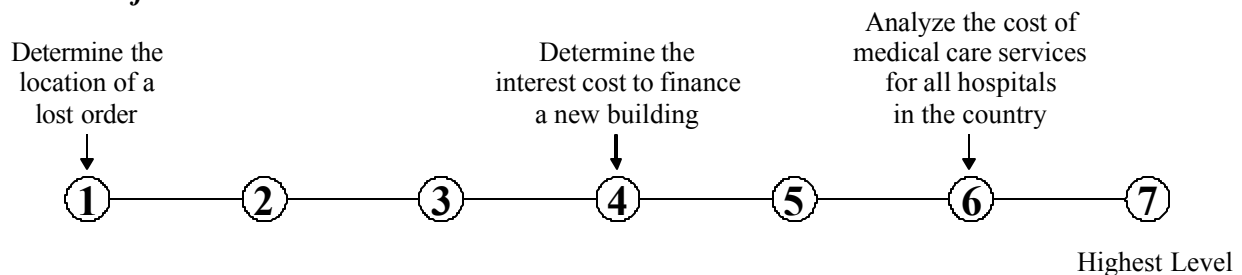
Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

A. How important is ANALYZING DATA OR INFORMATION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

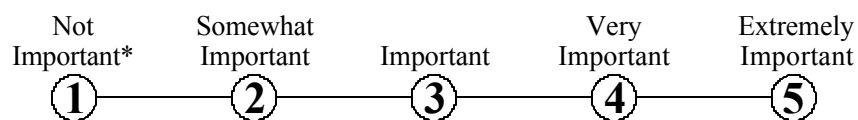
B. What level of ANALYZING DATA OR INFORMATION is needed to perform *your current job*?



10. Making Decisions and Solving Problems

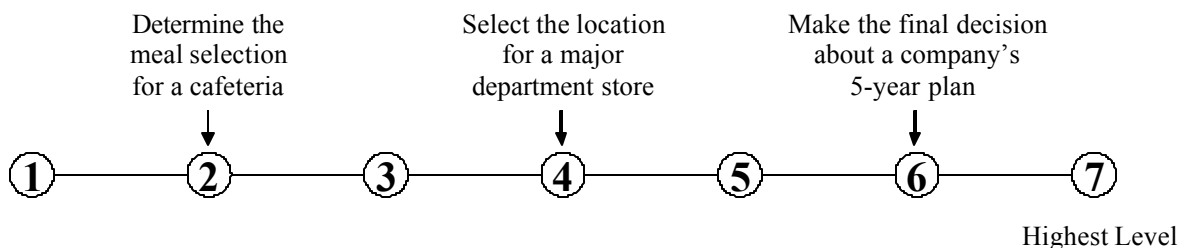
Analyzing information and evaluating results to choose the best solution and solve problems.

A. How important is MAKING DECISIONS AND SOLVING PROBLEMS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

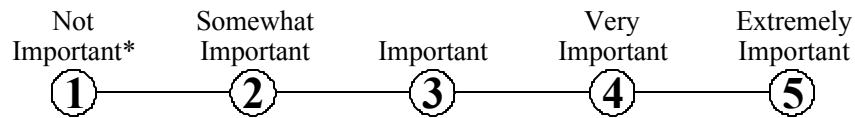
B. What level of MAKING DECISIONS AND SOLVING PROBLEMS is needed to perform *your current job*?



11. Thinking Creatively

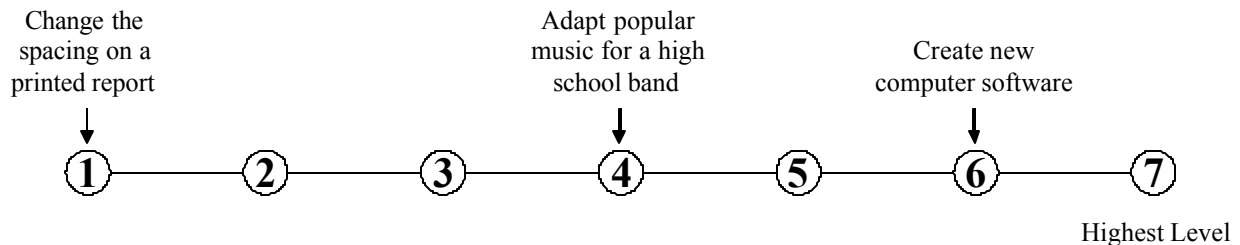
Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

A. How important is THINKING CREATIVELY to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

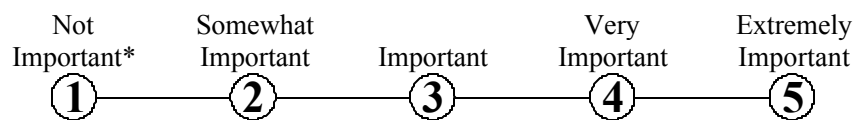
B. What level of THINKING CREATIVELY is needed to perform *your current job*?



12. Updating and Using Relevant Knowledge

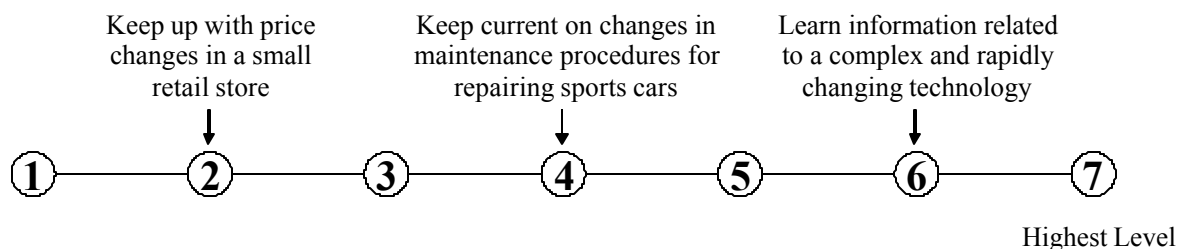
Keeping up-to-date technically and applying new knowledge to your job.

A. How important is UPDATING AND USING RELEVANT KNOWLEDGE to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

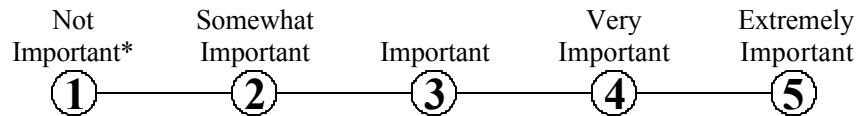
B. What level of UPDATING AND USING RELEVANT KNOWLEDGE is needed to perform *your current job*?



13. Developing Objectives and Strategies

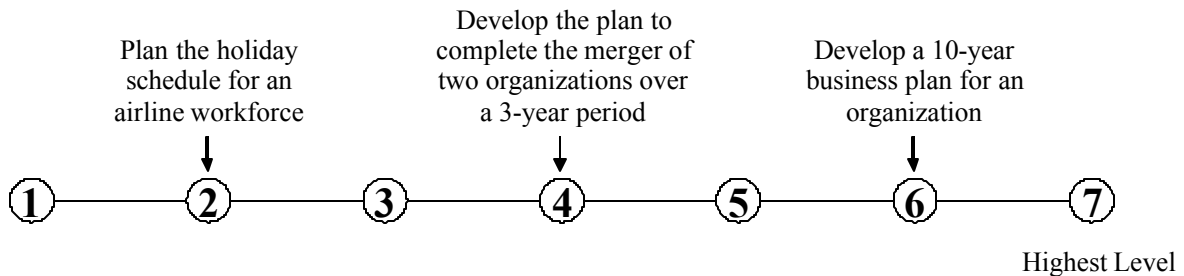
Establishing long-range objectives and specifying the strategies and actions to achieve them.

A. How important is DEVELOPING OBJECTIVES AND STRATEGIES to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

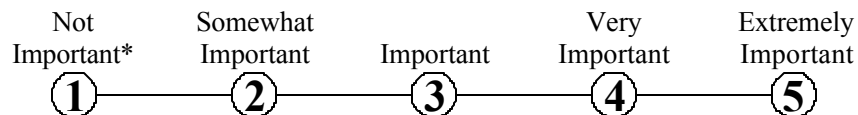
B. What level of DEVELOPING OBJECTIVES AND STRATEGIES is needed to perform *your current job*?



14. Scheduling Work and Activities

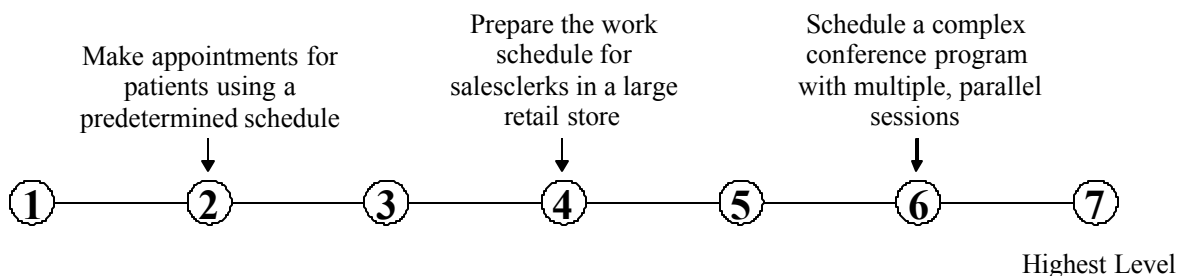
Scheduling events, programs, and activities, as well as the work of others.

A. How important is SCHEDULING WORK AND ACTIVITIES to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

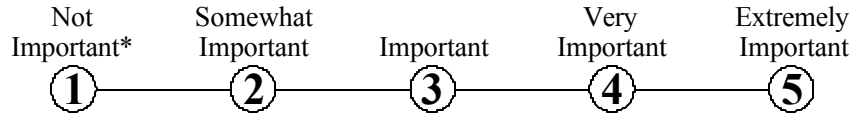
B. What level of SCHEDULING WORK AND ACTIVITIES is needed to perform *your current job*?



15. Organizing, Planning, and Prioritizing Work

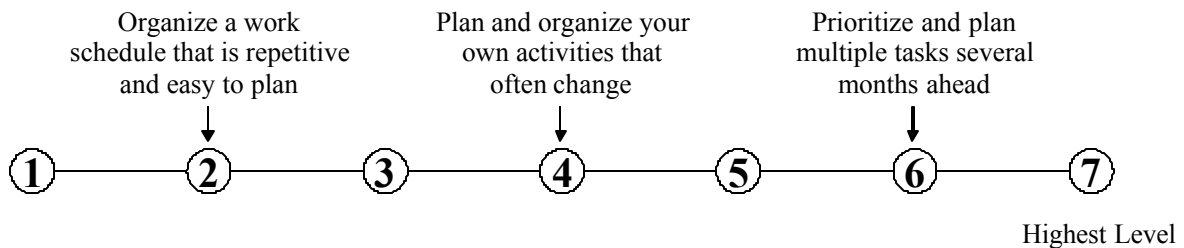
Developing specific goals and plans to prioritize, organize, and accomplish your work.

A. How important is ORGANIZING, PLANNING, AND PRIORITIZING WORK to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

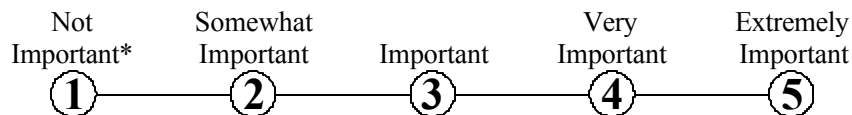
B. What level of ORGANIZING, PLANNING, AND PRIORITIZING WORK is needed to perform *your current job*?



16. Performing General Physical Activities

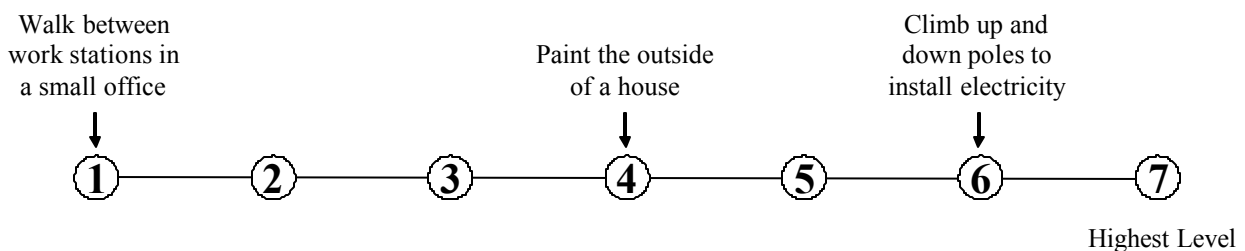
Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling materials.

A. How important is PERFORMING GENERAL PHYSICAL ACTIVITIES to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

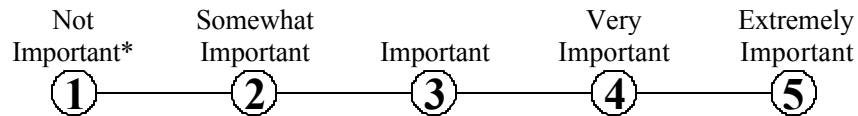
B. What level of PERFORMING GENERAL PHYSICAL ACTIVITIES is needed to perform *your current job*?



17. Handling and Moving Objects

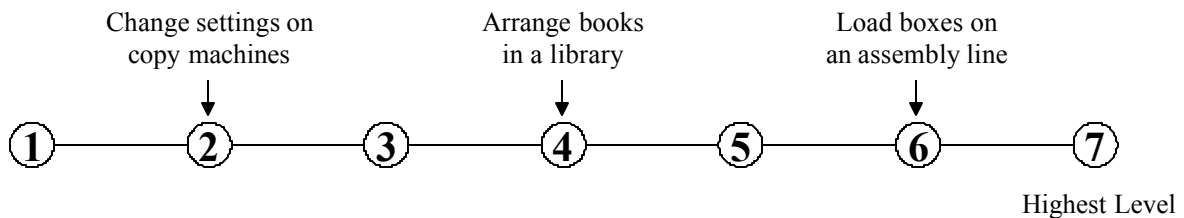
Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.

A. How important is HANDLING AND MOVING OBJECTS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

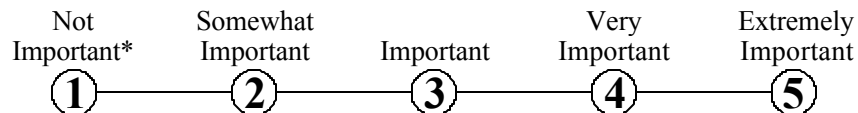
B. What level of HANDLING AND MOVING OBJECTS is needed to perform *your current job*?



18. Controlling Machines and Processes

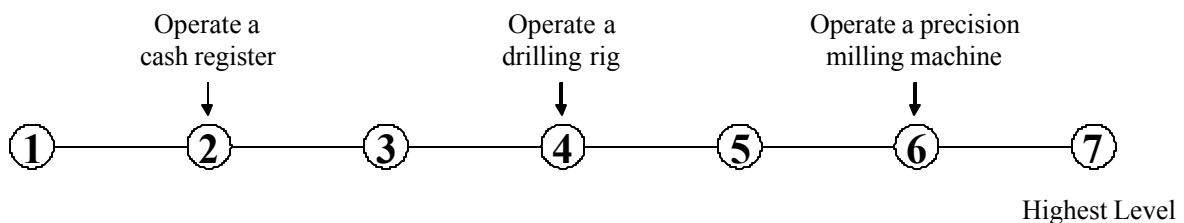
Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).

A. How important is CONTROLLING MACHINES AND PROCESSES to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

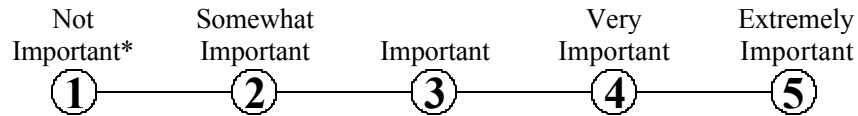
B. What level of CONTROLLING MACHINES AND PROCESSES is needed to perform *your current job*?



19. Working with Computers

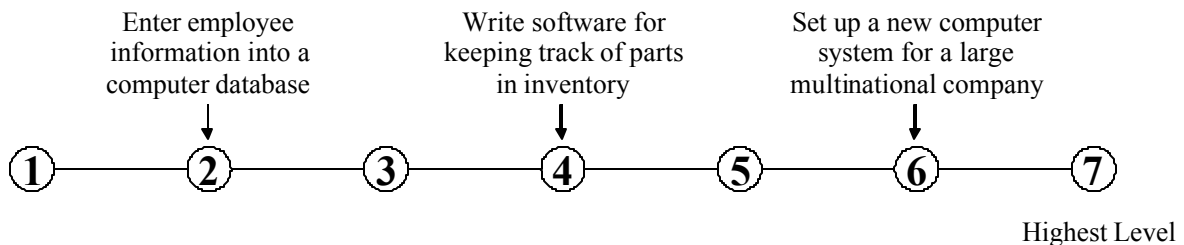
Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

A. How important is WORKING WITH COMPUTERS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

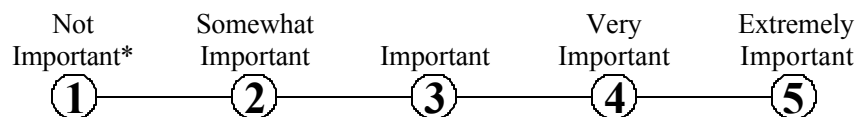
B. What level of WORKING WITH COMPUTERS is needed to perform *your current job*?



20. Operating Vehicles, Mechanized Devices, or Equipment

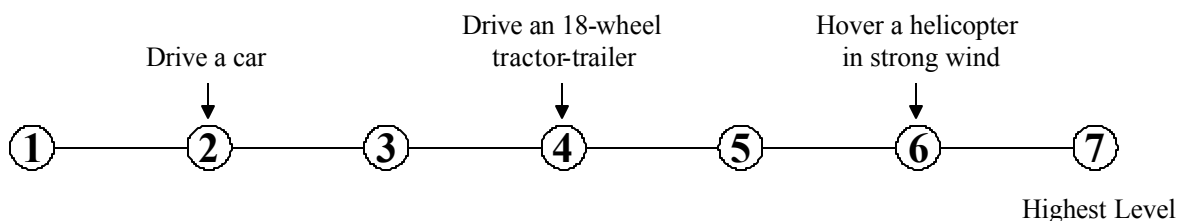
Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.

A. How important is OPERATING VEHICLES, MECHANIZED DEVICES, OR EQUIPMENT to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

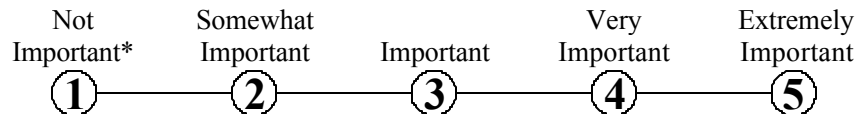
B. What level of OPERATING VEHICLES, MECHANIZED DEVICES, OR EQUIPMENT is needed to perform *your current job*?



21. Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment

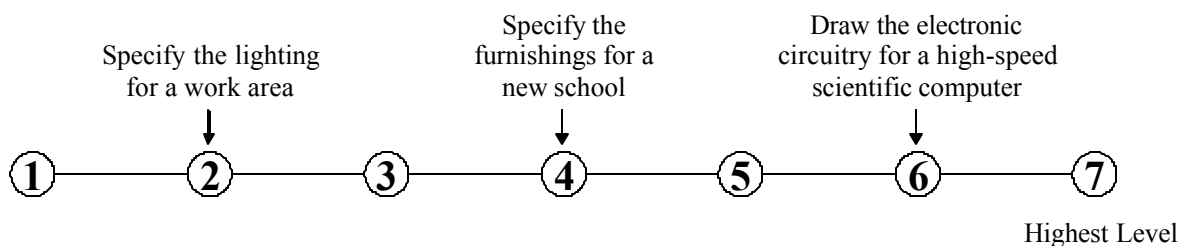
Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.

A. How **important** is DRAFTING, LAYING OUT, AND SPECIFYING TECHNICAL DEVICES, PARTS, AND EQUIPMENT to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

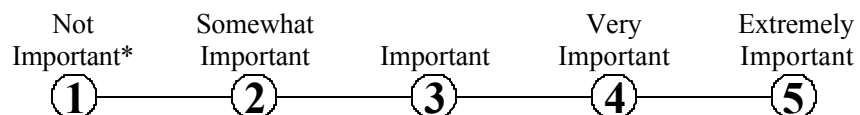
B. What **level** of DRAFTING, LAYING OUT, AND SPECIFYING TECHNICAL DEVICES, PARTS, AND EQUIPMENT is needed to perform *your current job*?



22. Repairing and Maintaining Mechanical Equipment

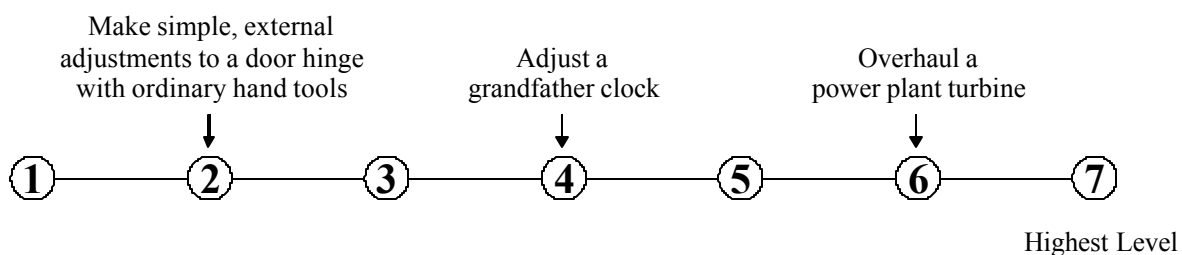
Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.

A. How **important** is REPAIRING AND MAINTAINING MECHANICAL EQUIPMENT to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

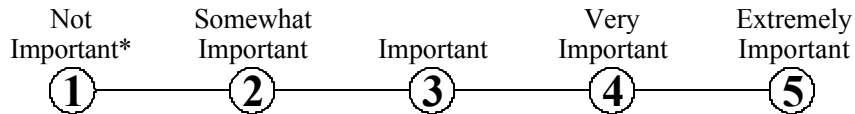
B. What **level** of REPAIRING AND MAINTAINING MECHANICAL EQUIPMENT is needed to perform *your current job*?



23. Repairing and Maintaining Electronic Equipment

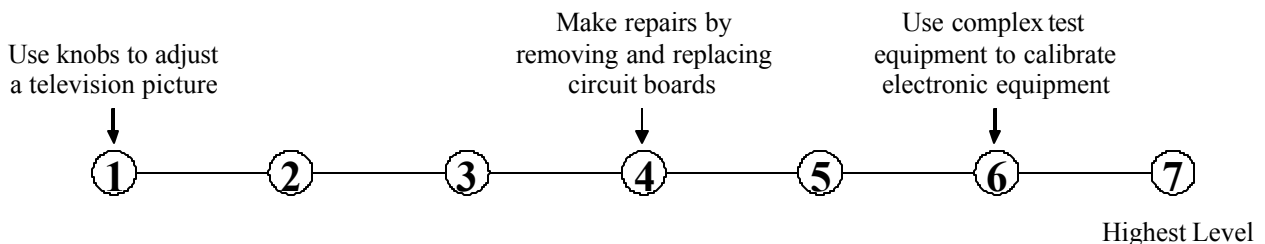
Servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.

A. How important is REPAIRING AND MAINTAINING ELECTRONIC EQUIPMENT to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

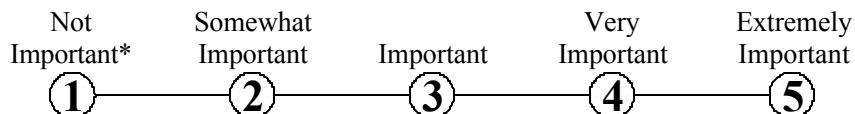
B. What level of REPAIRING AND MAINTAINING ELECTRONIC EQUIPMENT is needed to perform *your current job*?



24. Documenting/Recording Information

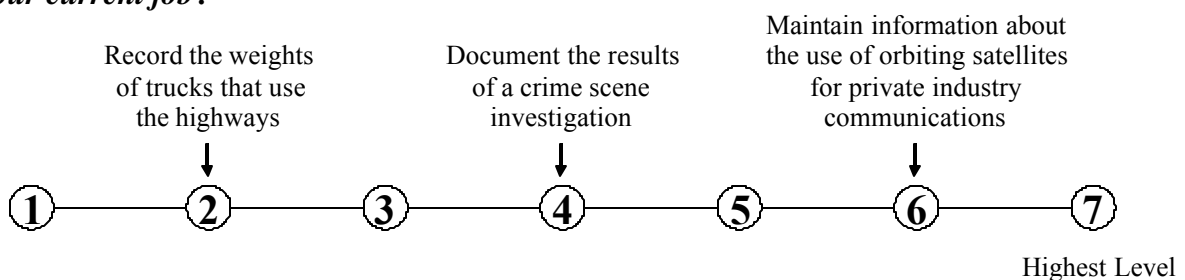
Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

A. How important is DOCUMENTING/RECORDING INFORMATION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

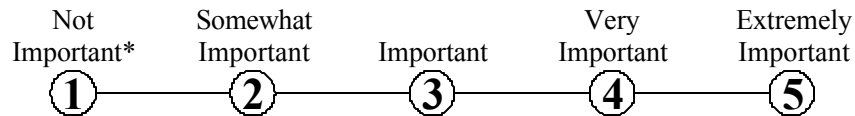
B. What level of DOCUMENTING/RECORDING INFORMATION is needed to perform *your current job*?



25. Interpreting the Meaning of Information for Others

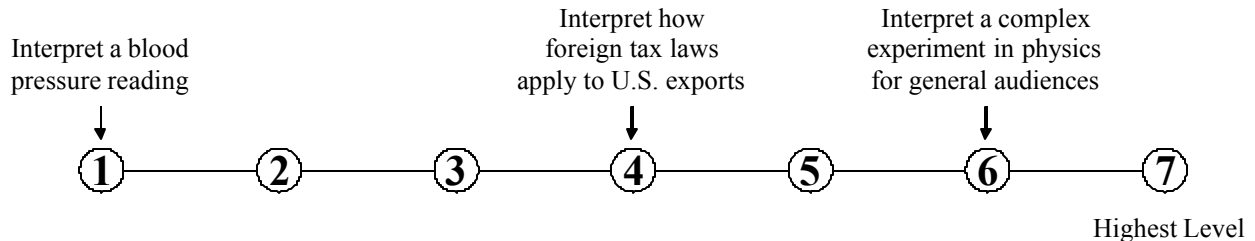
Translating or explaining what information means and how it can be used.

A. How important is INTERPRETING THE MEANING OF INFORMATION FOR OTHERS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

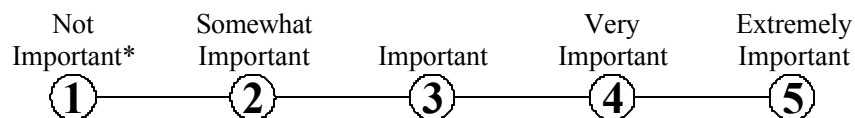
B. What level of INTERPRETING THE MEANING OF INFORMATION FOR OTHERS is needed to perform *your current job*?



26. Communicating with Supervisors, Peers, or Subordinates

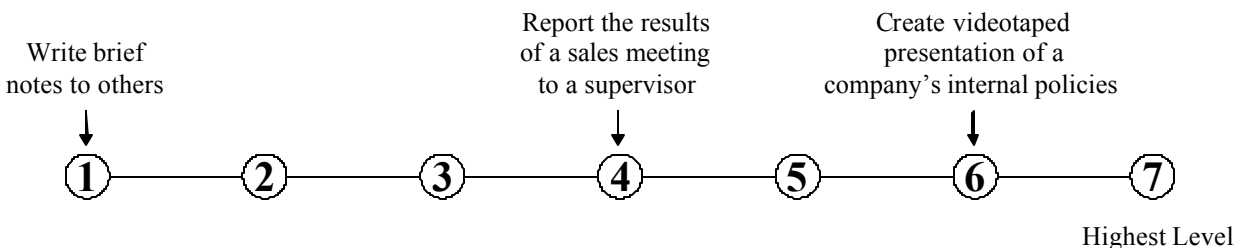
Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person.

A. How important is COMMUNICATING WITH SUPERVISORS, PEERS, OR SUBORDINATES to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

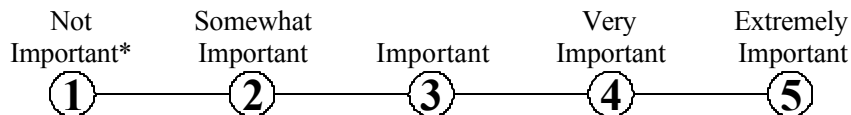
B. What level of COMMUNICATING WITH SUPERVISORS, PEERS, OR SUBORDINATES is needed to perform *your current job*?



27. Communicating with People Outside the Organization

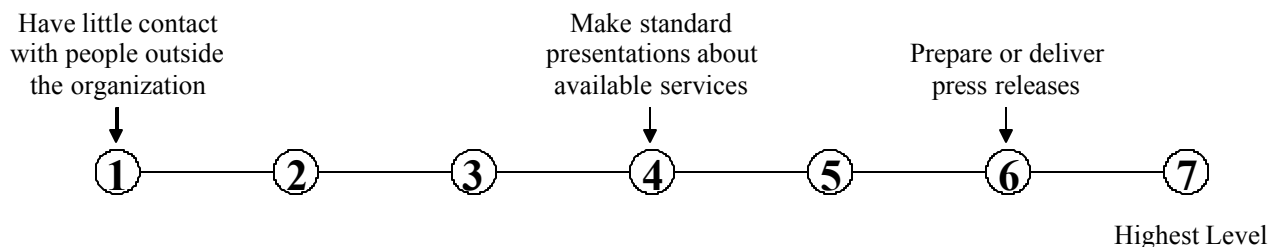
Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.

A. How **important** is COMMUNICATING WITH PEOPLE OUTSIDE THE ORGANIZATION to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

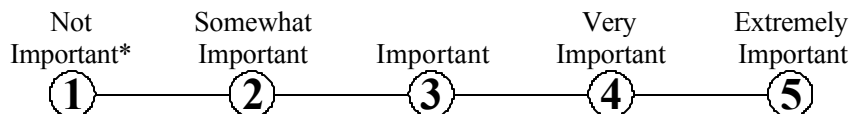
B. What **level** of COMMUNICATING WITH PEOPLE OUTSIDE THE ORGANIZATION is needed to perform *your current job*?



28. Establishing and Maintaining Interpersonal Relationships

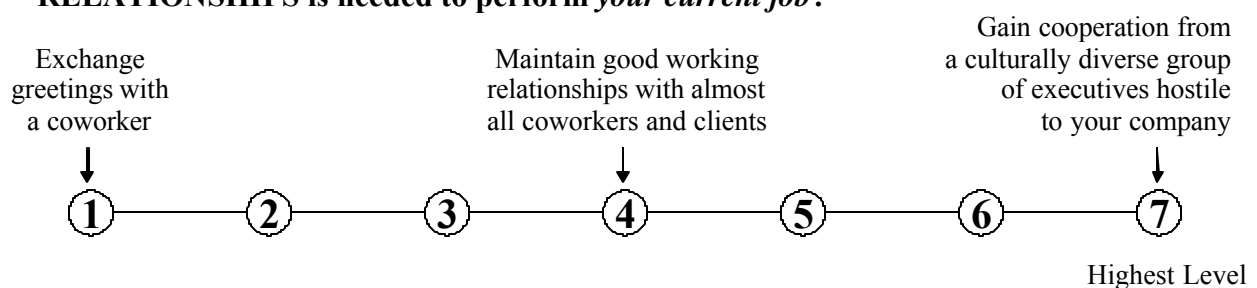
Developing constructive and cooperative working relationships with others and maintaining them over time.

A. How **important** is ESTABLISHING AND MAINTAINING INTERPERSONAL RELATIONSHIPS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

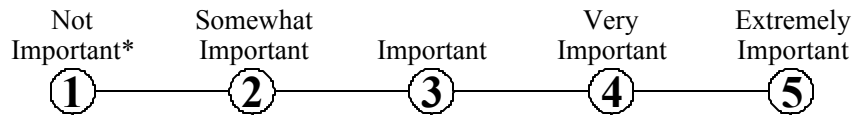
B. What **level** of ESTABLISHING AND MAINTAINING INTERPERSONAL RELATIONSHIPS is needed to perform *your current job*?



29. Assisting and Caring for Others

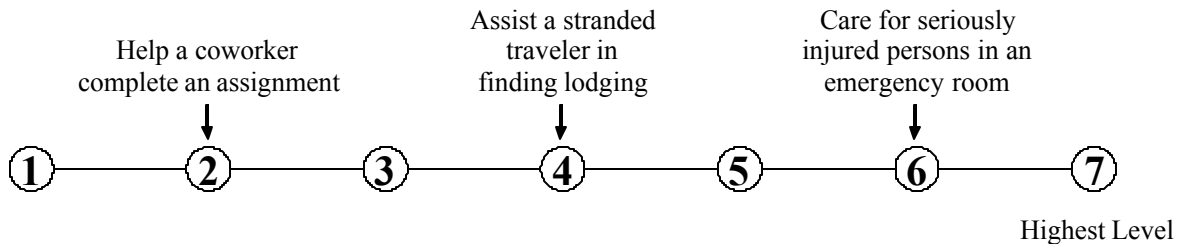
Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients.

A. How **important** is ASSISTING AND CARING FOR OTHERS to the performance of your current job?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

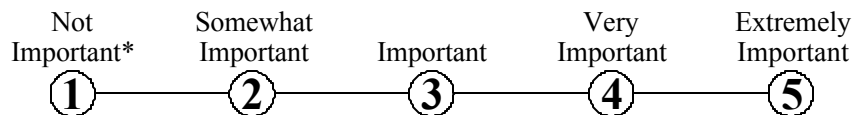
B. What **level** of ASSISTING AND CARING FOR OTHERS is needed to perform your current job?



30. Selling or Influencing Others

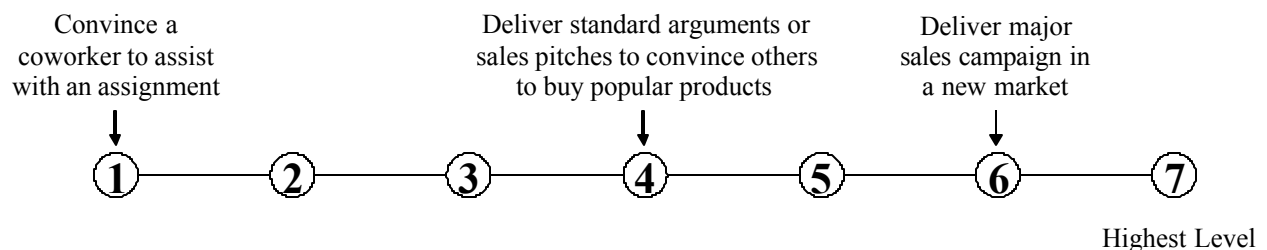
Convincing others to buy merchandise/goods or to otherwise change their minds or actions.

A. How **important** is SELLING OR INFLUENCING OTHERS to the performance of your current job?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

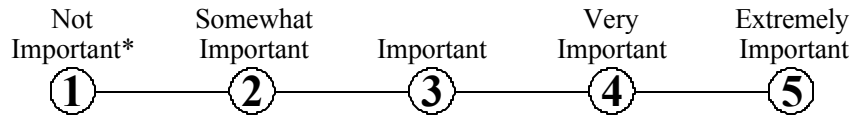
B. What **level** of SELLING OR INFLUENCING OTHERS is needed to perform your current job?



33. Coordinating the Work and Activities of Others

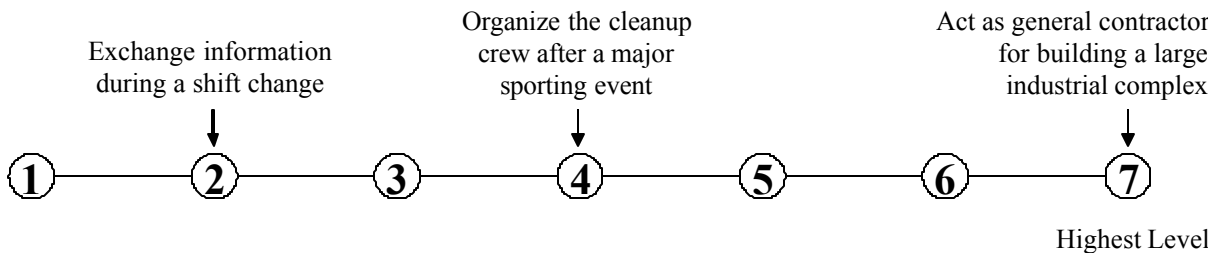
Getting members of a group to work together to accomplish tasks.

- A. How important is COORDINATING THE WORK AND ACTIVITIES OF OTHERS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

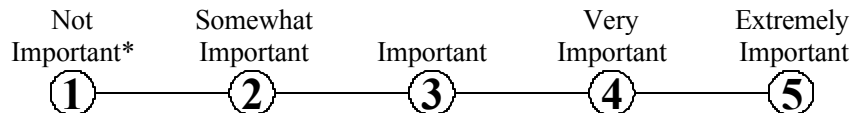
- B. What level of COORDINATING THE WORK AND ACTIVITIES OF OTHERS is needed to perform *your current job*?



34. Developing and Building Teams

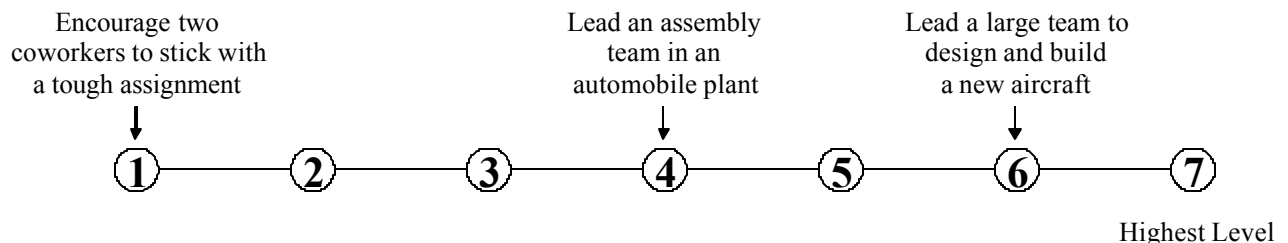
Encouraging and building mutual trust, respect, and cooperation among team members.

- A. How important is DEVELOPING AND BUILDING TEAMS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

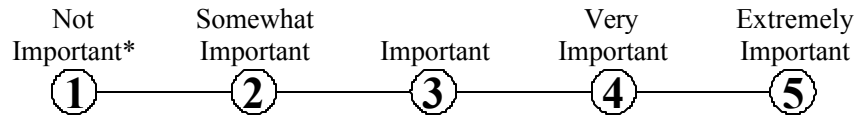
- B. What level of DEVELOPING AND BUILDING TEAMS is needed to perform *your current job*?



35. Training and Teaching Others

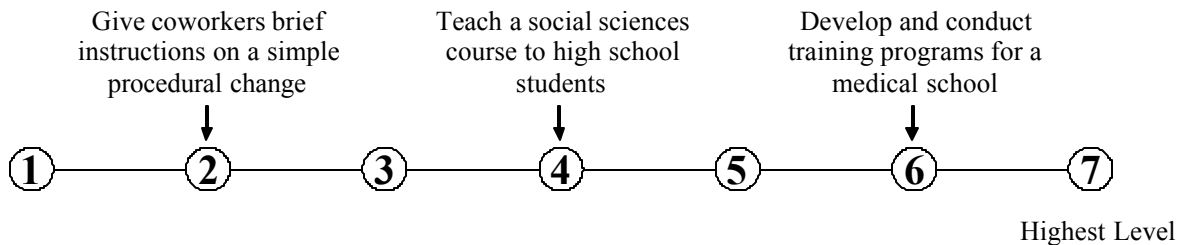
Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others.

A. How important is TRAINING AND TEACHING OTHERS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

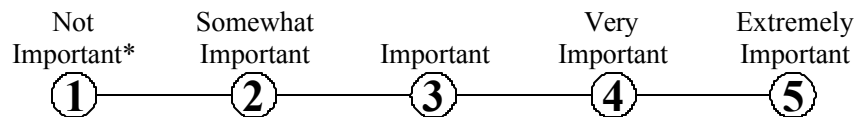
B. What level of TRAINING AND TEACHING OTHERS is needed to perform *your current job*?



36. Guiding, Directing, and Motivating Subordinates

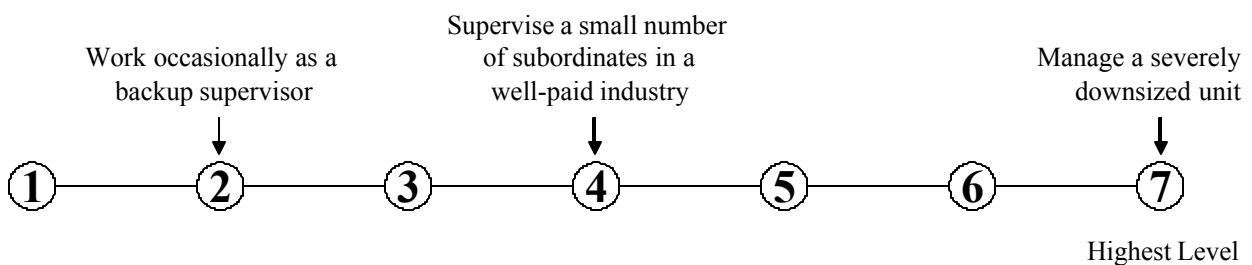
Providing guidance and direction to subordinates, including setting performance standards and monitoring performance.

A. How important is GUIDING, DIRECTING, AND MOTIVATING SUBORDINATES to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

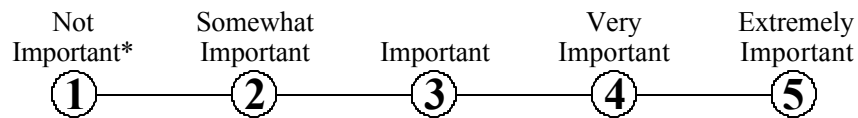
B. What level of GUIDING, DIRECTING, AND MOTIVATING SUBORDINATES is needed to perform *your current job*?



37. Coaching and Developing Others

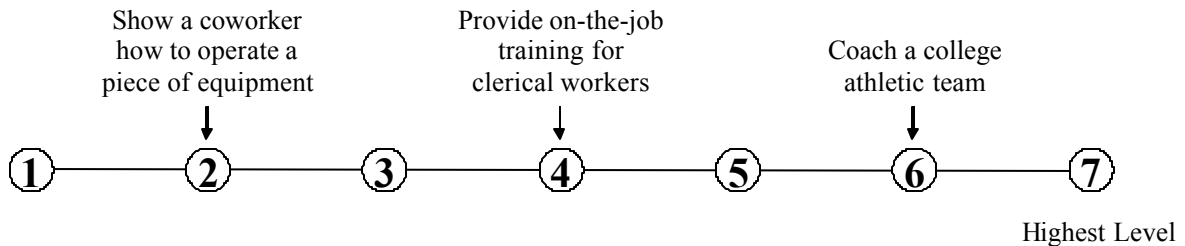
Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills.

A. How important is COACHING AND DEVELOPING OTHERS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

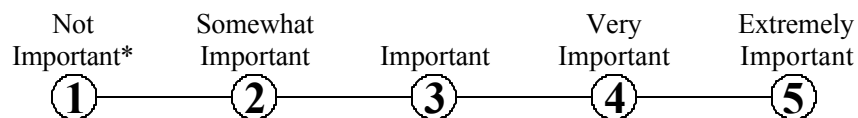
B. What level of COACHING AND DEVELOPING OTHERS is needed to perform *your current job*?



38. Providing Consultation and Advice to Others

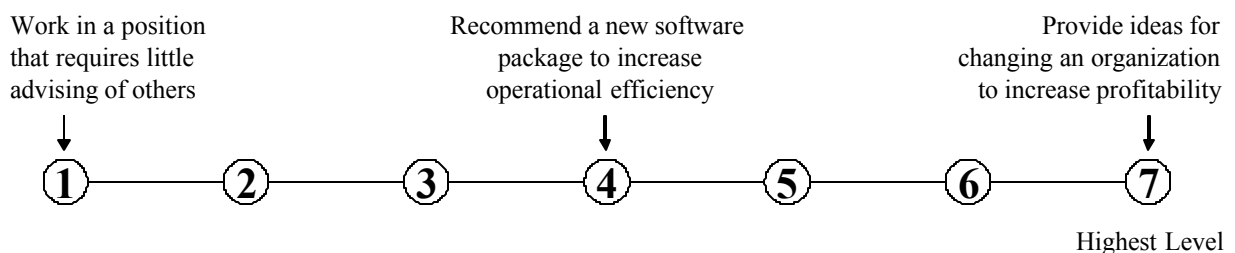
Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.

A. How important is PROVIDING CONSULTATION AND ADVICE TO OTHERS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

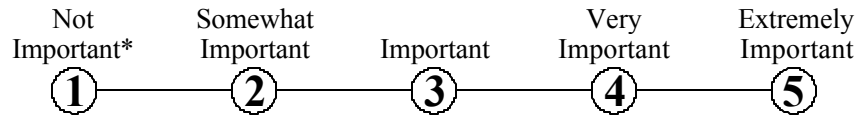
B. What level of PROVIDING CONSULTATION AND ADVICE TO OTHERS is needed to perform *your current job*?



39. Performing Administrative Activities

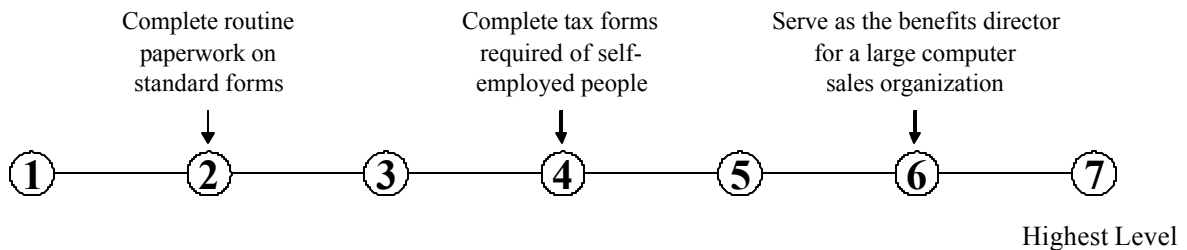
Performing day-to-day administrative tasks such as maintaining information files and processing paperwork.

A. How important is PERFORMING ADMINISTRATIVE ACTIVITIES to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

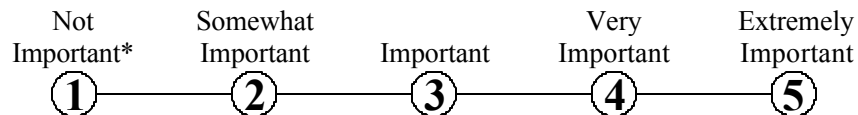
B. What level of PERFORMING ADMINISTRATIVE ACTIVITIES is needed to perform *your current job*?



40. Staffing Organizational Units

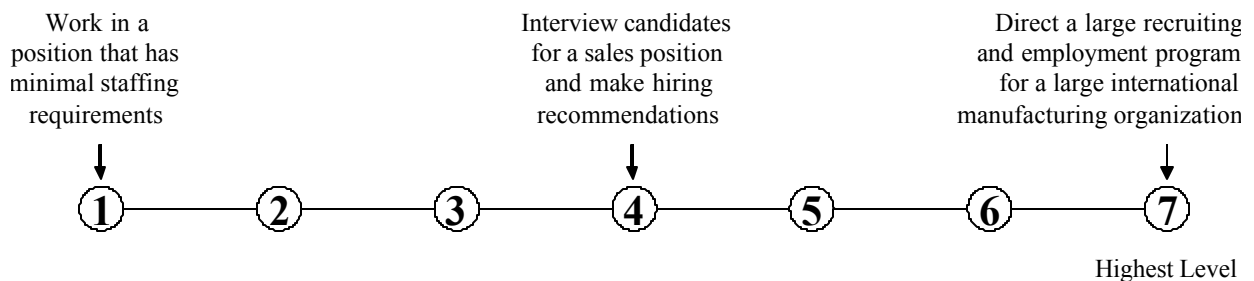
Recruiting, interviewing, selecting, hiring, and promoting employees in an organization.

A. How important is STAFFING ORGANIZATIONAL UNITS to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

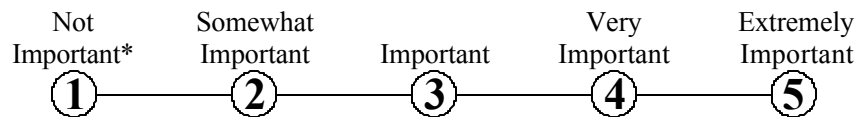
B. What level of STAFFING ORGANIZATIONAL UNITS is needed to perform *your current job*?



41. Monitoring and Controlling Resources

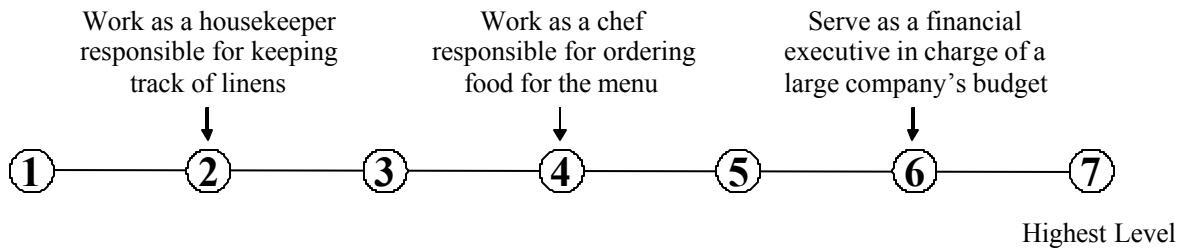
Monitoring and controlling resources and overseeing the spending of money.

A. How important is **MONITORING AND CONTROLLING RESOURCES** to the performance of *your current job*?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

B. What level of **MONITORING AND CONTROLLING RESOURCES** is needed to perform *your current job*?



Specific Tasks Performed on Your Job

Instructions: Please read the following position description and then answer the question that follows it by marking an X in the appropriate box below.

Registered Nurses

Assess patient health problems and needs, develop and implement nursing care plans, and maintain medical records. Administer nursing care to ill, injured, convalescent, or disabled patients. May advise patients on health maintenance and disease prevention or provide case management. Licensing or registration required. Include advance practice nurses such as: nurse practitioners, clinical nurse specialists, certified nurse midwives, and certified registered nurse anesthetists. Advanced practice nursing is practiced by RNs who have specialized formal, post-basic education and who function in highly autonomous and specialized roles.

Which of the following best describes how closely this description matches the duties and responsibilities of your current job?

- It describes almost exactly what I do.
- Most of it matches, but there are a few things that don't match what I do.
- Some things match, but most of it does not match what I do.
- It does not at all describe what I do.

Please proceed to the next page.

Specific Tasks Performed on Your Job (continued)

Instructions: The next section presents a list of tasks. A task is an action or set of actions performed together to accomplish an objective. This list is specific to the job you are describing.

For each task, please make the following three ratings: **Relevance, Frequency, and Importance.** These ratings are described as follows:

RELEVANCE. If the task is NOT RELEVANT at all to performance on the job, mark through the "0" in the NOT RELEVANT column. Carefully read the task before deciding whether it is RELEVANT or NOT RELEVANT to this job. If you select the "0" in the NOT RELEVANT column, however, there is no need to complete the IMPORTANCE and FREQUENCY ratings described below. If the task is part of this job, rate IMPORTANCE and FREQUENCY.

FREQUENCY. (Do not complete if NOT RELEVANT was selected.) Ask yourself, "How often is this task performed on this job?" For example, "Interact with potential customers" is a task that an employee in one job might perform only "once per week or less," but an employee in another job might perform "hourly or more often."

Rate the FREQUENCY with which a task is performed by marking through the appropriate number, from 1 (indicating that the task is performed once per year or less often) to 7 (indicating that the task is performed hourly or more often) on the FREQUENCY scale.

IMPORTANCE. (Do not complete if NOT RELEVANT was selected.) Ask yourself, "How important is this task to performance on this job?" For example, "Develop objectives and strategies to guide the organization" might be very important for an employee in one job, but less important for another job. For the second job, however, "Provide performance feedback to subordinates" might be very important.

Rate importance of the task for performance on the job by marking through the appropriate number, from 1 (indicating that the task is of no importance) to 5 (indicating that the task is extremely important) on the IMPORTANCE scale.

Please proceed to the next page.

Frequency

Importance

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
1. Consult and coordinate with health care team members to assess, plan, implement and evaluate patient care plans.	0	1	2	3	4	5	6	7	1	2	3	4	5
2. Maintain accurate, detailed reports and records.	0	1	2	3	4	5	6	7	1	2	3	4	5
3. Modify patient treatment plans as indicated by patients' responses and conditions.	0	1	2	3	4	5	6	7	1	2	3	4	5
4. Monitor all aspects of patient care, including diet and physical activity.	0	1	2	3	4	5	6	7	1	2	3	4	5
5. Monitor, record and report symptoms and changes in patients' conditions.	0	1	2	3	4	5	6	7	1	2	3	4	5
6. Observe nurses and visit patients to ensure that proper nursing care is provided.	0	1	2	3	4	5	6	7	1	2	3	4	5
7. Prepare patients for, and assist with, examinations and treatments.	0	1	2	3	4	5	6	7	1	2	3	4	5
8. Prepare rooms, sterile instruments, equipment and supplies, and ensure that stock of supplies is maintained.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
9. Provide health care, first aid, immunizations and assistance in convalescence and rehabilitation in locations such as schools, hospitals, and industry.	0	1	2	3	4	5	6	7	1	2	3	4	5
10. Record patients' medical information and vital signs.	0	1	2	3	4	5	6	7	1	2	3	4	5
11. Assess the needs of individuals, families and/or communities, including assessment of individuals' home and/or work environments to identify potential health or safety problems.	0	1	2	3	4	5	6	7	1	2	3	4	5
12. Conduct specified laboratory tests.	0	1	2	3	4	5	6	7	1	2	3	4	5
13. Consult with institutions or associations regarding issues and concerns relevant to the practice and profession of nursing.	0	1	2	3	4	5	6	7	1	2	3	4	5
14. Direct and supervise less skilled nursing/health care personnel, or supervise a particular unit on one shift.	0	1	2	3	4	5	6	7	1	2	3	4	5
15. Hand items to surgeons during operations.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
16. Instruct individuals, families and other groups on topics such as health education, disease prevention and childbirth, and develop health improvement programs.	0	1	2	3	4	5	6	7	1	2	3	4	5
17. Order, interpret, and evaluate diagnostic tests to identify and assess patient's condition.	0	1	2	3	4	5	6	7	1	2	3	4	5
18. Prescribe or recommend drugs, medical devices or other forms of treatment, such as physical therapy, inhalation therapy, or related therapeutic procedures.	0	1	2	3	4	5	6	7	1	2	3	4	5
19. Provide or arrange for training/instruction of auxiliary personnel or students.	0	1	2	3	4	5	6	7	1	2	3	4	5
20. Refer students or patients to specialized health resources or community agencies furnishing assistance.	0	1	2	3	4	5	6	7	1	2	3	4	5
21. Work with individuals, groups, and families to plan and implement programs designed to improve the overall health of communities.	0	1	2	3	4	5	6	7	1	2	3	4	5

Frequency

Importance

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
22. Administer local, inhalation, intravenous, and other anesthetics.	0	1	2	3	4	5	6	7	1	2	3	4	5
23. Contract independently to render nursing care, usually to one patient, in hospital or private home.	0	1	2	3	4	5	6	7	1	2	3	4	5
24. Deliver infants and provide prenatal and postpartum care and treatment under obstetrician's supervision.	0	1	2	3	4	5	6	7	1	2	3	4	5
25. Direct and coordinate infection control programs, advising and consulting with specified personnel about necessary precautions.	0	1	2	3	4	5	6	7	1	2	3	4	5
26. Engage in research activities related to nursing.	0	1	2	3	4	5	6	7	1	2	3	4	5
27. Inform physician of patient's condition during anesthesia.	0	1	2	3	4	5	6	7	1	2	3	4	5
28. Perform administrative and managerial functions, such as taking responsibility for a unit's staff, budget, planning, and long-range goals.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
	0	1	2	3	4	5	6	7	1	2	3	4	5
29. Perform physical examinations, make tentative diagnoses, and treat patients en route to hospitals or at disaster site triage centers.		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important

Frequency

Importance

	Not Relevant	Once per year or less More than once per year More than once per month More than once per week Daily Several times per day Hourly or more often	Not Important Somewhat Important Important Very Important Extremely Important
<p>Additional Relevant Tasks Please write in additional relevant tasks and provide a rating.</p> <p>1. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>2. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>3. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>4. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>5. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5

Information About You

Many workers are being asked to complete this survey. Your answers to these questions will help us know that workers with differing amounts of experience and different backgrounds are included.

Please read each question carefully and mark your answer by putting an **X** in the box beside your answer, or by writing an answer on the line provided.

1. What is the title of your current job? (PLEASE PRINT)

2. For how long have you worked at this job? (Mark one box)

- Ten years or more
- At least 6 years, but less than 10 years
- At least 3 years, but less than 6 years
- At least 1 year, but less than 3 years
- At least 3 months, but less than 12 months
- At least 1 month, but less than 3 months
- Less than 1 month

3. In your current job, are you employed by (Mark one box)

- Government
- Private for-profit company
- Nonprofit organization including tax exempt and charitable organizations
- Self-employed
- Family business

4. **If you are working in the family business, is this business incorporated?**

Yes

No

Not working in a family business

5. **In what year were you born?** 1 9

6. **Are you male or female?** (Mark one box)

Male

Female

7. **Are you Hispanic or Latino?** (Mark one box)

Yes

No

8. **What is your race?** (Mark one or more boxes)

American Indian or Alaska Native

Asian

Black or African American

Native Hawaiian or Other Pacific Islander

White

9. Do you have any of the following long-lasting conditions?

Yes No

- a. Blindness, deafness, or a severe vision or hearing impairment?.....

- b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?.....

10. Because of a physical, mental, or emotional condition lasting 6 months or more, do you have any difficulty doing any of the following activities?

Yes No

- a. Learning, remembering, or concentrating?

- b. Dressing, bathing, or getting around inside the home?

- c. Going outside the home alone to shop or visit a doctor's office?

- d. Working at a job or business?

11. Indicate the highest level of education that you have completed
(please check only one box):

- Less than a High School Diploma**
- High School Diploma** (or GED or High School Equivalence Certificate)
- Post-Secondary Certificate** - awarded for training completed after high school (for example, in Personnel Services, Engineering-related Technologies, Vocational Home Economics, Construction Trades, Mechanics and Repairers, Precision Production Trades)
- Some College Courses**
- Associate's Degree** (or other 2-year degree)
- Bachelor's Degree**
- Post-Baccalaureate Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Baccalaureate degree but do not meet the requirements of academic degrees carrying the title of Master.
- Master's Degree**
- Post-Master's Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Master's degree but do not meet the requirements of academic degrees at the doctoral level.
- First Professional Degree** - awarded for completion of a program that
 - requires at least 2 years of college work before entrance into the program,
 - includes a total of at least 6 academic years of work to complete, and
 - provides all remaining academic requirements to begin practice in a profession.
- Doctoral Degree**
- Post-Doctoral Training**

Your Association Memberships

Finally, we would like to know about the professional associations to which you belong.

1. Are you currently a member of the following professional association(s)? (Please respond for each association listed; if none are listed below, please skip to Question 2.)

American Nurses Association Yes No (13995)

Federation of Nurses and Health Professionals Yes No (14073)

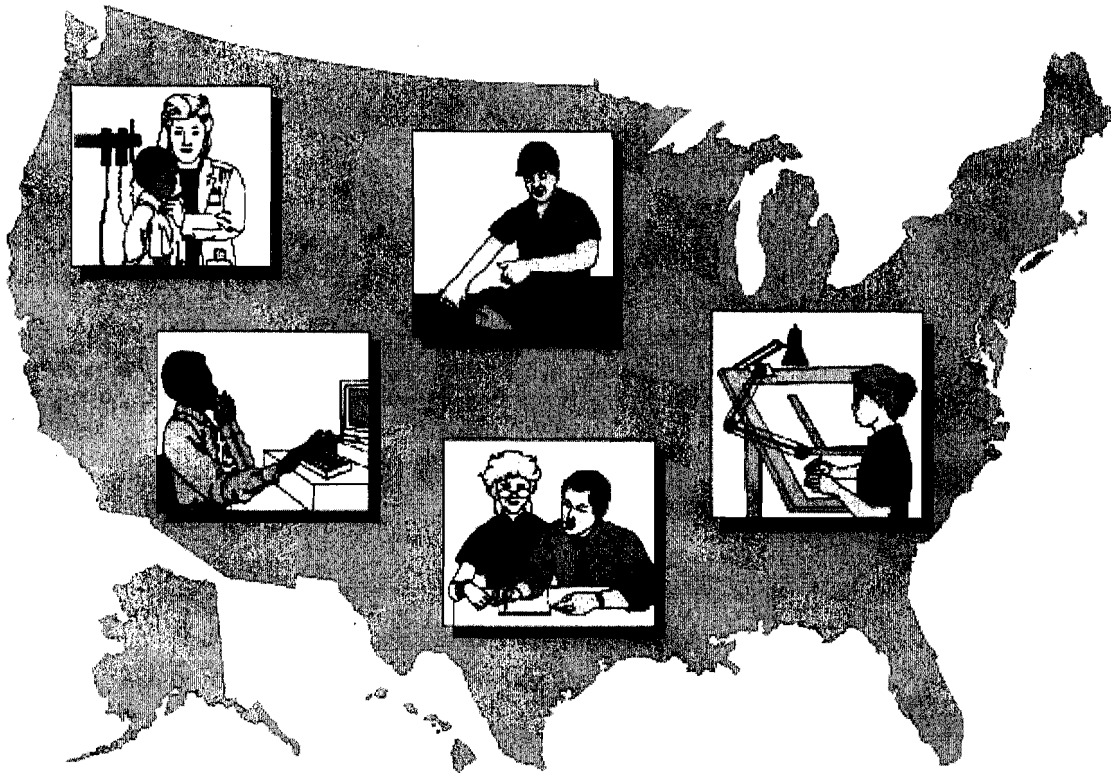
2. Please write in the names of any job-related associations to which you belong that are not listed above:

- a. _____
- b. _____
- c. _____

Form D
OMB#1205-0421
Expires: 12/31/2008
Ver.: 9/05

O=15642 C=62891 B=2619
(OCCUPATION NAME, ROSTER LINE NUMBER)
Web site username: (USERNAME)
Web site password: (PASSWORD)

Some Important Questions About The *Work Context* Of Your Occupation



Please return your completed questionnaire in the enclosed envelope to:

Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 2770

Sponsored by: The U.S. Department of Labor and the National O*NET Consortium

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number. Respondents' obligation to reply to these reporting requirements is voluntary. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the U.S. Department of Labor, Office of Workforce Investment, Attn: O*NET Project, Frances Perkins Building, Mail Stop S4231, 200 Constitution Ave., NW, Washington, DC 20210 (OMB Control Number 1205-0421).

Return to: Research Triangle Institute, PO Box 12194
Research Triangle Park, North Carolina, 27709-2194

Instructions for Work Context Questionnaire

Instructions

In this questionnaire you will be asked about your working conditions. These questions are about your work setting and its possible hazards, the pace of your work, and your dealings with other people.

Read each question carefully and look closely at answer choices after each question. Put an **X** through the number for the answer that best describes *your current job*.

For example:

<p><u>How many hours</u> do you work in a typical week?</p> <p>Less than 40 hours 40 hours More than 40 hours</p> <p>① ————— 2 ————— ③</p>
--

Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

1. How often does *your current job* require face-to-face discussions with individuals and within teams?

Never	Once a year or more but not every month	Once a month or more but not every week	Once a week or more but not every day	Every day
①	②	③	④	⑤

2. How frequently does *your current job* require public speaking (one speaker with an audience)?

Never	Once a year or more but not every month	Once a month or more but not every week	Once a week or more but not every day	Every day
①	②	③	④	⑤

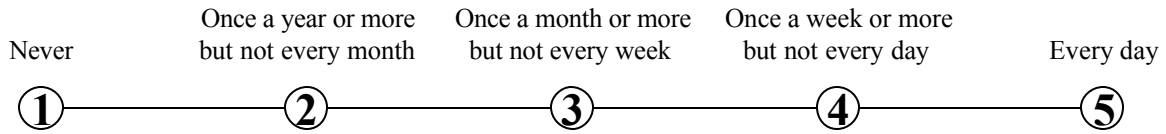
3. How frequently does *your current job* require telephone conversation?

Never	Once a year or more but not every month	Once a month or more but not every week	Once a week or more but not every day	Every day
①	②	③	④	⑤

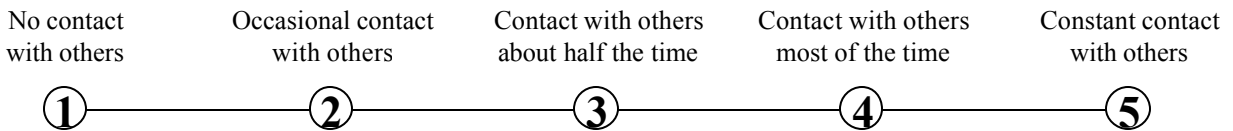
4. How frequently does *your current job* require electronic mail?

Never	Once a year or more but not every month	Once a month or more but not every week	Once a week or more but not every day	Every day
①	②	③	④	⑤

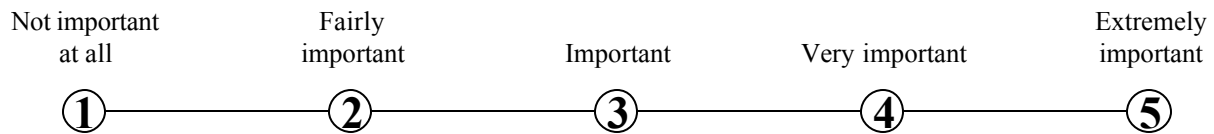
5. How frequently does *your current job* require written letters and memos?



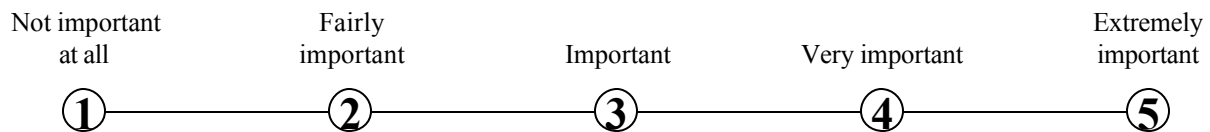
6. How much contact with others (by telephone, face-to-face, or otherwise) is required to perform *your current job*?



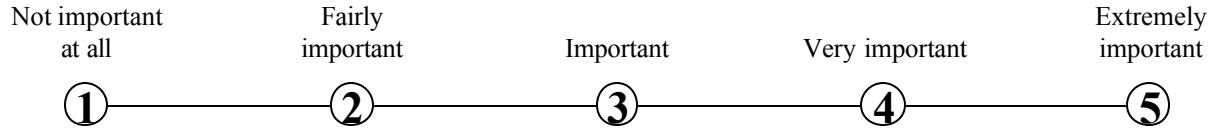
7. How important are interactions that require you to work with or contribute to a work group or team to perform *your current job*?



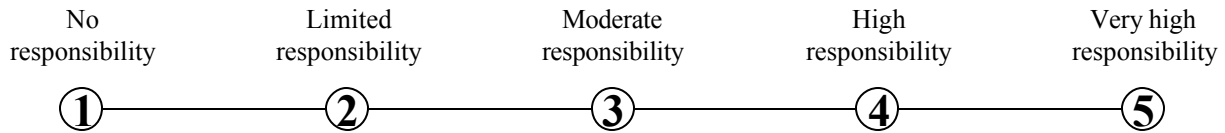
8. In *your current job*, how important are interactions that require you to deal with external customers (as in retail sales) or the public in general (as in police work)?



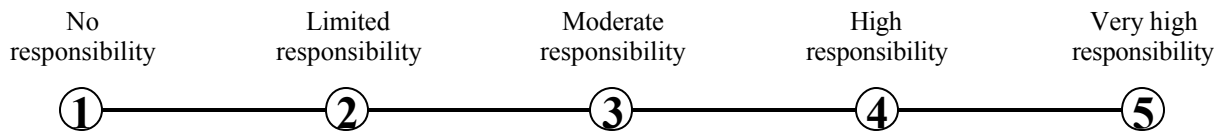
9. In *your current job*, how important are interactions that require you to coordinate or lead others in accomplishing work activities (not as a supervisor or team leader)?



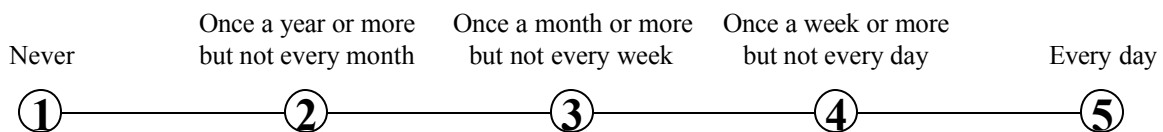
10. How responsible are you for the health and safety of other workers on *your current job*?



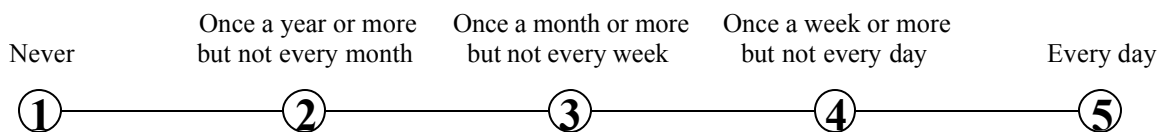
11. How responsible are you for work outcomes and results of other workers on *your current job*?



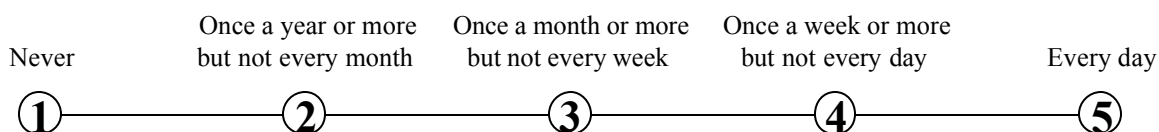
12. How often are conflict situations a part of *your current job*?



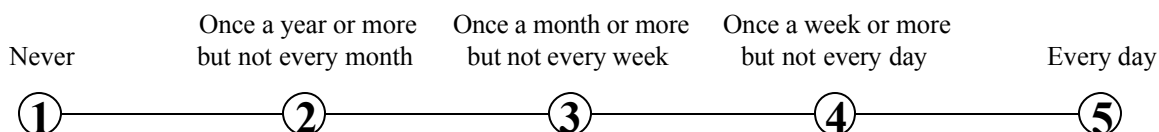
13. How often is dealing with unpleasant, angry, or discourteous people a part of *your current job*?



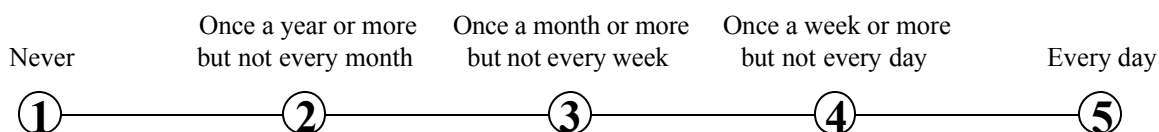
14. How often is dealing with violent or physically aggressive people a part of *your current job*?



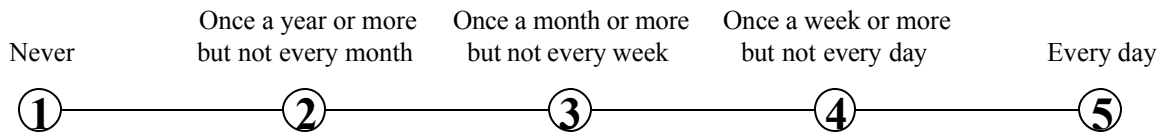
15. How often does *your current job* require you to work indoors in an environmentally controlled environment (like a warehouse with air conditioning)?



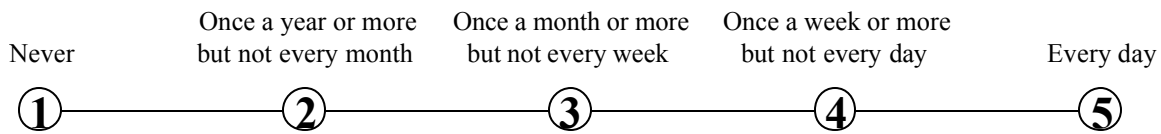
16. How often does *your current job* require you to work in an environment that is not environmentally controlled (like a warehouse without air conditioning)?



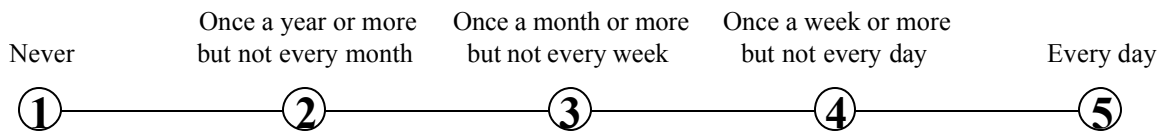
17. How often does *your current job* require you to work outdoors, exposed to all weather conditions?



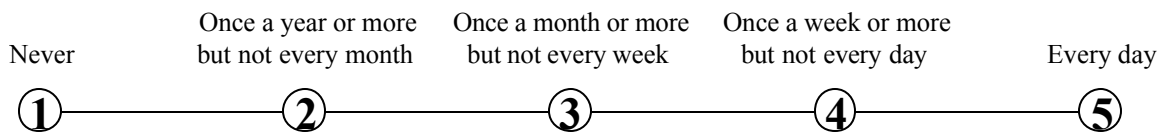
18. How often does *your current job* require you to work outdoors, under cover (like in an open shed)?



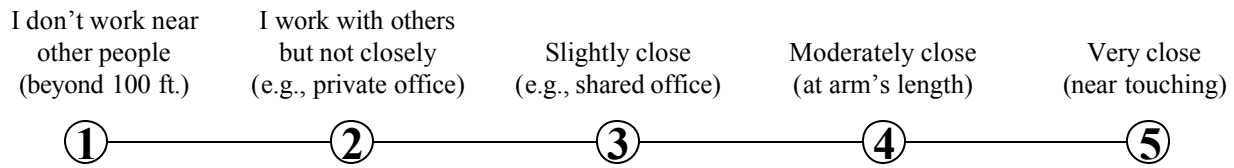
19. How often does *your current job* require you to work in an open vehicle or operating equipment (like a tractor)?



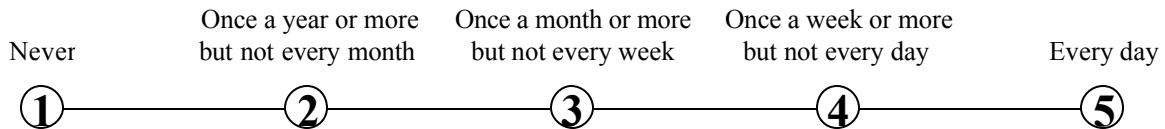
20. How often does *your current job* require you to work in a closed vehicle or operate enclosed equipment (like a car)?



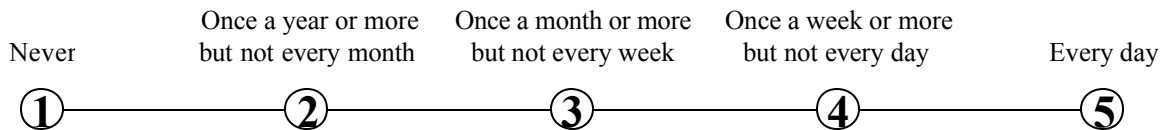
21. How physically close to other people are you when you perform *your current job*?



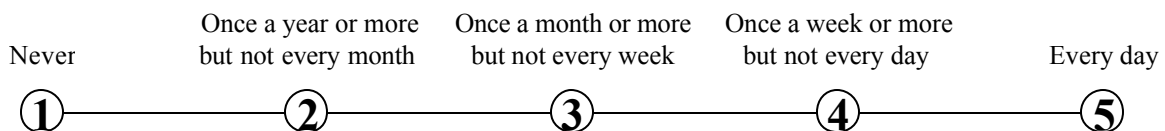
22. In *your current job*, how often are you exposed to sounds and noise levels that are distracting and uncomfortable?



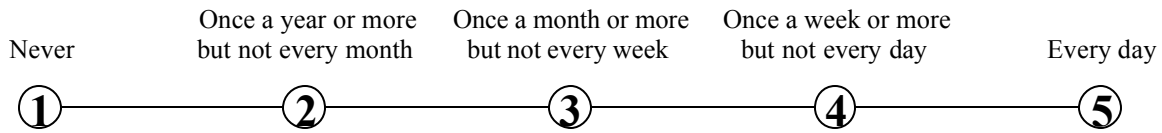
23. In *your current job*, how often are you exposed to very hot (above 90° F) or very cold (under 32° F) temperatures?



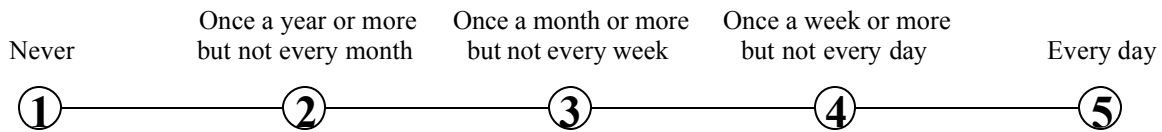
24. In *your current job*, how often are you exposed to extremely bright or inadequate lighting conditions?



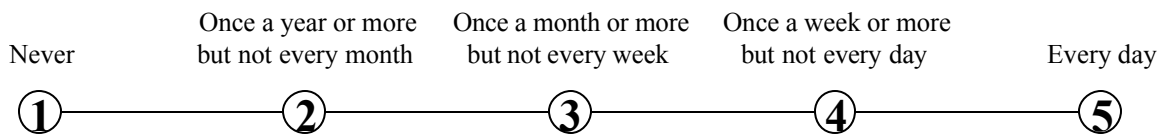
25. In *your current job*, how often are you exposed to contaminants (such as pollutants, gases, dust, or odors)?



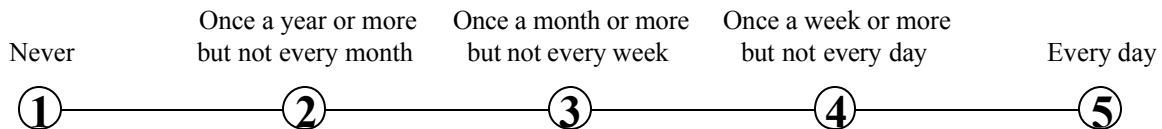
26. In *your current job*, how often are you exposed to cramped work space that requires getting into awkward positions?



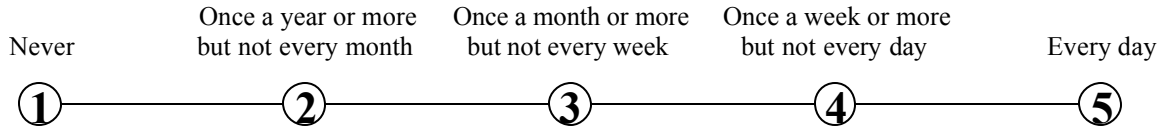
27. In *your current job*, how often are you exposed to whole body vibration (like operating a jackhammer or earth moving equipment)?



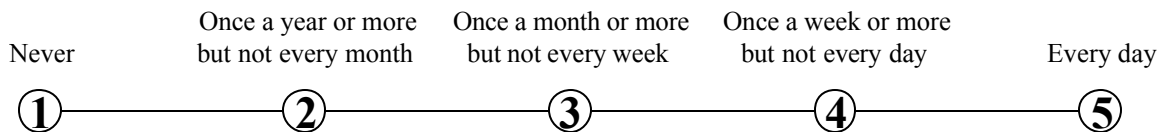
28. How often does *your current job* require that you be exposed to radiation?



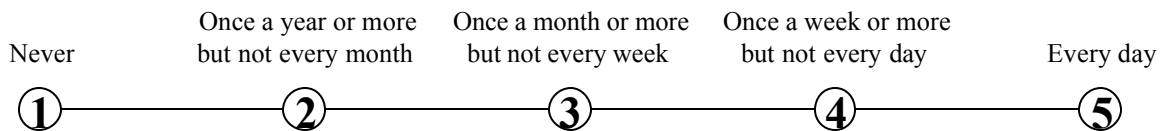
29. **How often does your current job require that you be exposed to diseases or infection?** This can happen with workers in patient care, some laboratory work, sanitation control, etc.



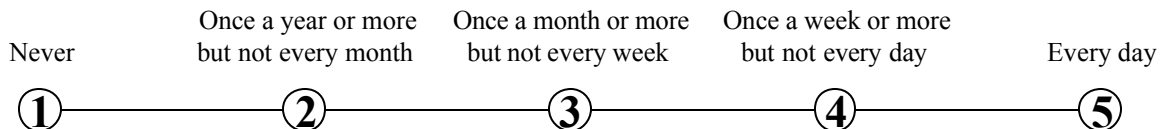
30. **How often does your current job require that you be exposed to high places?** This can happen for workers who work on poles, scaffolding, catwalks, or ladders longer than 8 feet in length.



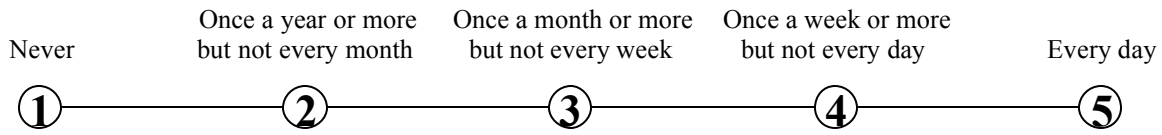
31. **How often does your current job require that you be exposed to hazardous conditions?** This can happen when working with high voltage electricity, flammable material, explosives, or chemicals. Do not include working with hazardous equipment.



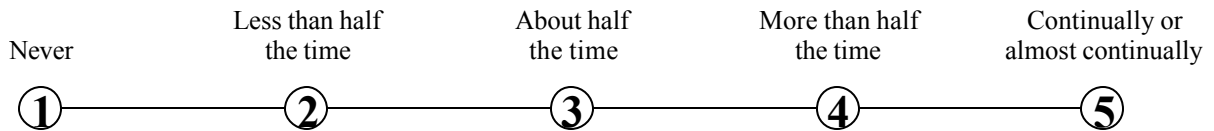
32. **How often does your current job require that you be exposed to hazardous equipment?** This includes working with saws, close to machinery with exposed moving parts, or working near vehicular traffic (but not including driving a vehicle).



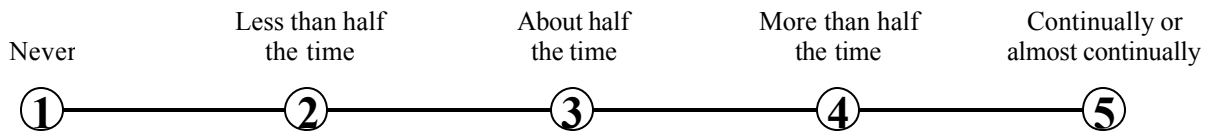
33. How often does *your current job* require that you be exposed to minor burns, cuts, bites, or stings?



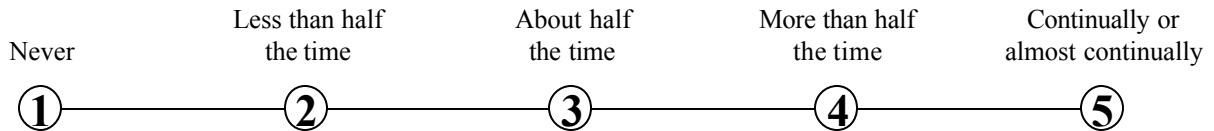
34. How much time in *your current job* do you spend sitting?



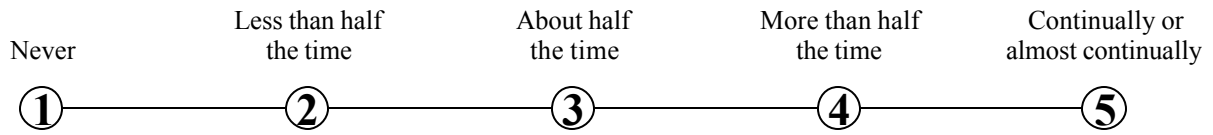
35. How much time in *your current job* do you spend standing?



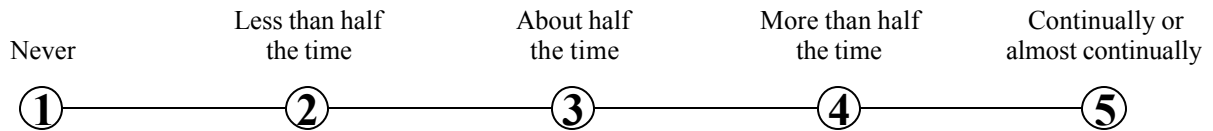
36. How much time in *your current job* do you spend climbing ladders, scaffolds, poles, etc.?



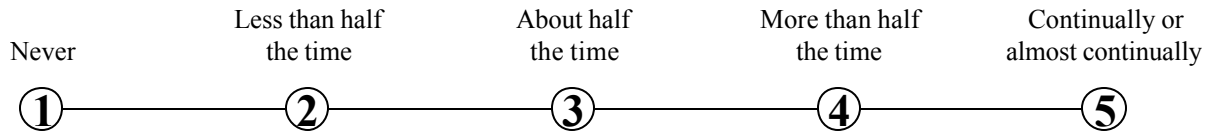
37. How much time in *your current job* do you spend walking or running?



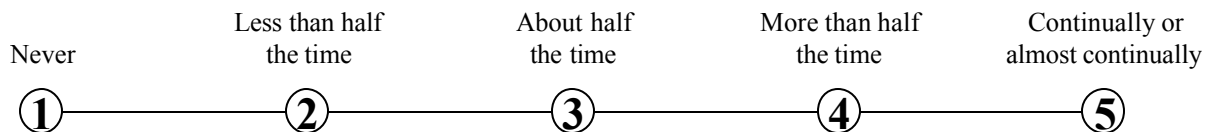
38. How much time in *your current job* do you spend kneeling, crouching, stooping, or crawling?



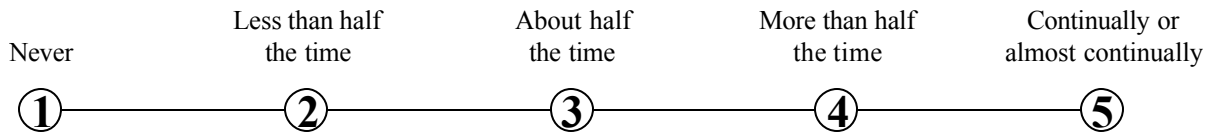
39. How much time in *your current job* do you spend keeping or regaining your balance?



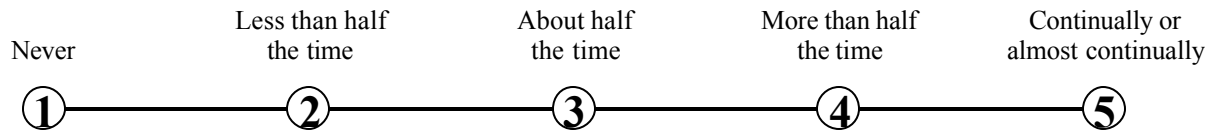
40. How much time in *your current job* do you spend using your hands to handle, control, or feel objects, tools, or controls?



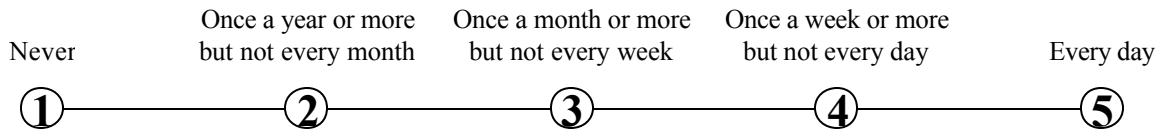
41. How much time in *your current job* do you spend bending or twisting your body?



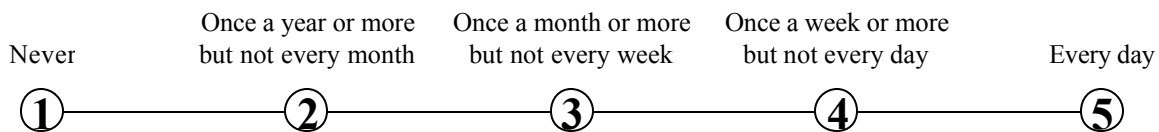
42. How much time in *your current job* do you spend making repetitive motions?



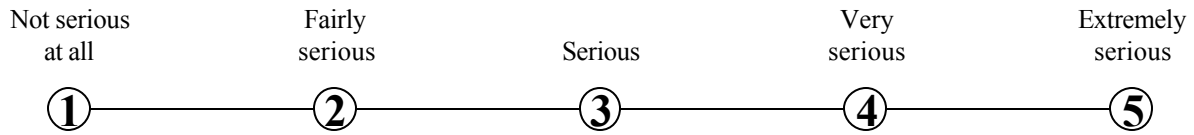
43. In *your current job*, how often do you wear common protective or safety equipment such as safety shoes, glasses, gloves, hearing protection, hard hats, or life jackets?



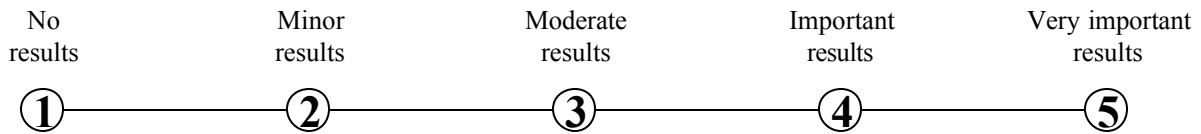
44. In *your current job*, how often do you wear specialized protective or safety equipment, such as breathing apparatus, safety harness, full protection suits, or radiation protection?



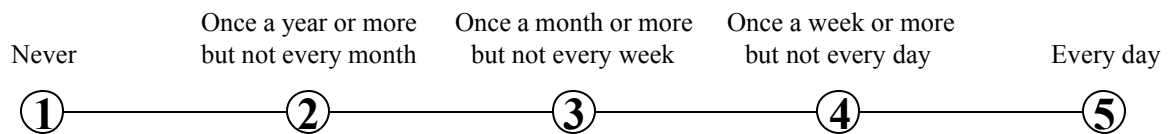
45. **How serious a mistake can you make on *your current job* (one you can't easily correct)?**



46. **In your current job, what results do your decisions usually have on other people or the image or reputation or financial resources of your employer?**



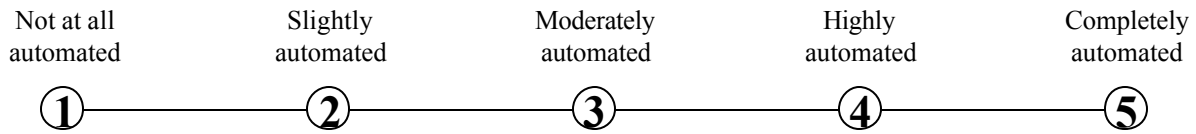
47. **In your current job, how often do your decisions affect other people or the image or reputation or financial resources of your employer?**



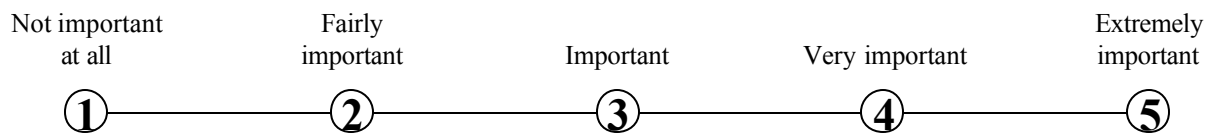
48. **In your current job, how much freedom do you have to make decisions without supervision?**



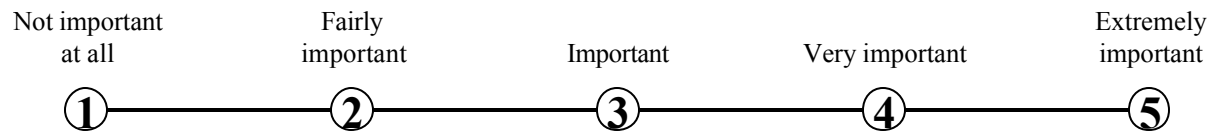
49. How automated is your current job?



50. How important to your current job is being very exact or highly accurate?



51. How important to your current job are continuous, repetitious physical activities (like key entry) or mental activities (like checking entries in a ledger)?



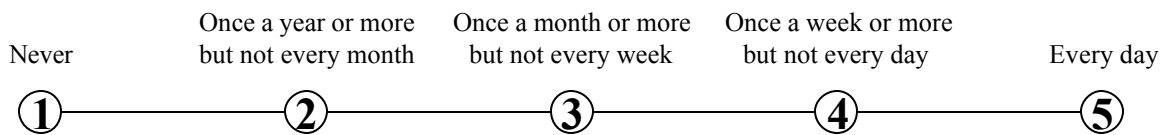
52. How much freedom do you have to determine the tasks, priorities, or goals of your current job?



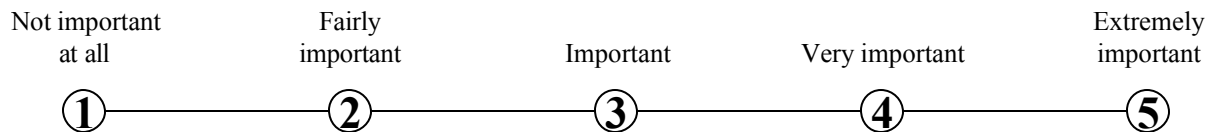
53. How competitive is *your current job*?



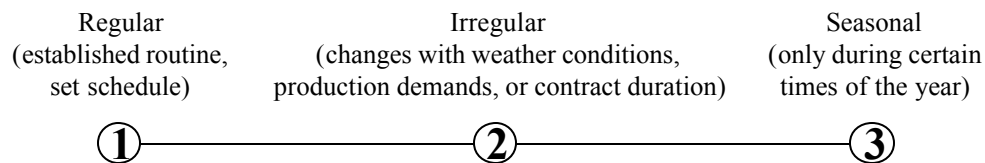
54. How often does *your current job* require you to meet strict deadlines?



55. How important to *your current job* is keeping a pace set by machinery or equipment?



56. How regular is your work schedule on *your current job*?



57. How many hours do you work in a typical week on *your current job*?

Less than 40 hours

40 hours

More than 40 hours

①

②

③

Specific Tasks Performed on Your Job

Instructions: Please read the following position description and then answer the question that follows it by marking an X in the appropriate box below.

Registered Nurses

Assess patient health problems and needs, develop and implement nursing care plans, and maintain medical records. Administer nursing care to ill, injured, convalescent, or disabled patients. May advise patients on health maintenance and disease prevention or provide case management. Licensing or registration required. Include advance practice nurses such as: nurse practitioners, clinical nurse specialists, certified nurse midwives, and certified registered nurse anesthetists. Advanced practice nursing is practiced by RNs who have specialized formal, post-basic education and who function in highly autonomous and specialized roles.

Which of the following best describes how closely this description matches the duties and responsibilities of your current job?

- It describes almost exactly what I do.
- Most of it matches, but there are a few things that don't match what I do.
- Some things match, but most of it does not match what I do.
- It does not at all describe what I do.

Please proceed to the next page.

Specific Tasks Performed on Your Job (continued)

Instructions: The next section presents a list of tasks. A task is an action or set of actions performed together to accomplish an objective. This list is specific to the job you are describing.

For each task, please make the following three ratings: **Relevance, Frequency, and Importance.** These ratings are described as follows:

RELEVANCE. If the task is NOT RELEVANT at all to performance on the job, mark through the "0" in the NOT RELEVANT column. Carefully read the task before deciding whether it is RELEVANT or NOT RELEVANT to this job. If you select the "0" in the NOT RELEVANT column, however, there is no need to complete the IMPORTANCE and FREQUENCY ratings described below. If the task is part of this job, rate IMPORTANCE and FREQUENCY.

FREQUENCY. (Do not complete if NOT RELEVANT was selected.) Ask yourself, "How often is this task performed on this job?" For example, "Interact with potential customers" is a task that an employee in one job might perform only "once per week or less," but an employee in another job might perform "hourly or more often."

Rate the FREQUENCY with which a task is performed by marking through the appropriate number, from 1 (indicating that the task is performed once per year or less often) to 7 (indicating that the task is performed hourly or more often) on the FREQUENCY scale.

IMPORTANCE. (Do not complete if NOT RELEVANT was selected.) Ask yourself, "How important is this task to performance on this job?" For example, "Develop objectives and strategies to guide the organization" might be very important for an employee in one job, but less important for another job. For the second job, however, "Provide performance feedback to subordinates" might be very important.

Rate importance of the task for performance on the job by marking through the appropriate number, from 1 (indicating that the task is of no importance) to 5 (indicating that the task is extremely important) on the IMPORTANCE scale.

Please proceed to the next page.

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
1. Consult and coordinate with health care team members to assess, plan, implement and evaluate patient care plans.	0	1	2	3	4	5	6	7	1	2	3	4	5
2. Maintain accurate, detailed reports and records.	0	1	2	3	4	5	6	7	1	2	3	4	5
3. Modify patient treatment plans as indicated by patients' responses and conditions.	0	1	2	3	4	5	6	7	1	2	3	4	5
4. Monitor all aspects of patient care, including diet and physical activity.	0	1	2	3	4	5	6	7	1	2	3	4	5
5. Monitor, record and report symptoms and changes in patients' conditions.	0	1	2	3	4	5	6	7	1	2	3	4	5
6. Observe nurses and visit patients to ensure that proper nursing care is provided.	0	1	2	3	4	5	6	7	1	2	3	4	5
7. Prepare patients for, and assist with, examinations and treatments.	0	1	2	3	4	5	6	7	1	2	3	4	5
8. Prepare rooms, sterile instruments, equipment and supplies, and ensure that stock of supplies is maintained.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
9. Provide health care, first aid, immunizations and assistance in convalescence and rehabilitation in locations such as schools, hospitals, and industry.	0	1	2	3	4	5	6	7	1	2	3	4	5
10. Record patients' medical information and vital signs.	0	1	2	3	4	5	6	7	1	2	3	4	5
11. Assess the needs of individuals, families and/or communities, including assessment of individuals' home and/or work environments to identify potential health or safety problems.	0	1	2	3	4	5	6	7	1	2	3	4	5
12. Conduct specified laboratory tests.	0	1	2	3	4	5	6	7	1	2	3	4	5
13. Consult with institutions or associations regarding issues and concerns relevant to the practice and profession of nursing.	0	1	2	3	4	5	6	7	1	2	3	4	5
14. Direct and supervise less skilled nursing/health care personnel, or supervise a particular unit on one shift.	0	1	2	3	4	5	6	7	1	2	3	4	5
15. Hand items to surgeons during operations.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
16. Instruct individuals, families and other groups on topics such as health education, disease prevention and childbirth, and develop health improvement programs.	0	1	2	3	4	5	6	7	1	2	3	4	5
17. Order, interpret, and evaluate diagnostic tests to identify and assess patient's condition.	0	1	2	3	4	5	6	7	1	2	3	4	5
18. Prescribe or recommend drugs, medical devices or other forms of treatment, such as physical therapy, inhalation therapy, or related therapeutic procedures.	0	1	2	3	4	5	6	7	1	2	3	4	5
19. Provide or arrange for training/instruction of auxiliary personnel or students.	0	1	2	3	4	5	6	7	1	2	3	4	5
20. Refer students or patients to specialized health resources or community agencies furnishing assistance.	0	1	2	3	4	5	6	7	1	2	3	4	5
21. Work with individuals, groups, and families to plan and implement programs designed to improve the overall health of communities.	0	1	2	3	4	5	6	7	1	2	3	4	5

Frequency

Importance

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
22. Administer local, inhalation, intravenous, and other anesthetics.	0	1	2	3	4	5	6	7	1	2	3	4	5
23. Contract independently to render nursing care, usually to one patient, in hospital or private home.	0	1	2	3	4	5	6	7	1	2	3	4	5
24. Deliver infants and provide prenatal and postpartum care and treatment under obstetrician's supervision.	0	1	2	3	4	5	6	7	1	2	3	4	5
25. Direct and coordinate infection control programs, advising and consulting with specified personnel about necessary precautions.	0	1	2	3	4	5	6	7	1	2	3	4	5
26. Engage in research activities related to nursing.	0	1	2	3	4	5	6	7	1	2	3	4	5
27. Inform physician of patient's condition during anesthesia.	0	1	2	3	4	5	6	7	1	2	3	4	5
28. Perform administrative and managerial functions, such as taking responsibility for a unit's staff, budget, planning, and long-range goals.	0	1	2	3	4	5	6	7	1	2	3	4	5

	Not Relevant	Frequency							Importance				
	0	1	2	3	4	5	6	7	1	2	3	4	5
29. Perform physical examinations, make tentative diagnoses, and treat patients en route to hospitals or at disaster site triage centers.		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important

Frequency

Importance

	Not Relevant	Once per year or less More than once per year More than once per month More than once per week Daily Several times per day Hourly or more often	Not Important Somewhat Important Important Very Important Extremely Important
<p>Additional Relevant Tasks Please write in additional relevant tasks and provide a rating.</p> <p>1. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>2. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>3. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>4. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5
<p>5. _____ _____ _____</p>	0	1 2 3 4 5 6 7	1 2 3 4 5

Information About You

Many workers are being asked to complete this survey. Your answers to these questions will help us know that workers with differing amounts of experience and different backgrounds are included.

Please read each question carefully and mark your answer by putting an **X** in the box beside your answer, or by writing an answer on the line provided.

1. What is the title of your current job? (PLEASE PRINT)

2. For how long have you worked at this job? (Mark one box)

- Ten years or more
- At least 6 years, but less than 10 years
- At least 3 years, but less than 6 years
- At least 1 year, but less than 3 years
- At least 3 months, but less than 12 months
- At least 1 month, but less than 3 months
- Less than 1 month

3. In your current job, are you employed by (Mark one box)

- Government
- Private for-profit company
- Nonprofit organization including tax exempt and charitable organizations
- Self-employed
- Family business

4. **If you are working in the family business, is this business incorporated?**

Yes

No

Not working in a family business

5. **In what year were you born?** 1 9

6. **Are you male or female?** (Mark one box)

Male

Female

7. **Are you Hispanic or Latino?** (Mark one box)

Yes

No

8. **What is your race?** (Mark one or more boxes)

American Indian or Alaska Native

Asian

Black or African American

Native Hawaiian or Other Pacific Islander

White

9. Do you have any of the following long-lasting conditions?

Yes No

- a. Blindness, deafness, or a severe vision or hearing impairment?.....

- b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?.....

10. Because of a physical, mental, or emotional condition lasting 6 months or more, do you have any difficulty doing any of the following activities?

Yes No

- a. Learning, remembering, or concentrating?

- b. Dressing, bathing, or getting around inside the home?

- c. Going outside the home alone to shop or visit a doctor's office?

- d. Working at a job or business?

11. Indicate the highest level of education that you have completed
(please check only one box):

- Less than a High School Diploma**
- High School Diploma** (or GED or High School Equivalence Certificate)
- Post-Secondary Certificate** - awarded for training completed after high school (for example, in Personnel Services, Engineering-related Technologies, Vocational Home Economics, Construction Trades, Mechanics and Repairers, Precision Production Trades)
- Some College Courses**
- Associate's Degree** (or other 2-year degree)
- Bachelor's Degree**
- Post-Baccalaureate Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Baccalaureate degree but do not meet the requirements of academic degrees carrying the title of Master.
- Master's Degree**
- Post-Master's Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Master's degree but do not meet the requirements of academic degrees at the doctoral level.
- First Professional Degree** - awarded for completion of a program that
 - requires at least 2 years of college work before entrance into the program,
 - includes a total of at least 6 academic years of work to complete, and
 - provides all remaining academic requirements to begin practice in a profession.
- Doctoral Degree**
- Post-Doctoral Training**

Your Association Memberships

Finally, we would like to know about the professional associations to which you belong.

1. Are you currently a member of the following professional association(s)? (Please respond for each association listed; if none are listed below, please skip to Question 2.)

American Nurses Association Yes No (13995)

Federation of Nurses and Health Professionals Yes No (14073)

2. Please write in the names of any job-related associations to which you belong that are not listed above:

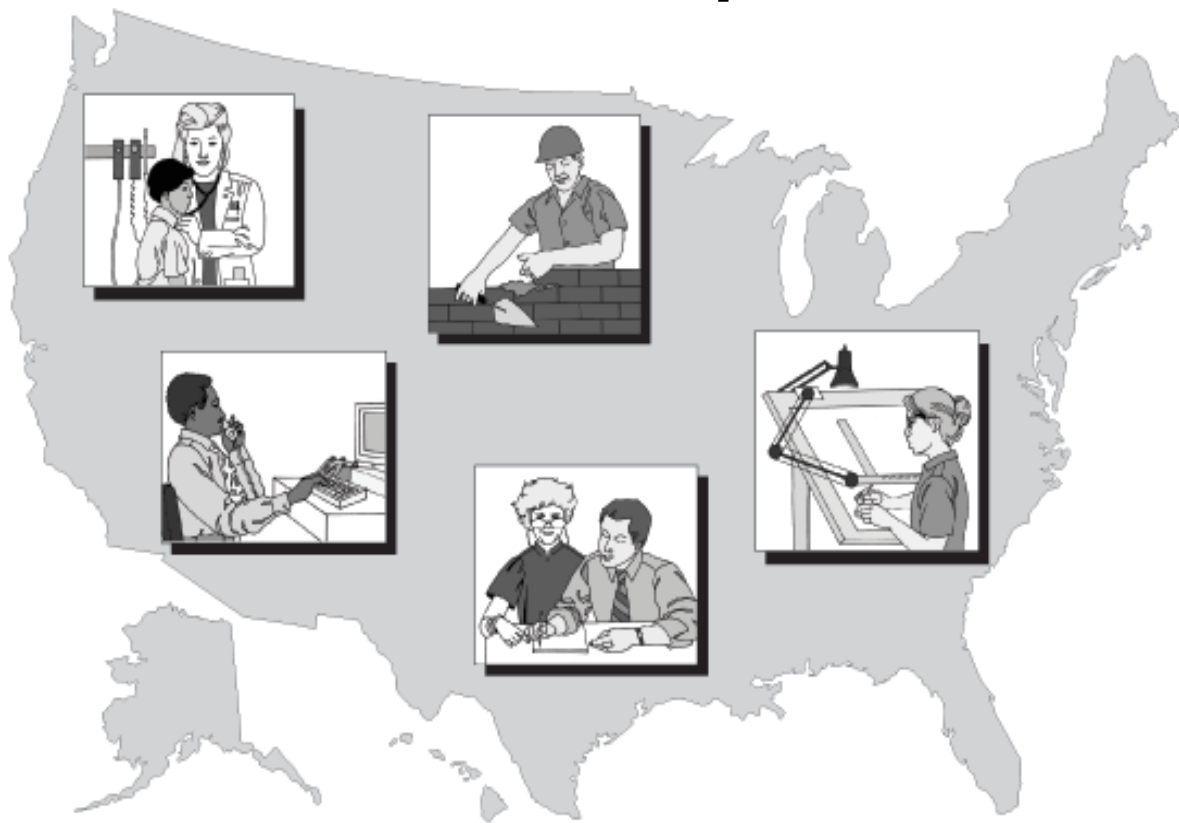
- a. _____
- b. _____
- c. _____

Occupation Expert Method Questionnaires

As mentioned in the Supporting Statement, each Occupation Expert will be asked to complete all five of the following questionnaires.

Form E
OMB#1205-0421
Expires: 12/31/2008
Ver.: 9/05

Some Important Questions About The *Knowledge* Required For The Occupation



Please return your completed questionnaire in the enclosed envelope to:
Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 27709-2194
Sponsored by: The U.S. Department of Labor and the National O*NET Consortium

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number. Respondents' obligation to reply to these reporting requirements is voluntary. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the U.S. Department of Labor, Office of Workforce Investment, Attn: O*NET Project, Frances Perkins Building, Mail Stop S4231, 200 Constitution Ave., NW, Washington, DC 20210 (OMB Control Number 1205-0421).

Return to: Research Triangle Institute, PO Box 12194
Research Triangle Park, North Carolina, 27709-2194

Instructions for Making Knowledge Ratings

These questions are about work-related areas of knowledge. **Knowledge areas** are sets of facts and principles needed to address problems and issues that are part of a job. You will be asked about a series of different areas of knowledge and how they relate to workers in the occupation. As an occupational expert, first consider the different knowledge areas needed by workers to perform the occupation. Then, with this information in mind, please answer each question as if you were performing work that is typical of the occupation.

Each knowledge area in this questionnaire is named and defined.

For example:

Economics and Accounting

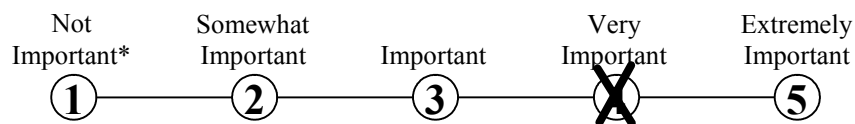
Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.

You are then asked two questions about each knowledge area:

A How important is the knowledge area to the performance of the occupation?

For example:

How important is ECONOMICS AND ACCOUNTING knowledge to the performance of the occupation?



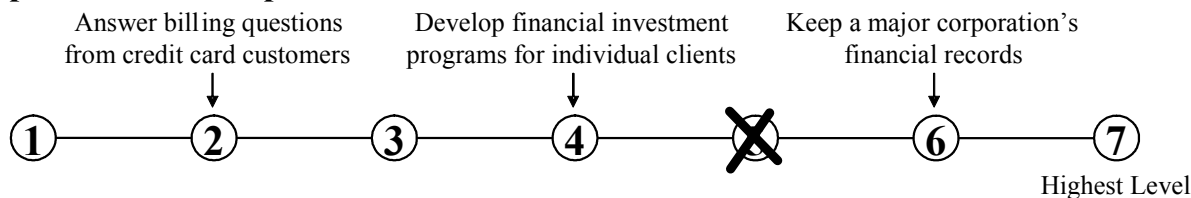
Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

***If you rate the knowledge area as Not Important to the performance of the occupation, mark the one [~~X~~] then skip over question B and proceed to the next knowledge area.**

B What level of the knowledge is needed to perform the occupation?

To help you understand what we mean by level, we provide you with examples of job-related activities at different levels. For example:

What level of ECONOMICS AND ACCOUNTING knowledge is needed to perform the occupation?

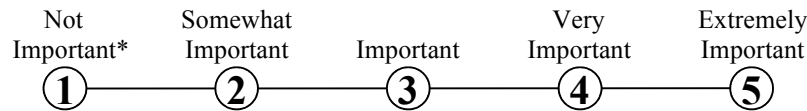


Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

1. Administration and Management

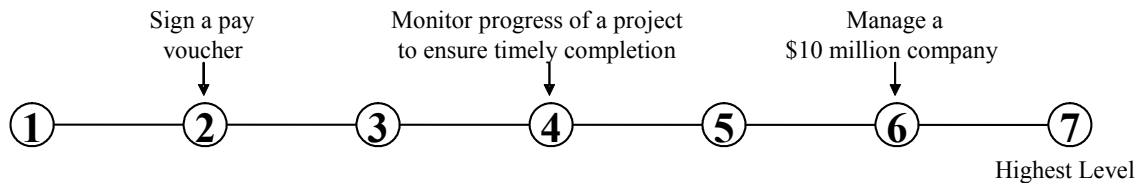
Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

- A. How important is ADMINISTRATION AND MANAGEMENT knowledge to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

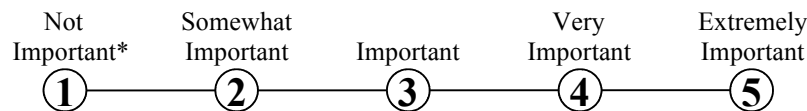
- B. What level of ADMINISTRATION AND MANAGEMENT knowledge is needed to perform the occupation?



2. Clerical

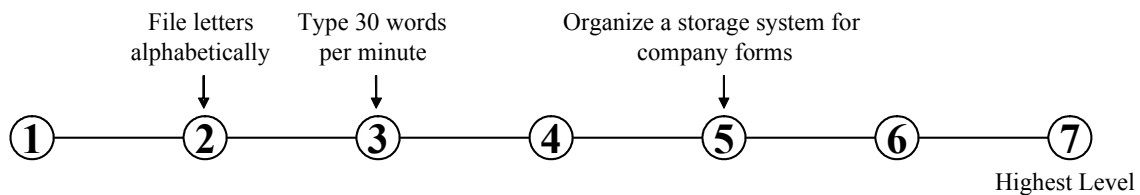
Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.

- A. How important is CLERICAL knowledge to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

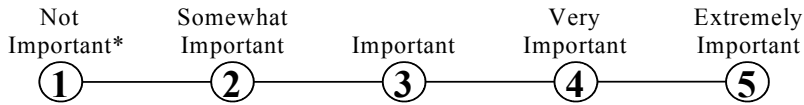
- B. What level of CLERICAL knowledge is needed to perform the occupation?



3. Economics and Accounting

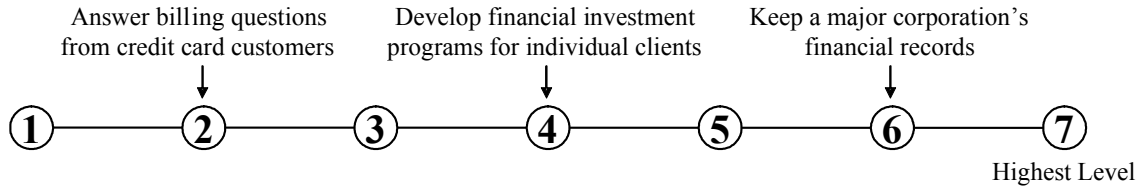
Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.

A. How important is ECONOMICS AND ACCOUNTING knowledge to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

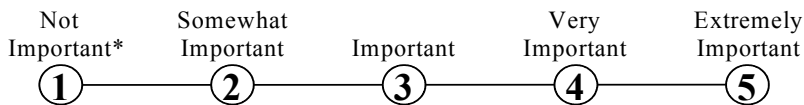
B. What level of ECONOMICS AND ACCOUNTING knowledge is needed to perform the occupation?



4. Sales and Marketing

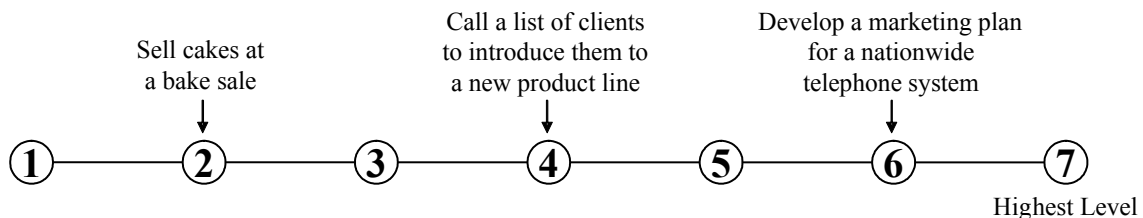
Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

A. How important is SALES AND MARKETING knowledge to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

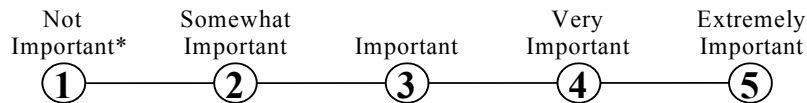
B. What level of SALES AND MARKETING knowledge is needed to perform the occupation?



5. Customer and Personal Service

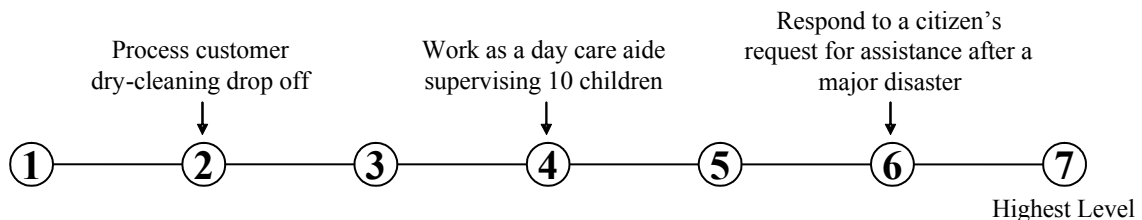
Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

- A. How important is CUSTOMER AND PERSONAL SERVICE knowledge to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

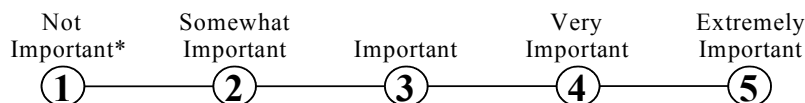
- B. What level of CUSTOMER AND PERSONAL SERVICE knowledge is needed to perform the occupation?



6. Personnel and Human Resources

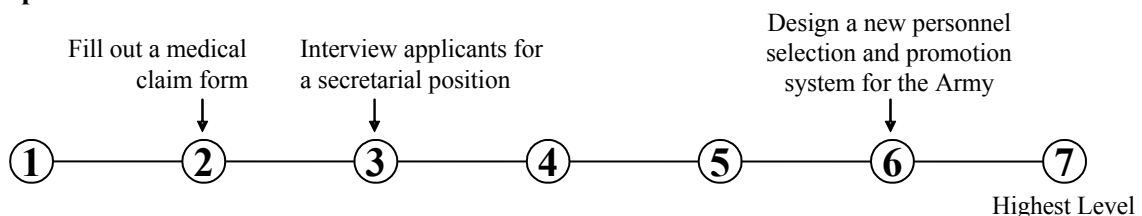
Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.

- A. How important is knowledge of PERSONNEL AND HUMAN RESOURCES to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

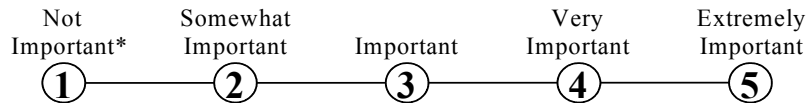
- B. What level of PERSONNEL AND HUMAN RESOURCES knowledge is needed to perform the occupation?



7. Production and Processing

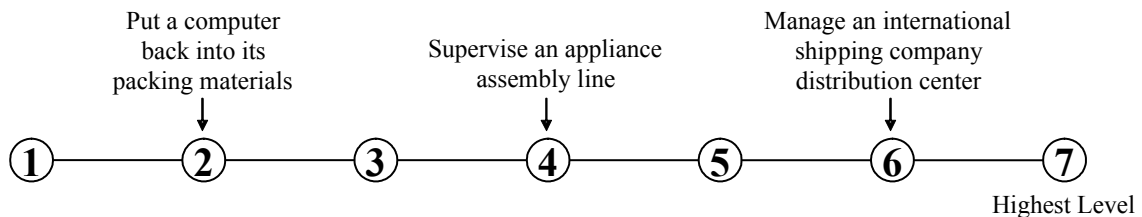
Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

A. How important is knowledge of PRODUCTION AND PROCESSING to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

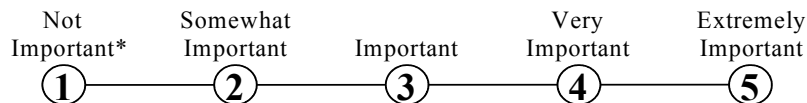
B. What level of PRODUCTION AND PROCESSING knowledge is needed to perform the occupation?



8. Food Production

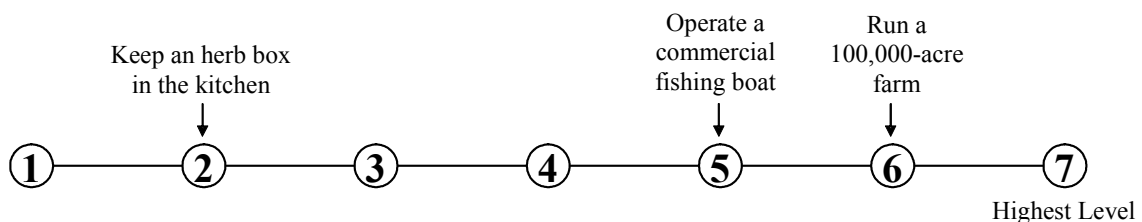
Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.

A. How important is knowledge of FOOD PRODUCTION to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

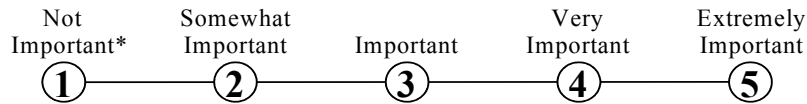
B. What level of FOOD PRODUCTION knowledge is needed to perform the occupation?



11. Design

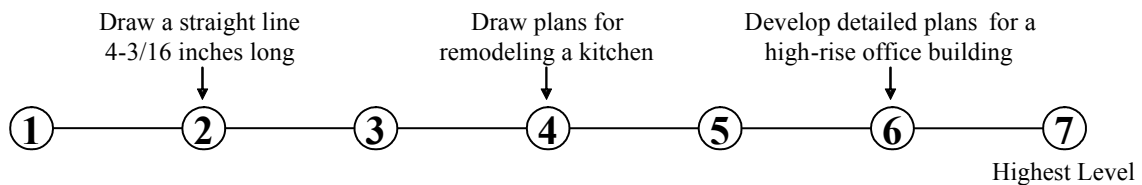
Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

A. How important is knowledge of DESIGN to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

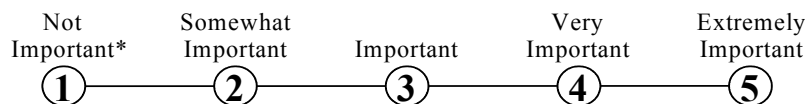
B. What level of knowledge of DESIGN is needed to perform the occupation?



12. Building and Construction

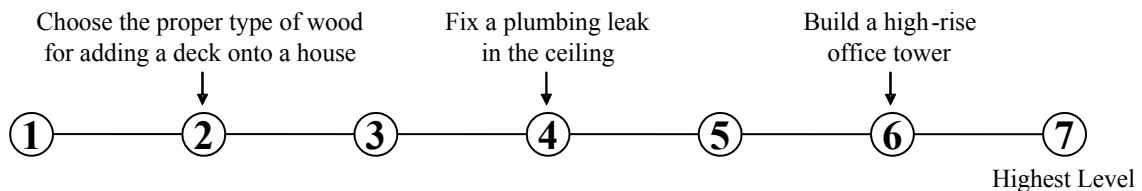
Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

A. How important is knowledge of BUILDING AND CONSTRUCTION to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

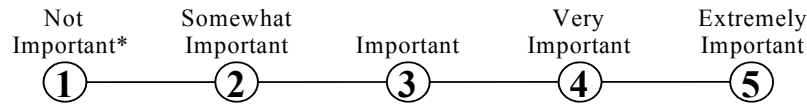
B. What level of BUILDING AND CONSTRUCTION knowledge is needed to perform the occupation?



13. Mechanical

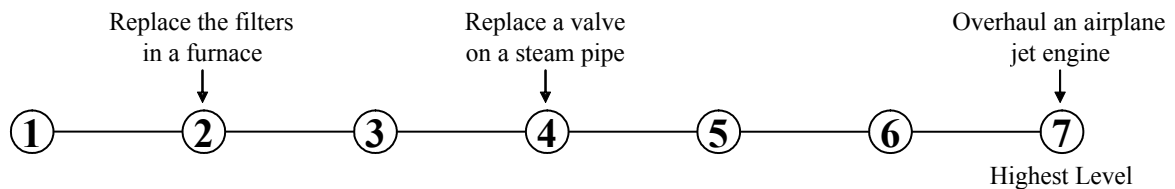
Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

A. How important is MECHANICAL knowledge to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

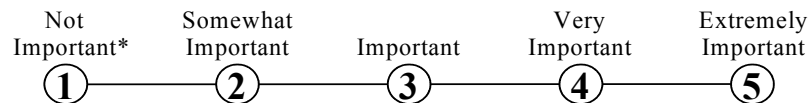
B. What level of MECHANICAL knowledge is needed to perform the occupation?



14. Mathematics

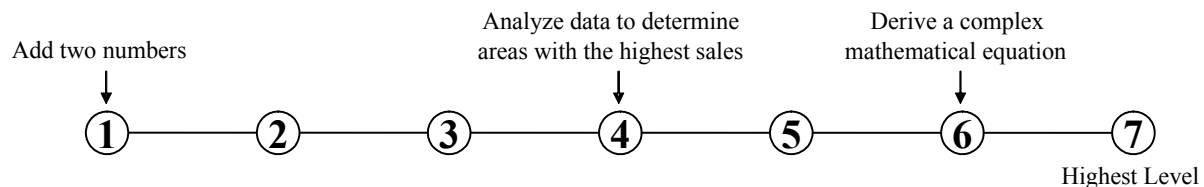
Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

A. How important is knowledge of MATHEMATICS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

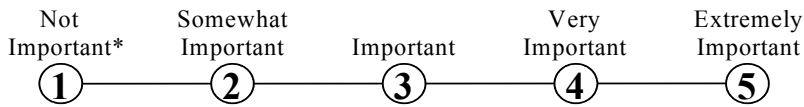
B. What level of knowledge of MATHEMATICS is needed to perform the occupation?



15. Physics

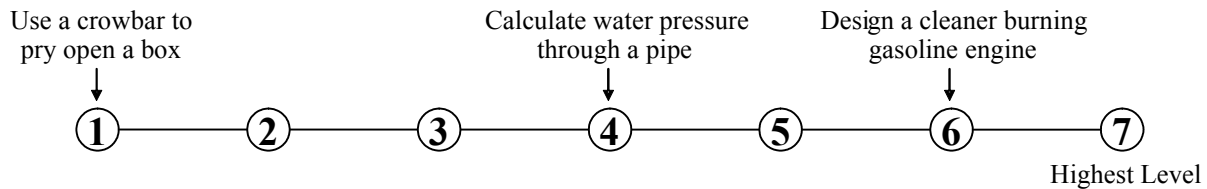
Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.

A. How important is knowledge of PHYSICS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

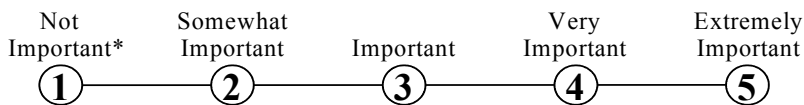
B. What level of PHYSICS knowledge is needed to perform the occupation?



16. Chemistry

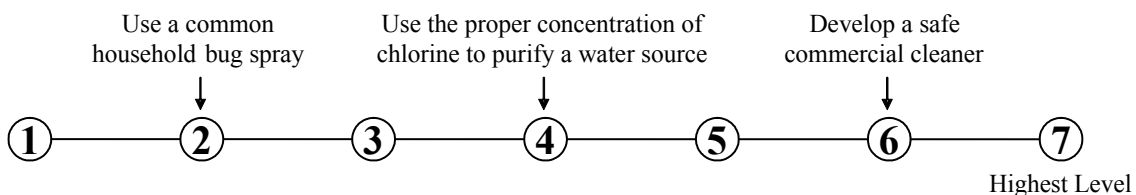
Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.

A. How important is knowledge of CHEMISTRY to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

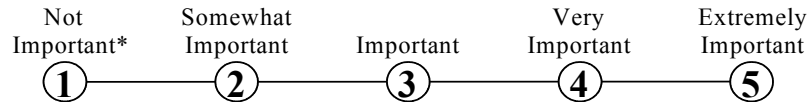
B. What level of CHEMISTRY knowledge is needed to perform the occupation?



17. Biology

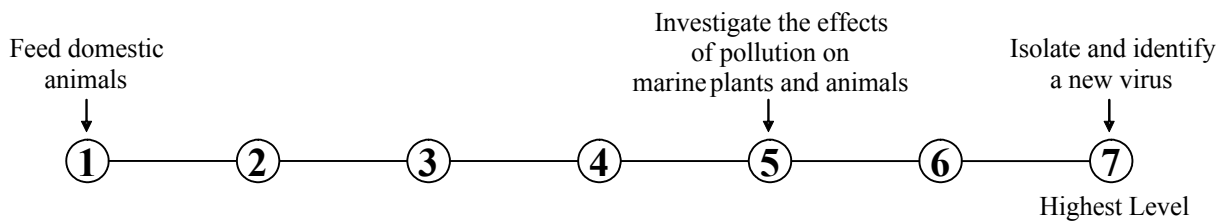
Knowledge of plant and animal organisms and their tissues, cells, functions, interdependencies, and interactions with each other and the environment.

A. How important is knowledge of BIOLOGY to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

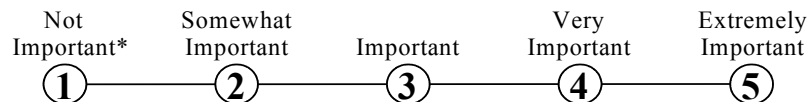
B. What level of BIOLOGY knowledge is needed to perform the occupation?



18. Psychology

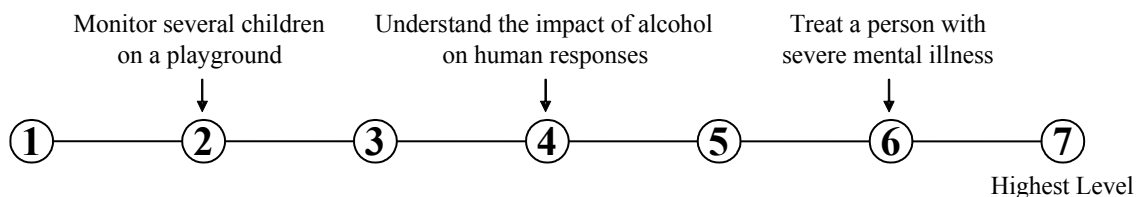
Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.

A. How important is knowledge of PSYCHOLOGY to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

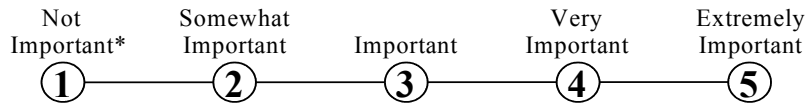
B. What level of PSYCHOLOGY knowledge is needed to perform the occupation?



19. Sociology and Anthropology

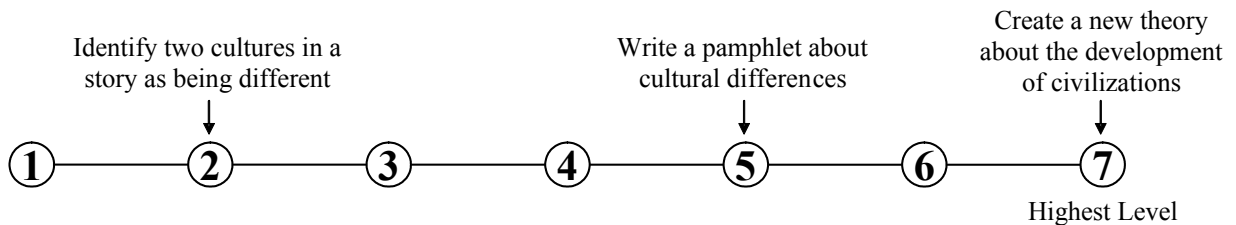
Knowledge of group behavior and dynamics, societal trends and influences, human migrations, ethnicity, cultures, and their history and origins.

- A. How important is knowledge of SOCIOLOGY AND ANTHROPOLOGY to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

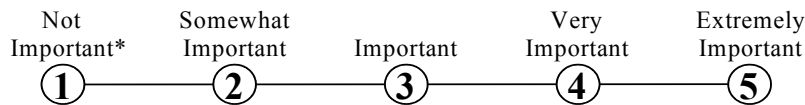
- B. What level of knowledge of SOCIOLOGY AND ANTHROPOLOGY is needed to perform the occupation?



20. Geography

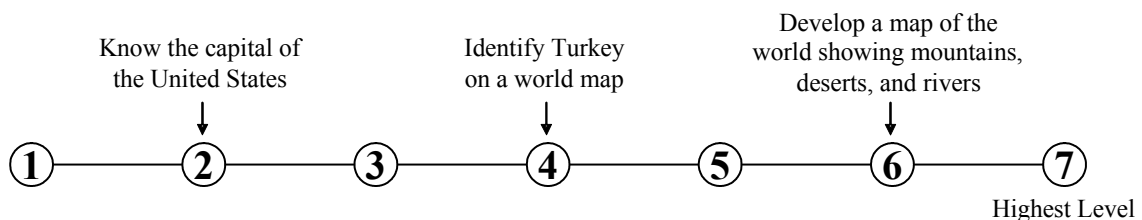
Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.

- A. How important is knowledge of GEOGRAPHY to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

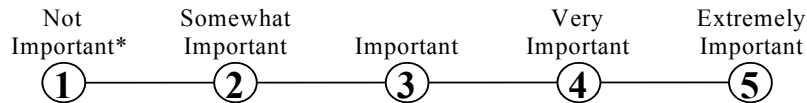
- B. What level of knowledge of GEOGRAPHY is needed to perform the occupation?



21. Medicine and Dentistry

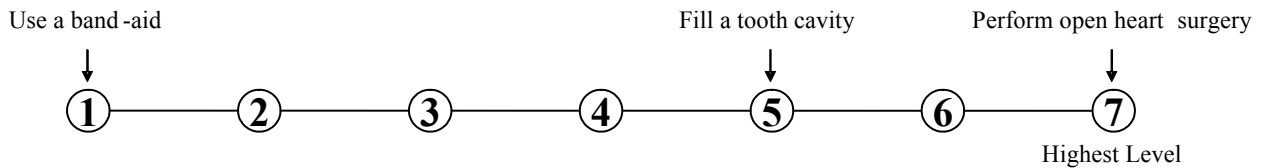
Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.

- A. How important is knowledge of MEDICINE AND DENTISTRY to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

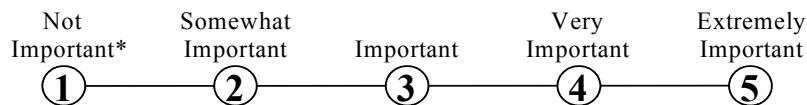
- B. What level of MEDICINE AND DENTISTRY knowledge is needed to perform the occupation?



22. Therapy and Counseling

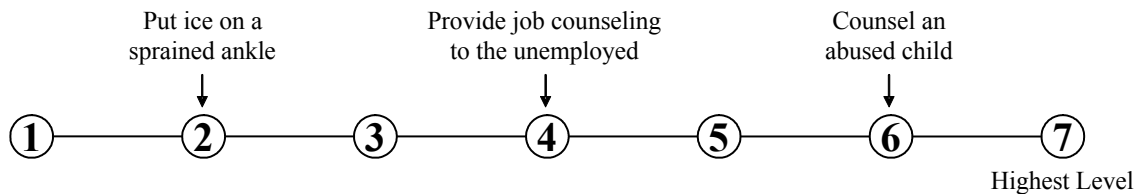
Knowledge of principles, methods, and procedures for diagnosis, treatment, and rehabilitation of physical and mental dysfunctions, and for career counseling and guidance.

- A. How important is knowledge of THERAPY AND COUNSELING to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

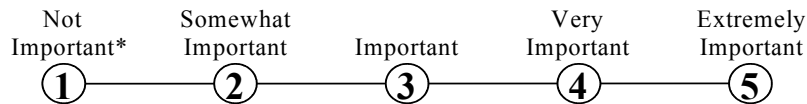
- B. What level of THERAPY AND COUNSELING knowledge is needed to perform the occupation?



23. Education and Training

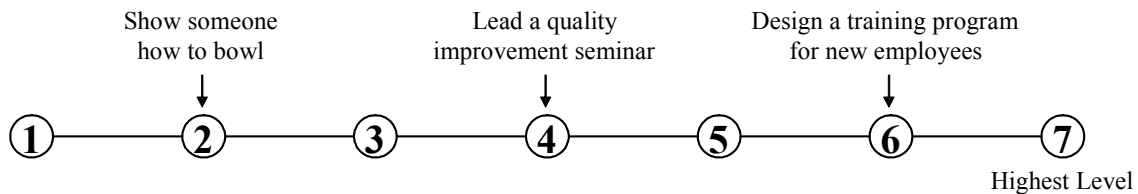
Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.

- A. How important is knowledge of EDUCATION AND TRAINING to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

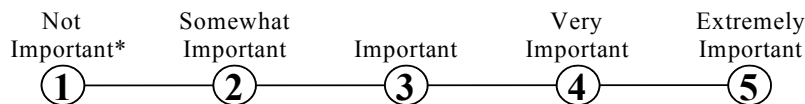
- B. What level of EDUCATION AND TRAINING knowledge is needed to perform the occupation?



24. English Language

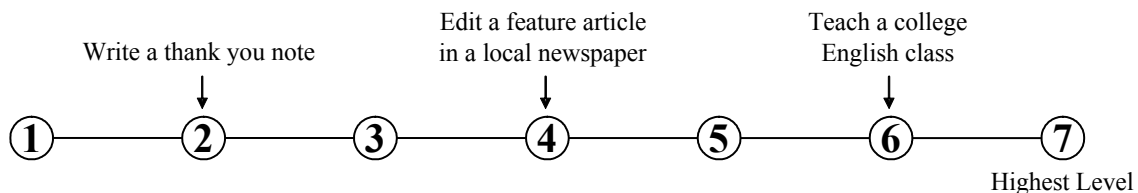
Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

- A. How important is knowledge of the ENGLISH LANGUAGE to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

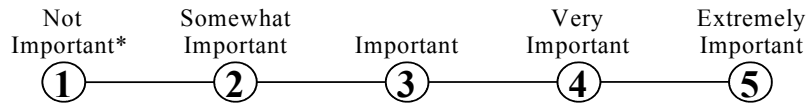
- B. What level of ENGLISH LANGUAGE knowledge is needed to perform the occupation?



25. Foreign Language

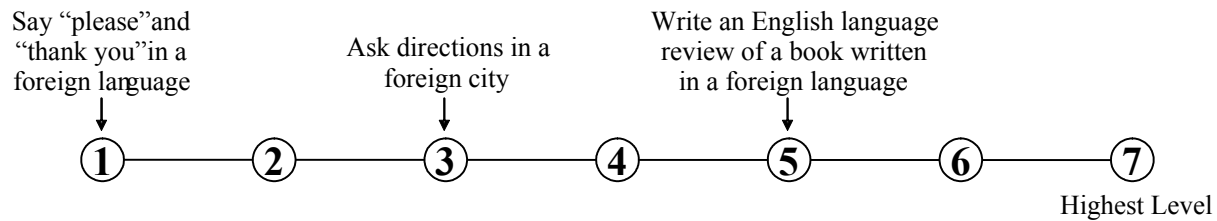
Knowledge of the structure and content of a foreign (non-English) language including the meaning and spelling of words, rules of composition and grammar, and pronunciation.

A. How important is knowledge of a FOREIGN LANGUAGE to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

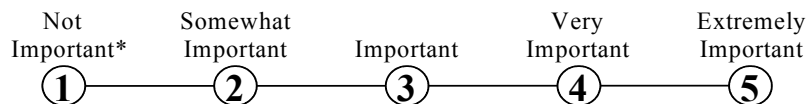
B. What level of FOREIGN LANGUAGE knowledge is needed to perform the occupation?



26. Fine Arts

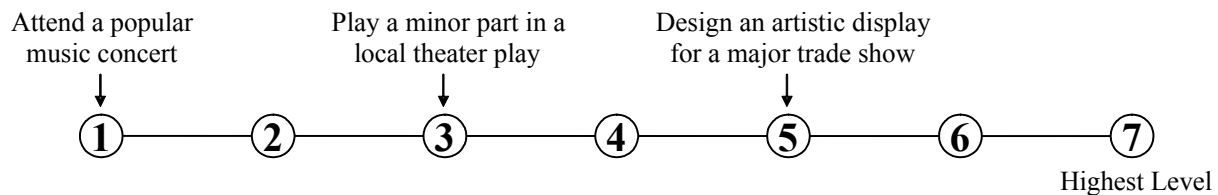
Knowledge of the theory and techniques required to compose, produce, and perform works of music, dance, visual arts, drama, and sculpture.

A. How important is knowledge of FINE ARTS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

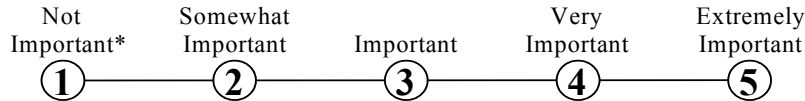
B. What level of FINE ARTS knowledge is needed to perform the occupation?



29. Public Safety and Security

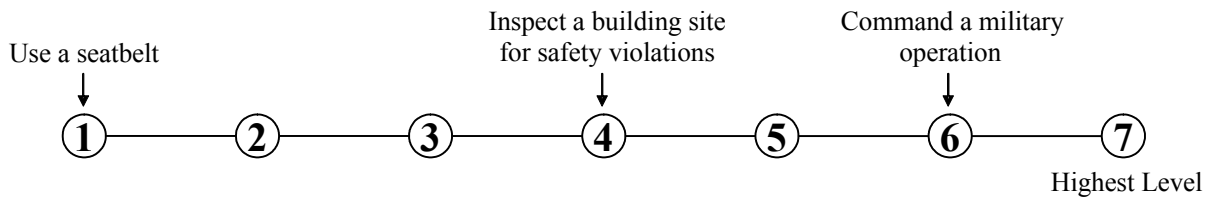
Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

- A. How important is PUBLIC SAFETY AND SECURITY knowledge to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

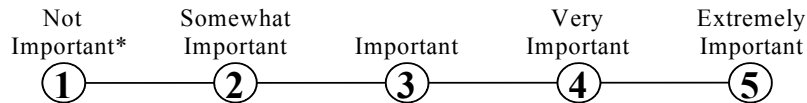
- B. What level of PUBLIC SAFETY AND SECURITY knowledge is needed to perform the occupation?



30. Law and Government

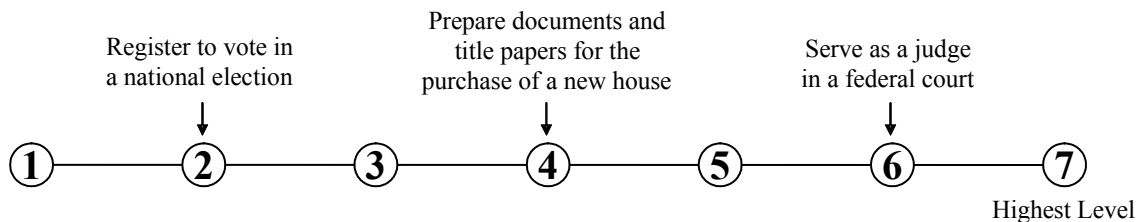
Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.

- A. How important is knowledge of LAW AND GOVERNMENT to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

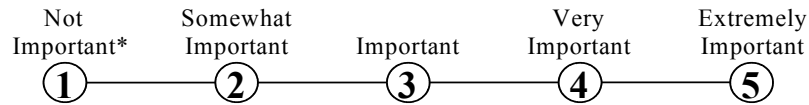
- B. What level of knowledge of LAW AND GOVERNMENT is needed to perform the occupation?



31. Telecommunications

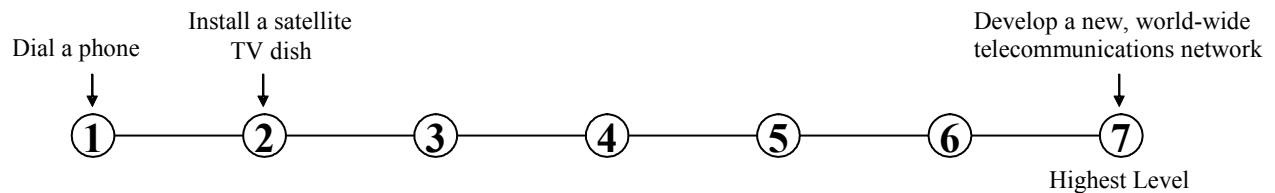
Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

- A. How important is knowledge of TELECOMMUNICATIONS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

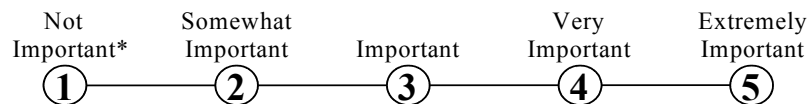
- B. What level of TELECOMMUNICATIONS knowledge is needed to perform the occupation?



32. Communications and Media

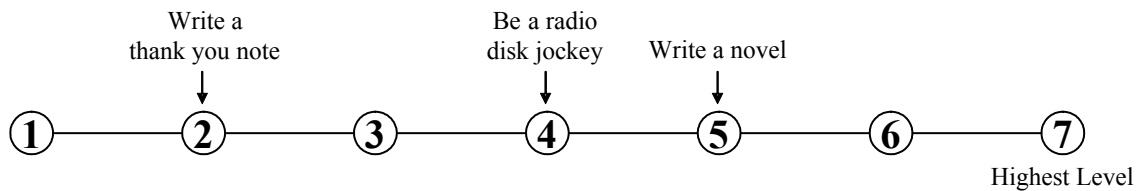
Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

- A. How important is knowledge of COMMUNICATIONS AND MEDIA to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

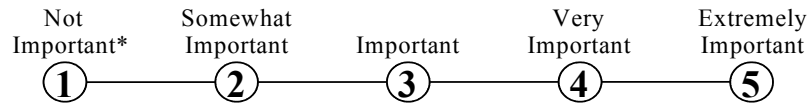
- B. What level of COMMUNICATIONS AND MEDIA knowledge is needed to perform the occupation?



33. Transportation

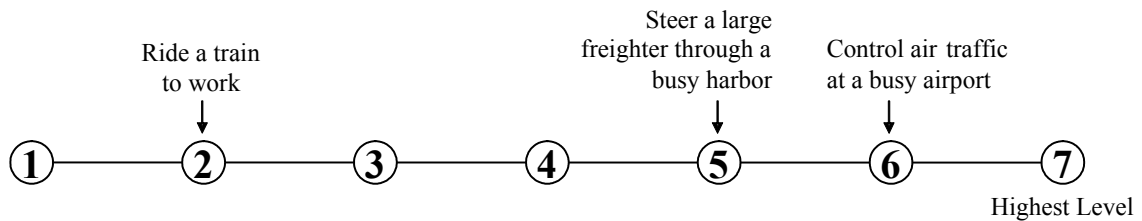
Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.

A. How important is knowledge of TRANSPORTATION to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

B. What level of TRANSPORTATION knowledge is needed to perform the occupation?



PLEASE CONTINUE ON NEXT PAGE

Instructions for Completing Education and Training Questions

In these questions, you are asked about the education and experience requirements for the occupation. Please read each question carefully and mark your answer by putting an **X** in the box beside your one best answer.

REQUIRED LEVEL OF EDUCATION

34. If someone were being hired to perform the occupation, indicate the level of education that would be required (please check only one box):

(Note that this does not mean the level of education that you personally have achieved.)

- Less than a High School Diploma**
- High School Diploma** (or GED or High School Equivalence Certificate)
- Post-Secondary Certificate** - awarded for training completed after high school (for example, in Personnel Services, Engineering-related Technologies, Vocational Home Economics, Construction Trades, Mechanics and Repairers, Precision Production Trades)
- Some College Courses**
- Associate's Degree** (or other 2-year degree)
- Bachelor's Degree**
- Post-Baccalaureate Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Baccalaureate degree but do not meet the requirements of academic degrees carrying the title of Master.
- Master's Degree**
- Post-Master's Certificate** - awarded for completion of an organized program of study; designed for people who have completed a Master's degree but do not meet the requirements of academic degrees at the doctoral level.
- First Professional Degree** - awarded for completion of a program that
 - requires at least 2 years of college work before entrance into the program,
 - includes a total of at least 6 academic years of work to complete, and
 - provides all remaining academic requirements to begin practice in a profession.
- Doctoral Degree**
- Post-Doctoral Training**

35. If someone were being hired to perform the occupation, how much RELATED WORK EXPERIENCE would be required? (That is, having other jobs that prepare the worker for the job.)

- None
- Up to and including 1 month
- Over 1 month, up to and including 3 months
- Over 3 months, up to and including 6 months
- Over 6 months, up to and including 1 year
- Over 1 year, up to and including 2 years
- Over 2 years, up to and including 4 years
- Over 4 years, up to and including 6 years
- Over 6 years, up to and including 8 years
- Over 8 years, up to and including 10 years
- Over 10 years

36. If someone were being hired to perform the occupation, how much ON-SITE OR IN-PLANT TRAINING would be required? (That is, organized classroom study provided by the employer.)

- None
- Up to and including 1 month
- Over 1 month, up to and including 3 months
- Over 3 months, up to and including 6 months
- Over 6 months, up to and including 1 year
- Over 1 year, up to and including 2 years
- Over 2 years, up to and including 4 years
- Over 4 years, up to and including 10 years
- Over 10 years

37. If someone were being hired to perform the occupation, how much ON-THE-JOB TRAINING would be required? (That is, serving as a learner or trainee on the job under instruction of a more experienced worker.)

- None or short demonstration
- Anything beyond short demonstration, up to and including 1 month
- Over 1 month, up to and including 3 months
- Over 3 months, up to and including 6 months
- Over 6 months, up to and including 1 year
- Over 1 year, up to and including 2 years
- Over 2 years, up to and including 4 years
- Over 4 years, up to and including 10 years
- Over 10 years

38. If someone were being hired to perform the occupation, how much APPRENTICESHIP would be required? (That is, having served in a registered US Department of Labor program and received a certificate of completion.)

- None
- Up to and including 1 year
- Over 1 year, up to and including 2 years
- Over 2 years, up to and including 3 years
- Over 3 years, up to and including 4 years
- Over 4 years, up to and including 5 years
- Over 5 years, up to and including 6 years

Instructions for Making Work Style Ratings

These questions are about work styles. A **Work Style** is a *personal characteristic*. You will be asked about a series of different work styles and how they relate to the occupation. As an occupational expert, first consider the different work styles needed by workers to perform the occupation. Then, with this information in mind, please answer each question as if you were performing work typical of the occupation.

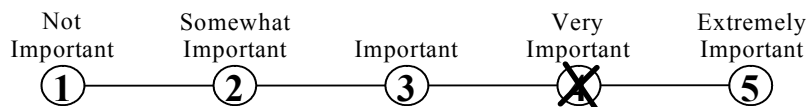
First, each work style is named and defined. For example:

Stress Tolerance

Job requires accepting criticism and dealing calmly and effectively with high-stress situations.

Then you are asked *How important is this characteristic to the performance of the occupation?* For example:

How important is STRESS TOLERANCE to the performance of the occupation?

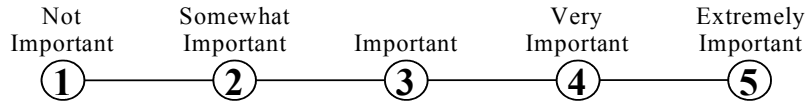


Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

39. Achievement/Effort

Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.

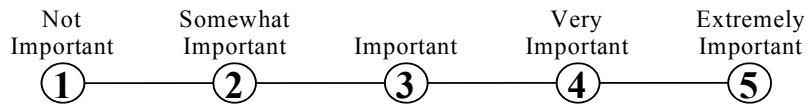
How important is ACHIEVEMENT/EFFORT to the performance of the occupation?



40. Persistence

Job requires persistence in the face of obstacles.

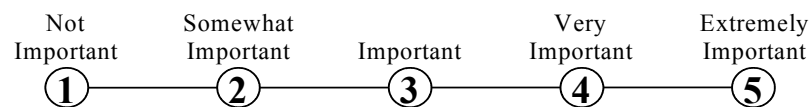
How important is PERSISTENCE to the performance of the occupation?



41. Initiative

Job requires a willingness to take on responsibilities and challenges.

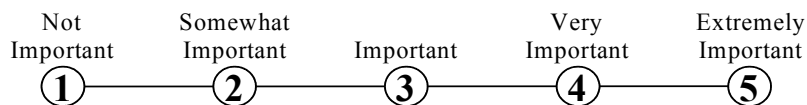
How important is INITIATIVE to the performance of the occupation?



42. Leadership

Job requires a willingness to lead, take charge, and offer opinions and direction.

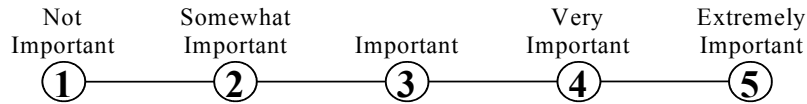
How important is LEADERSHIP to the performance of the occupation?



43. Cooperation

Job requires being pleasant with others and displaying a good-natured, cooperative attitude.

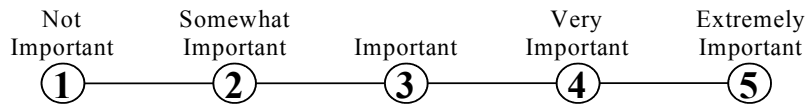
How important is COOPERATION to the performance of the occupation?



44. Concern for Others

Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others.

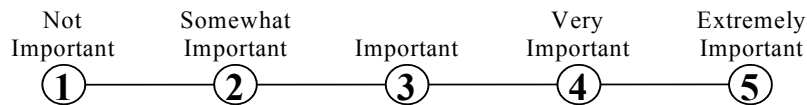
How important is CONCERN FOR OTHERS to the performance of the occupation?



45. Social Orientation

Job requires preferring to work with others rather than alone, and being personally connected with others.

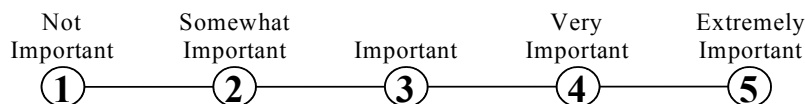
How important is SOCIAL ORIENTATION to the performance of the occupation?



46. Self-Control

Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.

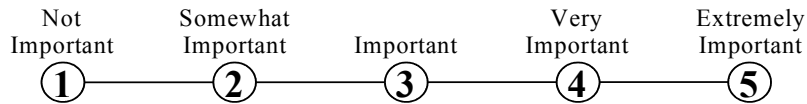
How important is SELF-CONTROL to the performance of the occupation?



47. Stress Tolerance

Job requires accepting criticism and dealing calmly and effectively with high-stress situations.

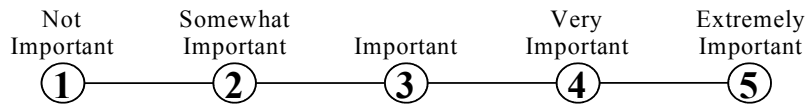
How important is STRESS TOLERANCE to the performance of the occupation?



48. Adaptability/Flexibility

Job requires being open to change (positive or negative) and to considerable variety in the workplace.

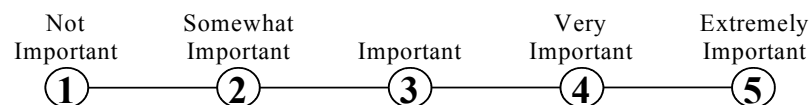
How important is ADAPTABILITY/FLEXIBILITY to the performance of the occupation?



49. Dependability

Job requires being reliable, responsible, and dependable, and fulfilling obligations.

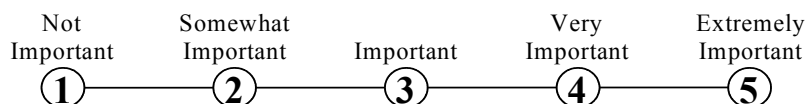
How important is DEPENDABILITY to the performance of the occupation?



50. Attention to Detail

Job requires being careful about details and thorough in completing tasks.

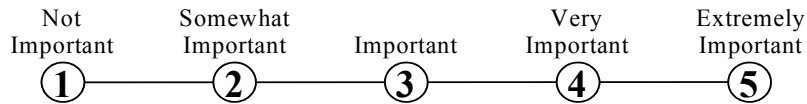
How important is ATTENTION TO DETAIL to the performance of the occupation?



51. Integrity

Job requires being honest and ethical.

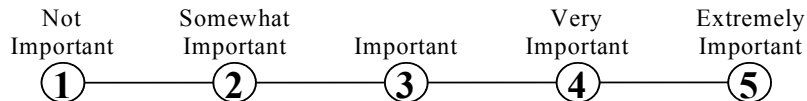
How important is INTEGRITY to the performance of the occupation?



52. Independence

Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

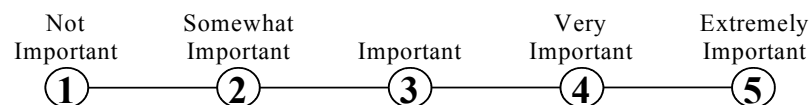
How important is INDEPENDENCE to the performance of the occupation?



53. Innovation

Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems.

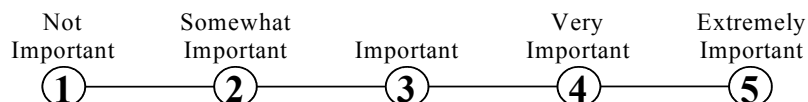
How important is INNOVATION to the performance of the occupation?



54. Analytical Thinking

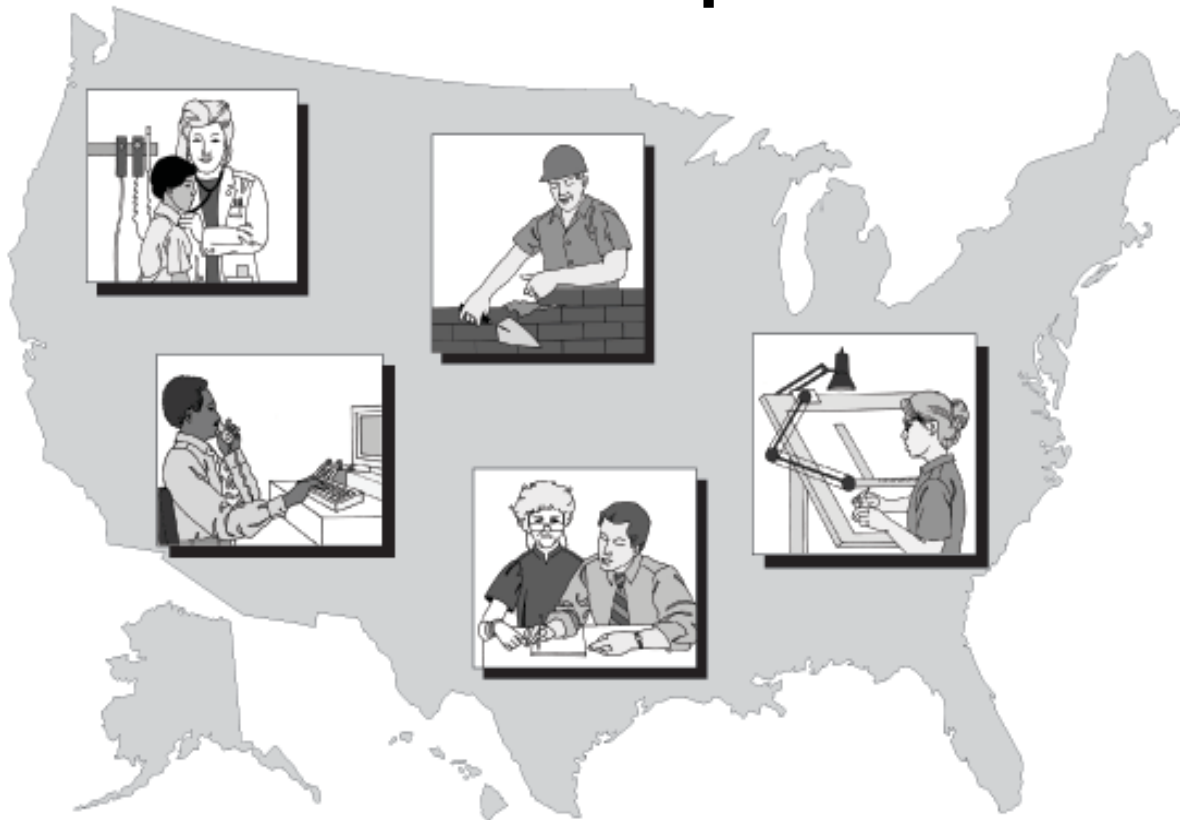
Job requires analyzing information and using logic to address work-related issues and problems.

How important is ANALYTICAL THINKING to the performance of the occupation?



Form B
OMB#1205-0421
Expires: 12/31/2008
Ver.: 9/05

Some Important Questions About The *Work Activities* Of The Occupation



Please return your completed questionnaire in the enclosed envelope to:
Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 27709-2194
Sponsored by: The U.S. Department of Labor and the National O*NET Consortium

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number. Respondents' obligation to reply to these reporting requirements is voluntary. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the U.S. Department of Labor, Office of Workforce Investment, Attn: O*NET Project, Frances Perkins Building, Mail Stop S4231, 200 Constitution Ave., NW, Washington, DC 20210 (OMB Control Number 1205-0421).

Return to: Research Triangle Institute, PO Box 12194
Research Triangle Park, North Carolina, 27709-2194

Instructions for Making Work Activities Ratings

These questions are about work activities. A work activity is a set of similar actions that are performed together in many different jobs. You will be asked about a series of different work activities and how they relate to workers in the occupation. As an occupational expert, first consider the different work activities performed by workers in the occupation. Then, with this information in mind, please answer each question as if you were performing work that is typical of the occupation.

Each activity in this questionnaire is named and defined.

For example:

Getting Information

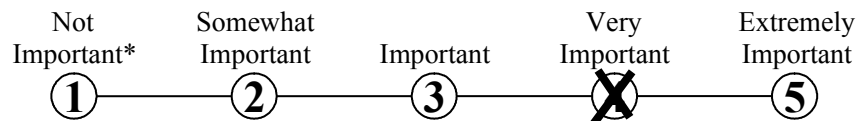
Observing, receiving, and otherwise obtaining information from all relevant sources.

You are then asked to answer two questions about that activity:

A *How important is the activity to the occupation?*

For example:

How important is GETTING INFORMATION to the performance of the occupation?



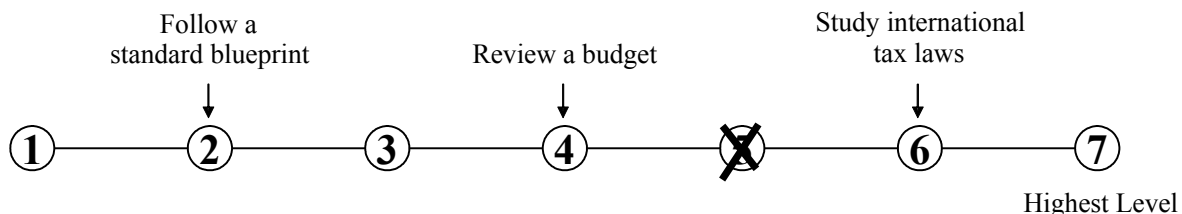
Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

***If you rate the activity as Not Important to the performance of the occupation, mark the one [~~X~~] then skip over question B and proceed to the next activity.**

B *What level of the activity is needed to perform the occupation?*

To help you understand what we mean by **level**, we provide you with examples of job-related activities at different levels. For example:

What level of GETTING INFORMATION is needed to perform the occupation?

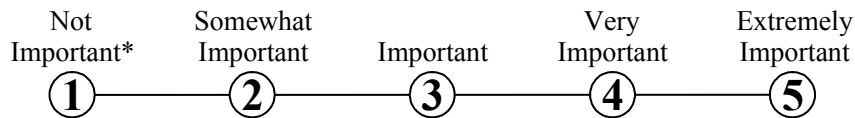


Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

3. Monitoring Processes, Materials, or Surroundings

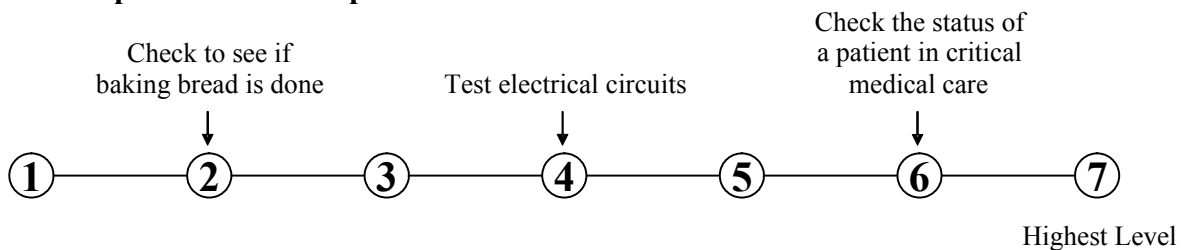
Monitoring and reviewing information from materials, events, or the environment to detect or assess problems.

A. How important is MONITORING PROCESSES, MATERIALS, OR SURROUNDINGS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

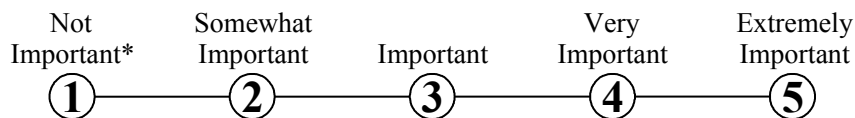
B. What level of MONITORING PROCESSES, MATERIALS, OR SURROUNDINGS is needed to perform the occupation?



4. Inspecting Equipment, Structures, or Materials

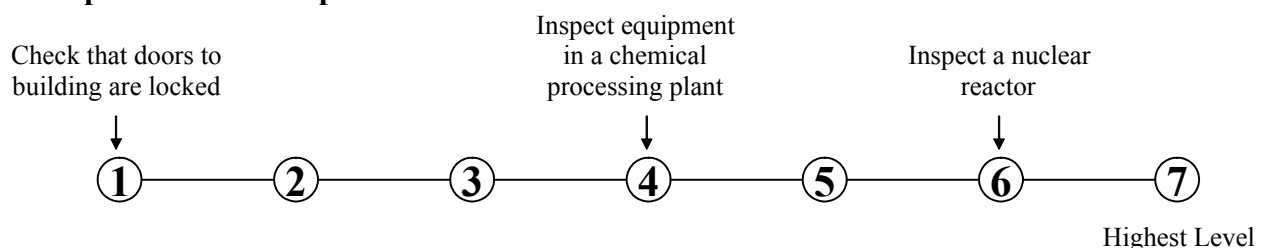
Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.

A. How important is INSPECTING EQUIPMENT, STRUCTURES, OR MATERIALS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

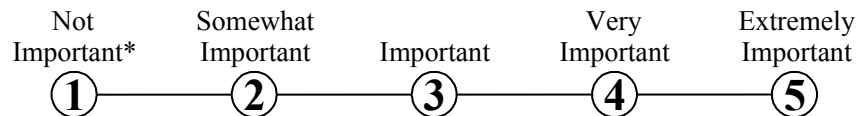
B. What level of INSPECTING EQUIPMENT, STRUCTURES, OR MATERIALS is needed to perform the occupation?



5. Estimating the Quantifiable Characteristics of Products, Events, or Information

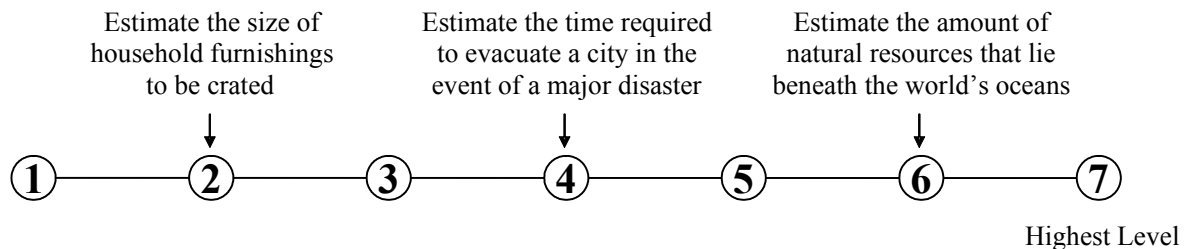
Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.

A. How important is ESTIMATING THE QUANTIFIABLE CHARACTERISTICS OF PRODUCTS, EVENTS, OR INFORMATION to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

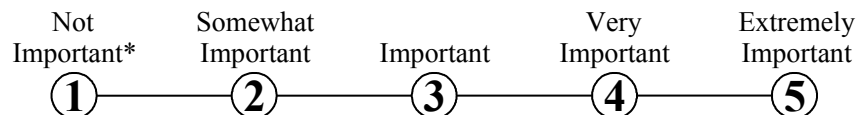
B. What level of ESTIMATING THE QUANTIFIABLE CHARACTERISTICS OF PRODUCTS, EVENTS, OR INFORMATION is needed to perform the occupation?



6. Judging the Qualities of Objects, Services, or People

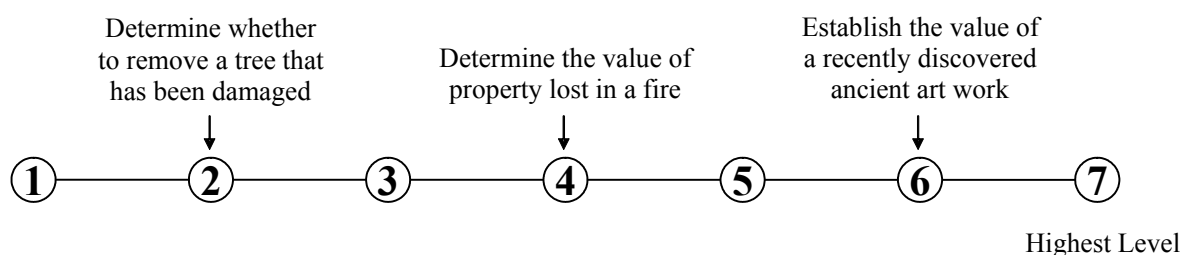
Assessing the value, importance, or quality of things or people.

A. How important is JUDGING THE QUALITIES OF OBJECTS, SERVICES, OR PEOPLE to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

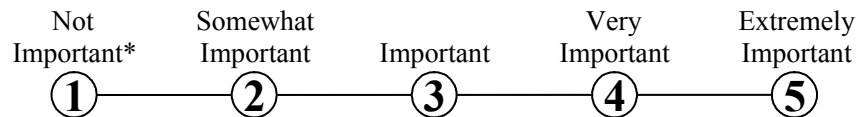
B. What level of JUDGING THE QUALITIES OF OBJECTS, SERVICES, OR PEOPLE is needed to perform the occupation?



7. Evaluating Information to Determine Compliance with Standards

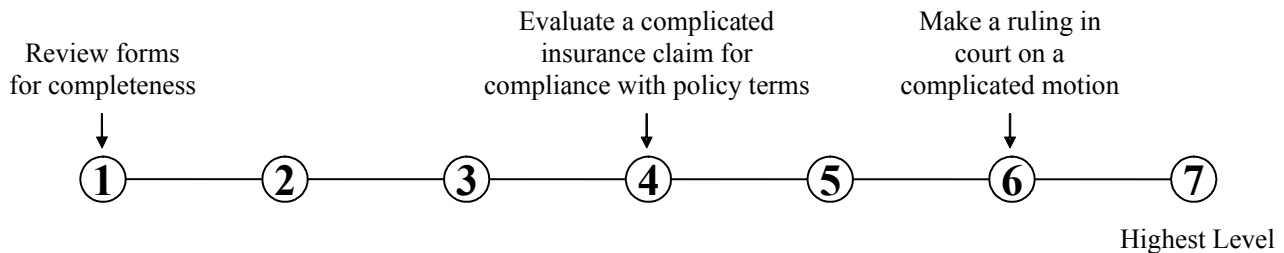
Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

A. How important is EVALUATING INFORMATION TO DETERMINE COMPLIANCE WITH STANDARDS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

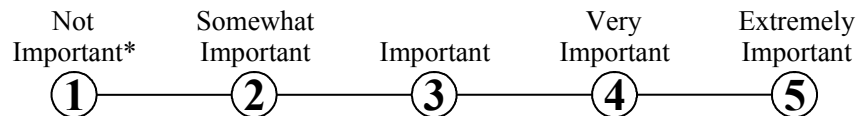
B. What level of EVALUATING INFORMATION TO DETERMINE COMPLIANCE WITH STANDARDS is needed to perform the occupation?



8. Processing Information

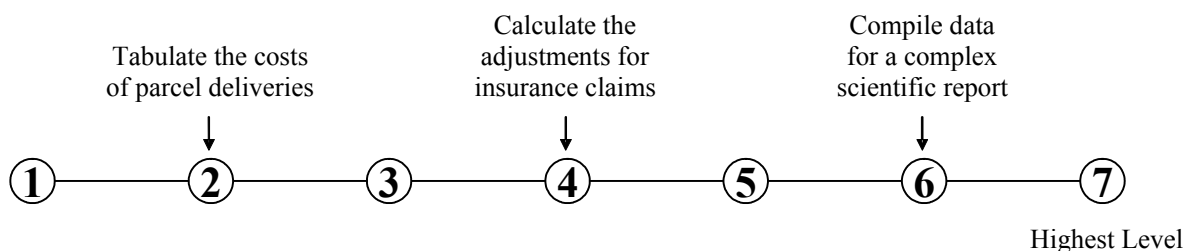
Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

A. How important is PROCESSING INFORMATION to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

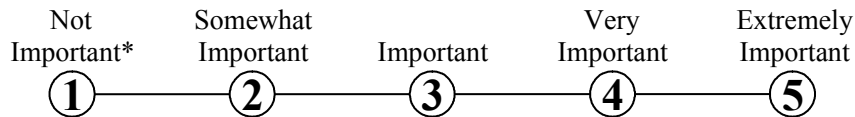
B. What level of PROCESSING INFORMATION is needed to perform the occupation?



9. Analyzing Data or Information

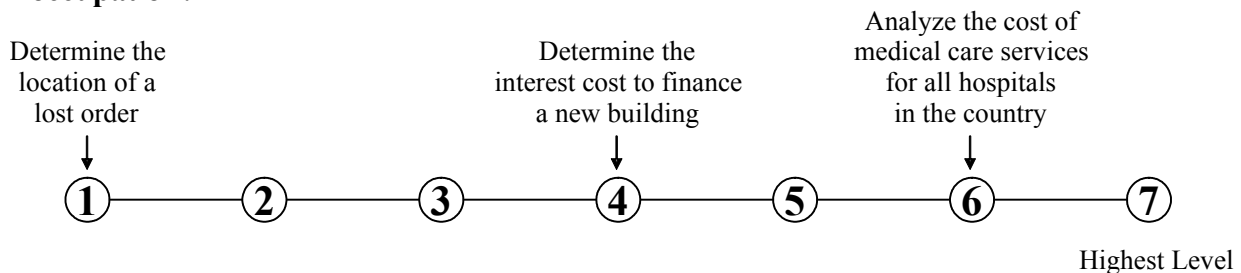
Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

A. How important is ANALYZING DATA OR INFORMATION to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

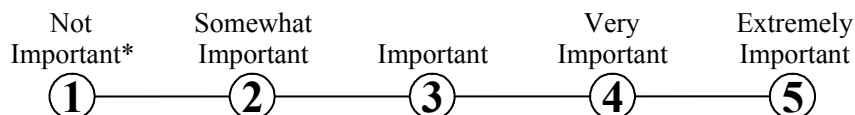
B. What level of ANALYZING DATA OR INFORMATION is needed to perform the occupation?



10. Making Decisions and Solving Problems

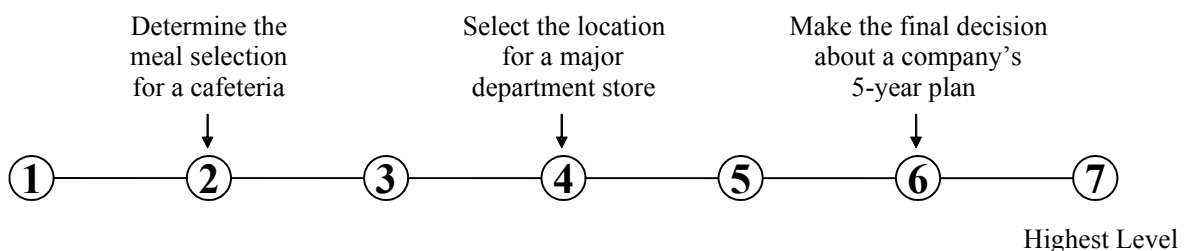
Analyzing information and evaluating results to choose the best solution and solve problems.

A. How important is MAKING DECISIONS AND SOLVING PROBLEMS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

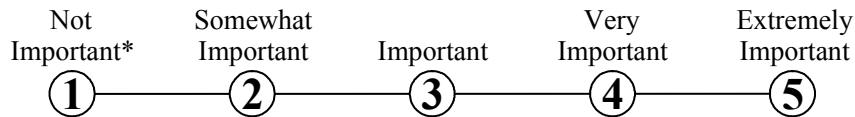
B. What level of MAKING DECISIONS AND SOLVING PROBLEMS is needed to perform the occupation?



11. Thinking Creatively

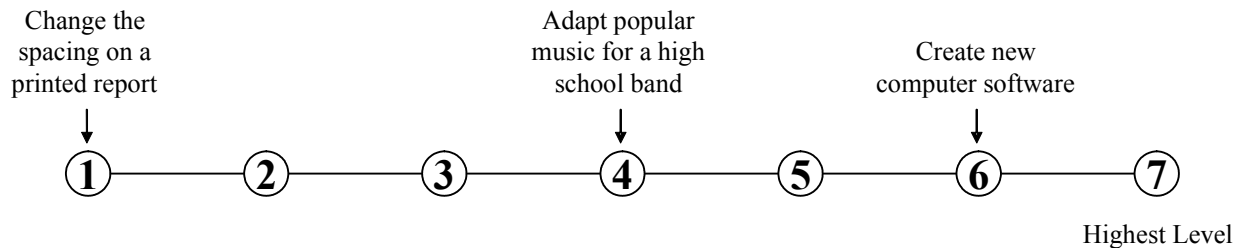
Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

A. How important is THINKING CREATIVELY to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

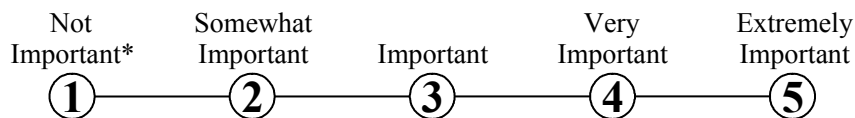
B. What level of THINKING CREATIVELY is needed to perform the occupation?



12. Updating and Using Relevant Knowledge

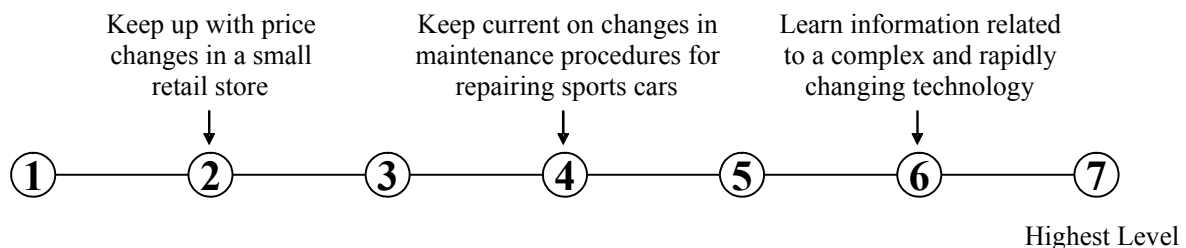
Keeping up-to-date technically and applying new knowledge to the job.

A. How important is UPDATING AND USING RELEVANT KNOWLEDGE to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

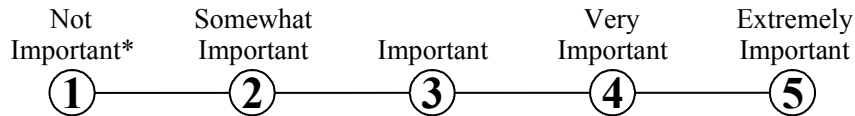
B. What level of UPDATING AND USING RELEVANT KNOWLEDGE is needed to perform the occupation?



15. Organizing, Planning, and Prioritizing Work

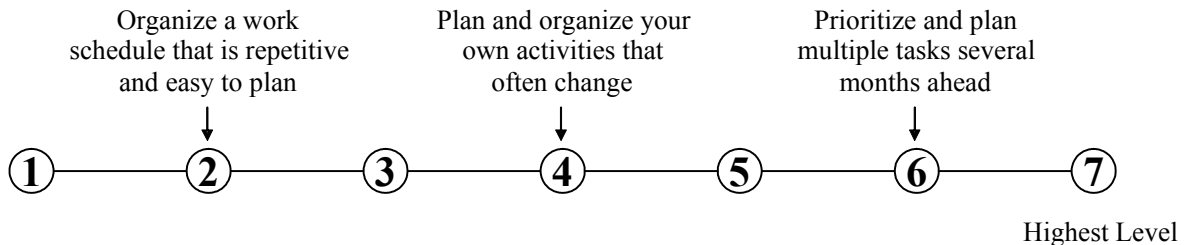
Developing specific goals and plans to prioritize, organize, and accomplish the work.

A. How important is ORGANIZING, PLANNING, AND PRIORITIZING WORK to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

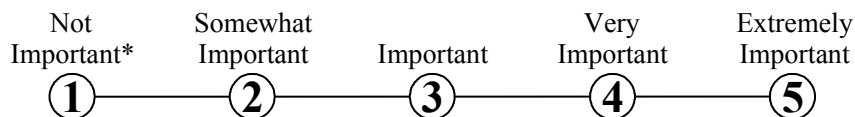
B. What level of ORGANIZING, PLANNING, AND PRIORITIZING WORK is needed to perform the occupation?



16. Performing General Physical Activities

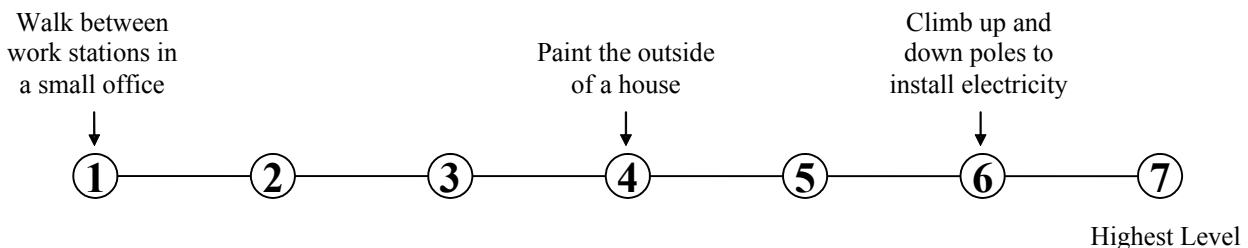
Performing physical activities that require considerable use of arms and legs and moving the whole body, such as climbing, lifting, balancing, walking, stooping, and handling materials.

A. How important is PERFORMING GENERAL PHYSICAL ACTIVITIES to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

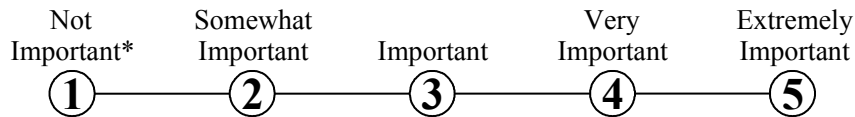
B. What level of PERFORMING GENERAL PHYSICAL ACTIVITIES is needed to perform the occupation?



17. Handling and Moving Objects

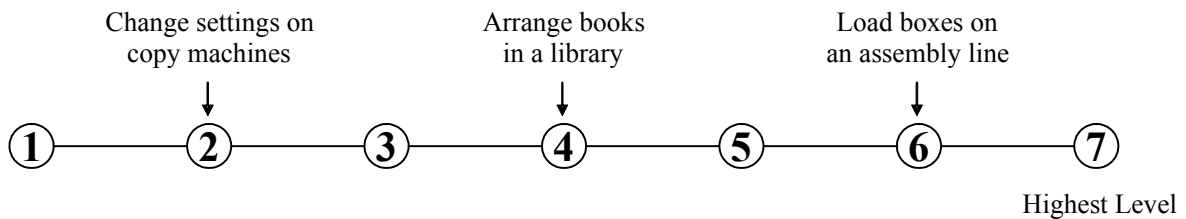
Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.

A. How important is HANDLING AND MOVING OBJECTS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

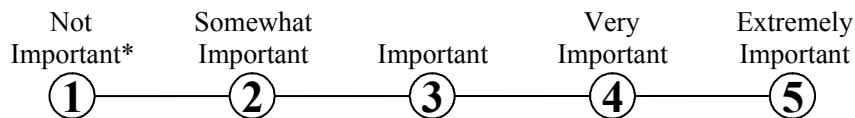
B. What level of HANDLING AND MOVING OBJECTS is needed to perform the occupation?



18. Controlling Machines and Processes

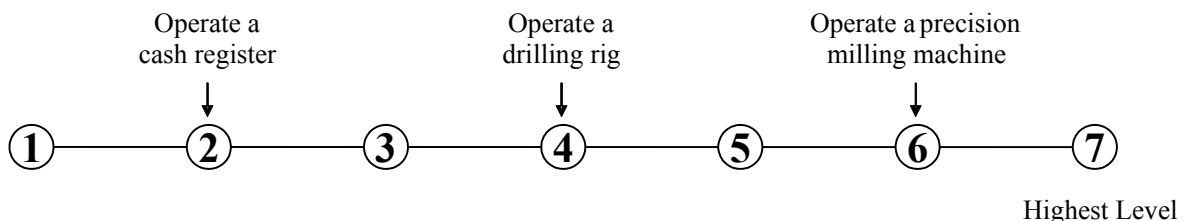
Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).

A. How important is CONTROLLING MACHINES AND PROCESSES to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

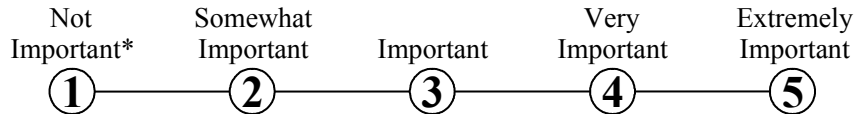
B. What level of CONTROLLING MACHINES AND PROCESSES is needed to perform the occupation?



21. Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment

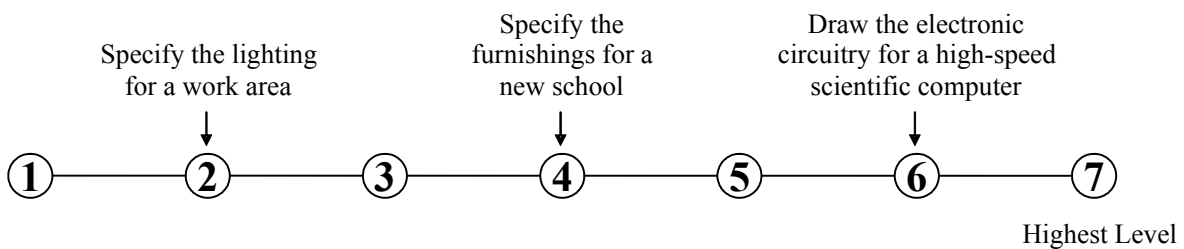
Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.

A. How **important** is **DRAFTING, LAYING OUT, AND SPECIFYING TECHNICAL DEVICES, PARTS, AND EQUIPMENT** to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

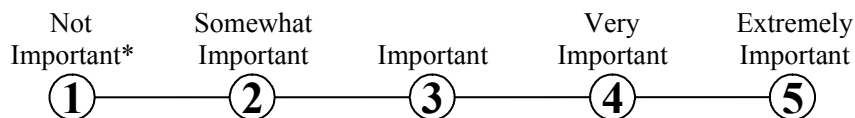
B. What **level** of **DRAFTING, LAYING OUT, AND SPECIFYING TECHNICAL DEVICES, PARTS, AND EQUIPMENT** is needed to perform the occupation?



22. Repairing and Maintaining Mechanical Equipment

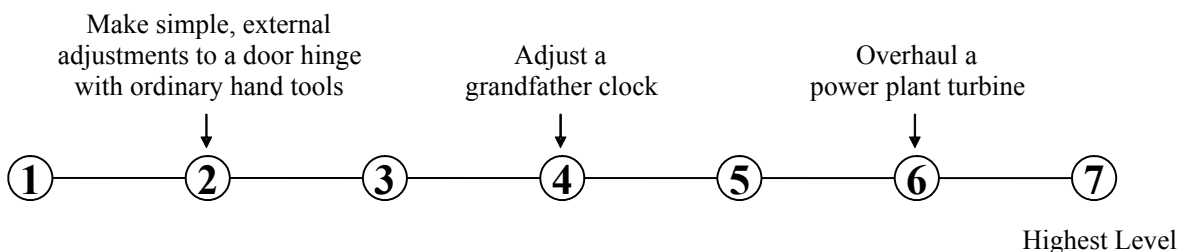
Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.

A. How **important** is **REPAIRING AND MAINTAINING MECHANICAL EQUIPMENT** to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

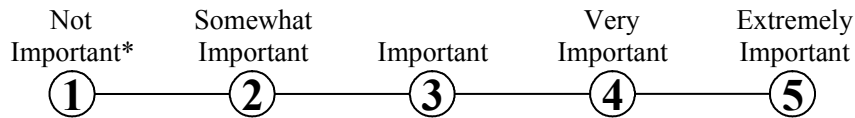
B. What **level** of **REPAIRING AND MAINTAINING MECHANICAL EQUIPMENT** is needed to perform the occupation?



23. Repairing and Maintaining Electronic Equipment

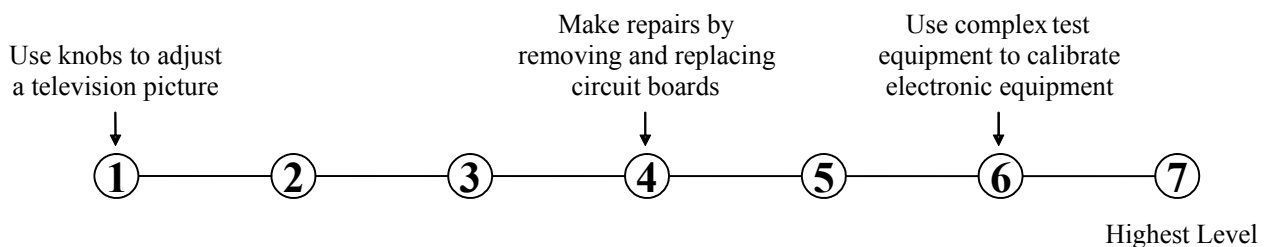
Servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.

A. How important is REPAIRING AND MAINTAINING ELECTRONIC EQUIPMENT to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

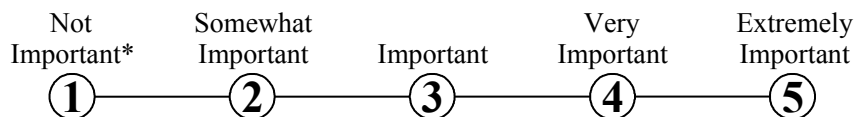
B. What level of REPAIRING AND MAINTAINING ELECTRONIC EQUIPMENT is needed to perform the occupation?



24. Documenting/Recording Information

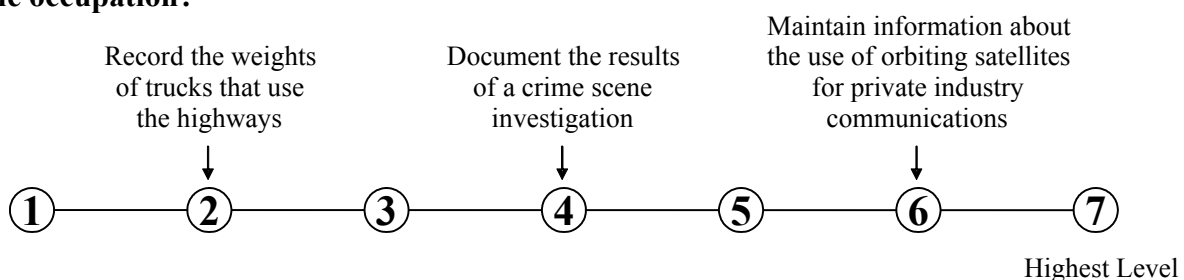
Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

A. How important is DOCUMENTING/RECORDING INFORMATION to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

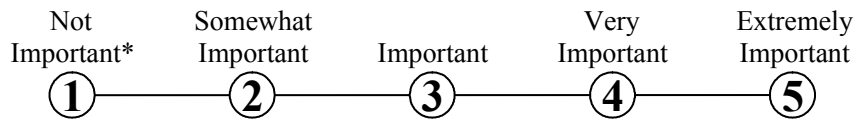
B. What level of DOCUMENTING/RECORDING INFORMATION is needed to perform the occupation?



25. Interpreting the Meaning of Information for Others

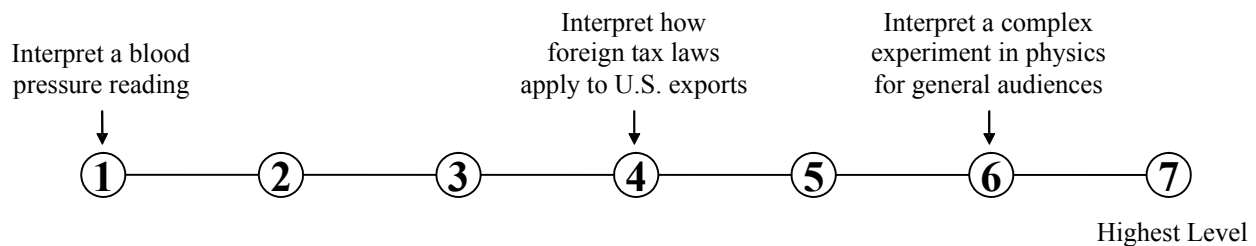
Translating or explaining what information means and how it can be used.

A. How important is INTERPRETING THE MEANING OF INFORMATION FOR OTHERS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

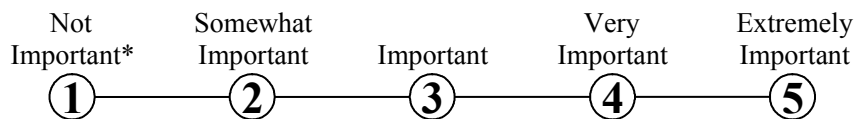
B. What level of INTERPRETING THE MEANING OF INFORMATION FOR OTHERS is needed to perform the occupation?



26. Communicating with Supervisors, Peers, or Subordinates

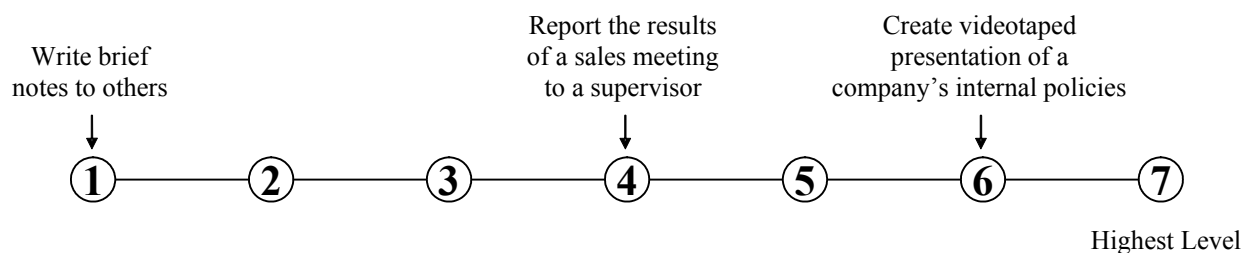
Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person.

A. How important is COMMUNICATING WITH SUPERVISORS, PEERS, OR SUBORDINATES to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

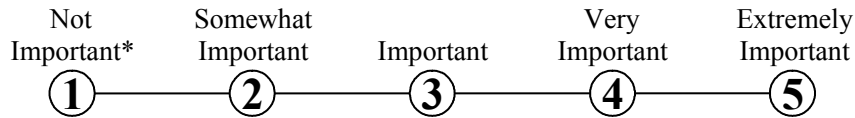
B. What level of COMMUNICATING WITH SUPERVISORS, PEERS, OR SUBORDINATES is needed to perform the occupation?



29. Assisting and Caring for Others

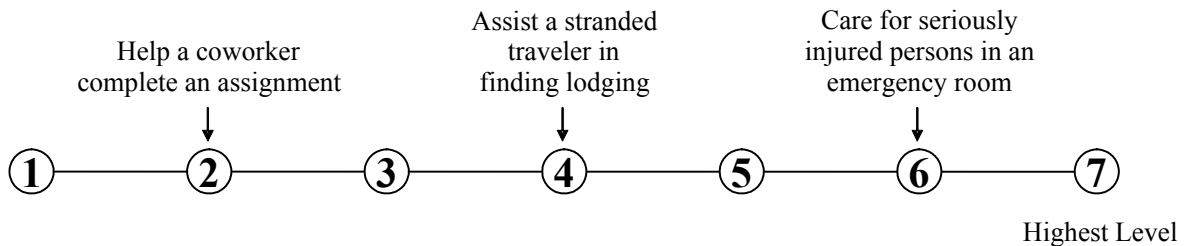
Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients.

A. How important is ASSISTING AND CARING FOR OTHERS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

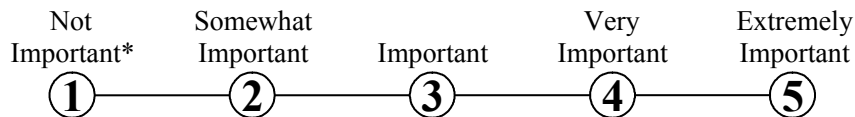
B. What level of ASSISTING AND CARING FOR OTHERS is needed to perform the occupation?



30. Selling or Influencing Others

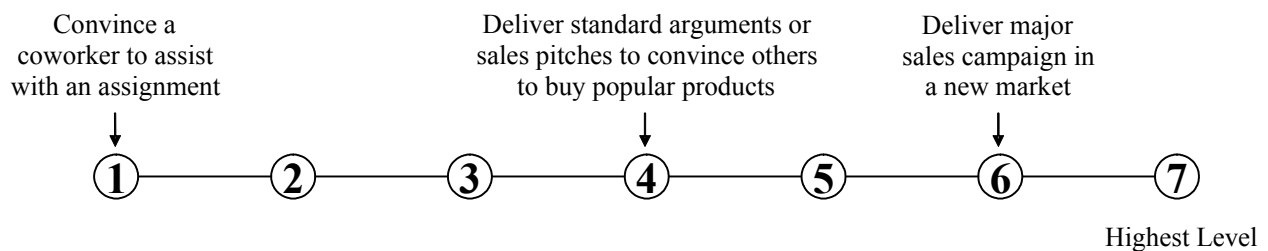
Convincing others to buy merchandise/goods or to otherwise change their minds or actions.

A. How important is SELLING OR INFLUENCING OTHERS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

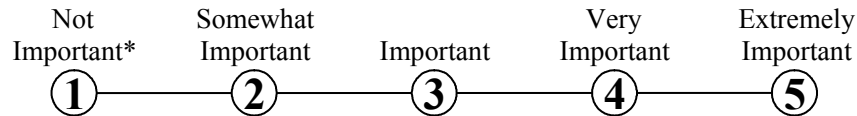
B. What level of SELLING OR INFLUENCING OTHERS is needed to perform the occupation?



31. Resolving Conflicts and Negotiating with Others

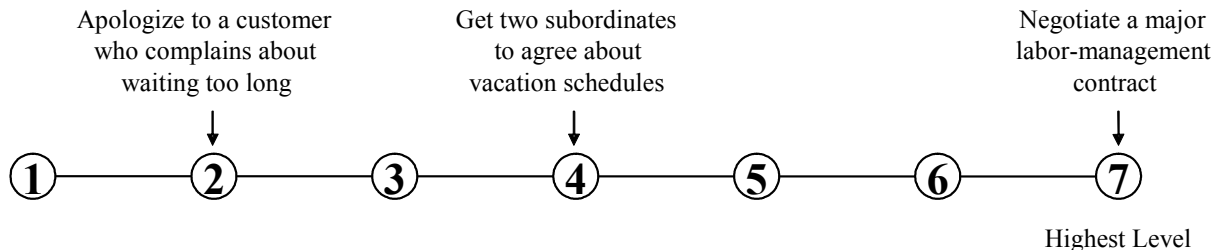
Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others.

A. How important is RESOLVING CONFLICTS AND NEGOTIATING WITH OTHERS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

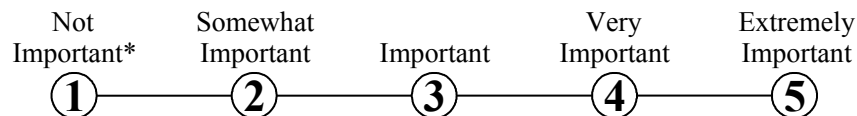
B. What level of RESOLVING CONFLICTS AND NEGOTIATING WITH OTHERS is needed to perform the occupation?



32. Performing for or Working Directly with the Public

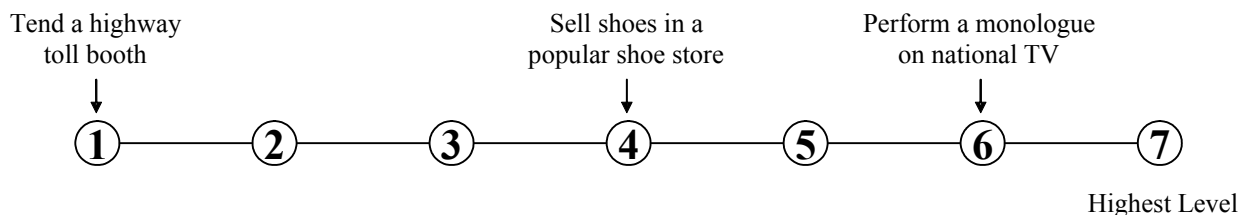
Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.

A. How important is PERFORMING FOR OR WORKING DIRECTLY WITH THE PUBLIC to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

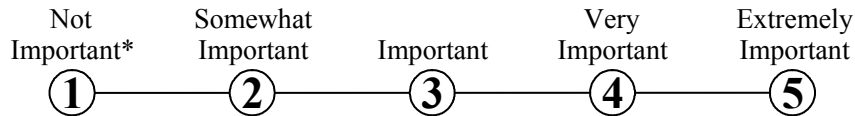
B. What level of PERFORMING FOR OR WORKING DIRECTLY WITH THE PUBLIC is needed to perform the occupation?



33. Coordinating the Work and Activities of Others

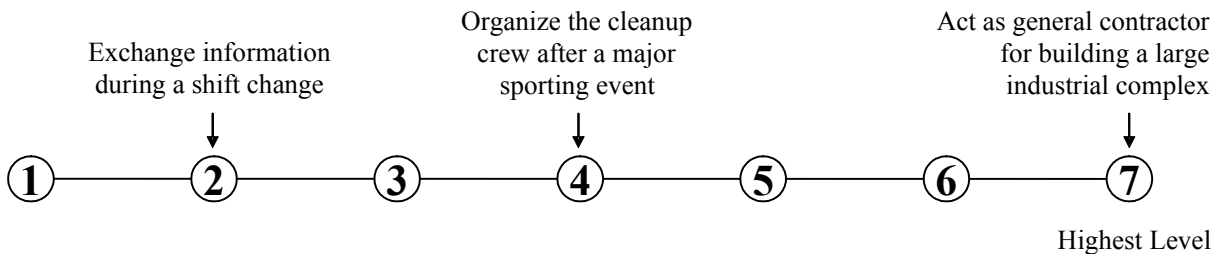
Getting members of a group to work together to accomplish tasks.

A. How important is COORDINATING THE WORK AND ACTIVITIES OF OTHERS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

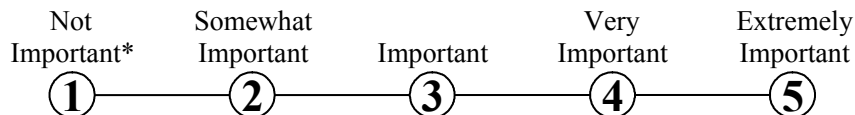
B. What level of COORDINATING THE WORK AND ACTIVITIES OF OTHERS is needed to perform the occupation?



34. Developing and Building Teams

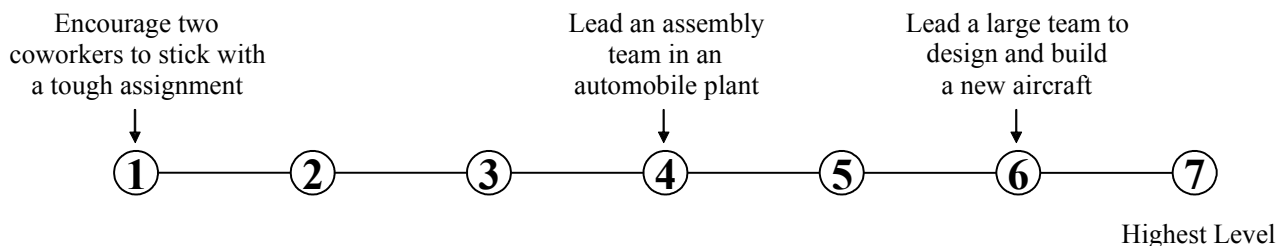
Encouraging and building mutual trust, respect, and cooperation among team members.

A. How important is DEVELOPING AND BUILDING TEAMS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

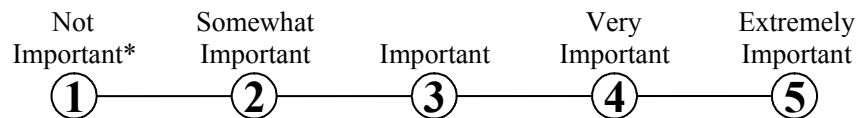
B. What level of DEVELOPING AND BUILDING TEAMS is needed to perform the occupation?



37. Coaching and Developing Others

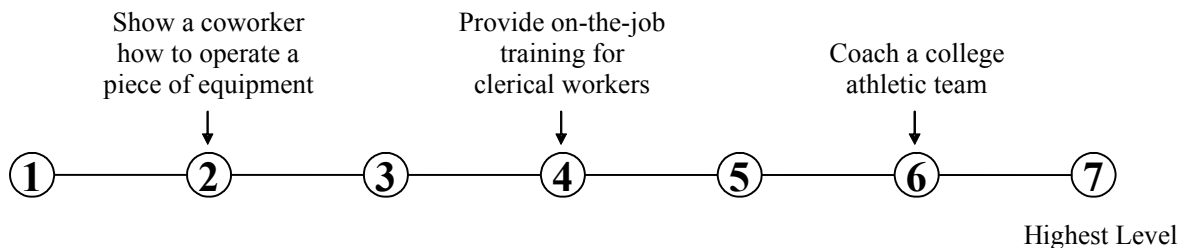
Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills.

A. How important is COACHING AND DEVELOPING OTHERS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

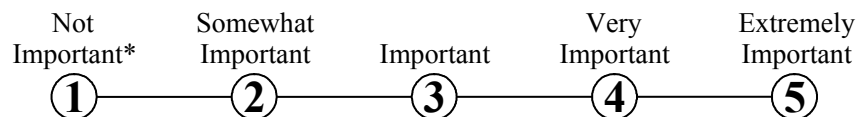
B. What level of COACHING AND DEVELOPING OTHERS is needed to perform the occupation?



38. Providing Consultation and Advice to Others

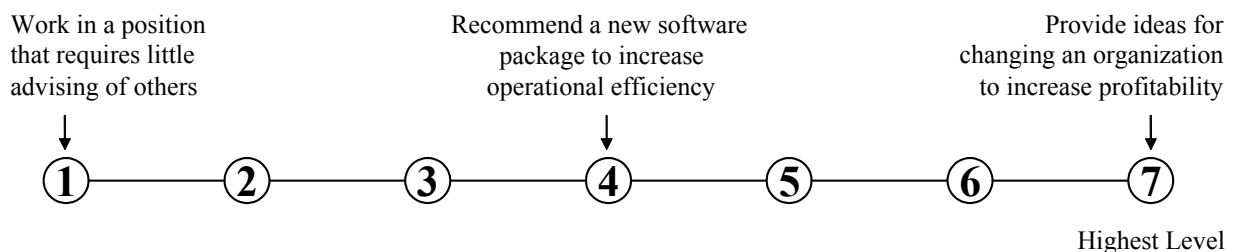
Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.

A. How important is PROVIDING CONSULTATION AND ADVICE TO OTHERS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

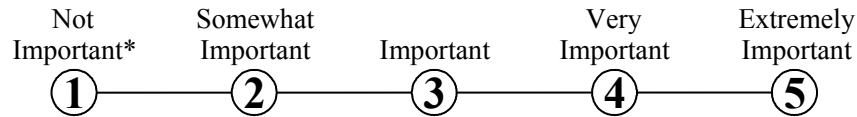
B. What level of PROVIDING CONSULTATION AND ADVICE TO OTHERS is needed to perform the occupation?



39. Performing Administrative Activities

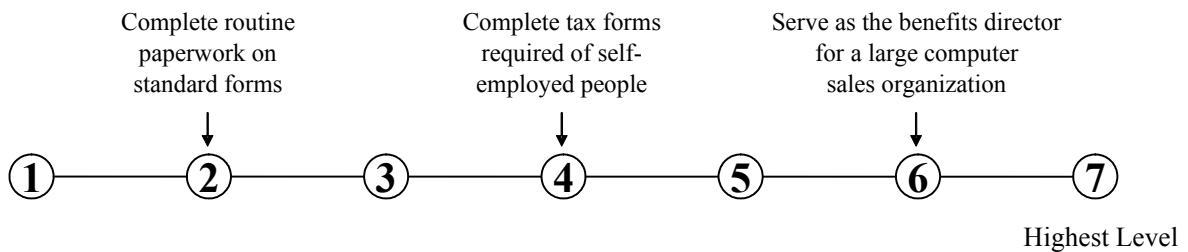
Performing day-to-day administrative tasks such as maintaining information files and processing paperwork.

A. How important is PERFORMING ADMINISTRATIVE ACTIVITIES to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

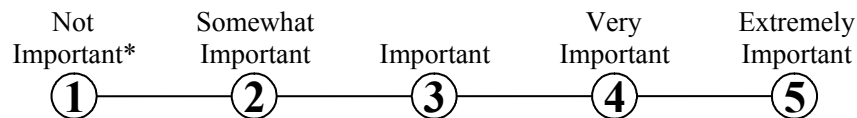
B. What level of PERFORMING ADMINISTRATIVE ACTIVITIES is needed to perform the occupation?



40. Staffing Organizational Units

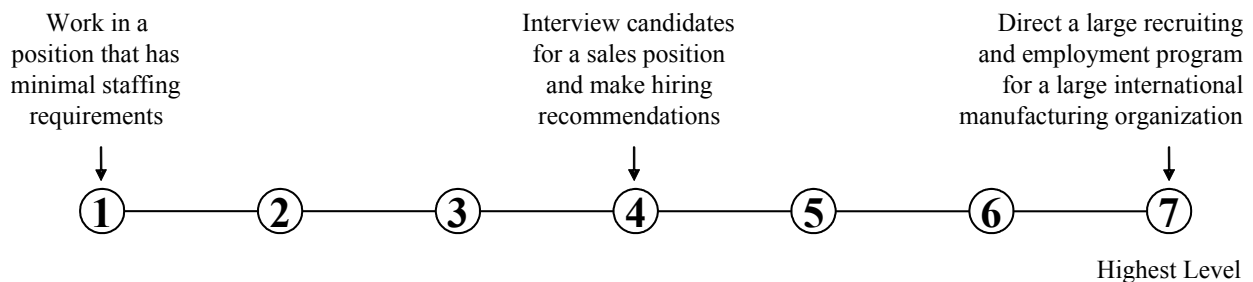
Recruiting, interviewing, selecting, hiring, and promoting employees in an organization.

A. How important is STAFFING ORGANIZATIONAL UNITS to the performance of the occupation?



* If you marked Not Important, skip LEVEL below and go on to the next activity.

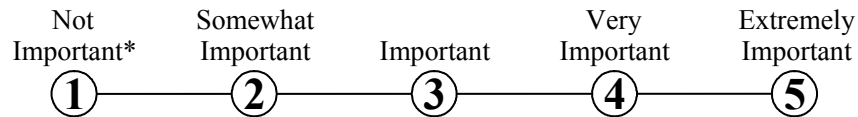
B. What level of STAFFING ORGANIZATIONAL UNITS is needed to perform the occupation?



41. Monitoring and Controlling Resources

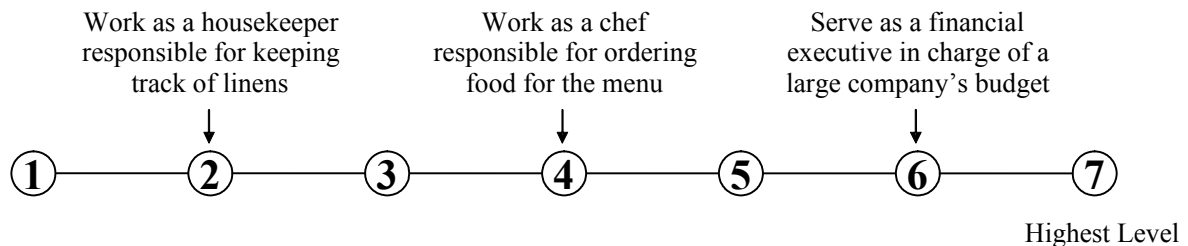
Monitoring and controlling resources and overseeing the spending of money.

A. How important is MONITORING AND CONTROLLING RESOURCES to the performance of the occupation?



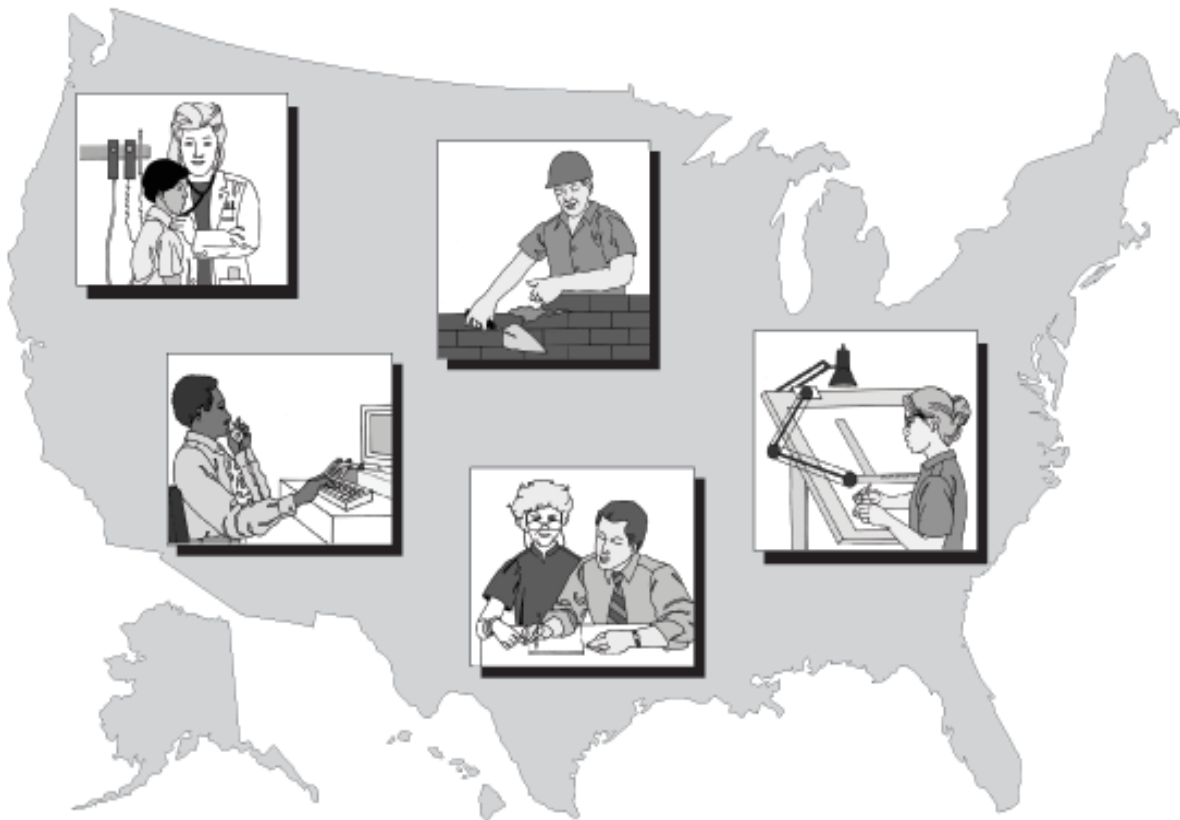
* If you marked Not Important, skip LEVEL below and go on to the next activity.

B. What level of MONITORING AND CONTROLLING RESOURCES is needed to perform the occupation?



Form D
OMB#1205-0421
Expires: 12/31/2008
Ver.: 9/05

Some Important Questions About The *Work Context* Of The Occupation



Please return your completed questionnaire in the enclosed envelope to:
Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 27709-2194
Sponsored by: The U.S. Department of Labor and the National O*NET Consortium

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number. Respondents' obligation to reply to these reporting requirements is voluntary. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the U.S. Department of Labor, Office of Workforce Investment, Attn: O*NET Project, Frances Perkins Building, Mail Stop S4231, 200 Constitution Ave., NW, Washington, DC 20210 (OMB Control Number 1205-0421).

Return to: Research Triangle Institute, PO Box 12194
Research Triangle Park, North Carolina, 27709-2194

Instructions for Work Context Questionnaire

Instructions

In this questionnaire you will be asked about working conditions. These questions are about the work setting and its possible hazards, the pace of work, and dealings with other people while on the job. As an occupational expert, first consider the different working conditions experienced by workers in the occupation. Then, with this information in mind, please answer each question as if you were performing work that is typical of the occupation.

Read each question carefully and look closely at answer choices after each question. Put an **X** through the number for the answer that best describes what workers experience in the occupation.

For example:

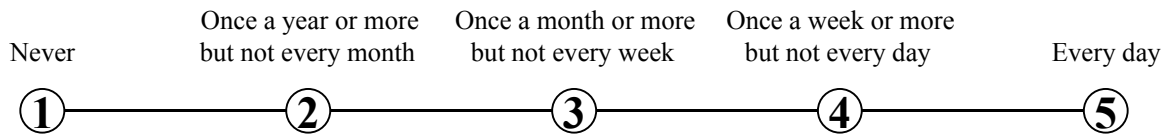
How many hours do workers work in a typical week in the occupation?

Less than 40 hours 40 hours More than 40 hours

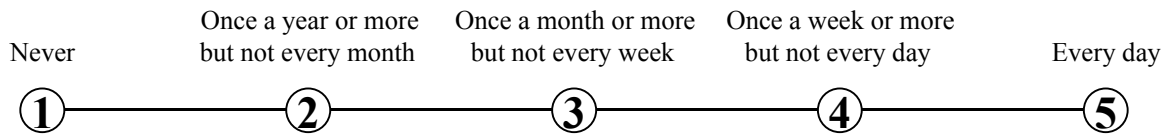
① ————— ~~②~~ ————— ③

Mark your answer by putting an **X** through the number that represents your answer.
Do not mark on the line between the numbers.

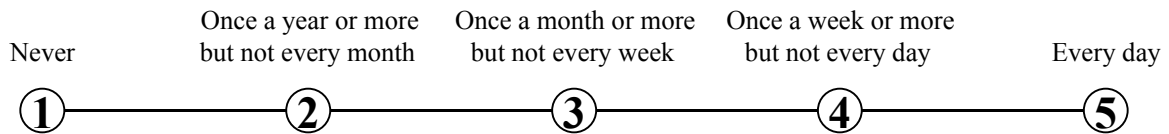
1. How often does the occupation require face-to-face discussions with individuals and within teams?



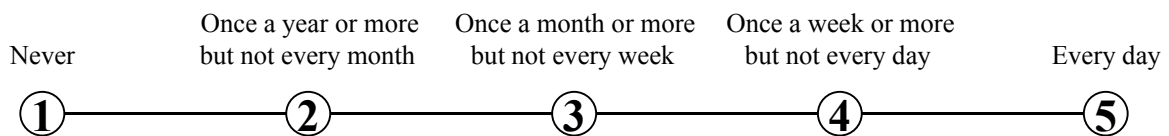
2. How frequently does the occupation require public speaking (one speaker with an audience)?



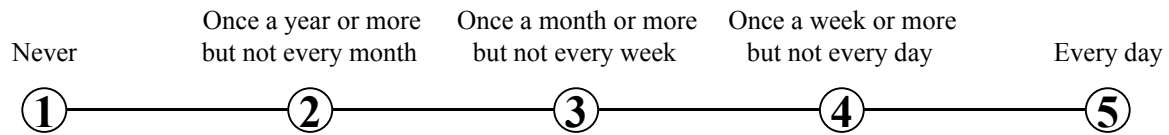
3. How frequently does the occupation require telephone conversation?



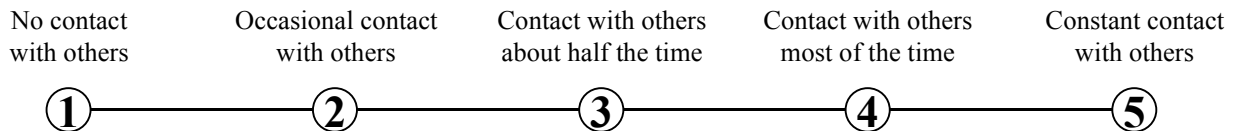
4. How frequently does the occupation require electronic mail?



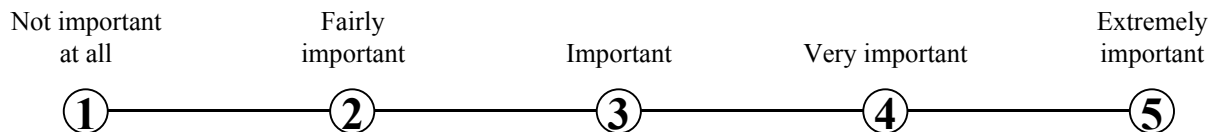
5. How frequently does the occupation require written letters and memos?



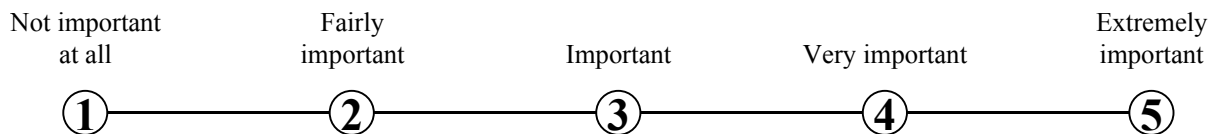
6. How much contact with others (by telephone, face-to-face, or otherwise) is required to perform the occupation?



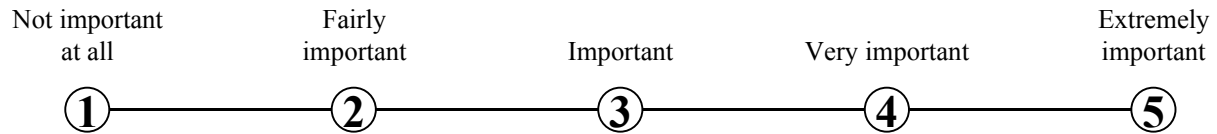
7. How important are interactions that require workers to work with or contribute to a work group or team to perform the occupation?



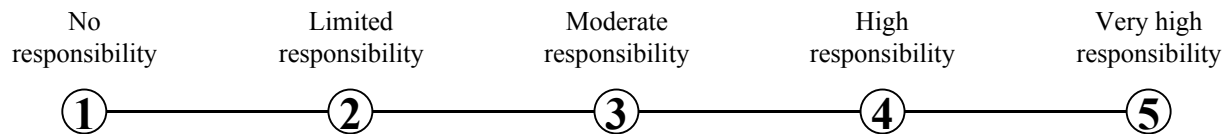
8. In the occupation, how important are interactions that require workers to deal with external customers (as in retail sales) or the public in general (as in police work)?



9. In the occupation, how important are interactions that require workers to coordinate or lead others in accomplishing work activities (not as a supervisor or team leader)?



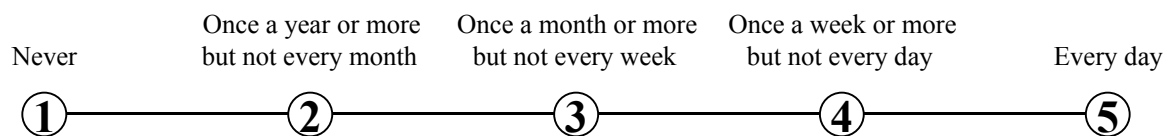
10. In the occupation, how responsible are workers for the health and safety of other workers?



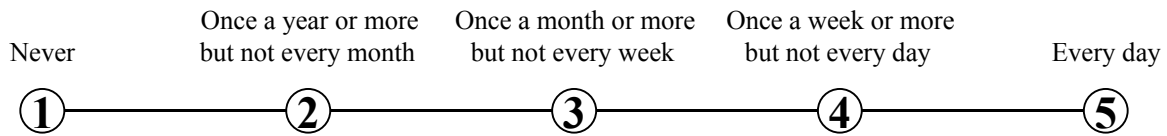
11. In the occupation, how responsible are workers for work outcomes and results of other workers?



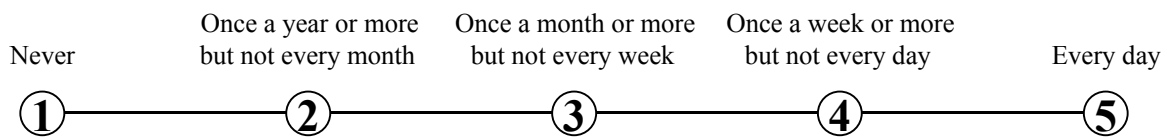
12. How often are conflict situations a part of the occupation?



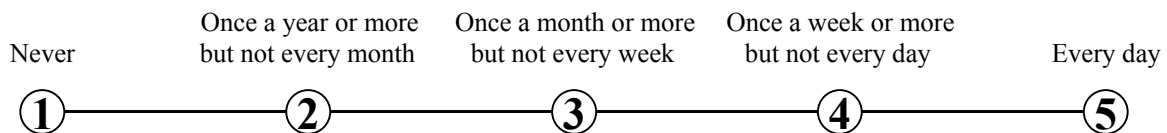
13. How often is dealing with unpleasant, angry, or discourteous people a part of the occupation?



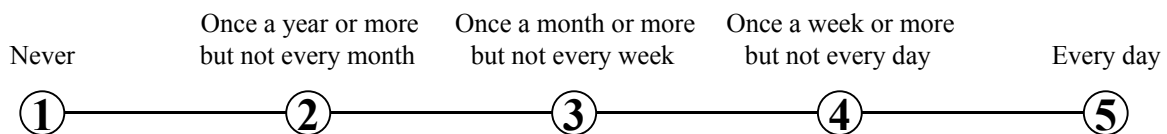
14. How often is dealing with violent or physically aggressive people a part of the occupation?



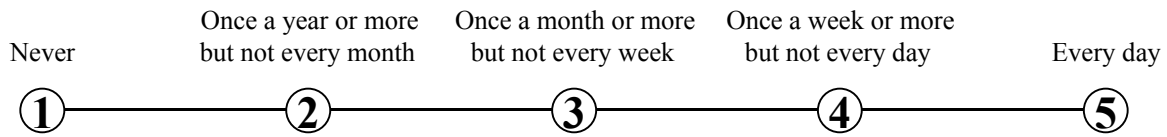
15. How often does the occupation require workers to work indoors in an environmentally controlled environment (like a warehouse with air conditioning)?



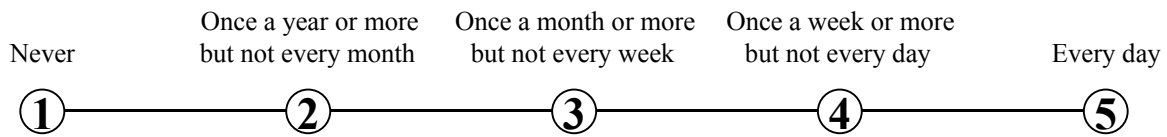
16. How often does the occupation require workers to work in an environment that is not environmentally controlled (like a warehouse without air conditioning)?



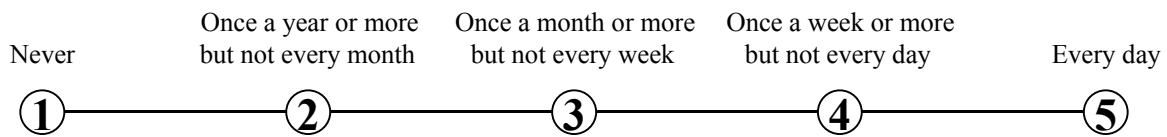
17. How often does the occupation require workers to work outdoors, exposed to all weather conditions?



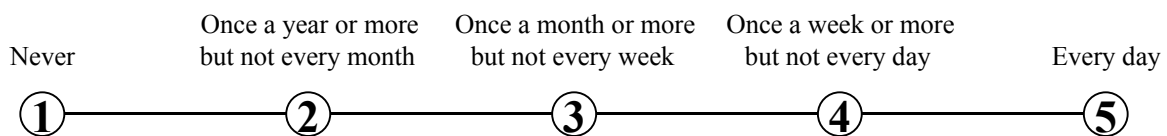
18. How often does the occupation require workers to work outdoors, under cover (like in an open shed)?



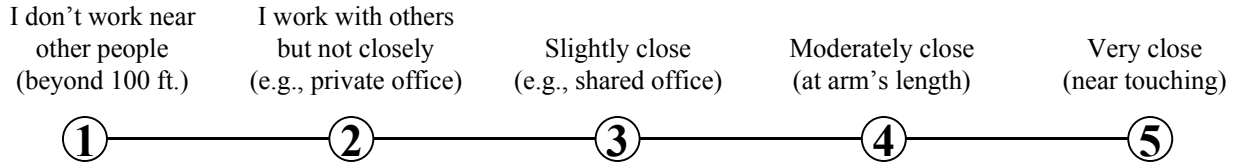
19. How often does the occupation require workers to work in an open vehicle or operating equipment (like a tractor)?



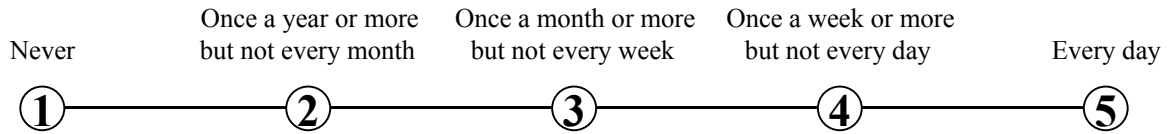
20. How often does the occupation require workers to work in a closed vehicle or operate enclosed equipment (like a car)?



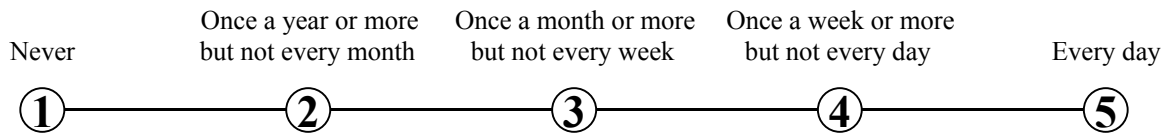
21. How physically close to other people are workers when they perform the occupation?



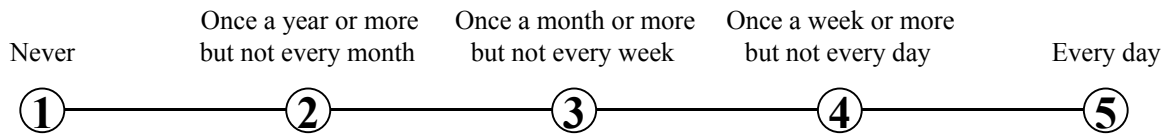
22. In the occupation, how often are workers exposed to sounds and noise levels that are distracting and uncomfortable?



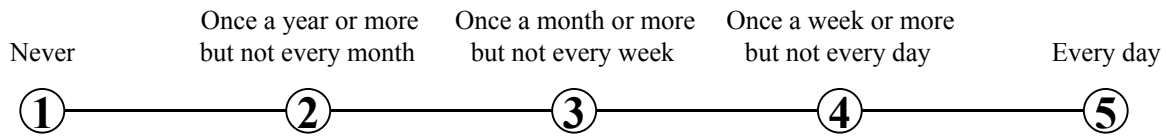
23. In the occupation, how often are workers exposed to very hot (above 90° F) or very cold (under 32° F) temperatures?



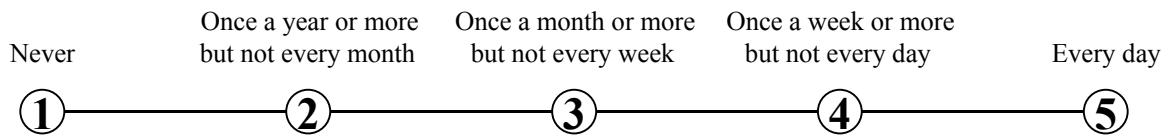
24. In the occupation, how often are workers exposed to extremely bright or inadequate lighting conditions?



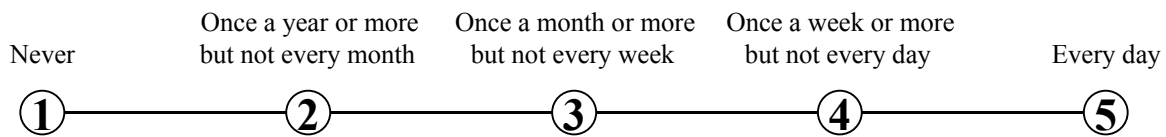
25. In the occupation, how often are workers exposed to contaminants (such as pollutants, gases, dust, or odors)?



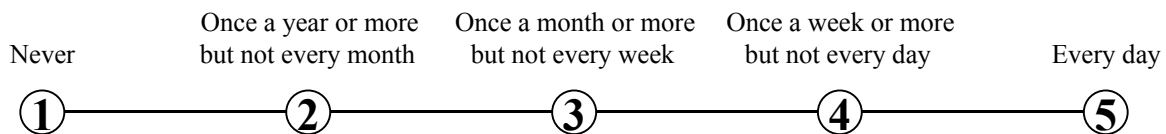
26. In the occupation, how often are workers exposed to cramped work space that requires getting into awkward positions?



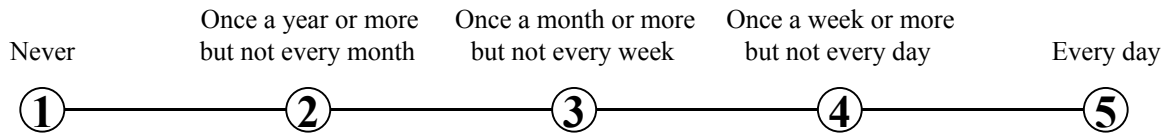
27. In the occupation, how often are workers exposed to whole body vibration (like operating a jackhammer or earth moving equipment)?



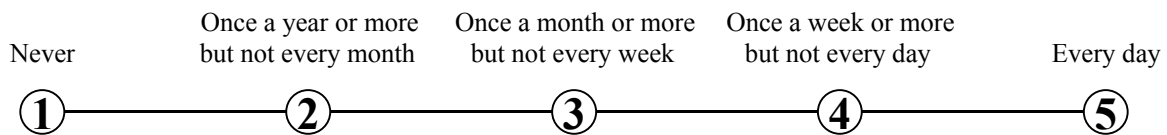
28. How often does the occupation require that workers be exposed to radiation?



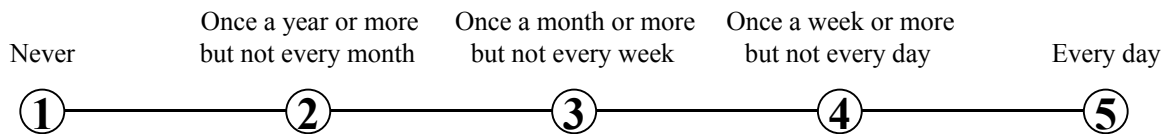
29. **How often does the occupation require that workers be exposed to diseases or infection?** This can happen with workers in patient care, some laboratory work, sanitation control, etc.



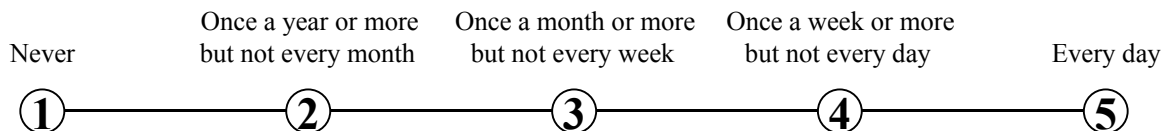
30. **How often does the occupation require that workers be exposed to high places?** This can happen for workers who work on poles, scaffolding, catwalks, or ladders longer than 8 feet in length.



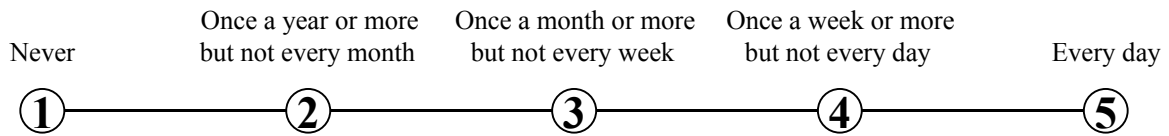
31. **How often does the occupation require that workers be exposed to hazardous conditions?** This can happen when working with high voltage electricity, flammable material, explosives, or chemicals. Do not include working with hazardous equipment.



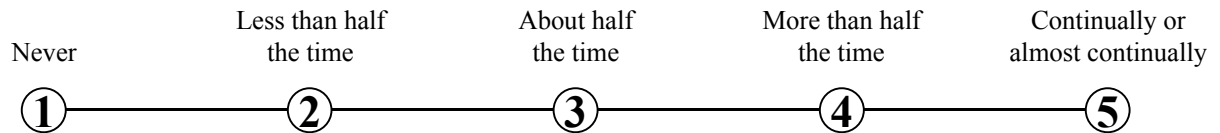
32. **How often does the occupation require that workers be exposed to hazardous equipment?** This includes working with saws, close to machinery with exposed moving parts, or working near vehicular traffic (but not including driving a vehicle).



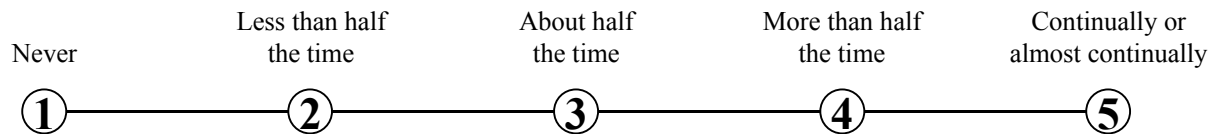
33. How often does the occupation require that workers be exposed to minor burns, cuts, bites, or stings?



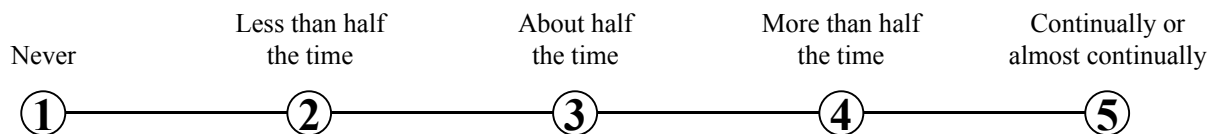
34. How much time in the occupation do workers spend sitting?



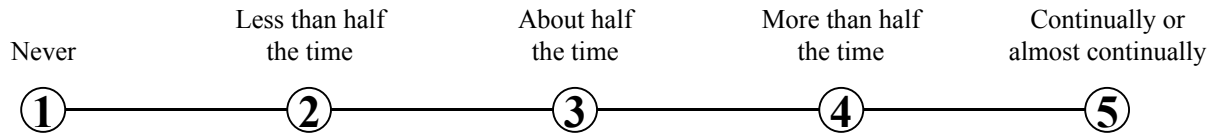
35. How much time in the occupation do workers spend standing?



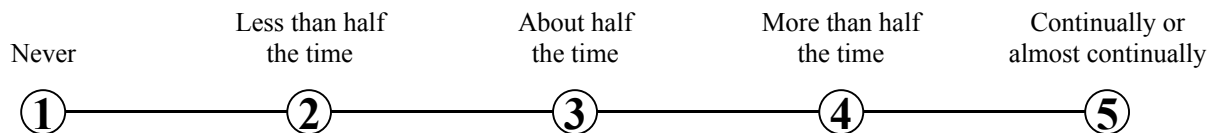
36. How much time in the occupation do workers spend climbing ladders, scaffolds, poles, etc.?



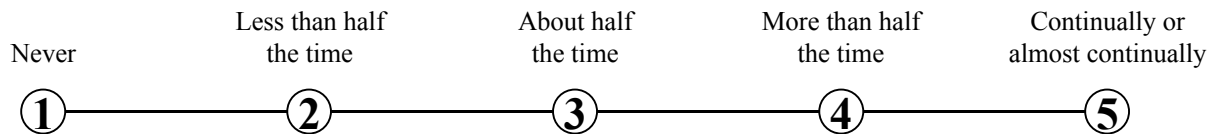
37. How much time in the occupation do workers spend walking or running?



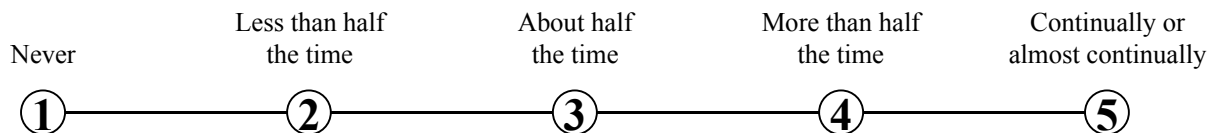
38. How much time in the occupation do workers spend kneeling, crouching, stooping, or crawling?



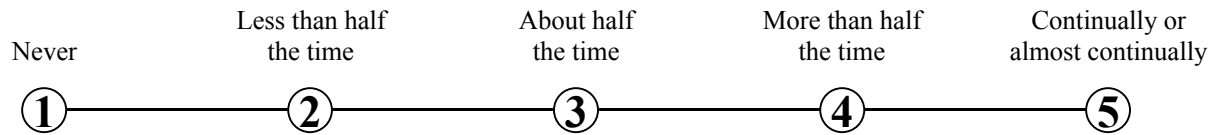
39. How much time in the occupation do workers spend keeping or regaining their balance?



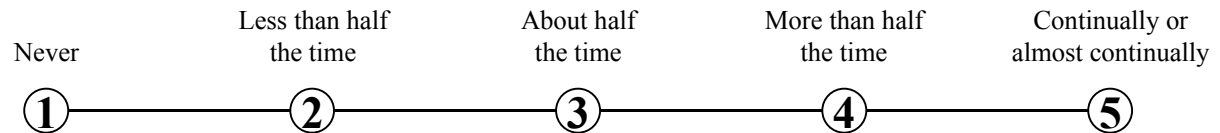
40. How much time in the occupation do workers spend using their hands to handle, control, or feel objects, tools, or controls?



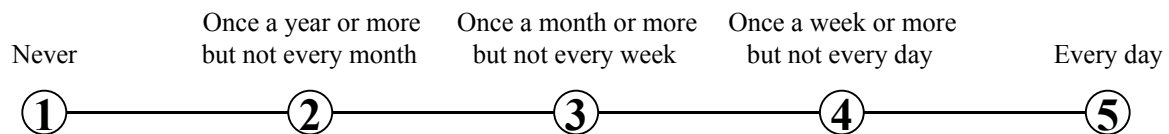
41. How much time in the occupation do workers spend bending or twisting their body?



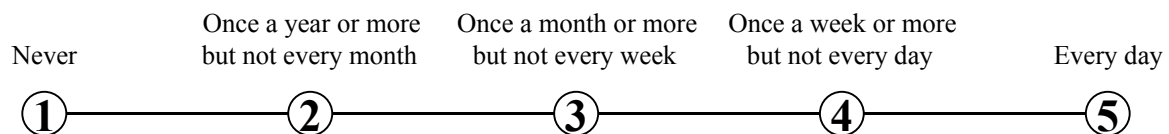
42. How much time in the occupation do workers spend making repetitive motions?



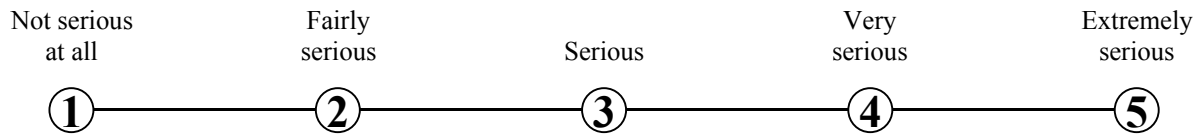
43. In the occupation, how often do workers wear common protective or safety equipment such as safety shoes, glasses, gloves, hearing protection, hard hats, or life jackets?



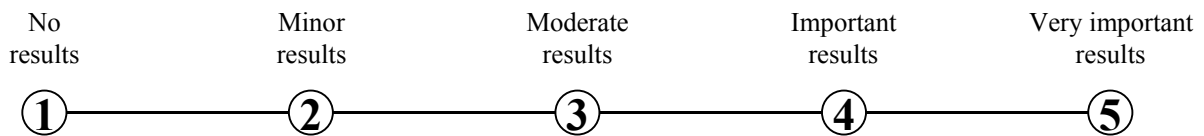
44. In the occupation, how often do workers wear specialized protective or safety equipment, such as breathing apparatus, safety harness, full protection suits, or radiation protection?



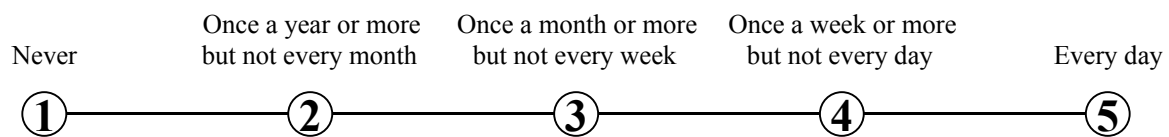
45. In the occupation, how serious a mistake can workers make (one they can't easily correct)?



46. In the occupation, what results do workers' decisions usually have on other people or the image or reputation or financial resources of their employers?



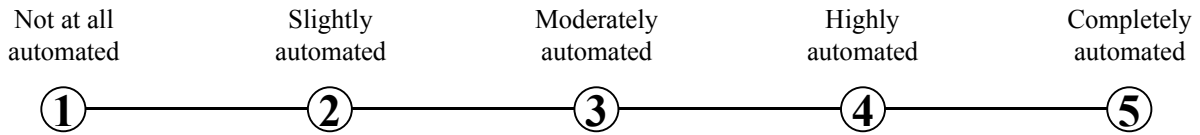
47. In the occupation, how often do workers' decisions affect other people or the image or reputation or financial resources of their employers?



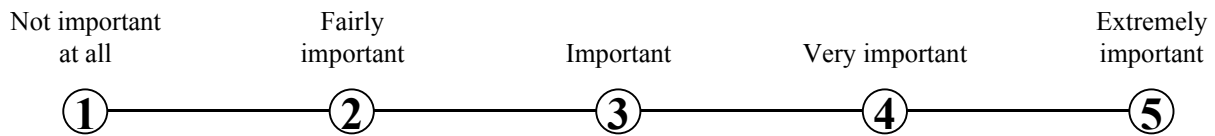
48. In the occupation, how much freedom do workers have to make decisions without supervision?



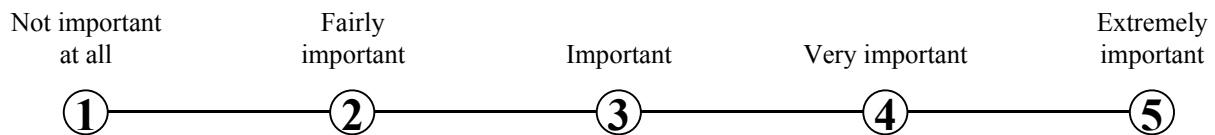
49. How automated is work in the occupation?



50. How important to the occupation is being very exact or highly accurate?



51. How important to the occupation are continuous, repetitious physical activities (like key entry) or mental activities (like checking entries in a ledger)?



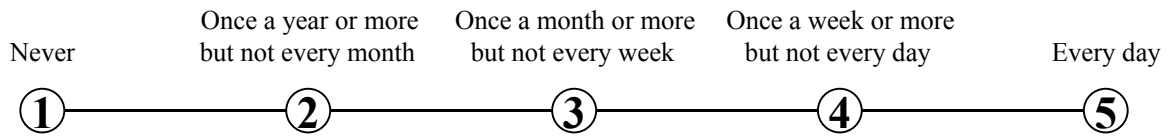
52. In the occupation, how much freedom do workers have to determine the tasks, priorities, or goals of their work?



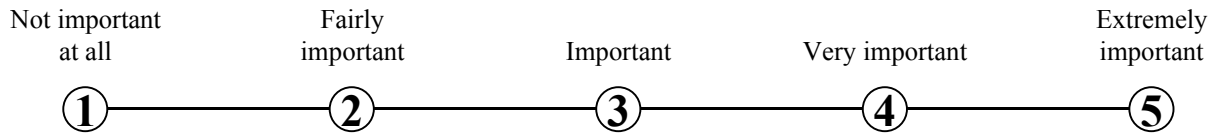
53. How competitive is the occupation?



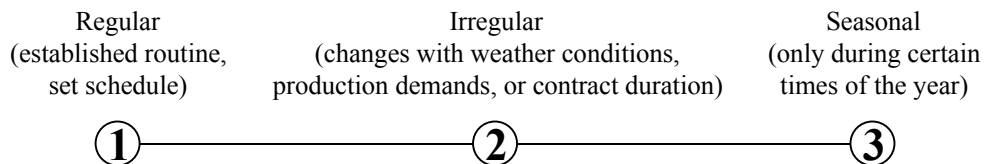
54. How often does the occupation require workers to meet strict deadlines?



55. How important to the occupation is keeping a pace set by machinery or equipment?



56. How regular is the work schedule in the occupation?

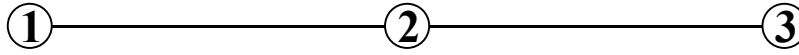


57. How many hours do workers work in a typical week in the occupation?

Less than 40 hours

40 hours

More than 40 hours



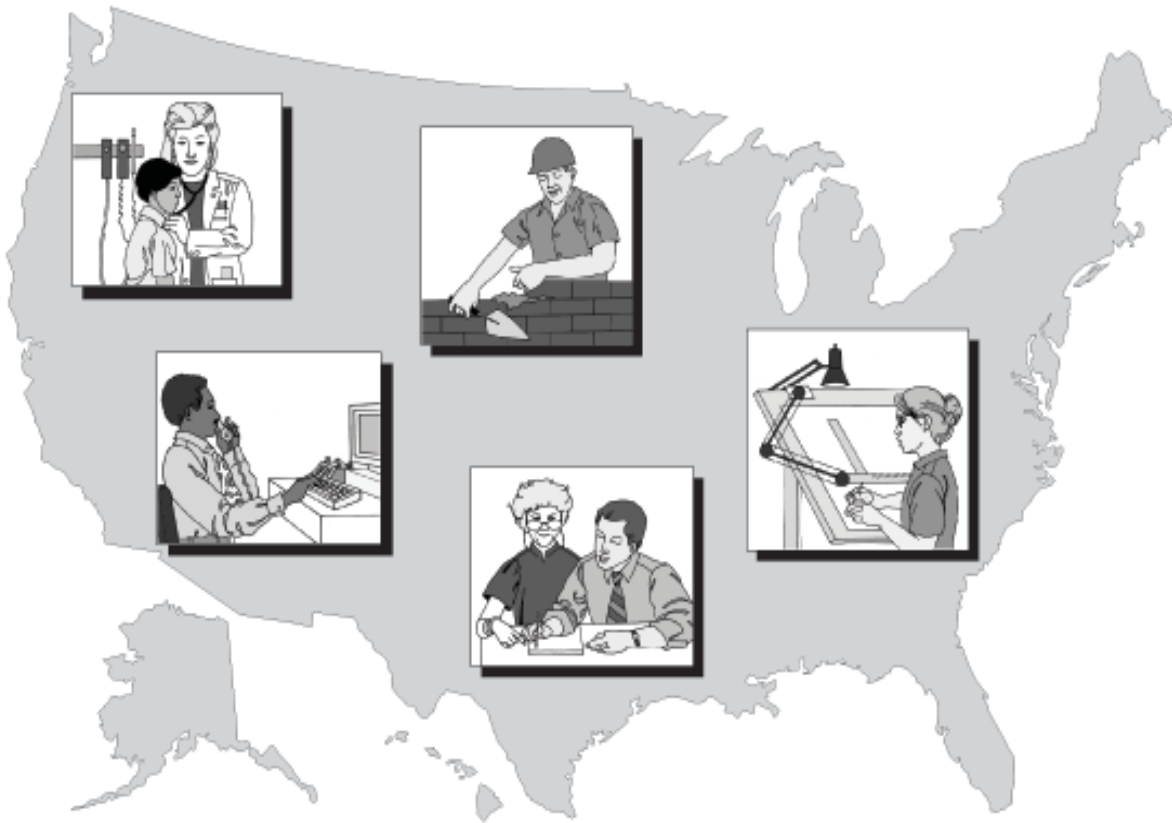
Occupation Expert Method Task Questionnaire

The occupation description and tasks in the Occupation Expert (OE) Task questionnaire will vary for each OE occupation. The following sample OE Background Questionnaire is for the occupation of Political Scientists.

OMB#1205-0421
Expires: 12/31/2008
Ver.: 9/05

Username: Password:
O=122748 S=39 B=1849
Political Scientists
Questionnaire ID:

Some Important Questions About The *Tasks* Of The Occupation



Please return your completed questionnaire in the enclosed envelope to:
Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 2770
Sponsored by: The U.S. Department of Labor and the National O*NET Consortium

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number. Respondents' obligation to reply to these reporting requirements is voluntary. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the U.S. Department of Labor, Office of Workforce Investment, Attn: O*NET Project, Frances Perkins Building, Mail Stop S4231, 200 Constitution Ave., NW, Washington, DC 20210 (OMB Control Number 1205-0421).

Return to: Research Triangle Institute, PO Box 12194
Research Triangle Park, North Carolina, 27709-2194

Specific Tasks Performed on Your Job

Instructions: Please read the following position description and then answer the question that follows it by marking an X in the appropriate box below.

Political Scientists

Study the origin, development, and operation of political systems. Research a wide range of subjects, such as relations between the United States and foreign countries, the beliefs and institutions of foreign nations, or the politics of small towns or a major metropolis. May study topics, such as public opinion, political decision making, and ideology. May analyze the structure and operation of governments, as well as various political entities. May conduct public opinion surveys, analyze election results, or analyze public documents.

Do you have expertise on the work performed in the occupation named and briefly described above?

- I have expertise on almost all of the work performed in the occupation.
- I have expertise on many aspects of the work performed, but not on some aspects.
- I have expertise on some aspects of the work performed, but not on many aspects.
- I have no expertise on the work performed in the occupation.

Please proceed to the next page.

Specific Tasks Performed in the Occupation (continued)

Instructions: The next section presents a list of tasks. A task is an action or set of actions performed together to accomplish an objective. This list is specific to the occupation you are describing.

For each task, please make the following three ratings: **Relevance**, **Frequency**, and **Importance**. As an occupational expert, first consider the different tasks performed by workers in the occupation. Then, with this information in mind, please rate each task as if you were performing work that is typical of the occupation. The ratings are described as follows:

RELEVANCE. If the task is NOT RELEVANT at all to performance of the occupation, mark through the "0" in the NOT RELEVANT column. Carefully read the task before deciding whether it is RELEVANT or NOT RELEVANT to the occupation. If you select the "0" in the NOT RELEVANT column, however, there is no need to complete the IMPORTANCE and FREQUENCY ratings described below. If the task is part of the occupation, rate IMPORTANCE and FREQUENCY.

FREQUENCY. (Do not complete if NOT RELEVANT was selected.) Ask yourself, "How often is this task performed in the occupation?" For example, "Interact with potential customers" is a task that an employee in one occupation might perform only "once per week or less," but an employee in another occupation might perform "hourly or more often."

Rate the FREQUENCY with which a task is performed by marking through the appropriate number, from 1 (indicating that the task is performed once per year or less often) to 7 (indicating that the task is performed hourly or more often) on the FREQUENCY scale.

IMPORTANCE. (Do not complete if NOT RELEVANT was selected.) Ask yourself, "How important is this task to performance of the occupation?" For example, "Develop objectives and strategies to guide the organization" might be very important for an employee in one occupation, but less important for another occupation. For the second occupation, however, "Provide performance feedback to subordinates" might be very important.

Rate importance of the task for performance of the occupation by marking through the appropriate number, from 1 (indicating that the task is of no importance) to 5 (indicating that the task is extremely important) on the IMPORTANCE scale.

Please proceed to the next page.

Frequency

Importance

		Frequency							Importance				
		Not Relevant	Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important
1. Forecast political, economic, and social trends.	0	1	2	3	4	5	6	7	1	2	3	4	5
2. Write drafts of legislative proposals, and prepare speeches, correspondence, and policy papers for governmental use.	0	1	2	3	4	5	6	7	1	2	3	4	5
3. Teach political science.	0	1	2	3	4	5	6	7	1	2	3	4	5
4. Collect, analyze, and interpret data such as election results and public opinion surveys; report on findings, recommendations, and conclusions.	0	1	2	3	4	5	6	7	1	2	3	4	5
5. Identify issues for research and analysis.	0	1	2	3	4	5	6	7	1	2	3	4	5
6. Provide media commentary and/or criticism related to public policy and political issues and events.	0	1	2	3	4	5	6	7	1	2	3	4	5
7. Interpret and analyze policies, public issues, legislation, and/or the operations of governments, businesses, and organizations.	0	1	2	3	4	5	6	7	1	2	3	4	5
8. Evaluate programs and policies, and make related recommendations to institutions and organizations.	0	1	2	3	4	5	6	7	1	2	3	4	5

Frequency

Importance

	Not Relevant	Frequency							Importance				
		Once per year or less	More than once per year	More than once per month	More than once per week	Daily	Several times per day	Hourly or more often	Not Important	Somewhat Important	Important	Very Important	Extremely Important
9. Develop and test theories, using information from interviews, newspapers, periodicals, case law, historical papers, polls, and/or statistical sources.	0	1	2	3	4	5	6	7	1	2	3	4	5
10. Disseminate research results through academic publications, written reports, or public presentations.	0	1	2	3	4	5	6	7	1	2	3	4	5
11. Maintain current knowledge of government policy decisions.	0	1	2	3	4	5	6	7	1	2	3	4	5
12. Consult with and advise government officials, civic bodies, research agencies, the media, political parties, and others concerned with political issues.	0	1	2	3	4	5	6	7	1	2	3	4	5

Frequency

Importance

Additional Relevant Tasks

Please write in additional relevant tasks and provide a rating.

1. _____

2. _____

3. _____

4. _____

5. _____

Not Relevant

Once per year or less
 More than once per year
 More than once per month
 More than once per week
 Daily
 Several times per day
 Hourly or more often

Not Important
 Somewhat Important
 Important
 Very Important
 Extremely Important

0

1 2 3 4 5 6 7

1 2 3 4 5

0

1 2 3 4 5 6 7

1 2 3 4 5

0

1 2 3 4 5 6 7

1 2 3 4 5

0

1 2 3 4 5 6 7

1 2 3 4 5

0

1 2 3 4 5 6 7

1 2 3 4 5

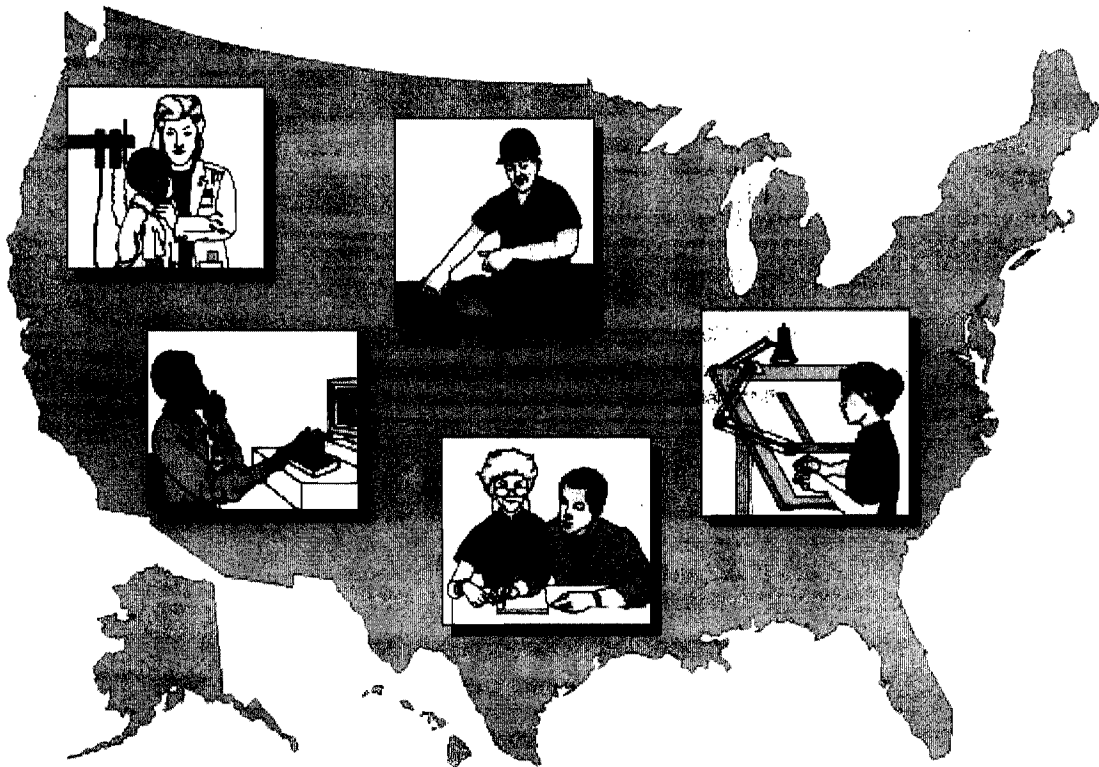
Occupation Expert Method Background Questionnaires

The occupation and association names in the question stem and response categories in the Occupation Expert (OE) Background Questionnaire vary for each OE occupation. The following sample OE Background Questionnaire is for the occupation of Environmental Compliance Inspectors.

OMB#1205-0421
Expires: 12/31/2008
Ver.: 9/05

O=15642 C=62891 B=2619
(OCCUPATION NAME, ROSTER LINE NUMBER)
Web site username: (USERNAME)
Web site password: (PASSWORD)

Background Questionnaire



Please return your completed questionnaire in the enclosed envelope to:
Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 2770
Sponsored by: The U.S. Department of Labor and the National O*NET Consortium

Persons are not required to respond to this collection of information unless it displays a currently valid OMB control number. Respondents' obligation to reply to these reporting requirements is voluntary. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the U.S. Department of Labor, Office of Workforce Investment, Attn: O*NET Project, Frances Perkins Building, Mail Stop S4231, 200 Constitution Ave., NW, Washington, DC 20210 (OMB Control Number 1205-0421).

Return to: Research Triangle Institute, PO Box 12194
Research Triangle Park, North Carolina, 27709-2194

Background Information

Occupation Expert for: Environmental Compliance Inspector

The goal of this project is to get accurate, up-to-date information on the occupation of **environmental compliance inspector** from a diverse and representative set of experts in the field. Your answers to these questions will help us achieve this goal. Therefore, it is very important that you give accurate answers to these questions. Thank you for your assistance.

Please read each question carefully and mark your answer by putting an X in the box beside your answer or by writing an answer on the line provided. Please answer the following questions for the occupation of **environmental compliance inspector**.

1. **What is the title of your most recent job in this occupation?** (Please print)

2. **In your most recent job in this occupation, were you employed part-time or full-time?** (Mark one box)

Part-time

Full-time

3. **In your most recent job in this occupation, were you employed by** (Mark one box)

Government

Private for-profit company

Non-profit organization, including tax-exempt and charitable organizations

Academic institution

Self-employed

Other (Please print) _____

4. How much **combined** experience do you have performing work in this occupation, supervising workers in this occupation, and/or conducting training or teaching educational courses related to performing the work in this occupation? (Mark one box)

- Ten years or more
- At least 5 years, but less than 10 years
- At least 3 years, but less than 5 years
- At least 1 year, but less than 3 years
- Less than 1 year
- Never worked in this occupation in any capacity.

5. How much experience do you have **performing work** in this occupation? (Mark one box)

- Ten years or more
- At least 5 years, but less than 10 years
- At least 3 years, but less than 5 years
- At least 1 year, but less than 3 years
- Less than 1 year
- Never performed work in the occupation

6. When were you **last employed** in this occupation? (Mark one box)

- Currently employed in this occupation
- Within the last 6 months
- At least 6 months ago, but less than 1 year
- One year or more ago
- Never employed in this occupation

7. **How much experience do you have supervising workers in this occupation?**
(Mark one box)

- Ten years or more
- At least 5 years, but less than 10 years
- At least 3 years, but less than 5 years
- At least 1 year, but less than 3 years
- Less than 1 year
- Never supervised workers in this occupation

8. **When were you last a supervisor of workers in this occupation?**
(Mark one box)

- Currently a supervisor of workers in this occupation
- Within the last 6 months
- At least 6 months ago, but less than 1 year
- One year or more ago
- Never supervised workers in this occupation

9. **How much experience do you have conducting training or teaching educational courses related to performing this occupation?** (Mark one box)

- Ten years or more
- At least 5 years, but less than 10 years
- At least 3 years, but less than 5 years
- At least 1 year, but less than 3 years
- Less than 1 year
- Never served as a trainer/teacher for workers in this occupation

10. When were you last conducting training or teaching educational courses related to performing this occupation? (Mark one box)

- Currently employed as a trainer/teacher of workers in this occupation
- Within the last six months
- At least 6 months ago, but less than 1 year
- One year or more ago
- Never served as a trainer/teacher of workers in this occupation

11. Are you male or female? (Mark one box)

- Male
- Female

12. In what year were you born? 1 9 _ _

13. Are you Hispanic or Latino? (Mark one box)

- Yes
- No

14. What is your race? (Mark one or more boxes)

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White

15. Do you have any of the following long-lasting conditions?

Yes No

- | | | |
|--|--------------------------|--------------------------|
| a. Blindness, deafness, or a severe vision or hearing impairment? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. A condition that essentially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying? | <input type="checkbox"/> | <input type="checkbox"/> |

16. Because of a physical, mental, or emotional condition lasting 6 months or more, do you have any difficulty doing any of the following activities?

Yes No

- | | | |
|---|--------------------------|--------------------------|
| a. Learning, remembering, or concentrating? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Dressing, bathing, or getting around inside the home? | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Going outside the home alone to shop or visit a doctor's office? | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Working at a job or business? | <input type="checkbox"/> | <input type="checkbox"/> |

17. Indicate the highest level of education that you have completed
(Mark one box)

- Less than a High School Diploma**
- High School Diploma** (or GED or High School Equivalence Certificate)
- Post-Secondary Certificate** – awarded for training completed after high school (for example, in Personnel Services, Engineering-related Technologies, Vocational Home Economics, Construction Trades, Mechanics and Repairers, Precision Production Trades)
- Some College Courses**
- Associate’s Degree** (or other 2-year degree)
- Bachelor’s Degree**
- Post-Baccalaureate Certificate** – awarded for completion of an organized program of study; designed for people who have completed a Baccalaureate degree but do not meet the requirements of academic degrees carrying the title of Master
- Master’s Degree**
- Post-Master’s Certificate** – awarded for completion of an organized program of study; designed for people who have completed a Master’s degree but do not meet the requirements of academic degrees at the doctoral level
- First Professional Degree** – awarded for completion of a program that
 - requires at least 2 years of college work before entrance into the program
 - includes a total of at least 6 academic years of work to complete, and
 - provides all remaining academic requirements to begin practice in a profession
- Doctoral Degree**
- Post-Doctoral Training**

Your Association Memberships

Finally, we would like to know about the professional associations to which you belong.

1. **Are you currently a member of one or more professional associations?**
(Please respond for each association listed; if none are listed below, please skip to Question 2.)

Environmental Protection Agency Yes No

International Network for Environmental Yes No

Compliance and Enforcement

2. **Please print the names of any other job-related associations to which you belong:**

a. _____

b. _____

c. _____

***Appendix B: Advisory Panel for the Dictionary of
Occupational Titles: Final Report***

The New DOT: A Database of Occupational Titles for the Twenty-First Century



U.S. Department of Labor
Employment and Training Administration

Advisory Panel for the Dictionary of
Occupational Titles (APDOT)

Final Report

May 1993

The New DOT: A Database of Occupational Titles for the Twenty-First Century



Final Report

Advisory Panel for the Dictionary
of Occupational Titles (APDOT)

U.S. Department of Labor
Robert B. Reich, Secretary

Employment and Training Administration
United States Employment Service
1993

TABLE OF CONTENTS

Letter of Transmittal	v
Members of the Advisory Panel	vii
Chapter 1: Executive Summary	1
Figure A: Comparison of the Current and Future <u>Dictionary of Occupational Titles</u> (DOT)	9
Chapter 2: APDOT Recommendations	11
Appendices	
Appendix A: Content Model	31
Figure B: The New DOT Content Model	32
Appendix B: APDOT's Role in Revitalizing the DOT	38
Appendix C: Advisory Panel for the Dictionary of Occupational Titles (APDOT) Members (Brief Biographical Sketches)	40
Appendix D: Final Recommendations and APDOT's Charter	44
Appendix E: List of Technical Reports Supporting the Work of the APDOT	46
Appendix F: APDOT Meeting Presenters	50
Appendix G: Acknowledgements	53

ADVISORY PANEL FOR THE DICTIONARY OF OCCUPATIONAL TITLES

APDOT
Washington, D.C.

March 22, 1993

Dear Secretary Reich:

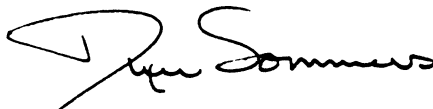
It is my privilege to transmit to you the report of the Advisory Panel for the Dictionary of Occupational Titles. The title of our report, The New DOT: A Database of Occupational Titles for the Twenty-First Century, suggests the forward-looking nature of our recommendations to you.

Historically, the Dictionary of Occupational Titles, the DOT, was developed during the economic crisis of the 1930s as a tool to help the new public employment service place workers in jobs. Over the years, many other uses of the DOT have evolved, making it the nation's most important and widely used information resource on jobs.

The Panel believes that the DOT should be reinvented to reflect the changing nature of work in the global economy. We have recommended creating a new database system for identifying and describing the skills, knowledges and competencies needed in the changing workplace. With this new database, the Department of Labor can provide a strong foundation supporting employers and workers in the transformation to a high performance economy.

My fellow Panel members and I appreciate the opportunity to have served the Department on this important issue. We believe you will find our report to be a strategic tool in improving the nation's workforce development efforts.

Sincerely,



Dixie Sommers
Chair
Advisory Panel for
the Dictionary of Occupational Titles

**MEMBERS OF
THE ADVISORY PANEL FOR THE DICTIONARY
OF OCCUPATIONAL TITLES (APDOT)**

Ms. Dixie Sommers
Chair
Ohio Bureau of Employment Services
Columbus, Ohio

Mr. Ken Baker
Freeman White Architects
Charlotte, North Carolina

Dr. Kenneth Pearlman
AT&T
Morristown, New Jersey

Dr. Sue Berryman
The World Bank
Washington, DC

Dr. Richard Santos
University of New Mexico
Albuquerque, New Mexico

Mr. Manfred Emmrich
North Carolina Employment Security
Commission
Raleigh, North Carolina

Dr. C. Gary Standridge
Fort Worth Independent School District
Fort Worth, Texas

Dr. Marilyn K. Gowing
U.S. Office of Personnel Management
Washington, DC

Mr. Charles Tetro
Training and Development Corporation
Bucksport, Maine

Mr. Reese Hammond
International Union of Operating Engineers
Washington, DC

Executive Director
Dr. Marilyn B. Silver
Aguirre International
Washington, DC

Dr. Anita Lancaster
Defense Manpower Data Center
Arlington, Virginia

Dr. Malcolm Morrison
Continental Medical Systems, Inc.
Mechanicsburg, Pennsylvania

Project Officer
Ms. Donna Dye
U.S. Department of Labor
Washington, DC

CHAPTER 1: EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

"The only way America can compete and win in the twenty-first century is to have the best-educated, best-trained workforce in the world, linked together by transportation and communication networks second to none."¹

President Bill Clinton

• *Amanda Strong, a dedicated teacher, has brought education and business together to address pressing community problems. She has won wide support for her success in translating the skills, knowledge and abilities employers say are needed for success on the job into meaningful learning objectives for her students. Because of the new DOT, Amanda was able to move beyond generalities about the need for "a work ethic" or "problem solving skills" to a level of detail that resulted in real understanding. Now Amanda has the tools and information to make a real difference in the future of her students!*

• *When he left the service, Luis Rivera, a veteran with a college degree and 20 years of experience as a defense analyst, encountered many problems trying to identify and match his transferable skills with those in the private sector. Now, employed in a "downsizing" industry, he is amazed that technology has made this task easier. With the new DOT, Luis is able to align his proficiencies with the workplace requirements of jobs in "growth" industries to secure a successful job match.*

• *Jackson Graham, a labor policy analyst developing retraining programs for dislocated workers, begins his efforts by estimating the skills gap between worker capacity and workplace requirements. The new DOT, a national database system that replaced cumbersome crosswalks among national data sets on job content, demographics, wages and employment trends, makes his task easier and allows him to serve more people effectively.*

• *Leslie Tanner, a small business owner, is convinced that she needs to restructure her business into a high performance workplace if she is to stay competitive. Leslie wants to use a*

skill-based pay system to improve productivity. She plans to pay staff 10-20 percent more if they diversify their skills. Leslie is delighted to find the information she needs to help sales staff identify the skills involved in handling billing, production, delivery, scheduling and technical support on a sales call, in the new DOT.

The experiences of these people and millions of others will result from the nation's creation of a concise, accurate and up-to-date occupational information system. A database system that identifies and describes the skills, knowledge and competencies needed to produce a high performance workplace will help millions of students, workers and employers to make informed decisions. This new Database of Occupational Titles (DOT) will help eliminate costly mistakes in their education, training, counseling and employment efforts. A renewed commitment to identify, define, describe and classify occupations, in an accessible and flexible manner, is critical to the success of future plans for workforce investment.

As early as 1996, what is now the Dictionary of Occupational Titles (DOT), the nation's single most comprehensive source of occupational information, can be transformed into a database system useful and accessible to millions. In work stations at home, in school and on the job, the new DOT can provide the infrastructure or national framework needed to support the Administration's planned investment in people and their skills. It can become a vital tool for students, parents and teachers inquiring about the world of work, for workers in transition and for employers restructuring occupations to accommodate employees with disabilities, responding to new competitive forces and designing training programs. In developing a new DOT, the United States Department of

Labor can give an important boost to U.S. productivity and promote the effective education, training, counseling and employment of the American workforce.

THE WORKFORCE ISSUE AND THE DOT

To succeed in the global economy of the twenty-first century, the United States must improve its productivity and competitiveness. While technology and capital investment play a role in productivity improvements, a growing consensus among national leaders suggests that the key to a more prosperous future for this country is a major investment in the skills of our people and the restructuring of our workplaces into high performance organizations.² As Secretary of Labor Robert B. Reich acknowledges, "The real economic challenge facing the United States in the years ahead ... is to increase the potential value of what its citizens can add to the global economy, by enhancing their skills and capacities and by improving their means of linking those skills and capacities to the world market."³

The Advisory Panel for the Dictionary of Occupational Titles (APDOT), a Federal panel commissioned by the Secretary of Labor, has spent the past two years assessing the occupational information needs of the nation. The Panel has identified an essential role for the Department of Labor in assisting industry with skills identification and workers with skills acquisition by creating a new database system. To assure that educators can prepare students to meet the challenges of the 1990s and beyond, that employers can select, train and place workers in jobs and that workers can acquire the skills needed to achieve their career goals, new types of information and linkages among occupational databases are needed.

In short, a fundamental shift in the way we think about occupational information is required. The current DOT or Dictionary of Occupational Titles was first developed in the 1930s and is best known as a book that lists some 12,000 job descriptions or definitions in a narrative, fixed format. This dictionary concept must be replaced with the new Database of Occupational Titles that provides a flexible format and offers users computer-organized data that can be

expanded, updated and retrieved rapidly for various uses.

Data currently collected for the DOT describe the skills, knowledge, abilities and traits workers need as well as the education and training requirements, the machines, tools, equipment and materials used and the products produced. Such data descriptors are useful and their collection should continue. However, to support national efforts to revitalize the American economy, these descriptors must be supplemented with information that is necessary to revitalize the workforce.

APDOT has proposed new content for the DOT that will describe skills across a broad continuum from very general aptitudes, abilities and basic skills to occupation-specific and technical skills and knowledge. The new content is intended to help capture data on the increasingly cognitive demands of jobs and the new ways of thinking and managing that focus on quality, variety, speed and customer service -- hallmarks of productivity and competitiveness in the workplace.

Moreover, today's DOT, consisting of a patchwork of information on tasks, worker traits, activities and characteristics must be integrated into a coherent system. A new database system that highlights connections between occupations, emphasizes skills transferability and links easily with related databases of education and labor market information is essential for the human resource management of the American economy. Today's students, educators, trainers, counselors and workers need information that fosters the effective integration of technology, skills and new workplace structures. The development and maintenance of a coherent database system helps fulfill Department of Labor responsibilities for facilitating the match between workers and jobs and for collecting and disseminating data on labor supply and demand as well as on economic, industrial and technological trends.

Specific differences between the current DOT and APDOT's recommendations for the future DOT are highlighted in Figure A: Comparison of the Current and Future DOT, pp. 9-10.

APDOT CHARTER

Chartered under The Federal Advisory Committee Act, APDOT was asked to recommend to the Secretary of Labor strategies for collecting, analyzing and disseminating occupational information. The Final Report, The New DOT: A Database of Occupational Titles for the Twenty-First Century, presents the Panel's final recommendations. For a list of the recommendations presented in charter categories, see Appendix D. While the report responds to the APDOT charter, the Panel views the report primarily as a strategic management tool for the Secretary of Labor and other policy makers to use in revitalizing the DOT. Specifically, the report fulfills the Panel's mandate to:

- (1) Recommend the type and scope of coverage as well as the level of detail that should be collected on occupations to produce a DOT;
- (2) Advise on appropriateness of methodologies of occupational analysis used to identify, classify, define and describe jobs in the DOT;
- (3) Advise on new or alternative approaches to the production, publication and dissemination of the DOT; and
- (4) Recommend options for implementation of improvements to the DOT.

A NEW DOT TO SERVE MYRIAD USERS

Through its review, APDOT came to understand the myriad ways in which the DOT is currently used and to see its critical role in increasing the productivity and quality of the workforce. Consider the following examples. Because all military service occupational classification systems are cross-coded to the DOT, it is the most powerful tool available for linking military and civilian occupations, a critical issue during current downsizing efforts. Similarly, human resource professionals in both the public and private sectors use the DOT to create or modify job classifications, to determine qualifications for selection tests, to establish skill and training requirements and to develop job training performance appraisals, career planning strategies, competency certification and job design.

Department of Labor officials traditionally use the DOT in training, retraining and placement programs especially within the Employment Service, Job Training Partnership Act, Job Corps and Bureau of Apprenticeship and Training. The Bureau of Labor Statistics uses the DOT in its development of occupational and career information. The DOT also is critical to support planned workforce investment efforts such as career centers and youth apprenticeship.

The Social Security Administration identifies the DOT as a major source of information used to determine disability benefits for some one million cases per year.⁴ Vocational rehabilitation practitioners use the DOT extensively to identify potential new occupations for persons with disabilities. The DOT is central to counseling and guidance in high school and beyond where it is used to identify transferable skills and to plan career options. For example, last year more than four million people used the state supported Career Information Delivery Systems based on DOT data.⁵ Other counseling tools that identify wage earnings and employment outlook also rely on the DOT.

The DOT is used in the nation's Foreign Labor Certifications program to identify jobs offered by employers and held by applicants in order to demonstrate eligibility to work in the United States. Curriculum developers in schools and training organizations use the DOT to match training objectives with descriptions of tasks and to modify curricula. Agencies involved in developing and reporting labor market information use the DOT as a core reference. Social science researchers have also made extensive use of its data in hundreds of studies of workforce participants.⁶

In proposing the recommendations that follow, APDOT recognizes these uses and is committed to assuring that the revised version will be even more useful. The Panel has recommended implementation strategies that phase in dramatic changes over time and assure users of continuity while the system is restructured. At the same time, because the Department of Labor is the funding source for the DOT, APDOT believes that the Department should assign its programs as top priority. The Panel believes that in

revising the DOT to better meet its own information needs, the Department will also meet most needs of other DOT user groups.

APDOT'S RECOMMENDATIONS

Historically, the DOT was developed during the economic crisis of the 1930s as a tool to help the new public employment system improve linkages between skill supply and skill demand. The Panel believes that it is particularly appropriate for the DOT to be reinvented in the 1990s to serve the nation's current and future efforts to foster economic growth and competitiveness through skill acquisition and workforce investment.

What follows are the specific recommendations APDOT has proposed for the new DOT categorized according to the issues of purpose, database, data collection, dissemination and implementation. For a full discussion of the individual recommendations, see Chapter 2.

Purpose

1. *The purpose of the Database of Occupational Titles (DOT) should be to promote the effective education, training, counseling and employment of the American workforce. The DOT should be restructured to accomplish its purpose by providing a database system that identifies, defines, classifies and describes occupations in the economy in an accessible and flexible manner. Moreover, the DOT should serve as a national benchmark that provides a common language for all users of occupational information.*

Database

2. *The scope of the DOT should cover all occupations in the United States economy.*

3. *The Department of Labor should use a single standardized occupational classification for the DOT and its labor market data collection programs. A single standardized classification will allow the DOT and other sources of occupational and labor market information to be technically and conceptually compatible.*

4. *The level of detail used in the DOT database should be sufficiently flexible to match the recommended standardized occupational classification, while allowing for further differentiation of occupations based on user needs and on the information collected.*

5. *The Department of Labor should adopt the APDOT "Content Model" as a framework for identifying the occupational information included in the DOT. The Content Model's specific descriptors or data elements should be developed as part of the implementation phase of the new DOT.*

6. *The Department of Labor should review every occupation detailed in the DOT at least every five years to assure that the DOT database remains current and that occupational data contained within it are updated regularly. Some selected occupations should be reviewed more frequently.*

7. *As the funding source for the DOT, the Department of Labor should appropriately rank its own program needs as the top priority. In meeting the Department's needs, APDOT also expects the occupational information included in the DOT to meet most of the needs of specialized users involved in workforce education, training, counseling and employment.*

Data Collection

8. *The Department of Labor should use sampling techniques in the collection of data for the DOT that ensure the representativeness of occupations and the accuracy and consistency of information. The sampling design should make use of existing empirical information on employment by occupation and on the location and industry of employers.*

9. *The Department of Labor should rely on the use of structured job analysis questionnaires as the primary strategy for data collection. Alternative methods may be used to supplement data collection when warranted.*

10. *The Department of Labor should collect occupational information using automated technologies to facilitate quality control and to*

achieve currency and accuracy in a cost-effective manner.

Dissemination

11. *The Department of Labor should make a dynamic and flexible DOT database available in a variety of electronic, automated and hard copy formats to meet the varying needs of users involved in workforce development. The Department of Labor should invest in developing value-added applications as needed for its own use and where cost-effective. The Department should also continue to encourage the vendor industry to develop specialized, value-added applications. Moreover, DOT data should remain available to the public at the cost of reproduction or publication.*

12. *The Department of Labor should develop a continuing marketing campaign to educate and inform users about the DOT database, its content and its use.*

Implementation

13. *By the year 1996, the Department of Labor should develop a new, comprehensive, national database system that collects, produces, maintains and disseminates accurate, reliable and valid information on occupations to support the nation's workforce investment efforts. By 1994, the Department of Labor should develop a prototype database system that demonstrates the feasibility of new collection, analysis and dissemination strategies for target industries and occupations.*

14. *While focusing efforts on activities designed to produce a new DOT database system, the Department of Labor should maintain the existing DOT and develop interim products as appropriate.*

15. *The Department of Labor should commit to an ongoing research and development agenda to maintain the DOT database system's effectiveness over time.*

16. *The Department of Labor should assure that the staff and organization of its Occupational Analysis system reflect changes in the methods of data collection, occupational*

analysis and information dissemination required by the new DOT system. The Department should also sustain a commitment to recruit, train and maintain a core staff of methodologically sophisticated professionals to manage the DOT program.

17. *The Department of Labor should use the DOT as the foundation for related program efforts including the development of voluntary industry-based skill standards, the development of measures for assessing generic workplace skills and aptitudes and the proposed revision of the Standard Occupational Classification (SOC).*

18. *The Department of Labor should assure sufficient funding to develop the DOT database system. The Department should also make a commitment to provide additional resources for enhanced operational requirements.*

In conclusion, APDOT believes that the Department of Labor should reinvent the DOT in the context of the Administration's national economic investment strategy. In supplying critical information to support the effective education, training, counseling and employment of workers, the new DOT can help America regain its competitiveness and revitalize the workplace, both now and into the twenty-first century.

References

1. Governor Bill Clinton and Senator Al Gore. (1992). Putting People First: How We Can All Change America. New York, NY: Times Books, Random House.
2. National Center on Education and the Economy. (1990). The Report of the Commission on the Skills of the American Workforce, America's Choice: High Skills or Low Wages. Rochester, NY: National Center on Education and the Economy.

John E. Hunter and Frank L. Schmidt. (1982). "Fitting People to Jobs: The Impact of Personnel Selection on National Productivity." in Edwin A. Fleishman (ed). Human Performance and Productivity: Human

Capability Assessment. Volume 1. Hillsdale, NJ: Lawrence Erlbaum Associates.

3. Robert B. Reich. (1992). The Work of Nation's: Preparing Ourselves for 21st Century Capitalism. New York, NY: Vintage Books, A Division of Random House.

4. Testimony of the Social Security Administration to the Advisory Panel for the Dictionary of Occupational Titles by Joe Murphy, October 24, 1990. Washington, DC.

5. Association of Computer-Based Systems for Career Information. (August 1991). Use of the DOT by Career Information Delivery Systems.

6. National Research Council. (1980). Work, Jobs, and Occupations: A Critical Review of the Dictionary of Occupational Titles. Washington, DC: National Academy Press.

Figure A: Comparison of the Current and Future DOT

Current DOT	Future DOT
View of work reflects mechanistic, hierarchical structure of workplace.	View of work reflects restructured occupations; need for multi-skilled people.
Purpose to provide job matching for Employment Service.	Purpose to continue job matching and to support effective education, training, counseling and employment of workforce; purpose also to provide common language or benchmark for multiple users.
Scope includes all occupations but collection methods and resources limit coverage; predominance of blue-collar occupations.	Scope includes all occupations and reflects the actual composition of the labor market.
Uses classification system unique to DOT; Occupational Group Arrangement (OGA) requires complex crosswalks for linkage to other systems; uses nine-digit code for classification.	Uses a standardized occupational classification as primary classification method, facilitating direct linkage to other systems; capability for multiple classification approaches including skills.
Uses "Data-People-Things" to indicate level of complexity in jobs.	Uses new Content Model descriptors to reflect the multiple facets of job complexity.
Embeds skills information in the code, definitions and supplementary material.	Presents skills information directly in a broad continuum from very general aptitudes, abilities and basic skills to occupation-specific and technical skills and knowledge.
Patchwork of skills-related and other occupational information with both redundant and missing elements.	An integrated system that provides a common language of occupational information and a strong foundation for skills standards and assessment tools.
Content includes information on education and training requirements, machines, tools, equipment and materials used, as well as products produced.	Content redefines old descriptors and captures additional data on increasingly cognitive demands of jobs and new ways of thinking, working and managing that focus on worker attributes, work context, work content and outcomes and labor market context.
Information on skills transferability not available.	Empirically-based skills transferability information.

Current DOT	Future DOT
Limited information for understanding career paths including job families.	New organization/structure provides information on job families.
Data collected through manual, labor-intensive procedures requiring on-site observation/interview.	Data collected primarily through automated survey procedures.
Currency of data problematic because of labor intensive data collection and analysis procedures.	Currency of data facilitated through new methodology.
Sampling procedures remain problematic.	Sampling techniques increase representativeness, accuracy and consistency of data.
Primary method of dissemination is book/database with fixed format; does not allow manipulation to meet user needs.	Primary method of dissemination is flexible database; allows for easy access and manipulation to meet user needs.
Developed independently within the United States Employment Service (USES), United States Department of Labor.	Developed in coordinated fashion among offices within the Department of Labor and outside users to support related skills and assessment initiatives, the collection of labor market information and the effective education, training, counseling and employment of the workforce.

CHAPTER 2: APDOT RECOMMENDATIONS

APDOT RECOMMENDATIONS

In presenting its recommendations, APDOT recognizes the needs of millions of current DOT users and is committed to assuring that the revised version will be even more useful to them. APDOT's recommendations for reinventing the DOT are based on the fundamental proposition that the DOT's current purpose should be expanded to serve the national goal of creating "the best-educated and best-trained workforce in the world."

Specific recommendations regarding form and function follow purpose. APDOT's avowed purpose for the DOT transcends its historic function of supporting Employment Service job matching activities. Not only can the new DOT improve the labor exchange efforts of the Employment Service and other placement agencies, it can also better serve employers, educators, trainers and counselors in their efforts to prepare the future workforce, to restructure the workplace, to improve the quality of education and training and to identify potential career paths of workers.

APDOT has worked to assure that its recommendations are practical and cost-effective. The Panel has sought to produce recommendations that can and will be implemented. The Panel has recommended implementation strategies that phase in dramatic changes over time and assure users of continuity while the system is restructured. APDOT believes that the Department of Labor today has an historic opportunity to help forge the future. By creating a new database system that collects, publishes and maintains reliable and valid occupational information, the Department can help lead the nation's workforce revitalization efforts into the twenty-first century.

Purpose

1. *The purpose of the Database of Occupational Titles (DOT) should be to promote the effective education, training, counseling and employment of the American workforce. The DOT should be restructured to accomplish its purpose by providing a database system that identifies, defines, classifies and describes occupations in the economy in an*

accessible and flexible manner. Moreover, the DOT should serve as a national benchmark that provides a common language for all users of occupational information.

APDOT recommends that the Department of Labor begin its revision of the Dictionary of Occupational Titles (DOT) by articulating a purpose that underscores the national goal of creating the best-educated and best-trained workforce in the world. While significant changes are required to transform the DOT into an effective tool for the twenty-first century, in identifying, defining, classifying and describing the nation's occupations, the DOT can provide the **infrastructure** or national framework needed to support the Administration's planned investment in people and their skills. The DOT is the nation's most comprehensive source of information on occupations and skills. By implementing the series of recommendations APDOT has proposed, the new DOT can continue to support past uses as well as career centers and youth apprenticeship.¹

The DOT was originally developed in the 1930s to help the new public Employment Service match skill supply with skill demand. It was a time when mass production largely controlled or limited worker discretion. Jobs were broken into simple tasks that could be filled by low-skilled workers. Layers of managers directed efforts while sophisticated quality control systems caught defects.² In describing workers and workplaces, the DOT of the past reflected centralized hierarchical structures and thousands of narrowly defined jobs. As a result, it frequently emphasized manual and manipulative rather than cognitive skill requirements.

Today intense international competition is changing the workplace. The new workplace is characterized by fast-paced product cycles, rapid changes in technology and increased interest in quality and service. To meet these changes, new business arrangements have evolved that encourage faster and more creative action, increased flexibility and closer partnerships with employees and customers.³ Competition has also increased the pressure for performance.

More flexible and adaptable workforces value teamwork over individual effort and networks and alliances over rigid hierarchies. Flatter organizations decentralize responsibility and create greater employee involvement at all levels. In short, these new high performance workplaces demand new technologies, new workplace structures and new skills.

APDOT believes that the new DOT must reflect these changes. To be useful to educators, employers, trainers and counselors in the future, the DOT database must capture new information on workers and workplaces. It must also allow users greater access to and flexibility in manipulating this information. By providing accurate, current and timely information on skills and related data, the new DOT database can serve business, education and government in their efforts to fully develop human resources.

Developing the DOT database as a national benchmark will help standardize terminology for consistent use across sectors. Today there are few standard definitions in the study of skills and work. If major consumers and producers of occupational information can agree on a common language for identifying and defining worker attributes, work content and outcomes and performance standards, efforts to bridge the gap between workforce skills and workplace requirements will be greatly enhanced. The DOT can provide comprehensive information about work and workers in a common language useful to students, educators, employers and workers. In serving to improve communication among these groups, the DOT will help integrate learning, training and work in ways not currently possible.

Database Content

2. *The scope of the DOT should cover all occupations in the United States economy.*

To fulfill its purpose and serve as a coherent national database system for identifying and describing the skills, knowledge and competencies needed to produce a competitive workforce, the DOT should describe all occupations in the United States economy. Limiting the coverage of the future DOT to occupations in high employment or high growth

industries or to new and emerging occupations, as has been proposed by some users, would limit the DOT's usefulness as a tool for human resource management of the American economy. The DOT is a useful resource for those who remain employed in traditional and/or declining industries as well as for those who continue to need comprehensive information on work and workers across all industries.

APDOT believes that the future DOT should cover all occupations in the national economy while reflecting the actual composition of the labor market. The new DOT should mirror the changing workplace by illustrating the collapsing, merging and restructuring of occupations. As a result of this guidance, APDOT anticipates that the scope of the future DOT will cover the national economy while describing significantly fewer than the 12,000 occupations currently detailed.

APDOT believes that comprehensive coverage of occupations will help the DOT serve as a vital tool for students, parents and teachers inquiring about the world of work, for workers in transition and for employers restructuring occupations to accommodate employees with disabilities, responding to competitive forces and designing training programs. Comprehensive coverage will also allow the DOT to help students, educators, employers and workers to compare workforce proficiencies with workplace requirements. Coupled with assessments on students and workers, comprehensive coverage in the new DOT database system will also help policy makers more accurately estimate future skills requirements.

3. *The Department of Labor should use a single standardized occupational classification for the DOT and its labor market data collection programs. A single standardized classification will allow the DOT and other sources of occupational and labor market information to be technically and conceptually compatible.*

One of the APDOT's principal charges is to advise the Secretary of Labor on the most appropriate classification system for the DOT. The classification system provides the structure that allows for standardizing, sorting,

organizing, locating and analyzing data. After a review of other systems used in the U.S. and internationally, APDOT recommends that the Department of Labor designate a single classification system to be used throughout the Department for developing the DOT database, reporting labor market data, designing and evaluating training programs and assisting in job placement.

This single classification system cannot be a simple revision of the current DOT structure, but should be a system representing today's world of work. The APDOT recognizes that the Standard Occupational Classification (SOC) was originally developed to provide a single standard classification. The SOC, developed and maintained by the Office of Management and Budget, has not fully served this purpose. It is now out of date and has required adaptation when used for data collection purposes.

The Bureau of Labor Statistics is assisting the Office of Management and Budget in the upcoming revision of the SOC. The Department of Labor should consider the revision of the SOC as an opportunity to develop the standardized classification system recommended for use throughout the Department. (The SOC revision is discussed further in Recommendation 17.)

APDOT believes that standardization of classification systems across all major sources of occupational information, including the DOT, will lead to one system in which both occupational (job content) information and labor market (wages, supply and demand) information are technically and conceptually compatible. Although efforts have been made to provide crosswalks, the nation's classification systems remain incompatible in significant ways.⁴ Standardization allows accurate integration of existing and new data, facilitating the linkage of training programs, job placement activities and the labor market. Integration of such information will improve the DOT's usefulness in matching people with jobs, including identifying transferable skills among dislocated workers and those impacted by downsizing the military, as well as the work of the public Employment Service.

A standardized classification structure will also improve the DOT's linkages with other programs devoted to skills. In these cases, measures will need to be developed to link skills assessment in schools and employment and training agencies with the DOT. The National Assessment of Educational Progress (NAEP), the Department of Labor Workplace Literacy Assessment and the General Aptitude Test Battery (GATB) assessment programs represent some programs that may serve the needs of educators, employers and others interested in workforce development.

Finally, it is important to realize that using a standardized classification for the new DOT will assist those interested in the counting functions and occupation information data development without harming those that would prefer a skills-based system for classifying occupational data. An automated DOT database is no longer tied to one rigid classification methodology. It allows for presentation and manipulation of the data in whatever manner is desired by the user, thereby serving a broader range of user needs. The potential for multiple ways to classify the data is extremely important, as this multiple approach can increase users' capacities to identify transferable skills. Other classification bases might include, but are not limited to, physical demands, skills, interests, industries, education levels or the current "MPSMS" (materials, products, subject matter and services).

Until the SOC revision is completed or an alternative classification is developed, the Department of Labor will need to adopt interim measures regarding the DOT's classification structure. APDOT suggests that the Department consider using the Occupational Employment Statistics (OES) classification system, developed by the Bureau of Labor Statistics for collecting employment data. As an interim classification, the OES will allow the Department to take advantage of empirical data on employment patterns for sample design for the new DOT and to relate the information in the DOT to other occupational data sources linked with the OES. (Sampling design is discussed further under Recommendation 8.)

4. The level of detail used in the DOT database should be sufficiently flexible to match

the recommended standardized occupational classification, while allowing for further differentiation of occupations based on user needs and on the information collected.

APDOT recognizes that information at the most detailed level provided by a standardized classification system will not be sufficient to meet the needs of many DOT users. Therefore, the DOT should be flexible in the level of detail it provides, providing additional subcategories where appropriate. The level of occupational detail should be governed by the empirical information on how much distinction actually exists within broader job categories represented by the standardized classification and by policy questions regarding the importance of the distinct categories to particular users.

Depending on the needs of users, the future DOT could provide different levels of detail for different types of jobs. Options include detailing high-skill occupations more than low-skill occupations or limiting detailed description to selected occupations. For example, users engaged in training and development activities may require more detail for occupations with recent changes in task and skill requirements, with modifications in the complexity of tasks performed and with variations in the extent of education and training required. Certain economic and labor market trends, such as anticipated high levels of employment growth and anticipated labor shortages, also suggest the need for detailed occupations when employment/placement is the goal. The criteria for these selected occupations should be determined by the Department with the support of technical experts.

5. The Department of Labor should adopt the APDOT "Content Model" as a framework for identifying the occupational information included in the DOT. The Content Model's specific descriptors or data elements should be developed as part of the implementation phase of the new DOT.

To accommodate the demands of the broad spectrum of DOT users involved in educating, training, counseling and employing workers, APDOT recommends the adoption of a new DOT "Content Model." (See Appendix A for a

detailed discussion of the Content Model.) This Content Model has been drawn from a thorough analysis of user survey results, public comments and a wide-ranging review of research in such areas as job and skill analysis, human individual differences and organization analysis. It embodies a broad view of occupational analysis that reflects the characteristics both of occupations (through the use of job-oriented descriptors) and of people (through the use of worker-oriented descriptors). The Content Model provides a coherent, integrated system of comprehensive information about work and workers that APDOT believes should be considered for inclusion in a revised DOT, as well as in related or supplementary documents such as the Guide for Occupational Exploration.

The APDOT Content Model is organized into four sections that represent the major elements of a systems model of work: **Worker Attributes** (Section I) reflecting input variables; **Work Context** (Section II) reflecting throughput or process variables which are further divided into Organizational Context and Work/Job Context; **Work Content and Outcomes** (Section III) reflecting output variables and **Labor Market Context** (Section IV) reflecting the broader economic system of which all jobs are a part. Each section defines, provides examples of and in some cases lists more specific elements of individual descriptor categories.

The **Worker Attributes** section includes descriptors related to the characteristics or qualifications that a worker brings to the job, such as aptitudes, basic workplace skills and personal qualities. The **Work Context** section includes descriptors related to the broader organizational system in which the work is performed as well as the more immediate job context. Descriptors include: organizational structure, terms and conditions of employment, physical working conditions and performance standards.

The **Work Content and Outcomes** section includes descriptors related to the content of the work carried out by the worker and the outcomes resulting from the work, such as generalized work activities, duties/tasks performed, services rendered and/or products

produced. The **Labor Market Context** section includes descriptors related to the broader economic and labor market setting in which jobs are performed, as well as information regarding how these factors affect jobs. These include labor market trends, economic trends and occupational outlook.

Although the proposed Content Model is detailed in Appendix A of this Final Report, the model does not define all aspects or specific elements of every descriptor category listed. This is viewed by APDOT as a matter for more intensive and focused research, analysis and implementation-related decisions. Research efforts should focus on among other things, validation of the suggested skills-related information hierarchy (the first five Worker Attributes descriptor categories) and the feasibility of constructing standardized taxonomies of occupation-specific skills and occupation-specific knowledge. A series of research papers commissioned for the APDOT to examine some of the issues related to the Content Model are listed in Appendix E. **However, in principle, APDOT does not support the inclusion of any descriptors or elements on which sufficiently reliable, valid and generalizable data cannot be obtained, unless their inclusion is intended to obtain the data necessary to examine such questions.**

6. The Department of Labor should review every occupation detailed in the DOT at least every five years to assure that the DOT database remains current and that occupational data contained within it are updated regularly. Some selected occupations should be reviewed more frequently.

Perhaps the most consistent criticism of the DOT has been its lack of currency. The fourth edition was published in 1977. While a small supplement was offered in 1986, the DOT was not revised again until 1991. However, even this revision was not as extensive as required since most occupations were not updated.

The timely updating of skills and related information remains a critical issue if the DOT is to serve as a useful tool in workforce education, training, counseling and employment. The Department of Labor will need to balance

user needs for currency with practical considerations of cost-effectiveness and budgeting restraints. However, maintaining current information is a key to economic competitiveness. APDOT believes that the ability of the Department to achieve currency in future editions of the DOT will depend upon: (1) increased automation, (2) alternative job analysis methodologies, (3) new classification structures, and (4) adequate funding. Each of these factors is discussed in some detail in other recommendations. (See Recommendations 10, 9, 3, and 18.)

To update DOT data, the Department should combine periodic reviews of occupations, consultation with subject matter experts and a mechanism that links the DOT database to other systems and databases, in mutually beneficial relationships. Employer groups, unions and associations should be consulted, along with data from the Bureau of Labor Statistics, to identify and gather information on all occupations at least once every five years. Some selected occupations may need to be reviewed more frequently as determined by the Department. These may include new and emerging occupations as well as those experiencing significant and/or frequent changes in task and skill requirements, complexity of tasks performed, extent of education and training required, high levels of employment growth and anticipated labor shortages.

If the Department implements APDOT's recommendation to move to a single classification system, the DOT data collection could be tied to the same three year data collection cycle used by the Bureau of Labor Statistics in the Occupational Employment Statistics program. The counting and reporting functions carried out by the Bureau of Labor Statistics and the descriptive functions carried out by the Employment and Training Administration would remain separate and distinct. However, the timely updating of both would allow users to stay in touch with changes emerging in the workplace.

7. As the funding source for the DOT, the Department of Labor should appropriately rank its own program needs as the top priority. In meeting the Department's needs, APDOT also

expects the occupational information included in the DOT to meet most of the needs of specialized users involved in workforce education, training, counseling and employment.

The DOT is a multi-faceted tool with broad human resource applications. Because the Department of Labor is the funding source, APDOT believes that the Department should assign serving its own programs as top priority for revising the DOT. Employment and Training Administration programs such as the Employment Service, the Job Training Partnership Act, the Bureau of Apprenticeship and Training and the Office of Work-Based Learning efforts regarding voluntary industry-based skill standards and youth apprenticeship are critical to providing the nation with a better trained workforce. Equally important to guiding the nation's economic strategy are the key data collection and reporting programs of the Bureau of Labor Statistics such as the Occupational Employment Statistics program and the development of the Occupational Outlook Handbook. Programs of the National Occupational Information Coordinating Committee should be considered essential as well.

After reviewing the major uses and users of the DOT, the Panel believes that in revising the DOT to better meet its own information needs, the Department will also meet most of the needs of other DOT user groups.⁵ Those who use the DOT for career and vocational counseling, disability determination, vocational rehabilitation, curriculum development, foreign labor certification, employment placement, labor market information, human resource development and management, occupational information development and dissemination and research largely require the data descriptors for work, the worker and the workplace that APDOT has recommended in the new DOT Content Model.

In providing comprehensive, accurate and current skills and related information, the DOT will accommodate the information needs of current users. In addition, by clustering occupations into job families, the new DOT will facilitate the identification of transferable skills

and improve job matching capabilities. By linking more easily with related classification systems and databases, the new DOT will help users consider data on wages, demographics, job vacancies and job surpluses at the same time they review data on job descriptions, skills and knowledge assessments and national industry-based skill standards.

While APDOT is enthusiastic about the potential of the new DOT to foster the best-educated and best-trained workforce in the world, the Panel believes that the Department of Labor should use a formal disclaimer to express the limitations of DOT data as well. Some longstanding concerns regarding the validity of DOT data result from the uses to which the data are put.⁶ For example, within the vocational rehabilitation and forensic communities, the DOT frequently is introduced into courts as evidence and DOT data are used in medical settings to determine the physical demands of jobs. APDOT believes that such uses may be questionable, since the DOT offers composite occupational descriptions and not organization-specific job descriptions.

Additionally, some users and user groups have suggested that the new DOT be used to help operationalize the Americans with Disabilities Act (ADA). These users believe that the DOT provides information on the "essential functions" of jobs. "Essential functions," according to ADA, are the functions that an individual who holds the job must be able to perform unaided or with the assistance of reasonable accommodation.⁷ Through its recommendations regarding the proposed Content Model for the DOT, as well as its emphasis on skills, APDOT supports the goals of ADA. The Panel believes that the new DOT will be helpful to both employers and workers in understanding the dimensions of a job. The new DOT will describe the characteristics of occupations so that any person can evaluate capability to perform an occupation.

It must be emphasized, however, that both the present and future DOT provide information on composite occupations and not specific jobs of particular employers. According to ADA, whether a particular function is essential is a factual determination that must be made on a

case by case basis. This determination is the sole right and responsibility, by law, of the employer. Thus APDOT believes that the use of the DOT to determine essential functions under ADA is inappropriate. APDOT believes that the Department of Labor will want to investigate the issue and offer its own legal opinions.

Data Collection Methodology

8. *The Department of Labor should use sampling techniques in the collection of data for the DOT that ensure the representativeness of occupations and the accuracy and consistency of information. The sampling design should make use of existing empirical information on employment by occupation and on the location and industry of employers.*

It is important that the DOT accurately reflect the occupational composition of the U.S. economy. APDOT agrees with a common criticism of the existing DOT that it is not representative. The DOT contains much more detail on occupations in manufacturing than in other sectors and contains many very specific occupations which probably have very few workers. Most important, because no data exist on employment by DOT occupation, how well the DOT represents the economy cannot be examined directly.

APDOT has recommended that the Department develop a single standardized occupational classification system for use in the DOT and its labor market data collection programs. (See Recommendation 3.) Until this new classification system is in place, APDOT recommends that the Department develop a sampling design for the DOT which draws on the Occupational Employment Statistics (OES) survey as a universe of occupations in the non-farm payroll sector of the economy. The OES data indicate the distribution of jobs by occupation, with further detail by industry, state and size of employing establishment. A sampling design for the DOT should use this information to develop a random sample of establishments from which to collect occupational data, using the Bureau of Labor Statistics establishment files (the ES-202) as the universe of establishments. For sectors not

covered by the OES program, a supplemental sampling design must be developed.

Data collection should include gathering information on the characteristics of the occupation at the most detailed level in a standardized occupational classification system and provide for defining occupations below that level. It may be possible to gather data on the distribution of jobs across occupations below the standardized occupational classification system's most detailed level, providing DOT users with information on the relative importance of the occupation in terms of employment.

In addition to requiring a representative database, DOT users also need to know how occupations are changing. The Department should include in its sampling design procedures for identifying occupations in which rapid change is occurring. It should develop special studies using supplemental samples to gather information on these occupations. More generally, the Department should implement a survey schedule which provides for data collection on specific occupational areas at regular intervals, so trends in occupational information can be identified. (See Recommendation 6.)

9. *The Department of Labor should rely on the use of structured job analysis questionnaires as the primary strategy for data collection. Alternative methods may be used to supplement data collection when warranted.*

The needs of users involved in workforce education, training, counseling and employment must be the driving force behind the design and development of new data collection methodologies. Put simply, the DOT must collect, analyze and disseminate the data that people need. APDOT has proposed a new DOT Content Model to organize occupational data. (See Recommendation 5 and Appendix A of this Final Report.) The information in each data category of the Content Model must be collectable using a measurement tool or instrument. To ensure the efficient and cost-effective collection of high-quality, current and accurate data, APDOT recognizes that the DOT's current job analysis/data collection methodology must change.

The collection of occupational information for the DOT has, from its inception in the 1930s, been performed by trained occupational analysts in a network of occupational analysis field centers. These experts compile data primarily through the use of observation/interview techniques, a methodology of data collection that generally results in accurate occupational information but at great expense of time and cost. Quite simply, it is a cost-prohibitive method for any realistic effort to describe all occupations in the American economy. In the course of reviewing the DOT, APDOT studied numerous job analysis systems and concluded that high-quality results are achievable with the use of structured questionnaires and properly conducted surveys.⁸ The use of structured questionnaires and survey methods offers the Department the opportunity to collect more data, more quickly thus improving currency. These alternative methodologies also appear to be cost-effective.

After studying alternative job analysis methods and consulting with technical experts as well as the developers of well-respected systems, APDOT concluded that no single system currently exists that will accommodate all of the demands of a future DOT.⁹ The Department of Labor will ultimately need to develop a comprehensive occupational analysis system to replace the current data collection procedures detailed in The Revised Handbook for Analyzing Jobs.¹⁰ To be credible with users of the data, the system must be empirically derived and provide solid technical documentation.

APDOT does not believe that the new occupational analysis methodology and instruments must all be fully developed before the Department can move forward with a significant data collection effort. Rather, APDOT believes that it may be possible to begin the process by using currently available methods or instruments with perhaps some minor adaptations. Some current systems may be available to the Department without cost. In other cases, the Department can negotiate cost with the developers. This approach will prevent the unnecessary expenditure of funds and assure that the nation has the data needed to move forward in workforce training, education, counseling and employment.

To maximize resources, APDOT believes the Department should also investigate the feasibility of incorporating job analysis data collected by other organizations, such as the Office of Personnel Management, the Department of Defense and appropriate private-sector organizations, into the DOT database. This supports President Clinton's suggestions regarding a national defense-jobs inventory to assist displaced workers.¹¹ All data accepted for inclusion in the DOT from outside sources would meet the standards of validity and reliability established by the Department of Labor.

Finally, APDOT wishes to emphasize that not all information used in the new DOT will be collected through job analysis processes. Some information may be more appropriately determined through other forms of research or data collection. These may include for example, the development of worker aptitude/ability patterns through aptitude test validation studies and linkages with other databases and information sources for the development of occupational outlook information, labor market trends and occupational demographics.

10. The Department of Labor should collect occupational information using automated technologies to facilitate quality control and to achieve currency and accuracy in a cost-effective manner.

Current industry research and data collection activities for the DOT are manual processes with automation limited to creating, managing, storing and retrieving job analysis and occupational definition documents. Data are manually collected on-site using the observation/interview technique by trained occupational analysts located in five field offices. The current database is housed in the North Carolina Field Center office. It has limited accessibility, uses very limited technology and has no linkages to external databases. Moreover, the occupational analysts who collect information for the current DOT have no direct access to the database during the course of industry planning, data collection, analysis, evaluation and coordination of work activities.

APDOT believes that extensive use of computer technology is mandatory if the Department of Labor is to transform the DOT into a multipurpose tool for the education, training, counseling and employment of the workforce of the future. The Department can choose from a broad array of technology to implement an automated data collection process. The results will improve the currency and accuracy of DOT data. Automation can also ensure quality control of DOT occupational information as well as provide a cost-effective process for collecting it.

In a paper commissioned by APDOT on potential automation strategies, experts have identified the following technologies, currently or soon to be available, that have the potential to greatly alter the process of DOT data collection: hand-held computers, pen computers, bar coding, optical character recognition, handwriting recognition, speech recognition, electronic gateways providing access to other databases, relational databases and distributed systems and the use of geographic information systems to dramatically improve the systematic sampling techniques used in DOT data collection.¹²

Because of the range of options available to the Department of Labor in automating the DOT, APDOT recommends that the Department begin by developing a plan for automating the system consistent with the Content Model and recommended job analysis approaches. (See Recommendations 5 and 9.) For example, the use of survey methodology for job analysis/data collection can be accommodated by the existing computer technology of machine readable questionnaire forms. Moreover, observation/interview techniques of job analysis, which will be needed to develop and validate surveys, can be improved by computer technology such as scannable answer sheets for the job analysis reports, electronic keypads and laptop computers. The Department will need to select those computer technologies most appropriate to fulfilling its goal of a cost-effective, coherent national database system.

Dissemination

11. *The Department of Labor should make a dynamic and flexible DOT database available in a variety of electronic, automated and hard copy formats to meet the varying needs of users involved in workforce development. The Department of Labor should invest in developing value-added applications as needed for its own use and where cost-effective. The Department should also continue to encourage the vendor industry to develop specialized, value-added applications. Moreover, DOT data should remain available to the public at the cost of reproduction or publication.*

While the DOT is currently available on data tapes and floppy disks, it has traditionally been primarily a hard copy medium. Both technical experts commissioned by APDOT and DOT users have suggested that automated dissemination of the database will increase its utility as an effective tool for workforce education, training, counseling and employment.¹³ In their responses to surveys and Federal Register notices, DOT users emphasized the desirability of a user-friendly, highly accessible, automated database. Users cited floppy disks, on-line information, electronic bulletin boards, CD-ROM, interactive laser disks and mainframe and PC versions as potential dissemination media. Users also requested that the DOT remain available in hard copy. Expressing concern that some educators, schools, libraries and others may not have access to computerized equipment, they suggested that hard copy versions of the DOT will be needed for the foreseeable future.

APDOT believes that the Department of Labor should develop an automated DOT version available on current and future media such as tape, disk and/or CD-ROM. This new database system should allow users to access and manipulate the data. It should be a relational database rather than a flat file or text file. In addition, the DOT database system should be sufficiently flexible and accessible to facilitate creation of small-scale, customized, hard copy versions. Subscription services and electronic bulletin board technologies may be further explored as a way of making the DOT or DOT-related products such as the Guide for

Occupational Exploration (GOE) available to users.

The extent of Department involvement in the provision of advanced DOT applications is of major concern to scores of developers and vendors who have built a substantial industry around the provision of value-added products based on the DOT. Numerous private vendors have taken the core DOT, added value to it, and successfully marketed these products. APDOT believes that the Department should encourage the developer and vendor industry to make available the widest possible variety of value-added applications, utilizing information provided by the DOT database.

A paper commissioned by APDOT to review the nature and extent of commercial products that utilize data from the DOT identified more than 100 products.¹⁴ These public and private hard copy products and software programs vary widely in the amount and kind of data they make available, in their levels of sophistication of accessing strategies, in their applications, equipment (hardware and software) requirements and in their cost. Applications by vendors range from simple reprints of the DOT to automated versions of the database on disk or tape. There are also computerized accessing strategies tailored to meet specific needs. Some products supplement the DOT by including assessment instruments that are keyed to DOT worker trait items, by providing instructional information, or by facilitating career exploration, disability determination or some other special application. Some products add information from other classification systems and databases, such as Standard Occupational Classification and Occupational Employment Statistics codes, census data, wage data and interest data, in specific combinations for specific uses.

APDOT recommends that the Department of Labor develop the DOT as a flexible, automated, database that remains available for public use at the cost of reproduction or publication. Basic hard copy versions of the DOT and related products should be produced. In addition, the Department should invest in applications development when such materials are cost-effective and needed for its own use. However, APDOT believes the Department

should not seek to compete with entrepreneurs in customizing the DOT information needed for the market place.

12. *The Department of Labor should develop a continuing marketing campaign to educate and inform users about the DOT database, its content and its use.*

To maximize the DOT's usefulness as a national database for identifying and describing the skills, knowledge and competencies needed to educate, train, counsel and employ the workforce, the Department of Labor must broaden users' awareness and understanding of the DOT and its content. The Department must assure that the DOT is appropriately marketed and that its users have adequate informational and educational programs supporting it.

Historically, the marketing of the DOT and related products, such as the Selected Characteristics of Occupations Defined in the DOT and the Guide for Occupational Exploration, has been accomplished through the Government Printing Office (GPO) with announcements of updates distributed as part of the GPO's efforts for all publications. While the DOT is a GPO best seller, with more than 350,000 hard copies sold, many users remain unaware of DOT-related products or the DOT data tape. When the DOT Fourth Edition, Revised was published in September 1991, many users remained unaware of its existence for months.

APDOT believes that the Department should develop an effective marketing strategy to inform the user community about the DOT. In addition to printed documents and other hard copy materials, this marketing campaign may include the development of demonstration video tapes or computer diskettes targeted at specific user groups to illustrate its potential uses. Materials should explain the benefits of DOT use such as its comprehensiveness and flexibility, linkages to other databases and systems, as well as the currency and accuracy of the data contained within it.

Many DOT users have expressed a need for training and assistance in correctly using the current DOT, noting the value of "help" menus,

user manuals and instructional programs. Although explanatory information has been provided in the past, it has not been sufficiently user-friendly to accommodate a document/database as complex as the DOT. APDOT believes that DOT information should be presented in an easily understood format with a minimum of technical jargon. Technical assistance in the form of easily referenced hard copy and automated desk aids and training manuals, as well as instructional programs and videos, should be available to users.

As the Department of Labor institutes major changes to the DOT database, the need for an aggressive and continuing educational and informational campaign becomes acute, both to illustrate the scope and range of information that will be available to DOT users and to assure appropriate use of this information. A significant technical assistance effort will be needed nationwide to facilitate a managed transition to a new DOT. Appropriate education and training materials will be the key to its success. In addition, toll-free help lines and the formation of user groups may be explored to assist in the transition.

Implementation

13. *By the year 1996, the Department of Labor should develop a new, comprehensive, national database system that collects, produces, maintains and disseminates accurate, reliable and valid information on occupations to support the nation's workforce investment efforts. By 1994, the Department of Labor should develop a prototype database system that demonstrates the feasibility of new collection, analysis and dissemination strategies for target industries and occupations.*

APDOT believes that its vision of the DOT as an effective tool for identifying and describing the skills, knowledge and competencies needed to produce a high performance workforce is achievable by the year 1996. In supplying critical data to support the effective education, training, counseling and employment of workers, the new DOT can help America regain its competitiveness and revitalize the workplace. The Panel has recommended implementation strategies that phase in dramatic changes over

time and assure users of continuity while the system is restructured.

The Panel acknowledges that, while continuity is needed, some of the current uses of the DOT will need to change. For example, if the Department implements Recommendation 3 concerning classification, it is likely that the current nine-digit code will be replaced by a different coding scheme. Users will therefore need to change their systems which are based on the nine-digit code. In other cases, the DOT will continue to be used to meet an agency's purposes, but particular regulations that specify how the DOT should be used will need to be revised.

Summarizing APDOT's recommendations, the goal is to produce a coherent database system that:

- meets the needs of the Department of Labor and a broad spectrum of users
- embodies a common language and serves as a national benchmark for occupational information
- captures new content data that reflect hallmarks of productivity and competitiveness in the workplace
- covers all occupations in the national economy
- links easily with related databases
- creates a new Content Model for systematically capturing skills-related information of multiple types, at multiple levels of detail
- achieves accuracy, currency and timeliness in data coverage
- relies on structured surveys conducted for data collection
- improves productivity through applications of computer technology
- uses a single, standardized occupational classification system as its primary classification structure
- disseminates data through multiple media and flexible formats
- incorporates a restructured occupational analysis system
- provides effective training and technical assistance to users

While this revitalization of the DOT represents a considerable effort, APDOT

believes that its accomplishment is well within the scope of Department action. Between 1993 and 1996, the Department will need to undertake extensive activities, including making the Content Model operational by researching and validating new skills domains; developing and testing new survey data collection methodologies; revising the classification structure and sampling methodologies; validating and updating the current DOT database and linking with other classification structures and databases on national standards, job descriptions, skills assessment and labor market information.

APDOT supports the use of technical advisors to assist the Department in finalizing decisions regarding specific data to be included as well as collection and analysis methods to be used. The Department should begin its implementation of recommendations by developing a plan for making the new Content Model operational. This plan should include a definition of the data descriptors to be included, a rationale for inclusion, possible measurement options, issues or problems raised and recommendations. As a result of this plan, Department staff will be able to move forward with data collection and analysis efforts. APDOT believes that it will be vital for the Department of Labor to demonstrate the capabilities of the new database system as quickly as possible.

To build support among users for the development and maintenance of a new system, the Department should implement a prototype DOT by 1994. By developing a prototype that selects targeted industries and occupations (high performance, high technology, new and emerging), the Department of Labor can test new approaches to collection, analysis and dissemination and demonstrate the feasibility of the new system.

The prototype DOT should demonstrate the systems' capability to accomplish the following types of activities of benefit to educators, trainers, counselors and employers:

- create job profiles
- develop tailored occupational descriptions
- link to other databases

- include new content descriptors on skills and related issues
- identify new and emerging occupations

The Department should outline specifications for the prototype as quickly as possible. Once the desired "outputs" are defined, Department staff, with the support of technical experts, will be able to define the steps, resources and procedures needed to accomplish the goal. While advice on appropriate hardware and software should be sought from technical experts, the entire process must be informed by the needs of users who should be consulted on a regular basis through focus groups and meetings with industry representatives. Moreover, Department of Labor decisions regarding the Content Model must be included in plans for the prototype to assure that the prototype will be as complete as possible by 1994.

14. While focusing efforts on activities designed to produce a new DOT database system, the Department of Labor should maintain the existing DOT and develop interim products as appropriate.

The value of the DOT has been confirmed in its use by hundreds of thousands of human resource professionals. Indeed in several surveys dating back to 1980, significant numbers of users expressed concerns that they would have difficulty performing their jobs without the DOT.¹⁵ While the Department of Labor works toward development of a coherent national database system (1996) and demonstrates the feasibility of new methods to collect, analyze and disseminate data in a prototype (1994), it must continue to make DOT data available to the user community. In a process of managed transition, the Department should immediately begin making adjustments to the DOT and the system that produces it.

During the development phase for the new DOT, maintenance activities should be viewed as a lesser priority for the Department. Appropriate activities may consist of reformatting the current DOT classification structure into a relational database format for the future version. Staff can also begin the process of collapsing occupations based on existing information. Coordinated efforts with the

Bureau of Labor Statistics to identify new and emerging occupations and with the Office of Work-Based Learning to identify voluntary skill standards should also continue as interim steps in the development of a new DOT. (See Recommendation 17 for a discussion of coordination activities.)

15. *The Department of Labor should commit to an ongoing research and development agenda to maintain the DOT database system's effectiveness over time.*

APDOT recognizes that as the current DOT evolves into a new database system, it should be supported by an ongoing research agenda. As suggested in Recommendation 5 and Appendix A on the Content Model and Recommendation 9 on data collection methods, expert technical assistance will be needed to make final decisions regarding the inclusion of appropriate descriptor categories and specific elements for worker attributes, work context, work content and outcomes and labor market context. Use of a single standardized classification system for classification and sampling purposes may also require outside technical support and planning. (See Recommendations 3 and 8.) Moreover, rapid advances in automation technologies require continual monitoring to ensure appropriate use in the development, production and dissemination of the new DOT. (See Recommendations 10 and 11.)

APDOT supports funding for research and development activities to assure that the new DOT database system becomes fully operational and maintains its effectiveness over time. Ongoing research and development activities will help the DOT system adjust to change and identify new strategies for maintaining currency and accuracy in the future. Research and development will also preserve the DOT in the forefront of occupational information. Research has already begun on key technical issues identified in the recommendations cited above. A list of papers and reports developed for APDOT is included in Appendix E of this report.

16. *The Department of Labor should assure that the staff and organization of its Occupational Analysis system reflect changes in*

the methods of data collection, occupational analysis and information dissemination required by the new DOT system. The Department should also sustain a commitment to recruit, train and maintain a core staff of methodologically sophisticated professionals to manage the DOT program.

APDOT believes that the transformation of the DOT into a new database system that furthers the national goal of creating the best-educated and best-trained workforce in the world will require fundamental changes in the structure and staffing of the Occupational Analysis system. Since its inception, data for the Dictionary of Occupational Titles have been produced by the Occupational Analysis system, an organization whose current structure includes a network of field centers. Oversight, technical direction, and support for the system is the responsibility of the U.S. Employment Service. This agency, headquartered in the U.S. Department of Labor in Washington, D.C., is also responsible for the final production of the DOT document.

Over the years, the field center network has consisted of a changing mix of locations and personnel. It currently includes five offices (situated in North Carolina, Massachusetts, Michigan, Missouri, and Utah) employing approximately 30 occupational analysts with an annual budget of \$2.3 million. North Carolina has had lead responsibility for collecting, developing and analyzing the data used in the DOT.

To be successful in future efforts, APDOT believes that the Department needs a new organization supporting a new system. The transformation of the current DOT into a new database system requires a concomitant restructuring of the occupational analysis staff and organization to reflect changes in the methods of data collection, occupational analysis and information dissemination. The Department will need to model the actions of a high performance work organization and focus on its customers. It must simultaneously upgrade the skills of the analysts, make effective use of technology and automation and restructure workplace processes used to collect, analyze, produce and disseminate a new DOT.

Occupational analysts for the new DOT will need to be trained in the use of structured questionnaires and survey methodology for data collection. Professional staff with highly specialized skills in areas such as job and skill analysis, survey design, statistical analysis or demographics will be needed. APDOT believes that the Department should maintain a centrally-located group of professionals to provide leadership and manage the program. Such Department staff will be responsible for framing key issues, reviewing core papers and recruiting staff expertise both within the Department and from outside research organizations.

In addition, in transforming the Occupational Analysis system into a high performance organization, staff must focus on the customer. Occupational analysts and other core staff should be encouraged to interact extensively with customers/users. The system must begin to rely on previously untapped resources, including extensive consultation with subject matter experts and increased contacts with professional and trade associations, labor unions, employers and others.

President Clinton has proposed a national information system to link homes, business labs, classrooms and libraries by the year 2015. The goal is to expand access to information.¹⁶ APDOT believes that efforts to restructure the Occupational Analysis system and automate the DOT database represent an important step in the Administration's long-range plans. These actions will help the Department of Labor make comprehensive information on work, workers and skills available and accessible to all users.

17. The Department of Labor should use the DOT as the foundation for related program efforts including the development of voluntary industry-based skill standards, the development of measures for assessing generic workplace skills and aptitudes and the proposed revision of the Standard Occupational Classification (SOC).

If the nation is to succeed in developing a more productive and competitive workforce, the Department of Labor should implement strategies for more fully integrating its skills and assessment initiatives with the development of

the new DOT. The DOT can be a vital tool in tracking changing occupation and skills requirements. In addition to APDOT's review of the DOT, efforts are currently underway within the Department to identify the key requirements of highly skilled workers in high performance workplaces, to increase the skill levels of American workers and to expand work-based training options. The Office of Work-Based Learning, in a joint initiative with the Department of Education, has undertaken a demonstration project in which 13 national trade associations and education groups are developing and implementing voluntary skill standards in a wide range of industries.¹⁷

APDOT recommends that the Department integrate DOT development activities with the Office of Work-Based Learning planned technical assistance on industry-based skill standards. By integrating DOT development efforts with the technical assistance that will be offered to the organizations and associations engaged in developing voluntary industry-based skill standards, a synergy can be created that will dramatically benefit both initiatives. Participants involved in the industry-based skills project can help make the new DOT Content Model operational and thus assure that the new DOT meets their needs as a database for skill standards. In addition, they will gain access to data available in the DOT system related to the occupations and industry groups under study. The DOT is the nation's single most comprehensive source of data on occupations. The ability to access DOT data will likely save participants valuable resources and prevent them from reinventing the wheel in developing constructs for skill standards.

At the same time, DOT staff can use the industry experts involved in setting industry-based skill standards to help determine the validity and usefulness of current DOT data. The participants involved in setting industry-based skill standards are appropriate sources of information for determining which tasks, skills and occupational group clusters are valid for a new DOT. This information can also provide staff with a starting point for developing task inventories that can be used in data collection for the new DOT (structured questionnaires and survey methods).

APDOT believes that the revised DOT can also help the Department's numerous assessment initiatives move forward. The Department's Office of Strategic Planning and Policy Development, with support from the Department of Education and the Office of Personnel Management, has undertaken an effort to develop and validate measures of the generic workplace competencies put forth by SCANS. This effort is focused on identifying, verifying and describing what the competencies look like in the workplace. In addition, the United States Employment Service is engaged in developing new assessment measures. APDOT believes that these activities should use the same language and benchmarks as the DOT activities and be mutually reinforcing.

Finally, APDOT also advocates Department of Labor coordination in the upcoming revision process for the Standard Occupational Classification (SOC). The 1980 SOC is more than a decade old and in need of immediate updating. The SOC revision will be conducted under the leadership of the Bureau of Labor Statistics. During the revision process, APDOT recommends that the Employment and Training Administration and the Bureau of Labor Statistics continue to work together closely to assure that the information available in the DOT program is used in the revision and that planning and development for the new DOT are carried out in concert with the SOC revision. The DOT, the SOC and the OES program should be consolidated into one occupational taxonomy that serves the Department's overall needs and facilitates the development of the DOT database. APDOT also supports the continued coordination of current staff efforts to identify new and emerging occupations and include them in the DOT database.

18. The Department of Labor should assure sufficient funding to develop the DOT database system. The Department should also make a commitment to provide additional resources for enhanced operational requirements.

The creation of the new DOT database system will incur both start up and ongoing operational expenses. While recognizing the fiscal constraints facing the U.S. Government, APDOT believes that the Department of Labor

must consider the larger picture of economic change in the workplace and global competition. The Department and the nation will benefit from funding the efforts needed to revise the DOT and make it a useful tool for workforce revitalization into the twenty-first century.

APDOT has made recommendations for developing, producing and disseminating a new DOT that are fiscally responsible and consider return on investment. The Department of Labor must do everything it can to improve the cost-efficiency of the DOT production process. To demonstrate a commitment to cost-effectiveness and fiscal restraint, APDOT has proposed recommendations that it expects will produce cost savings. These include: reducing the number of occupations detailed in the DOT; emphasizing survey methodology for data collection; using subject matter experts, associations, labor unions, employers and others to supplement data collection; and using state-of-the-art data collection technologies including existing job analysis methodologies.

Beyond any monetary savings gained for the Department of Labor through implementation of these recommendations are monetary savings for the nation. Because the data content planned for the new DOT is not now available, millions of students, workers and employers make uninformed choices and costly mistakes in their education, training, counseling and employment efforts. In addition, employers, state agencies and others currently spend millions of dollars to identify and capture such information. This results in duplicative and wasteful efforts. The Department may want to consider the feasibility of pooling resources with state agencies, employers, trade groups and others involved in delineating workforce skills. It may be possible for the Department to offer supplementary data collection on a cost reimbursable basis for specialized users who need data above and beyond what is needed for the Department's programs and purposes.

APDOT believes that the Department of Labor should expand its funding base for the DOT in order to secure both the one-time resources needed to transform the system as well as the ongoing resources needed to maintain it. APDOT estimates developmental costs for the

new DOT including the conceptualization, design, development and acquisition of automated equipment and training in its use, to be on the order of \$25 million over three to four years. Annual operational and maintenance costs could reach \$5 to \$8 million. All possible avenues of funding must be explored.

The value of the new DOT as a tool for creating the best-educated and best trained workforce in the world must be underscored. As a coherent national database system for improving the productivity and competitiveness of American workers, the DOT has a unique role. APDOT believes that the Department of Labor and the nation should recognize and support the DOT's fundamental contribution both now and into the twenty-first century.

References

1. The White House. (February 17, 1993). A Vision of Change for America. Washington, DC: Office of Management and Budget.
2. Sue E. Berryman and Thomas R. Bailey. (1992). The Double Helix of Education and the Economy. New York: The Institute on Education and the Economy, Teachers College, Columbia University.
3. Rosabeth Moss Kantor. (1989). When Giants Learn to Dance: Mastering the Challenge of Strategy, Management and Careers in the 1990's. New York: Simon and Schuster.
4. John E.S. Lawrence. (1988). "Occupational Information: Status and Sources." in Sidney Gael (ed). The Job Analysis Handbook for Business, Industry, and Government, Vol 1. New York: John Wiley & Sons.
5. Marilyn B. Silver. (December 18, 1990). Summary of Public Response to DOT Concept Paper Published in the Federal Register.

Michael D. Dymmel. (September 15, 1992). An Analysis of the Public Response to the Interim Report of the Advisory Panel for the Dictionary of Occupational Titles (APDOT).

Westat, Inc. (February 1993). DOT User Survey: A Report and Analysis.
6. National Research Council. (1980). Work, Jobs, and Occupations: A Critical Review of the Dictionary of Occupational Titles. Washington, DC: National Academy Press.
7. The Americans With Disabilities Act, Title I. 29 C.F.R. Part 1630.
8. Donald W. Drewes. (August 1992). Job Analysis Methodologies: A Comparative Review. Technical report for the DOT Review.
9. Ibid.
10. U.S. Department of Labor, Employment and Training Administration. (1991). The Revised Handbook for Analyzing Jobs. Washington, DC.
11. Governor Bill Clinton and Senator Al Gore. (1992). Putting People First: How We Can All Change America. New York, NY: Times Books, Random House.
12. DOT Review Staff Working Paper. (August 1992). Collection, Publication & Dissemination of DOT Data.
13. DOT Review Staff Working Paper, op. cit.

Marilyn B. Silver, op. cit.

Michael D. Dymmel, op. cit.

Westat, Inc., op.cit.
14. Eleanor Dietrich Morgenthau. (October 30, 1992). Identification of How Commercial Products Publish and Disseminate DOT Data. Technical report for the DOT Review.
15. National Research Council, op. cit.
16. Clinton and Gore, op. cit.
17. U.S. Department of Labor. (October 26, 1992). Education, Labor Departments Announce Grants for Skill Standards. USDL: 92-692.

APPENDICES

CONTENT MODEL

Overview

To help revitalize the American economy, the APDOT is recommending a national database system that collects, produces and maintains accurate, reliable and valid information on occupations. The new Database of Occupational Titles (DOT) would serve as a national benchmark and provide a common language for all users of occupational information.

The APDOT proposes the following Content Model as a framework for the new DOT. This model is intended to provide a coherent and integrated system that identifies the most important types of information about jobs and workers that APDOT believes should be considered for inclusion in the new DOT. **APDOT views this Content Model as an initial point of departure and subject to further research and analysis as well as administrative decisions that will be made during implementation.** APDOT expects that specifics of the descriptors will be designed and developed based on future intensive research and that descriptors will be included when supporting data meet professional standards for reliability, validity and generalizability.

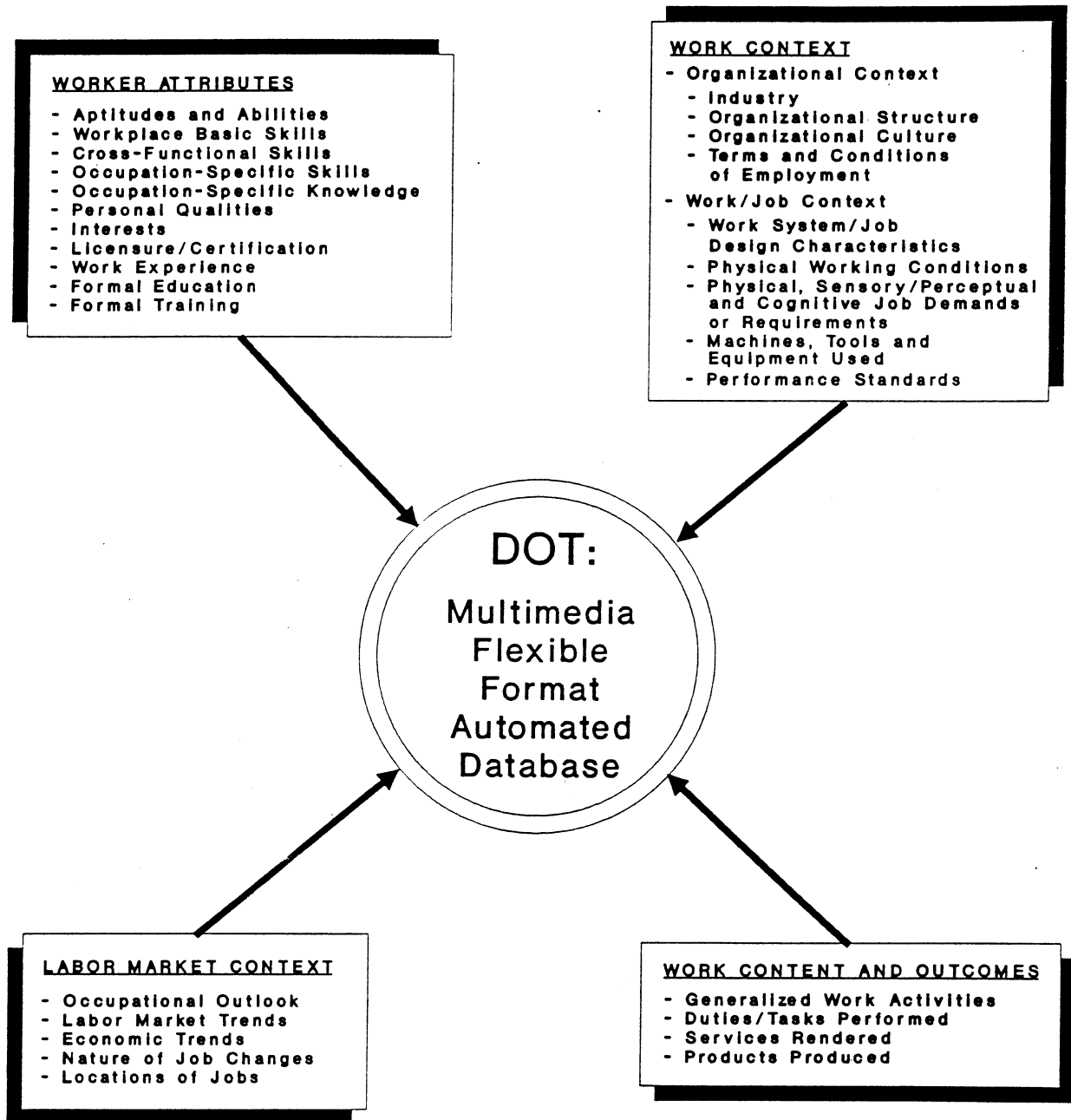
This Content Model has been drawn from a thorough analysis of user survey results, public comments and a wide-ranging review of research in such areas as job and skill analysis, human individual differences and organization analysis. It embodies a view of occupational analysis that reflects the characteristics both of occupations (through use of "job-oriented" descriptors) and of people (through use of "worker-oriented" descriptors) as well as the broader labor market.

This Content Model is not intended to imply that information or data regarding all of its components can or should be collected as part of a single job analysis instrument, or even as part of the job analysis process. Some information may more appropriately lend itself to determination through other forms of research or

data collection. For example, worker aptitude/ability patterns may be developed through aptitude test validation studies. In addition, some descriptors may be obtained through linkages with other databases and information sources. For example the development of such descriptors as occupational outlook information, labor market trends and occupational demographics may be completed by linking with appropriate databases developed by sources outside of the DOT.

The Content Model is organized into four sections that are intended to represent the major elements of a systems model of work: Worker Attributes (Section I), reflecting input variables; Work Context (Section II), reflecting the organizational, social and physical environment or system in which a job is performed; Work Content and Outcomes (Section III), reflecting output variables; and Labor Market Context (Section IV), reflecting the broader economic system of which all jobs are a part. The Content Model is shown schematically in Figure B: The New DOT Content Model. Each section defines, provide examples of and in some cases lists more specific elements of a set of descriptor categories.

Figure B: The New DOT Content Model



CONTENT MODEL

I. Worker Attributes

This section includes a series of descriptor categories related to the characteristics or qualifications that a worker brings to a job. The first five descriptors listed represent an approximate hierarchy or continuum of skills-related information (moving from general to increasingly specific levels of description and analysis) that is expected to provide a wide range of application options for users requiring skills information of different types and at different levels of specificity. It is expected that appropriate verification, elaboration and specification of these descriptor categories and their specific component elements will require further research.

Aptitudes and Abilities. The capacity to perform particular classes or categories of mental and physical functions; examples include: cognitive abilities (examples include: verbal, quantitative, abstract reasoning), spatial/perceptual abilities (examples include: spatial orientation and visualization, perceptual speed, flexibility and speed of closure), psychomotor abilities (examples include: arm, manual, and finger dexterity, eye-hand coordination), sensory abilities (examples include: vision, hearing, color discrimination) and physical abilities (examples include: static strength, dynamic strength, stamina, extent flexibility).

Workplace Basic Skills. Fundamental developed abilities that are required to at least some degree in virtually all jobs. Examples include: reading, writing and arithmetic or computational abilities. (These are included as a separate descriptor category because, although related to aptitudes and abilities, they include significant knowledge and learning components.)

Cross-Functional Skills. The various types of developed generic skills that are related to the performance of broad categories of work activity that tend to occur across relatively wide ranges of jobs. Examples include: information gathering, oral communication, problem analysis, negotiating, organizing and planning, coordinating with others and coaching or mentoring.

Occupation-Specific Skills. The developed ability to perform given general or specific work activities that tend to occur across relatively narrower ranges of jobs and/or are defined in relatively job or activity specific terms; these are operationally defined as the ability to perform the generalized work activities and job duties/tasks, defined in Section III, or the ability to use or operate given machines, tools, or equipment, defined in Section II. Examples include: ability to read blueprints, ability to repair electrical appliances, ability to type and proofread statistical reports, ability to operate a milling machine and ability to operate a forklift.

Occupation-Specific Knowledge. Understanding or awareness of, or familiarity with, the facts, principles, processes, methods, or techniques related to a particular subject area, discipline, trade, science, or art. Includes knowledge of foreign languages, computer programming languages and specific computer software packages or applications. Examples include: financial planning and analysis, fire protection systems, computer graphics, data communication networks, patent law, Spanish, COBOL and spreadsheet software.

Personal Qualities. An individual's characteristic, habitual, or typical manner of thinking, feeling, behaving, or responding with respect to oneself, others, situations, or events. Examples include: self-esteem, sociability, responsibility and integrity/honesty.

Interests. Expressed affinity for performing particular types or categories or work tasks or activities, or applying particular types of skills. Examples include: realistic, investigative, artistic, social, enterprising and conventional.

Licensure/Certification. The type or name of particular state licenses or professional or technical certification programs required for given jobs or possessed by an individual. Examples include: Board of Certified Safety Professionals (BCSP) certification; Certified Public Accountant (CPA); Registered Nurse licensure; American Production and Inventory Control Society (APICS) certification; and Academy of Certified Social Workers (ACSW) certification.

Work Experience. The type and amount of either paid job experience (acquired in regular full- or part-time employment, military jobs, paid apprenticeship, internship, or trainee positions) or unpaid job experience (acquired in volunteer or civic activities or in student work-study programs) required or characteristic of workers in a given job or possessed by an individual.

Formal Education. The type and amount of secondary school, vocational-technical school, college, or university education required or characteristic of workers in a given job or possessed by an individual.

Formal Training. The type and amount of learning or instruction, acquired through such means as apprenticeships, certification programs, military training programs, practicums and organization- or association-sponsored training programs (but outside of formal academic or educational settings) required or characteristic of workers in a given job or possessed by an individual.

II. Work Context

This section includes descriptors for Organizational Context and Work/Job Context. Organizational context includes descriptors related primarily to the broader organizational system within which work is carried out. Work/Job Context includes descriptors related to the more immediate job context.

It should be noted that some of the descriptor categories and component elements listed in this section (more so than in other sections) are prone to vary as a function of the specific setting, location or type of organization in which a job is performed, and hence may not represent generalizable characteristics of a job or its context. APDOT's view is that this determination should be based on empirical job analysis. Such data can then be used to determine the most appropriate manner of treating such characteristics in a DOT occupational description.

ORGANIZATIONAL CONTEXT

Industry. The major or defining activity or purpose of the establishments in which a given job is performed, such as defined in the Standard Industrial Classification (SIC) system. Examples from the current SIC include: Retail Trade, Finance, Insurance, Real Estate and Health Services.

Organizational Structure. Includes such elements as:

- size of organization (examples include: number of employees, divisions, work units)
- type of organization (examples include: non-profit, conglomerate, multinational)
- degree of product or service diversity or specialization
- mode of organizational structure and production control (examples include: hierarchical versus flat, centralized versus decentralized)
- reward structure (examples include: bases for wage and salary treatment, bases for performance and promotion evaluation)

Organizational Culture. Includes such elements as:

- operating values/style (examples include: institutional fairness, employee involvement, open communication, customer focus, continuous learning environment, entrepreneurial, diversity, social responsibility)
- strategic emphases (examples include: quality, speed of production, innovation, low cost, automation/technology infusion)

Terms and Conditions of Employment. Includes such elements as:

- work schedule (examples include: hourly, shift work, daily)
- type of compensation (examples include: salary, wages, fee-for-service, incentive or commission)
- basis of compensation (examples include: hours worked, output produced, products or services sold)
- amount of compensation (examples include: ranges)
- travel or relocation requirements
- degree to which work is unionized
- special clothing or uniform requirements

WORK/JOB CONTEXT

Work System/Job Design Characteristics. The characteristic manner in which a given job is designed and work is organized, especially in relationship to other aspects of the organizational system of which the job is a part. (Note: The combination of many of these elements may be used to define what has come to be called a "high performance" workplace or organization, and hence may help to determine the degree to which it is appropriate to characterize a given organization or work setting in this manner.) Examples of such elements include:

- degree of shared or interdependent task or job responsibility (examples include: team vs. individual organization of work)
- degree and nature of interactions with technology
- decision making and/or dollar accountability (examples include: degree of empowerment, autonomy or latitude for judgment)
- degree to which job entails performance of a variety of tasks or use of a variety of skills
- degree of task or job identity
- skill or knowledge acquisition or maintenance demands (examples include: degree to which frequent or continuous learning is required)
- nature of job impact (examples include: remote, indirect, contributory, shared, direct)
- degree of job impact (examples include: sphere of influence, number of people affected)
- degree of structure (examples include: presence of formal guidelines, policies or standard procedures)
- pace or intensity of work
- degree and duration of contact with others
- scope and nature of communications or interactions with others
- nature and degree of formal responsibility for directing or supervising the work of others
- degree of stability or dynamism in work schedules, methods and procedures or job duties and responsibilities
- degree and type of performance feedback available

Physical Working Conditions. The nature of the immediate physical environment in which a job is performed. Includes such elements as:

- the nature or type of work setting (examples include: indoor/outdoor)
- type of work location (examples include: factory, office)
- physical hazards present (examples include: chemicals, radiation, combustibles, etc.)
- physical discomforts present (examples include: noise, vibration, odors, dust, fumes, etc.)

Physical, Sensory/Perceptual and Cognitive Job Demands or Requirements. An occupation's characteristic type and degree of physical (examples include: standing, carrying, lifting, climbing, stooping), sensory/perceptual (examples include: color or auditory discrimination, depth perception) and cognitive (examples include: vigilance or information encoding, processing and retrieval) job demands.

Machines, Tools and Equipment Used. Physical instruments or devices used to carry out or facilitate the completion of particular jobs, work activities or tasks. Examples include: printing press, electric hoist, bulldozer, milling machine, pneumatic hammer, tape measure, camera, photocopying machine, facsimile machine, laptop computer, radio transmitter and video recorder.

Performance Standards. The nature of the production or quality criteria by which the work performed in a given job is typically judged or evaluated. Examples include: amount produced, quantity sold, error or defect rates and timeliness of production or service.

III. Work Content and Outcomes

This section includes a series of descriptor categories related to the content of the work actually carried out by an individual and the outcomes resulting from this work.

Generalized Work Activities. Aggregations of related duties or tasks into somewhat more general activity statements that do not include highly job-specific content. Examples include: writing technical reports, reading blueprints, preparing budgets and repairing electrical appliances.

Duties/Tasks Performed. The specific work steps, elements or activities performed in order to achieve a given work objective. Examples include: locate and repair leaks in pressurized cable, prepare written replies to customer inquiries or complaints and type and proofread statistical reports.

Services Rendered. The services provided by an individual or organization based on the work that individuals or work teams perform. Examples include: guidance and counseling, cleaning, teaching and medical testing.

Products Produced. The products designed, developed, made or manufactured by an individual or organization based on the work that individuals or work teams complete. Examples include: automobile parts, compact discs and food products.

IV. Labor Market Context

This section includes a series of descriptor categories related to the broader economic and labor market setting in which jobs are performed, as well as information regarding how these factors affect given jobs. It is expected that the information comprising this category will not be obtained from the job analysis process used to gather data on individual jobs, but rather from linkages with other databases and information sources such as those developed by the U.S. Office of Personnel Management (OPM), Bureau of Labor Statistics (BLS) and the U.S. Department of Education.

Occupational Outlook. Information related to the future of the occupation, describing potential educational and occupational requirements and employment prospects. Examples include: BLS information on occupational outlook and OPM projections for future employment.

Labor Market Trends. Information related to current and future employment in specific occupations. Examples include: total employment for specific occupations.

Economic Trends. Information related to economic patterns that have implications for employment. Examples include: growth patterns by industry and/or occupation.

Nature of Job Changes. Information related to changes in occupations. Examples include: changes in employment, occupational requirements and industry.

Locations of Jobs. Information related to location of occupations geographically or within the organization. Examples include: total employment of specific occupations by geographic area, organizational unit where occupation may be located such as printing department, audio visual department.

APDOT'S ROLE IN REVITALIZING THE DOT

To lead its analysis of the changes needed to make the DOT a useful tool for the twenty-first century, the Department of Labor created the Advisory Panel for the Dictionary of Occupational Titles (APDOT). The Department charged the Panel with making recommendations regarding the production, publication and dissemination of the DOT. Asking representatives of key user groups and nationally recognized experts of occupational information to study the nation's occupational information needs and assess the DOT's ability to meet those needs, was seen as an efficient and effective strategy for addressing this complex issue.

The participation of the APDOT afforded the Department the opportunity to expand the range of expertise and perspectives available for the effort. As a Secretarial Initiative, the review of the DOT was envisioned as part of a national agenda keyed to workforce quality. The charge to the Panel focused on the current and future needs of the occupational information user community. Chartered under The Federal Advisory Committee Act, APDOT was specifically required to:

- (1) Recommend the type and scope of coverage as well as the level of detail that should be collected on occupations to produce a DOT;
- (2) Advise on appropriateness of methodologies of occupational analysis used to identify, classify define and describe jobs in the DOT;
- (3) Advise on new or alternative approaches to the production, publication and dissemination of the DOT; and
- (4) Recommend options for implementation of improvements to the DOT.

The approach to the entire review was articulated in a concept paper developed by the Department. This concept paper was the first of several products to be published in the Federal Register and mailed to interested parties. (August 1990).

Expert Advice and Papers

Since October 1990, the Panel has held quarterly public meetings where experts and members of the public were invited to offer testimony on key issues under discussion. By December 1992, close to 50 experts and user groups had addressed the APDOT and scores of staff papers and expert technical reports had been commissioned on topics including: the impact of the changing world of work; skills issues; classification issues; generalized work activities; reliability and validity of current descriptors; alternative job analysis methodologies; automation issues and options; coordination and integration with the Standard Occupational Classification (SOC) system; the needs of special user groups such as vocational rehabilitation; linkage with other databases such as the National Assessment of Educational Progress (NAEP); and the status of vendor products based on the DOT.

Notices of all public meetings were published in the Federal Register and mailed to a core list of interested persons along with papers and reports produced for the Panel. A list of papers produced for the APDOT is included in Appendix E to this Final Report. These materials and papers serve as supporting documentation for the APDOT recommendations. APDOT anticipates that they will eventually be published as a separate document.

Subcommittees and Workshops

During most of its tenure, APDOT maintained only 12 members, a relatively small group to be charged with such a complex task. To make the most efficient use of the limited number of APDOT members, each was assigned to subcommittee activities. The original two subcommittees focused on Skills Issues and Purpose/Uses of the DOT. As the project progressed, these groups were refocused on the proposed DOT Content Model as well as the Final Recommendations. As part of their subcommittee activities, APDOT members also presided over special workshops conducted for them and DOT Review staff. They reported on the results of these sessions at public meetings. These workshops included a session on job analysis methodologies used in the military services in July 1992 and a session convened in September 1992 by the American Psychological Association (APA). The APA workshop brought together a group of national experts to review a series of papers commissioned by the Panel and to offer expert advice on the potential role of cognitive science in a new DOT. Potential strategies for measuring cognitive abilities were seen as a critical issue for the DOT of the future because of the increasingly cognitive requirements of the workplace.

International Research

To assure that APDOT had the best available information on the cutting-edge issues they were grappling with, the Department also undertook research on equivalent labor market tools currently used or under development by economic trading partners, including Australia, Canada, France, Germany, Japan, Sweden and the United Kingdom. Experts at the International Labour Office in Geneva worked with the Department to identify experts in individual countries who prepared a series of reports. Early in the project, additional expertise was hired to undertake a study of the changes to the Canadian occupational information system. The old Canadian system had been modeled closely on the DOT and was currently undergoing a radical transformation to a skills-based system.

Interim Report

In March 1992, the APDOT submitted an Interim Report to the Secretary of Labor, published it in the Federal Register and distributed copies to some 5,000 interested persons to generate public response. The APDOT Interim Report discussed activities undertaken to date, tentative findings and potential options for recommendations. The report was part of a concerted effort by the APDOT to solicit input from users throughout the review process. User groups and representatives were invited to testify at meetings and to submit papers. Staff constructed tentative user profiles to help APDOT focus on user and use issues while data from an empirically-based user survey were collected and analyzed. A comprehensive analysis of the responses APDOT received regarding the Interim Report was made and reported back to APDOT. As mentioned earlier, the project also undertook a user survey that attempted to clarify user perspectives on the DOT and to identify user attitudes toward potential changes.

**ADVISORY PANEL FOR THE DICTIONARY OF OCCUPATIONAL TITLES
(APDOT) MEMBERS**

Dixie Sommers, APDOT Chair, is currently Deputy Administrator at the Ohio Bureau of Employment Services in Columbus, Ohio, where she has responsibility for information systems, labor market information, and workforce development policy. She is also leading the development of an innovative Employment Service automation system. Previously, Ms. Sommers served as Director of the Bureau's Labor Market Information Division. In 1991, she was a consultant with The World Bank on employment security programs in Eastern Europe. Ms. Sommers has also worked in the labor and occupational information area in the Federal service. She was on the staff of the National Occupational Information Coordinating Committee (NOICC) for four years, where she directed the development of technical materials for use in improving and delivering occupational information, including the development of occupational and educational classification crosswalks. Ms. Sommers started her career as a labor economist at the Bureau of Labor Statistics and conducted research on occupational mobility.

Ken Baker is Director of Marketing for Freeman White Architects. In 1984, he received a White House appointment as a Representative of the U.S. Secretary of Labor where he served as a liaison with the Federal agencies and elected state officials. Mr. Baker has also been a member of the Tennessee House of Representatives where he served on the Government Operations Committee. During his legislative service, Mr. Baker was a small business owner, developing one of West Tennessee's largest travel agencies. He is also a former school teacher.

Sue E. Berryman is an Education Specialist with The World Bank in Washington, D.C., where she provides technical expertise for the Bank's human capital work in the Middle East, North Africa, Eastern Europe and the former countries of the Soviet Union. From 1985-1992 she directed the Institute on Education and the Economy at Teachers College, Columbia University, in New York City, a research institute that focuses on the implications of changes in the U.S. economy and workplaces for needed changes in the U.S. education and training system. She was a Behavioral Scientist with the RAND Corporation for 12 years, after serving on the faculty of the University of Minnesota, working as a research associate in the Director's Division of the Oak Ridge National Laboratory, and teaching at the Harvard Business School. She is a member of several national advisory boards and an invited speaker at many conferences on education and employability in the United States. She has served on several National Academy of Sciences and National Academy of Engineering panels and currently serves on the Academy's Committee on Postsecondary Education and Training for the Workplace. Her most recent book, co-authored with Thomas R. Bailey, is The Double Helix of Education and the Economy.

Manfred Emmrich is the Director of the Employment Service Division of the Employment Security Commission of North Carolina. He is responsible for the operation of 78 local Job Service Centers across the state. Previously, Mr. Emmrich served as a Senior Associate with MDC, Inc., a research and development group with special interests in workforce and economic development issues. Mr. Emmrich was also Chairman of the Employment Security Commission of North Carolina from 1973 to 1978. He is a past president of the Interstate Conference of Employment Security Agencies. Mr. Emmrich holds a bachelor's degree in economics from Davidson College.

Marilyn Gowing is Assistant Director for Personnel Research and Development for the U.S. Office of Personnel Management (OPM). Previously, Dr. Gowing has held positions with a variety of public and private sector organizations. She has received awards from the Internal Revenue Service, the

Department of Housing and Urban Development, the International Personnel Management Association, the American Society of Association Executives and OPM. She has served as a national officer for the Society for Industrial and Organizational Psychology and is a Past President of the Personnel Testing Council/Metropolitan Washington. Dr. Gowing holds a bachelor's degree from the College of William and Mary and a master's and Ph.D. in industrial and organizational psychology from George Washington University which recognized her with a Distinguished Alumna Award. She has written numerous articles for professional journals, chapters for books and has co-authored a book on job analysis entitled Taxonomies of Human Performance: The Description of Human Tasks.

Reese Hammond is currently the President of TOR Associates. From 1961 to 1990 he was the Director of Education and Training at The International Union of Operating Engineers (IUOE). Mr. Hammond has published various papers in the area of human resources development, apprenticeship, education, training and pension fund administration. He developed The National Apprenticeship System for Operating Engineers and he developed, negotiated and implemented the first union-sponsored Job Corps vocational program in 1966. From 1983 to 1989 he was a member of the Advisory Policy Committee of the National Assessment of Educational Progress. Mr. Hammond is a member of the Advisory Committee at the George Meany Center for Labor Studies, Antioch College External Degree Program.

Anita R. Lancaster is Assistant Director of Program Management, Defense Manpower Data Center (DMDC), the central organization within defense that collects and integrates automated manpower and personnel data, and conducts research on behalf of the Office of the Secretary of Defense. She previously served as Assistant Director for Accession Policy, Office of the Assistant Secretary of Defense for Force Management and Personnel, and had policy oversight for military personnel testing, enlistment standards and processing, and Joint-Service military occupational information. She has served as trustee, National Career Development Association, and was awarded the Secretary of Defense's Meritorious Civilian Service Medal in recognition of her achievements in military testing and occupational information development. Dr. Lancaster holds a Ph.D. in educational guidance and counseling from Wayne State University.

Malcolm H. Morrison is Vice President, Operations Research and Program Effectiveness at Continental Medical Systems, Inc., Mechanicsburg, Pennsylvania. Previously Dr. Morrison was Director of Research and Information Services for the National Association of Rehabilitation Facilities. He also served as Director of Disability Research for the Social Security Administration and held a number of positions at the U.S. Department of Labor in the Employment Standards Administration. Dr. Morrison is an international expert on disability, health and employment, and has published widely in these fields. He serves as an advisor to major foundations and government agencies. He received his Ph.D. in Social Welfare Policy from The Florence Heller Graduate School of Brandeis University and also holds masters degrees from The University of Michigan and Boston University. His undergraduate training was completed at McGill University in Montreal, Canada.

Kenneth Pearlman is a District Manager in AT&T's Corporate Human Resources Department, where he has been responsible for management selection research and development since 1983. Previously, he spent nine years as a personnel research psychologist at the U.S. Office of Personnel Management. He has specialized in the research, development, and evaluation of methods and programs for personnel selection, job and skill analysis and person-job matching. He has authored many professional journal articles, technical reports, papers and book chapters in the areas of job family development, cumulative analysis of research results, and the productivity implications of person-job matching procedures and systems. He is a senior editor of widely used text of readings in personnel. He has consulted to public and private organizations and has served as a reviewer for the major professional journals in applied and personnel psychology. Dr. Pearlman holds a bachelor's degree in psychology from the Catholic University of America and a Ph.D. in industrial and organizational psychology from George Washington University.

Richard Santos is an Associate Professor of Economics at the University of New Mexico. He is a graduate of Michigan State School of Labor and Industrial Relations and his areas of research interests include Hispanic employment, school to work issues and health care economics. His publications include articles on employment and a book on Hispanic youth. Some of his recent research topics are the implications of the North American Free Trade Agreement for Mexican American workers and the education and employment patterns of Hispanic high school graduates.

C. Gary Standridge is Director of the Research and Development Department for Fort Worth Independent School District. He has extensive experience in developing, implementing and evaluating education programs and in working with business alliances to improve education systems. A graduate of the University of Arkansas at Fayetteville, Dr. Standridge has received the following recognition: National Superintendent's Academy, Who's Who in American Education, \I\D\E\A\ Distinguished Educator Award, President of Phi Delta Kappa Network and the Arkansas Co-op Directors. As project coordinator, Dr. Standridge helped design and implement Project C³, a cooperative effort involving the Community, Corporations, and Classrooms working together to create a new education system in the Fort Worth ISD. Project C³ has received national attention through affiliations with the National Alliance of Business and the American Business Conference and was highlighted in newspaper articles in The Wall Street Journal and The Washington Post.

Charles G. Tetro is President and CEO of Training and Development Corporation, a national, not-for-profit, educational management, training and consulting organization headquartered in Bucksport, Maine. He has also served as the Chief Executive Officer of the New England Institute for Human Resource Planning and Management since 1979 and as Executive Director of the Penobscot Consortium since 1975. Mr. Tetro is a past president of the New England Training and Employment Council, has taught in Boston University's graduate program in Urban Studies, and has served on numerous local, regional and national boards and commissions such as the Maine Coalition on Excellence in Education, The Maine Development Foundation, Husson College, the Coalition for Sensible Energy, Northeastern University's Center for Labor Market Studies, and the Secretary of Labor's Advisory Committees on Job Corps and on the Job Training Partnership Act. Mr. Tetro's recent writing includes Kaputnik: An Inquiry into the Nature of Entropy and the Dissolution of Contemporary Social and Economic Institutions and with John Dorrer, PRAXIS: Re-engineering Government at the Point of Service.

Marilyn B. Silver, Executive Director, APDOT, is also Project Director. An employee of Aguirre International, Dr. Silver manages, organizes and staffs activities of the Advisory Panel on-site within the Department of Labor. From 1981-1990, Dr. Silver was at the National Alliance of Business where she served as Vice President, Youth and Education and managed a variety of national demonstration projects focused on education reform, employment and training policy, occupational information and workplace skills. She designed, developed and implemented training programs for business, government and education, receiving four NAB President's Awards and an IBM Quality Achievement Award. Dr. Silver also served for five years on the faculty of Delaware Technical and Community College, Wilmington, DE. She is the author of numerous books, trainer's guides and articles on subjects including: workplace skills, education reform, marketing, adult learning theory and practice, technical writing and negotiation strategies. Dr. Silver has her A.B. from Temple University and her Ph.D. from the Ohio State University.

Donna M. Dye is Personnel Research Psychologist in the U.S. Employment Service and Project Officer for the DOT Review, a Secretarial Initiative. She is also Program Manager for the Occupational Analysis Program, the research arm for the current DOT. Previously she provided leadership and direction for test development research projects for the General Aptitude Test Battery (GATB). For her work in the Employment Service, she earned quality performance awards for the past four years. Ms. Dye also has experience in Employment and Training Administration (ETA) Regional Offices as a

Federal Representative for ETA grants dealing with employment and training issues. Prior to joining the Federal Government, Ms. Dye served in the Michigan Employment Security Commission as an employment interviewer, counselor, program manager and contract developer. She gained international experience in counseling and vocational education at the Community College of Micronesia. Ms. Dye has a masters degree from Wayne State University, Detroit, Michigan, and a bachelors's degree from Marygrove College, Detroit, Michigan.

FINAL RECOMMENDATIONS AND APDOT'S CHARTER

What follows are APDOT's specific recommendations organized according to the mandates of the Panel's Charter:

- I. **Recommend the type and scope of coverage as well as the level of detail that should be collected on occupations to produce a DOT.**
 1. The purpose of the Database of Occupational Titles (DOT) should be to promote the effective education, training, counseling and employment of the American workforce. The DOT should be restructured to accomplish its purpose by providing a database system that identifies, defines, classifies and describes occupations in the economy in an accessible and flexible manner. Moreover, the DOT should serve as a national benchmark that provides a common language for all users of occupational information.
 2. The scope of the DOT should cover all occupations in the United States economy.
 4. The level of detail used in the DOT database should be sufficiently flexible to match the recommended standardized occupational classification, while allowing for further differentiation of occupations based on user needs and on the information collected.
 5. The Department of Labor should adopt the APDOT "Content Model" as a framework for identifying the occupational information included in the DOT. The Content Model's specific descriptors or data elements should be developed as part of the implementation phase of the new DOT.
 7. As the funding source for the DOT, the Department of Labor should appropriately rank its own program needs as the top priority. In meeting the Department's needs, APDOT also expects the occupational information included in the DOT to meet most of the needs of specialized users involved in workforce education, training, counseling and employment.
- II. **Advise on appropriateness of methodologies of occupational analysis used to identify, classify, define and describe jobs in the DOT.**
 3. The Department of Labor should use a single standardized occupational classification for the DOT and its labor market data collection programs. A single standardized classification will allow the DOT and other sources of occupational and labor market information to be technically and conceptually compatible.
 6. The Department of Labor should review every occupation detailed in the DOT at least every five years to assure that the DOT database remains current and that occupational data contained within it are updated regularly. Some selected occupations should be reviewed more frequently.
 8. The Department of Labor should use sampling techniques in the collection of data for the DOT that ensure the representativeness of occupations and the accuracy and consistency of information. The sampling design should make use of existing empirical information on employment by occupation and on the location and industry of employers.

9. The Department of Labor should rely on the use of structured job analysis questionnaires as the primary strategy for data collection. Alternative methods may be used to supplement data collection when warranted.
10. The Department of Labor should collect occupational information using automated technologies to facilitate quality control and to achieve currency and accuracy in a cost-effective manner.

III. Advise on new or alternative approaches to the production, publication and dissemination of the DOT.

11. The Department of Labor should make a dynamic and flexible DOT database available in a variety of electronic, automated and hard copy formats to meet the varying needs of users involved in workforce development. The Department of Labor should invest in developing value-added applications as needed for its own use and where cost-effective. The Department should also continue to encourage the vendor industry to develop specialized, value-added applications. Moreover, DOT data should remain available to the public at the cost of reproduction or publication.
12. The Department of Labor should develop a continuing marketing campaign to educate and inform users about the DOT database, its content and its use.

IV. Recommend options for implementation of improvements to the DOT.

13. By the year 1996, the Department of Labor should develop a new, comprehensive, national database system that collects, produces, maintains and disseminates accurate, reliable and valid information on occupations to support the nation's workforce investment efforts. By 1994, the Department of Labor should develop a prototype database system that demonstrates the feasibility of new collection, analysis and dissemination strategies for target industries and occupations.
14. While focusing efforts on activities designed to produce a new DOT database system, the Department of Labor should maintain the existing DOT and develop interim products as appropriate.
15. The Department of Labor should commit to an ongoing research and development agenda to maintain the DOT database system's effectiveness over time.
16. The Department of Labor should assure that the staff and organization of its Occupational Analysis system reflect changes in the methods of data collection, occupational analysis and information dissemination required by the new DOT system. The Department should also sustain a commitment to recruit, train and maintain a core staff of methodologically sophisticated professionals to manage the DOT program.
17. The Department of Labor should use the DOT as the foundation for related program efforts including the development of voluntary industry-based skill standards, the development of measures for assessing generic workplace skills and aptitudes and the proposed revision of the Standard Occupational Classification (SOC).
18. The Department of Labor should assure sufficient funding to develop the DOT database system. The Department should also make a commitment to provide additional resources for enhanced operational requirements.

**LIST OF TECHNICAL REPORTS SUPPORTING THE WORK OF THE
ADVISORY PANEL FOR THE DICTIONARY OF OCCUPATIONAL TITLES**

Advisory Panel for the Dictionary of Occupational Titles. Interim Report, March 1992. Report presenting interim findings and recommendations of APDOT.

American Psychological Association. Implications of Cognitive Psychology and Cognitive Task Analysis for the Revision of the Dictionary of Occupational Titles, September 22, 1992. Final report of American Psychological Association workshop on cognitive psychology and task analysis.

Bertrand, Olivier. Sources of Occupational Information in France, January 1991. International Labour Office report on French classification systems.

Black, John B. Cognitive Task Analysis, 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Botterbusch, Karl F. Suggestions for Revisions in the Dictionary of Occupational Titles, October 19, 1992. Technical paper examining the current and proposed content of the DOT in relation to special user needs associated with vocational and rehabilitative counseling and disability determination and adjudication.

Campbell, John P. Alternative Job Analysis Models and Their Potential Application to a Revised Dictionary of Occupational Titles, August 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Campion, Michael A. Job Analysis for the Proposed Revision of the Dictionary of Occupational Titles (DOT), August 25, 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Cooke, Nancy J. The Implications of Cognitive Task Analyses for the Revision of the Dictionary of Occupational Titles, 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Cunningham, J.W. and Wilson, Mark A. The Functions of Generalized Work Behaviors and Nomothetic Job Descriptors in a National Computerized Occupational Information and Classification System, March 10, 1993. Technical paper examining Generalized Work Behaviors within the context of the DOT.

DOT Review. The DOT Review Initiative, February 23, 1993. Brief summary of the DOT Review and the Advisory Panel for the Dictionary of Occupational Titles (APDOT).

DOT Review Staff Working Paper. Purpose and Uses of the DOT, September 17, 1991. Report describing uses of the DOT by various categories of users.

DOT Review Staff Working Paper. Department of Labor Uses of the DOT, December 20, 1991. Report describing various uses of the DOT within the Department of Labor.

DOT Review Staff Working Paper. Skills Issues in the DOT, September 20, 1991. Report examining skills and their presentation in the DOT.

DOT Review Staff Working Paper. Interim Skills Technical Report, December 31, 1991.

DOT Review Staff Working Paper. Job Analysis Methodologies, April 17, 1992. Report examining the features of several job analysis methodologies.

DOT Review Staff Working Paper. Classification Issues and Options, June 3, 1992. Report examining classification systems within the context of the DOT.

DOT Review Staff Working Paper. Collection, Publication & Dissemination of DOT Data, August 1992. Report examining the potential use of computerized technology for the new DOT.

DOT Review Staff Working Paper. Standard Occupational Classification Principles of Classification, September 2, 1992. Report examining the use of the SOC for the DOT's classification system.

Drewes, Donald W. Job Analysis Methodologies: A Comparative Review, August 1992. Technical paper comparing five job analysis methodologies.

Drewes, Donald W. The Role of General Work Activities in the DOT Review, January 1993. Technical paper examining the potential application of general work activities to the design of a future DOT.

Dymmel, Michael D. An Analysis of the Public Response to the Interim Report of the Advisory Panel for the Dictionary of Occupational Titles (APDOT), September 15, 1992. Report providing a comprehensive analysis of the public response to APDOT's Interim Report.

Elias, Peter. The Use and Gathering of Occupational Information in the United Kingdom, September 1991. International Labour Office report examining classification systems in the United Kingdom.

Embury, Brian L. The Use and Gathering of Occupational Information in Australia, June 25, 1991. International Labour Office report examining Australian classification systems.

Fleishman, Edwin A. Psychomotor, Physical, and Interpersonal Requirements of Work: Implications for Revision of the Dictionary of Occupational Titles (DOT), December 1992. Technical paper that identifies and defines the psychomotor, physical, and interpersonal characteristics associated with the performance of work within the context of the DOT.

Geyer, Paul D. Issues of Reliability in Ratings of Occupational Characteristics in the Dictionary of Occupational Titles, September 21, 1992. Technical paper documenting the reliability and validity of occupational characteristics in the DOT.

Gitomer, Drew H. Cognitive Science Implications for Revising DOT, August 1992. Technical paper developed for American Psychological Association workshop on cognitive psychology and task analysis.

Harvey, Robert J. Potential Applications of Generalized Work Behaviors (GWBs) for the Dictionary of Occupational Titles (DOT), Draft Interim Report, November 10, 1992. Technical paper examining the application of Generalized Work Behaviors within the context of the DOT.

Hoffmann, Eivind. Report on the National Occupational Dictionary and Classification System Used in Sweden, August 1991. International Labour Office report examining Swedish classification systems.

Hoffmann, Eivind. Mapping the World of Work, An International Review of the Use and Gathering of Occupational Information, December 20, 1991. International Labour Office report summarizing international classification systems.

Hogan, Joyce. Describing Interpersonal, Physical, and Psychomotor Skills for the Dictionary of Occupational Titles, December 15, 1992. Technical paper identifying and defining psychomotor, physical, and interpersonal work characteristics within the context of the DOT.

Jeanneret, Paul R. Potential Application of Generalized Work Behaviors in the Development of a Revised Dictionary of Occupational Titles, December 1992. Technical paper examining the potential application of Generalized Work Behaviors within the context of the DOT.

Levine, Edward L. Critique of the Paper, "Job Descriptions for the 21st Century," September 1992. Technical paper examining the use of skills matrices to replace job descriptions.

Meridian Corporation. The Changing World of Work: Implications for the DOT Review Initiative, April 5, 1991. Report examining changes in the world of work and potential DOT responses.

Mission Permanente du Japon. Responses to the International Labour Office's Questions about the U.S. Dictionary of Occupational Titles, December 21, 1990. International Labour Office report on Japanese classification systems.

Morgenthau, Eleanor Dietrich. Identification of How Commercial Products Publish and Disseminate DOT Data, October 30, 1992. Report examining the DOT and related products vendor and developer industry.

Morgenthau, Eleanor Dietrich and Lenz, Janet. International Practices: Occupational Classification and Description, December 1992. Report summarizing the characteristics of international systems of occupational classification and dictionaries.

Packer, Arnold. Speaking in One Tongue: Integrating the NAEP and DOT via the SCANS Know-How, October 31, 1992. Report outlining the integration of SCANS competencies into the DOT.

Schoorlemmer, Annelie and Meesters, Marion. Classification and Information Systems of Jobs and Occupations in the Netherlands, January 10, 1992. International Labour Office report on classification systems in the Netherlands.

Silver, Marilyn B. Advisory Panel for the Dictionary of Occupational Titles, Reference Guide Package, October 24-25, 1990. Report describing the background and operations of APDOT, and the roles and responsibilities of key players.

Silver, Marilyn B. Summary of Public Response to DOT Concept Paper Published in the Federal Register, December 18, 1990. Analysis of public viewpoints of the DOT Review Initiative.

Silver, Marilyn B. APDOT Management Report: "The Changing the World or Work: Implications for the DOT Review Initiative" (Meridian Corporation, 1991), April 8, 1991. Report summarizing the Meridian publication on the changing world of work for APDOT.

Stevens, David W. Canada's National Occupational Classification Taxonomy, December 1991. Technical paper examining the classification system being developed in Canada.

Stevens, David W. and Cohen, Malcolm S. The Feasibility of a Coordinated Approach to Revise the Dictionary of Occupational Titles and Standard Occupational Classification Systems, January 5, 1993. Technical paper examining a coordinated SOC-DOT approach to classification or the possible creation of a single classification system.

U.S. Department of Labor. An Invitation to Participate in a U.S. Department of Labor Survey of Users of the Dictionary of Occupational Titles, April 1992. Text of the survey of DOT users.

U.S. Department of Labor, Employment and Training Administration. Dictionary of Occupational Titles Issue Paper and Initiative, Federal Register, August 10, 1990. Initial publication of the issues and intent of the DOT Review.

Westat, Inc. DOT User Survey: A Report and Analysis, February 1993. Technical report analyzing user survey responses.

Studies undertaken in conjunction with the Bureau of Labor Statistics, scheduled for completion no later than May 1993:

Dempsey, Richard E. Study that examines and addresses issues related to how a new Standard Occupational Classification can be used to collect data from both employers and households.

Economic Roundtable. Study that examines and addresses issues related to the future use of the Standard Occupational Classification, both domestically and internationally.

Popkin, Joel. Study that conceptualizes an ideal standard classification system to integrate the SOC and the DOT.

Weinstein, Emanuel. Study that examines and addresses the issues related to developing a DOT and SOC which are conceptually and technically compatible.

APDOT MEETING PRESENTERS**Invited Presenters at APDOT Public Meetings**

Deborah Bloch, President, National Career Development Association

Karl F. Botterbusch, Vocational Consulting Associates & Professor, Research and Training Center, University of Wisconsin-Stout

Peter Carlson, Managing Director, National Advisory Commission on Work-Based Learning, U.S. Department of Labor

John P. Coyne, Director, Information Systems Management, George Washington University

Donald Drewes, North Carolina State University

Lloyd Feldman, Westat, Inc.

Richard Garner, Systems Engineering, OGDEN/ERC

Carolyn Golding, Deputy Assistant Secretary of Labor, U.S. Department of Labor

Lucy Gray, Westat, Inc.

Donna Gregory, U.S. Office of Personnel Management

Eivind Hoffmann, Chief, Statistics of Employment and Unemployment Section, Bureau of Statistics, International Labour Office

Les Janis, Director, Georgia Career Information Center, Georgia State University

Roberts T. Jones, Assistant Secretary of Labor, U.S. Department of Labor

Michael Kane, Pelavin Associates, Inc.

Robert Litman, Acting Director, U.S. Employment Service, U.S. Department of Labor

Charles McNeil, Manager, Employment Security Commission, Henderson, North Carolina

Eleanor Morgenthau, Directions

Harvey Ollis, National Occupational Information Coordinating Committee

Brian S. O'Leary, U.S. Office of Personnel Management

Arnold Packer, Executive Director, Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor & Chairman, Institute for Policy Studies, SCANS/2000 Program, The Johns Hopkins University

Thomas J. Plewes, Associate Commissioner, Office of Employment and Unemployment Statistics, Bureau of Labor Statistics, U.S. Department of Labor

Kay Raithel, Director, Missouri Occupational Information Coordinating Committee

Margaret Roberts, Chief, Occupational Information Development Division, Employment and Immigration Canada

Neal H. Rosenthal, Chief, Division of Occupational Outlook, Bureau of Labor Statistics, U.S. Department of Labor

Robert A. Schaerfl, Director, U.S. Employment Service, U.S. Department of Labor & Designated Federal Official, Advisory Panel for the Dictionary of Occupational Titles

Amiel Sharon, U.S. Office of Personnel Management

David Stevens, Director, Regional Employment Dynamics Center, Robert G. Merrick School of Business, University of Baltimore

James Van Erden, Administrator, Office of Work-Based Learning, U.S. Department of Labor

Daniel Weinberg, Chief, Housing and Household Economic Statistics Division, Bureau of the Census, U.S. Department of Commerce

Jim Woods, National Occupational Information Coordinating Committee

Seth Zinman, Associate Solicitor for Division of Legislation and Legal Counsel, Office of the Solicitor, U.S. Department of Labor

Individuals Stating Public Comments at and/or Submitting Written Comments for APDOT Public Meetings

Janelle Bjorlie-Ellis, National Rehabilitation Association & Vocational Evaluation and Work Adjustment Association

John R. Feldheim, Director of Disability and Medicare Operations, United States of America Railroad Retirement Board

Sidney A. Fine, Ph.D.

Pamela Frugoli, OIS Specialist, National Occupational Information Coordinating Committee

Gale Gibson, President, VERTEK

Charles T. Hall, Attorney at Law, Hall & Joneth, P.C.

John R. Isaac, Vocational Rehabilitation Specialist

Jerry Lewis, Executive Director, Governor's Council on Vocational Education, Alaska

Marilyn Maze, President, The Vocational Resource

Milan Moravec, Moravec and Associates

Joe Murphy, Office of Disability, Social Security Administration, U.S. Department of Health and Human Services

Deborah Nolte, VEWAA Long Range Planning Task Force, Chair and President-Elect, Vocational Evaluation and Work Adjustment Association

Charles Peters, International Organizer, Sheet Metal Workers International Association

Dale Prediger, Ph.D., Senior Research Scientist, American College Testing

Pat Reeves, Employers' National Job Service Council

Robert Sherer, President, National Association of State Occupational Information Coordinating Committees

Harold Silverman, Psychologist, Montgomery County Children Services

Irene M. Thorelli, Ph.D., Member of the Society of Industrial and Organizational Psychology (SIOP)

ACKNOWLEDGEMENTS

The Advisory Panel for the Dictionary of Occupational Titles (APDOT) thanks the public, interested parties and contractors who participated in this review, as well as the staff of the United States Employment Service, Aguirre International, the Pacific Assessment Research and Development Center and the Occupational Analysis Field Centers in North Carolina, Massachusetts, Michigan, Missouri and Utah for their contributions to this project. Particular thanks to: Deborah Crosby, Michael Dymmel and Sherril Hurd of Aguirre International; Vince MacManus of the Pacific Assessment Research and Development Center; Anne R. Cooke, Jane Golec, John O. Nottingham, Bruce A. Paige, John L. Patterson, Stanley M. Rose, Michael Swaim, Herbert L. Swain and James L. Young of North Carolina; Lori Baigelman, Paul Cleary, Frank Frezza, Jacqueline Gardner, Peter Maloy and Michael McDonald of Massachusetts; Lea Behnkendorf, Sandra Bowers, Thomas Kearney and Joseph Maxwell of Michigan; Doris Phelan, Martin Sherman, Mary Stammer and Beverly Unwer of Missouri; and Gary Porter, Tony S. Reiter, Barbara S. Smith and Kathleen A. Strieby of Utah.

**DOT Review
U.S. Department of Labor
200 Constitution Avenue, NW, N4470
Washington, DC 20210**

(202) 219-7161

***Appendix C: Citations from the Workforce
Investment Act, the Carl D. Perkins
Career and Technical Education
Improvement Act, and the Code of
Federal Regulations***

Appendix C: Citations from the Workforce Investment Act, the Carl D. Perkins Career and Technical Education Improvement Act, and the Code of Federal Regulations

This appendix provides the specific text from the Workforce Investment Act of 1998 (Pub. L. 105-220) and the Carl D. Perkins Career and Technical Education Improvement Act of 2006, section 118 (Pub. L. 109-270), which contain provisions related to the Occupational Information Network (O*NET) Data Collection Program, and sections of the *Code of Federal Regulations*, which cite either O*NET, the *Dictionary of Occupational Titles* (DOT, the predecessor to O*NET), or occupational information. The C.F.R. citations were identified through electronic search of the *Code of Federal Regulations* on the Internet site of the U.S. Government Printing Office (<http://www.gpoaccess.gov/cfr/index.html>). Given the length of the documents obtained through this search, only the specific sections containing the O*NET or DOT references are included. Exhibit C-1 lists the specific citations, the regulatory entity, and the topic of the regulation.

Exhibit C-1. Code of Federal Regulation Passages That Reference the O*NET Data Collection Program, the *Dictionary of Occupational Titles*, or Occupational Information

Regulatory Entity	C.F.R. Title and Part/Section	Topic
Railroad Retirement Board	20 C.F.R. pt. 220	Determining Disability
	20 C.F.R. § 220.13	Establishment of permanent disability for work in regular railroad occupation
	20 C.F.R. § 220.131	Work which exists in the national economy
	20 C.F.R. § 220.132	Physical exertion requirements
	20 C.F.R. § 220.134	Medical—vocational guidelines in appendix 2 of this report
	20 C.F.R. § 220.135	Exertional and non-exertional limitations
	20 C.F.R. app. 2 § 200.00	Medical Vocational Guidelines—Introduction
Social Security Administration	20 C.F.R. pt. 404(P)	Determining Disability and Blindness
	20 C.F.R. § 404.1560	When we will consider your vocational background
	20 C.F.R. § 404.1566	Work which exists in the national economy
	20 C.F.R. § 404.1567	Physical exertion requirements
	20 C.F.R. § 404.1569	Listing of medical-vocational guidelines
	20 C.F.R. § 404.1569a	Exertional and non-exertional limitations
Social Security Administration	20 C.F.R. pt. 404(P) app. 2 § 200.00	Introduction
Social Security Administration	20 C.F.R. pt. 416(I)	Supplemental Security Income for Aged, Blind, and Disabled
	20 C.F.R. § 416.960	When we will consider your vocational background
	20 C.F.R. § 416.966	Work which exists in the national economy
	20 C.F.R. § 416.967	Physical exertion requirements
	20 C.F.R. § 416.969	Listing of medical-vocational guidelines
Department of Labor	20 C.F.R. § 627.40	Job Training Partnership Act—On-the-job training
	20 C.F.R. § 651.10	General Provisions Governing the Federal-State Employment Service, Definition of terms used in parts 651–658
	20 C.F.R. § 653.103	Migrant and Seasonal Farm Worker Job Applications
	20 C.F.R. § 655.730	What is the process for filing a labor condition application?
	20 C.F.R. § 655.940	Employer attestations
Department of Labor, Wage and Hour Division	29 C.F.R. pt. 553	Application of Fair Labor Standards Act to Employees of State and Local Government
	29 C.F.R. § 553.30	Occasional or sporadic employment—Section 7(p)(2)
	29 C.F.R. § 553.103	“Same type of services” defined
Equal Employment Opportunity Commission	29 C.F.R. § 1607.15	Documentation of impact and validity evidence
Department of Education, Office of Post-Secondary Education	34 C.F.R. § 600.2	Institutional Eligibility under the Higher Education Act of 1965 as amended, Definition of “recognized occupation” for which institution provides training
Department of Veterans’ Affairs	38 C.F.R. § 21.382	Training and staff development for personnel providing assistance under Chapter 31

(A) regarding the provision of services by such member (or by an entity that such member represents); or

(B) that would provide direct financial benefit to such member or the immediate family of such member; or

(2) engage in any other activity determined by the Governor to constitute a conflict of interest as specified in the State plan.

(g) **SUNSHINE PROVISION.**—The State board shall make available to the public, on a regular basis through open meetings, information regarding the activities of the State board, including information regarding the State plan prior to submission of the plan, information regarding membership, and, on request, minutes of formal meetings of the State board.

29 USC 2822.

SEC. 112. STATE PLAN.

(a) **IN GENERAL.**—For a State to be eligible to receive an allotment under section 127 or 132, or to receive financial assistance under the Wagner-Peyser Act (29 U.S.C. 49 et seq.), the Governor of the State shall submit to the Secretary for consideration by the Secretary, a single State plan (referred to in this title as the “State plan”) that outlines a 5-year strategy for the statewide workforce investment system of the State and that meets the requirements of section 111 and this section.

(b) **CONTENTS.**—The State plan shall include—

(1) a description of the State board, including a description of the manner in which such board collaborated in the development of the State plan and a description of how the board will continue to collaborate in carrying out the functions described in section 111(d);

(2) a description of State-imposed requirements for the statewide workforce investment system;

(3) a description of the State performance accountability system developed for the workforce investment activities to be carried out through the statewide workforce investment system, that includes information identifying State performance measures as described in section 136(b)(3)(A)(ii);

(4) information describing—

(A) the needs of the State with regard to current and projected employment opportunities, by occupation;

(B) the job skills necessary to obtain such employment opportunities;

(C) the skills and economic development needs of the State; and

(D) the type and availability of workforce investment activities in the State;

(5) an identification of local areas designated in the State, including a description of the process used for the designation of such areas;

(6) an identification of criteria to be used by chief elected officials for the appointment of members of local boards based on the requirements of section 117;

(7) the detailed plans required under section 8 of the Wagner-Peyser Act (29 U.S.C. 49g);

(8)(A) a description of the procedures that will be taken by the State to assure coordination of and avoid duplication among—

(C) shall provide access to the activities carried out under subsection (e), if any;

(D) shall provide access to programs and activities carried out by one-stop partners and described in section 121(b); and

(E) shall provide access to the information described in section 15 of the Wagner-Peyser Act and all job search, placement, recruitment, and other labor exchange services authorized under the Wagner-Peyser Act (29 U.S.C. 49 et seq.).

(2) **ONE-STOP DELIVERY.**—At a minimum, the one-stop delivery system—

(A) shall make each of the programs, services, and activities described in paragraph (1) accessible at not less than one physical center in each local area of the State; and

(B) may also make programs, services, and activities described in paragraph (1) available—

(i) through a network of affiliated sites that can provide one or more of the programs, services, and activities to individuals; and

(ii) through a network of eligible one-stop partners—

(I) in which each partner provides one or more of the programs, services, and activities to such individuals and is accessible at an affiliated site that consists of a physical location or an electronically or technologically linked access point; and

(II) that assures individuals that information on the availability of the core services will be available regardless of where the individuals initially enter the statewide workforce investment system, including information made available through an access point described in subclause (I).

(3) **SPECIALIZED CENTERS.**—The centers and sites described in paragraph (2) may have a specialization in addressing special needs, such as the needs of dislocated workers.

(d) **REQUIRED LOCAL EMPLOYMENT AND TRAINING ACTIVITIES.**—

(1) **IN GENERAL.**—

(A) **ALLOCATED FUNDS.**—Funds allocated to a local area for adults under paragraph (2)(A) or (3), as appropriate, of section 133(b), and funds allocated to the local area for dislocated workers under section 133(b)(2)(B), shall be used—

(i) to establish a one-stop delivery system described in subsection (c);

(ii) to provide the core services described in paragraph (2) to adults and dislocated workers, respectively, through the one-stop delivery system in accordance with such paragraph;

(iii) to provide the intensive services described in paragraph (3) to adults and dislocated workers, respectively, described in such paragraph; and

(iv) to provide training services described in paragraph (4) to adults and dislocated workers, respectively, described in such paragraph.

(B) **OTHER FUNDS.**—A portion of the funds made available under Federal law authorizing the programs and activities described in section 121(b)(1)(B), including the Wagner-Peyser Act (29 U.S.C. 49 et seq.), shall be used as described in clauses (i) and (ii) of subparagraph (A), to the extent not inconsistent with the Federal law involved.

(2) **CORE SERVICES.**—Funds described in paragraph (1)(A) shall be used to provide core services, which shall be available to individuals who are adults or dislocated workers through the one-stop delivery system and shall, at a minimum, include—

(A) determinations of whether the individuals are eligible to receive assistance under this subtitle;

(B) outreach, intake (which may include worker profiling), and orientation to the information and other services available through the one-stop delivery system;

(C) initial assessment of skill levels, aptitudes, abilities, and supportive service needs;

(D) job search and placement assistance, and where appropriate, career counseling;

(E) provision of employment statistics information, including the provision of accurate information relating to local, regional, and national labor market areas, including—

(i) job vacancy listings in such labor market areas;

(ii) information on job skills necessary to obtain the jobs described in clause (i); and

(iii) information relating to local occupations in demand and the earnings and skill requirements for such occupations; and

(F) provision of performance information and program cost information on eligible providers of training services as described in section 122, provided by program, and eligible providers of youth activities described in section 123, providers of adult education described in title II, providers of postsecondary vocational education activities and vocational education activities available to school drop-outs under the Carl D. Perkins Vocational and Applied Technology Education Act (20 U.S.C. 2301 et seq.), and providers of vocational rehabilitation program activities described in title I of the Rehabilitation Act of 1973 (29 U.S.C. 720 et seq.);

(G) provision of information regarding how the local area is performing on the local performance measures and any additional performance information with respect to the one-stop delivery system in the local area;

(H) provision of accurate information relating to the availability of supportive services, including child care and transportation, available in the local area, and referral to such services, as appropriate;

(I) provision of information regarding filing claims for unemployment compensation;

(J) assistance in establishing eligibility for—

(i) welfare-to-work activities authorized under section 403(a)(5) of the Social Security Act (as added by section 5001 of the Balanced Budget Act of 1997) available in the local area; and

(3) ASSISTANCE.—The Secretary shall make the services of staff available to the representatives to assist the representatives in participating in the collaboration described in paragraph (1) and in the activities described in section 502.

29 USC 2872.

SEC. 137. AUTHORIZATION OF APPROPRIATIONS.

(a) YOUTH ACTIVITIES.—There are authorized to be appropriated to carry out the activities described in section 127(a), such sums as may be necessary for each of fiscal years 1999 through 2003.

(b) ADULT EMPLOYMENT AND TRAINING ACTIVITIES.—There are authorized to be appropriated to carry out the activities described in section 132(a)(1), such sums as may be necessary for each of fiscal years 1999 through 2003.

(c) DISLOCATED WORKER EMPLOYMENT AND TRAINING ACTIVITIES.—There are authorized to be appropriated to carry out the activities described in section 132(a)(2), such sums as may be necessary for each of fiscal years 1999 through 2003.

Subtitle C—Job Corps

29 USC 2881.

SEC. 141. PURPOSES.

The purposes of this subtitle are—

(1) to maintain a national Job Corps program, carried out in partnership with States and communities, to assist eligible youth who need and can benefit from an intensive program, operated in a group setting in residential and nonresidential centers, to become more responsible, employable, and productive citizens;

(2) to set forth standards and procedures for selecting individuals as enrollees in the Job Corps;

(3) to authorize the establishment of Job Corps centers in which enrollees will participate in intensive programs of activities described in this subtitle; and

(4) to prescribe various other powers, duties, and responsibilities incident to the operation and continuing development of the Job Corps.

29 USC 2882.

SEC. 142. DEFINITIONS.

In this subtitle:

(1) APPLICABLE LOCAL BOARD.—The term “applicable local board” means a local board—

(A) that provides information for a Job Corps center on local employment opportunities and the job skills needed to obtain the opportunities; and

(B) that serves communities in which the graduates of the Job Corps center seek employment.

(2) APPLICABLE ONE-STOP CENTER.—The term “applicable one-stop center” means a one-stop customer service center that provides services, such as referral, intake, recruitment, and placement, to a Job Corps center.

(3) ENROLLEE.—The term “enrollee” means an individual who has voluntarily applied for, been selected for, and enrolled in the Job Corps program, and remains with the program, but has not yet become a graduate.

(4) FORMER ENROLLEE.—The term “former enrollee” means an individual who has voluntarily applied for, been selected for, and enrolled in the Job Corps program, but left the program

SEC. 154. INDUSTRY COUNCILS.

29 USC 2894.

(a) **IN GENERAL.**—Each Job Corps center shall have an industry council, appointed by the director of the center after consultation with the Liaison, in accordance with procedures established by the Secretary.

(b) **INDUSTRY COUNCIL COMPOSITION.**—

(1) **IN GENERAL.**—An industry council shall be comprised of—

(A) a majority of members who shall be local and distant owners of business concerns, chief executives or chief operating officers of nongovernmental employers, or other private sector employers, who—

(i) have substantial management, hiring, or policy responsibility; and

(ii) represent businesses with employment opportunities that reflect the employment opportunities of the applicable local area;

(B) representatives of labor organizations (where present) and representatives of employees; and

(C) enrollees and graduates of the Job Corps.

(2) **LOCAL BOARD.**—The industry council may include members of the applicable local boards who meet the requirements described in paragraph (1).

(c) **RESPONSIBILITIES.**—The responsibilities of the industry council shall be—

(1) to work closely with all applicable local boards in order to determine, and recommend to the Secretary, appropriate vocational training for the center;

(2) to review all the relevant labor market information to—

(A) determine the employment opportunities in the local areas in which the enrollees intend to seek employment after graduation;

(B) determine the skills and education that are necessary to obtain the employment opportunities; and

(C) recommend to the Secretary the type of vocational training that should be implemented at the center to enable the enrollees to obtain the employment opportunities; and

(3) to meet at least once every 6 months to reevaluate the labor market information, and other relevant information, to determine, and recommend to the Secretary, any necessary changes in the vocational training provided at the center.

(d) **NEW CENTERS.**—The industry council for a Job Corps center that is not yet operating shall carry out the responsibilities described in subsection (c) at least 3 months prior to the date on which the center accepts the first enrollee at the center.

SEC. 155. ADVISORY COMMITTEES.

29 USC 2895.

The Secretary may establish and use advisory committees in connection with the operation of the Job Corps program, and the operation of Job Corps centers, whenever the Secretary determines that the availability of outside advice and counsel on a regular basis would be of substantial benefit in identifying and overcoming problems, in planning program or center development, or in strengthening relationships between the Job Corps and agencies, institutions, or groups engaged in related activities.

of Health and Human Services the purpose of which is determined by the Interagency Group to be related to the purpose of the Institute.

(2) OFFICES.—The Institute shall have offices separate from the offices of the Department of Education, the Department of Labor, and the Department of Health and Human Services.

(3) RECOMMENDATIONS.—The Interagency Group shall consider the recommendations of the National Institute for Literacy Advisory Board (in this section referred to as the “Board”) established under subsection (e) in planning the goals of the Institute and in the implementation of any programs to achieve the goals. If the Board’s recommendations are not followed, the Interagency Group shall provide a written explanation to the Board concerning actions the Interagency Group takes that are inconsistent with the Board’s recommendations, including the reasons for not following the Board’s recommendations with respect to the actions. The Board may also request a meeting of the Interagency Group to discuss the Board’s recommendations.

(4) DAILY OPERATIONS.—The daily operations of the Institute shall be administered by the Director of the Institute.

(c) DUTIES.—

(1) IN GENERAL.—In order to provide leadership for the improvement and expansion of the system for delivery of literacy services, the Institute is authorized—

(A) to establish a national electronic data base of information that disseminates information to the broadest possible audience within the literacy and basic skills field, and that includes—

(i) effective practices in the provision of literacy and basic skills instruction, including instruction in phonemic awareness, systematic phonics, fluency, and reading comprehension, and the integration of literacy and basic skills instruction with occupational skills training;

(ii) public and private literacy and basic skills programs, and Federal, State, and local policies, affecting the provision of literacy services at the national, State, and local levels;

(iii) opportunities for technical assistance, meetings, conferences, and other opportunities that lead to the improvement of literacy and basic skills services; and

(iv) a communication network for literacy programs, providers, social service agencies, and students;

(B) to coordinate support for the provision of literacy and basic skills services across Federal agencies and at the State and local levels;

(C) to coordinate the support of reliable and replicable research and development on literacy and basic skills in families and adults across Federal agencies, especially with the Office of Educational Research and Improvement in the Department of Education, and to carry out basic and applied research and development on topics that are not being investigated by other organizations or agencies, such as the special literacy needs of individuals with learning disabilities;

(5) by redesignating subsection (e) as subsection (d); and
 (6) in subsection (d) (as redesignated in paragraph (5)),
 by striking “such plans” and inserting “such detailed plans”.

SEC. 307. REPEAL OF FEDERAL ADVISORY COUNCIL.

Section 11 of the Wagner-Peyser Act (29 U.S.C. 49j) is amended—

- (1) by striking “11.” and all that follows through “(b) In” and inserting “11. In”; and
- (2) by striking “Director” and inserting “Secretary”.

SEC. 308. REGULATIONS.

Section 12 of the Wagner-Peyser Act (29 U.S.C. 49k) is amended by striking “The Director, with the approval of the Secretary of Labor,” and inserting “The Secretary”.

SEC. 309. EMPLOYMENT STATISTICS.

The Wagner-Peyser Act is amended—

- (1) by redesignating section 15 (29 U.S.C. 49 note) as section 16; and
- (2) by inserting after section 14 (29 U.S.C. 49l-1) the following:

29 USC 49l-2.

“SEC. 15. EMPLOYMENT STATISTICS.

“(a) **SYSTEM CONTENT.**—

“(1) **IN GENERAL.**—The Secretary, in accordance with the provisions of this section, shall oversee the development, maintenance, and continuous improvement of a nationwide employment statistics system of employment statistics that includes—

“(A) statistical data from cooperative statistical survey and projection programs and data from administrative reporting systems that, taken together, enumerate, estimate, and project employment opportunities and conditions at national, State, and local levels in a timely manner, including statistics on—

“(i) employment and unemployment status of national, State, and local populations, including self-employed, part-time, and seasonal workers;

“(ii) industrial distribution of occupations, as well as current and projected employment opportunities, wages, benefits (where data is available), and skill trends by occupation and industry, with particular attention paid to State and local conditions;

“(iii) the incidence of, industrial and geographical location of, and number of workers displaced by, permanent layoffs and plant closings; and

“(iv) employment and earnings information maintained in a longitudinal manner to be used for research and program evaluation;

“(B) information on State and local employment opportunities, and other appropriate statistical data related to labor market dynamics, which—

“(i) shall be current and comprehensive;

“(ii) shall meet the needs identified through the consultations described in subparagraphs (A) and (B) of subsection (e)(2); and

“(iii) shall meet the needs for the information identified in section 134(d);

“(C) technical standards (which the Secretary shall publish annually) for data and information described in subparagraphs (A) and (B) that, at a minimum, meet the criteria of chapter 35 of title 44, United States Code;

“(D) procedures to ensure compatibility and additivity of the data and information described in subparagraphs (A) and (B) from national, State, and local levels;

“(E) procedures to support standardization and aggregation of data from administrative reporting systems described in subparagraph (A) of employment-related programs;

“(F) analysis of data and information described in subparagraphs (A) and (B) for uses such as—

“(i) national, State, and local policymaking;

“(ii) implementation of Federal policies (including allocation formulas);

“(iii) program planning and evaluation; and

“(iv) researching labor market dynamics;

“(G) wide dissemination of such data, information, and analysis in a user-friendly manner and voluntary technical standards for dissemination mechanisms; and

“(H) programs of—

“(i) training for effective data dissemination;

“(ii) research and demonstration; and

“(iii) programs and technical assistance.

“(2) INFORMATION TO BE CONFIDENTIAL.—

“(A) IN GENERAL.—No officer or employee of the Federal Government or agent of the Federal Government may—

“(i) use any submission that is furnished for exclusively statistical purposes under the provisions of this section for any purpose other than the statistical purposes of this section for which the submission is furnished;

“(ii) make any publication or media transmittal of the data contained in the submission described in clause (i) that permits information concerning individual subjects to be reasonably inferred by either direct or indirect means; or

“(iii) permit anyone other than a sworn officer, employee, or agent of any Federal department or agency, or a contractor (including an employee of a contractor) of such department or agency, to examine an individual submission described in clause (i);

without the consent of the individual, agency, or other person who is the subject of the submission or provides that submission.

“(B) IMMUNITY FROM LEGAL PROCESS.—Any submission (including any data derived from the submission) that is collected and retained by a Federal department or agency, or an officer, employee, agent, or contractor of such a department or agency, for exclusively statistical purposes under this section shall be immune from the legal process and shall not, without the consent of the individual, agency, or other person who is the subject of the submission or provides that submission, be admitted as evidence or used

“(A) consult with State and local employers, participants, and local workforce investment boards about the labor market relevance of the data to be collected and disseminated through the statewide employment statistics system;

“(B) consult with State educational agencies and local educational agencies concerning the provision of employment statistics in order to meet the needs of secondary school and postsecondary school students who seek such information;

“(C) collect and disseminate for the system, on behalf of the State and localities in the State, the information and data described in subparagraphs (A) and (B) of subsection (a)(1);

“(D) maintain and continuously improve the statewide employment statistics system in accordance with this section;

“(E) perform contract and grant responsibilities for data collection, analysis, and dissemination for such system;

“(F) conduct such other data collection, analysis, and dissemination activities as will ensure an effective statewide employment statistics system;

“(G) actively seek the participation of other State and local agencies in data collection, analysis, and dissemination activities in order to ensure complementary, compatibility, and usefulness of data;

“(H) participate in the development of the annual plan described in subsection (c); and

“(I) utilize the quarterly records described in section 136(f)(2) of the Workforce Investment Act of 1998 to assist the State and other States in measuring State progress on State performance measures.

“(3) **RULE OF CONSTRUCTION.**—Nothing in this section shall be construed as limiting the ability of a State agency to conduct additional data collection, analysis, and dissemination activities with State funds or with Federal funds from sources other than this section.

“(f) **NONDUPLICATION REQUIREMENT.**—None of the functions and activities carried out pursuant to this section shall duplicate the functions and activities carried out under the Carl D. Perkins Vocational and Applied Technology Education Act (20 U.S.C. 2301 et seq.).

“(g) **AUTHORIZATION OF APPROPRIATIONS.**—There are authorized to be appropriated to carry out this section such sums as may be necessary for each of the fiscal years 1999 through 2004.

“(h) **DEFINITION.**—In this section, the term ‘local area’ means the smallest geographical area for which data can be produced with statistical reliability.”.

SEC. 310. TECHNICAL AMENDMENTS.

Sections 3(b), 6(b)(1), and 7(d) of the Wagner-Peyser Act (29 U.S.C. 49b(b), 49e(b)(1), and 49f(d)) are amended by striking “Secretary of Labor” and inserting “Secretary”.

SEC. 311. EFFECTIVE DATE.

The amendments made by this subtitle shall take effect on July 1, 1999.

PUBLIC LAW 109–270—AUG. 12, 2006 120 STAT. 683

Public Law 109–270

109th Congress

An Act

To amend the Carl D. Perkins Vocational and Technical Education Act of 1998 to improve the Act.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; AMENDMENT.

(a) **SHORT TITLE.**—This Act may be cited as the “Carl D. Perkins Career and Technical Education Improvement Act of 2006”.

(b) **AMENDMENT.**—The Carl D. Perkins Vocational and Technical Education Act of 1998 (20 U.S.C. 2301 et seq.) is amended to read as follows:

“SEC. 118. OCCUPATIONAL AND EMPLOYMENT INFORMATION.

“(a) NATIONAL ACTIVITIES.—From funds appropriated under subsection (g), the Secretary, in consultation with appropriate Federal agencies, is authorized—

“(1) to provide assistance to an entity to enable the entity—

“(A) to provide technical assistance to State entities designated under subsection (c) to enable the State entities to carry out the activities described in such subsection;

“(B) to disseminate information that promotes the replication of high quality practices described in subsection (c); and

“(C) to develop and disseminate products and services related to the activities described in subsection (c); and

“(2) to award grants to States that designate State entities in accordance with subsection (c) to enable the State entities to carry out the State level activities described in such subsection.

“(b) STATE APPLICATION.—

“(1) IN GENERAL.—A jointly designated State entity described in subsection (c) that desires to receive a grant under this section shall submit an application to the Secretary at the same time the State submits its State plan under section 122, in such manner, and accompanied by such additional information, as the Secretary may reasonably require.

“(2) CONTENTS.—Each application submitted under paragraph (1) shall include a description of how the jointly designated State entity described in subsection (c) will provide information based on trends provided pursuant to section 15 of the Wagner-Peyser Act to inform program development.

“(c) STATE LEVEL ACTIVITIES.—In order for a State to receive a grant under this section, the eligible agency and the Governor of the State shall jointly designate an entity in the State—

“(1) to provide support for career guidance and academic counseling programs designed to promote improved career and

120 STAT. 714 PUBLIC LAW 109–270—AUG. 12, 2006
education decision making by students (and parents, as appropriate)
regarding education (including postsecondary education)
and training options and preparations for high skill, high wage,
or high demand occupations and non-traditional fields;

“(2) to make available to students, parents, teachers,
administrators, faculty, and career guidance and academic
counselors, and to improve accessibility with respect to,
information and planning resources that relate academic and
career and technical educational preparation to career goals
and expectations;

“(3) to provide academic and career and technical education
teachers, faculty, administrators, and career guidance and academic
counselors with the knowledge, skills, and occupational
information needed to assist parents and students, especially
special populations, with career exploration, educational
opportunities, education financing, and exposure to high skill,
high wage, or high demand occupations and non-traditional
fields, including occupations and fields requiring a baccalaureate
degree;

“(4) to assist appropriate State entities in tailoring career
related educational resources and training for use by such
entities, including information on high skill, high wage, or
high demand occupations in current or emerging professions
and on career ladder information;

“(5) to improve coordination and communication among
administrators and planners of programs authorized by this
Act and by section 15 of the Wagner-Peyser Act at the Federal,
State, and local levels to ensure nonduplication of efforts and
the appropriate use of shared information and data;

“(6) to provide ongoing means for customers, such as students
and parents, to provide comments and feedback on products
and services and to update resources, as appropriate, to
better meet customer requirements; and

“(7) to provide readily available occupational information
such as—

“(A) information relative to employment sectors;

“(B) information on occupation supply and demand;
and

“(C) other information provided pursuant to section
15 of the Wagner-Peyser Act as the jointly designated
State entity considers relevant.

“(d) NONDUPLICATION.—

“(1) WAGNER-PEYSER ACT.—The jointly designated State
entity described under subsection (c) may use funds provided
under subsection (a)(2) to supplement activities under section
15 of the Wagner-Peyser Act to the extent such activities do
not duplicate activities assisted under such section.

“(2) PUBLIC LAW 105–220.—None of the functions and activities
assisted under this section shall duplicate the functions
and activities carried out under Public Law 105–220.

“(e) FUNDING RULE.—Of the amounts appropriated to carry
out this section, the Federal entity designated under subsection
(a) shall use—

“(1) not less than 85 percent to carry out subsection (c);
and

“(2) not more than 15 percent to carry out subsection (a).

“(f) REPORT.—The Secretary, in consultation with appropriate Federal agencies, shall prepare and submit to the appropriate committees of Congress, an annual report that includes—

“(1) a description of activities assisted under this section during the prior program year;

“(2) a description of the specific products and services assisted under this section that were delivered in the prior program year; and

“(3) an assessment of the extent to which States have effectively coordinated activities assisted under this section with activities authorized under section 15 of the Wagner-Peyser Act.

“(g) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section such sums as may be necessary for each of the fiscal years 2007 through 2012.

other test results, and other information provided by the employee or obtained by the Board. If such records reveal that there are significant differences in the medical findings, significant differences in opinions concerning the residual functional capacity evaluations among treating physicians, or significant differences between the results of functional capacity evaluations and residual functional capacity examinations, then the Board may request additional evidence from treating physicians, additional consultative examinations and/or residual functional capacity tests to resolve the inconsistencies;

(D) *Step 4.* When the Board determines that there is concordance of medical findings, then the Board will assess the quality of the evidence in accordance with § 220.112, which describes the weight to be given to the opinions of various physicians, and § 220.114, which describes how the Board evaluates symptoms such as pain. The Board will also assess the weight of evidence by utilizing § 220.14, which outlines factors to be used in determining the weight to be attributed to certain types of evidence. If, after assessment, the Board determines that there is no substantial objective evidence of an impairment, the Board will determine that the employee is not disabled;

(E) *Step 5.* Next, the Board determines the physical and mental demands of the employee's regular railroad occupation. In determining the job demands of the employee's regular railroad occupation, the Board will not only consider the employee's own description of his or her regular railroad occupation, but shall also consider the employer's description of the physical requirements and environmental factors relating to the employee's regular railroad occupation, as provided by the employer on the appropriate form set forth in appendix 3 of this part, and consult other sources such as the Dictionary of Occupational Titles and the job descriptions of occupations found in the Occupational Disability Claims Manual, as provided for in § 220.10;

(F) *Step 6.* Based upon the assessment of the evidence in paragraph (b)(2)(iv)(D) of this section, the Board shall determine the employee's resid-

ual functional capacity. The Board will then compare the job demands of the employee's regular railroad occupation, as determined in paragraph (b)(2)(iv)(E) of this section. If the demands of the employee's regular railroad occupation exceed the employee's residual functional capacity, then the Board will find the employee disabled. If the demands do not exceed the employee's residual functional capacity, then the Board will find the employee not disabled.

[56 FR 12980, Mar. 28, 1991, as amended at 63 FR 7541, Feb. 13, 1998]

§ 220.14 Weighing of evidence.

(a) *Factors which support greater weight.* Evidence will generally be given more weight if it meets one or more of the following criteria:

(1) The residual functional capacity evaluation is based upon functional objective tests with high validity and reliability;

(2) The medical evidence shows multiple impairments which have a cumulative effect on the employee's residual functional capacity;

(3) Symptoms associated with limitations are consistent with objective findings;

(4) There exists an adequate trial of therapies with good compliance, but poor outcome;

(5) There exists consistent history of conditions between treating physicians and other health care providers.

(b) *Factors which support lesser weight.* Evidence will generally be given lesser weight if it meets one or more of the following criteria:

(1) There is an inconsistency between the diagnoses of the treating physicians;

(2) There is inconsistency between reports of pain and functional impact;

(3) There is inconsistency between subjective symptoms and physical examination findings;

(4) There is evidence of poor compliance with treatment regimen, keeping appointments, or cooperating with treatment;

(5) There is evidence of exam findings which is indicative of exaggerated or potential malingering response;

Railroad Retirement Board

§ 220.133

(7) The claimant not actually being hired to do work he or she could otherwise do; or

(8) The claimant not wishing to do a particular type of work.

(d) *Administrative notice of job data.* The following sources are used when the Board determines that unskilled, sedentary, light and medium jobs exist in the national economy:

(1) *Dictionary of Occupational Titles*, published by the Department of Labor.

(2) *County Business Patterns*, published by the Bureau of the Census.

(3) *Census Reports*, also published by the Bureau of the Census.

(4) *Occupational Analyses*, prepared for the Social Security Administration by various State employment agencies.

(5) *Occupational Outlook Handbook*, published by the Bureau of Labor Statistics.

(e) *Use of vocational experts and other specialists.* If the issue in determining whether the claimant is disabled is whether his or her work skills can be used in other work and the specific occupations in which they can be used, or there is a similarly complex issue, the Board may use the services of a vocational expert or other specialist. The Board will decide whether to use a vocational expert or other specialist.

§ 220.132 Physical exertion requirements.

To determine the physical exertion requirements of work in the national economy, jobs are classified as "sedentary", "light", "medium", "heavy", and "very heavy." These terms have the same meaning as they have in the Dictionary of Occupational Titles, published by the Department of Labor. In making disability determinations the Board uses the following definitions:

(a) *Sedentary work.* Sedentary work involves lifting no more than 10 pounds at a time and occasionally lifting or carrying articles like docket files, ledgers, and small tools. Although a sedentary job is defined as one which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties. Jobs are sedentary if walking and standing are required occasionally and the other sedentary criteria are met.

(b) *Light work.* Light work involves lifting no more than 20 pounds at a time with frequent lifting or carrying of objects weighing up to 10 pounds. Even though the weight lifted may be very little, a job is in this category when it requires a good deal of walking or standing, or when it involves sitting most of the time with some pushing and pulling of arm or leg controls. To be considered capable of performing a full or wide range of light work, the claimant must have the ability to do substantially all of these activities. If the claimant can do light work, the Board determines that he or she can also do sedentary work, unless there are additional limiting factors such as loss of fine dexterity or inability to sit for long periods of time.

(c) *Medium work.* Medium work involves lifting no more than 50 pounds at a time with frequent lifting or carrying of objects weighing up to 25 pounds. If the claimant can do medium work, the Board determines that he or she can also do sedentary and light work.

(d) *Heavy work.* Heavy work involves lifting no more than 100 pounds at a time with frequent lifting or carrying of objects weighing up to 50 pounds. If the claimant can do heavy work, the Board determines that he or she can also do medium, light, and sedentary work.

(e) *Very heavy work.* Very heavy work involves lifting objects weighing more than 100 pounds at a time with frequent lifting or carrying of objects weighing 50 pounds or more. If the claimant can do very heavy work, the Board determines that he or she can also do heavy, medium, light and sedentary work.

§ 220.133 Skill requirements.

(a) *General.* To evaluate skills and to help determine the existence in the national economy of work the claimant is able to do, occupations are classified as unskilled, semi-skilled, and skilled. In classifying these occupations, the Board uses materials published by the Department of Labor.

(b) *Unskilled work.* Unskilled work is work which needs little or no judgment to do simple duties that can be learned on the job in a short period of time (30 days). The job may or may not require

considerable strength. A job is considered unskilled if the claimant can usually learn to do the job in 30 days, and little job training and judgment are needed. The claimant does not gain work skills by doing unskilled jobs. For example, jobs are considered unskilled if primary work duties are—

- (1) Handling;
- (2) Feeding;
- (3) Offbearing (placing or removing materials from machines which are automatic or operated by others); or
- (4) Machine tending.

(c) *Semi-skilled work.* Semi-skilled work is work which needs some skills but does not require doing the more complex work duties. A job may be classified as semi-skilled where coordination and dexterity are necessary, as when hand or feet must be moved quickly to do repetitive tasks. Semi-skilled jobs may require—

- (1) Alertness and close attention to watching machine processes;
- (2) Inspecting, testing, or otherwise looking for irregularities;
- (3) Tending or guarding equipment, property, materials, or persons against loss, damage, or injury; or
- (4) Other types of activities which are similarly less complex than skilled work but more complex than unskilled work.

(d) *Skilled work.* Skilled work requires qualifications in which a person uses judgment to determine the machine and manual operations to be performed in order to obtain the proper form, quality, or quantity of material to be produced. Skilled jobs may require—

- (1) Laying out work;
- (2) Estimating quality;
- (3) Determining suitability and needed quantities of materials;
- (4) Making precise measurements;
- (5) Reading blueprints or other specifications;
- (6) Making necessary computations or mechanical adjustments to control or regulate work; or
- (7) Dealing with people, facts, figures or abstract ideas at a high level of complexity.

(e) *Skills that can be used in other work (transferability)*—(1) *What the Board means by transferable skills.* The Board considers the claimant to have skills that can be used in other jobs, when

the skilled or semi-skilled work activities the claimant did in past work can be used to meet the requirements of skilled or semi-skilled work activities of other jobs or kinds of work. This depends largely on the similarity of occupationally significant work activities among different jobs.

(2) *How the Board determines skills that can be transferred to other jobs.* Transferability is most probable and meaningful among jobs in which—

- (i) The same or a lesser degree of skill is required;
- (ii) The same or similar tools and machines are used; and
- (iii) The same or similar raw materials, products, processes, or services are involved.

(3) *Degrees of transferability.* There are degrees of transferability of skills ranging from very close similarities to remote and incidental similarities among jobs. A complete similarity of all three factors is not necessary for transferability. However, when skills are so specialized or have been acquired in such an isolated vocational setting (like many jobs in mining, agriculture, or fishing) that they are not readily usable in other industries, jobs, and work settings, they are considered not transferable.

§ 220.134 Medical-vocational guidelines in appendix 2 of this part.

(a) The Dictionary of Occupational Titles includes information about jobs (classified by their exertional and skill requirements) that exist in the national economy. Appendix 2 of this part provides rules using this data reflecting major functional and vocational patterns.

(b) The Board applies that rules in appendix 2 of this part in cases where a claimant is not doing substantial gainful activity and is prevented by a severe impairment(s) from doing vocationally relevant past work.

(c) The rules in appendix 2 of this part do not cover all possible variations of factors. The Board does not apply these rules if one of the findings of fact about the claimant's vocational factors and residual functional capacity is not the same as the corresponding criterion of a rule. In these

instances, the Board gives full consideration to all relevant facts in accordance with the definitions and discussions under vocational considerations. However, if the findings of fact made about all factors are the same as the rule, the Board uses that rule to decide whether that claimant is disabled.

§ 220.135 Exertional and nonexertional limitations.

(a) *General.* The claimant's impairment(s) and related symptoms, such as pain, may cause limitations of function or restrictions which limit the claimant's ability to meet certain demands of jobs. These limitations may be exertional, nonexertional, or a combination of both. Limitations are classified as exertional if they affect the claimant's ability to meet the strength demands of jobs. The classification of a limitation as exertional is related to the United States Department of Labor's classification of jobs by various exertional levels (sedentary, light, medium, heavy, and very heavy) in terms of the strength demands for sitting, standing, walking, lifting, carrying, pushing, and pulling. Sections 220.132 and 220.134 of this part explain how the Board uses the classification of jobs by exertional levels (strength demands) which is contained in the Dictionary of Occupational Titles published by the Department of Labor, to determine the exertional requirements of work which exists in the national economy. Limitations or restrictions which affect the claimant's ability to meet the demands of jobs other than the strength demands, that is, demands other than sitting, standing, walking, lifting, carrying, pushing or pulling, are considered nonexertional. Sections 220.100(b)(5) and 220.180(h) of this part explain that if the claimant can no longer do the claimant's past relevant work because of a severe medically determinable impairment(s), the Board must determine whether the claimant's impairment(s), when considered along with the claimant's age, education, and work experience, prevents the claimant from doing any other work which exists in the national economy in order to decide whether the claimant is disabled or continues to be disabled. Paragraphs (b), (c), and (d) of this section

explain how the Board applies the medical-vocational guidelines in Appendix 2 of this part in making this determination, depending on whether the limitations or restrictions imposed by the claimant's impairment(s) and related symptoms, such as pain, are exertional, nonexertional, or a combination of both.

(b) *Exertional limitations.* When the limitations and restrictions imposed by the claimant's impairment(s) and related symptoms, such as pain, affect only the claimant's ability to meet the strength demands of jobs (sitting, standing, walking, lifting, carrying, pushing, and pulling), the Board considers that the claimant has only exertional limitations. When the claimant's impairment(s) and related symptoms only impose exertional limitations and the claimant's specific vocational profile is listed in a rule contained in Appendix 2 of this part, the Board will directly apply that rule to decide whether the claimant is disabled.

(c) *Nonexertional limitations.* (1) When the limitations and restrictions imposed by the claimant's impairment(s) and related symptoms, such as pain, affect only the claimant's ability to meet the demands of jobs other than the strength demands, the Board considers that the claimant has only nonexertional limitations or restrictions. Some examples of nonexertional limitations or restrictions include the following:

(i) Difficulty functioning because the claimant is nervous, anxious, or depressed;

(ii) Difficulty maintaining attention or concentration;

(iii) Difficulty understanding or remembering detailed instructions;

(iv) Difficulty in seeing or hearing;

(v) Difficulty tolerating some physical feature(s) of certain work settings, e.g., the claimant cannot tolerate dust or fumes; or

(vi) Difficulty performing the manipulative or postural functions of some work such as reaching, handling, stooping, climbing, crawling, or crouching.

(2) If the claimant's impairment(s) and related symptoms, such as pain, only affect the claimant's ability to

APPENDIX 2 TO PART 220—MEDICAL-
VOCATIONAL GUIDELINES

Sec.

- 200.00 Introduction.
- 201.00 Maximum sustained work capability limited to sedentary work as a result of severe medically determinable impairment(s).
- 202.00 Maximum sustained work capability limited to light work as a result of severe medically determinable impairment(s).
- 203.00 Maximum sustained work capability limited to medium work as a result of severe medically determinable impairment(s).
- 204.00 Maximum sustained work capability limited to heavy work (or very heavy work) as a result of severe medically determinable impairment(s).

200.00 *Introduction.* (a) The following rules reflect the major functional and vocational patterns which are encountered in cases which cannot be evaluated on medical considerations alone, where an individual with a severe medically determinable physical or mental impairment(s) is not engaging in substantial gainful activity and the individual's impairment(s) prevents the performance of his or her vocationally relevant past work. They also reflect the analysis of the various vocational factors (i.e., age, education, and work experience) in combination with the individual's residual functional capacity (used to determine his or her maximum sustained work capability for sedentary, light, medium, heavy, or very heavy work) in evaluating the individual's ability to engage in substantial gainful activity in other than his or her vocationally relevant past work. Where the findings of fact made with respect to a particular individual's vocational factors and residual functional capacity coincide with all of the criteria of a particular rule, the rule directs a conclusion as to whether the individual is or is not disabled. However, each of these findings of fact is subject to rebuttal and the individual may present evidence to refute such findings. Where any one of the findings of fact does not coincide with the corresponding criterion of a rule, the rule does not apply in that particular case and, accordingly, does not direct a conclusion of disabled or not disabled. In any instance where a rule does not apply, full consideration must be given to all of the relevant facts of the case in accordance with the definitions and discussions of each factor in the appropriate sections of the regulations.

(b) The existence of jobs in the national economy is reflected in the "Decisions" shown in the rules; i.e., in promulgating the rules, administrative notice has been taken of the numbers of unskilled jobs that exist

throughout the national economy at the various functional levels (sedentary, light, medium, heavy, and very heavy) as supported by the "Dictionary of Occupational Titles" and the "Occupational Outlook Handbook," published by the Department of Labor; the "County Business Patterns" and "Census Surveys" published by the Bureau of the Census; and occupational surveys of light and sedentary jobs prepared for the Social Security Administration by various State employment agencies. Thus, when all factors coincide with the criteria of a rule, the existence of such jobs is established. However, the existence of such jobs for individuals whose remaining functional capacity or other factors do not coincide with the criteria of a rule must be further considered in terms of what kinds of jobs or types of work may be either additionally indicated or precluded.

(c) In the application of the rules, the individual's residual functional capacity (i.e., the maximum degree to which the individual retains the capacity for sustained performance of the physical-mental requirements of jobs), age, education, and work experience must first be determined. When assessing the person's residual functional capacity, the Board considers his or her symptoms (such as pain), signs, and laboratory findings together with other evidence the Board obtains.

(d) The correct disability decision (i.e., on the issue of ability to engage in substantial gainful activity) is found by then locating the individual's specific vocational profile. If an individual's specific profile is not listed within this appendix 2, a conclusion of disabled or not disabled is not directed. Thus, for example, an individual's ability to engage in substantial gainful work where his or her residual functional capacity falls between the ranges of work indicated in the rules (e.g., the individual who can perform more than light but less than medium work), is decided on the basis of the principles and definitions in the regulations, giving consideration to the rules for specific case situations in this appendix 2. These rules represent various combinations of exertional capabilities, age, education and work experience and also provide an overall structure for evaluation of those cases in which the judgments as to each factor do not coincide with those of any specific rule. Thus, when the necessary judgments have been made as to each factor and it is found that no specific rule applies, the rules still provide guidance for decisionmaking, such as in cases involving combinations of impairments. For example, if strength limitations resulting from an individual's impairment(s) considered with the judgments made as to the individual's age, education and work experience correspond to (or closely approximate) the factors of a particular rule, the adjudicator then has a frame of reference for considering the jobs or types of work precluded by other,

medical and nonmedical evidence, including the information described in § 404.1529(c).

[56 FR 57943, Nov. 14, 1991, as amended at 68 FR 51162, Aug. 26, 2003]

§ 404.1546 Responsibility for assessing your residual functional capacity.

(a) *Responsibility for assessing residual functional capacity at the State agency.* When a State agency makes the disability determination, a State agency medical or psychological consultant(s) (or a medical or psychological expert (as defined in § 405.5 of this chapter) in claims adjudicated under the procedures in part 405 of this chapter) is responsible for assessing your residual functional capacity.

(b) *Responsibility for assessing residual functional capacity in the disability hearings process.* If your case involves a disability hearing under § 404.914, a disability hearing officer is responsible for assessing your residual functional capacity. However, if the disability hearing officer's reconsidered determination is changed under § 404.918, the Associate Commissioner for the Office of Disability Determinations or his or her delegate is responsible for assessing your residual functional capacity.

(c) *Responsibility for assessing residual functional capacity at the administrative law judge hearing or Appeals Council level.* If your case is at the administrative law judge hearing level under § 404.929 or at the Appeals Council review level under § 404.967, the administrative law judge or the administrative appeals judge at the Appeals Council (when the Appeals Council makes a decision) is responsible for assessing your residual functional capacity.

(d) *Responsibility for assessing residual functional capacity in claims adjudicated under part 405 of this chapter.* In claims adjudicated under the procedures in part 405 of this chapter at the Federal reviewing official, administrative law judge, and Decision Review Board levels of the administrative review process, the Federal reviewing official, administrative law judge, or the Decision Review Board is responsible for assessing your residual functional capacity.

[68 FR 51162, Aug. 26, 2003, as amended at 71 FR 16445, Mar. 31, 2006]

VOCATIONAL CONSIDERATIONS

§ 404.1560 When we will consider your vocational background.

(a) *General.* If you are applying for a period of disability, or disability insurance benefits as a disabled worker, or child's insurance benefits based on disability which began before age 22, or widow's or widower's benefits based on disability for months after December 1990, and we cannot decide whether you are disabled at one of the first three steps of the sequential evaluation process (see § 404.1520), we will consider your residual functional capacity together with your vocational background, as discussed in paragraphs (b) and (c) of this section.

(b) *Past relevant work.* We will first compare our assessment of your residual functional capacity with the physical and mental demands of your past relevant work.

(1) *Definition of past relevant work.* Past relevant work is work that you have done within the past 15 years, that was substantial gainful activity, and that lasted long enough for you to learn to do it. (See § 404.1565(a).)

(2) *Determining whether you can do your past relevant work.* We will ask you for information about work you have done in the past. We may also ask other people who know about your work. (See § 404.1565(b).) We may use the services of vocational experts or vocational specialists, or other resources, such as the "Dictionary of Occupational Titles" and its companion volumes and supplements, published by the Department of Labor, to obtain evidence we need to help us determine whether you can do your past relevant work, given your residual functional capacity. A vocational expert or specialist may offer relevant evidence within his or her expertise or knowledge concerning the physical and mental demands of a claimant's past relevant work, either as the claimant actually performed it or as generally performed in the national economy. Such evidence may be helpful in supplementing or evaluating the accuracy of the claimant's description of his past work. In addition, a vocational expert or specialist may offer expert

what you have done in the past, we will ask you to tell us about all of the jobs you have had in the last 15 years. You must tell us the dates you worked, all of the duties you did, and any tools, machinery, and equipment you used. We will need to know about the amount of walking, standing, sitting, lifting and carrying you did during the work day, as well as any other physical or mental duties of your job. If all of your work in the past 15 years has been arduous and unskilled, and you have very little education, we will ask you to tell us about all of your work from the time you first began working. This information could help you to get disability benefits.

§ 404.1566 Work which exists in the national economy.

(a) *General.* We consider that work exists in the national economy when it exists in significant numbers either in the region where you live or in several other regions of the country. It does not matter whether—

- (1) Work exists in the immediate area in which you live;
- (2) A specific job vacancy exists for you; or
- (3) You would be hired if you applied for work.

(b) *How we determine the existence of work.* Work exists in the national economy when there is a significant number of jobs (in one or more occupations) having requirements which you are able to meet with your physical or mental abilities and vocational qualifications. Isolated jobs that exist only in very limited numbers in relatively few locations outside of the region where you live are not considered "work which exists in the national economy". We will not deny you disability benefits on the basis of the existence of these kinds of jobs. If work that you can do does not exist in the national economy, we will determine that you are disabled. However, if work that you can do does exist in the national economy, we will determine that you are not disabled.

(c) *Inability to obtain work.* We will determine that you are not disabled if your residual functional capacity and vocational abilities make it possible for you to do work which exists in the

national economy, but you remain unemployed because of—

- (1) Your inability to get work;
- (2) Lack of work in your local area;
- (3) The hiring practices of employers;
- (4) Technological changes in the industry in which you have worked;
- (5) Cyclical economic conditions;
- (6) No job openings for you;
- (7) You would not actually be hired to do work you could otherwise do; or
- (8) You do not wish to do a particular type of work.

(d) *Administrative notice of job data.* When we determine that unskilled, sedentary, light, and medium jobs exist in the national economy (in significant numbers either in the region where you live or in several regions of the country), we will take administrative notice of reliable job information available from various governmental and other publications. For example, we will take notice of—

- (1) *Dictionary of Occupational Titles*, published by the Department of Labor;
- (2) *County Business Patterns*, published by the Bureau of the Census;
- (3) *Census Reports*, also published by the Bureau of the Census;
- (4) *Occupational Analyses*, prepared for the Social Security Administration by various State employment agencies; and
- (5) *Occupational Outlook Handbook*, published by the Bureau of Labor Statistics.

(e) *Use of vocational experts and other specialists.* If the issue in determining whether you are disabled is whether your work skills can be used in other work and the specific occupations in which they can be used, or there is a similarly complex issue, we may use the services of a vocational expert or other specialist. We will decide whether to use a vocational expert or other specialist.

§ 404.1567 Physical exertion requirements.

To determine the physical exertion requirements of work in the national economy, we classify jobs as *sedentary*, *light*, *medium*, *heavy*, and *very heavy*. These terms have the same meaning as

they have in the *Dictionary of Occupational Titles*, published by the Department of Labor. In making disability determinations under this subpart, we use the following definitions:

(a) *Sedentary work*. Sedentary work involves lifting no more than 10 pounds at a time and occasionally lifting or carrying articles like docket files, ledgers, and small tools. Although a sedentary job is defined as one which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties. Jobs are sedentary if walking and standing are required occasionally and other sedentary criteria are met.

(b) *Light work*. Light work involves lifting no more than 20 pounds at a time with frequent lifting or carrying of objects weighing up to 10 pounds. Even though the weight lifted may be very little, a job is in this category when it requires a good deal of walking or standing, or when it involves sitting most of the time with some pushing and pulling of arm or leg controls. To be considered capable of performing a full or wide range of light work, you must have the ability to do substantially all of these activities. If someone can do light work, we determine that he or she can also do sedentary work, unless there are additional limiting factors such as loss of fine dexterity or inability to sit for long periods of time.

(c) *Medium work*. Medium work involves lifting no more than 50 pounds at a time with frequent lifting or carrying of objects weighing up to 25 pounds. If someone can do medium work, we determine that he or she can also do sedentary and light work.

(d) *Heavy work*. Heavy work involves lifting no more than 100 pounds at a time with frequent lifting or carrying of objects weighing up to 50 pounds. If someone can do heavy work, we determine that he or she can also do medium, light, and sedentary work.

(e) *Very heavy work*. Very heavy work involves lifting objects weighing more than 100 pounds at a time with frequent lifting or carrying of objects weighing 50 pounds or more. If someone can do very heavy work, we determine that he or she can also do heavy, medium, light and sedentary work.

§ 404.1568 Skill requirements.

In order to evaluate your skills and to help determine the existence in the national economy of work you are able to do, occupations are classified as unskilled, semi-skilled, and skilled. In classifying these occupations, we use materials published by the Department of Labor. When we make disability determinations under this subpart, we use the following definitions:

(a) *Unskilled work*. Unskilled work is work which needs little or no judgment to do simple duties that can be learned on the job in a short period of time. The job may or may not require considerable strength. For example, we consider jobs unskilled if the primary work duties are handling, feeding and offbearing (that is, placing or removing materials from machines which are automatic or operated by others), or machine tending, and a person can usually learn to do the job in 30 days, and little specific vocational preparation and judgment are needed. A person does not gain work skills by doing unskilled jobs.

(b) *Semi-skilled work*. Semi-skilled work is work which needs some skills but does not require doing the more complex work duties. Semi-skilled jobs may require alertness and close attention to watching machine processes; or inspecting, testing or otherwise looking for irregularities; or tending or guarding equipment, property, materials, or persons against loss, damage or injury; or other types of activities which are similarly less complex than skilled work, but more complex than unskilled work. A job may be classified as semi-skilled where coordination and dexterity are necessary, as when hands or feet must be moved quickly to do repetitive tasks.

(c) *Skilled work*. Skilled work requires qualifications in which a person uses judgment to determine the machine and manual operations to be performed in order to obtain the proper form, quality, or quantity of material to be produced. Skilled work may require laying out work, estimating quality, determining the suitability and needed quantities of materials, making precise measurements, reading blueprints or

other specifications, or making necessary computations or mechanical adjustments to control or regulate the work. Other skilled jobs may require dealing with people, facts, or figures or abstract ideas at a high level of complexity.

(d) *Skills that can be used in other work (transferability)*—(1) *What we mean by transferable skills.* We consider you to have skills that can be used in other jobs, when the skilled or semi-skilled work activities you did in past work can be used to meet the requirements of skilled or semi-skilled work activities of other jobs or kinds of work. This depends largely on the similarity of occupationally significant work activities among different jobs.

(2) *How we determine skills that can be transferred to other jobs.* Transferability is most probable and meaningful among jobs in which—

(i) The same or a lesser degree of skill is required;

(ii) The same or similar tools and machines are used; and

(iii) The same or similar raw materials, products, processes, or services are involved.

(3) *Degrees of transferability.* There are degrees of transferability of skills ranging from very close similarities to remote and incidental similarities among jobs. A complete similarity of all three factors is not necessary for transferability. However, when skills are so specialized or have been acquired in such an isolated vocational setting (like many jobs in mining, agriculture, or fishing) that they are not readily usable in other industries, jobs, and work settings, we consider that they are not transferable.

(4) *Transferability of skills for individuals of advanced age.* If you are of advanced age (age 55 or older), and you have a severe impairment(s) that limits you to *sedentary* or *light* work, we will find that you cannot make an adjustment to other work unless you have skills that you can transfer to other skilled or semiskilled work (or you have recently completed education which provides for direct entry into skilled work) that you can do despite your impairment(s). We will decide if you have transferable skills as follows. If you are of advanced age and you

have a severe impairment(s) that limits you to no more than *sedentary* work, we will find that you have skills that are transferable to skilled or semi-skilled sedentary work only if the sedentary work is so similar to your previous work that you would need to make very little, if any, vocational adjustment in terms of tools, work processes, work settings, or the industry. (See § 404.1567(a) and § 201.00(f) of appendix 2.) If you are of advanced age but have not attained age 60, and you have a severe impairment(s) that limits you to no more than *light* work, we will apply the rules in paragraphs (d)(1) through (d)(3) of this section to decide if you have skills that are transferable to skilled or semiskilled light work (see § 404.1567(b)). If you are *closely approaching retirement age* (age 60–64) and you have a severe impairment(s) that limits you to no more than *light* work, we will find that you have skills that are transferable to skilled or semi-skilled light work only if the light work is so similar to your previous work that you would need to make very little, if any, vocational adjustment in terms of tools, work processes, work settings, or the industry. (See § 404.1567(b) and Rule 202.00(f) of appendix 2 to this subpart.)

[45 FR 55584, Aug. 20, 1980, as amended at 65 FR 18000, Apr. 6, 2000]

§ 404.1569 Listing of Medical-Vocational Guidelines in appendix 2.

The Dictionary of Occupational Titles includes information about jobs (classified by their exertional and skill requirements) that exist in the national economy. Appendix 2 provides rules using this data reflecting major functional and vocational patterns. We apply these rules in cases where a person is not doing substantial gainful activity and is prevented by a severe medically determinable impairment from doing vocationally relevant past work. The rules in appendix 2 do not cover all possible variations of factors. Also, as we explain in § 200.00 of appendix 2, we do not apply these rules if one of the findings of fact about the person's vocational factors and residual functional capacity is not the same as the corresponding criterion of a rule.

In these instances, we give full consideration to all relevant facts in accordance with the definitions and discussions under vocational considerations. However, if the findings of fact made about all factors are the same as the rule, we use that rule to decide whether a person is disabled.

§ 404.1569a Exertional and non-exertional limitations.

(a) *General.* Your impairment(s) and related symptoms, such as pain, may cause limitations of function or restrictions which limit your ability to meet certain demands of jobs. These limitations may be exertional, non-exertional, or a combination of both. Limitations are classified as exertional if they affect your ability to meet the strength demands of jobs. The classification of a limitation as exertional is related to the United States Department of Labor's classification of jobs by various exertional levels (sedentary, light, medium, heavy, and very heavy) in terms of the strength demands for sitting, standing, walking, lifting, carrying, pushing, and pulling. Sections 404.1567 and 404.1569 explain how we use the classification of jobs by exertional levels (strength demands) which is contained in the Dictionary of Occupational Titles published by the Department of Labor, to determine the exertional requirements of work which exists in the national economy. Limitations or restrictions which affect your ability to meet the demands of jobs other than the strength demands, that is, demands other than sitting, standing, walking, lifting, carrying, pushing or pulling, are considered non-exertional. When we decide whether you can do your past relevant work (see §§ 404.1520(f) and 404.1594(f)(7)), we will compare our assessment of your residual functional capacity with the demands of your past relevant work. If you cannot do your past relevant work, we will use the same residual functional capacity assessment along with your age, education, and work experience to decide if you can adjust to any other work which exists in the national economy. (See §§ 404.1520(g) and 404.1594(f)(8).) Paragraphs (b), (c), and (d) of this section explain how we apply the medical-vocational guidelines in

appendix 2 of this subpart in making this determination, depending on whether the limitations or restrictions imposed by your impairment(s) and related symptoms, such as pain, are exertional, nonexertional, or a combination of both.

(b) *Exertional limitations.* When the limitations and restrictions imposed by your impairment(s) and related symptoms, such as pain, affect only your ability to meet the strength demands of jobs (sitting, standing, walking, lifting, carrying, pushing, and pulling), we consider that you have only exertional limitations. When your impairment(s) and related symptoms only impose exertional limitations and your specific vocational profile is listed in a rule contained in appendix 2 of this subpart, we will directly apply that rule to decide whether you are disabled.

(c) *Nonexertional limitations.* (1) When the limitations and restrictions imposed by your impairment(s) and related symptoms, such as pain, affect only your ability to meet the demands of jobs other than the strength demands, we consider that you have only nonexertional limitations or restrictions. Some examples of nonexertional limitations or restrictions include the following:

(i) You have difficulty functioning because you are nervous, anxious, or depressed;

(ii) You have difficulty maintaining attention or concentrating;

(iii) You have difficulty understanding or remembering detailed instructions;

(iv) You have difficulty in seeing or hearing;

(v) You have difficulty tolerating some physical feature(s) of certain work settings, e.g., you cannot tolerate dust or fumes; or

(vi) You have difficulty performing the manipulative or postural functions of some work such as reaching, handling, stooping, climbing, crawling, or crouching.

(2) If your impairment(s) and related symptoms, such as pain, only affect your ability to perform the non-exertional aspects of work-related activities, the rules in appendix 2 do not direct factual conclusions of disabled

not direct a conclusion of disabled or not disabled. In any instance where a rule does not apply, full consideration must be given to all of the relevant facts of the case in accordance with the definitions and discussions of each factor in the appropriate sections of the regulations.

(b) The existence of jobs in the national economy is reflected in the "Decisions" shown in the rules; *i.e.* in promulgating the rules, administrative notice has been taken of the numbers of unskilled jobs that exist throughout the national economy at the various functional levels (sedentary, light, medium, heavy, and very heavy) as supported by the "Dictionary of Occupational Titles" and the "Occupational Outlook Handbook," published by the Department of Labor; the "County Business Patterns" and "Census Surveys" published by the Bureau of the Census; and occupational surveys of light and sedentary jobs prepared for the Social Security Administration by various State employment agencies. Thus, when all factors coincide with the criteria of a rule, the existence of such jobs is established. However, the existence of such jobs for individuals whose remaining functional capacity or other factors do not coincide with the criteria of a rule must be further considered in terms of what kinds of jobs or types of work may be either additionally indicated or precluded.

(c) In the application of the rules, the individual's residual functional capacity (*i.e.*, the maximum degree to which the individual retains the capacity for sustained performance of the physical-mental requirements of jobs), age, education, and work experience must first be determined. When assessing the person's residual functional capacity, we consider his or her symptoms (such as pain), signs, and laboratory findings together with other evidence we obtain.

(d) The correct disability decision (*i.e.*, on the issue of ability to engage in substantial gainful activity) is found by then locating the individual's specific vocational profile. If an individual's specific profile is not listed within this appendix 2, a conclusion of disabled or not disabled is not directed. Thus, for example, an individual's ability to engage in substantial gainful work where his or her residual functional capacity falls between the ranges of work indicated in the rules (e.g., the individual who can perform more than light but less than medium work), is decided on the basis of the principles and definitions in the regulations, giving consideration to the rules for specific case situations in this appendix 2. These rules represent various combinations of exertional capabilities, age, education and work experience and also provide an overall structure for evaluation of those cases in which the judgments as to each factor do not coincide with those of any specific rule. Thus, when the necessary judgments have been made as

to each factor and it is found that no specific rule applies, the rules still provide guidance for decisionmaking, such as in cases involving combinations of impairments. For example, if strength limitations resulting from an individual's impairment(s) considered with the judgments made as to the individual's age, education and work experience correspond to (or closely approximate) the factors of a particular rule, the adjudicator then has a frame of reference for considering the jobs or types of work precluded by other, nonexertional impairments in terms of numbers of jobs remaining for a particular individual.

(e) Since the rules are predicated on an individual's having an impairment which manifests itself by limitations in meeting the strength requirements of jobs, they may not be fully applicable where the nature of an individual's impairment does not result in such limitations, e.g., certain mental, sensory, or skin impairments. In addition, some impairments may result solely in postural and manipulative limitations or environmental restrictions. Environmental restrictions are those restrictions which result in inability to tolerate some physical feature(s) of work settings that occur in certain industries or types of work, e.g., an inability to tolerate dust or fumes.

(1) In the evaluation of disability where the individual has solely a nonexertional type of impairment, determination as to whether disability exists shall be based on the principles in the appropriate sections of the regulations, giving consideration to the rules for specific case situations in this appendix 2. The rules do not direct factual conclusions of disabled or not disabled for individuals with solely nonexertional types of impairments.

(2) However, where an individual has an impairment or combination of impairments resulting in both strength limitations and nonexertional limitations, the rules in this subpart are considered in determining first whether a finding of disabled may be possible based on the strength limitations alone and, if not, the rule(s) reflecting the individual's maximum residual strength capabilities, age, education, and work experience provide a framework for consideration of how much the individual's work capability is further diminished in terms of any types of jobs that would be contraindicated by the nonexertional limitations. Also, in these combinations of nonexertional and exertional limitations which cannot be wholly determined under the rules in this appendix 2, full consideration must be given to all of the relevant facts in the case in accordance with the definitions and discussions of each factor in the appropriate sections of the regulations, which will provide insight into the adjudicative weight to be accorded each factor.

(see § 416.920), we will consider your residual functional capacity together with your vocational background, as discussed in paragraphs (b) and (c) of this section.

(b) *Past relevant work.* We will first compare our assessment of your residual functional capacity with the physical and mental demands of your past relevant work.

(1) *Definition of past relevant work.* Past relevant work is work that you have done within the past 15 years, that was substantial gainful activity, and that lasted long enough for you to learn to do it. (See § 416.965(a).)

(2) *Determining whether you can do your past relevant work.* We will ask you for information about work you have done in the past. We may also ask other people who know about your work. (See § 416.965(b).) We may use the services of vocational experts or vocational specialists, or other resources, such as the "Dictionary of Occupational Titles" and its companion volumes and supplements, published by the Department of Labor, to obtain evidence we need to help us determine whether you can do your past relevant work, given your residual functional capacity. A vocational expert or specialist may offer relevant evidence within his or her expertise or knowledge concerning the physical and mental demands of a claimant's past relevant work, either as the claimant actually performed it or as generally performed in the national economy. Such evidence may be helpful in supplementing or evaluating the accuracy of the claimant's description of his past work. In addition, a vocational expert or specialist may offer expert opinion testimony in response to a hypothetical question about whether a person with the physical and mental limitations imposed by the claimant's medical impairment(s) can meet the demands of the claimant's previous work, either as the claimant actually performed it or as generally performed in the national economy.

(3) *If you can do your past relevant work.* If we find that you have the residual functional capacity to do your past relevant work, we will determine that you can still do your past work and are not disabled. We will not con-

sider your vocational factors of age, education, and work experience or whether your past relevant work exists in significant numbers in the national economy.

(c) *Other work.* (1) If we find that your residual functional capacity is not enough to enable you to do any of your past relevant work, we will use the same residual functional capacity assessment we used to decide if you could do your past relevant work when we decide if you can adjust to any other work. We will look at your ability to adjust to other work by considering your residual functional capacity and your vocational factors of age, education, and work experience. Any other work (jobs) that you can adjust to must exist in significant numbers in the national economy (either in the region where you live or in several regions in the country).

(2) In order to support a finding that you are not disabled at this fifth step of the sequential evaluation process, we are responsible for providing evidence that demonstrates that other work exists in significant numbers in the national economy that you can do, given your residual functional capacity and vocational factors. We are not responsible for providing additional evidence about your residual functional capacity because we will use the same residual functional capacity assessment that we used to determine if you can do your past relevant work.

[68 FR 51166, Aug. 26, 2003]

§ 416.962 Medical-vocational profiles showing an inability to make an adjustment to other work.

(a) *If you have done only arduous unskilled physical labor.* If you have no more than a marginal education (see § 416.964) and work experience of 35 years or more during which you did only arduous unskilled physical labor, and you are not working and are no longer able to do this kind of work because of a severe impairment(s) (see §§ 416.920(c), 416.921, and 416.923), we will consider you unable to do lighter work, and therefore, disabled.

Example to paragraph (a): B is a 58-year-old miner's helper with a fourth grade education who has a lifelong history of unskilled arduous physical labor. B says that he is disabled

live or in several regions of the country), we will take administrative notice of reliable job information available from various governmental and other publications. For example, we will take notice of—

(1) *Dictionary of Occupational Titles*, published by the Department of Labor;

(2) *County Business Patterns*, published by the Bureau of the Census;

(3) *Census Reports*, also published by the Bureau of the Census;

(4) *Occupational Analyses* prepared for the Social Security Administration by various State employment agencies; and

(5) *Occupational Outlook Handbook*, published by the Bureau of Labor Statistics.

(e) *Use of vocational experts and other specialists.* If the issue in determining whether you are disabled is whether your work skills can be used in other work and the specific occupations in which they can be used, or there is a similarly complex issue, we may use the services of a vocational expert or other specialist. We will decide whether to use a vocational expert or other specialist.

§ 416.967 Physical exertion requirements.

To determine the physical exertion requirements of work in the national economy, we classify jobs as *sedentary*, *light*, *medium*, *heavy*, and *very heavy*. These terms have the same meaning as they have in the *Dictionary of Occupational Titles*, published by the Department of Labor. In making disability determinations under this subpart, we use the following definitions:

(a) *Sedentary work.* Sedentary work involves lifting no more than 10 pounds at a time and occasionally lifting or carrying articles like docket files, ledgers, and small tools. Although a sedentary job is defined as one which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties. Jobs are sedentary if walking and standing are required occasionally and other sedentary criteria are met.

(b) *Light work.* Light work involves lifting no more than 20 pounds at a time with frequent lifting or carrying of objects weighing up to 10 pounds.

Even though the weight lifted may be very little, a job is in this category when it requires a good deal of walking or standing, or when it involves sitting most of the time with some pushing and pulling of arm or leg controls. To be considered capable of performing a full or wide range of light work, you must have the ability to do substantially all of these activities. If someone can do light work, we determine that he or she can also do sedentary work, unless there are additional limiting factors such as loss of fine dexterity or inability to sit for long periods of time.

(c) *Medium work.* Medium work involves lifting no more than 50 pounds at a time with frequent lifting or carrying of objects weighing up to 25 pounds. If someone can do medium work, we determine that he or she can also do sedentary and light work.

(d) *Heavy work.* Heavy work involves lifting no more than 100 pounds at a time with frequent lifting or carrying of objects weighing up to 50 pounds. If someone can do heavy work, we determine that he or she can also do medium, light, and sedentary work.

(e) *Very heavy work.* Very heavy work involves lifting objects weighing more than 100 pounds at a time with frequent lifting or carrying of objects weighing 50 pounds or more. If someone can do very heavy work, we determine that he or she can also do heavy, medium, light, and sedentary work.

§ 416.968 Skill requirements.

In order to evaluate your skills and to help determine the existence in the national economy of work you are able to do, occupations are classified as unskilled, semi-skilled, and skilled. In classifying these occupations, we use materials published by the Department of Labor. When we make disability determinations under this subpart, we use the following definitions:

(a) *Unskilled work.* Unskilled work is work which needs little or no judgment to do simple duties that can be learned on the job in a short period of time. The job may or may not require considerable strength. For example, we consider jobs unskilled if the primary work duties are handling, feeding and offbearing (that is, placing or removing materials from machines which are

limits you to no more than *light* work, we will find that you have skills that are transferable to skilled or semi-skilled light work only if the light work is so similar to your previous work that you would need to make very little, if any, vocational adjustment in terms of tools, work processes, work settings, or the industry. (See § 416.967(b) and Rule 202.00(f) of appendix 2 of subpart P of part 404 of this chapter.)

[45 FR 55621, Aug. 20, 1980, as amended at 65 FR 18001, Apr. 6, 2000]

§ 416.969 Listing of Medical-Vocational Guidelines in appendix 2 of subpart P of part 404 of this chapter.

The *Dictionary of Occupational Titles* includes information about jobs (classified by their exertional and skill requirements) that exist in the national economy. Appendix 2 provides rules using this data reflecting major functional and vocational patterns. We apply these rules in cases where a person is not doing substantial gainful activity and is prevented by a severe medically determinable impairment from doing vocationally relevant past work. The rules in appendix 2 do not cover all possible variations of factors. Also, as we explain in § 200.00 of appendix 2, we do not apply these rules if one of the findings of fact about the person's vocational factors and residual functional capacity is not the same as the corresponding criterion of a rule. In these instances, we give full consideration to all relevant facts in accordance with the definitions and discussions under vocational considerations. However, if the findings of fact made about all factors are the same as the rule, we use that rule to decide whether a person is disabled.

§ 416.969a Exertional and non-exertional limitations.

(a) *General.* Your impairment(s) and related symptoms, such as pain, may cause limitations of function or restrictions which limit your ability to meet certain demands of jobs. These limitations may be exertional, non-exertional, or a combination of both. Limitations are classified as exertional if they affect your ability to meet the strength demands of jobs. The classi-

fication of a limitation as exertional is related to the United States Department of Labor's classification of jobs by various exertional levels (sedentary, light, medium, heavy, and very heavy) in terms of the strength demands for sitting, standing, walking, lifting, carrying, pushing, and pulling. Sections 416.967 and 416.969 explain how we use the classification of jobs by exertional levels (strength demands) which is contained in the *Dictionary of Occupational Titles* published by the Department of Labor, to determine the exertional requirements of work which exists in the national economy. Limitations or restrictions which affect your ability to meet the demands of jobs other than the strength demands, that is, demands other than sitting, standing, walking, lifting, carrying, pushing or pulling, are considered non-exertional. When we decide whether you can do your past relevant work (see §§ 416.920(f) and 416.994(b)(5)(vi)), we will compare our assessment of your residual functional capacity with the demands of your past relevant work. If you cannot do your past relevant work, we will use the same residual functional capacity assessment along with your age, education, and work experience to decide if you can adjust to any other work which exists in the national economy. (See §§ 416.920(g) and 416.994(b)(5)(vii).) Paragraphs (b), (c), and (d) of this section explain how we apply the medical-vocational guidelines in appendix 2 of subpart P of part 404 of this chapter in making this determination, depending on whether the limitations or restrictions imposed by your impairment(s) and related symptoms, such as pain, are exertional, non-exertional, or a combination of both.

(b) *Exertional limitations.* When the limitations and restrictions imposed by your impairment(s) and related symptoms, such as pain, affect only your ability to meet the strength demands of jobs (sitting, standing, walking, lifting, carrying, pushing, and pulling), we consider that you have only exertional limitations. When your impairment(s) and related symptoms only impose exertional limitations and your specific vocational profile is listed in a rule contained in appendix 2, we will

§ 627.235 General program requirements.

(a) The requirements set forth in sections 141, 142 and 143 of the Act apply to all programs under titles I, II, and III of the Act, except as provided elsewhere in the Act.

(b) Recipients shall ensure that an individual enrolled in a JTPA program meets the requirements of section 167(a)(5) of the Act, Section 3 of the Military Selective Service Act (50 U.S.C. App. 453) and other requirements applicable to programs funded under the specific section or title of the Act under which the participant is enrolling (section 604).

(c) Recipients shall ensure that individuals are enrolled within 45 days of the date of eligibility determination or a new eligibility determination (including new application, if necessary) shall be made, except that eligible summer program applicants under title II-B may be enrolled within 45 days into a summer youth enrollee pool, and no subsequent eligibility determination need be made prior to participation during the period of that summer program. In addition, the 45-day enrollment requirement shall not apply for individuals who have a valid certificate of continuing eligibility under the title III program, as described in § 631.3 and § 631.53 of this chapter.

(d) Programs operated under titles I, II, and III of the Act are not subject to the provisions of 29 CFR part 97, "Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments," except as otherwise explicitly provided in this chapter.

(e) If a recipient or SDA imposes a requirement that is in addition to the provisions of the Act and these regulations relating to the administration and operation of programs funded by the Act, the recipient or SDA shall identify the requirement as a State- or SDA-imposed requirement (section 124).

§ 627.240 On-the-job training.

(a) *General*—(1) *On-the-job training* (OJT) means training by an employer in the private or public sector given to a participant who, after objective assessment, and in accordance with the

ISS, has been referred to and hired by the employer following the development of an agreement with the employer to provide occupational training in exchange for reimbursement of the employer's extraordinary costs. On-the-job training occurs while the participant is engaged in productive work which provides knowledge and skills essential to the full and adequate performance of the job.

(2) This does not preclude a participant who has been trained by one employer from ultimately being placed in a comparable training-related position with another employer.

(3) On-the-job training may be sequenced with or accompanied by other types of training such as classroom training or literacy training.

(b) *Duration of OJT.* (1) OJT authorized for a participant shall be limited to a period not in excess of that required for the participant to acquire the skills needed for the OJT position. Except as described in paragraph (b) (3) of this section, the period of reimbursement to the employer under an OJT agreement shall not exceed 6 months of training.

(2) The 6-month duration of OJT may be expressed as a number of hours, days, or weeks the participant is expected to work in a 6-month period if the participant works full-time.

(3) In the event that a participant's regular employment is less than full-time and less than 500 hours of OJT has occurred by the end of 6 months, that participant may remain in OJT until 499 hours OJT hours have occurred.

(4)(i) Recipients shall develop policies and procedures for determining the average training duration for occupations including to reflect an individual participant's need for additional training time, or reduction in training time to reflect the individual participant's partial acquisition of needed skills. (In no case should an individual who is fully skilled in an occupation be placed in OJT in that occupation.)

(ii) In determining the average training time, consideration should be given to recognized reference materials, such as the "Dictionary of Occupational Titles" (DOT) and employer training plans. Such materials need not be limited to the DOT, however.

shares in exercising one or more of the definitional indicia.

Establishment means a public or private economic employing unit generally at a single physical location which produces and/or sells goods or services, for example, a mine, factory, store, farm orchard or ranch. It is usually engaged in one, or predominantly one, type of commercial or governmental activity. Each branch or subsidiary unit of a large employer in a geographical area or community should be considered an individual establishment, except that all such units in the same physical location shall be considered a single establishment. A component of an establishment which may not be located in the same physical structure (such as the warehouse of a department store) should also be considered as part of the parent establishment. For the purpose of the "seasonal farmworker" definition, farm labor contractors and crew leaders are not considered establishments; it is the organizations to which they supply the workers that are the establishments.

Farmwork means work performed for wages in agricultural production or agricultural services North American Industry Classification System (NAICS) 111, 112, and 115 (excluding the following codes: 1125 (under 112) and 1152 and 1153 (under 115)).

Farmworker, see *Agricultural worker*.

Full application means an application for an applicant who has participated in an application interview and which includes the applicant's personal characteristics, work history and an occupational classification and DOT code.

Hearing Officer means a Department of Labor Administrative Law Judge, designated to preside at DOL administrative hearings.

Identification card (applicant identification card) means a card given to the applicant on which are recorded identifying information and the dates of the applicant's visits to the local employment office.

Intrastate job order means a job order describing one or more hard-to-fill job openings, which a local office uses to request recruitment assistance from other local offices within the State.

JS regulations means the Federal regulations at 20 CFR parts 601-604, 620,

621, and 651-658, and at 29 CFR parts 8, 26, and 75.

Job bank means a computer assisted system which provides listings of current job openings in the area, on a regular basis, for distribution to JS offices and to cooperating agencies.

Job development means the process of securing a job interview with a public or private employer for a specific applicant for whom the local office has no suitable opening on file.

Job information means information derived from data compiled in the normal course of employment service activities from reports, job orders, applications and the like.

Job opening means a single job opportunity for which the local office has on file a request to select and refer on applicant or applicants.

Job Information Service (JIS) means a unit or an area within a JS local office where applicants primarily, on a self-service basis or with minimum professional help, can obtain specific and general information on where and how to get a job.

Job referral means (1) the act of bringing to the attention of an employer an applicant or group of applicants who are available for specific job openings and (2) the record of such referral. "Job referral" means the same as "referral to a job."

Job Service (JS) means the nationwide system of public employment offices, funded through the United States Employment Service (USES) as grantee State agencies, and the various offices of the State agencies.

Labor market area means a geographic area consisting of a central city (or cities) and the surrounding territory within a reasonable commuting distance.

Labor Market Information (LMI) means that body of knowledge pertaining to the socio-economic forces influencing the employment process in specific labor market areas. These forces, which affect labor demand-supply relationships and define the content of the LMI program, include population and growth characteristics, trends in industrial and occupational structure, technological developments,

shifts in consumer demands, unionization, trade disputes, retirement practices, wage levels, conditions of employment, training opportunities, job vacancies, and job search information.

Local office manager means the JS official in charge of all JS activities in a local office of a State agency.

LMI means labor market information.

Migrant farmworker is a seasonal farmworker who had to travel to do the farmwork so that he/she was unable to return to his/her permanent residence within the same day. Full-time students traveling in organized groups rather than with their families are excluded.

Migrant food processing worker means a person who during the preceding 12 months has worked at least an aggregate of 25 or more days or parts of days in which some work was performed in food processing (as classified in the North American Industry Classification System (NAICS) 311411, 311611, 311421 for food processing establishments), earned at least half of his/her earned income from processing work and was not employed in food processing year round by the same employer, provided that the food processing required travel such that the worker was unable to return to his/her permanent residence in the same day. Migrant food processing workers who are full-time students but who travel in organized groups rather than with their families are excluded.

MSFW means a migrant farmworker, a migrant food processing worker, or a seasonal farmworker.

*Occupational Information Network (O*NET)* means the online reference database which contains detailed descriptions of U.S. occupations, distinguishing characteristics, classification codes, and information on tasks, knowledge, skills, abilities, and work activities as well as information on interests, work styles, and work values.

*O*NET-SOC* means Standard Occupational Classification (SOC) titles and codes are used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating and disseminating data. DOL uses O*NET-SOC titles and codes for the purposes of re-

porting data on training, certifications, and placement in employment by occupation.

Partial application means the application of an applicant who has not participated in an application interview and which does not include an occupational classification of DOT code. Partial applications prepared for Migrants and Seasonal Farmworkers must include a signed waiver for full services at that time in accordance with 20 CFR 653.103.

Placement means the hiring by a public or private employer of an individual referred by the employment office for a job or an interview, provided that the employment office completed all of the following steps:

(a) Prepared a job order form prior to referral, except in the case of a job development contact on behalf of a specific applicant;

(b) Made prior arrangements with the employer for the referral of an individual or individuals;

(c) Referred an individual who had not been specifically designated by the employer, except for referrals on agricultural job orders for a specific crew leader or worker;

(d) Verified from a reliable source, preferably the employer, that the individual had entered on a job; and

(e) Appropriately recorded the placement.

Program Budget Plan (PBP) means the annual planning document for the SWA required by Sec. 8 of the Wagner-Peyser Act containing the SWA's detailed planning, programming and budget for carrying out employment security activities. For the purpose of JS regulations, this definition shall be restricted to the employment service portion of the PBP.

Public housing means housing operated by or on behalf of any public agency.

RA; see *Regional Administrator*.

Regional Administrator, Employment and Training Administration (RA) means the chief DOL Employment and Training Administration (ETA) official in each DOL regional office.

Respondent means the employer or State agency (including a State agency

Subpart B—Services for Migrant and Seasonal Farmworkers (MSFWs)

SOURCE: 45 FR 39459, June 10, 1980, unless otherwise noted.

§ 653.100 Purpose and scope of subpart.

This subpart sets forth the principal regulations of the United States Employment Service (USES) for counseling, testing, and job and training referral services for migrant and seasonal farmworkers (MSFWs) on a basis which is qualitatively equivalent and quantitatively proportionate to services provided to non-MSFWs. It also contains requirements that State agencies establish a system to monitor their own compliance with USES regulations governing services to MSFWs, including the regulations under this subpart. Special services to ensure that MSFWs receive the full range of employment related services are established under this subpart.

§ 653.101 Provision of services to migrant and seasonal farmworkers (MSFWs).

(a) Each State agency and each local office shall offer to migrant and seasonal farmworkers (MSFWs) the full range of employment services, benefits and protections, including the full range of counseling, testing, and job and training referral services as are provided to non-MSFWs. In providing such services, the State agency shall consider and be sensitive to the preferences, needs, and skills of individual MSFWs and the availability of job and training opportunities.

(b) Each State agency shall assure that, in a local area, the same local offices, including itinerant and satellite offices, but exclusive of day-haul operations, offer services to both non-MSFWs and MSFWs. Separate farm labor service local offices, which offer only farmwork to agricultural workers while another local office serving the same geographical area offers other JS services to other applicants, are prohibited so that all applicants receive employment services on the same basis.

§ 653.102 Job information.

All State agencies shall make job order information conspicuous and available to MSFWs in all local offices. This information shall include Job Bank information in local offices where it is available. Such information shall be made available either by computer terminal, microfiche, hard copy, or other equally effective means. Each significant MSFW local office shall provide adequate staff assistance to each MSFW to use the job order information effectively. In those offices designated as significant MSFW bilingual offices, such assistance shall be provided to MSFWs in Spanish and English, wherever requested or necessary, during any period of substantial MSFW activity.

§ 653.103 MSFW job applications.

(a) Every local office shall determine whether or not applicants are MSFWs as defined at § 651.10 of this chapter.

(b) Except as provided in § 653.105, when an MSFW applies for JS services at a local office or is contacted by an Outreach worker, the services available through the JS shall be explained to the MSFW. In local offices which have been designated as significant MSFW bilingual offices by ETA, this explanation shall be made in Spanish, if necessary or requested during any period of substantial MSFW activity. Other local offices shall provide bilingual explanations wherever feasible.

(c) The local office staff member shall provide the MSFW a list of those services. The list shall be written in English and Spanish and shall specify those services which are available after completion of a full application and those services which are available after completion of a partial application. The JS staff member shall explain to each MSFW the advantages of completing a full application.

Applications shall be reviewed periodically by the local office manager or a member of his/her staff to ensure their accuracy and quality. Applications and the application-taking process shall also be reviewed during State and Federal onsite reviews by the State and Regional MSFW Monitor Advocates and/or review staff, who shall check

§ 653.104

20 CFR Ch. V (4-1-07 Edition)

overall accuracy and quality, and offer technical advice on corrections or improvements.

(d) If the MSFW wishes to complete a full application, the staff shall provide all assistance necessary to complete the application and shall ensure that the form includes complete information. It shall include, to the extent possible, the significant history of the MSFW's prior employment, training and educational background and a statement of any desired employment and any training needs in order to permit a thorough assessment of the applicant's skills, abilities and preferences. All applicable items shall be completed according to the ETA instructions for preparation of the application card (ES-511). Additional Occupational Informational Network (O*NET) codes or keywords shall be assigned, where appropriate, based on the MSFW's work history, training, and skills, knowledges, and abilities. Secondary cards shall be completed and separately filed when keywords are not used. In extremely small local offices where the limited applicant load and file size does not require completion of secondary cards, additional O*NET-SOC codes shall be noted on the primary application card.

(e) If an MSFW wishes any JS service, and does not wish or is unable to file a full application, the interviewer shall try to obtain as much information as possible for a partial application. The interviewer shall enter the information on the partial application. The interviewer shall offer to refer the applicant to any available jobs for which the MSFW may be qualified, and any JS services permitted by the limited information available. He/she shall advise the MSFW that he/she may file a full application at any time.

(f) Partial applications shall be completed according to ETA instructions.

(g) Partial applications for MSFWs shall be filed in accordance with local office procedures for filing other partial applications.

(h) To minimize the need for additional applications in other offices, States shall issue JS cards to MSFWs at the initial visit under the following conditions:

(1) When automated data retrieval systems are available in the State. In this instance, JS staff shall advise the MSFW that the JS card may be presented at any other JS office in the State and that services will be provided without completion of an additional application unless the services requested require additional information for adequate service delivery.

(2) When an MSFW is referred on an interstate or intrastate order. In this instance, when it is known to the order-holding local office (through the presentation of an JS card or otherwise) that the MSFW has completed a full application or partial application in the applicant holding office or elsewhere, an additional application shall not be taken by the order-holding office unless the MSFW requests JS services in addition to referral on the clearance order.

(Approved by the Office of Management and Budget under control number 1205-0039)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 *et seq.*))

[45 FR 39459, June 10, 1980, as amended at 46 FR 7772, Jan. 23, 1981; 47 FR 145, Jan. 5, 1982; 71 FR 35517, June 21, 2006]

§ 653.104 Services to MSFW family members, farm labor contractors, and crew members.

(a) In addition to other requirements in this subpart, the following special requirements are established for services to MSFW family members, farm labor contractors and crew members. Except as provided at §§ 653.103(e) and 653.105, no local office shall refer an MSFW family or crew unless each working member of the family or crew being referred, has filed either a full or partial application pursuant to § 653.103(b) at a local office or has been issued a JS card in instances set forth in § 653.103(h). Local offices may, upon request, provide general information, e.g., the types of crops in other areas, to farm labor contractors and family heads prior to the registration of all working members.

(b) No local office shall accept an application from an individual for employment as a farm labor contractor or fill an agricultural job order submitted by a farm labor contractor ("FLC") or farm labor contractor employee

(c) *What is to be submitted and what are its contents?* Form ETA 9035 or ETA 9035E.

(1) *General.* The employer (or the employer's authorized agent or representative) must submit to ETA one completed and dated LCA as prescribed in § 655.720. The electronic LCA, Form ETA 9035E, is found on the DOL Web site where the electronic submission is made, at <http://www.lca.doleta.gov>. Copies of the paper form, Form ETA 9035, and cover pages Form ETA 9035CP are available on the DOL Web site at <http://www.ows.doleta.gov> and from the ETA National Office, and may be used by employers with approval under § 655.720 to file by U.S. Mail during the approval's validity period.

(2) *Undertaking of the Employer.* In submitting the LCA, and by affixing the signature of the employer or its authorized agent or representative on Form ETA 9035E or Form ETA 9035, the employer (or its authorized agent or representative on behalf of the employer) attests the statements in the LCA are true and promises to comply with the labor condition statements (attestations) specifically identified in Forms ETA 9035E and ETA 9035, as well as set forth in full in the Form ETA 9035CP. The labor condition statements (attestations) are described in detail in §§ 655.731 through 655.734, and the additional attestations for LCAs filed by certain H-1B-dependent employers and employers found to have willfully violated the H-1B program requirements are described in §§ 655.736 through 655.739.

(3) *Signed Originals, Public Access, and Use of Certified LCAs.* In accordance with § 655.760(a) and (a)(1), the employer must maintain in its files and make available for public examination the LCA as submitted to ETA and as certified by ETA. When Form ETA 9035E is submitted electronically, a signed original is created by the employer (or by the employer's authorized agent or representative) printing out and signing the form immediately upon certification by ETA. When Form ETA 9035 is submitted by U.S. Mail as permitted by § 655.720(a), the form must bear the original signature of the employer (or of the employer's authorized agent or representative) when submitted to

ETA. For H-1B visas only, the employer must submit a copy of the signed, certified Form ETA 9035 or ETA 9035E to the U.S. Citizenship and Immigration Services (USCIS, formerly INS) in support of the Form I-129 petition, thereby reaffirming the employer's acceptance of all of the attestation obligations in accordance with 8 CFR 214.2(h)(4)(iii)(B)(2).

(4) *Contents of LCA.* Each LCA shall identify the occupational classification for which the LCA is being submitted and shall state:

(i) The occupation, by Dictionary of Occupational Titles (DOT) Three-Digit Occupational Groups code and by the employer's own title for the job;

(ii) The number of nonimmigrants sought;

(iii) The gross wage rate to be paid to each nonimmigrant, expressed on an hourly, weekly, biweekly, monthly, or annual basis;

(iv) The starting and ending dates of the nonimmigrants' employment;

(v) The place(s) of intended employment;

(vi) The prevailing wage for the occupation in the area of intended employment and the specific source (e.g., name of published survey) relied upon by the employer to determine the wage. If the wage is obtained from a SESA, now known as a State Workforce Agency (SWA), the appropriate box must be checked and the wage must be stated; the source for a wage obtained from a source other than a SWA must be identified along with the wage; and

(vii) For applications filed regarding H-1B nonimmigrants only (and not applications regarding H-1B1 nonimmigrants), the employer's status as to whether or not the employer is H-1B-dependent and/or a willful violator, and, if the employer is H-1B-dependent and/or a willful violator, whether the employer will use the application only in support of petitions for exempt H-1B nonimmigrants.

(5) *Multiple positions and/or places of employment.* The employer shall file a separate LCA for each occupation in which the employer intends to employ one or more nonimmigrants, but the

United States (U.S.) worker means any U.S. citizen or alien who is legally permitted to work indefinitely within the United States.

§ 655.930 Addresses of Department of Labor regional offices.

Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont): One Congress Street 10th Floor, Boston, MA 02114-2021. Telephone: 617-565-4446.

Region II (New York, New Jersey, Puerto Rico, and the Virgin Islands): 201 Varick Street, room 755, New York, NY 10014. Telephone: 212-660-2185.

Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia): Post Office Box 8796, Philadelphia, PA 19101. Telephone: 215-596-6363.

Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee): 1371 Peachtree Street, N.E., Atlanta, GA 30309. Telephone: 404-347-3938.

Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin): 230 South Dearborn Street, room 605, Chicago, IL 60604. Telephone: 312-353-1550.

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas): 525 Griffin Street, room 314, Dallas, TX 75202. Telephone: 214-767-4989.

Region VII (Iowa, Kansas, Missouri, and Nebraska) 911 Walnut Street, Kansas City, MO 64106. Telephone: 816-426-3796.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming) 1961 Stout Street, 16th Floor, Denver, CO 80294. Telephone: 303-844-4613.

Region IX (Arizona, California, Guam, Hawaii, and Nevada) 71 Stevenson Street, room 830, San Francisco, CA 94119. Telephone: 415-744-6647.

Region X (Alaska, Idaho, Oregon, and Washington) 1111 Third Avenue, room 900, Seattle, WA 98101. Telephone: 206-553-5297.

The telephone numbers set forth in this section are not toll-free.

§ 655.940 Employer attestations.

(a) *Who may submit attestations?* An employer (or the employer's designated agent or representative) seeking to employ F-1 student(s) for off-campus work shall submit an attestation on Form ETA-9034. The attestation shall be signed by the employer (or the employer's designated agent or representative). For this purpose, the employer's authorized agent or representative shall mean an official of the employer who has the legal authority to commit

the employer to the terms and conditions of F-1 student attestations.

(b) *Where and when should attestations be submitted?* (1) Attestations shall be submitted, by U.S. mail, private carrier, or facsimile transmission, to the appropriate ETA Regional office, as defined in § 655.920 of this part, not later than 60 days after the employer's recruitment period (see paragraph (d) of this section) has ended and shall be accepted for filing, returned, or rejected by ETA in accordance with paragraph (f) of this section.

(2) Attestations shall also be submitted to the Designated School Official (DSO) at each educational institution from which the employer seeks to hire any F-1 student(s). Attestations may be filed simultaneously with ETA and the DSO, or the employer may file the approved attestation with the DSO. However, in no case shall the employer file the attestation with the DSO before filing the attestation with ETA or in the absence of filing the attestation with ETA.

(3) If the attestation is submitted simultaneously with ETA and the DSO, and ETA does not receive its copy of the attestation, the Administrator, for purposes of enforcement proceedings under subpart K of this part, shall consider that the attestation was accepted for filing by ETA as of the date the attestation is received by the DSO.

(c) *What should be submitted?* (1) Form ETA-9034. One completed and dated original Form ETA-9034 (or a facsimile), containing the attestation elements referenced in paragraphs (d) and (e) of this section, and the original signature (or a facsimile of the original signature) of the employer (or the employer's authorized agent or representative) and one copy of Form ETA-9034 shall be submitted to ETA. Each attestation form shall identify the position(s) for which the attestation is provided, state the occupational division in which the position is located, by Dictionary of Occupational Titles (DOT) Two-Digit Occupational Divisions code, and shall state the rate(s) of pay for the position(s). The DOT Two-Digit Occupational Division code is required for DOL recordkeeping and reporting purposes only and should not be used by the employer to determine

(c) Similarly, compensatory time earned or accrued by an employee for employment in excess of a standard established by the personnel policy or practice of an employer, or by custom, which does not result from the FLSA provision, is another example of "other" compensatory time.

(d) The FLSA does not require that the rate at which "other" compensatory time is earned has to be at a rate of one and one-half hours for each hour of employment. The rate at which "other" compensatory time is earned may be some lesser or greater multiple of the rate or the straight-time rate itself.

(e) The requirements of section 7(o) of the FLSA, including the limitations on accrued compensatory time, do not apply to "other" compensatory time as described above.

OTHER EXEMPTIONS

§ 553.30 Occasional or sporadic employment-section 7(p)(2).

(a) Section 7(p)(2) of the FLSA provides that where State or local government employees, solely at their option, work occasionally or sporadically on a part-time basis for the same public agency in a different capacity from their regular employment, the hours worked in the different jobs shall not be combined for the purpose of determining overtime liability under the Act.

(b) *Occasional or sporadic.* (1) The term *occasional or sporadic* means infrequent, irregular, or occurring in scattered instances. There may be an occasional need for additional resources in the delivery of certain types of public services which is at times best met by the part-time employment of an individual who is already a public employee. Where employees freely and solely at their own option enter into such activity, the total hours worked will not be combined for purposes of determining any overtime compensation due on the regular, primary job. However, in order to prevent overtime abuse, such hours worked are to be excluded from computing overtime compensation due only where the occasional or sporadic assignments are not within the same general occupational

category as the employee's regular work.

(2) In order for an employee's occasional or sporadic work on a part-time basis to qualify for exemption under section 7(p)(2), the employee's decision to work in a different capacity must be made freely and without coercion, implicit or explicit, by the employer. An employer may suggest that an employee undertake another kind of work for the same unit of government when the need for assistance arises, but the employee must be free to refuse to perform such work without sanction and without being required to explain or justify the decision.

(3) Typically, public recreation and park facilities, and stadiums or auditoriums utilize employees in occasional or sporadic work. Some of these employment activities are the taking of tickets, providing security for special events (*e.g.*, concerts, sports events, and lectures), officiating at youth or other recreation and sports events, or engaging in food or beverage sales at special events, such as a county fair. Employment in such activity may be considered occasional or sporadic for regular employees of State or local government agencies even where the need can be anticipated because it recurs seasonally (*e.g.*, a holiday concert at a city college, a program of scheduled sports events, or assistance by a city payroll clerk in processing returns at tax filing time). An activity does not fail to be occasional merely because it is recurring. In contrast, for example, if a parks department clerk, in addition to his or her regular job, also regularly works additional hours on a part-time basis (*e.g.*, every week or every other week) at a public park food and beverage sales center operated by that agency, the additional work does not constitute intermittent and irregular employment and, therefore, the hours worked would be combined in computing any overtime compensation due.

(c) *Different capacity.* (1) In order for employment in these occasional or sporadic activities not to be considered subject to the overtime requirements of section 7 of the FLSA, the regular government employment of the individual performing them must also be in

§ 553.31

29 CFR Ch. V (7-1-06 Edition)

a different capacity, *i.e.*, it must not fall within the same general occupational category.

(2) In general, the Administrator will consider the duties and other factors contained in the definitions of the 3-digit categories of occupations in the *Dictionary of Occupational Titles* (except in the case of public safety employees as discussed below in section (3)), as well as all the facts and circumstances in a particular case, in determining whether employment in a second capacity is substantially different from the regular employment.

(3) For example, if a public park employee primarily engaged in playground maintenance also from time to time cleans an evening recreation center operated by the same agency, the additional work would be considered hours worked for the same employer and subject to the Act's overtime requirements because it is not in a *different capacity*. This would be the case even though the work was *occasional or sporadic*, and, was not regularly scheduled. Public safety employees taking on any kind of security or safety function within the same local government are never considered to be employed in a *different capacity*.

(4) However, if a bookkeeper for a municipal park agency or a city mail clerk occasionally referees for an adult evening basketball league sponsored by the city, the hours worked as a referee would be considered to be in a different general occupational category than the primary employment and would not be counted as hours worked for overtime purposes on the regular job. A person regularly employed as a bus driver may assist in crowd control, for example, at an event such as a winter festival, and in doing so, would be deemed to be serving in a different capacity.

(5) In addition, any activity traditionally associated with teaching (e.g., coaching, career counseling, etc.) will not be considered as employment in a *different capacity*. However, where personnel other than teachers engage in such teaching-related activities, the work will be viewed as employment in a *different capacity*, provided that these activities are performed on an occasional or sporadic basis and all other requirements for this provision are

met. For example, a school secretary could substitute as a coach for a basketball team or a maintenance engineer could provide instruction on auto repair on an occasional or sporadic basis.

§ 553.31 Substitution—section 7(p)(3).

(a) Section 7(p)(3) of the FLSA provides that two individuals employed in any occupation by the same public agency may agree, solely at their option and with the approval of the public agency, to substitute for one another during scheduled work hours in performance of work in the same capacity. The hours worked shall be excluded by the employer in the calculation of the hours for which the substituting employee would otherwise be entitled to overtime compensation under the Act. Where one employee substitutes for another, each employee will be credited as if he or she had worked his or her normal work schedule for that shift.

(b) The provisions of section 7(p)(3) apply only if employees' decisions to substitute for one another are made freely and without coercion, direct or implied. An employer may suggest that an employee substitute or "trade time" with another employee working in the same capacity during regularly scheduled hours, but each employee must be free to refuse to perform such work without sanction and without being required to explain or justify the decision. An employee's decision to substitute will be considered to have been made at his/her sole option when it has been made (i) without fear of reprisal or promise of reward by the employer, and (ii) exclusively for the employee's own convenience.

(c) A public agency which employs individuals who substitute or "trade time" under this subsection is not required to keep a record of the hours of the substitute work.

(d) In order to qualify under section 7(p)(3), an agreement between individuals employed by a public agency to substitute for one another at their own option must be approved by the agency. This requires that the agency be aware of the arrangement prior to the work being done, *i.e.*, the employer must know what work is being done, by

§ 553.102 Employment by the same public agency.

(a) Section 3(e)(4)(A)(ii) of the FLSA does not permit an individual to perform hours of volunteer service for a public agency when such hours involve the same type of services which the individual is employed to perform for the same public agency.

(b) Whether two agencies of the same State or local government constitute the same public agency can only be determined on a case-by-case basis. One factor that would support a conclusion that two agencies are separate is whether they are treated separately for statistical purposes in the Census of Governments issued by the Bureau of the Census, U.S. Department of Commerce.

§ 553.103 "Same type of services" defined.

(a) The 1985 Amendments provide that employees may volunteer hours of service to their public employer or agency provided "such services are not the same type of services which the individual is employed to perform for such public agency." Employees may volunteer their services in one capacity or another without contemplation of pay for services rendered. The phrase "same type of services" means similar or identical services. In general, the Administrator will consider, but not as the only criteria, the duties and other factors contained in the definitions of the 3-digit categories of occupations in the *Dictionary of Occupational Titles* in determining whether the volunteer activities constitute the "same type of services" as the employment activities. Equally important in such a determination will be the consideration of all the facts and circumstances in a particular case, including whether the volunteer service is closely related to the actual duties performed by or responsibilities assigned to the employee.

(b) An example of an individual performing services which constitute the "same type of services" is a nurse employed by a State hospital who proposes to volunteer to perform nursing services at a State-operated health clinic which does not qualify as a separate public agency as discussed in

§ 553.102. Similarly, a firefighter cannot volunteer as a firefighter for the same public agency.

(c) Examples of volunteer services which do not constitute the "same type of services" include: A city police officer who volunteers as a part-time referee in a basketball league sponsored by the city; an employee of the city parks department who serves as a volunteer city firefighter; and an office employee of a city hospital or other health care institution who volunteers to spend time with a disabled or elderly person in the same institution during off duty hours as an act of charity.

§ 553.104 Private individuals who volunteer services to public agencies.

(a) Individuals who are not employed in any capacity by State or local government agencies often donate hours of service to a public agency for civic or humanitarian reasons. Such individuals are considered volunteers and not employees of such public agencies if their hours of service are provided with no promise expectation, or receipt of compensation for the services rendered, except for reimbursement for expenses, reasonable benefits, and nominal fees, or a combination thereof, as discussed in § 553.106. There are no limitations or restrictions imposed by the FLSA on the types of services which private individuals may volunteer to perform for public agencies.

(b) Examples of services which might be performed on a volunteer basis when so motivated include helping out in a sheltered workshop or providing personal services to the sick or the elderly in hospitals or nursing homes; assisting in a school library or cafeteria; or driving a school bus to carry a football team or band on a trip. Similarly, individuals may volunteer as firefighters or auxiliary police, or volunteer to perform such tasks as working with retarded or handicapped children or disadvantaged youth, helping in youth programs as camp counselors, soliciting contributions or participating in civic or charitable benefit programs and volunteering other services needed to carry out charitable or educational programs.

[52 FR 2032, Jan. 16, 1987; 52 FR 2648, Jan. 23, 1987]

be used as documentation, but its adequacy will be evaluated in terms of compliance with the requirements of these guidelines.

(c) *Completeness.* In the event that evidence of validity is reviewed by an enforcement agency, the validation reports completed after the effective date of these guidelines are expected to contain the information set forth below. Evidence denoted by use of the word "(Essential)" is considered critical. If information denoted essential is not included, the report will be considered incomplete unless the user affirmatively demonstrates either its unavailability due to circumstances beyond the user's control or special circumstances of the user's study which make the information irrelevant. Evidence not so denoted is desirable but its absence will not be a basis for considering a report incomplete. The user should maintain and have available the information called for under the heading "Source Data" in sections 15B(11) and 15D(11). While it is a necessary part of the study, it need not be submitted with the report. All statistical results should be organized and presented in tabular or graphic form to the extent feasible.

B. *Criterion-related validity studies.* Reports of criterion-related validity for a selection procedure should include the following information:

(1) *User(s), location(s), and date(s) of study.* Dates and location(s) of the job analysis or review of job information, the date(s) and location(s) of the administration of the selection procedures and collection of criterion data, and the time between collection of data on selection procedures and criterion measures should be provided (Essential). If the study was conducted at several locations, the address of each location, including city and State, should be shown.

(2) *Problem and setting.* An explicit definition of the purpose(s) of the study and the circumstances in which the study was conducted should be provided. A description of existing selection procedures and cutoff scores, if any, should be provided.

(3) *Job analysis or review of job information.* A description of the procedure used to analyze the job or group of

jobs, or to review the job information should be provided (Essential). Where a review of job information results in criteria which may be used without a full job analysis (see section 14B(3)), the basis for the selection of these criteria should be reported (Essential). Where a job analysis is required a complete description of the work behavior(s) or work outcome(s), and measures of their criticality or importance should be provided (Essential). The report should describe the basis on which the behavior(s) or outcome(s) were determined to be critical or important, such as the proportion of time spent on the respective behaviors, their level of difficulty, their frequency of performance, the consequences of error, or other appropriate factors (Essential). Where two or more jobs are grouped for a validity study, the information called for in this subsection should be provided for each of the jobs, and the justification for the grouping (see section 14B(1)) should be provided (Essential).

(4) *Job titles and codes.* It is desirable to provide the user's job title(s) for the job(s) in question and the corresponding job title(s) and code(s) from U.S. Employment Service's Dictionary of Occupational Titles.

(5) *Criterion measures.* The bases for the selection of the criterion measures should be provided, together with references to the evidence considered in making the selection of criterion measures (essential). A full description of all criteria on which data were collected and means by which they were observed, recorded, evaluated, and quantified, should be provided (essential). If rating techniques are used as criterion measures, the appraisal form(s) and instructions to the rater(s) should be included as part of the validation evidence, or should be explicitly described and available (essential). All steps taken to insure that criterion measures are free from factors which would unfairly alter the scores of members of any group should be described (essential).

(6) *Sample description.* A description of how the research sample was identified and selected should be included (essential). The race, sex, and ethnic composition of the sample, including those groups set forth in section 4A above,

work products should be made (essential).

(5) *Job titles and codes.* It is desirable to provide the selection procedure user's job title(s) for the job(s) in question and the corresponding job title(s) and code(s) from the United States Employment Service's dictionary of occupational titles.

(6) *Selection procedure.* The selection procedure used as a measure of the construct should be completely and explicitly described or attached (essential). If commercially available selection procedures are used, they should be identified by title, form and publisher (essential). The research evidence of the relationship between the selection procedure and the construct, such as factor structure, should be included (essential). Measures of central tendency, variability and reliability of the selection procedure should be provided (essential). Whenever feasible, these measures should be provided separately for each relevant race, sex and ethnic group.

(7) *Relationship to job performance.* The criterion-related study(ies) and other empirical evidence of the relationship between the construct measured by the selection procedure and the related work behavior(s) for the job or jobs in question should be provided (essential). Documentation of the criterion-related study(ies) should satisfy the provisions of section 15B above or section 15E(1) below, except for studies conducted prior to the effective date of these guidelines (essential). Where a study pertains to a group of jobs, and, on the basis of the study, validity is asserted for a job in the group, the observed work behaviors and the observed work products for each of the jobs should be described (essential). Any other evidence used in determining whether the work behavior(s) in each of the jobs is the same should be fully described (essential).

(8) *Alternative procedures investigated.* The alternative selection procedures investigated and available evidence of their impact should be identified (essential). The scope, method, and findings of the investigation, and the conclusions reached in light of the findings should be fully described (essential).

(9) *Uses and applications.* The methods considered for use of the selection procedure (e.g., as a screening device with a cutoff score, for grouping or ranking, or combined with other procedures in a battery) and available evidence of their impact should be described (essential). This description should include the rationale for choosing the method for operational use, and the evidence of the validity and utility of the procedure as it is to be used (essential). The purpose for which the procedure is to be used (e.g., hiring, transfer, promotion) should be described (essential). If weights are assigned to different parts of the selection procedure, these weights and the validity of the weighted composite should be reported (essential). If the selection procedure is used with a cutoff score, the user should describe the way in which normal expectations of proficiency within the work force were determined and the way in which the cutoff score was determined (essential).

(10) *Accuracy and completeness.* The report should describe the steps taken to assure the accuracy and completeness of the collection, analysis, and report of data and results.

(11) *Source data.* Each user should maintain records showing all pertinent information relating to its study of construct validity.

(12) *Contact person.* The name, mailing address, and telephone number of the individual who may be contacted for further information about the validity study should be provided (essential).

E. *Evidence of validity from other studies.* When validity of a selection procedure is supported by studies not done by the user, the evidence from the original study or studies should be compiled in a manner similar to that required in the appropriate section of this section 15 above. In addition, the following evidence should be supplied:

(1) *Evidence from criterion-related validity studies—*a. *Job information.* A description of the important job behavior(s) of the user's job and the basis on which the behaviors were determined to be important should be provided (essential). A full description of the basis for determining that these important work behaviors are the same as those

Nonprofit institution: An institution that—

(1) Is owned and operated by one or more nonprofit corporations or associations, no part of the net earnings of which benefits any private shareholder or individual;

(2) Is legally authorized to operate as a nonprofit organization by each State in which it is physically located; and

(3) Is determined by the U.S. Internal Revenue Service to be an organization to which contributions are tax-deductible in accordance with section 501(c)(3) of the Internal Revenue Code (26 U.S.C. 501(c)(3)).

One-academic-year training program: An educational program that is at least one academic year as defined under 34 CFR 668.2.

Preaccredited: A status that a nationally recognized accrediting agency, recognized by the Secretary to grant that status, has accorded an unaccredited public or private nonprofit institution that is progressing toward accreditation within a reasonable period of time.

Recognized equivalent of a high school diploma: The following are the equivalent of a high school diploma—

(1) A General Education Development Certificate (GED);

(2) A State certificate received by a student after the student has passed a State-authorized examination that the State recognizes as the equivalent of a high school diploma;

(3) An academic transcript of a student who has successfully completed at least a two-year program that is acceptable for full credit toward a bachelor's degree; or

(4) For a person who is seeking enrollment in an educational program that leads to at least an associate degree or its equivalent and who has not completed high school but who excelled academically in high school, documentation that the student excelled academically in high school and has met the formalized, written policies of the institution for admitting such students.

Recognized occupation: An occupation that is—

(1) Listed in an "occupational division" of the latest edition of the *Dic-*

tionary of Occupational Titles, published by the U.S. Department of Labor; or

(2) Determined by the Secretary in consultation with the Secretary of Labor to be a recognized occupation.

Regular student: A person who is enrolled or accepted for enrollment at an institution for the purpose of obtaining a degree, certificate, or other recognized educational credential offered by that institution.

Secretary: The Secretary of the Department of Education or an official or employee of the Department of Education acting for the Secretary under a delegation of authority.

State: A State of the Union, American Samoa, the Commonwealth of Puerto Rico, the District of Columbia, Guam, the Virgin Islands, the Commonwealth of the Northern Mariana Islands, the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau. The latter three are also known as the Freely Associated States.

Telecommunications course: A course offered principally through the use of one or a combination of technologies including television, audio, or computer transmission through open broadcast, closed circuit, cable, microwave, or satellite; audio conferencing; computer conferencing; or video cassettes or discs to deliver instruction to students who are separated from the instructor and to support regular and substantive interaction between these students and the instructor, either synchronously or asynchronously. The term does not include a course that is delivered using video cassettes or disc recordings unless that course is delivered to students physically attending classes at the institution providing the course during the same award year. If the course does not qualify as a telecommunications course, it is considered to be a correspondence course.

Title IV, HEA program: Any of the student financial assistance programs listed in 34 CFR 668.1(c).

(Authority: 20 U.S.C. 1071 *et seq.*, 1078–2, 1088, 1099b, 1099c, and 1141 and 26 U.S.C. 501(c).)

[59 FR 22336, Apr. 29, 1994, as amended at 63 FR 40622, July 29, 1998; 64 FR 58615, Oct. 29, 1999; 71 FR 45692, Aug. 9, 2006]

- (vi) Uncle,
- (vii) Aunt,
- (viii) Niece, or
- (ix) Nephew.

(c) *Attendant employed by the Federal government.* (1) VA may authorize a person in the regular civilian employment of the Federal government to act as an attendant. When assigned, the attendant:

- (i) Will be entitled to transportation and expenses, or
- (ii) May be allowed per diem in place of subsistence in accordance with the provisions of the Federal Travel Regulations (5 U.S.C. Chapter 57).

(2) VA will pay no fee to civilian employees of the Federal government who act as attendants.

[49 FR 40814, Oct. 18, 1984; 50 FR 9622, Mar. 11, 1985]

§ 21.376 Travel expenses for initial evaluation and counseling.

When VA asks a disabled veteran to report to a designated place for an initial evaluation, reevaluation or counseling (including personal or vocational adjustment counseling), the veteran will travel to and from the place of evaluation and counseling at government expense. When a veteran, because of a severe disability, requires the services of an attendant while traveling, VA will authorize payment of travel expenses for the attendant under the provisions of § 21.374.

(Authority: 38 U.S.C. 111)

PERSONNEL TRAINING AND DEVELOPMENT

§ 21.380 Establishment of qualifications for personnel providing assistance under Chapter 31.

(a) *General.* Notwithstanding any other provision of law or regulation, VA shall establish qualification standards for VBA personnel providing evaluation, rehabilitation, and case management services to eligible veterans under chapter 31, including:

- (1) Counseling psychologists;
- (2) Vocational rehabilitation specialists; and
- (3) Other staff providing professional and technical assistance.

(b) *Rehabilitation Act of 1973.* VA shall consider qualification standards established for comparable personnel under the Rehabilitation Act of 1973, when setting agency standards.

(Authority: 38 U.S.C. 3118(c))

§ 21.382 Training and staff development for personnel providing assistance under Chapter 31.

(a) *General.* VA shall provide a program of ongoing professional training and development for staff of the VR&E Service engaged in providing rehabilitation services under chapter 31. The objective of such training shall be to insure that rehabilitation services for disabled veterans are provided in accordance with the most advanced knowledge, methods, and techniques available for the rehabilitation of disabled persons. The areas in which training and development services may be provided to enhance staff skills include:

- (1) Evaluation and assessment;
- (2) Medical aspects of disability;
- (3) Psychological aspects of disability;
- (4) Counseling theory and techniques;
- (5) Personal and vocational adjustment;
- (6) Occupational information;
- (7) Placement processes and job development;
- (8) Special considerations in rehabilitation of the seriously disabled;
- (9) Independent living services;
- (10) Resources for training and rehabilitation; and
- (11) Utilizing research findings and professional publications.

(Authority: 38 U.S.C. 3118)

(b) *Training and development resources.* For the purpose of carrying out the provisions of paragraph (a) of this section VA may:

- (1) Employ the services of consultants;
- (2) Make grants to and contract with public and private agencies, including institutions of higher learning, to conduct workshop and training activities;
- (3) Authorize individual training at institutions of higher learning and other appropriate facilities; and

Appendix D: Federal Register Notice

DEPARTMENT OF LABOR**Employment and Training Administration****Proposed Information Collection Request Submitted for Sixty Days' Public Comment; O*NET Data Collection Program, Extension of Currently Approved Collection Without Change**

AGENCY: Employment and Training Administration.

ACTION: Notice.

SUMMARY: The Department of Labor, as part of its continuing effort to reduce paperwork and respondent burden conducts a preclearance consultation program to provide the general public and federal agencies with an opportunity to comment on proposed and/or continuing collections of information in accordance with the Paperwork Reduction Act of 1995 (PRA 95) [44 U.S.C. 3506(c)(2)(A)]. This program helps to ensure that requested data can be provided in the desired format, reporting burden (time and financial resources) is minimized, collection instruments are clearly understood, and the impact of collection requirements on respondents can be properly assessed. Currently, the Employment and Training Administration is soliciting comments concerning the proposed extension of the O*NET (Occupational Information Network) Data Collection Program. A copy of the proposed information collection request (ICR) can be obtained by contacting the office listed below in the addressee section of this notice or by accessing: <http://www.doleta.gov/OMBControlNumber.cfm>.

DATES: Written comments must be submitted to the office listed in the addressee's section below on or before July 15, 2008.

ADDRESSES: Submit written comments to the Employment and Training Administration, 200 Constitution Avenue, NW., Room S-4231, Washington, DC 20210, Attention: Pam Frugoli, Telephone number: 202-693-3643 (this is not a toll-free number). Fax: 202-693-3015. E-mail: O*NET@doleta.gov.

SUPPLEMENTARY INFORMATION:**I. Background**

The O*NET Data Collection Program is a continuing effort to collect and maintain current information on detailed characteristics of occupations and skills for over 800 occupations. The resulting database is and will continue to be the most comprehensive standard

source of occupational and skills information in the nation. O*NET information is used by a wide range of audiences, from individuals making career decisions, to public agencies and schools providing career exploration services and planning workforce investment programs, to businesses making staffing and training decisions. The O*NET system provides a common language, framework and database to meet the administrative needs of various federal programs, including workforce investment and training programs of the Departments of Labor, Education, and Health and Human Services.

Section 309 of the Workforce Investment Act requires the Secretary of Labor to oversee the "development, maintenance, and continuous improvement of a nationwide employment statistics system" which shall include, among other components, "skill trends by occupation and industry." The States are to develop similar statewide employment statistics systems.

The O*NET Data Collection Program is the primary vehicle for collecting skills and occupational information across all occupations nationwide. The continued population and completion of the entire O*NET database is a critical component of the nationwide labor market information system to support employer, workforce, and education information needs.

O*NET succeeds the Dictionary of Occupational Titles (DOT) and is a powerful tool for various critical federal and state workforce investment functions. O*NET integrates a powerful relational database and a common language for occupational and skill descriptions into a value-added tool for business, job seekers, and the workforce investment professionals who help bring them together. By providing information organized according to the O*NET Content Model, the O*NET database is an important tool for keeping up with today's rapidly changing world of work. The O*NET database provides:

- Detailed information for more than 800 occupations.
- Descriptive information on standardized descriptors of skills, abilities, interests, knowledge, work values, education, training, work context, and work activities.
- Occupational coding based on the 2000 Standard Occupational Classification (SOC).

The O*NET electronic database serves as the underpinning for hundreds of publicly and privately developed products and resources in the marketplace and can be found at

<http://www.onetcenter.org/database.html>. These products and resources are being used to serve millions of customers.

II. Review Focus

The Department of Labor is particularly interested in comments which:

- Evaluate whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility;
- Evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;
- Enhance the quality, utility, and clarity of the information to be collected; and
- Minimize the burden of the collection of information on those who are to respond, including through the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submissions of responses.

III. Current Actions

Type of Review: Extension.

Agency: Employment and Training Administration.

Title: O*NET Data Collection Program.

OMB Number: 1205-0421.

Affected Public: Business/Employers (includes private and not-for-profit businesses and government); individuals (incumbent workers, subject-matter experts).

Form: O*NET Data Collection Program.

Total Respondents: 85,780.

Frequency: Annual.

Total Responses: 85,780.

Average Time Per Response: Employer response time is 70 minutes. Incumbent worker response time is 30 minutes. Subject-matter expert response time is 2 hours.

Estimated Total Burden Hours: 43,857.

Total Burden Cost: \$1,355,266.

Comments submitted in response to this comment request will be summarized and/or included in the request for the Office of Management and Budget approval of the information collection request. They will also become a matter of public record.

Signed: At Washington, DC, this 8th day of May, 2008.

Gay M. Gilbert,

Administrator, Office of Workforce Investment, Employment & Training Administration.

[FR Doc. E8-10934 Filed 5-15-08; 8:45 am]

BILLING CODE 4510-FN-P

DEPARTMENT OF LABOR

Employment and Training Administration

Notice of Availability of Funds and Solicitation for Grant Applications (SGA) To Fund Demonstration Projects Targeting Dislocated Workers

Announcement type: New, Notice of Solicitation for Grant Applications.

Funding Opportunity Number: SGA/DFA PY-07-10.

Catalog of Federal Assistance Number: 17.269.

Key Dates: The closing date for receipt of applications under this announcement is June 13, 2008. Applications must be received at the address below no later than 4:30 p.m. (Eastern Time). Application and submission information is explained in detail in Part IV of this SGA.

SUMMARY: The U.S. Department of Labor (DOL), Employment and Training Administration (ETA) announces the availability of approximately \$20 million to fund grants to State Workforce Agencies (SWAs) for demonstration projects targeting Workforce Investment Act (WIA) dislocated workers. This solicitation provides SWAs with the option to choose from four categories under which applicants can submit a single grant application. Please note that two options exist under category one and two options exist under category three. If the applicant chooses to apply under categories one or three, the applicant must indicate which option the proposal addresses. Applicants may only submit a grant application under *one* category and only *one* application per SWA will be accepted. Applicants must indicate in the abstract of their proposal the category under which they are applying.

Category 1—Entrepreneurship Opportunities for Dislocated Workers (two options).

Category 2—Getting Ahead of the Curve: Raising Educational/Skill Levels of Workers in Declining Industries.

Category 3—Innovative Adult Learning Models for Dislocated Workers (two options).

Category 4—Preventing Dislocations of TANF Recipients Moving Into Entry Level Jobs Subject to Economic Churn.

Additional background information is provided under Part I.

ADDRESSES: Mailed applications must be addressed to the U.S. Department of Labor, Employment and Training Administration, Division of Federal Assistance, Attention: Bjai Johnson, Reference SGA/DFA PY-07-10, 200 Constitution Avenue, NW., Room N-4716, Washington, DC 20210. Facsimile applications will not be accepted. Information about applying online can be found in Part V.C. of this document. Applicants are advised that mail delivery in the Washington, DC, area may be delayed due to mail decontamination procedures. Hand delivered proposals will be received at the above address.

SUPPLEMENTARY INFORMATION: *This solicitation consists of eight parts:*

Part I provides background information for each category.

Part II describes award information.

Part III describes eligibility information.

Part IV describes the application and submission process.

Part V describes the applications review process.

Part VI contains award administration information.

Part VII contains DOL agency contact information.

Part VIII lists additional resources of interest to applicants.

Part I. Background Information

This section provides background information for each of the four categories for grant applications. In some cases the background information is applicable to more than one category and is identified as such.

Background Information for Category 1—Entrepreneurship Opportunities for Dislocated Workers: *Applicants may submit an application under only one of the following options:* Option A—Project GATE (Growing America Through Entrepreneurship) for Dislocated Workers in Rural Areas or Option B—Project GATE for Dislocated Workers Fifty Years and Older. This background information is relevant to both options.

Although many Americans have neither the skills nor the desire to be self-employed (more than 90 percent of employed Americans work for other people in “wage and salary” jobs) some Americans do want to be self-employed. Some have a passion for a particular business idea, while others want to be their own bosses, have no access to wage and salary jobs in which they can use their skills, or desire the flexibility of self-employment. These people often

are willing to work hard, and have specific skills, interests, and talents they can use in a business.

Many aspiring entrepreneurs’ lack of business knowledge and access to credit poses significant barriers to self-employment. This lack of knowledge may encompass marketing, finance, regulations, how to develop a business plan, or other aspects of developing and running a business. Disadvantaged populations in particular are less likely to have access to the information sources that would make such knowledge and skills available to them. Many people may need loans to start their businesses but have little collateral and poor or no credit histories. Moreover, commercial banks frequently are reluctant to make loans to small, risky ventures.

In providing assistance designed to surmount these obstacles to self-employment, Project GATE aims to promote both workforce and economic development. In improving the likelihood of being successful at self-employment, the project sought to increase employment, earnings, and the self-sufficiency of GATE participants. Even if not successful at self-employment, the program could have improved success at wage and salary employment by providing GATE participants with contacts, business skills, or just the knowledge that entrepreneurship is not for them. By promoting small businesses and the jobs they create, Project GATE also aimed to promote economic development in some low-income areas.

1. Project GATE Demonstration

This initiative builds on the prior Project GATE Demonstration funded by ETA which began in early fall 2003 and was implemented in three states—Pennsylvania, Minnesota, and Maine. Participants in Project GATE were offered assessments, classroom training and one-on-one business counseling in developing their businesses and applying for a Small Business Administration (SBA) Microloan or other source of business finance. Nonprofit Community-Based Organizations and the SBA’s Small Business Development Centers provided the classroom training and business counseling.

One-Stop Career Centers were the gateways to the program. These centers conducted outreach for Project GATE and hosted the program’s orientation session. Project GATE added a new service to the One-Stop Career Centers’ arsenal of employment services—helping people become self-employed. In addition, Project GATE attracted new

***Appendix E: Publications Referencing the O*NET
Data Collection Program***

Appendix E: Publications Referencing the O*NET Program

E.1 Journal Articles

- Anderson, L., Morath, L., Light, E., & Wilken, J. A. (2004). Estimating the dollar utility of changes in job performance due to seasonal allergic rhinitis and its treatment. *Human Performance, 17*(1), 43–69.
- Armstrong, P. I., Smith, T. J., Donnay, D. A. C., & Rounds, J. (2004). The strong ring: A basic interest model of occupational structure. *Journal of Counseling Psychology, 51*(3), 299–213.
- Bowen, C. C. (2003). A case study of a job analysis. *Journal of Psychological Practice, 8*(1), 46–55.
- Breeding, R. R. (2005). Vocational rehabilitation and sudden onset disability: Advancing proprietary consumer involvement through improved vocational assessment. *Journal of Vocational Rehabilitation, 22*(3), 131–141.
- Chang, A., Moley, K., Wangler, M., Feinberg, A., & DeBaun, M. (2005). Association between Beckwith-Wiedemann syndrome and assisted reproductive technology: A case series of 19 patients. *Fertility and Sterility, 83*(2), 349–354.
- Converse, P. D., & Oswald, F. L. (2004). The effects of data type of job classification and its purposes. *Psychological Science, 46*(1), 99–127.
- Converse, P. D., Oswald, F. L., Gillespie, M. A., Field, K. A., & Bizot, E. B. (2004). Matching individuals to occupations using abilities and the O*NET: Issues and an application in career guidance. *Personnel Psychology, 57*(2), 451–487.
- Crouter, A. C., Lanza, S. T., Pirretti, A., Goodman, W. B., & Neebe, E. (2006). The O*Net jobs classification system: A primer for family researchers. *Family Relations: Interdisciplinary Journal of Applied Family Studies, 55*(4), 461–472.
- Deng, C. P., Armstrong, P. I., & Rounds, J. (2007). The fit of Holland's RIASEC model to U.S. occupations. *Journal of Vocational Behavior, 71*(1), 1–22.
- Dunn, P. (2001). Proprietary rehabilitation: Challenges and opportunities in the new millennium. *Work, 17*(2), 135–142.
- Eggerth, D. E., Bowles, S. M., Tunick, R. H., & Andrew, M. E. (2005). Convergent validity of O*NET Holland code classifications. *Journal of Career Assessment, 13*(2), 150–168.
- Engelbrecht, H. (2001). Gender and the information work force: New Zealand evidence and issues. *Carfax Publishing Company, 19*(2), 135–145.
- Feser, E. J. (2003). What regions do rather than make: A proposed set of knowledge-based occupation clusters. *Carfax Publishing Company, 40*(10), 1937–1958.

- Field, T. M. (2002). Transferable skills analysis: A common sense approach. *Journal of Forensic Vocational Analysis*, 5, 29–40.
- Grusky, D. B., & Weeden, K. A. (2001). Decomposition without death: A research agenda for a new class analysis. *Taylor & Francis AS*, 44(3), 203–218.
- Gustafson, S. B., & Rose, A. M. (2003). Investigating O*NET's suitability for the Social Security Administration's disability determination process. *Journal of Forensic Vocational Analysis*, 6(1), 3–16.
- Handel, M. J. (2002). Skills mismatch in the labor market. *Annual Review of Sociology*, 29, 135–165.
- Handley, H. A. H., & Heacox, N. J. (2004). An integrative decision space model for simulation of cultural differences in human decision-making. *Information, Knowledge, Systems Management*, 4(2), 95–105.
- Helton-Fauth, W., Gaddis, B., Scott, G., Mumford, M., Devenport, L., Connelly, S., et al. (2003). A new approach to assessing ethical conduct in scientific work. *Carfax Publishing Company*, 10(4), 205–228.
- Hotchkiss, J. L. (2004). Growing part-time employment among workers with disabilities: Marginalization or opportunity? *Economic Review*, 3(Q), 25–40.
- Hurt, A. C., & Horman, S. R. (2005). Growing leaders. *Industrial and Commercial Training*, 37(3), 120–123.
- Ingram, B. F., & Neuman, G. R. (2006). The returns to skill. *Labour Economics*, 13, 35–59.
- Isakson, C. (2006). Caught on the Web. *Education Digest: Essential Readings Condensed for Quick Review*, 5(71), 79–80.
- Jeanneret, P. R. & Strong, M. H. (2003). Linking O*NET job analysis information to job requirement predictors: An O*Net application. *Personnel Psychology*, 56(2), 465–492.
- Kaplan, C. P., Napoles-Springer, A., Stewart, S. L., & Perez-Stable, E. (2001). Smoking acquisition among adolescents and young Latinas: The role of socio-environmental and personal factors. *Addictive Behaviors*, 26(4), 531–550.
- Karman, S. K., & Truthan, J. A. (2003). Transferable skills analysis and vocational information during a time of transition. *Journal of Forensic Vocational Analysis*, 6(1), 17–25.
- Kersnovske, S., Gibson, L., & Strong, J. (2005). Item validity of the physical demands from the *Dictionary of Occupational Titles* for functional capacity evaluation of clients with chronic back pain. *Work*, 24(2), 157–169.
- Kessler, R. C., Ames, M., Hymel, P. A., Loeppke, R., McKenas, D. K., Richling, D. E., et al. (2004). Using the World Health Organization health and work performance questionnaire (HPQ) to evaluate the indirect workplace costs of illness. *Journal of Occupational & Environmental Medicine*, 46(Suppl. 6), S23–S37.
- Kessler, R. C., Barber, C., Beck, A., Berglund, P. M., Cleary, P. D., McKenas, D., Pronk, N., Simon, G., Stang, P., Ustun, T. B., & Wang, P. (2003). The World Health Organization health and work performance questionnaire (HPQ). *Journal of Occupational & Environmental Medicine*, 45(2), 156–174.

- Konig, C. J., Buhner, M., & Murling, G. (2005). Working memory, fluid intelligence, and attention are predictors of multitasking performance, but polychronicity and extraversion are not. *Human Performance, 18*(3), 243–266.
- Kontosh, L. G., & Wheaton, J. (2003). Transferable skills analysis and standards of practice: Wherever the two shall meet? *Journal of Forensic Vocational Analysis, 6*(1), 41–48.
- Lewis, R. E., & Klausner, J. S. (2003). Nontechnical competencies underlying career success as a veterinarian. *Journal of the American Veterinary Medical Association, 222*(12), 1690–1696.
- Lui, C., Spector, P. E., & Jex, S. M. (2005). The relation of job control with job strains: A comparison of multiple data sources. *Journal of Occupational & Organizational Psychology, 78*(3), 325–336.
- Mallen, M. J., & Vogel, D. L. (2005). Introduction to the major contribution: Counseling psychology and online counseling. *Counseling Psychologist, 33*(6), 761–775.
- Man, D. W., Li, E. P., & Lam, C. S. (2007). Development of a job evaluation system to predict job placements for persons with mild mental retardation: A pilot study. *International Journal of Rehabilitation Research, 30*(2), 175–179.
- Mariani, M. (2001). O*NET. *Occupational Outlook Quarterly, 45*(3), 26–27.
- MacDonald, S., & Crew, R. E., Jr. (2006). Welfare to Web to work: Internet job searching among former welfare clients in Florida. *Journal of Sociology and Social Welfare, 33* (1), 239–253.
- McElroy, J. A., Newcomb, P. A., Trentham-Dietz, A., Titus-Ernstoff, L., Hampton, J. M., & Egan, K. M. (2005). Breast cancer risk associated with electromagnetic field exposure from computer work ascertained from occupational history data. *Epidemiology, 16*(Suppl. 5), S99–S100.
- Morgeson, F. P., & Campion, M. A. (2000). Accuracy in job analysis: Toward an inference-based model. *Journal of Organizational Behavior, 21*(7), 819–827.
- Morgeson, F. P., Delaney-Klinger, K., Ferrara, P., Mayfield, M. S., & Campion, M. A. (2004). Self-presentation processes in job analysis: A field experiment investigating inflation in ability, tasks and competencies. *Journal of Applied Psychology, 89*(4), 674–686.
- Morgeson, F. P., Reider, M. H., & Campion, M. A. (2005). Selecting individuals in team settings: The importance of social skills, personality characteristics, and teamwork knowledge. *Personnel Psychology, 58*, 583.
- Murphy, K. R., & Dzieweczynski, J. L. (2005). Why don't measures of broad dimensions of personality perform better as predictors of job performance? *Human Performance, 18*(4), 344–357.
- Peterson, N. G., Mumford, M. D., Borman, W. C., Jeanneret, P. R., Fleishman, E. A., Levin, K. Y., et al. (2001). Understanding work using the occupational information network (O*NET). *Personnel Psychology, 54*(2), 451–492.
- Pollack, L. J., Simons, C., Romero, H., & Hausser, D. (2002). A common language for classifying and describing occupations: The development, structure, and application of the Standard Occupational Classification. *Human Resource Management, 41*(3), 297–307.

- Pransky, G. S., Benjamin, K. L., Savageau, J. A., Currivan, D., & Fletcher, K. (2005). Outcomes in work-related injuries: A comparison of older and younger workers. *American Journal of Industrial Medicine, 47*(2), 104–112.
- Prediger, D. J. (2002). Abilities, interest, and values: Their assessment and their integration via the World-of-Work Map. *Journal of Career Assessment, 10*(2), 209–232.
- Reynolds, L. (2004). Is prehospital care really a profession? *Journal of Emergency Primary Health Care, 2*(1–2), 1–6.
- Robinson, D. D. (2002). Assessing occupational effects of medical impairment. *Forensic Examiner, 11*(1–2), 23–30.
- Rotundo, M., & Sackett, P. R. (2004). Specific versus general skills and abilities: A job level examination of relationships with wage. *Journal of Occupational and Organizational Psychology, 77*, 127–148.
- Scherbaum, C. A. (2005). Synthetic validity: Past, present, and future. *Personnel Psychology, 58*(2), 481.
- Shaw, J. D., & Gupta, N. (2004). Job complexity, performance, and well-being: When does supplies–values fit matter? *Personnel Psychology, 57*(4), 847.
- Shostak, A. B. (2005). On the state of cyberunionism: An American progress report. *Working USA, 8*(4), 403.
- Skinner, C. (2001). Measuring skills mismatch: New York City in the 1980s. *Urban Affairs Review, 36*(5), 678–695.
- Smith, T. J. & Compbell, C. (2006). The structure of O*NET occupational values. *Journal of Career Assessment, 14*(4), 437–448.
- Taylor, P. J., Pajo, K., Cheung, G. W., & Stingfield, P. (2004). Dimensionality and validity of a structured telephone reference check procedure. *Personnel Psychology, 57*(3), 745.
- Wolfe, F., Michaud, K., Choi, H. K., & Williams, R. (2005). Household income and earnings losses among 6396 persons with rheumatoid arthritis. *Journal of Rheumatology, 32*(10), 1875–1883.
- Zhang, Z. & Snizek, W. E. (2003). Occupation, job characteristics, and the use of alcohol and other drugs. *Social Behavior and Personality, 31*(4), 395–412.
- Zimmerman, F. J., Christakis, D. A., & Vander Stoep, A. (2004). Tinker, tailor, soldier, patient: Work attributes and depression disparities among young adults. *Social Science & Medicine, 58*, 1889–1901.

E.2 Books and Book Chapters

- Baldwin, T., Bommer, B., & Rubin, R. (2007). *Developing management skills: What great managers know and do*. New York: McGraw-Hill/Irwin.
- Brannick, M. T., Levine, E. L., & Morgeson, F. P. (2007). *Job analysis: Methods, research, and applications for human resource management* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Brown, D. (2003). *Career information, career counseling, and career development* (8th ed.). Needham Heights, MA: Allyn & Bacon.

- Brown, S. D. & Lent, R. W. (2004). *Career development and counseling: Putting theory and research to work*. Hoboken, NJ: Wiley.
- Casio, J. (2004). *Career Pathways Handbook*. Victoria, British Columbia, Canada: Trafford.
- Church, A. H., Waclawski, J. & McPhail, S. M. (2007). *Alternative validation strategies: Developing new and leveraging existing validity evidence*. San Francisco, CA: Wiley.
- Colquitt, J., LePine, J., & Wesson, M. (2007). *Organizational Behavior*. Burr Ridge, IL: McGraw-Hill Higher Education.
- Cully, M. (2003). *Pathways to knowledge work*. Kensington Park, SA, Australia: NCVET.
- Farr, M. (2004). *The very quick job search*. Indianapolis, IN: JIST.
- Farr, M., Lidden, L., & Shatch, L. (2003). *300 best jobs without a 4-year degree*. Indianapolis, IN: JIST.
- Farr, M., Lidden, L., & Shatch, L. (2003). *200 best jobs for a college graduate*. Indianapolis, IN: JIST.
- Fontaine, M. A., & Millen, D. R. (2004). Understanding the benefits and impact of communities of practice and networks: Reviewing two perspectives on social learning. In P. Hildreth & C. Kimble (Eds.), *Knowledge networks: Innovation through communities of practice*. London: Idea Group.
- Gore, P. A., Jr., & Hitch, J. L. (2005). *Occupational classification and sources of occupational information*. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work*. Hoboken, NJ: Wiley.
- Herman, E. (2001). *Locating United States government information: A guide to sources*. Buffalo, NY: Hein.
- Jeanneret, P. R., D'Egidio, E. L., & Hanson, M. A. (2004). Assessment and development opportunities using the Occupational Information Network (O*NET). In M. Hersen (Ed.), *Comprehensive handbook of psychological assessment* (pp. 192–202). Hoboken, NJ: Wiley.
- Krannich, R., & Krannich, C. (2005). *I want to do something else, but I'm not sure what it is*. Manassas Park, VA: Impact Publications.
- Landy, F. J. & Conte, J. M. (2006). *Work in the 21st century: An introduction to industrial and organizational psychology*. Malden, MA: Blackwell.
- Levy, D. G., Thie, H. J., Robbert, A. A., Naftel, S., Cannon, C., Ehrenberg, R., et al. (2001). *Characterizing the future defense workforce* (MR-1304-OSD). Santa Monica, CA: RAND Corporation.
- Lewis, P., & Davis, D. (2004). Improving work life decisions: O*NET Career exploration tools. In J. E. Wall & G. R. Waltz (Eds.), *Measuring up: Assessment issues for teachers, counselors, and administrators*. Greensboro, NC: CAPS Press.
- Mathis, R. L., & Jackson, J. H. (Eds.). (2006). *Human resource management: Essential perspectives*. Belmont, CA: Thomson South-Western.
- Miltiadis D. L., & Ambjorn, N. (2006) *Intelligent learning infrastructure for knowledge intensive organizations: A semantic web perspective*. Hershey, PA: Idea Group.

- Nemko, M., Edwards, P., & Edwards, S. (2001). *Cool careers for dummies*. New York: Wiley.
- Peterson, N. G., & Jeanneret, J. P. (2007). Job analysis: Overview and description of deductive methods. In D. L. Whetzel & G. R. Wheaton (Eds.), *Applied measurement: Industrial psychology in human resources management*. Mahwah, NJ: Erlbaum.
- Peterson, N., Mumford, M., Borman, W., Jeanneret, P., & Fleishman, E. (1995). *Development of prototype Occupational Information Network (O*NET) Content Model* (Vols. 1–2). Salt Lake City, UT: Utah Department of Workforce Services.
- Peterson, N., Mumford, M., Borman, W., Jeanneret, P., Fleishman, E., & Levin, K. Y. (1997). *O*NET final technical report* (Vols. 1–2). Salt Lake City, UT: Utah Department of Workforce Services.
- Peterson, N. G., Mumford, M. D., Borman, W. C., Jeanneret, P. R., & Fleishman, E. A. (1999). *An occupational information system for the 21st century: The development of O*NET*. Washington, DC: American Psychological Association.
- Rounds, J. B., & Armstrong, P. I. (2005). Assessment of needs and values. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work*. Hoboken, NJ: Wiley.
- Sackett, P. R. & Laczko, R. M. (2003). Job and work analysis. In D. R. Ilgen & W. C. Borman, (Eds.), *Handbook of psychology: Industrial and organizational psychology* (Vol. 12). New York: Wiley.
- Sanchez, J. I. & Levine, E. L. (2002). The analysis of work in the 20th and 21st centuries. In D. S. Ones & N. Anderson (Eds.), *Handbook of industrial, work and organizational psychology: Vol. 1. Personnel psychology*. London: Sage Publications.
- Spector, P. E. (2005). *Industrial and organizational psychology: Research and practice*. Hoboken, NJ: Wiley.
- Stein, M. (2005). *Fearless career change: The fast track to success in a new field*. New York: McGraw-Hill.
- Taylor, J., & Hardy, D. (2004). *Monster careers: How to land the job of your life*. London: Penguin Books.
- Schmelter-Davis, H. (2004). O*NET in action—Expanding youth career horizons. In S. M. Wakefield, H. Sage, & D. R. Coy (Eds.), *Unfocused kids—Helping students to focus on their education and career plans*. Greensboro, NC: Capps Press.
- Wall, J. E. (2006). *Job Seeker's online goldmine: A step-by-step guidebook to government and no-cost Web tools*. Indianapolis, IN: JIST.
- Woods, J. & Frugoli, P. (2004). Information, tools, and technology: Information labor exchange participants. In D. E. Balducchi, R. W. Eberts, & C. J. O'Leary (Eds.), *Labor exchange policy in the United States* (pp. 279–210). Kalamazoo, MI: W. E. Upjohn Institute.

E.3 Research and Technical Reports

- ACT. (2006). *Ready for College and Ready for Work: Same or Different?* Retrieved May 30, 2007, from <http://www.act.org/path/policy/pdf/ReadinessBrief.pdf>

- Achtelik, L., Davis, M., Hax, L., Peters, J., Rose, C., Taylor, J., et al. (2003, May). *Help wanted: Making a difference in health care part 1*. California Employment Development Department, Labor Market Information Division, Information Services Group, Occupational Research Unit. Retrieved January 23, 2008, from <http://www.calmis.ca.gov/file/occmisc/HelpWanted-Part1.pdf>
- Achtelik, L., Davis, M., Hax, L., Peters, J., Rose, C., & Taylor, J. (2003, May). *Help wanted: Making a difference in health care part 2*. California Employment Development Department, Labor Market Information Division, Information Services Group, Occupational Research Unit. Retrieved January 23, 2008, from <http://www.calmis.ca.gov/file/occmisc/HelpWanted-Part2.pdf>
- Achtelik, L., Davis, M., Hax, L., Peters, J., Rose, C., & Taylor, J. (2003, May). *Help wanted: Making a difference in health care part 3*. California Employment Development Department, Labor Market Information Division, Information Services Group, Occupational Research Unit. Retrieved January 23, 2008, from <http://www.calmis.ca.gov/file/occmisc/HelpWanted-Part3.pdf>
- Best careers methodology—How we got our results*. (2006). Retrieved January 7, 2008, from Careerjournal.com: The Wall Street Journal Executive Career Site: <http://www.careerjournal.com/reports/bestcareers/20060711-method.html>
- Boese, R. & Lewis, P. (2001, October). *Combining original “analyst” O*NET Skill Questionnaire constructs to form more general constructs for the revised Incumbent Questionnaire*. Raleigh, NC: National Center for O*NET Development.
- Boese, R., Lewis, P., Frugoli, P., & Litwin, K. (2001, October). *Summary of O*NET 4.0 Content Model and database*. Raleigh, NC: National O*NET Consortium.
- Campbell, J. P. (2001, October). *Protocol for matching O*NET Work Context Questionnaire item response scale values between the original “analyst” form and the revised incumbent form*. Raleigh, NC: National Center for O*NET Development.
- Carter, G. W., Dorsey, D. W., & Incalcaterra, K. A. (2001, December). *O*NET and information technology occupations* (Tech. Rep. No. 394). Arlington, VA: Personnel Decisions Research Institutes.
- Cochran, C. C., Carter, G. W., & Dorsey, D. W. (2003, July). *Identifying career paths: A review of the literature* (Tech. Rep. No. 435). Minneapolis, MN: Personnel Decision Research Institutes.
- Donsbach, J., Tsacoumis, S., Sager, C., & Updegraff, J. (2003, August). *O*NET analyst occupational abilities ratings: Procedures*. Alexandria, VA: Human Resources Research Organization.
- Education, Earnings and Decent Jobs. (2007). *Editorial Projects in Education*. Retrieved June 12, 2007, from <http://www.edweek.org/media/ew/dc/2007/40jobs-zones.pdf>
- Field, J. (2004). *Jobs for the sidewalk economist*. Lacey, WA: Washington State Employment Security Department, Labor Market and Economic Analysis.
- Goldhaber, D., & Player, D. (2003, April). *What different benchmarks suggest about how financially attractive it is to teach in public schools* (Tech. Rep. No. TC-03-01). Madison, WI: Consortium for Policy Research in Education.
- Horey, J., Falleson, J. J., Morath, R., Cronin, B., Cassella, R., Franks, W., Jr., et al. (2004, July). *Competency based future leadership requirements* (Tech. Rep. No. 1148). Arlington, VA: United States Army Research Institute for the Behavioral and Social Sciences.

- Hubbard, M., McCloy, R., Cambell, J., Nottingham, J., Lewis, P., Rivkin, D., et al. (2000, October). *Revision of O*NET data collection instruments*. Raleigh, NC: National O*NET Consortium.
- Ingram, B. F., & Neumann, G. R. (2000, May). *The returns to skill* (Tech. Rep. No. W210 PBAB). Iowa City: University of Iowa.
- LaPolice, C. C., Carter, G. W., & Johnson, J. W. (2005) *Linking O*NET descriptors to occupational literacy requirements using job component validation*. Alexandria, VA: Personnel Decisions Research Institutes.
- Levine, J., Nottingham, J., Paige, B. & Lewis, P. (2001, May). *Transitioning O*NET to the Standard Occupational Classification*. Raleigh, NC: National O*NET Consortium.
- Levy, D. G., Thie, H. J., Robbert, A. A., Naftel, S., Cannon, C., Ehrenberg, R. G., & Gershwin, M. (2001). *Characterizing the future defense workforce*. Santa Monica, CA: RAND Corporation.
- Lewis, P., & Rivkin, D. (1999). *Development of the O*NET Interest Profiler*. Raleigh, NC: National Center for O*NET Development.
- McCloy, R., Campbell, J., Oswald, F., Lewis, P., & Rivkin, D. (1999). *Linking client assessment profiles to O*NET occupational profiles*. Raleigh, NC: National Center for O*NET Development.
- McCloy, R., Campbell, J., Oswald, F., Rivkin, D., & Lewis, P. (1999). *Generation and use of occupational ability profiles for exploring O*NET occupational units* (Vols. 1–2). Raleigh, NC: National Center for O*NET Development.
- McCloy, R., Waugh, G., Medsker, G., Wall, J., Rivkin, D., & Lewis, P. (1999). *Determining the occupational reinforcer patterns for O*NET occupational units* (Vols. 1–2). Raleigh, NC: National Center for O*NET Development.
- McCloy, R., Waugh, G., Medsker, G., Wall, J., Rivkin, D., & Lewis, P. (1999). *Development of the O*NET computerized Work Importance Profiler*. Raleigh, NC: National Center for O*NET Development.
- McCloy, R., Waugh, G., Medsker, G., Wall, J., Rivkin, D., & Lewis, P. (1999). *Development of the O*NET paper-and-pencil Work Importance Locator*. Raleigh, NC: National Center for O*NET Development.
- National Crosswalk Service Center (2006). *O*NET occupations reference guide*. Des Moines, IA: Iowa Department of Education. Retrieved January 2, 2008, from <ftp://ftp.xwalkcenter.org/download/onet10/ONET10UserGuide.pdf>
- Noble, C. L., Sager, C., Tsacoumis, S., Updegraff, J. & Donsbach, J. (2003, November). *O*NET analyst occupational abilities ratings: Wave 1 results*. Alexandria, VA: Human Resources Research Organization.
- Oswald, F., Campbell, J., McCloy, R., Rivkin, D., & Lewis, P. (1999). *Stratifying occupational units by specific vocational preparation*. Raleigh, NC: National Center for O*NET Development.
- Rivkin, D., Lewis, P., Cox, S. & Koritko, L. (2001, March). *Pilot test results: Testing subject matter expert methodology for collecting occupational information for O*NET*. Raleigh, NC: National Center for O*NET Development.

- Rounds, J., Mazzeo, S. E., Smith, T. J., Hubert, L., Lewis, P., & Rivkin, D. (1999). *O*NET computerized Interest Profiler: Reliability, validity, and comparability*. Raleigh, NC: National Center for O*NET Development.
- Rounds, J., Smith, T., Hubert, L., Lewis, P., & Rivkin, D. (1999). *Development of occupational interest profiles for O*NET occupations*. Raleigh, NC: National Center for O*NET Development.
- Rounds, J., Walker, C. M., Day, S. X., Hubert, L., Lewis, P., & Rivkin, D. (1999). *O*NET Interest Profiler: Reliability, validity, and self-scoring*. Raleigh, NC: National Center for O*NET Development.
- Segall, D. O. & Monzon, R. I. (1995). *Equating forms E and F of the P&P-GATB*. San Diego, CA: Navy Personnel Research and Development Center.
- Silva, J. (1999). *O*NET Ability Profiler Scoring Program technical manual*. Raleigh, NC: National Center for O*NET Development.
- Swanson, C. B. (2007, June 12). Learning and Earning. In *Diplomas count: Ready for what? Preparing students for college, careers and life after high school*. Retrieved June 26, 2007, from the Education Week Web site: <http://www.edweek.org/ew/articles/2007/06/12/40jobs.h26.html>
- Tsacoumis, S., & Van Iddekinge, C. H. (2006, April). *A comparison of incumbent and analyst ratings of O*NET skills*. Alexandria, VA: Human Resources Research Organization.
- Van Iddekinge, C. H., Tsacoumis, S., & Donsbach, J. (2002, October). *A preliminary analysis of occupational task statements from the O*NET Data Collection Program*. Alexandria, VA: Human Resources Research Organization.
- Weekley, J. A., Ployhart, R. E., & Cooper-Hakim, A. (2005). *On the development of measures of the O*NET work styles*. Paper presented at the annual conference for the Society of Industrial-Organizational Psychology, Los Angeles, CA.

E.4 Presentations and Other Papers

- Ashley, G., James, J., Young, M., Yurkovich, J. M., & Reiter-Palmon, R. (2007, April). Task skill/ability linkage reliability using O*NET taxonomy. Paper presented at the annual meeting of the Society for Industrial and Organizational Psychology, New York.
- Blinder, A. S. (2007). *How many U.S. jobs might be offshorable?* (Working Paper No. 142). Princeton, NJ: Princeton University Center for Economic Policy Studies.
- Borman, W. C., Fleishman, E. A., Jeanneret, P. R., Mumford, M. D., & Peterson, N. G. (2003, April). *M. Scott Myers Award for Applied Research in the Workplace: O*NET perspectives: The midwives' views*. Award presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Orlando, FL.
- Brown, M. L., Sandal, D., & Reiter-Palmon, R. (2002, April). Defining work with fidelity: O*NET-centric Navy IT worker requirements. Paper presented at the Society for Industrial/Organizational Psychology, Toronto, Canada.
- Bublitz, S. T. (2007, April). *Using adaptive assessments to improve job placement*. Paper presented at the annual meeting of the Society for Industrial and Organizational Psychology, New York.

- Bublitz, S. T. (2007, April). *Using O*NET for Adaptive Career Assessments*. Paper presented at the annual meeting of the Society for Industrial and Organizational Psychology, New York.
- Campion, M. A. & Mumford, M. D. (2003, April). *How to use O*Net to do a job analysis*. Paper presented at the annual meeting of the Society for Industrial and Organizational Psychology, Orlando, FL.
- Carter, G. W., Dorsey, D. W., Incalcaterra, K. A., & Wasserman, M. E. (2002, April). O*NET and IT occupations. In R. J. Vance (Chair), *Describing IT jobs/occupations: Challenges, approaches, and implications for occupational analysis*. Symposium conducted at the Annual Conference of the Society for Industrial and Organizational Psychology, Toronto.
- Carter, G. W., Dorsey, D. W., & Johnson, J. W. (2003, April). *Linking O*NET descriptors to occupational aptitudes using job component validation*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Orlando, FL.
- Carter, G. W., Dorsey, D. W., & Niehaus, J. W. (2004, April). The use of transactional data in occupational analysis: Textmining of on-line job listings. In J. M. Ford (Chair), *Automated text analysis in I/O psychology: Research to practice*. Symposium conducted at the Annual Conference of the Society for Industrial and Organizational Psychology, Chicago.
- Cronshaw, S., Fine, S., Fleishman, E., Hakel, M., Harvey, R., & Quinones, M. (2004, April). *Things, data, and people: Fifty years of a seminal theory*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Chicago.
- Cuozzo, L. (2001). Labor market trends for technology-focused occupations and career fields: Implications for high school/high tech program operators. *National Collaborative on Work and Disability Information Brief*. Retrieved January 7, 2008, from the National Collaborative on Work and Disability Web site: http://www.ncwd-youth.info/assets/info_briefs/infobrief_issue2.pdf
- Dickter, D. N. (2005) *A validity transport procedure using O*NET job analysis information*. Paper presented at the Twentieth Annual Conference of the Society for Industrial and Organizational Psychology, Los Angeles.
- Elliott, S. W. (2007, May). *Projecting the impact of computers on work in 2030*. Presentation at the Workshop on Research Evidence Related to Future Skill Demands Center for Education, National Research Council, Washington, DC.
- Freeman, J. A., & Hirsh, B. T. (2005). *College majors and the knowledge content of jobs*. Paper presented at the 2005 Society of Labor Economics Meetings, San Francisco.
- Frillman, S. A., Homan, S. R., Kochert, J. F., Tomavic, C. L., & Wilde, K. L. (2007, June). *Entry-level engineering professionals and product lifecycle management: A competency model*. Paper presented at the International Conference on Comprehensive Product Realization. Beijing, China.
- Gibson, S. G., Harvey, R. J., & Quintela, Y. (2004, April). *Holistic versus decomposed ratings of general dimensions of work activity*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Chicago.
- Gillie, S., & Isenhour, M. G. (2005). *The educational, social, and economic value of informed and considered career decisions: America's Career Resource Network Association research-based policy guidance..* Retrieved January 2, 2008, http://esi.cc/iccd/iccd_update_2005.pdf

- Gustafson, S., Heil, S., Karman, S., Kertay, L., Mueller, L., O'Shea, P., et al. (2004, April). *The use of occupational information in disability determination contexts*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Chicago.
- Handel, M. J. (2007, May). *A new survey of workplace skills, technology, and management practices (STAMP): Background and descriptive statistics*. Paper presented at the Workshop on Research Evidence Related to Future Skill Demands, Washington, DC.
- Harvey, R. J. (2003). Applicability of binary IRT models to job analysis data. In A. Meade (Chair), *Applications of IRT for measurement in organizations*. Symposium conducted at the Annual Conference of the Society for Industrial and Organizational Psychology, Orlando, FL.
- Harvey, R. J., & Hollander, E. (2002, April). Assessing interrater agreement in the O*NET. In M. A. Wilson (Chair), *The O*NET: Mend it or end it?* Symposium conducted at the Annual Conference of the Society for Industrial and Organizational Psychology, Toronto.
- Harvey, R. & Wagner, T. (2004, April). *Job component validation using CMQ and O*NET: Assessing the additivity assumption*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Chicago.
- Henderson, J. (2007, April). *Using O*NET in Web-based job analysis*. Paper presented at the annual meeting of the Society for Industrial and Organizational Psychology, New York.
- Hirsch, B. T. (2002, April). *Why do part-time workers earn less? The role of worker and job skills*. Paper presented at the Annual Meeting of the Society of Labor Economists, Baltimore.
- Hollander, E., & Harvey, R. J. (2002, April). *Generalizability theory analysis of item-level O*NET database ratings*. In M. A. Wilson (Chair), *The O*NET: Mend it or end it?* Symposium conducted at the Annual Conference of the Society for Industrial and Organizational Psychology, Toronto.
- Hollander, E., McKinney, A. P., & Watt, A. H. (2003, April). *NBADS format: Further support to its advantages over other formats*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Orlando, FL.
- Homan, S. R., & Sandall, D. (2003, July). An analysis of the results of an occupational information network (O*NET) curriculum needs assessment performed by the faculty of the Organizational Leadership and Supervision Department at Purdue University. Paper presented at the Association of Leadership Educators Conference, Anchorage, AK.
- Jex, S., Liu, C., & Spector, P. (2004, April). *Testing job control-job strain relation with multiple data*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Chicago.
- Kim, Y. M., & Levanon, A. (2005, August). Eliminating discrimination? Effects of industrial characteristics on patterns of occupational sex segregation. Paper presented at the RC28 meeting *Inequality and Mobility in Family, School, and Work*, Los Angeles.
- Koo, J. (2005, September). *Occupation analysis for the greater Cleveland area*. Paper prepared for Cleveland State University Presidential Initiative. Retrieved January 2, 2008, from Cleveland State University Web site: http://urban.csuohio.edu/economicdevelopment/reports/occupation_analysis_report.pdf

- Lewis, P. & Rivkin, D. (2003). *Improving work life decisions: O*NET Career Exploration Tools*. Retrieved January 2, 2008, from http://www.eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED480077&ERICExtSearch_SearchType_0=no&accno=ED480077
- Lindner, J. R., & Dooley, K. E. (2001, December). *Agricultural education competencies and progress towards a doctoral degree*. Paper presented at the Annual National Agricultural Education Research Conference, New Orleans, LA.
- Milanowski, A. (2003, March). Using occupational characteristics information from O*NET to identify occupations for compensation comparisons with K–12 teachers. Paper presented at the Annual Meeting of the American Education Finance Association, Orlando, FL.
- Nathan, B. R. (2002, December). Cross-cluster analysis of workforce development needs for southwestern Pennsylvania: An analysis of O*Net and WorkKeys. Prepared for Workforce Connections, Pittsburgh, PA.
- NetAssets (2004). *Excerpts from the Dot.com job search course: Lesson 9.1, Researching occupations before your interview—Using O*NET*. Retrieved January 2, 2008, from <http://www.hrms-netassets.net/templates/template.asp?articleid=668&zoneid=9>
- Oswald, F. L. (2003, April). *How to use I.O. psychology to support organizational strategy*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Orlando.
- Oswald, F. L. (2002, April). *It's new and it's used: Applications of O*NET*. Symposium conducted at the Annual Conference of the Society for Industrial and Organizational Psychology, Toronto.
- Page, R. C., (2007, April) *Optimizing cross-cultural generalizability of an O*NET-based assessment: The Work Behavior Inventory*. PowerPoint presentation at the annual meeting of the Society for Industrial and Organizational Psychology, New York.
- Rosenbaum, J. E. (2005, May). *Educational opportunity in American society: A research agenda for studying transitions*. Paper presented at the forum Research on Improving High Schools: A Forum for Advancing the Research Agenda, Washington, DC.
- Sommers, D. (2002). The Standard Occupational Classification: Improving information for career and technical education. *In brief: Fast facts for policy and practice*. Columbus, OH: The Ohio State University National Dissemination Center.
- Sommers, D. & Austin, J. (2002). *Using O*NET in dislocated worker retraining: The Toledo Dislocated Worker Consortium Project..* Columbus, OH: Center on Education and Training for Employment.
- Takahashi, Y. & Kiyoki, Y. (2004). *A meta-level career-design support system for connecting educational and occupational databases*. Symposium on Applications and the Internet—Workshops (SAINT 2004 Workshops), Tokyo, Japan.
- Tsacoumis, S. (2007, May). *The feasibility of using O*NET to study skill changes*. Paper presented to The National Academies Center for Education, Workshop on Research Evidence Related to Future Skill Demands, Washington, DC.
- Uhalde, R. & Strohl, J. (2006). *America in the global economy, a background paper for the new commission on the skills of the American workforce*. National Center on Education and the Economy, Washington, DC.

Wagner, T. A., & Harvey, R. J. (2004, April). *Job-component validation using CMQ and O*NET: Assessing the additivity assumption*. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, Chicago.

E.5 Dissertations

Clark, C. L., (2002). Title factor structures of the O*NET occupational descriptors. (Master's thesis, North Carolina State University, 2002). *NCSU electronic theses and dissertations*, <http://www.lib.ncsu.edu/theses/available/etd-11222002-005158/>

D'Egidio, E. L. (2001). Building a job component validity model using job analysis data from the occupational information network (Doctoral dissertation, University of Houston, 2001). *Dissertation Abstracts International*, 62, 5416.

Kantrowitz, T. M. (2005). Development and construct validation of a measure of soft skills performance. (Doctoral dissertation, Georgia Institute of Technology, 2005). *Dissertation Abstracts International*, 66, 1770.

Kubisiak, U. C. (2003). The impact of different job analytic descriptors on the clustering of jobs. (Doctoral dissertation, University of South Florida, 2003). *Dissertation Abstracts International*, 64, 2426.

Lee, C. (2004). Perceived job change toward dimensions of knowledge work among three levels of employees in a Korean bank. (Doctoral dissertation, The Ohio State University, 2004). *Dissertation Abstracts International*, 66, 65 .

Levine, J. D. (2004). Use of the O*NET descriptors in numerical occupational classification: An exploratory study. (Doctoral dissertation, North Carolina State University, 2003). *Dissertation Abstracts International*, 64, 3567.

Weingarden, S. M. (2004). Executive succession, organizational performance, and charisma. (Doctoral dissertation, Wayne State University, 2004). *Dissertation Abstracts International*, 66, 3454.

Wilson, J. L. (2003) *Are analysts' occupational ability requirement ratings necessary? A look at using other occupational descriptors to capture the rating policy of analysts*. Master's thesis, North Carolina State University. Retrieved January 7, 2008, from <http://www.lib.ncsu.edu/theses/available/etd-07222003-125153/>

E.6 Reviews

Green, K. (2004). [Review of the O*NET Career Values Inventory: Based on the O*NET Work Importance Locator developed by the U.S. Department of Labor]. In Spies, R. A., & Plake, B. S. (Eds.), *The sixteenth mental measurements yearbook*. Accession Number 16182924.

Harding, R. E. (2004) [Review of the O*NET Career Values Inventory: Based on the O*NET Work Importance Locator developed by the U.S. Department of Labor]. In Spies, R. A. & Plake, B. S. (Eds.), *The sixteenth mental measurements yearbook*. Accession Number 16182924.

Michael, W. B. (2004). [Review of the O*NET Work Importance Locator]. In Spies, R. A., & Plake, B. S. (Eds.), *The sixteenth mental measurements yearbook*. Accession Number 16182940.

Sanford, E. E. (2004). [Review of the O*NET Career Interests Inventory: Based on the O*NET Interest Profiler developed by the U.S. Department of Labor]. In Spies, R. A., & Plake, B. S. (Eds.), *The sixteenth mental measurements yearbook*. Accession Number 16182925

U.S. Department of Labor and Bureau of Labor Statistics (2007, Summer). O*NET T2: Technology at work. *Occupational Outlook Quarterly*. Retrieved January 7, 2008, <http://www.bls.gov/opub/ooq/2007/summer/grabbag.pdf>

Valentine, B. (2004, February). O*NET Consortium: Occupational Information Network [Review of O*NET Web sites]. *C&RL News*. Retrieved November 23, 2007, from <http://www.ala.org/ala/acrl/acrlpubs/crlnews/internetreviews/200402/onet.cfm>

E.7 Web Sites

ACT. (2008). *WorkKeys* [O*NET database]. Retrieved January 2, 2008, from <http://www.act.org/workkeys/index.html>

American Association of Retired Persons. (2008). *Assessing yourself to get your next job* [O*NET Career Exploration Tools]. Retrieved January 2, 2008, from the AARP Web site: <http://www.aarp.org/money/careers/choosecareer/assessment/a2004-04-22-assessingyourself.html>

American Foundation for the Blind. (2007). *AFB CareerConnect* [O*NET database]. Retrieved January 2, 2008, from <http://www.afb.org/Section.asp?SectionID=7>

American Foundry Society. (2008). *Human resources links* [links to O*NET Resource Center]. Retrieved January 2, 2008, from <http://www.afsinc.org/content/view/122/>

Arizona State University Center for Research on Education in Science, Mathematics, Engineering, and Technology (CRESMET). (2007). *O*NET tools* [O*NET Career Exploration Tools]. Retrieved January 2, 2008, from http://vcc.asu.edu/o_net/index.shtml

Bridges Transitions. (2007). *Products—High school: Education and career planning* [O*NET Interest Profiler, Work Importance Locator, Ability Profiler, Spanish Interest Profiler]. Retrieved January 2, 2008, from http://www.bridges.com/us/prodnserv/educareerplan_hs.html

Business & Legal Reports. (2008). *HR.BLR.com* [O*NET database]. Retrieved January 2, 2008, from <http://hr.blr.com/tour.aspx?view=jdm>

California Career Zone. (n.d.). [O*NET Interest Profiler and Work Importance Profiler]. Retrieved January 2, 2008, from <http://www.cacareerzone.org/>

Career Consulting Corner. (2007). *O*NET dictionary assessment package* [Products based on Interest Profiler, Work Importance Locator, and O*NET database]. Available from http://www.careercc.com/shopmall/html/ONET_dictionary_assessment_package.shtml

CareerEdgeSystem.com. (2006). [A career assessment and planning Web site with the “O*NET in-it” logo]. <http://careeredgesystem.com/careeredgesystem/home.asp>

Career Kokua, Research and Statistics, Department of Labor & Industrial Relations, State of Hawai'i. (2007). *Kokua: The Hawai'i Career Information Delivery System* [O*NET database and career tools]. Retrieved January 2, 2008, from <http://www.careerkokua.org/about/>

Career Prospects System—New Mexico. (n.d.). [O*NET Interest Profiler]. Retrieved January 11, 2008, from http://www.nmcrn.state.nm.us/career/dol_interest.html

- Cascadia Community College, Bothel, WA. (2002). *Career planning tools and assessments* [Refers students to the University of Central Florida Knight Source Web site]. Retrieved January 2, 2008, from <http://www.cascadia.ctc.edu/CareerServicesCenter/careerplanningtools.asp>
- Central Michigan University. (2004). *Leadership competency model* [O*NET database]. Retrieved January 2, 2008, from http://www.chsbs.cmich.edu/leader_model/model.htm
- Centris Partners. (2008). *Guidance Direct* [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.guidancedirect.com/NonMembers/Features.asp>
- CollegeRecruiting.com. (2007). *CollegeRecruiting.com* [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.collegerecruiting.com/>
- College Search Engine* [O*NET career tools]. (n.d.). Retrieved January 2, 2008, from http://www.collegesearchengine.net/career_assessment/
- Dow Jones. (2008). *CareerJournal.com: The Wall Street Journal executive career site* [O*NET database]. Retrieved January 2, 2008, from <http://www.careerjournal.com/reports/bestcareers/20060711-method.html>
- Ere Media. (2008). *Ere.net: Recruiting intelligence, recruiting community* [Web site for recruiters; references O*NET data, especially job titles]. Retrieved January 2, 2008, from <http://www.ere.net/articles/db/BA7F90A198424CB49F87C54ACCD6A00B.asp>
- e-TESDA. (2008). *Youth profiler for starring careers: O*NET computerized (Interest Profiler)* [Company in Manila offering O*NET computerized Interest Profiler and computerized Ability Profiler]. Retrieved January 2, 2008, from <http://www.tesda.gov.ph/eTESDA/page.asp?rootID=3&sID=27&pID=12>
- Georgia Department of Labor. (n.d.). Job seekers: Assessment links. [O*NET Career Exploration Tools]. Retrieved January 2, 2008, from http://www.dol.state.ga.us/js/assessment_link.htm
- Hasse, Jim. (2008). *Three O*NET Career Exploration Tools for career counseling and planning* [O*NET Career Exploration Tools]. Retrieved January 2, 2008, from the eSight Careers Network Web site: <http://www.esight.org/View.cfm?x=1757>
- Hollandcodes.com. (2007). *Hollandcodes.com: Providing Holland code resources worldwide* [O*NET Content Model]. Retrieved January 2, 2008, from <http://www.hollandcodes.com/onet.html>
- Impact Education. (2008). *Impact education: Sharing responsibility for tomorrow*. [O*NET Career Exploration Tools]. Retrieved January 2, 2008, from <http://www.impactpartnerships.com/>
- Iseek Solutions. (2007). Iseek: Minnesota's gateway to career, education, employment and business information [O*NET OnLine and Career Exploration Tools]. Retrieved January 2, 2008, from <http://iseek.org/sv/index.jsp>
- Louisiana State University Libraries. (2007). *Researching a career* [User instruction on researching a career on O*NET OnLine]. Retrieved January 2, 2008, from <http://www.lib.lsu.edu/instruction/career/career01.html>
- Lunch-Money.com. (2007). *CollegeToolkit.com* [O*NET Interest Profiler and Work Importance Profiler]. Retrieved January 2, 2008, from <http://www.collegetoolkit.com/Career/Main.aspx>

- Mapping Your Future. (2002). *CareerShip: An online career exploration adventure* [O*NET Career Exploration Tools]. Retrieved January 2, 2008, from <http://www.mapping-your-future.org/features/careership/>
- Middle Tennessee State University. (2007). [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.mtsu.edu/>
- Midwest Association of Colleges and Employers 2006 Conference. (2006). *Rockin' with collaboration and rollin' with technology: An early intervention hit!* [bibliography; O*NET Interest Profiler technical reports]. Retrieved January 2, 2008, from http://www.mwace.org/core/contentmanager/uploads/PDFs/Annual_Conference/2006_Presentations/Rockin_with_Collaboration_and_Rollin_with_Technology_bibliography.pdf
- Missouri Economic Research and Information Center. (n.d.). *Missouri Dislocated Worker Tool* [O*NET data]. Retrieved January 2, 2008, from <http://apps.oseda.missouri.edu/MODislocatedWorker/HelpPage.aspx>
- Montana Career Information System. (n.d.). [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.nwlincs.org/mtlincs/pilotproject/career/MCIS%20WEB%20PAGES/onetinterestprofiler.htm>
- Nebraska Career Information System. (2007). *Freelists: Career assessments and interest inventories* [O*NET Interest Profiler and Work Importance Locator]. Retrieved January 2, 2008, from <http://www.freelists.org/archives/ncis/05-2006/msg00001.html>
- New York State Office of Children and Family Services/Office of Workforce Development. (2007). [O*NET Interest Profiler]. Retrieved January 2, 2008, from http://www.ocfs.state.ny.us/main/owd/portfolio/Facilitator/Attachments/Attachment_A.pdf
- Normandale Community College Counseling Department [Minnesota]. (n.d.). *Career counseling* [O*NET Interest Profiler and Work Importance Profiler]. Retrieved January 2, 2008, from <http://faculty.normandale.edu/~counseling/career.htm>
- OCOnestop.com. (n.d.). *Job skills links* [O*NET OnLine]. Retrieved January 2, 2008, from <http://www.centralonestop.com/oconestops/jobskills.htm>
- OSCAR: Occupation and Skill Computer-Assisted Research: Arkansas, Louisiana, Texas. (n.d.). [O*NET Interest Profiler and Work Importance Locator]. Retrieved January 2, 2008, from <http://www.ioscar.org/>
- Postsecondary Innovative Transition Technologies (Post-ITT). (n.d.). *Activity 18: Exploring interests with an interests inventory* [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.postitt.org/teachcourse/plan04/4-04.shtml>
- Psychometrics Canada. (2007). *Psychometrics: Building better organizations through people* [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.psychometrics.com/index.cfm>
- Salt Lake-Tooele Applied Technology College. (n.d.). *Career resources* [O*NET OnLine]. Retrieved January 2, 2008, from http://www.sltatc.org/student/resources_career.php
- Sigma Assessment Systems. (2002). *Career Directions Inventory* [O*NET database]. Retrieved January 2, 2008, from <http://cdi.wonderlic.com/default.htm>

- State of Utah. (2007). *Department of Workforce Services: Utah's job connection* [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://jobs.utah.gov/jobseeker/dwsdefault.asp>
- TestingRoom.com. (n.d.). [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.testingroom.com/>
- Texas State University–San Marcos, College of Liberal Arts, Division of Academic Affairs. (n.d.). *Online career interests tests* [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.liberalarts.txstate.edu/services/career-center/tests.html>
- Trefoil Corporation. (2008). *Occupational viewer 2000 and resume builder* [Software using O*NET data]. Retrieved January 2, 2008, from <http://trefoil.com/index.php?sectionID=256&pageID=257>
- University of Central Florida. (2007). *Knight source: First year advising and exploration* [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://soe.sdes.ucf.edu/>
- University of Oregon. (2007). *Illinois career information system* [O*NET Work Importance Locator and Interest Profiler]. Retrieved January 2, 2008, from <http://ilcis.intocareers.org/loginmain.aspx>
- Vermont Career Resource Network. (n.d.). *Vermont labor market information: Occupational information center* [O*NET database and career tools]. Retrieved January 2, 2008, from <http://www.vtlmi.info/oic.cfm>
- VocRehab.com* [O*NET database]. (2006). Retrieved January 2, 2008, from <http://www.vocrehab.com/what.htm>
- Workforce Explorer Washington* [O*NET Interest Profiler and Work Importance Locator]. (n.d.). Retrieved January 2, 2008, from <http://www.workforceexplorer.com/>
- Workforce New Jersey Public Information Network. (n.d.). [O*NET Interest Profiler]. Retrieved January 2, 2008, from <http://www.state.nj.us/education/voc/resources/tools/exploration.htm>
- WorkforceUSA.net. (2007). [O*NET Ability Profiler]. Retrieved January 2, 2008, from <http://www.workforceusa.net/>
- WorkSource Washington. (2007). [O*NET Interest Profiler, Work Importance Profiler, Skills Profiler; based on O*NET data]. Retrieved January 2, 2008, from <https://fortress.wa.gov/esd/worksource/StaticContent.aspx?Context=SkillsCenter>
- XAP Corporation. (2008). *AlabamaMentor.org* [Alabama higher-education Web site; O*NET database and career tools]. Retrieved January 2, 2008, from the Alabama higher education Web site: <http://www.alabamamentor.org/AboutMentor/>
- XAP Corporation. (2008). *CaliforniaColleges.edu: The official source for college and career planning in California* [O*NET career tools]. Retrieved January 2, 2008, from <http://www.californiacolleges.edu/career/OnetInterestSurvey/default.asp>
- XAP Corporation. (2008). *GoHigherKY.org* [Web site for college-bound students in Kentucky; O*NET database and career tools]. Retrieved January 2, 2008, from <http://www.gohigher.ky.gov/>
- XAP Corporation. (2008). *IllinoisMentor at collegezone.com* [O*NET career tools]. Retrieved January 2, 2008, from <http://www.illinoismentor.org/career/OnetInterestSurvey/default.asp>

- XAP Corporation. (2008). *MassMentor.edu: Your Internet connection to the colleges and universities in Massachusetts*. [O*NET database and career tools]. Retrieved January 2, 2008, from <http://www.massmentor.edu/>
- XAP Corporation. (2008). *MississippiMentor: Online source for higher education in Mississippi* [O*NET career tools]. Retrieved January 2, 2008, from <http://www.mississippimentor.org/career/OnetInterestSurvey/default.asp>
- XAP Corporation. (2008). *PennsylvaniaMentor: Your online connection to colleges and universities in Pennsylvania* [O*NET career tools]. Retrieved January 2, 2008, from <http://www.pennsylvaniamentor.org/career/OnetInterestSurvey/default.asp>
- XAP Corporation. (2008). *TexasMentor: Your guide to the private colleges of Texas* [O*NET career tools]. Retrieved January 2, 2008, from <http://www.texasmentor.org/career/OnetInterestSurvey/default.asp>
- XAP Corporation. (2008). *VirginiaMentor: Your online source for higher education*. [O*NET database and career tools]. Retrieved January 2, 2008, from <http://www.virginiamentor.org/>

Appendix F: Mailing Materials

Establishment Method Materials

Information Package Mailing to the Point-of-Contact

- Letter from U.S. Department of Labor
- Who What & How Brochure
- Incentives Brochure
- Selected Occupations List
- O*NET Brochure
- Association Endorsement List

Letter from U.S. Department of Labor



[Date]

Dear

You recently received a phone call from RTI about an important program called the Occupational Information Network (O*NET[®]). As the caller explained, your company has been randomly selected to participate in the O*NET Data Collection, an important program sponsored by the United States Department of Labor (DOL) and the National O*NET Consortium.

The O*NET Consortium has been charged with the challenging task of keeping information about occupations up to date in a rapidly changing U.S. workplace. Employers, human resource professionals, job seekers, trainers, and labor market analysts across the country depend on occupational information to perform their daily work. We would like your help in keeping this information current.

RTI, a non-profit research organization, is conducting this data collection effort for the DOL and the National O*NET Consortium. The information we collect from your organization will be used to update the O*NET database, the primary source of occupational information in the nation. Responses will be kept confidential. Data will not be linked to any individual employee or organization, but will only be used in summary form to describe occupations – not specific jobs.

This package includes information that explains your participation in this important project. In addition, a brochure describing O*NET information and benefits is included, as well as a list of professional associations endorsing the O*NET data collection. Finally, please accept the enclosed gift as a token of our appreciation for your consideration of these materials.

Please be assured that your participation in this effort is voluntary. The time we estimate for your participation will vary from 15 to 90 minutes over the next four to six weeks. You are encouraged to send any comments regarding this estimate of your effort, or any other aspect of this collection of information to: U.S. Department of Labor, O*NET Project, ETA/OWI, 200 Constitution Avenue NW, Mail Stop S4231, Washington, DC 20210 (refer to OMB Control Number 1205-0421).

Thank you for your time and consideration. A member of the RTI O*NET team will call you in a few days to provide additional details and answer any questions you may have.

Sincerely,

A handwritten signature in cursive script that reads "Brent R. Orrell".

Brent R. Orrell
Acting Assistant Secretary

Who What & How Brochure

Your Participation in O*NET Involves Only Three Simple Steps



Step 1: Assist Business Liaison (BL) in the employee sampling process.

The RTI Business Liaison will assist you in determining which employees in a selected occupation are chosen to receive questionnaires. In order for this process to be random and confidential, you will be asked to compile a numbered roster of the employees in each selected occupation. This will take place over a brief telephone call of about 5-10 minutes.

Step 2: Distribute questionnaires to sampled employees.

Once the employees have been sampled, we will mail questionnaire packets to you for distribution to them. Remember, it's important to retain your roster as you are the only person who knows who the questionnaires are intended to go to.

Step 3: Assist Business Liaison with follow-up activities.

Once you have received your questionnaires the BL will give you a follow-up call to see if all the materials were received and to answer any questions. In the event that not all the questionnaires are returned, we will send replacement questionnaires for you to distribute to any non-responders at your organization. The BL will keep you informed as the questionnaires are returned by the employee.

O*NET Data Collection Program: Who, What & How

An Introduction to the Occupational Information Network

Do I have to tell you the names of the employees sampled for the data collection?

No, you do not have to give us the names of your employees at any time during this study, unless you choose to have the questionnaire sent to them directly. However, if you wish, you may give us the initials of sampled employees to facilitate the distribution of materials. We will delete this information when data collection has been completed at your organization.

Will the information that we provide be kept confidential?

Absolutely! No **identifying** information about you, your company, or your company's employees will be published or released in any form to anyone outside the research team. We do not use names in our results. The data we collect from your employees will be combined with like data from other participants in order to develop a more complete and comprehensive database.

Who will contact me?

You will be called by one of O*NET's professionally-trained Business Liaisons, who will walk you through the data collection process and be available to answer your questions and concerns. Because we are committed to providing you with the highest quality of service, O*NET supervisors may monitor a sample of these calls.

If you have any questions, you can call toll-free: 1-877-233-7348, ext. 100 and Rob Stupar, O*Net Operations Center Manager, will assist you.

Will employees do this on company time?

The questionnaires used in the O*NET Data Collection Program are self-administered. The instruction sheet that is included with the questionnaire packet requests selected employees to complete the questionnaire in their “off time” from work (e.g., at home, at lunch, during a break, etc.) The research staff has no direct contact with the employees, except in the event that a selected employee has a problem or question about the questionnaire and calls our toll-free number for help.

Am I required to participate by law?

No, your participation is voluntary. However, you are a critical link in this data collection project. You have the opportunity to provide direct input to the United States Department of Labor by providing occupational information.

Is information on the O*NET Program available on the world-wide web?

Yes, it is. Information on the O*NET Data Collection Program is available online at: <http://onet.rti.org>. You can also find general information on many other O*NET programs and resources at the O*NET Resource Center website: <http://www.onetcenter.org>.

How much time is this going to take?

We estimate that the total time for your participation is only about 15 minutes to 90 minutes over the next several weeks.

It takes approximately 30 minutes for a respondent to complete an O*NET Questionnaire.

What is O*NET®?

The O*NET® acronym stands for “Occupational Information Network.” It is an automated database that replaces the Dictionary of Occupational Titles (DOT) as the nation’s primary source of occupational information. The O*NET information is available as a timely, easy-to-use database that is designed to help millions of employers, workers, educators, and students make informed decisions about education, training, career choices, and work.

What is the O*NET Data Collection Program?

The O*NET Data Collection Program is an ongoing effort to develop and maintain this unique database on the detailed characteristics of workers and occupations. The information is primarily collected directly from employees working in the occupations we are interested in. The collection of this information is designed to provide data that are valid, reliable, and current. The O*NET Data Collection Program is a critical step in the full development of O*NET.

Who is funding this program?

The United States Department of Labor (DOL) funds the O*NET Data Collection Program. You can verify this information by checking the DOL website: <http://www.doleta.gov/programs/onet>.

Who is conducting the O*NET Data Collection?

RTI is working with the United States Department of Labor (DOL) to collect these data. RTI is an independent, not-for-profit research organization located in Research Triangle Park, NC. RTI is affiliated with Duke University, the University of North Carolina at Chapel Hill, and North Carolina State University.

How did you select my company?

Your establishment was randomly selected from a list containing nearly every business and institution in the country. The participation of your business is important since the employees we select from your business will represent thousands of employees in many other businesses like yours nationwide.

Are you selling us something?

Absolutely NOT! This is not a market study and we are not selling anything. This is an opportunity for you to provide direct input to the United States Department of Labor regarding occupational data that will be used to develop a national Occupational Information Network (O*NET). O*NET is available at no cost by downloading the O*NET Database or by viewing the O*NET data using O*NET OnLine.

What are you asking me to do?

The "Three Simple Steps" on the last page of this brochure summarizes what your participation involves. Briefly, we will first ask you to assist in selecting a few employees in certain occupations in your company. Then, we will mail you questionnaire packets to distribute to the selected employees. Finally, we will ask you to help us by following up with the employees who do not respond within a few weeks time by distributing replacement questionnaires.

How many employees are you selecting in my company?

No more than 20 employees in total will be selected from your business. Usually, the number selected is less than 20.

How will my company benefit?

To express our appreciation to your company for participating, we offer your business the O*NET Toolkit for Business. This Toolkit is designed to help you use the O*NET database to simplify tasks such as writing job descriptions and planning for future human resource needs. Additionally, every company benefits from the updated national O*NET database that will be the product of the occupation information your company provides.

How will I personally benefit?

You will benefit indirectly from the improvement in the O*NET database that will be possible because of your company's participation. This up-to-date, accurate information will make tasks like writing job descriptions and determining job qualifications much easier. In addition, the person in each business who serves as our point of contact will receive an attractive desk clock and a framed Certificate of Appreciation from the U. S. Department of Labor. Another special gift – the O*NET Toolkit for Business – will be sent to you later when we mail the questionnaires.

How will the sampled employees benefit?

As our way of saying thanks, we'll provide each sampled employee with a \$10 incentive attached to their questionnaire. (The only exceptions are Federal Government employees and employees of businesses that request that no incentive be offered.) Furthermore, an improved O*NET database will benefit your employees in the long run, if they are considering a career change or improving their job skills to be able to qualify for a more specialized job.

What kinds of questions are asked of the employees?

Our survey consists of objective questions regarding the requirements and training for occupations we have identified to study at this time. You can find a complete set of questionnaires on the O*NET Data Collection Program Website at: <http://onet.rti.org>. A selected employee will receive only one of the questionnaires being used.

Incentives Brochure



*Gifts that say "Thanks for participating
in the O*NET Data Collection Program"*

*RTI International is a trade name of Research Triangle Institute.

Conducted by RTI International* for the U.S. Department of Labor and the National O*NET Consortium



Thank you very much for your help

We are very appreciative of the help you and your company are providing to the O*NET Data Collection Program. We realize your time is valuable and limited, and we are truly appreciative of your contributions to this program.

To express our appreciation, we have put together a collection of gifts for you, your company, and the employees who are selected to participate in the Program. Descriptions of these gifts are shown on the right.

We believe the most valuable benefit of your participation is the information that will be returned to you and your company through the O*NET database. Many employers access this database routinely for information on occupational characteristics, worker attributes, and job descriptions.

We hope you enjoy all these benefits of the O*NET Program. We look forward to working with you over the new few weeks as we collect occupational information from your company.

You have already received...

O*NET Desk Clock is included in this mailing.



In our next mailing to you, you will receive...



A framed Certificate of Appreciation from the U.S. Department of Labor.

A \$10 cash gift for each employee who is selected to complete the O*NET Questionnaire. The \$10 cash gift is an expression of our appreciation to the employees for completing this 30-minute questionnaire during their spare time.



In a separate mailing, your company will receive...

The O*NET Toolkit for Business. The O*NET Toolkit for Business is a free packet of information about the O*NET Program that managers can use for human resource planning, including a guide for writing job descriptions.



These gifts will be included with the questionnaires that we will ask you to distribute to the sampled employees. Each employee's \$10 gift will be enclosed in a sealed envelope containing the questionnaire.

Selected Occupations List

Selected Occupations for (NAME OF ESTABLISHMENT)

This list contains the definitions of a number of occupations that are of interest to the survey. Your O*NET representative will try to determine whether you have employees in some of these occupations in your next phone call. Please have this list available when he or she calls.

Note: Only five or fewer of the occupations listed below will actually be selected from your organization. The O*NET representative will provide further details about this when he or she calls.

1. Terrazzo Workers and Finishers:

Apply a mixture of cement, sand, pigment, or marble chips to floors, stairways, and cabinet fixtures to fashion durable and decorative surfaces.

2. Floor Layers, Except Carpet, Wood, and Hard Tiles:

Apply blocks, strips, or sheets of shock-absorbing, sound-deadening, or decorative coverings to floors.

3. Stonemasons:

Build stone structures, such as piers, walls, and abutments. Lay walks, curbstones, or special types of masonry for vats, tanks, and floors.

4. Plasterers and Stucco Masons:

Apply interior or exterior plaster, cement, stucco, or similar materials. May also set ornamental plaster.

5. Tile and Marble Setters:

Apply hard tile, marble, and wood tile to walls, floors, ceilings, and roof decks.

6. Carpet Installers:

Lay and install carpet from rolls or blocks on floors. Install padding and trim flooring materials.

7. Helpers--Electricians:

Help electricians by performing duties of lesser skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment.

8. Helpers--Carpenters:

Help carpenters by performing duties of lesser skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment.

9. Brickmasons and Blockmasons:

Lay and bind building materials, such as brick, structural tile, concrete block, cinder block, glass block, and terra-cotta block, with mortar and other substances to construct or repair walls, partitions, arches, sewers, and other structures.

10. Rough Carpenters:

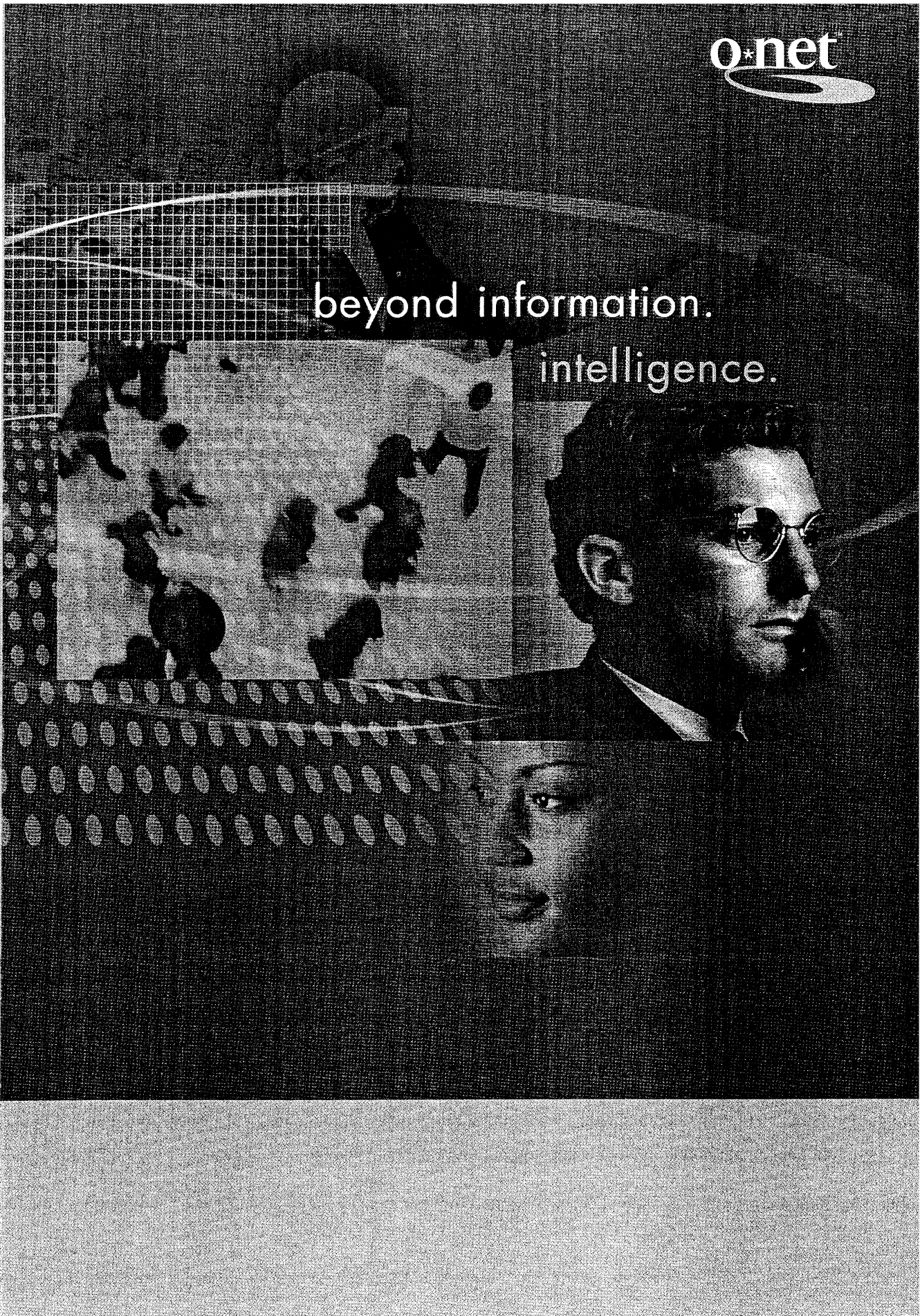
Build rough wooden structures, such as concrete forms, scaffolds, tunnel, bridge, or sewer supports, billboard signs, and temporary frame shelters, according to sketches, blueprints, or oral instructions.

O*NET Brochure



beyond information.

intelligence.



beyond information. intelligence.

Hire intelligence.

* Rapidly changing world markets and vast technological innovation. Increasing competition at home and abroad. Rising customer expectations. For employers and job seekers alike, staying competitive in today's demanding workplace means making smart choices in all employment decisions. * At the same time, occupational information is everywhere—in books, newspapers, websites, magazines, and elsewhere. But most sources only give part of the picture. Without standardization in the business of employment, compiling, customizing, and maintaining occupational data can be a cumbersome, ongoing process.

Fortunately, the business of employment just got smarter.

O*NET is a unique, powerful source for continually updated occupational information and labor market research. By using a contemporary, interactive skills-based database and a common language to describe worker skills and attributes, O*NET transforms mountains of data into precise, focused occupational intelligence that anyone can understand easily and efficiently.

WHO USES O*NET?

- HR personnel
- Training facilitators
- Students
- Workforce researchers
- Career counselors
- Efficiency experts
- Rehabilitation counselors
- Job seekers
- Software developers
- Displaced workers
- Business forecasters
- Industry analysts
- Educators at all levels
- Organizational consultants

O*NET in·it

* **See O*NET in it.** Some of the most sophisticated occupational systems in the world contain one powerful, unique ingredient: O*NET. Software and system developers can meet your specific needs by customizing O*NET's powerful, flexible data to your own organization's applications. * O*NET contains information from some of the nation's top occupational researchers and analysts. They have collected and classified this knowledge to guarantee that O*NET intelligence is accurate, current, consistent, and comprehensive.

Look for the seal. All software applications and other resources powered by O*NET data will now display the official "O*NET in·it" seal on their packaging. Look for it to find the most dynamic intelligence on today's U.S. labor market.



O*NET will help us keep our internal job descriptions, appraisals, and training up-to-date. Rather than spend our time collecting data, we will have more time to focus on developing our workforce.

—James B. McGregor,
Morgal Machine Tool Company

O*NET in action

More than a database—a solution.

O*NET integrates a powerful, relational database, a common language for job and skill descriptions, and crosswalks to other classifications systems into a complete solution for businesses, job seekers, and workforce development professionals. As the most comprehensive occupation resource available, O*NET helps workforce professionals:

DEVELOP detailed, accurate job descriptions.

IDENTIFY interest and experience requirements to align the right candidate with the right job.

DESIGN relevant career curricula and occupational skills development programs.

DEFINE success factors for promotion and advancement.

FORECAST HR requirements more effectively.

Tools you can use.

Whether it's finding and retaining the right people, developing more effective job descriptions, or just getting the most recent occupational information available, O*NET is your complete solution for keeping up with today's rapidly changing world of work. O*NET offers:

- Current, detailed information on more than 900 occupations.
- More than 450 standardized descriptors of skills, abilities, interests, knowledge, and work context.
- Standard occupational classification (SOC) coding.
- Easy-to-use interface and search menus.
- Skill-searchable occupational descriptions for more exact career targeting.
- Tools to build accurate job descriptions.
- Crosswalks to other classification systems and links to placement and labor market resources.
- Accommodation information to use as a disability counseling tool.

O*NET helps employers by giving them very current information to help in the designing of organizational, recruiting, training, and compensation systems.

—**Michael D. Bass,**
Sears Roebuck & Co.

the power of O*NET

BUSINESSES AND HR PROFESSIONALS

JOB SEEKERS

USE O*NET TO FIND—AND KEEP:

QUALIFIED JOB CANDIDATES

- Expand the pool of quality candidates for open positions.
- Develop effective job descriptions quickly and easily.
- Define employee and/or job-specific success factors.
- Align organizational development with workplace needs.
- Refine recruitment and training goals.
- Design competitive compensation and promotion systems.

A QUALITY JOB

- Find out which jobs fit with their interests, skills, and experience.
- Explore growth career profiles using the latest available labor market data.
- Research what it takes to get their dream job.
- Maximize earning potential and job satisfaction.
- Know what it takes to be successful in their field and in related occupations.

What you're **looking** for.

O*NET ORGANIZES ITS WEALTH OF INFORMATION ABOUT EACH OCCUPATION INTO SEVEN, INTERRELATED AREAS:

EXPERIENCE REQUIREMENTS	describe the education, training, skills, licensing, and experience required for entry and advancement.
OCCUPATION REQUIREMENTS	outline the typical tasks associated with each occupation or group of occupations, including specific physical, social, or structural demands on workers.
WORKER REQUIREMENTS	include individual performance factors, such as skills and knowledge, including basic skills and cross-functional skills.
WORKER CHARACTERISTICS	represent the work styles, interests, and abilities that are important to job seekers evaluating potential career opportunities.
OCCUPATION CHARACTERISTICS	include links to current labor market information on occupations, including wages, employment outlook, and industry size.
OCCUPATION SPECIFIC INFORMATION	provides comprehensive details for a single occupation or narrowly-defined job family.
RELATED OCCUPATIONS	cross-reference occupations that require similar knowledge, skills, and experience.



O*NET is brought to you by:

O*NET Project
U.S. Department of Labor
Employment and Training Administration
200 Constitution Avenue, NW, Room N5637
Washington, DC 20210

National O*NET Consortium
O*NET Center
P.O. Box 27625
Raleigh, NC 27611

www.doleta.gov/programs/onet

www.onetcenter.org

Association Endorsement List



Association Support

As a leading national and industry association, we support O*NET, the Occupational Information Network. A major initiative of the United States Department of Labor, O*NET is a database of occupation information, specifying job characteristics and worker skills and abilities.

O*NET helps employers meet human resource challenges by identifying front line skill needs. It helps employees identify skills necessary to succeed in their fields, and helps job seekers understand the skills and training they need for the jobs they want.

We urge you to complete the O*NET questionnaire. By providing this valuable information, you will help the O*NET database capture the realities of the changing American workplace and be a participant in building a national labor exchange system able to compete in the international marketplace.

a

Academy of Criminal Justice Sciences
Accrediting Council for Continuing
Education and Training
African American Women's Clergy
Association
Air Conditioning Contractors of America
Aircraft Electronics Association
Allied Pilots Association
American Academy of Actuaries
American Academy of Environmental
Engineers
American Academy of Orthotists and
Prosthetists
American Academy of Physical Medicine
and Rehabilitation
American Academy of Physician
Assistants
American Apparel and Footwear
Association
American Association for Active Lifestyles
and Fitness
American Association for Adult and
Continuing Education
American Association for Health
Education
American Association for Homecare
American Association for Leisure and
Recreation
American Association for Marriage and
Family Therapy
American Association for Respiratory
Care
American Association for Vocational
Instructional Materials
American Association of Colleges of
Pharmacy

American Association of Community
Colleges
American Association of Cosmetology
Schools
American Association of Early Childhood
Educators
American Association of Engineering
Societies
American Association of Motor Vehicle
Administrators
American Association of Museums
American Association of Psychiatric
Technicians
American Association of State Colleges
and Universities
American Association of Zoo Keepers
American Bar Association
American Business Conference
American Chemical Society
American College of Cardiology
American Composites Manufacturers
Association
American Congress on Surveying and
Mapping
American Correctional Association
American Council for Construction
Education
American Council of Life Insurers
American Counseling Association
American Culinary Federation
American Dental Assistants Association
American Design Drafting Association
American Education Finance Association
American Electronics Association
American Federation for Medical
Research

American Federation of Home Health
Agencies
American Federation of School
Administrators
American Federation of Teachers
American Financial Services Association
American Fisheries Society
American Forest & Paper Association
American Foundry Society
American Geological Institute
American Health Information
Management Association
American Historical Association
American Home Furnishings Alliance
American Hotel and Lodging Association
American Industrial Hygiene Association
American Institute for Conservation of
Historic and Artistic Works
American Institute of Aeronautics and
Astronautics
American Institute of Building Design
American Institute of Chemists
American Institute of Constructors
American Institute of Engineers
American Institute of Floral Designers
American Institute of Professional
Bookkeepers
American Insurance Association
American Jail Association
American Library Association
American Loggers Council
American Management Association
American Meat Institute
American Mental Health Counselors
Association

American Moving & Storage Association
American Optometric Association
American Pharmacists Association
American Physical Therapy Association
American Physiological Society
American Planning Association
American Probation and Parole Association
American Prosthodontic Society
American Psychological Association
American Public Gas Association
American Public Human Services Association
American Purchasing Society
American Rehabilitation Counseling Association
American Rental Association
American Road and Transportation Builders Association
American School Counselor Association
American School Health Association
American Society for Clinical Laboratory Science
American Society for Engineering Education
American Society for Engineering Management
American Society for Microbiology
American Society for Quality
American Society for Training and Development
American Society of Agronomy
American Society of Association Executives
American Society of Certified Engineering Technicians
American Society of Interior Designers
American Society of Law Enforcement Trainers
American Society of Professional Estimators
American Society of Radiologic Technologists
American Society of Sanitary Engineering
American Society of Travel Agents
American Sociological Association
American Subcontractors Association
American Therapeutic Recreation Association
American Watchmakers-Clockmakers Institute
American Water Works Association
American Zoo and Aquarium Association
America's Health Insurance Plans
Animal Behavior Society
Appraisal Institute

Appraisers Association of America
Architectural Engineering Institute of the American Society of Civil Engineers
Associated Bodywork and Massage Professionals
Associated Builders and Contractors
Associated General Contractors of America
Associated Locksmiths of America
Associated Specialty Contractors
Association for Career and Technical Education
Association for Career and Technical Education Research
Association for Childhood Education International
Association for Commuter Transportation
Association for Continuing Higher Education
Association for Financial Professionals
Association for Healthcare Documentation Integrity
Association for Library and Information Science Education
Association for Library Collections and Technical Services
Association for Professionals in Infection Control and Epidemiology
Association for the Advancement of Cost Engineering
Association of Business Support Services International
Association of Consulting Foresters of America, Inc.
Association of Credit and Collection Professionals
Association of Energy Engineers
Association of Environmental Engineering and Science Professors
Association of Equipment Management Professionals
Association of Executive and Administrative Professionals
Association of Information Technology Professionals
Association of Management Consulting Firms
Association of Master of Business Administration Executives
Association of Minority Health Professions Schools
Association of Oncology Social Work
Association of Sales and Marketing Companies
Association of School Business Officials International

Association of Schools of Allied Health Professions
Association of Surgical Technologists
Association of the Wall and Ceiling Industry
Association of Women in the Metal Industries
Association of Women Soil Scientists
Automotive Maintenance and Repair Association

b-h

Belt Association
Biomedical Engineering Society
Biotechnology Industry Organization
Blow-in-Blanket Contractors Association
Bread Bakers Guild of America
Brotherhood of Shoe and Allied Craftsmen
Business Marketing Association
Business Professionals of America
California Fashion Association
Ceilings and Interior Systems Construction Association
Center for Book Arts
Ceramic Tile Institute of America
Chamber of Shipping of America
Chartered Property Casualty Underwriters Society
Commercial Vehicle Training Association
Community Transportation Association of America
CompTIA
Construction Management Association of America
Consumer Electronics Association
Contact Lens Manufacturers Association
Council for American Private Education
Council of Fashion Designers of America
Council of Industrial Boiler Owners
Council of Supply Chain Management Professionals
Crane Certification Association of America
Crop Science Society of America
Custom Electronic Design and Installation Association
Dangerous Goods Advisory Council
Deck Industry Association
Dietary Managers Association
Drug and Alcohol Testing Industry Association
Edison Welding Institute
Editorial Freelancers Association
Electronics Technicians Association International

Employee Benefit Research Institute
Energy Council of the Northeast
Fabricators & Manufacturers Association
International
Federal Resource Center for Special
Education
Federation of Tax Administrators
Flexographic Technical Association
Floor Covering Installation Contractors
Association
Foodservice Consultants Society
International
Forest Resources Association
Forging Industry Association
Gases and Welding Distributors
Association
Graphic Artists Guild
Graphic Arts Technical Foundation &
Affiliates
Group Underwriters Association of
America
Healthcare Distribution Management
Association
Home Care Aide Association of America
Home Healthcare Nurses Association
Hospice Association of America
Hospitality Business Alliance

i-k

IEEE (Institute of Electrical and
Electronics Engineers)
IEEE Aerospace and Electronic Systems
Society
IEEE Computer Society
IEEE Engineering in Medicine and
Biology Society
IEEE Engineering Management Society
Independent Automotive Damage
Appraisers Association
Industrial Designers Society of America
Information Systems Audit and Control
Association
Information Technology Association of
America
Inland Marine Underwriters Association
Institute for Certification of Computing
Professionals
Institute for Operations Research and the
Management Sciences
Institute for Supply Management
Institute of Environmental Sciences and
Technology
Institute of Industrial Engineers
Institute of Management Accountants
Institute of Management Consultants
USA
Institute of Packaging Professionals

Insurance Information Institute
International Association for Computer
Information Systems
International Association of Administrative
Professionals
International Association of Arson
Investigators
International Association of Asian Studies
International Association of Campus Law
Enforcement Administrators
International Association of Fire Chiefs
International Association of Foundation
Drilling
International Association of Workforce
Professionals
International Disk Drive Equipment and
Materials Association
International Economic Development
Council
International Executive Housekeeping
Association
International Federation of Professional
and Technical Engineers
International Fire Marshals Association
International Interior Design Association
International Maintenance Institute
International Masonry Institute
International Plant Propagators' Society
International Public Management
Association for Human Resources
International Ticketing Association
International Union of Bakers and
Bakers-Confectioners
International Union of Bricklayers and
Allied Craftworkers
International Union of Painters and Allied
Trades
International Union of Police Associations
International Warehouse Logistics
Association
Ironworker Management Progressive
Action Cooperative Trust
Irrigation Association
Jewelers of America
Jewelry Information Center
Kitchen Cabinet Manufacturers
Association

m-n

Machinery Dealers National Association
Manufactured Housing Institute
Marine Technology Society
Marketing Research Association
Mason Contractors Association of
America
Material Handling Equipment Distributors
Association

Metals Service Center Institute
Metropolitan Burglar and Fire Alarm
Association
Minerals, Metals, and Materials Society
Modular Building Institute
NALS
National Academy of Opticianry
National Academy of Sciences
National Alliance of Business
National Association for Business
Economics
National Association for Equal
Opportunity in Higher Education
National Association for Girls and Women
in Sport
National Association for Home Care and
Hospice
National Association for Practical Nurse
Education and Service
National Association for Printing
Leadership
National Association for Sport and
Physical Education
National Association of African American
Studies
National Association of Child Care
Professionals
National Association of Child Care
Resource and Referral Agencies
National Association of Construction
Boilermaker Employers
National Association of Counties
National Association of County Surveyors
National Association of Emergency
Medical Technicians
National Association of Environmental
Professionals
National Association of Geoscience
Teachers
National Association of Health
Underwriters
National Association of Hispanic and
Latino Studies
National Association of Independent
Insurance Adjusters
National Association of Independent
Publishers
National Association of Legal Assistants
National Association of Manufacturers
National Association of Native American
Studies
National Association of Professional
Employer Organizations
National Association of Sales and
Marketing Agencies
National Association of School
Psychologists
National Association of Service Managers
National Association of Social Workers

National Association of State Directors of Career Technical Education Consortium
National Athletic Trainers' Association
National Bicycle Dealers Association
National Blacksmiths and Weldors Association
National Burglar and Fire Alarm Association
National Business Education Association
National Career Development Association
National Center for Manufacturing Sciences
National Center for Simulation
National Cleaners Association
National Concrete Masonry Association
National Cosmetology Association
National Council for Advanced Manufacturing
National Council of Agricultural Employers
National Council of Teachers of English
National Council of Teachers of Mathematics
National Criminal Justice Association
National Dance Association
National Dental Assistants Association
National Dental Association
National Earth Science Teachers Association
National Elevator Industry, Inc.
National Employment Counseling Association
National Environmental Health Association
National Farmers Union
National Federation of Licensed Practical Nurses
National Freight Transportation Association
National Funeral Directors Association
National Glass Association
National Hardwood Lumber Association
National High School Association
National Human Resources Association
National Institute for Automotive Service Excellence
National Institute for Literacy
National Institute for Metalworking Skills
National Jewelers Association
National Judges Association
National League of Postmasters of the United States
National Management Association
National Maritime Education and Training Association
National Paralegal Association
National Propane Gas Association

National Railroad Construction and Maintenance Association
National Registry of Environmental Professionals
National Rehabilitation Counseling Association
National Retail Federation
National Roofing Contractors Association
National Science and Technology Education Partnership
National Society of Professional Surveyors
National Stone, Sand and Gravel Association
National Terrazzo and Mosaic Association
National Therapeutic Recreation Society
National Tile Contractors Association
National Tooling and Machining Association
National Tour Association
National Training and Simulation Association
National Utility Contractors Association
National Wheel and Rim Association
Network and System Professionals Association
Network Professional Association
New York Academy of Sciences

O-S

Outdoor Power Equipment Aftermarket Association
Owner-Operator Independent Drivers Association
Packaging and Label Gravure Association
Painting & Decorating Contractors of America
Pedorthic Footwear Association
Plastic and Metal Products Manufacturers Association
Pleaters, Stitchers & Embroiderers Association
Plumbing-Heating-Cooling Contractors National Association
Precision Machined Products Association
Precision Machined Products Association Educational Foundation
Precision Metalforming Association
Precision Metalforming Association Educational Foundation
Printing Industries of America & Affiliates
Professional Association of Custom Clothiers
Professional Caddie Association
Professional Landcare Network

Professional Managers Association
Property Casualty Insurers Association of America
Refractory Ceramic Fibers Coalition
Refrigeration Service Engineers Society
Retail Bakers of America
Risk Management Association
Society for Experimental Biology and Medicine
Society for Foodservice Management
Society for Protective Coatings
Society for Technical Communication
Society of Allied Weight Engineers
Society of American Archivists
Society of American Florists
Society of American Foresters
Society of Computer Professionals
Society of Fire Protection Engineers
Society of Manufacturing Engineers
Society of Naval Architects and Marine Engineers
Society of Petroleum Engineers
Society of Professional Benefit Administrators
Soil Science Society of America
SOLE—The International Society of Logistics
Specialty Graphic Imaging Association
Structural Insulated Panel Association

t-w

Telecommunications Industry Association
Tooling and Manufacturing Association
Transportation Intermediaries Association
Tree Care Industry Association
Tube and Pipe Association International
Tubular Piping Association
United Brotherhood of Carpenters and Joiners of America
United Council on Welfare Fraud
United Professional Sales Association
United States Tour Operators Association
Water Environment Federation
Western Dredging Association
Wildlife Disease Association
Wood Flooring Manufacturers Association
Wood Moulding and Millwork Producers Association
World International Nail and Beauty Association
World Leisure and Recreation Association

Mailing to POC with Questionnaire Packets for Selected Employees

- RTI Letter to POC to Accompany Questionnaire
- Example POC Memo to Employees

RTI Letter to POC to Accompany Questionnaires



3040 Cornwallis Road ■ PO Box 12194 ■ Research Triangle Park, NC 27709-2194 ■ USA

[CURRENT RTI LETTER TO POC TO ACCOMPANY QUESTIONNAIRES]

[DATE]

[NAME OF POC]
[COMPANY NAME]
[COMPANY ADDRESS]

Dear [NAME OF POC]:

As we recently discussed on the telephone, enclosed are the questionnaire packets for the employees who were sampled to participate in the O*NET[®] Data Collection Program. Please distribute the packets to the appropriate employees as soon as possible.

Note that the label affixed to each envelope includes the occupation, line number and initials of the employee (optional) from the roster you created for each occupation. Please use the roster as a guide to ensure that each employee receives the correct envelope.

To encourage a high level of response from the employees, we have prepared the attached example memorandum that you can send to each employee to show your support for the Program. We hope you will consider modifying this memorandum as you wish and distributing it along with the questionnaire packets. Call me at the number below if you would like me to send an electronic copy of the memo to you.

We sincerely appreciate your company's support of this important program and hope that our sincere thanks is communicated to each employee receiving a packet. We realize that their participation is completely voluntary and that their time is valuable.

Finally, as a token of our appreciation for your efforts, we have enclosed a Certificate of Appreciation from the U.S. Department of Labor in your name. Also enclosed is a frame for the certificate. Your personal efforts in support of this important national data collection program are recognized and sincerely appreciated by the U.S. Department of Labor, as well as the entire O*NET Project Team.

We will contact you again in the near future to see if you need any additional support. In the meantime, feel free to contact me toll free at 1-877-233-7348, ext. [BL EXTENSION], any time I can be of assistance.

Sincerely,

[NAME OF BL]
Business Liaison

Enclosure

Example POC Memo to Employees

Company Letterhead

MEMORANDUM

DATE:

TO: [SELECTED EMPLOYEE]

FROM: [POINT OF CONTACT]

SUBJECT: Occupational Information Network (O*NET[®]) Data Collection Program

Our company has been invited by the U.S. Department of Labor to participate in an important national project called the O*NET Data Collection Program. The purpose of this study is to collect information on the knowledge, skills, and competencies required for individuals in various occupations. Results of this data collection effort will be used to update a national database on occupations called the Occupational Information Network (O*NET), our nation's primary source of information on jobs.

You have been randomly identified to participate in this program as part of a national sample. Your responses to the enclosed questionnaire are very important because they will represent many other employees nationwide who also work in your occupation. I encourage you to complete the questionnaire and return it as soon as you can. However, your participation is completely voluntary and will in no way affect your employment.

Also, please be assured that your responses will be kept strictly confidential and your name will not be associated with your individual responses. As you will note from the instructions provided in the questionnaire packet, your completed questionnaire should be returned directly to RTI, the survey organization collecting the data. An addressed, postage-paid envelope is enclosed in the packet of materials for this purpose. Neither I, nor anyone else in the company, will ever see or have access to your answers.

Thank you very much for attending to this request. I hope you will complete the questionnaire and return it to RTI in the next few days. If you have questions about it, please contact me.

Selected Employee Package

- RTI Letter to Accompany Questionnaire (With \$10 Incentive)
- RTI Letter to Accompany Questionnaire (Without \$10 Incentive)
- Instructions for Completing the Web Version of the O*NET Questionnaire

**RTI Letter to Accompany Questionnaire
(With \$10 Incentive)**



[DATE]

Dear Madam or Sir,

On behalf of the U.S. Department of Labor and the National Occupational Information Network (O*NET[®]) Consortium, I am requesting your participation in the O*NET Data Collection Program. This important data collection effort is being undertaken to update the O*NET database, our nation's primary source of occupational information. RTI, a non-profit research organization, is conducting this data collection effort for the U.S. Department of Labor and the National O*NET Consortium. We are collecting data from randomly sampled workers in businesses all across the United States.

Your company has agreed to participate in the O*NET Data Collection Program. One of your co-workers, [NAME OF POC], is helping RTI to randomly sample employees to be invited to participate in this important program.

To participate, please complete the questionnaire enclosed with this letter and return it to us in the enclosed stamped envelope. It should only take about 30 minutes to complete. We also ask that you do this on your own time, not company time. We have enclosed \$10, which is yours to keep as an expression of our appreciation for your time.

Your participation is completely voluntary. You can skip over any question you do not want to answer. Your responses are returned directly to RTI, where your answers will be kept completely confidential and will not affect your employment in any way. Neither your name nor your company's name will be associated with your response. Data will only be used in summary form to describe occupations - not specific jobs or the individuals performing them.

We have enclosed an O*NET brochure that will answer many questions you have about the O*NET program. If you have access to the Internet, you may wish to complete the questionnaire on our web site at <http://onet.rti.org>. We have enclosed instructions to assist you with that. If you have further questions about this request, please contact Chris Ellis, Data Collection Task Leader, toll-free at RTI at 1-800-334-8571, ext 2-6480.

Thank you for your help with the O*NET project. The participation of businesses and employees across the country will ensure that all occupational information contained in the O*NET system is accurate and useful to business, educators, and individuals exploring careers.

Sincerely,

Michael F. Weeks
O*NET Project Director

Enclosure

**RTI Letter to Accompany Questionnaire
(Without \$10 Incentive)**



[DATE]

Dear Madam or Sir,

On behalf of the U.S. Department of Labor and the National Occupational Information Network (O*NET[®]) Consortium, I am requesting your participation in the O*NET Data Collection Program. This important data collection effort is being undertaken to update the O*NET database, our nation's primary source of occupational information. RTI, a non-profit research organization, is conducting this data collection effort for the U.S. Department of Labor and the National O*NET Consortium. We are collecting data from randomly sampled workers in businesses all across the United States.

Your company has agreed to participate in the O*NET Data Collection Program. One of your co-workers, [NAME OF POC], is helping RTI to randomly sample employees to be invited to participate in this important program.

To participate, please complete the questionnaire enclosed with this letter and return it to us in the enclosed stamped envelope. It should only take about 30 minutes to complete. We also ask that you do this on your own time, not company time. We sincerely appreciate your taking the time to help us in this important effort.

Your participation is completely voluntary. You can skip over any question you do not want to answer. Your responses are returned directly to RTI, where your answers will be kept completely confidential and will not affect your employment in any way. Neither your name nor your company's name will be associated with your response. Data will only be used in summary form to describe occupations, not specific jobs or the individuals performing them.

We have enclosed an O*NET brochure that will answer many questions you have about the O*NET program. If you have access to the Internet, you may wish to complete the questionnaire on our web site at <http://onet.rti.org>. We have enclosed instructions to assist you with that. If you have further questions about this request, please contact Chris Ellis, Data Collection Task Leader, toll-free at RTI at 1-800-334-8571, ext 2-6480.

Thank you again for your help with the O*NET project. The participation of businesses and employees across the country will ensure that all occupational information contained in the O*NET system is accurate and useful to business, educators, and individuals exploring careers.

Sincerely,

Michael F. Weeks
O*NET Project Director

Enclosure

Instructions for Completing the Web Version



Instructions for Completing the Web Version of the O*NET[®] Questionnaire

You can complete the questionnaire *online*, if you prefer. Just follow these simple steps.

- Step 1.** Go to the web address <http://onet.rti.org>.
- Step 2.** Click on the Login link to gain access to the questionnaire.
- Step 3.** Enter your **Web site username** and **Web site password**. This information can be found in the upper-right corner of the front cover of the questionnaire booklet that you received.
- Step 4.** Click on **OK**. Once you are logged in, you will receive further instructions on completing the questionnaire.

Please be assured that your online responses are completely secure and are protected by the same technology used by businesses to secure credit card numbers.

If you have any problems accessing the web site, please call 1-877-233-7348, ext. 100. Technical assistance is available through this toll free number Monday through Friday between 8:30 AM and 5:00 PM Eastern Time. You can also email your technical questions to onethelp@rti.org.

If you have any other questions about the survey, please call Mr. Chris Ellis at RTI toll free at 1-800-334-8571 ext 2-6480 from Monday through Friday between 8:30 AM and 5:00 PM Eastern Time. If you prefer, you can email him at ellis@rti.org.

**Thank you again for your participation in the
O*NET Data Collection Program!**

Occupation Expert Method Materials

- Letter to Occupation Expert from U.S. Department of Labor
- RTI Letter to Occupation Expert to Accompany Questionnaire (with \$40 Incentive)
- RTI Letter to Occupation Expert to Accompany Questionnaire (without \$40 Incentive)
- Occupation Expert Method Who What & How Brochure
- Association Endorsement List
- Instructions for Completing Occupation Expert Web Version

**Letter to Occupation Expert from
U.S. Department Of Labor**



(DATE)

(OE NAME)

(ADDRESS)

(ADDRESS)

(ADDRESS)

Dear (OE NAME):

You recently received a phone call from RTI about an important program called the Occupational Information Network (O*NET[®]). As the caller explained, the U.S. Department of Labor is requesting your assistance with the O*NET program. The program serves employers, human resource professionals, job seekers, trainers, and labor market analysts nationwide who depend on occupational information to perform their daily work. Individuals who are exploring and planning careers also use O*NET information. We would like your help to keep this information current.

You have been identified as an occupation expert for the occupation of (occupation name). As a participating expert, you will be asked to complete O*NET questionnaires on the knowledge areas, work activities, work context factors, and tasks common to the occupation; we also ask for some background information about you. To express our appreciation for your expert contribution to this effort, you will receive a payment of \$40 and a framed Certificate of Appreciation from the U.S. Department of Labor. These items will be included when we mail the questionnaires to you. You can either complete the paper questionnaires and mail them back to RTI in the postage-paid envelope they will provide, or you may complete the questionnaires online using unique login credentials provided on each questionnaire cover.

Your participation in this effort is voluntary, yet participation by you and other occupation experts is vital to the success of this important program. A member of the RTI O*NET team will call you in a few days to provide additional details and answer any questions you may have. Thank you for your time and consideration.

Sincerely,

A handwritten signature in black ink that reads "Pamela H. Frugoli".

Pamela Frugoli
O*NET/SKILL Assessment Team Lead
Office of Workforce Investment

**RTI Letter to Occupation Expert to Accompany
Questionnaire (with \$40 Incentive)**



3040 Cornwallis Road • PO Box 12194 • Research Triangle Park, NC 27709-2194 • USA

OE RTI letter to accompany questionnaires - Version with \$40

(DATE)

(OE NAME)

(ADDRESS)

(ADDRESS)

(ADDRESS)

Dear (OE NAME):

Thank you for agreeing to participate in the O*NET[®] Data Collection Program as an occupation expert for the occupation of [occupation name]. We greatly appreciate your contribution of expertise concerning this occupation. As we recently discussed on the telephone, enclosed you will find the O*NET questionnaires, a postage-paid return envelope, \$40 in cash, and a framed Certificate of Appreciation from the U.S. Department of Labor. If you have access to the Internet, you may wish to complete the questionnaires online at <http://onet.rti.org>. In your questionnaire packet, you will find instructions for responding online.

Your responses will be kept confidential. The questionnaires have an identification number for mailing and tracking purposes only. Your responses will be combined with those of other experts in this occupation and will be reported in summary form only.

Participation by you and other occupation experts is invaluable to the accuracy and usefulness of information in the O*NET database, from which educators, business professionals, counselors, researchers, and career seekers benefit. **Please complete the questionnaires in the order indicated on the questionnaire cover**, in as many sittings as your schedule requires. If you have further questions about the O*NET program or the questionnaires, please contact me toll-free at 877-233-7348, ext. [BL extension].

Thank you for completing and returning the questionnaires at your earliest convenience.

Sincerely,

[BL Name]

Business Liaison

**RTI Letter to Occupation Expert to Accompany
Questionnaire (without \$40 Incentive)**



OE RTI letter to accompany questionnaires - Version without \$40

(DATE)

(OE NAME)
(ADDRESS)
(ADDRESS)
(ADDRESS)

Dear (OE):

Thank you for agreeing to participate in the O*NET® Data Collection Program as an occupation expert for the occupation of [occupation name]. We greatly appreciate your contribution of expertise concerning this occupation. As we recently discussed on the telephone, enclosed you will find the O*NET questionnaires, a postage-paid return envelope, and a framed Certificate of Appreciation from the U.S. Department of Labor. If you have access to the Internet, you may wish to complete the questionnaires online at <http://onet.rti.org>. In your questionnaire packet, you will find instructions for responding online.

Your responses will be kept confidential. The questionnaires have an identification number for mailing and tracking purposes only. Your responses will be combined with those of other experts in this occupation and will be reported in summary form only.

Participation by you and other occupation experts is invaluable to the accuracy and usefulness of information in the O*NET database, from which educators, business professionals, counselors, researchers, and career seekers benefit. **Please complete the questionnaires in the order indicated on the questionnaire cover**, in as many sittings as your schedule requires. If you have further questions about the O*NET program or the questionnaires, please contact me toll-free at 877-233-7348, ext. [BL extension].

Thank you for completing and returning the questionnaires at your earliest convenience.

Sincerely,

[BL Name]
Business Liaison

**Occupation Expert Method
Who What & How Brochure**



Your Participation in O*NET Involves Only Three Simple Steps

Step 1: Ensure all O*NET questionnaires on the packing list are enclosed within the box.

Review the materials in the box you receive to ensure all of the O*NET questionnaires are enclosed. The covers for the questionnaires are different colors and are labeled according to their content and the order in which they should be completed.

Step 2: Complete the O*NET questionnaires.

Please complete the O*NET questionnaires in the order indicated on the Post-it® on the cover of the questionnaires. In order to maximize the quality of the data, we have pre-assigned the order of the questionnaires. Please complete the questionnaires in that order. Work at your own pace, in as many sittings as your schedule requires. You may wish to complete the questionnaires online at <http://onet.rti.org>. Your unique login credentials are printed in the upper-right corner of each printed questionnaire cover.

Step 3: Return the O*NET questionnaires in the enclosed postage-paid return envelope.

After completing the O*NET questionnaires, please return them in the postage-paid return envelope. Before sealing the envelope, please review the checklist located on the back of the return envelope.

O*NET Data Collection Program: Who, What & How An Introduction to the Occupational Information Network

Form: OE 01/2008

Find out more at <http://onet.rti.org>.

How will I personally benefit?

As our way of saying thanks for completing and returning the O*NET questionnaires, we will send you \$40 in cash and a framed Certificate of Appreciation from the U.S. Department of Labor (if you wish, you may decline the gifts). These items will arrive in a package with the O*NET questionnaires. In addition, you will benefit from the improvement in the O*NET database. Millions of people nationwide will better understand the occupation with the up-to-date, accurate information that you provide.

Who will contact me?

You will be called by one of O*NET's professionally-trained Business Liaisons, who will walk you through the data collection process and be available to address your questions and concerns. Because we are committed to providing you with the highest quality of service, O*NET supervisors may monitor a sample of these calls.

If you have questions, you can call toll-free: 1-877-233-7348, ext. 100, and Rob Stupar, O*NET Operations Center Manager, will assist you.

Is information on the O*NET Program available on the World Wide Web?

Yes. General information on many O*NET programs and resources can be found at the O*NET Resource Center website: <http://www.onetcenter.org>.

Will the information that I provide be kept confidential?

Absolutely! No identifying information about you will be published or released in any form to anyone outside the research team. We do not use names in our results. Your data will be combined with data from other occupation experts in order to develop a more complete and comprehensive database.

Am I required by law to participate?

Your participation is voluntary. However, you are a critical link in this data collection program. This is an opportunity to provide direct input to the United States Department of Labor by providing occupational information.

Are you selling me something?

Absolutely NOT! This is not a market study and we are not selling anything. O*NET information is available at no cost by downloading the O*NET Database or by viewing the O*NET data using O*NET Online (<http://online.onetcenter.org>).

Find out more at <http://onet.rti.org>.

What is O*NET®?

The O*NET® acronym stands for “Occupational Information Network.” It is an automated database that replaces the Dictionary of Occupational Titles (DOT) as the nation’s primary source of occupational information. O*NET information is available as a timely, easy-to-use database designed to help millions of employers, workers, educators, and students make informed decisions about education, training, career choices, and work.

What is the O*NET Data Collection Program?

The O*NET Data Collection Program is an ongoing effort to develop and maintain this unique database on the detailed characteristics of workers and occupations. The information is primarily collected from employees working within selected organizations. Occupation experts are providing information for some occupations. The collection of this information is designed to provide data that are valid, reliable, and current. The O*NET Data Collection Program is a critical step in the full development of O*NET.

Who is funding this program?

The United States Department of Labor (DOL) funds the O*NET Data Collection Program. You may verify this information by checking the DOL website: <http://www.doleta.gov/programs/onet>.

Find out more at <http://onet.rti.org>.

Who is conducting the O*NET Data Collection?

RTI International is working with the United States Department of Labor (DOL) to collect these data. RTI International is an independent, not-for-profit research organization located in Research Triangle Park, NC. RTI is affiliated with Duke University, the University of North Carolina at Chapel Hill, and North Carolina State University.

What is an occupation expert?

An occupation expert is a person who has several years of experience and training in an occupation. He or she has the expert knowledge required to respond to questions about the skills, knowledge and activities required for work in the occupation.

How did you get my name?

Occupation experts are identified by contacting professional associations and educational institutions related to the occupation.

What kinds of questions will I be asked?

The questionnaires consist of objective questions about the activities, work context, training, and other aspects of work within an occupation.

Why should I participate?

Your participation is important because your responses, combined with the responses of other experts, will describe your occupation to millions of job seekers, educators, career counselors, human resource professionals, and labor market analysts.

What are you asking me to do?

The “Three Simple Steps” on the last page of this brochure summarizes your participation. Briefly, we will ask you to carefully complete several questionnaires in a certain order and return them to RTI in the postage-paid return envelope provided. If you have access to the Internet, you may wish to complete the questionnaires on our Web site. In your questionnaire packet, we will enclose instructions for responding online.

Can I complete the questionnaires online?

Absolutely. Each of the paper questionnaires sent to you is also available via our secure Web site, <http://onet.rti.org>. As an identified occupation expert, you will be issued login credentials to allow you to access Web versions of the questionnaires. These unique credentials (username and password) are printed on the cover of each paper questionnaire for ease of reference.

Association Endorsement List



Association Support

As a leading national and industry association, we support O*NET, the Occupational Information Network. A major initiative of the United States Department of Labor, O*NET is a database of occupation information, specifying job characteristics and worker skills and abilities.

O*NET helps employers meet human resource challenges by identifying front line skill needs. It helps employees identify skills necessary to succeed in their fields, and helps job seekers understand the skills and training they need for the jobs they want.

We urge you to complete the O*NET questionnaire. By providing this valuable information, you will help the O*NET database capture the realities of the changing American workplace and be a participant in building a national labor exchange system able to compete in the international marketplace.

a

Academy of Criminal Justice Sciences
 Accrediting Council for Continuing Education and Training
 African American Women's Clergy Association
 Air Conditioning Contractors of America
 Aircraft Electronics Association
 Allied Pilots Association
 American Academy of Actuaries
 American Academy of Environmental Engineers
 American Academy of Orthotists and Prosthetists
 American Academy of Physical Medicine and Rehabilitation
 American Academy of Physician Assistants
 American Apparel and Footwear Association
 American Association for Active Lifestyles and Fitness
 American Association for Adult and Continuing Education
 American Association for Health Education
 American Association for Homecare
 American Association for Leisure and Recreation
 American Association for Marriage and Family Therapy
 American Association for Respiratory Care
 American Association for Vocational Instructional Materials
 American Association of Colleges of Pharmacy

American Association of Community Colleges
 American Association of Cosmetology Schools
 American Association of Early Childhood Educators
 American Association of Engineering Societies
 American Association of Motor Vehicle Administrators
 American Association of Museums
 American Association of Psychiatric Technicians
 American Association of State Colleges and Universities
 American Association of Zoo Keepers
 American Bar Association
 American Business Conference
 American Chemical Society
 American College of Cardiology
 American Composites Manufacturers Association
 American Congress on Surveying and Mapping
 American Correctional Association
 American Council for Construction Education
 American Council of Life Insurers
 American Counseling Association
 American Culinary Federation
 American Dental Assistants Association
 American Design Drafting Association
 American Education Finance Association
 American Electronics Association
 American Federation for Medical Research

American Federation of Home Health Agencies
 American Federation of School Administrators
 American Federation of Teachers
 American Financial Services Association
 American Fisheries Society
 American Forest & Paper Association
 American Foundry Society
 American Geological Institute
 American Health Information Management Association
 American Historical Association
 American Home Furnishings Alliance
 American Hotel and Lodging Association
 American Industrial Hygiene Association
 American Institute for Conservation of Historic and Artistic Works
 American Institute of Aeronautics and Astronautics
 American Institute of Building Design
 American Institute of Chemists
 American Institute of Constructors
 American Institute of Engineers
 American Institute of Floral Designers
 American Institute of Professional Bookkeepers
 American Insurance Association
 American Jail Association
 American Library Association
 American Loggers Council
 American Management Association
 American Meat Institute
 American Mental Health Counselors Association

American Moving & Storage Association
American Optometric Association
American Pharmacists Association
American Physical Therapy Association
American Physiological Society
American Planning Association
American Probation and Parole Association
American Prosthodontic Society
American Psychological Association
American Public Gas Association
American Public Human Services Association
American Purchasing Society
American Rehabilitation Counseling Association
American Rental Association
American Road and Transportation Builders Association
American School Counselor Association
American School Health Association
American Society for Clinical Laboratory Science
American Society for Engineering Education
American Society for Engineering Management
American Society for Microbiology
American Society for Quality
American Society for Training and Development
American Society of Agronomy
American Society of Association Executives
American Society of Certified Engineering Technicians
American Society of Interior Designers
American Society of Law Enforcement Trainers
American Society of Professional Estimators
American Society of Radiologic Technologists
American Society of Sanitary Engineering
American Society of Travel Agents
American Sociological Association
American Subcontractors Association
American Therapeutic Recreation Association
American Watchmakers-Clockmakers Institute
American Water Works Association
American Zoo and Aquarium Association
America's Health Insurance Plans
Animal Behavior Society
Appraisal Institute

Appraisers Association of America
Architectural Engineering Institute of the American Society of Civil Engineers
Associated Bodywork and Massage Professionals
Associated Builders and Contractors
Associated General Contractors of America
Associated Locksmiths of America
Associated Specialty Contractors
Association for Career and Technical Education
Association for Career and Technical Education Research
Association for Childhood Education International
Association for Commuter Transportation
Association for Continuing Higher Education
Association for Financial Professionals
Association for Healthcare Documentation Integrity
Association for Library and Information Science Education
Association for Library Collections and Technical Services
Association for Professionals in Infection Control and Epidemiology
Association for the Advancement of Cost Engineering
Association of Business Support Services International
Association of Consulting Foresters of America, Inc.
Association of Credit and Collection Professionals
Association of Energy Engineers
Association of Environmental Engineering and Science Professors
Association of Equipment Management Professionals
Association of Executive and Administrative Professionals
Association of Information Technology Professionals
Association of Management Consulting Firms
Association of Master of Business Administration Executives
Association of Minority Health Professions Schools
Association of Oncology Social Work
Association of Sales and Marketing Companies
Association of School Business Officials International

Association of Schools of Allied Health Professions
Association of Surgical Technologists
Association of the Wall and Ceiling Industry
Association of Women in the Metal Industries
Association of Women Soil Scientists
Automotive Maintenance and Repair Association

b-h

Belt Association
Biomedical Engineering Society
Biotechnology Industry Organization
Blow-in-Blanket Contractors Association
Bread Bakers Guild of America
Brotherhood of Shoe and Allied Craftsmen
Business Marketing Association
Business Professionals of America
California Fashion Association
Ceilings and Interior Systems Construction Association
Center for Book Arts
Ceramic Tile Institute of America
Chamber of Shipping of America
Chartered Property Casualty Underwriters Society
Commercial Vehicle Training Association
Community Transportation Association of America
CompTIA
Construction Management Association of America
Consumer Electronics Association
Contact Lens Manufacturers Association
Council for American Private Education
Council of Fashion Designers of America
Council of Industrial Boiler Owners
Council of Supply Chain Management Professionals
Crane Certification Association of America
Crop Science Society of America
Custom Electronic Design and Installation Association
Dangerous Goods Advisory Council
Deck Industry Association
Dietary Managers Association
Drug and Alcohol Testing Industry Association
Edison Welding Institute
Editorial Freelancers Association
Electronics Technicians Association International



Employee Benefit Research Institute
 Energy Council of the Northeast
 Fabricators & Manufacturers Association
 International
 Federal Resource Center for Special
 Education
 Federation of Tax Administrators
 Flexographic Technical Association
 Floor Covering Installation Contractors
 Association
 Foodservice Consultants Society
 International
 Forest Resources Association
 Forging Industry Association
 Gases and Welding Distributors
 Association
 Graphic Artists Guild
 Graphic Arts Technical Foundation &
 Affiliates
 Group Underwriters Association of
 America
 Healthcare Distribution Management
 Association
 Home Care Aide Association of America
 Home Healthcare Nurses Association
 Hospice Association of America
 Hospitality Business Alliance

i-k

IEEE (Institute of Electrical and
 Electronics Engineers)
 IEEE Aerospace and Electronic Systems
 Society
 IEEE Computer Society
 IEEE Engineering in Medicine and
 Biology Society
 IEEE Engineering Management Society
 Independent Automotive Damage
 Appraisers Association
 Industrial Designers Society of America
 Information Systems Audit and Control
 Association
 Information Technology Association of
 America
 Inland Marine Underwriters Association
 Institute for Certification of Computing
 Professionals
 Institute for Operations Research and the
 Management Sciences
 Institute for Supply Management
 Institute of Environmental Sciences and
 Technology
 Institute of Industrial Engineers
 Institute of Management Accountants
 Institute of Management Consultants
 USA
 Institute of Packaging Professionals

Insurance Information Institute
 International Association for Computer
 Information Systems
 International Association of Administrative
 Professionals
 International Association of Arson
 Investigators
 International Association of Asian Studies
 International Association of Campus Law
 Enforcement Administrators
 International Association of Fire Chiefs
 International Association of Foundation
 Drilling
 International Association of Workforce
 Professionals
 International Disk Drive Equipment and
 Materials Association
 International Economic Development
 Council
 International Executive Housekeeping
 Association
 International Federation of Professional
 and Technical Engineers
 International Fire Marshals Association
 International Interior Design Association
 International Maintenance Institute
 International Masonry Institute
 International Plant Propagators' Society
 International Public Management
 Association for Human Resources
 International Ticketing Association
 International Union of Bakers and
 Bakers-Confectioners
 International Union of Bricklayers and
 Allied Craftworkers
 International Union of Painters and Allied
 Trades
 International Union of Police Associations
 International Warehouse Logistics
 Association
 Ironworker Management Progressive
 Action Cooperative Trust
 Irrigation Association
 Jewelers of America
 Jewelry Information Center
 Kitchen Cabinet Manufacturers
 Association

m-n

Machinery Dealers National Association
 Manufactured Housing Institute
 Marine Technology Society
 Marketing Research Association
 Mason Contractors Association of
 America
 Material Handling Equipment Distributors
 Association

Metals Service Center Institute
 Metropolitan Burglar and Fire Alarm
 Association
 Minerals, Metals, and Materials Society
 Modular Building Institute
 NALS
 National Academy of Opticianry
 National Academy of Sciences
 National Alliance of Business
 National Association for Business
 Economics
 National Association for Equal
 Opportunity in Higher Education
 National Association for Girls and Women
 in Sport
 National Association for Home Care and
 Hospice
 National Association for Practical Nurse
 Education and Service
 National Association for Printing
 Leadership
 National Association for Sport and
 Physical Education
 National Association of African American
 Studies
 National Association of Child Care
 Professionals
 National Association of Child Care
 Resource and Referral Agencies
 National Association of Construction
 Boilermaker Employers
 National Association of Counties
 National Association of County Surveyors
 National Association of Emergency
 Medical Technicians
 National Association of Environmental
 Professionals
 National Association of Geoscience
 Teachers
 National Association of Health
 Underwriters
 National Association of Hispanic and
 Latino Studies
 National Association of Independent
 Insurance Adjusters
 National Association of Independent
 Publishers
 National Association of Legal Assistants
 National Association of Manufacturers
 National Association of Native American
 Studies
 National Association of Professional
 Employer Organizations
 National Association of Sales and
 Marketing Agencies
 National Association of School
 Psychologists
 National Association of Service Managers
 National Association of Social Workers



National Association of State Directors of Career Technical Education Consortium
National Athletic Trainers' Association
National Bicycle Dealers Association
National Blacksmiths and Weldors Association
National Burglar and Fire Alarm Association
National Business Education Association
National Career Development Association
National Center for Manufacturing Sciences
National Center for Simulation
National Cleaners Association
National Concrete Masonry Association
National Cosmetology Association
National Council for Advanced Manufacturing
National Council of Agricultural Employers
National Council of Teachers of English
National Council of Teachers of Mathematics
National Criminal Justice Association
National Dance Association
National Dental Assistants Association
National Dental Association
National Earth Science Teachers Association
National Elevator Industry, Inc
National Employment Counseling Association
National Environmental Health Association
National Farmers Union
National Federation of Licensed Practical Nurses
National Freight Transportation Association
National Funeral Directors Association
National Glass Association
National Hardwood Lumber Association
National High School Association
National Human Resources Association
National Institute for Automotive Service Excellence
National Institute for Literacy
National Institute for Metalworking Skills
National Jewelers Association
National Judges Association
National League of Postmasters of the United States
National Management Association
National Maritime Education and Training Association
National Paralegal Association
National Propane Gas Association

National Railroad Construction and Maintenance Association
National Registry of Environmental Professionals
National Rehabilitation Counseling Association
National Retail Federation
National Roofing Contractors Association
National Science and Technology Education Partnership
National Society of Professional Surveyors
National Stone, Sand and Gravel Association
National Terrazzo and Mosaic Association
National Therapeutic Recreation Society
National Tile Contractors Association
National Tooling and Machining Association
National Tour Association
National Training and Simulation Association
National Utility Contractors Association
National Wheel and Rim Association
Network and System Professionals Association
Network Professional Association
New York Academy of Sciences

O-S

Outdoor Power Equipment Aftermarket Association
Owner-Operator Independent Drivers Association
Packaging and Label Gravure Association
Painting & Decorating Contractors of America
Pedorthic Footwear Association
Plastic and Metal Products Manufacturers Association
Pleaters, Stitchers & Embroiderers Association
Plumbing-Heating-Cooling Contractors National Association
Precision Machined Products Association
Precision Machined Products Association Educational Foundation
Precision Metalforming Association
Precision Metalforming Association Educational Foundation
Printing Industries of America & Affiliates
Professional Association of Custom Clothiers
Professional Caddie Association
Professional Landcare Network

Professional Managers Association
Property Casualty Insurers Association of America
Refractory Ceramic Fibers Coalition
Refrigeration Service Engineers Society
Retail Bakers of America
Risk Management Association
Society for Experimental Biology and Medicine
Society for Foodservice Management
Society for Protective Coatings
Society for Technical Communication
Society of Allied Weight Engineers
Society of American Archivists
Society of American Florists
Society of American Foresters
Society of Computer Professionals
Society of Fire Protection Engineers
Society of Manufacturing Engineers
Society of Naval Architects and Marine Engineers
Society of Petroleum Engineers
Society of Professional Benefit Administrators
Soil Science Society of America
SOLE—The International Society of Logistics
Specialty Graphic Imaging Association
Structural Insulated Panel Association

t-w

Telecommunications Industry Association
Tooling and Manufacturing Association
Transportation Intermediaries Association
Tree Care Industry Association
Tube and Pipe Association International
Tubular Piping Association
United Brotherhood of Carpenters and Joiners of America
United Council on Welfare Fraud
United Professional Sales Association
United States Tour Operators Association
Water Environment Federation
Western Dredging Association
Wildlife Disease Association
Wood Flooring Manufacturers Association
Wood Moulding and Millwork Producers Association
World International Nail and Beauty Association
World Leisure and Recreation Association

**Instructions for Completing Occupation Expert
Web Version**



Instructions for Completing O*NET[®] Occupation Expert Questionnaires Online

Username: [FILL HERE]
Password: [FILL HERE]

You can complete the questionnaires *online*, if you prefer. Just follow these simple steps.

- Step 1.** Go to the Web address <http://onet.rti.org>.
- Step 2.** Click on the Login link to gain access to the questionnaires.
- Step 3.** Enter your **Username** and **Password**. This information can be found above or in the upper-right corner of the front cover of any one of the questionnaire booklets that you received.
- Step 4.** Click on **OK**. Once you are logged in, you will receive further instructions on completing the questionnaires.

Please be assured that your online responses are completely secure and are protected by the same technology used by businesses to secure credit card numbers.

If you have any problems accessing the Web site, please call 1-877-233-7348, ext. 100. Technical assistance is available through this toll free number Monday through Friday between 8:30 AM and 5:00 PM Eastern Time. You can also email your technical questions to onethelp@rti.org.

If you have any other questions about the survey, please call Mr. Chris Ellis at RTI toll free at 1-800-334-8571, ext 2-6480 from Monday through Friday between 8:30 AM and 5:00 PM Eastern Time. If you prefer, you can email him at ellis@rti.org.

**Thank you again for your participation in the
O*NET Data Collection Program!**

Appendix G: Paper on Model-Aided Sampling for the O*NET Data Collection Program¹

¹ Berzofsky, M. E., Welch, B., Williams, R. L., & Biemer, P. P. (2006). Using a model-assisted sampling paradigm instead of a traditional sampling paradigm in a nationally representative establishment survey. *Proceedings of the American Statistical Association, Section on Survey Research Methods*, 2763–2770.

Using a Model-Assisted Sampling Paradigm instead of a Traditional Sampling Paradigm in a Nationally Representative Establishment Survey

Marcus Berzofsky,¹ Brandon Welch,¹ Rick Williams,¹ and Paul Biemer¹
¹RTI International

Key Words: traditional sampling, model-based sampling, quota sampling, business establishment surveys, O*NET

1. Introduction

1.1 Two Sampling Paradigms

Historically, the sampling of finite populations has been conducted with one of two methods: a probability-based approach or a pure model-based approach (Moser, 1952; Moser & Stuart, 1953). For large, federally funded surveys, the probability-based approach, as defined by Neyman (1934), has been deemed the superior of the two methods by the statistical community (Kish, 1965). However, in situations where the population of interest is difficult to find or the sample size is very small, a third approach may be best. This approach, called *Model-Assisted Sampling* (MAS), combines traditional probability sampling with quota sampling and may be viewed as a type of model-based sampling. It can be highly effective in providing results that allow inference to the general population while controlling costs (Sudman, 1966). This paper describes the application of MAS to the Occupation Information Network (O*NET) Data Collection Program and evaluates how it compares with probability-based sampling. We also consider the utility of MAS in future iterations of the O*NET program.

Before defining MAS, it is important to review the key elements of the traditional sampling paradigm and contrast them with the model-based sampling paradigm. In particular, we consider the sample selection mechanism and all requirements associated with it, the data collection requirements, the types of inference that can be made, and the basis for these inferences.

If the population of interest is well defined, then the usual approach is to design the sample so that the selected units are in some sense representative of the whole population (Smith, 1983). Both traditional sampling and model-based sampling strive for this but accomplish it in very different manners. The traditional sampling paradigm requires that a precise specification of the sampling frame be made and that its coverage of the population of interest be acceptable (King, 1985). In traditional sampling, the sample can support inference only to the population implied by the sampling frame (Deming, 1960). Therefore, to minimize coverage bias, the sampling frame should have a high coverage level of the population of interest. Furthermore, under traditional sampling, the sampling units must be selected from the frame under a random process with known probabilities of selection (King, 1985).

Random selection is the central tenet of the traditional paradigm and the process by which representativeness and population inference is justified.

Under model-based sampling, a model is used to define the distribution of the target population (Stephenson, 1979) with respect to the variables of interest. The model is usually defined by quotas for subgroups or cells based on the cross-classification of known demographic information relevant to the outcome of interest. Examples of quota cells include geographic region by age and, in the case of business establishments, by the industry in which the business operates. Moser and Stuart (1953) point out that the quotas can be either “independent,” which means that the quotas are based on the marginal distribution, or “interrelated,” which means that the quota requirements are made for each cross-classified subgroup. In either case no frame is explicitly required; however, knowledge of the population of interest is required for proper specification of the sampling distribution (Deville, 1991; Moser, 1952). Either a frame or another external source of information can be used for this purpose. Because a predefined model is being used to determine the sampling distribution of respondents, there are no coverage requirements for the sample. If the model assumptions hold, there is no bias in the estimates produced (Deville, 1991). Moreover, the model-based sampling paradigm does not require known selection probabilities or even random sampling. Once the quotas are defined, essentially any sampling method can be used to identify and select sample members for each quota cell (Moser, 1952).

Thus, the requirements for data collection differ greatly between the two paradigms. Under the traditional paradigm, rigid controls of field procedures are specified so that the sampling instructions are properly executed and any interviewer effects on response are minimized. In carrying out the sampling instructions, interviewers must complete data collection on the entire sample, regardless of the achieved response rate, and conduct callbacks sufficient to reduce the proportion of nonrespondents and minimize the impact of nonresponse on the survey results (King, 1985). Conversely, the model-based sampling paradigm allows data collection to stop in a particular quota cell once the quota is met. In addition, interviewers are allowed great flexibility in how they collect the data. Callbacks and other attempts to recontact nonrespondents are not required, so long as the quota requirements are achieved (Moser, 1952).

Because of the differences in sample selection and data collection methods, the two paradigms also differ from one another in methods for analysis. The traditional paradigm uses randomization to allow the creation of probability-

based weights to represent the entire frame population; it argues that, even if the achieved sample is not proportionally representative, the use of survey weights minimizes any potential bias. Furthermore, standard errors are used to express the level of precision of the survey estimates. Under the model-based sampling paradigm, inference is based on a superpopulation model, which King (1983) and Deville (1991) argue can be made if the a priori sampling distribution is achieved during data collection. Deville even defines a variance estimator for quota samples, and previously Moser and Stuart (1953) defined a “standard error” for quota sample designs using resampling methods. Furthermore, although the model-based sampling paradigm does not use probability-based weights, it often incorporates poststratification for making descriptive inferences to a specific population (Smith, 1983).

Although these two paradigms appear to be diametrically different and incompatible, the model-based sampling paradigm is often used to complement more traditional methods as the last sampling technique used in a multistage stratified survey (Deville, 1991). Here we empirically examine the accuracy of a MAS design that combines elements of both paradigms for estimates obtained in the O*NET program.

1.2 Application to the O*NET Data Collection Program

The O*NET project is a survey of workers contacted through a nationally representative business establishment survey that produces estimates for more than 800 occupations in the United States, across four occupational domains—skills, work context, work activities, and knowledge. Hence, O*NET is simultaneously conducting over 3,200 surveys. The O*NET program differs from most large-scale surveys in that it is targeting a large number of subpopulations, which yields a large number of completed questionnaires in aggregate, but at the occupation-by-domain level the sample sizes are relatively small. Furthermore, with limited empirical information, predicting eligibility and response rates for each of these subpopulations is difficult. Thus, it is problematic to accurately determine the number of sampling units to release in order to obtain the desired number of responses.

The current data collection began in 2001 and has compiled information by more than 110,000 survey respondents. To date, estimates have been derived under the traditional paradigm for more than 700 of the 810 occupations at the national level, with an average of 144 questionnaires collected per occupation (median = 117). For each occupation, information across each of the four occupational domains—skills, work context, work activities, and knowledge—is collected, with each respondent completing a questionnaire for one domain. The goal of the current data collection for a particular occupation is to complete a minimum of 15 questionnaires per domain for a total of 60 completed questionnaires. Of

the occupations that have completed data collection, an average of 36 (median = 29) questionnaires per occupation by occupational domain have been collected. Within each domain, the O*NET program collects information on the importance of an occupational attribute (e.g., reading comprehension) on a 5-point scale, the level of need for that attribute on a 7-point scale, and estimates of proportions for “mark-all-that-apply” questions.

The sample design is a traditional multistage design that first selects establishments and then selects employees in the occupations of interest for the selected establishments. Selected employees may complete the survey by mailed paper instrument or by Web instrument. The design takes advantage of the correlation in the industries for which occupations are employed by collecting data on several occupations at a time. Currently, this design follows the guidelines of the traditional paradigm. Although the current design is effective in identifying persons of interest in aggregate, the sample size for a particular occupation by domain can be highly variable, depending on the ease with which that occupation is found in the population. This variability causes an inequality in the number of questionnaires collected across occupations.

One of the constraints on the O*NET program is the number of public burden hours approved by the Office of Management and Budget. As data collection progressed, it was observed that for some occupations a higher than desired sample size was obtained. For example, occupations, such as Secretaries, which are found in many industries, were more easily found than many others and would return a larger than desired number of questionnaires. In order to make the best use of the available burden hours, it was necessary to control the number of completed questionnaires. We found that a small number of occupations completed a large number of questionnaires and disproportionately used burden hours. Unlike other large-scale surveys, the O*NET program’s large number of targeted subpopulations makes it particularly sensitive to excessive burden and cost involving any one subpopulation. In such situations, after the initial sampling units are drawn, the traditional paradigm does not provide much flexibility for sample modifications to help limit overproduction of respondents. It is therefore of interest to incorporate methods that can help control the sample sizes across occupations while ensuring that the questionnaires collected still represent the occupation of interest.

MAS, as defined for this study, incorporates a sample selection mechanism from a traditional sampling paradigm, uses data collection techniques from both paradigms, and uses analysis techniques from a model-based sampling paradigm. Our approach proposes continuation of the random, multistage design to select employees in the occupations of interest, in order to ensure that no selection bias occurs. However, before sample selection, a sampling

distribution, in the form of quotas, is defined for each occupation, based on the distribution of the occupation by region, establishment size, and industry groupings for which the occupation is employed. Furthermore, during data collection a strict protocol is used to identify and contact establishments, as dictated by a traditional sampling paradigm, including multiple contact attempts to minimize nonresponse bias. Unlike the traditional paradigm, however, once enough questionnaires are projected to be completed in a quota cell for an occupation, further sampling contacts in that cell for that occupation cease. Once all quota cells are met, data collection is stopped for the entire occupation, whether or not data collection on all selected business establishments has been completed. At this point, weighted survey estimates using poststratification weights to known population totals are created for inference to the population. Here we hypothesize that estimates for occupations created under MAS will not significantly differ from the estimates created under the current traditional paradigm.

1.3 Other Studies of MAS

In the 1950s, statisticians treated the two sampling paradigms dichotomously and argued the merits of each. Leading proponents of the model-based sampling paradigm were based in England and led by Moser and Stuart (1953), and Stephan and McCarthy (1979). Proponents of the traditional sampling paradigm argued that model-based sampling led to biased results (Kish, 1965). Moser (1952) countered that, although model-based sampling may be biased with regard to certain characteristics, it may be quite satisfactory for others. The quality of estimates produced through model-based sampling depends on the model used to derive the sampling quotas. If the model holds, model-based sampling will likely give good estimates of the population quantity, but if it does not then the estimates may be badly biased (Lohr, 1999). In fact, Moser and Stuart found in their experiments comparing the traditional paradigm and the model-based paradigm few major differences in the results. However, Moser and Stuart admit that there is no theoretical evidence to suggest that model-based sampling will always produce estimates as unbiased as those from traditional sampling.

In order to bridge the theoretical gap, statisticians began developing hybrid approaches. Sudman (1966) developed “probability sampling with quotas.” Under this design, the probability of respondents’ being available to be interviewed defines the quota for each cell. Interviewers comply, as well, with tighter controls on how survey participants are selected; however, rules are relaxed regarding number of callbacks an interviewer must make to a selected sampling unit. In empirical testing, Sudman found that estimates under this design resembled estimates

determined by traditional sampling methods. Stephenson also (1979) empirically compared “probability sampling with quotas” to traditional sampling, finding, as Sudman suggested, that it behaves much like traditional sampling, with no detectable bias for most questionnaire items. He cautioned, however, that it carries greater risk of bias due to exclusion of people who are hard to find or interview.

More recently, statisticians have argued that nonprobability samples can be analyzed through model-based inference. Smith (1983) demonstrated how a model-based approach to inference allows one to analyze nonrandom sampling in a formal way while making explicit the underlying assumptions. Smith argues that randomization is advantageous in model-based designs, not necessarily because it is essential, but because the scientific community will find the design more acceptable. Moreover, Smith advocates the use of poststratification in model-based designs when the goal is to make inference to a specific population. King (1985) used a Bayesian model based on prior information to determine the allocation of a model-based design. King determined that the classes used to define quotas had to be highly correlated to the outcome of interest in order to ensure nearly unbiased results. He concluded that the researcher must ascertain agreement between model-based sampling results and traditional sampling results before he or she implements a model-based design.

Hybrid designs have also been implemented to ensure a representative sample when response rates are expected to be very low. Sanzo, Garcia-Calabuig, Audicana, and Dehesa (1993) used a combination of random sampling and model-based sampling to estimate the prevalence of *Coxiella burnetii* infection within a region in northern Spain. Under this design, the investigators used stratified random sampling to select health care centers. However, because of concerns about an expected low response rate during the second stage of selection, the investigators derived age and gender quotas that would make the results representative of the population. Once the investigators filled a particular quota cell, they stopped collecting data in that cell. After the completion of all cells, the investigators stopped data collection.

Another recent hybrid design is multiple inverse sampling (MIS) proposed by Chang, Liu, and Han (1998). This design partitions the population into two or more subpopulations with known sizes. MIS is effective when one of these subpopulations is rare and it would be undesirable to obtain no or very few responses from the rare subpopulation. MIS selects sampling units one at a time, without replacement, until the predetermined sample sizes are obtained for all subpopulations. Through simulations, Chang et al. found that MIS is reasonably efficient when compared to simple random sampling.

2. Methods

2.1 Data

Data collected for the O*NET program were used to compare, from 79 occupations, estimates derived under each of the two sampling paradigms. Of all 810 occupations, these 79 were a representative cross section based on the educational requirements of each occupation and its relative rarity in the population. For each occupation, estimates were created for 36 items. These items spanned all four domain questionnaires and all question types (e.g., 5-point and 7-point types, and estimates of proportions). Therefore, our analysis consisted of 2,844 occupations by item-level estimates.

2.2 Quota Definitions

The first step in the MAS design is to define the model by which each occupation will be defined. This model should be based on known attributes of the occupation and incorporate characteristics that help explain all aspects of the occupation. For the O*NET project, three classifications were used to define the model: industry division, Census region, and number of employees, as shown in Table 1. MAS uses “marginal quotas with unequal rates” to represent the occupation and define each class (Deville, 1991). Under this design, the marginal totals for each subgroup must be met, but no constraints are made on the joint distribution between classes.

Table 1. MAS Quota Classifications

Industry division	
▪ Agricultural, Forestry, and Fishing	
▪ Wholesale Trade	
▪ Mining	
▪ Retail Trade	
▪ Construction	
▪ Finance, Insurance, and Real Estate (FIRE)	
▪ Manufacturing	
▪ Services	
▪ Transportation, Communications, Electric, Gas, and Sanitary Services	
▪ Government (Federal, State, and Local)	
Census region	
▪ Northeast	▪ Midwest
▪ South	▪ West
Number of employees	
▪ Unknown, 1–24	▪ 250 or more
▪ 25–249	

The industry division quotas are defined first according to the proportional distribution of employment in an occupation as found in the Occupational Employment Statistics (OES) Survey conducted by the U.S. Bureau of

Labor Statistics. For each occupation, the quota for particular industries may be altered to allow for “overrepresentation” in that cell (Deville, 1991). Furthermore, small industry cells for an occupation are collapsed into a single cell. These adjustments are done to allow for a more cost-efficient data collection process and to reduce respondent burden. Once the industry quotas are determined, the region and establishment size quotas are defined according to the industries’ distribution in the Dun and Bradstreet (D&B) frame. Because of the right-skewed distribution of size of establishments (i.e., number of employees), further “overrepresentation” is made in the “250 or more” employees cell to ensure that it is represented. Within each class, the quotas sum to 60, the desired sample size for each occupation.

2.3 Simulation, Stopping Rules, and Collapsing Rules

In order to create MAS estimates, a simulation using existing data was conducted to determine which questionnaires would have been collected had a MAS design been used. The O*NET program is primarily a mail survey (questionnaires are mailed to potential respondents at their place of employment). Because of this design, a lag exists between selection and response. Therefore, the stopping of a quota cell must be based on the projected number of respondents from those selected. Thus, the date a potential respondent was selected was used as the basis for inclusion in the MAS estimate, instead of the date a questionnaire was returned. In other words, the simulation was performed by ordering questionnaires according to the date they were mailed. Respondents were included chronologically, and cumulative tally counts were generated by occupational domain, region, business size (number of employees), and industry division.

Under the simulation, stopping rules were created to determine when a quota cell should be stopped. Moreover, minimum quotas for each cell were set, in case the targeted quota could not be achieved. Because it was not known whether the choice in stopping rule, minimum quota level, and the manner by which the collapsed industry cell was created would affect the MAS estimates, a sensitivity analysis was incorporated into the study evaluation. For each rule, two criteria were defined. The combination of these criteria gives a total of eight stopping rules. Table 2 outlines the criteria used to define the eight different rules by which the simulation was conducted.

Under MAS, establishments and employees are selected under the same procedures currently being used in the traditional paradigm. The first point at which MAS differs from the current design is after a questionnaire is mailed to an employee. Thus, the purpose of the simulation was to determine which questionnaires would have been collected had a MAS design been in place. The stopping rules were used to determine when to stop the simulation

Table 2. Rules Used in Sensitivity Analysis

Minimum Quota Rules	Stopping Quota Cell Rules	Collapsing Quota Rules (Industry Class Only)
1. 5 completed questionnaires in the cell.	1. Stop cell if projected no. of completed questionnaires exceeds the quota plus 5.	1. Collapse cell if quota is less than 10.
2. 5 completed questionnaires allocation based on OES distribution is less than 25; 10 completed questionnaires otherwise.	2. Stop cell if projected no. of completed questionnaires exceeds the quota plus 10.	2. Collapse cell if quota is less than 15.

for a particular quota cell. Because MAS has a marginal design, if a stop rule was met for a cell, then all remaining completed questionnaires from that cell would not be included, even if they were needed to fill cells in the other two classes. The simulation was complete if 20 questionnaires were collected in each domain and the minimum cell counts were met for all quota cells.

Once the MAS respondents were determined, point estimates were created for all the items being analyzed. In order to help minimize potential bias, a poststratification weight based on OES information was applied. This process was conducted for each of the eight stopping or collapsing rules.

2.4 Analysis

For each stopping or collapsing rule, we used two statistical methods to compare the simulated MAS estimates to the published traditional estimates. For MAS-to-traditional comparisons, analyses were performed on three different item types: means of 5-point and 7-point scales, and estimates of proportions. Additional analyses were also performed by the occupation’s education-level category to verify that MAS was not biased for particular occupation types. Two education-level categories were created: less than bachelor’s degree, including vocational degree, and bachelor’s degree or above required.

Substantive confidence bands were the primary tools used to compare simulated MAS estimates with traditional estimates. Based on O*NET research findings, the variation around 5-point item estimates is approximately 0.5 to 1.0 scale points, whereas variation around 7-point item estimates is approximately 1.0 to 1.5 scale points (Mumford, Peterson, & Childs, 1997). In other words, the population estimate is within one point or 1.5 points of the traditional estimate for 5-point and 7-point scale items, respectively. We concluded that using substantive limits for 5-point and 7-point items to compare the MAS estimates with the traditional estimates was more meaningful than using statistical confidence intervals.

Thus, we define substantive confidence limits in the following manner: For 5-point and 7-point scale items, define μ_M as the mean item by occupation value under the MAS process, and $\hat{\mu}_M$ as its corresponding estimate. Similarly define μ_T as the item-by-occupation mean under

the traditional approach, with $\hat{\mu}_T$ as its corresponding estimate. Define

$$\hat{\mu}_T \pm 1 \text{ and } \hat{\mu}_T \pm 1.5$$

as substantive confidence limits for 5-point and 7-point scale items, respectively. If $\hat{\mu}_M$ fell outside the substantive limit, then the MAS estimate was substantively different from the traditional estimate.

On the basis of a review of the literature, for estimates of proportions no substantive limit was known; therefore, we used statistical confidence bands to determine a statistically significant difference between MAS and traditional estimates. In order to standardize this difference for all estimates, we used the mean sample size, \bar{n} , for each item when we calculated the half width of a 95% confidence interval, as if all estimates were based on a sample size of \bar{n} . Thus, the confidence limit for estimates of this type was calculated by the following formula:

$$\hat{p}_T \pm z_{0.025} \sqrt{\frac{\hat{p}_T(1-\hat{p}_T)}{\bar{n}}},$$

where \hat{p}_T is the estimated proportion under the traditional sampling design.

In addition to confidence limits, effect sizes were computed for each occupation and item. For 5-point and 7-point scale items, the effect size was defined as

$$d = \frac{|\hat{\mu}_M - \hat{\mu}_T|}{\hat{\sigma}_T}.$$

For estimates of proportions, we used the chi-square equivalent to calculate the effect size as described by Cohen (1988). The effect size standardizes the difference between the two means, using the standard deviation estimated under the traditional design. We compared the effect sizes to a standard normal distribution and determined the percentage of items falling outside its inter-quartile range (IQR) of a standard normal distribution. A small percentage of estimates falling outside the IQR would indicate that the traditional estimates and the MAS estimates were similar.

3. Results

3.1 Sensitivity Analysis

Results from comparing each of the eight quota stopping or collapsing rules yielded no significant differences. For 5-point items, the percentage of items that fell outside the 1-point substantive band did not differ between methods by more than 0.5%. Similarly, the percentage of estimates that fell outside the IQR was never more than 0.4% different. In addition, the results for the 7-point items and the estimates of proportions never deviated by more than 0.5% for any two sets of rules. Therefore, it was determined that the choice in stopping rule, minimum quota rule, and collapsing rule did not bias the results produced under MAS. Thus, the most flexible rule was selected, which set a minimum quota of 5, allowed quota cells to exceed the targeted quota by 10 questionnaires, and provided that industry cells be collapsed into one cell if their quota was less than 15.

3.2 Substantive Limits, Statistical Confidence Bands, and Effect Sizes

Overall there were not significant differences between estimates generated by each method. For 5-point items, 99.84% of items fell within the 1-point substantive band. For 7-point items, 99.58% of estimates fell within the 1.5-point substantive band. Figure 1 illustrates how almost all occupation-by-item data points fall within substantive bands for 5-point and 7-point items. Similar results for 5-point and 7-point items were found in the analysis of effect sizes. In this analysis 97.93% of 5-point items and 97.44%

of 7-point items fell within the IQR when compared to the traditional estimates. These results suggest no statistical difference between the two methods for 5-point and 7-point items. For estimates of proportions, 88.7% of estimates fell within the statistical confidence intervals, and 89.22% of estimates fell within the IQR when compared to the traditional estimates.

3.3 Impact on Burden

Under the traditional paradigm, the 79 occupations in the analysis produced 15,871 completed questionnaires. However, under MAS these occupations produced only 6,583 completed questionnaires. Table 3 illustrates the amount of employee burden saved because of MAS. This table indicates that the number of burden hours expended by respondents would decrease by more than 50%. Thus, MAS would reduce the burden hours and associated cost for future occupations studied in the O*NET program.

4. Discussion

Similar to the goal of the other hybrid designs discussed in the introduction, the intent of MAS (as implemented in this paper) was to retain as many of the probabilistic features underlying the traditional sampling paradigm as possible while incorporating quota cells to minimize any bias induced by the cutoff sampling rules. MAS departs from the traditional paradigm in two key areas. First, once the randomly selected sample was released to the field, interviewers proceeded to fill quota cells defined by the MAS model. As quotas were achieved for some cells, interviewing shifted to other cells until the specified criteria

Figure 1. Substantive Confidence Bands for 5-Point and 7-Point Items

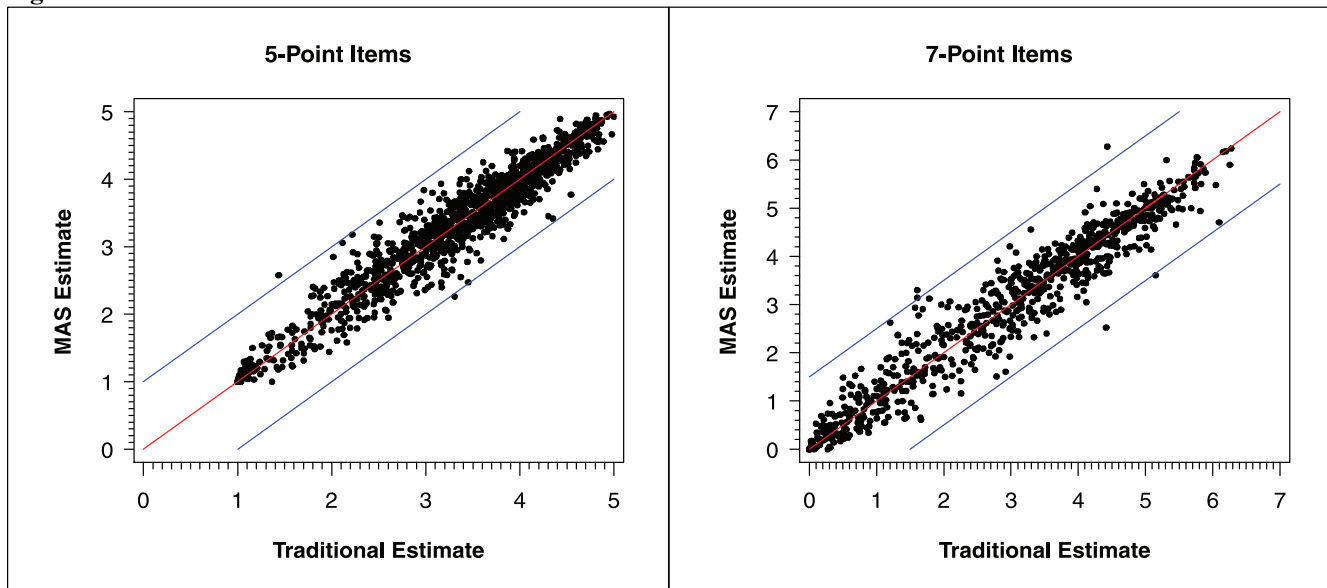


Table 3. Impact to Employee Burden Due to MAS for 79 Analyzed Occupations

A. Estimated burden hours per responding employee	0.5
B. Number of completed questionnaires under traditional paradigm	15,871
C. Burden hours under traditional Paradigm (A * B)	7,935.5
D. Number of completed questionnaires under MAS Paradigm	6,583
E. Burden hours under MAS paradigm (A * D)	3,291.5
F. Burden saved under MAS (C – E)	4,644
G. Change in burden (E/C – 1) * 100	-58.5%

were met for all cells. At that point, interviewing was terminated on all outstanding samples that had not yet been contacted. Second, the survey estimates were not weighted for the selection probabilities. But, as Smith (1983) recommended, poststratification weights were applied. The other areas of the sample design, such as the way establishments and employees were selected, and the way interviewers were to contact establishments, followed a traditional paradigm design.

Like the earlier studies, our analysis suggests that MAS produces estimates comparable to the traditional design currently employed. MAS did not substantively alter the estimates across all occupations and questionnaire items. Under each measurement scale type, the MAS estimates were consistently in agreement with the traditional estimates. Moreover, our sensitivity analysis indicates that our choice of criteria regarding quota cell fulfillment does not bias the estimates, as evidenced by their agreement with traditional estimates. Furthermore, as in most establishment surveys (see, e.g., Knaub, n.d.), the O*NET data exhibit a tendency to be skewed toward smaller establishments (i.e., many more small establishments—those with fewer employees—respond to the survey than larger establishments). MAS is designed to control the number of survey respondents by establishment size and minimize the bias that may be created by this inherent skewness in the size distribution of responding establishments.

As Sudman (1966) and Stephenson (1979) state, there is no theoretical argument for suggesting that hybrid approaches, such as MAS, will always fare as well as the traditional estimates. There are only empirical arguments based on empirical experiments or simulations like the one we conducted. We believe that our simulation performed well because we were able to accurately define a model for each occupation. In addition, we agree with King (1998) that if we had been unable to specify a correct model, our MAS results would not have been as close as they were to the traditional estimates. This qualification suggests that

MAS may not be an effective design for an initial data collection study where there is little prior information about the target population. MAS may be effective in update studies that are collecting data on a target population a second time and can use the information collected in the first study to assist in the model definitions.

Also, in studies where the population of interest is difficult to identify in the general population, the use of model-based designs such as MAS can help ensure that survey estimates are representative and include members from all areas that are necessary to fully describe the population of interest. The O*NET Data Collection Program uses MAS to ensure that each occupation has respondents from all industries and all sizes of establishment that appropriately represent the occupation. Furthermore, MAS can help ensure that these respondents come from the entire country and not just one region.

5. Conclusions

Our simulation suggests that our MAS approach does not significantly bias the estimates as compared to a traditional design. Moreover, using MAS, we found no evidence of a bias in the estimates of the standard errors. In other words, both the estimates and confidence intervals for these estimates are not significantly different under MAS than under the traditional paradigm. MAS substantially reduced establishments' burden of providing many more responses than are required for some occupations. MAS does not appear to negatively impact the O*NET program's ability to reliably produce data for users, and it obtains those data more cost-efficiently than traditional designs.

We emphasize that one cannot assume these findings apply to all large-scale surveys. General surveys without the issues found on the O*NET survey, such as sampling a large number of subpopulations, will not benefit from MAS more than from the traditional paradigm. Furthermore, before the implementation of the MAS strategy, research and testing must be conducted to determine whether the strategy is appropriate.

Because of these findings, the O*NET program has incorporated some features of MAS for its second iteration of data collection. Specifically, before data collection a model is defined for each occupation, based on experience gained during the initial data collection period. These models are used to help guide the sample selection process so that the set of respondents for each occupation is representative. MAS cells are stopped when it is clear that the quota will be met; however, traditional probability-based weighted estimates are still produced, and respondent weights are adjusted to account for any stopped cells. This hybrid method incorporates the theoretical strengths of the traditional method, while including steps to ensure a representative respondent sample.

References

- Chang, K.-C., Liu, J.-F., & Han, C.-P. (1998). Multiple inverse sampling in post-stratification. *Journal of Statistical Planning and Inference*, 69, 209–227.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Deming, E. W. (1960). *Sample design in business research*. New York: Wiley.
- Deville, J.-C. (1991). A theory of quota surveys. *Survey Methodology*, 17, 163–181.
- King, B. (1985). Surveys combining probability and quota methods of sampling. *Journal of the American Statistical Association*, 80(392), 890–896.
- King, B. (1998). Quota, representative, and other methods of purposive sampling. In *The encyclopedia of biostatistics* (Vol. 5, pp. 3656–3659). New York: Wiley.
- Kish, L. (1965). *Survey sampling*. New York: Wiley.
- Knaub, J. R. (n.d.). *Model-based sampling, inference and imputation*. Retrieved September 1, 2006, from <http://tonto.eia.doe.gov/FTPROOT/electricity/mbsii.pdf#search=%22model-based%20sampling%2C%20inference%2C%20imputation%22>
- Lohr, S. L. (1999). *Sampling: Design and analysis*. New York: Duxbury Press.
- Moser, C. A. (1952). Quota sampling. *Journal of the Royal Statistical Society, Series A*, 115, 411–423.
- Moser, C. A., & Stuart, A. (1953). An experimental study of quota sampling. *Journal of the Royal Statistical Society, Series A*, 116, 349–405.
- Mumford, M. D., Peterson, N. G., & Childs, R. A. (1997). *Basic and cross-functional skills: Evidence for the reliability and validity of the measures* (O*NET Final Technical Report Contract No. 94-552).
- Neyman, J. (1934). On the two different aspects of the representative method: The method of stratified sampling and the method of purposive selection. *Journal of the Royal Statistical Society*, 97, 558–622.
- Sanzo, J. M., Garcia-Calabuig, M. A., Audicana, A., & Dehesa, V. (1993). Q fever: Prevalence and antibodies to *Coxiella burnetii* in the Basque country. *International Journal of Epidemiology*, 22, 1183–1188.
- Smith, T. M. F. (1983). On the validity of inference from non-random samples. *Journal of the Royal Statistical Society, Pt. 4*, 146, 394–403.
- Stephan, F. F., & McCarthy, P. J. (1979). *Sampling opinions*. New York: Wiley.
- Stephenson, B. C. (1979). Probability sampling with quotas: An experiment. *Public Opinion Quarterly*, 43, 477–495.
- Sudman, S. (1966). Probability sampling with quotas. *Journal of the American Statistical Association*, 61, 749–771.

***Appendix H: Nonresponse Analysis for Analysis
Cycles 4 Through 8***

Appendix H: Nonresponse Analysis

H.1 Overview

Establishments can cause nonresponse in the O*NET Data Collection Program at the Verification, Screening, Recruiting, or Sampling stage of selection. This nonresponse is referred to in this report as *establishment nonresponse*. Another type of nonresponse occurs at the employee level when a selected employee fails to complete and return a questionnaire (referred to as *employee nonresponse*). Finally, employees who return their questionnaires may inadvertently or intentionally skip one or more items on the questionnaire. This type of missing data is known as *item nonresponse*. These three types of nonresponse are discussed in this appendix.

The data analyzed in this report come from the Establishment Method data included in Analysis Cycles 4–8.¹ Data from the Occupation Expert (OE) Method do not lend themselves to this type of analysis, because the OE Method respondents are not sampled through establishments and are not related to a target population from which bias can be measured.

H.2 How Nonresponse Is Related to Bias

Nonresponse bias is the expected difference between an estimate from the responding cases and an estimate from all cases originally selected from the target population. The extent to which nonresponse bias occurs ultimately depends on (1) the extent of missing data and (2) the difference in an estimate between respondents and nonrespondents. For example, consider the following equation:

$$\bar{X} = p_R \bar{X}_R + p_N \bar{X}_N, \quad (1)$$

which says that an overall population estimate, \bar{X} , depends on the proportion of respondents and nonrespondents (denoted p_R and p_N , respectively, with $p_R + p_N = 1$) and the mean response from both respondents and nonrespondents (denoted \bar{X}_R and \bar{X}_N). Bias due to nonresponse is given by the following equation:

$$Bias(\bar{X}_R) = \bar{X}_R - \bar{X}, \quad (2)$$

demonstrating that bias varies as a function of the overall population estimate and the mean response from respondents. In the estimate the bias due to nonresponse increases as the difference between \bar{X}_R and \bar{X} increases. Now, substituting Equation (1) into Equation (2) gives

$$Bias(\bar{X}_R) = \bar{X}_R(1 - p_R) - p_N \bar{X}_N, \quad (3)$$

¹ A total of eight analysis cycles have been completed through June 2007. An analysis of nonresponse in Analysis Cycles 1–3 was included in the September 2, 2005, Office of Management and Budget submission (Appendix E).

and, because $1 - p_R = p_N$, Equation (3) can be expressed as

$$\text{Bias}(\bar{X}_R) = p_N (\bar{X}_R - \bar{X}_N). \quad (4)$$

Equation (4) reveals that the components of nonresponse bias depend on the proportion of nonrespondents in the eligible sample and the difference between mean responses for respondents and for nonrespondents. If either or both components are small, then the bias should also be small. Important biases usually occur when a substantial proportion of nonrespondents (p_N) exist and there is a large difference between the mean responses (Kish, 1965). When one uses sample data to approximate bias, the components p_N , \bar{X}_R , and \bar{X}_N can be estimated with sample data across attributes that can be measured for both respondents and nonrespondents. Unless a special nonresponse follow-up study is conducted, it is rarely possible to measure any of the primary study outcome variables on the nonrespondents; if one had such data, they would be on respondents. Thus, to obtain surrogates for the primary outcome variables, it is necessary to turn to other variables that are available for both respondents and nonrespondents. If respondent data indicate that the surrogate variables are related to the primary outcome variables, then any nonresponse bias, or lack thereof, observed in the surrogate variables can be inferred to the primary outcome variables. Such approximations are not deterministic but can evidence potential nonresponse bias.

The likelihood of missing data may be related to an observed variable, such as the number of employees in a business establishment. For example, employees from larger establishments may be less likely to respond than employees from smaller establishments. Analyzing skills across jobs within an occupation could therefore be subject to bias if the work performed differs systematically by establishment size—that is, if employees in larger establishments tend to respond differently from employees in smaller establishments. In this hypothetical example, employees in larger establishments may be less likely to respond; if they do respond, they may respond differently from employees in smaller establishments. This situation would cause both components of nonresponse bias (p_N and $\bar{X}_R - \bar{X}_N$) to be magnified.

In general, restricting an analysis to only those cases that are observed may introduce bias into the results unless the missing data mechanism is accounted for in the analysis (Graham, Hofer, & Piccinin, 1994; Little & Rubin, 1987; Schafer, 2000). Weighting is one common method of adjusting for nonresponse patterns based on observed values (Little & Rubin). The O*NET Data Collection Program incorporates weighting as one method to protect against the influence of nonresponse bias.²

H.3 Establishment Nonresponse

Exhibit H-1 (at the end of this appendix) displays the establishment eligibility and response rates for Analysis Cycles 4–8 by stage of data collection. The analysis population of establishments included each establishment that had at least one of its assigned occupations published in these analysis cycles, whether or not any of the occupations were eventually selected from the establishment. The response rates are presented separately by various variables to allow examination of the possibility of nonresponse bias.

² For a discussion of weighting, see Section B.1.1 in the main body of the Supporting Statement.

These variables were selected because they were available for both respondents and nonrespondents and were likely to be related to the primary outcome variables of the O*NET Program. Rates marked with an asterisk (*) are significantly different from the overall rates (where the overall rates are assumed to be fixed quantities).³

The following describes the columns in Exhibit H-1:

- **Total Estab** is the total number of selected establishments at the Verification stage.
- **Verification, Screening, Recruiting, and Sampling** refer to the four stages of data collection used in recruiting establishments. Only those establishments that responded at the previous stage were used in computing rates. For example, Screening rates reflect only establishments that responded at the Verification stage. For the very first wave of data collection, Wave 1.1, there was no distinction between the Verification and Screening stages. These establishments were all considered eligible and responding at the Verification stage in this analysis. Final rates are combined rates across all stages of data collection. All establishments are considered to be eligible at the verification stage. At subsequent stages, nonrespondents from the previous stage are removed from the denominator of the eligibility rate. Therefore the final eligibility rate, defined as the total number of eligible establishments divided by the total establishments in the sample, is not equivalent to the product of the eligibility rates at each stage. Similarly, establishments that were identified as ineligible in the previous stage are not included in the denominator of the response rate for a particular stage. Thus, the final response rate, defined as the total number of responding establishments divided by the total number of eligible establishments in the sample, is not the product of the response rates at each stage.
- **Elig** is the percentage of establishments that are considered eligible. Establishments are considered survey-eligible if they are classified as (1) at the same street address or building, (2) in business (permanently or temporarily), (3) able to be located, and (4) not a duplicate.
- **Resp** is the percentage of eligible establishments that are considered respondents; that is, they did not refuse to participate in the study.

The following describes the rows in Exhibit H-1:

- **Census Division** is assigned according to the address of the establishment. A total of 180 Wave 1.1 establishments from the analysis population had no address information because they went out of business between the time the initial sample frame was constructed and the onset of data collection. There was an additional establishment in Wave 5.62 that could not be located, so it was presumed to be out of business. These establishments were declared ineligible at the Screening stage and were assigned to the Unknown Census division, where the eligibility rate at the Screening stage is 0%. Note that this group of initially ineligible establishments also affects the Time Zone and Metropolitan Status rows, where they were treated similarly.
- **Total Employees in Establishment** is the establishment total employment estimate on the sample frame. The category Unknown for total employees in an establishment is an actual frame classification.
- **SIC Division** is the Standard Industry Classification of the establishment.

³ The tests were conditioned on the overall rates because the objective was to identify any subgroups that differed from the observed overall rate.

- **Number of SOCs on Establishment Sampling List** is the number of Standard Occupational Classifications linked to an establishment's sampling list. This number may be viewed as a measure of the point of contact's (POC's) perceived level of burden.
- **Time Zone** and **Metropolitan Status** were assigned according to the establishment's zip code.

H.3.1 Establishment Final Unweighted Response Rates

The data in Exhibit H-1 show that the final unweighted response rate for establishments was 74.8% and the final eligibility rate was 83.0%.⁴ The data also indicate that response rates varied for the four data collection stages, with the lowest response rate occurring at the Recruiting stage (84.7%) and the lowest eligibility rate occurring at the Verification (87.1%) stage. These results are intuitive for the following reasons:

- It was not until the Recruiting stage of data collection that the POC fully realized the burden involved in participation. Consequently, it was expected that most nonresponse would occur at this stage.
- The lowest eligibility rate is expected at the Verification stage because this is the first contact made with each establishment and the point at which one learns of establishments that have gone out of business. However, as discussed, for Wave 1.1 a Verification call was not conducted but was combined with the Screening stage. Thus, establishments that were out of business were identified at the Screening stage for Wave 1.1. In Exhibit H-1, all establishments from Wave 1.1 were considered eligible at the Verification stage.

Using frame information, one can compare the respondents and nonrespondents across various attributes to approximate nonresponse bias. An estimate of the first component of nonresponse bias can be found in Exhibit H-1 under the column headed Final Respondent. Low response rates indicate potential nonresponse bias. With the final unweighted response rate considered a fixed quantity with no variance, the response rate for each level of a specific attribute was assessed against the overall value to determine if the difference was significant. Differences statistically significant at the 0.05 level are indicated with an asterisk (*). The results indicate the following:

- **Census Division.** It appears that establishments in the Mountain (78.4%) region had the highest significant final response rate, while the Middle Atlantic (71.8%) region had the lowest significant final response rate.
- **Total Employees in Establishment.** If one ignores the Unknown category, there appears to be a decreasing trend in the final response rates as the size of the establishment increases. This pattern suggests that the perceived burden of the POCs in smaller establishments may have been lower than the perceived burden of the POCs in larger establishments. In addition, in larger organizations the decision to participate may not be at the discretion of the POC but instead may involve corporate approval. This observation is consistent with other literature, such as Willimack, Nichols, and Sudman (2002).
- **SIC Division.** Comparing the different SIC divisions to the overall final response rate, one can see that the Public Administration (85.3%) and Mining (82.8%) industries had the highest

⁴ Unweighted rates were used because appropriate weights were not available for ineligible or nonresponding establishments.

significant final response rates, while the Finance, Insurance, and Real Estate (67.2%) industry had the lowest final response rate. Response rate patterns by industry were highly dependent on the occupations included in a particular collection of occupations. Thus, these findings would not necessarily apply to a different set of occupations in another set of analysis cycles.

- **Number of SOCs on Establishment Sampling List.** At the Recruiting stage, the response rate for establishments with one to five occupations on the sampling list (88.8%) was significantly higher than the overall response rate of 84.7%, while all the remaining categories were significantly lower than the overall rate. This pattern may indicate that the POC perceives a lower number of O*NET occupations as less of a burden. Otherwise there is no discernible trend in the final response rates by number of occupations.
- **Metropolitan Status.** Compared with the overall response rate, rural establishments (80.1%) had a final response rate significantly higher than the overall response rate, while urban establishments (73.4%) had a significantly lower final response rate.

H.3.2 Comparison of Establishment Respondents and Nonrespondents

Exhibit H-2 shows a comparison of the distribution of respondents and nonrespondents across various establishment attributes. The column Difference in Percent (Respondents Versus Nonrespondents) shows an estimate of the second component of nonresponse bias. As already discussed, a potential source of nonresponse bias occurs when this difference becomes large. An estimate of the nonresponse bias across an attribute (see Equations [2] and [4]) is shown under the last column, Difference in Percent (Respondents Versus Overall). Differences marked with an asterisk are statistically different from zero at the 0.05 level. Large positive or negative values indicate possible nonresponse bias. Although there are numerous statistically significant differences, the large sample sizes mean that very small differences likely can be statistically detected. In this situation, it is important to determine if the differences are of sufficient magnitudes to be meaningful. For establishment nonresponse, the differences between respondents and overall sample do not appear to be meaningful:

- Approximately 82.6% of the attributes had an absolute bias of less than 1 percentage point.
- Approximately 13.0% of the attributes had an absolute bias between 1 and 2 percentage points.
- Approximately 4.3% of the attributes had an absolute bias greater than 2 percentage points.

Another measure of potential nonresponse bias is the effect size, as defined by Cohen (1988). In this case, the effect size is related to the chi-square test for comparing the equivalence of percentage distributions from respondents and the overall sample for the variables listed in Exhibit H-2. Cohen classifies an effect size as “small” when it is about 0.10, as “medium” when it is about 0.30, and as “large” when it is about 0.50. For the variables in Exhibit H-2, all of the effect sizes were small, with the largest effect size equal to 0.11 for Number of SOCs on Establishment Sampling List. This result suggests that the distribution of the variables for respondents and nonrespondents is quite similar (i.e., $\bar{X}_R - \bar{X}_N$ is small).

The combination of small absolute biases and very small effect sizes indicates a low likelihood of bias due to establishment nonresponse.

H.4 Employee Nonresponse

Exhibit H-3 displays the unweighted response rates for employees from Establishment Method data collection for occupations published in Analysis Cycles 4–8.⁵ The columns in Exhibit H-3 are as follows:

- **Sampled** is the total number of selected employees.
- **Response Rate** is the unweighted percentage of selected employees from the employee analysis population. Employees are considered respondents if they returned a questionnaire that satisfied all completeness and quality requirements.

In addition to the categories displayed in Exhibit H-1, Exhibit H-3 also displays response rates by the following employee-level characteristics (rows):

- **Selected Employees in Establishment** is the number of employees who were selected from the establishment. Note that this value ranges from only 1 to 20. This range reflects our rule that no more than 20 employees could be selected from any single establishment per 12-month period.
- **Questionnaire Type** is the type of questionnaire that the employee was selected to complete (Skills, Work Activities, Work Context, or Knowledge).
- **Occupation Class** is derived from the first two digits of the O*NET SOC.

The response rates are presented separately by the various row variables to allow examination of the possibility of nonresponse bias. These variables were selected because they were available for both respondents and nonrespondents and were likely to be related to the primary outcome variables of the O*NET Program.

H.4.1 Employee Response Rates

Like establishment nonresponse, employee nonresponse is difficult to thoroughly characterize in the O*NET Data Collection Program because relatively little information is known about the nonrespondents (except for some descriptive frame characteristics). However, as with the establishment level, using information known about both responding and nonresponding employees enables indirect determination of whether the nonrespondents are different from the respondents across variables that may be highly correlated with the survey data being collected. Thus, potential sources of nonresponse bias can be approximated at the employee level.

An estimate of the first component of nonresponse bias can be found in Exhibit H-3 under the column headed Response Rate. Low response rates indicate possible nonresponse bias. With the final unweighted response rate considered a fixed quantity with no variance, the response rate for each level of a specific covariate was assessed against the overall value to determine if the difference was significant.

⁵ Unweighted rates were used because appropriate weights were not available for nonresponding employees.

Differences statistically significant at the 0.05 level are indicated with an asterisk (*).⁶ The unweighted results indicate the following:

- **Census Division.** Employees in the East South Central (68.1%) division had the highest significant response rates, and employees in the Pacific division had the lowest significant response rates (59.6%).
- **Total Employees in Establishment.** Employee response rate is highest for establishments with 1 to 4 employees (71.0%) and is lowest for establishments with more than 5,000 employees (47.8%).
- **Selected Employees.** Much variation exists in the response rate across the number of selected employees with no clear pattern evident.
- **Questionnaire Type.** The response rates do not appear to vary greatly across questionnaire type, with the highest response rate (66.4%) associated with the Work Context Questionnaire and the lowest response rate (62.4%) associated with the Work Activities Questionnaire. The response rates for the Skills Questionnaire and Knowledge Questionnaire were not significantly different from the overall rate.
- **SIC Division.** The Non-Classifiable division (74.6%) had the highest significant response rate when compared with the overall response rate, while Construction (51.9%) had the lowest significant response rate.
- **Occupation Class.** Compared with the overall response rate, Community and Social Services Occupations (78.7%) and Management Occupations (73.7%) had the highest significant response rates, while Healthcare Practitioners and Technical Occupations (51.7%) and Construction and Extraction Occupations (52.2%) had the lowest significant response rates.
- **Number of SOCs on Establishment Sampling List.** There is no clear pattern in the employee response rate by the number of occupations on the establishment sampling list.
- **Time Zone.** The response rate for Pacific Standard Time (59.5%) was significantly lower than the overall response rate, while the response rate for Eastern Standard Time was significantly higher (65.1%). All other response rates for the different time zones were not significantly different from the overall response rate.
- **Metropolitan Status.** The findings at the employee level were similar to the findings at the establishment level. That is, the overall response rate for employees from rural areas was significantly higher than that for employees from urban areas.

H.4.2 Comparison of Employee Respondents and Nonrespondents

Exhibit H-4 presents a comparison of the distribution of respondents and nonrespondents across various employee attributes. The column Difference in Percent (Respondents Versus Nonrespondents) shows an estimate of the second component of nonresponse bias. As already discussed, a potential source of nonresponse bias occurs when this difference becomes large. The column Difference in Percent (Respondents Versus Overall) shows an estimate of the nonresponse bias across an attribute (see Equations [2] and [4]). Respondent Versus Overall differences marked with an asterisk are statistically different from zero at the 0.05 level. Large positive or negative values indicate possible nonresponse bias.

⁶ The tests were conditioned on the overall rates because the objective was to identify any subgroups that differed from the observed overall rate.

Although there are numerous statistically significant differences, the large sample sizes mean that very small differences likely can be statistically detected. In this situation, it is important to determine if the differences are of sufficient magnitudes to be meaningful. For employee nonresponse, the differences between respondents and the overall sample do not appear to be meaningful, as the following examples indicate:

- Approximately 88.9% of the attributes had an absolute bias of less than 1 percentage point.⁷
- Approximately 7.8% of the attributes had an absolute bias between 1 and 2 percentage points.
- Approximately 3.3% of the attributes had an absolute bias greater than 2 percentage points.

Another measure of the possibility for nonresponse bias is the effect size, as defined by Cohen (1988). In this case, the effect size is related to the chi-square test for comparing the equivalence of percentage distributions from respondents and overall sample for the variables listed in Exhibit H-4. Cohen classified an effect size as “small” when it is about 0.10, as “medium” when it is about 0.30, and as “large” when it is about 0.50. For the variables in Exhibit H-4, all of the effect sizes were small, with the largest equal to 0.10 for SIC Division and Occupation Class. As previously noted, a small effect size suggests that the distribution of the variables for respondents and nonrespondents is quite similar (i.e., $\bar{X}_R - \bar{X}_N$ is small). The combination of small absolute biases and very small effect sizes indicates a low likelihood of bias due to employee nonresponse.

H.5 Item Nonresponse

Exhibits H-5 through H-12 display unweighted item response rates by item, item type, and occupation for Establishment Method data included in Analysis Cycles 4–8. These tables include questionnaire data from employee respondents in the 451 occupations published in these analysis cycles and completed under the Establishment Method. Only items from those questionnaires that satisfied all completeness and quality requirements were evaluated. Cases that did not satisfy such requirements were included as employee nonrespondents.

Item nonresponse is analogous to partial information patterns in which some variables are observed and some are missing. Even though partial information is present, item nonresponse can still create biased parameter estimation if the missing values are systematically related to the outcome (e.g., wealthy respondents tend to leave an income question missing). The results indicate the following:

- **Skills, Work Activities, Work Context, and Knowledge.** The data in Exhibits H-5 through H-8 suggest that for the Skills, Work Activities, and Work Context Questionnaires, there is little item nonresponse with respect to a single item on each questionnaire. The minimum response rate for any specific item in the Skills Questionnaire is 93.6% (Item 22—Level), 94.7% for the Work Activities Questionnaire (Item 40—Level), 98.0% for the Work Context Questionnaire (Item 49), and 90.3% for the Knowledge Questionnaire (Item 8—Level). In addition, as seen in Exhibit H-11, item nonresponse is slightly more prevalent for Level items than for Importance items, regardless of questionnaire type.
- **Occupation-Specific Tasks.** The items in the Task Questionnaire are different from the items in the other domain questionnaires in that each task applies to only one specific occupation.

⁷ Absolute value of the last column in Exhibit H-4.

Participants indicate whether a task is “not relevant” to their occupation; if the task is “relevant,” they rate it on scales of frequency of performance and importance to the occupation. It should be noted that the eligible sample size for some tasks can be small because participants are instructed not to respond to the corresponding Frequency and Importance items if they do not consider the task to be “relevant” to their occupation. Tasks with a high percentage of “not relevant” responses from participants are removed from the occupation’s published task list. In particular, all task items included in Exhibit H-9 were withheld from publication because of high percentages of “not relevant” responses.

- **Background Questionnaire.** In Exhibit H-10, the item response rates appear to be nearly constant and high (more than 93%), with the exception of Item 4 (82.9%), which elicits information from the respondent about working in a family business.
- **Item Type.** All the response rates by item type in Exhibit H-11 exceed 95%.
- **Occupation.** Item response rates are provided in Exhibit H-12 for all occupations completed in Analysis Cycles 4–8. The overall item response rate is 97.9%, with the smallest response rate, 92.4%, coming from Sewing Machine Operators (SOC 51-6031.00), and the largest, 99.4%, coming from both Health Specialties Teachers, Postsecondary (SOC 25-1071.00) and Broadcast News Analysts (SOC 27-3021.00).

The extremely high item response rates indicate a low likelihood of bias due to item nonresponse.

H.6 Conclusion

Unit and item nonresponse can lead to biased inferences if the nonresponse rates are high and respondents and nonrespondents differ with regard to the characteristics of interest. An examination of both establishment and employee response rates found that nonresponse patterns were somewhat related to essentially all variables considered in the analyses. However, when the distribution of respondents and nonrespondents across various frame attributes was examined, the overall potential for nonresponse bias at both the establishment and employee levels was found to be negligible. Because nonresponse patterns for both establishments and employees are related to the substantive variables measured in the study, using these variables for nonresponse adjustments to the analysis weights should be effective in reducing the minimal effects, if any, due to nonresponse bias in the analysis.

At the item level, it was found that different questionnaire types and questions exhibited varying response rates, and in most cases the response rates were extremely high. This finding coincides with the findings at the establishment and employee levels—that is, that the potential for significant nonresponse bias due to item nonresponse is negligible.

Exhibit H-1. Establishment Eligibility and Response Rates

Category	Total Estab	Verification		Screening		Recruiting		Sampling		Final	
		Elig	Resp	Elig	Resp	Elig	Resp	Elig	Resp	Elig	Resp
Total	119,964	87.1	96.3	96.9	94.8	98.3	84.7	99.8	96.9	83.0	74.8
Census Division											
New England	6,229	87.8	96.2	96.9	95.0	98.5	83.7*	99.7	96.5	83.8	73.5*
Middle Atlantic	15,519	87.4	96.2	96.9	93.5*	98.3	82.8*	99.9	96.7	83.4	71.8*
East North Central	18,039	88.8*	96.6	97.2*	94.6	98.3	84.2	99.9	96.8	85.0*	74.4
West North Central	8,634	89.1*	97.2*	97.6*	95.8*	98.4	85.9*	99.7	97.0	85.5*	77.4*
South Atlantic	21,750	86.2*	96.3	96.9	95.1*	98.3	84.9	99.8	97.0	82.2*	75.2
East South Central	7,007	88.3*	97.3*	97.3*	95.3*	98.4	85.1	99.8	97.1	84.5*	76.5*
West South Central	13,905	86.6	96.0	97.1	95.0	98.4	85.6*	99.8	96.7	82.8	75.2
Mountain	8,753	86.3*	96.9*	97.4*	96.0*	98.6	86.9*	99.8	97.3	82.9	78.4*
Pacific	19,947	85.4*	95.5*	96.6	94.1*	98.1*	84.7	99.8	97.3*	81.1*	73.8*
Unknown	181	99.4*	100.0	0.0	NA	NA	NA	NA	NA	0.0	NA
Total Employees in Establishment											
Unknown	3,352	79.2*	95.3*	97.0	95.6	99.0*	91.6*	99.9	98.7*	76.2*	82.1*
1-4	27,725	76.9*	90.8*	95.2*	95.2*	98.6*	89.0*	99.9*	99.3*	72.6*	75.9*
5-9	8,797	87.0	96.8*	94.5*	95.3*	98.6	88.7*	99.9	98.2*	81.2*	80.1*
10-49	26,639	89.1*	97.8*	97.2*	95.4*	98.4	87.1*	99.8	97.8*	85.3*	79.3*
50-99	15,860	91.7*	98.5*	98.1*	95.6*	97.9*	86.3*	99.6*	97.2	87.9*	78.8*
100-249	7,585	91.6*	98.0*	97.4*	94.8	98.0	83.4*	99.8	95.9*	87.4*	74.1
250-499	16,391	91.1*	97.3*	98.1*	93.8*	98.4	79.5*	99.8	94.5*	87.9*	68.3*
500-999	7,403	92.2*	98.2*	97.5*	93.0*	98.7*	77.9*	99.8	93.3*	88.7*	66.3*
1,000-4,999	5,636	94.2*	98.2*	96.8	93.0*	97.8*	72.0*	99.7	92.0*	89.2*	60.3*
5,000 +	576	94.1*	97.2	94.5*	91.2*	94.3*	64.5*	99.6	88.7*	84.4	50.2*
SIC Division											
Agriculture, Forestry, Fishing	4,951	82.9*	93.4*	97.8*	96.2*	97.5*	87.7*	99.7	98.5*	79.1*	77.2*
Mining	3,996	83.5*	96.4	97.7*	96.1*	99.1*	91.0*	99.9*	98.3*	80.9*	82.8*
Construction	10,455	85.2*	93.5*	94.8*	92.8*	97.8*	83.4*	99.6*	97.4*	79.3*	70.0*
Manufacturing	23,233	87.8*	98.0*	97.7*	94.1*	98.4	84.4	99.8	96.6*	84.4*	75.0
Transportation, Communication, Electric, Gas, and Sanitary Services	11,098	86.0*	96.1	97.2	94.7	98.3	84.7	99.6*	96.1*	82.1*	73.9*
Wholesale Trade	2,549	85.5*	97.9*	96.0*	94.0	98.4	85.6	99.8	97.2	80.9*	76.4
Retail Trade	6,545	89.5*	93.4*	96.1*	93.5*	97.8*	81.8*	99.8	97.1	84.4*	68.9*
Finance, Insurance, Real Estate	6,346	88.5*	96.8*	95.1*	92.3*	97.0*	78.9*	99.8	95.8*	82.0*	67.2*

continued

Exhibit H-1. Establishment Eligibility and Response Rates (continued)

Category	Total Estab	Verification		Screening		Recruiting		Sampling		Final	
		Elig	Resp	Elig	Resp	Elig	Resp	Elig	Resp	Elig	Resp
SIC Division (cont'd)											
Services	38,837	85.9*	96.0*	96.6*	95.0	98.6*	84.2*	99.9*	96.8	82.0*	74.1*
Public Administration	7,945	92.7*	98.8*	97.5*	98.3*	98.6*	90.2*	99.8	97.3*	89.1*	85.3*
Non-Classifiable	4,009	94.7*	99.1*	99.6*	96.9*	99.2*	86.0*	99.8	98.2*	93.4*	80.9*
Number of SOCs on Establishment Sampling List											
1-5	83,430	85.0*	96.2*	98.0*	95.4*	98.2*	88.8*	99.8	98.5*	81.8*	80.1*
6	4,093	88.7*	95.7	96.5	91.8*	99.4*	81.4*	99.7	95.5*	85.1*	68.1*
7	3,558	89.9*	95.9	96.8	93.6*	98.9*	76.6*	99.8	93.9*	86.1*	64.4*
8	2,666	91.3*	96.4	94.4*	93.1*	99.1*	75.7*	99.9	93.3*	85.6*	63.2*
9	3,211	95.1*	97.4*	90.1*	94.1	98.0	77.0*	99.9*	92.9*	84.4*	65.3*
10	23,006	92.3*	96.9*	94.5*	93.5*	98.5*	74.4*	99.8	92.1*	86.1*	61.9*
Time Zone											
Eastern Standard Time	55,539	87.2	96.3	97.0	94.6	98.4	84.0*	99.8	96.8	83.3	73.9*
Central Standard Time	35,080	88.0*	96.7*	97.2*	95.1*	98.4	85.3*	99.8	96.8	84.2*	75.8*
Mountain Standard Time	8,065	86.3*	96.8*	97.4*	96.1*	98.7*	87.4*	99.8	97.3	83.0	79.0*
Pacific Standard Time	19,833	85.3*	95.5*	96.6	94.0*	98.1*	84.3	99.8	97.3*	81.0*	73.3*
Alaska Standard Time	717	87.9	97.8*	97.1	98.2*	98.6	89.6*	100.0	96.7	84.2	83.1*
Hawaii Standard Time	532	88.0	96.4	98.0	95.9	97.4	86.2	100.0	98.3*	84.2	78.1
Unknown	198	99.0*	100.0	8.2*	100.0	18.8*	66.7	100.0	100.0	1.5*	66.7
Metropolitan Status											
Rural	23,592	89.0*	97.0*	97.8*	96.4*	99.0*	87.8*	99.9*	97.7*	86.2*	80.1*
Urban	96,174	86.6*	96.2*	96.8	94.4*	98.2*	83.9*	99.8	96.7*	82.4*	73.4*
Unknown	198	99.0*	100.0	8.2*	100.0	18.8*	66.7	100.0	100.0	1.5*	66.7

Notes: Response rates were calculated from those establishments that were classified as eligible at each step. Final rates are combined rates across all stages of data collection. All establishments are considered to be eligible at the verification stage. At subsequent stages, nonrespondents from the previous stage are removed from the denominator of the eligibility rate. Therefore the final eligibility rate, defined as the total number of eligible establishments divided by the total establishments in the sample, is not equivalent to the product of the eligibility rates at each stage. Similarly, establishments that were identified as ineligible in the previous stage are not included in the denominator of the response rate for a particular stage. Thus, the final response rate, defined as the total number of responding establishments divided by the total number of eligible establishments in the sample, is not the product of the response rates at each stage. NA = not applicable.

*Statistically different from the total category at the 0.05 level.

Exhibit H-2. Comparison of Establishment Respondents and Nonrespondents

Category	Respondents		Nonrespondents		Overall		Diff in Percent (Resps vs. Nonresps)	Diff in Percent (Resps vs. Overall)
	No.	%	No.	%	No.	%		
Total	74,503	100.0	25,123	100.0	99,626	100.0	NA	NA
Census Division^a								
New England	3,836	5.1	1,383	5.5	5,219	5.2	-0.4	-0.1
Middle Atlantic	9,292	12.5	3,656	14.6	12,948	13.0	-2.1	-0.5*
East North Central	11,400	15.3	3,932	15.7	15,332	15.4	-0.3	-0.1
West North Central	5,715	7.7	1,669	6.6	7,384	7.4	1.0	0.3*
South Atlantic	13,439	18.0	4,434	17.6	17,873	17.9	0.4	0.1
East South Central	4,530	6.1	1,394	5.5	5,924	5.9	0.5	0.1
West South Central	8,667	11.6	2,852	11.4	11,519	11.6	0.3	0.1
Mountain	5,688	7.6	1,568	6.2	7,256	7.3	1.4	0.4*
Pacific	11,936	16.0	4,235	16.9	16,171	16.2	-0.8	-0.2
Total Employees in Establishment^b								
Unknown	2,098	2.8	457	1.8	2,555	2.6	1.0	0.3*
1-4	15,288	20.5	4,851	19.3	20,139	20.2	1.2	0.3
5-9	5,725	7.7	1,419	5.6	7,144	7.2	2.0	0.5*
10-49	18,024	24.2	4,701	18.7	22,725	22.8	5.5	1.4*
50-99	10,985	14.7	2,957	11.8	13,942	14.0	3.0	0.8*
100-249	4,914	6.6	1,716	6.8	6,630	6.7	-0.2	-0.1
250-499	9,840	13.2	4,567	18.2	14,407	14.5	-5.0	-1.3*
500-999	4,353	5.8	2,216	8.8	6,569	6.6	-3.0	-0.8*
1,000-4,999	3,032	4.1	1,997	7.9	5,029	5.0	-3.9	-1.0*
5,000 +	244	0.3	242	1.0	486	0.5	-0.6	-0.2*
SIC Division								
Agriculture, Forestry, Fishing	3,025	4.1	893	3.6	3,918	3.9	0.5	0.1
Mining	2,677	3.6	556	2.2	3,233	3.2	1.4	0.3*
Construction	5,801	7.8	2,487	9.9	8,288	8.3	-2.1	-0.5*
Manufacturing	14,718	19.8	4,895	19.5	19,613	19.7	0.3	0.1
Transportation, Communication, Electric, Gas, and Sanitary Services	6,729	9.0	2,380	9.5	9,109	9.1	-0.4	-0.1
Wholesale Trade	1,574	2.1	487	1.9	2,061	2.1	0.2	0.0
Retail Trade	3,810	5.1	1,716	6.8	5,526	5.5	-1.7	-0.4*
Finance, Insurance, Real Estate	3,496	4.7	1,705	6.8	5,201	5.2	-2.1	-0.5*
Services	23,604	31.7	8,248	32.8	31,852	32.0	-1.1	-0.3
Public Administration	6,037	8.1	1,042	4.1	7,079	7.1	4.0	1.0*
Non-Classifiable	3,032	4.1	714	2.8	3,746	3.8	1.2	0.3*

continued

**Exhibit H-2. Comparison of Establishment Respondents and Nonrespondents
(continued)**

Category	Respondents		Nonrespondents		Overall		Diff in Percent (Resps vs. Nonresps)	Diff in Percent (Resps vs. Overall)
	No.	%	No.	%	No.	%		
Number of SOCs on Establishment Sampling List^d								
1-5	54,684	73.4	13,584	54.1	68,268	68.5	19.3	4.9*
6	2,373	3.2	1,112	4.4	3,485	3.5	-1.2	-0.3*
7	1,972	2.6	1,092	4.3	3,064	3.1	-1.7	-0.4*
8	1,442	1.9	839	3.3	2,281	2.3	-1.4	-0.4*
9	1,769	2.4	940	3.7	2,709	2.7	-1.4	-0.3*
10	12,263	16.5	7,556	30.1	19,819	19.9	-13.6	-3.4*
Time Zone^e								
Eastern Standard Time	34,201	45.9	12,086	48.1	46,287	46.5	-2.2	-0.6*
Central Standard Time	22,387	30.0	7,146	28.4	29,533	29.6	1.6	0.4
Mountain Standard Time	5,287	7.1	1,403	5.6	6,690	6.7	1.5	0.4*
Pacific Standard Time	11,774	15.8	4,287	17.1	16,061	16.1	-1.3	-0.3
Alaska Standard Time	502	0.7	102	0.4	604	0.6	0.3	0.1
Hawaii Standard Time	350	0.5	98	0.4	448	0.4	0.1	0.0
Unknown	2	0.0	1	0.0	3	0.0	-0.0	-0.0
Metropolitan Status^f								
Rural	16,294	21.9	4,051	16.1	20,345	20.4	5.7	1.4*
Urban	58,207	78.1	21,071	83.9	79,278	79.6	-5.7	-1.4*
Unknown	2	0.0	1	0.0	3	0.0	-0.0	-0.0

Notes: Because of rounding, the difference columns may not match their constituent parts. NA = not applicable.

^a Effect size = 0.02.

^b Effect size = 0.08.

^c Effect size = 0.04.

^d Effect size = 0.11.

^e Effect size = 0.02.

^f Effect size = 0.03.

* Statistically different from the total category at the 0.05 level.

Exhibit H-3. Employee Response Rates

Category	Sampled	Response Rate
Total	104,376	64.2
Census Division		
New England	5,688	66.2
Middle Atlantic	12,478	63.9
East North Central	17,734	65.8*
West North Central	8,851	67.2*
South Atlantic	21,059	64.1
East South Central	8,192	68.1*
West South Central	10,079	62.2*
Mountain	7,025	62.5
Pacific	13,270	59.6*
Total Employees in Establishment		
Unknown	1,451	63.2
1-4	6,962	71.0*
5-9	3,898	63.3
10-49	21,004	61.9*
50-99	33,620	68.6*
100-249	6,611	60.4*
250-499	17,869	60.6*
500-999	7,621	61.7*
1,000-4, 999	4,892	59.2*
5,000+	448	47.8*
Selected Employees in Establishment		
1	6,011	74.7*
2	5,698	69.1*
3	5,406	65.0
4	5,276	66.7*
5	5,345	64.2
6	5,400	61.8*
7	5,068	63.2
8	34,056	61.4*
9	2,133	64.3
10	2,220	66.8
11	1,892	65.9
12	1,908	63.8
13	2,509	62.5
14	2,044	64.5
15	1,845	62.5
16	5,792	57.9*
17	833	68.3
18	1,008	68.8
19	912	64.1
20	9,020	67.8*

continued

Exhibit H-3. Employee Response Rates (continued)

Category	Sampled	Response Rate
Questionnaire Type		
Skills	26,037	64.4
Work Activities	26,374	62.4*
Work Context	25,724	66.4*
Knowledge	26,241	63.7
SIC Division		
Agriculture, Forestry, Fishing	3,691	59.1*
Mining	1,982	59.6*
Construction	6,600	51.9*
Manufacturing	25,490	64.5
Transportation, Communication, Electric, Gas, and Sanitary Services	11,822	57.4*
Wholesale Trade	1,319	61.3
Retail Trade	3,342	58.5*
Finance, Insurance, Real Estate	3,095	65.5
Services	21,182	63.2
Public Administration	5,588	66.3
Non-Classifiable	20,265	74.6*
Occupation Class		
Management Occupations	3,459	73.7*
Business and Financial Operations Occupations	3,111	65.0
Computer and Mathematical Occupations	300	68.0
Architecture and Engineering Occupations	2,075	64.7
Life, Physical, and Social Science Occupations	4,316	70.7*
Community and Social Services Occupations	1,881	78.7*
Legal Occupations	933	64.3
Education, Training, and Library Occupations	16,965	73.1*
Arts, Design, Entertainment, Sports, and Media Occupations	3,576	61.7
Healthcare Practitioners and Technical Occupations	3,498	51.7*
Healthcare Support Occupations	594	59.8
Protective Service Occupations	2,190	66.9
Food Preparation and Serving Related Occupations	1,235	53.5*
Building and Grounds Cleaning and Maintenance	2,017	64.9
Personal Care and Service Occupations	2,419	63.2
Sales and Related Occupations	1,703	56.1*
Office and Administrative Support Occupations	5,905	62.4
Farming, Fishing, and Forestry Occupations	3,054	57.8*
Construction and Extraction Occupations	8,471	52.2*
Installation, Maintenance, and Repair Occupations	6,924	64.3
Production Occupations	21,493	64.5
Transportation and Material Moving Occupations	8,257	59.3*

continued

Exhibit H-3. Employee Response Rates (continued)

Category	Sampled	Response Rate
Number of SOCs on Establishment Sampling List		
1-5	69,699	63.6
6	7,516	68.1*
7	4,232	63.3
8	1,926	63.1
9	2,169	66.4
10	18,834	64.9
Time Zone		
Eastern Standard Time	51,662	65.1*
Central Standard Time	32,017	64.9
Mountain Standard Time	6,506	63.5
Pacific Standard Time	13,051	59.5*
Alaska Standard Time	644	65.4
Hawaii Standard Time	496	56.7
Metropolitan Status		
Rural	26,188	67.8*
Urban	78,188	63.0*

*Statistically different from the total category at the 0.05 level.

Exhibit H-4. Comparison of Employee Respondents and Nonrespondents

Category	Respondents		Nonrespondents		Overall		Diff in Percent (Resps vs. Nonresps)	Diff in Percent (Resps vs. Overall)
	No.	%	No.	%	No.	%		
Total	67,017	100.0	37,359	100.0	104,376	100.0	NA	NA
Census Division^a								
New England	3,767	5.6	1,921	5.1	5,688	5.4	0.5	0.2
Middle Atlantic	7,973	11.9	4,505	12.1	12,478	12.0	-0.2	-0.1
East North Central	11,677	17.4	6,057	16.2	17,734	17.0	1.2	0.4*
West North Central	5,946	8.9	2,905	7.8	8,851	8.5	1.1	0.4*
South Atlantic	13,508	20.2	7,551	20.2	21,059	20.2	-0.1	-0.0
East South Central	5,578	8.3	2,614	7.0	8,192	7.8	1.3	0.5*
West South Central	6,267	9.4	3,812	10.2	10,079	9.7	-0.9	-0.3*
Mountain	4,393	6.6	2,632	7.0	7,025	6.7	-0.5	-0.2
Pacific	7,908	11.8	5,362	14.4	13,270	12.7	-2.6	-0.9*
Total Employees in Establishment^b								
Unknown	917	1.4	534	1.4	1,451	1.4	-0.1	-0.0
1-4	4,941	7.4	2,021	5.4	6,962	6.7	2.0	0.7*
5-9	2,467	3.7	1,431	3.8	3,898	3.7	-0.1	-0.1
10-49	13,007	19.4	7,997	21.4	21,004	20.1	-2.0	-0.7*
50-99	23,061	34.4	10,559	28.3	33,620	32.2	6.1	2.2*
100-249	3,994	6.0	2,617	7.0	6,611	6.3	-1.0	-0.4*
250-499	10,823	16.1	7,046	18.9	17,869	17.1	-2.7	-1.0*
500-999	4,699	7.0	2,922	7.8	7,621	7.3	-0.8	-0.3*
1,000-4,999	2,894	4.3	1,998	5.3	4,892	4.7	-1.0	-0.4*
5,000 +	214	0.3	234	0.6	448	0.4	-0.3	-0.1*
Total Selected Employees in Establishment^c								
1	4,490	6.7	1,521	4.1	6,011	5.8	2.6	0.9*
2	3,935	5.9	1,763	4.7	5,698	5.5	1.2	0.4*
3	3,513	5.2	1,893	5.1	5,406	5.2	0.2	0.1
4	3,521	5.3	1,755	4.7	5,276	5.1	0.6	0.2*
5	3,430	5.1	1,915	5.1	5,345	5.1	-0.0	-0.0
6	3,336	5.0	2,064	5.5	5,400	5.2	-0.5	-0.2*
7	3,202	4.8	1,866	5.0	5,068	4.9	-0.2	-0.1
8	20,915	31.2	13,141	35.2	34,056	32.6	-4.0	-1.4*
9	1,372	2.0	761	2.0	2,133	2.0	0.0	0.0
10	1,483	2.2	737	2.0	2,220	2.1	0.2	0.1
11	1,246	1.9	646	1.7	1,892	1.8	0.1	0.0
12	1,217	1.8	691	1.8	1,908	1.8	-0.0	-0.0
13	1,568	2.3	941	2.5	2,509	2.4	-0.2	-0.1

continued

Exhibit H-4. Comparison of Employee Respondents and Nonrespondents (continued)

Category	Respondents		Nonrespondents		Overall		Diff in Percent (Resps vs. Nonresps)	Diff in Percent (Resps vs. Overall)
	No.	%	No.	%	No.	%		
14	1,319	2.0	725	1.9	2,044	2.0	0.0	0.0
15	1,154	1.7	691	1.8	1,845	1.8	-0.1	-0.0
16	3,352	5.0	2,440	6.5	5,792	5.5	-1.5	-0.5*
17	569	0.8	264	0.7	833	0.8	0.1	0.1
18	694	1.0	314	0.8	1,008	1.0	0.2	0.1
19	585	0.9	327	0.9	912	0.9	-0.0	-0.0
20	6,116	9.1	2,904	7.8	9,020	8.6	1.4	0.5*
Questionnaire Type^d								
Skills	16,760	25.0	9,277	24.8	26,037	24.9	0.2	0.1
Work Activities	16,459	24.6	9,915	26.5	26,374	25.3	-2.0	-0.7*
Work Context	17,081	25.5	8,643	23.1	25,724	24.6	2.4	0.8*
Knowledge	16,717	24.9	9,524	25.5	26,241	25.1	-0.5	-0.2*
SIC Division^e								
Agriculture, Forestry, Fishing	2,180	3.3	1,511	4.0	3,691	3.5	-0.8	-0.3*
Mining	1,182	1.8	800	2.1	1,982	1.9	-0.4	-0.1*
Construction	3,428	5.1	3,172	8.5	6,600	6.3	-3.4	-1.2*
Manufacturing	16,451	24.5	9,039	24.2	25,490	24.4	0.4	0.1
Transportation, Communication, Electric, Gas, and Sanitary Services	6,781	10.1	5,041	13.5	11,822	11.3	-3.4	-1.2*
Wholesale Trade	808	1.2	511	1.4	1,319	1.3	-0.2	-0.1
Retail Trade	1,954	2.9	1,388	3.7	3,342	3.2	-0.8	-0.3*
Finance, Insurance, Real Estate	2,026	3.0	1,069	2.9	3,095	3.0	0.2	0.1
Services	13,386	20.0	7,796	20.9	21,182	20.3	-0.9	-0.3
Public Administration	3,704	5.5	1,884	5.0	5,588	5.4	0.5	0.2*
Nonclassifiable	15,117	22.6	5,148	13.8	20,265	19.4	8.8	3.1*
Occupation Class^f								
Management Occupations	2,551	3.8	908	2.4	3,459	3.3	1.4	0.5*
Business and Financial Operations Occupations	2,022	3.0	1,089	2.9	3,111	3.0	0.1	0.0
Computer and Mathematical Occupations	204	0.3	96	0.3	300	0.3	0.0	0.0
Architecture and Engineering Occupations	1,343	2.0	732	2.0	2,075	2.0	0.0	0.0

continued

Exhibit H-4. Comparison of Employee Respondents and Nonrespondents (continued)

Category	Respondents		Nonrespondents		Overall		Diff in Percent (Resps vs. Nonresps)	Diff in Percent (Resps vs. Overall)
	No.	%	No.	%	No.	%		
Life, Physical, and Social Science Occupations	3,050	4.6	1,266	3.4	4,316	4.1	1.2	0.4*
Community and Social Services Occupations	1,480	2.2	401	1.1	1,881	1.8	1.1	0.4*
Legal Occupations	600	0.9	333	0.9	933	0.9	0.0	0.0
Education, Training, and Library Occupations	12,404	18.5	4,561	12.2	16,965	16.3	6.3	2.3*
Arts, Design, Entertainment, Sports, and Media Occupations	2,206	3.3	1,370	3.7	3,576	3.4	-0.4	--0.1
Healthcare Practitioners and Technical Occupations	1,809	2.7	1,689	4.5	3,498	3.4	-1.8	-0.7*
Healthcare Support Occupations	355	0.5	239	0.6	594	0.6	-0.1	-0.0
Protective Service Occupations	1,466	2.2	724	1.9	2,190	2.1	0.2	0.1
Food Preparation and Serving Related Occupations	661	1.0	574	1.5	1,235	1.2	-0.6	-0.2*
Building and Grounds Cleaning and Maintenance Occupations	1,309	2.0	708	1.9	2,017	1.9	0.1	0.0
Personal Care and Service Occupations	1,528	2.3	891	2.4	2,419	2.3	-0.1	-0.0
Sales and Related Occupations	955	1.4	748	2.0	1,703	1.6	-0.6	-0.2*
Office and Administrative Support Occupations	3,682	5.5	2,223	6.0	5,905	5.7	-0.5	-0.2
Farming, Fishing, and Forestry Occupations	1,766	2.6	1,288	3.4	3,054	2.9	-0.8	-0.3*
Construction and Extraction Occupations	4,423	6.6	4,048	10.8	8,471	8.1	-4.2	-1.5*
Installation, Maintenance, and Repair Occupations	4,450	6.6	2,474	6.6	6,924	6.6	0.0	0.0
Production Occupations	13,858	20.7	7,635	20.4	21,493	20.6	0.2	0.1
Transportation and Material Moving Occupations	4,895	7.3	3,362	9.0	8,257	7.9	-1.7	-0.6*

continued

Exhibit H-4. Comparison of Employee Respondents and Nonrespondents (continued)

Category	Respondents		Nonrespondents		Overall		Diff in Percent (Resps vs. Nonresps)	Diff in Percent (Resps vs. Overall)
	No.	%	No.	%	No.	%		
Number of SOCs on Establishment Sampling List^g								
1-5	44,347	66.2	25,352	67.9	69,699	66.8	-1.7	-0.6*
6	5,117	7.6	2,399	6.4	7,516	7.2	1.2	0.4*
7	2,679	4.0	1,553	4.2	4,232	4.1	-0.2	-0.1
8	1,216	1.8	710	1.9	1,926	1.8	-0.1	-0.0
9	1,440	2.1	729	2.0	2,169	2.1	0.2	0.1
10	12,218	18.2	6,616	17.7	18,834	18.0	0.5	0.2
Time Zone^h								
Eastern Standard Time	33,635	50.2	18,027	48.3	51,662	49.5	1.9	0.7*
Central Standard Time	20,785	31.0	11,232	30.1	32,017	30.7	0.9	0.3
Mountain Standard Time	4,129	6.2	2,377	6.4	6,506	6.2	-0.2	-0.1
Pacific Standard Time	7,766	11.6	5,285	14.1	13,051	12.5	-2.6	-0.9*
Alaska Standard Time	421	0.6	223	0.6	644	0.6	0.0	0.0
Hawaii Standard Time	281	0.4	215	0.6	496	0.5	-0.2	-0.1
Metropolitan Statusⁱ								
Rural	17,761	26.5	8,427	22.6	26,188	25.1	3.9	1.4*
Urban	49,256	73.5	28,932	77.4	78,188	74.9	-3.9	-1.4*

Notes: Because of rounding, the difference columns may not match their constituent parts. NA = not applicable.

^a Effect size = 0.04.

^b Effect size = 0.06.

^c Effect size = 0.06.

^d Effect size = 0.02.

^e Effect size = 0.10.

^f Effect size = 0.10.

^g Effect size = 0.02.

^h Effect size = 0.03.

ⁱ Effect size = 0.03.

*Statistically different from zero at the 0.05 level.

Exhibit H-5. Ten Lowest Item Response Rate, Skills Questionnaire

Item	Item Description	Number Sampled	Response Rate (%)
A22-Level	Writing computer programs for various purposes.	5,450	93.6
A30-Level	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.	10,286	96.4
A33-Level	Determining how money will be spent to get the work done, and accounting for these expenditures.	8,774	96.5
A29-Level	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.	10,119	96.7
A34-Level	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.	10,384	96.7
A21-Level	Installing equipment, machines, wiring, or programs to meet specifications.	8,741	96.7
A18-Level	Analyzing needs and product requirements to create a design.	11,073	96.9
A25-Level	Controlling operations of equipment or systems.	10,971	96.9
A19-Level	Generating or adapting equipment and technology to serve user needs.	10,225	97.1
A28-Level	Repairing machines or systems using the needed tools.	9,185	97.1

Exhibit H-6. Ten Lowest Item Response Rate, Work Activities Questionnaire

Item	Item Description	Number Sampled	Response Rate (%)
B40-Level	Recruiting, interviewing, selecting, hiring, and promoting employees in an organization.	6,815	94.7
B21-Level	Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.	6,509	95.3
B05-Level	Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.	12,021	95.7
B23-Level	Servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.	6,933	95.9
B32-Level	Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.	9,976	95.9
B02-Level	Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.	13,837	96.0
B22-Level	Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.	7,616	96.1
B41-Level	Monitoring and controlling resources and overseeing the spending of money.	9,559	96.1
B13-Level	Establishing long-range objectives and specifying the strategies and actions to achieve them.	11,990	96.1
B09-Level	Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.	12,389	96.4

Exhibit H-7. Ten Lowest Item Response Rate, Work Context Questionnaire

Item	Item Description	Number Sampled	Response Rate (%)
D49	How automated is the job?	15,450	98.0
D45	How serious would the result usually be if the worker made a mistake that was not readily correctable?	15,450	98.2
D51	How important is repeating the same physical activities (e.g., key entry) or mental activities (e.g., checking entries in a ledger) over and over, without stopping, to performing this job?	15,450	98.6
D09	How important is it to coordinate or lead others in accomplishing work activities in this job?	15,450	98.7
D47	How frequently is the worker required to make decisions that affect other people, the financial resources, and/or the image and reputation of the organization?	15,450	98.7
D53	To what extent does this job require the worker to compete or to be aware of competitive pressures?	15,450	98.8
D21	To what extent does this job require the worker to perform job tasks in close physical proximity to other people?	15,450	98.9
D46	How do the decisions an employee makes impact the results of co-workers, clients or the company?	15,450	98.9
D12	How often are there conflict situations the employee has to face in this job?	15,450	99.0
D39	How much does this job require keeping or regaining your balance?	15,450	99.0

Exhibit H-8. Ten Lowest Item Response Rate, Knowledge Questionnaire

Item	Item Description	Number Sampled	Response Rate (%)
E08-Level	Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.	2,382	90.3
E26-Level	Knowledge of the theory and techniques required to compose, produce, and perform works of music, dance, visual arts, drama, and sculpture.	3,432	93.4
E17-Level	Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.	4,905	95.4
E27-Level	Knowledge of historical events and their causes, indicators, and effects on civilizations and cultures.	4,994	95.4
E12-Level	Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.	5,192	95.7
E25-Level	Knowledge of the structure and content of a foreign (non-English) language including the meaning and spelling of words, rules of composition and grammar, and pronunciation.	5,619	96.1
E03-Level	Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.	7,466	96.1
E28-Level	Knowledge of different philosophical systems and religions. This includes their basic principles, values, ethics, ways of thinking, customs, practices, and their impact on human culture.	5,815	96.3
E21-Level	Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.	5,614	96.6
E10-Level	Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.	8,006	96.7

Exhibit H-9. Ten Lowest Item Response Rates, Task Questionnaire

Item	Item Description	Number Sampled	Response Rate (%)
11-3031.02, Financial Managers, Branch or Department: T21-Importance	Direct floor operations of brokerage firm engaged in buying and selling securities at exchange.	1	0.0
11-9012.00, Farmers and Ranchers: T28-Importance	Maintain colonies of bees to produce honey and hive byproducts, pollinate crops, and/or produce queens and bees for sale.	1	0.0
11-9012.00, Farmers and Ranchers: T28-Frequency	Maintain colonies of bees to produce honey and hive byproducts, pollinate crops, and/or produce queens and bees for sale.	1	0.0
27-1013.00, Fine Artists, Including Painters, Sculptors, and Illustrators: T34-Frequency	Draw sketches of crime scenes, depicting such details as locations of doors and windows and exact positions of pieces of evidence.	3	0.0
27-1013.00, Fine Artists, Including Painters, Sculptors, and Illustrators: T35-Frequency	Alter, modify, or retouch photographs to update likenesses so that photographs can be used in criminal investigations.	3	0.0
27-1013.00, Fine Artists, Including Painters, Sculptors, and Illustrators: T36-Frequency	Prepare line drawings conforming to descriptions of suspects or crime scene details, presenting drawings to witnesses or victims for approval and completion of composite sketches.	3	0.0
27-1013.00, Fine Artists, Including Painters, Sculptors, and Illustrators: T23-Frequency	Gather relevant information about unidentified human remains, including photographs, bones, hair, and any other artifacts, for use in facial reconstructions.	5	20.0
53-4021.00, Railroad Brake, Signal, and Switch Operators: T25-Frequency	Collect tickets, fares, and passes from passengers.	5	20.0
27-1013.00, Fine Artists, Including Painters, Sculptors, and Illustrators: T25-Frequency	Interview crime victims or witnesses to obtain descriptive information about suspects, as well as objects such as jewelry or weapons.	4	25.0
27-1013.00, Fine Artists, Including Painters, Sculptors, and Illustrators: T32-Frequency	Show crime victims and witnesses photographs depicting different facial features, head shapes, and hair types so that those best representing suspects may be selected for use in composites.	4	25.0
51-5022.00, Prepress Technicians and Workers: T39-Frequency	Mount finished plates on wood or metal blocks, using hammers and nails or thermoplastic adhesives and heat presses.	4	25.0

Note: For items in the Task Questionnaire, participants first indicate whether a task is “not relevant” to their occupation. If a task is “not relevant,” the participants are instructed not to respond to the Frequency and Importance items. Tasks with a high percentage of “not relevant” responses from participants are removed from the occupation’s published task list. All task items in this exhibit were withheld from publication because of high percentages of “not relevant” responses.

Exhibit H-10. Response Rates, Background Questionnaire

Item	Item Description	Number Sampled	Response Rate (%)
2	How long at job?	60,486	99.3
3	Employment sector	60,486	96.0
4	Family business	60,486	82.9
5	Age group	60,486	96.9
6	Gender	60,486	98.7
7	Ethnicity	60,486	96.3
8	Race	60,486	93.9
9A	Blindness, deafness, or other severe vision or hearing impairment	60,486	98.3
9B	A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying	60,486	98.3
10A	Difficulty learning, remembering, or concentrating	60,486	95.9
10B	Difficulty bathing, or getting around inside the home	60,486	95.8
10C	Going outside the home alone to shop or visit the doctor's office	60,486	95.9
10D	Working at a job or business	60,486	95.8
11	Education level	60,486	98.8

Exhibit H-11. Item Response Rates by Item Type

Item Type	Questions	Response Rate (%)
Total	8,002,039	97.9
A: Skills—Importance	532,140	99.0
A: Skills—Level	423,718	97.8
B: Work Activities—Importance	605,816	99.1
B: Work—Activities—Level	475,869	97.0
Background	846,804	95.9
D: Work Context	880,650	99.2
E: Knowledge—Education and Training	75,280	98.4
E: Knowledge—Importance	496,848	99.0
E: Knowledge—Level	271,737	97.2
E: Knowledge—Work Styles Background	240,896	99.4
Task—Frequency	943,376	96.4
Task—Importance	943,376	97.2
Task—Relevance	1,265,529	98.8

Exhibit H-12. Item response Rates by Occupation

SOC	SOC Title	Questions	Response Rate (%)
Total		8,002,039	97.9
11-1011.00	Chief Executives	16,577	98.6
11-3031.01	Treasurers and Controllers	23,522	98.9
11-3031.02	Financial Managers, Branch or Department	7,986	98.9
11-9011.01	Nursery and Greenhouse Managers	12,181	98.6
11-9012.00	Farmers and Ranchers	15,234	97.8
11-9031.00	Education Administrators, Preschool and Child Care Center/Program	11,675	97.9
11-9032.00	Education Administrators, Elementary and Secondary School	83,695	98.7
11-9033.00	Education Administrators, Postsecondary	105,119	98.6
11-9071.00	Gaming Managers	15,611	98.3
11-9121.00	Natural Sciences Managers	11,865	98.6
11-9131.00	Postmasters and Mail Superintendents	11,083	98.6
11-9141.00	Property, Real Estate, and Community Association Managers	10,814	98.9
13-1011.00	Agents and Business Managers of Artists, Performers, and Athletes	15,463	98.0
13-1021.00	Purchasing Agents and Buyers, Farm Products	13,240	98.9
13-1031.01	Claims Examiners, Property and Casualty Insurance	14,575	98.0
13-1032.00	Insurance Appraisers, Auto Damage	11,512	97.8
13-1041.02	Licensing Examiners and Inspectors	15,339	98.2
13-1041.03	Equal Opportunity Representatives and Officers	10,557	98.0
13-1041.04	Government Property Inspectors and Investigators	8,036	98.5
13-1061.00	Emergency Management Specialists	19,180	99.2
13-1111.00	Management Analysts	9,050	98.4
13-2021.02	Appraisers, Real Estate	21,285	99.1
13-2051.00	Financial Analysts	9,089	99.1
13-2052.00	Personal Financial Advisors	12,754	98.9
13-2061.00	Financial Examiners	12,256	98.7
13-2071.00	Loan Counselors	8,704	98.2
13-2081.00	Tax Examiners, Collectors, and Revenue Agents	16,269	98.1
13-2082.00	Tax Preparers	14,089	98.0
15-1071.01	Computer Security Specialists	8,771	97.7
15-2041.00	Statisticians	12,643	98.8
17-2031.00	Biomedical Engineers	15,788	98.9
17-2061.00	Computer Hardware Engineers	8,227	98.3
17-2072.00	Electronics Engineers, Except Computer	13,661	98.6
17-2121.01	Marine Engineers	11,699	99.3
17-2121.02	Marine Architects	8,515	97.9
17-2131.00	Materials Engineers	10,863	99.2
17-2161.00	Nuclear Engineers	9,819	97.7

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
17-3012.01	Electronic Drafters	7,993	98.5
17-3012.02	Electrical Drafters	10,189	98.4
17-3024.00	Electro-Mechanical Technicians	9,293	98.2
17-3031.01	Surveying Technicians	17,579	98.4
17-3031.02	Mapping Technicians	20,023	98.7
19-1012.00	Food Scientists and Technologists	18,525	98.7
19-1021.00	Biochemists and Biophysicists	12,776	98.8
19-1031.01	Soil Conservationists	10,254	98.8
19-1031.02	Range Managers	12,243	99.1
19-1041.00	Epidemiologists	10,505	97.6
19-1042.00	Medical Scientists, Except Epidemiologists	10,453	98.5
19-2021.00	Atmospheric and Space Scientists	15,106	98.7
19-2032.00	Materials Scientists	14,396	99.1
19-3011.00	Economists	12,344	98.2
19-3021.00	Market Research Analysts	7,529	98.7
19-3022.00	Survey Researchers	8,654	98.4
19-3031.01	School Psychologist	24,185	98.7
19-3031.02	Clinical Psychologists	14,593	98.1
19-3031.03	Counseling Psychologists	9,677	99.1
19-3032.00	Industrial-Organizational Psychologists	19,739	99.2
19-4011.01	Agricultural Technicians	9,798	97.1
19-4011.02	Food Science Technicians	34,797	97.6
19-4041.01	Geophysical Data Technicians	9,670	99.1
19-4041.02	Geological Sample Test Technicians	7,372	98.5
19-4051.01	Nuclear Equipment Operation Technicians	7,766	98.7
19-4051.02	Nuclear Monitoring Technicians	14,408	98.2
19-4061.00	Social Science Research Assistants	20,374	99.0
19-4061.01	City and Regional Planning Aides	7,968	98.7
19-4093.00	Forest and Conservation Technicians	13,010	97.9
21-1011.00	Substance Abuse and Behavioral Disorder Counselors	34,278	98.7
21-1012.00	Educational, Vocational, and School Counselors	120,919	98.6
21-1015.00	Rehabilitation Counselors	11,708	98.3
21-1091.00	Health Educators	11,432	98.1
21-2011.00	Clergy	11,586	98.9
21-2021.00	Directors, Religious Activities and Education	19,880	98.3
23-1021.00	Administrative Law Judges, Adjudicators, and Hearing Officers	11,728	98.1
23-1022.00	Arbitrators, Mediators, and Conciliators	16,724	98.7
23-1023.00	Judges, Magistrate Judges, and Magistrates	13,273	98.5
23-2091.00	Court Reporters	15,688	98.1

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
23-2093.00	Title Examiners, Abstractors, and Searchers	10,688	98.5
25-1011.00	Business Teachers, Postsecondary	65,270	99.0
25-1021.00	Computer Science Teachers, Postsecondary	57,145	98.8
25-1022.00	Mathematical Science Teachers, Postsecondary	61,722	98.8
25-1031.00	Architecture Teachers, Postsecondary	26,594	98.7
25-1032.00	Engineering Teachers, Postsecondary	26,992	98.9
25-1041.00	Agricultural Sciences Teachers, Postsecondary	35,046	99.1
25-1042.00	Biological Science Teachers, Postsecondary	60,250	98.7
25-1043.00	Forestry and Conservation Science Teachers, Postsecondary	25,787	99.1
25-1051.00	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	26,446	99.1
25-1052.00	Chemistry Teachers, Postsecondary	37,872	99.1
25-1053.00	Environmental Science Teachers, Postsecondary	26,457	98.8
25-1054.00	Physics Teachers, Postsecondary	29,168	98.8
25-1061.00	Anthropology and Archeology Teachers, Postsecondary	19,678	99.0
25-1062.00	Area, Ethnic, and Cultural Studies Teachers, Postsecondary	15,305	98.7
25-1063.00	Economics Teachers, Postsecondary	22,871	98.8
25-1064.00	Geography Teachers, Postsecondary	20,019	98.7
25-1065.00	Political Science Teachers, Postsecondary	24,844	98.3
25-1066.00	Psychology Teachers, Postsecondary	55,385	99.1
25-1067.00	Sociology Teachers, Postsecondary	29,766	98.6
25-1071.00	Health Specialties Teachers, Postsecondary	24,258	99.4
25-1072.00	Nursing Instructors and Teachers, Postsecondary	26,067	98.6
25-1081.00	Education Teachers, Postsecondary	23,142	98.1
25-1082.00	Library Science Teachers, Postsecondary	33,475	98.8
25-1111.00	Criminal Justice and Law Enforcement Teachers, Postsecondary	17,908	99.1
25-1112.00	Law Teachers, Postsecondary	20,681	99.2
25-1113.00	Social Work Teachers, Postsecondary	22,698	98.3
25-1121.00	Art, Drama, and Music Teachers, Postsecondary	22,341	98.7
25-1122.00	Communications Teachers, Postsecondary	40,457	99.0
25-1123.00	English Language and Literature Teachers, Postsecondary	70,659	98.5
25-1124.00	Foreign Language and Literature Teachers, Postsecondary	31,323	98.5
25-1125.00	History Teachers, Postsecondary	38,379	98.7
25-1126.00	Philosophy and Religion Teachers, Postsecondary	30,712	98.7
25-1191.00	Graduate Teaching Assistants	14,889	98.8
25-1192.00	Home Economics Teachers, Postsecondary	14,898	99.0
25-1193.00	Recreation and Fitness Studies Teachers, Postsecondary	28,335	99.2
25-1194.00	Vocational Education Teachers Postsecondary	45,128	98.7
25-2011.00	Preschool Teachers, Except Special Education	39,097	96.0
25-2012.00	Kindergarten Teachers, Except Special Education	34,560	98.5

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
25-2021.00	Elementary School Teachers, Except Special Education	39,992	98.6
25-2022.00	Middle School Teachers, Except Special and Vocational Education	95,310	98.4
25-2023.00	Vocational Education Teachers, Middle School	35,910	98.0
25-2031.00	Secondary School Teachers, Except Special and Vocational Education	33,431	98.4
25-2032.00	Vocational Education Teachers, Secondary School	53,873	98.4
25-2041.00	Special Education Teachers, Preschool, Kindergarten, and Elementary School	37,028	98.4
25-2042.00	Special Education Teachers, Middle School	69,489	98.7
25-2043.00	Special Education Teachers, Secondary School	40,646	98.9
25-3011.00	Adult Literacy, Remedial Education, and GED Teachers and Instructors	37,364	98.2
25-3021.00	Self-Enrichment Education Teachers	19,307	97.9
25-4011.00	Archivists	12,085	98.5
25-9031.00	Instructional Coordinators	21,561	98.8
25-9041.00	Teacher Assistants	84,806	97.6
27-1013.00	Fine Artists, Including Painters, Sculptors, and Illustrators	17,152	98.0
27-1014.00	Multi-Media Artists and Animators	15,924	97.3
27-1021.00	Commercial and Industrial Designers	13,601	98.0
27-1022.00	Fashion Designers	11,189	97.3
27-1026.00	Merchandise Displayers and Window Trimmers	14,632	97.2
27-1027.00	Set and Exhibit Designers	12,146	99.3
27-2011.00	Actors	13,348	98.6
27-2012.03	Program Directors	13,191	99.2
27-2012.04	Talent Directors	13,075	98.7
27-2021.00	Athletes and Sports Competitors	10,742	98.8
27-2031.00	Dancers	16,035	98.2
27-2041.01	Music Directors	13,186	98.2
27-2041.02	Music Composers and Arrangers	11,824	98.4
27-2042.01	Singers	8,031	98.4
27-2042.02	Musicians, Instrumental	8,975	97.8
27-3012.00	Public Address System and Other Announcers	12,102	98.2
27-3021.00	Broadcast News Analysts	8,079	99.4
27-3091.00	Interpreters and Translators	12,148	98.1
27-4014.00	Sound Engineering Technicians	10,490	98.9
27-4021.00	Photographers	15,143	98.7
29-1011.00	Chiropractors	17,376	99.0
29-1021.00	Dentists, General	10,202	96.2
29-1022.00	Oral and Maxillofacial Surgeons	8,984	99.0

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
29-1023.00	Orthodontists	7,979	98.4
29-1024.00	Prosthodontists	9,126	98.5
29-1061.00	Anesthesiologists	18,157	98.7
29-1062.00	Family and General Practitioners	11,929	97.6
29-1063.00	Internists, General	13,224	98.3
29-1064.00	Obstetricians and Gynecologists	16,976	98.0
29-1065.00	Pediatricians, General	21,921	98.2
29-1067.00	Surgeons	18,716	98.4
29-1081.00	Podiatrists	9,654	98.2
29-1121.00	Audiologists	27,523	99.1
29-2053.00	Psychiatric Technicians	8,210	96.1
31-2012.00	Occupational Therapist Aides	8,540	98.5
31-9011.00	Massage Therapists	10,505	97.7
31-9094.00	Medical Transcriptionists	18,370	98.4
33-1011.00	First-Line Supervisors/Managers of Correctional Officers	19,112	98.6
33-1021.02	Forest Fire Fighting and Prevention Supervisors	16,770	97.6
33-2021.02	Fire Investigators	11,789	99.1
33-2022.00	Forest Fire Inspectors and Prevention Specialists	9,744	98.7
33-3021.03	Criminal Investigators and Special Agents	12,466	98.1
33-3021.05	Immigration and Customs Inspectors	22,089	98.5
33-3041.00	Parking Enforcement Workers	12,412	97.4
33-3051.03	Sheriffs and Deputy Sheriffs	11,964	98.6
33-3052.00	Transit and Railroad Police	8,965	98.2
33-9011.00	Animal Control Workers	10,651	97.4
33-9021.00	Private Detectives and Investigators	17,848	98.8
33-9091.00	Crossing Guards	10,652	96.2
35-1011.00	Chefs and Head Cooks	13,731	97.7
35-2012.00	Cooks, Institution and Cafeteria	13,746	95.2
35-3041.00	Food Servers, Nonrestaurant	12,323	95.8
35-9011.00	Dining Room and Cafeteria Attendants and Bartender Helpers	13,469	96.7
35-9021.00	Dishwashers	13,258	93.8
37-1011.00	First-Line Supervisors/Managers of Housekeeping and Janitorial Workers	17,724	96.8
37-1012.00	First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers	23,727	97.6
37-2011.00	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	19,636	95.9
37-2012.00	Maids and Housekeeping Cleaners	15,816	93.5
37-2021.00	Pest Control Workers	11,340	97.2
37-3011.00	Landscaping and Groundskeeping Workers	31,220	96.8
37-3012.00	Pesticide Handlers, Sprayers, and Applicators, Vegetation	18,246	97.7

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
37-3013.00	Tree Trimmers and Pruners	22,649	97.4
39-1021.00	First-Line Supervisors/Managers of Personal Service Workers	11,416	98.2
39-2011.00	Animal Trainers	12,696	98.5
39-3012.00	Gaming and Sports Book Writers and Runners	10,297	97.2
39-3021.00	Motion Picture Projectionists	17,023	98.7
39-3092.00	Costume Attendants	9,095	97.0
39-5011.00	Barbers	18,917	96.0
39-5092.00	Manicurists and Pedicurists	10,180	97.8
39-5094.00	Skin Care Specialists	20,563	97.7
39-6022.00	Travel Guides	8,166	98.0
39-6031.00	Flight Attendants	24,883	98.4
39-6032.00	Transportation Attendants, Except Flight Attendants and Baggage Porters	13,100	96.3
39-9041.00	Residential Advisors	26,434	98.9
41-1012.00	First-Line Supervisors/Managers of Non-Retail Sales Workers	13,878	98.4
41-2012.00	Gaming Change Persons and Booth Cashiers	8,431	96.6
41-3031.01	Sales Agents, Securities and Commodities	11,626	98.3
41-3031.02	Sales Agents, Financial Services	8,204	99.3
41-4011.00	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	15,949	98.1
41-4012.00	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	17,165	98.5
41-9011.00	Demonstrators and Product Promoters	11,828	97.7
41-9012.00	Models	7,980	98.4
41-9031.00	Sales Engineers	11,978	98.9
43-1011.00	First-Line Supervisors/Managers of Office and Administrative Support Workers	87,724	98.7
43-2021.00	Telephone Operators	11,199	96.9
43-3021.01	Statement Clerks	8,294	97.6
43-4011.00	Brokerage Clerks	6,640	97.9
43-4021.00	Correspondence Clerks	8,951	97.9
43-4031.03	License Clerks	16,006	95.7
43-4041.01	Credit Authorizers	6,594	98.5
43-4041.02	Credit Checkers	7,035	97.8
43-4061.00	Eligibility Interviewers, Government Programs	12,010	98.1
43-4131.00	Loan Interviewers and Clerks	23,818	98.0
43-4181.00	Reservation and Transportation Ticket Agents and Travel Clerks	9,257	97.5
43-5011.00	Cargo and Freight Agents	12,872	98.9
43-5021.00	Couriers and Messengers	15,938	95.6
43-5041.00	Meter Readers, Utilities	14,003	98.3

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
43-5051.00	Postal Service Clerks	21,139	97.6
43-5052.00	Postal Service Mail Carriers	20,536	97.9
43-5053.00	Postal Service Mail Sorters, Processors, and Processing Machine Operators	7,927	96.9
43-5061.00	Production, Planning, and Expediting Clerks	22,498	98.3
43-5081.02	Marking Clerks	6,399	96.1
43-5111.00	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	12,835	96.3
43-9021.00	Data Entry Keyers	13,613	97.4
43-9041.01	Insurance Claims Clerks	11,620	96.2
43-9051.00	Mail Clerks and Mail Machine Operators, Except Postal Service	19,313	96.0
43-9071.00	Office Machine Operators, Except Computer	15,961	97.5
43-9111.00	Statistical Assistants	9,566	98.7
45-1011.01	First-Line Supervisors and Manager/Supervisors - Agricultural Crop and Horticultural Workers	16,108	98.6
45-1011.02	First-Line Supervisors and Manager/Supervisors - Animal Husbandry and Animal Care Workers	13,390	97.7
45-1011.05	First-Line Supervisors and Manager/Supervisors - Logging Workers	10,754	97.8
45-2021.00	Animal Breeders	9,825	98.1
45-2041.00	Graders and Sorters, Agricultural Products	11,070	94.7
45-2091.00	Agricultural Equipment Operators	14,982	95.9
45-2092.01	Nursery Workers	13,019	95.2
45-2092.02	Farm Workers, Crop	10,828	94.6
45-2093.00	Farmworkers, Farm and Ranch Animals	12,687	95.6
45-3011.00	Fishers and Related Fishing Workers	18,814	97.1
45-4011.00	Forest and Conservation Workers	19,370	97.3
45-4021.00	Fallers	9,245	98.0
45-4022.00	Logging Equipment Operators	9,545	96.7
45-4023.00	Log Graders and Scalers	7,819	96.7
47-1011.00	First-Line Supervisors/Managers of Construction Trades and Extraction Workers	20,756	98.6
47-2011.00	Boilermakers	16,299	98.1
47-2022.00	Stonemasons	11,995	97.0
47-2042.00	Floor Layers, Except Carpet, Wood, and Hard Tiles	9,784	98.1
47-2051.00	Cement Masons and Concrete Finishers	11,416	97.5
47-2053.00	Terrazzo Workers and Finishers	24,404	97.7
47-2061.00	Construction Laborers	16,606	97.2
47-2073.00	Operating Engineers and Other Construction Equipment Operators	22,540	97.6
47-2081.00	Drywall and Ceiling Tile Installers	17,739	96.9
47-2082.00	Tapers	13,109	97.5

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
47-2121.00	Glaziers	10,404	97.3
47-2131.00	Insulation Workers, Floor, Ceiling, and Wall	9,929	96.3
47-2132.00	Insulation Workers, Mechanical	15,282	97.3
47-2141.00	Painters, Construction and Maintenance	14,449	96.8
47-2151.00	Pipelayers	11,730	97.9
47-2161.00	Plasterers and Stucco Masons	13,372	97.2
47-2171.00	Reinforcing Iron and Rebar Workers	11,167	96.7
47-2181.00	Roofers	15,506	96.8
47-2221.00	Structural Iron and Steel Workers	13,101	97.0
47-3011.00	Helpers—Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	10,901	96.0
47-3012.00	Helpers—Carpenters	11,576	97.7
47-3014.00	Helpers—Painters, Paperhangers, Plasterers, and Stucco Masons	12,535	95.8
47-4021.00	Elevator Installers and Repairers	11,506	97.3
47-4031.00	Fence Erectors	14,492	96.5
47-4041.00	Hazardous Materials Removal Workers	9,956	97.3
47-4061.00	Rail-Track Laying and Maintenance Equipment Operators	22,614	96.5
47-4071.00	Septic Tank Servicers and Sewer Pipe Cleaners	14,957	96.3
47-4091.00	Segmental Pavers	8,787	97.7
47-5011.00	Derrick Operators, Oil and Gas	10,025	96.0
47-5012.00	Rotary Drill Operators, Oil and Gas	14,650	97.9
47-5013.00	Service Unit Operators, Oil, Gas, and Mining	22,105	97.8
47-5021.00	Earth Drillers, Except Oil and Gas	11,820	96.9
47-5042.00	Mine Cutting and Channeling Machine Operators	9,078	95.5
47-5071.00	Roustabouts, Oil and Gas	13,400	97.9
47-5081.00	Helpers—Extraction Workers	10,970	97.6
49-2011.00	Computer, Automated Teller, and Office Machine Repairers	18,358	98.6
49-2021.00	Radio Mechanics	11,174	97.9
49-2022.00	Telecommunications Equipment Installers and Repairers, Except Line Installers	29,167	98.2
49-2091.00	Avionics Technicians	8,359	98.7
49-2092.00	Electric Motor, Power Tool, and Related Repairers	25,412	97.1
49-2093.00	Electrical and Electronics Installers and Repairers, Transportation Equipment	9,190	98.3
49-2095.00	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	15,701	97.5
49-2096.00	Electronic Equipment Installers and Repairers, Motor Vehicles	14,452	98.2
49-2097.00	Electronic Home Entertainment Equipment Installers and Repairers	12,298	98.3
49-2098.00	Security and Fire Alarm Systems Installers	19,142	98.6

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
49-3011.00	Aircraft Mechanics and Service Technicians	14,812	98.9
49-3022.00	Automotive Glass Installers and Repairers	13,069	98.0
49-3023.02	Automotive Specialty Technicians	10,861	98.4
49-3041.00	Farm Equipment Mechanics	14,674	97.8
49-3043.00	Rail Car Repairers	8,995	95.7
49-3051.00	Motorboat Mechanics	21,381	98.0
49-3052.00	Motorcycle Mechanics	12,337	97.0
49-3053.00	Outdoor Power Equipment and Other Small Engine Mechanics	13,930	98.1
49-3093.00	Tire Repairers and Changers	12,663	95.8
49-9011.00	Mechanical Door Repairers	16,841	98.7
49-9012.00	Control and Valve Installers and Repairers, Except Mechanical Door	24,764	97.6
49-9031.00	Home Appliance Repairers	12,080	98.6
49-9041.00	Industrial Machinery Mechanics	25,656	98.4
49-9043.00	Maintenance Workers, Machinery	28,775	98.1
49-9045.00	Refractory Materials Repairers, Except Brickmasons	10,350	96.2
49-9051.00	Electrical Power-Line Installers and Repairers	14,040	97.3
49-9052.00	Telecommunications Line Installers and Repairers	22,844	98.3
49-9061.00	Camera and Photographic Equipment Repairers	24,583	98.2
49-9091.00	Coin, Vending, and Amusement Machine Servicers and Repairers	17,691	96.8
49-9092.00	Commercial Divers	14,417	98.4
49-9094.00	Locksmiths and Safe Repairers	9,591	96.4
49-9095.00	Manufactured Building and Mobile Home Installers	7,109	98.0
49-9096.00	Riggers	14,993	97.4
49-9097.00	Signal and Track Switch Repairers	13,667	98.0
51-1011.00	First-Line Supervisors/Managers of Production and Operating Workers	102,534	98.3
51-2011.00	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	10,711	97.9
51-2021.00	Coil Winders, Tapers, and Finishers	8,941	96.8
51-2022.00	Electrical and Electronic Equipment Assemblers	8,284	95.2
51-2023.00	Electromechanical Equipment Assemblers	15,714	97.6
51-2031.00	Engine and Other Machine Assemblers	15,898	98.0
51-2041.00	Structural Metal Fabricators and Fitters	11,564	96.5
51-2091.00	Fiberglass Laminators and Fabricators	14,622	96.2
51-2092.00	Team Assemblers	24,188	97.7
51-3011.00	Bakers	15,694	97.6
51-3021.00	Butchers and Meat Cutters	12,906	96.1
51-3022.00	Meat, Poultry, and Fish Cutters and Trimmers	8,660	94.7
51-3023.00	Slaughterers and Meat Packers	9,879	96.9

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
51-3091.00	Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders	9,081	97.6
51-4011.00	Computer-Controlled Machine Tool Operators, Metal and Plastic	17,180	98.5
51-4012.00	Numerical Tool and Process Control Programmers	11,980	98.1
51-4021.00	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	13,409	96.7
51-4022.00	Forging Machine Setters, Operators, and Tenders, Metal and Plastic	10,416	96.8
51-4023.00	Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	12,308	97.2
51-4031.00	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	34,653	96.6
51-4032.00	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	10,246	97.0
51-4033.00	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	10,762	97.3
51-4034.00	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	17,105	98.2
51-4035.00	Milling and Planning Machine Setters, Operators, and Tenders, Metal and Plastic	13,992	98.0
51-4051.00	Metal-Refining Furnace Operators and Tenders	9,710	96.2
51-4052.00	Pourers and Casters, Metal	11,297	96.0
51-4061.00	Model Makers, Metal and Plastic	21,207	98.5
51-4062.00	Patternmakers, Metal and Plastic	16,901	98.3
51-4071.00	Foundry Mold and Coremakers	9,086	97.4
51-4072.00	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	17,051	96.3
51-4081.00	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	16,669	98.1
51-4111.00	Tool and Die Makers	12,351	98.8
51-4121.01	Welders, Cutters, and Welder Fitters	26,281	97.7
51-4121.07	Solderers and Brazers	10,443	97.9
51-4122.00	Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	18,252	97.3
51-4191.00	Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	9,921	98.1
51-4192.00	Lay-Out Workers, Metal and Plastic	8,921	98.7
51-4193.00	Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	15,061	96.4
51-4194.00	Tool Grinders, Filers, and Sharpeners	15,767	98.2
51-5011.00	Bindery Workers	18,789	98.0
51-5012.00	Bookbinders	9,337	98.7
51-5021.00	Job Printers	11,672	98.1

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
51-5022.00	Prepress Technicians and Workers	24,661	97.5
51-5023.00	Printing Machine Operators	26,796	98.0
51-6011.00	Laundry and Dry-Cleaning Workers	11,026	95.0
51-6021.00	Pressers, Textile, Garment, and Related Materials	12,524	92.9
51-6031.00	Sewing Machine Operators	19,622	92.4
51-6041.00	Shoe and Leather Workers and Repairers	18,636	96.7
51-6042.00	Shoe Machine Operators and Tenders	10,727	95.9
51-6052.00	Tailors, Dressmakers, and Custom Sewers	12,459	96.6
51-6061.00	Textile Bleaching and Dyeing Machine Operators and Tenders	17,359	95.4
51-6062.00	Textile Cutting Machine Setters, Operators, and Tenders	14,773	94.2
51-6063.00	Textile Knitting and Weaving Machine Setters, Operators, and Tenders	11,460	93.3
51-6064.00	Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders	17,914	95.0
51-6091.00	Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers	9,904	97.9
51-6092.00	Fabric and Apparel Patternmakers	10,991	97.9
51-6093.00	Upholsterers	15,722	96.4
51-7011.00	Cabinetmakers and Bench Carpenters	15,642	96.3
51-7021.00	Furniture Finishers	14,262	94.2
51-7031.00	Model Makers, Wood	8,313	97.5
51-7032.00	Patternmakers, Wood	12,851	98.6
51-7041.00	Sawing Machine Setters, Operators, and Tenders, Wood	23,744	95.8
51-7042.00	Woodworking Machine Setters, Operators, and Tenders, Except Sawing	25,573	97.0
51-8011.00	Nuclear Power Reactor Operators	13,833	99.3
51-8012.00	Power Distributors and Dispatchers	14,034	99.1
51-8013.00	Power Plant Operators	11,205	98.4
51-8021.00	Stationary Engineers and Boiler Operators	13,262	97.8
51-8091.00	Chemical Plant and System Operators	17,141	98.2
51-8092.00	Gas Plant Operators	12,097	97.6
51-8093.00	Petroleum Pump System Operators, Refinery Operators, and Gaugers	13,079	98.5
51-9011.00	Chemical Equipment Operators and Tenders	12,753	97.6
51-9012.00	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	16,968	98.6
51-9021.00	Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	17,771	98.3
51-9022.00	Grinding and Polishing Workers, Hand	13,639	95.5
51-9023.00	Mixing and Blending Machine Setters, Operators, and Tenders	24,017	98.0
51-9031.00	Cutters and Trimmers, Hand	13,844	95.7

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
51-9032.00	Cutting and Slicing Machine Setters, Operators, and Tenders	25,819	95.5
51-9041.00	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	12,623	97.6
51-9061.00	Inspectors, Testers, Sorters, Samplers, and Weighers	33,381	97.2
51-9081.00	Dental Laboratory Technicians	16,476	97.2
51-9082.00	Medical Appliance Technicians	18,097	98.7
51-9083.00	Ophthalmic Laboratory Technicians	8,215	97.4
51-9121.00	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	14,591	96.9
51-9122.00	Painters, Transportation Equipment	18,565	97.6
51-9123.00	Painting, Coating, and Decorating Workers	13,726	97.6
51-9131.00	Photographic Process Workers	20,890	98.2
51-9132.00	Photographic Processing Machine Operators	13,978	97.8
51-9141.00	Semiconductor Processors	11,903	96.6
51-9191.00	Cementing and Gluing Machine Operators and Tenders	13,146	97.3
51-9192.00	Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	7,657	96.0
51-9193.00	Cooling and Freezing Equipment Operators and Tenders	13,247	97.0
51-9194.00	Etchers and Engravers	11,860	96.7
51-9195.04	Glass Blowers, Molders, Benders, and Finishers	13,737	97.9
51-9195.07	Molding and Casting Workers	17,443	97.3
51-9196.00	Paper Goods Machine Setters, Operators, and Tenders	10,809	97.9
51-9197.00	Tire Builders	9,177	95.6
51-9198.00	Helpers—Production Workers	21,194	96.6
53-1011.00	Aircraft Cargo Handling Supervisors	8,061	98.2
53-1021.00	First-Line Supervisors/Managers of Helpers, Laborers, and Material Movers, Hand	22,587	98.8
53-1031.00	First-Line Supervisors/Managers of Transportation and Material-Moving Machine and Vehicle Operators	13,427	98.1
53-2011.00	Airline Pilots, Copilots, and Flight Engineers	29,714	98.7
53-2012.00	Commercial Pilots	15,682	98.1
53-2021.00	Air Traffic Controllers	14,293	98.3
53-2022.00	Airfield Operations Specialists	8,887	98.8
53-3011.00	Ambulance Drivers and Attendants, Except Emergency Medical Technicians	10,689	98.4
53-3022.00	Bus Drivers, School	28,434	97.2
53-3032.00	Truck Drivers, Heavy and Tractor-Trailer	26,071	96.8
53-3033.00	Truck Drivers, Light or Delivery Services	10,293	98.1
53-4011.00	Locomotive Engineers	11,471	97.5
53-4013.00	Rail Yard Engineers, Dinkey Operators, and Hostlers	13,604	96.8
53-4021.00	Railroad Brake, Signal, and Switch Operators	16,584	98.3

continued

Exhibit H-12. Item response Rates by Occupation (continued)

SOC	SOC Title	Questions	Response Rate (%)
53-4031.00	Railroad Conductors and Yardmasters	12,692	99.0
53-4041.00	Subway and Streetcar Operators	21,987	97.2
53-5011.00	Sailors and Marine Oilers	13,016	96.4
53-5021.01	Ship and Boat Captains	22,678	97.9
53-5021.02	Mates- Ship, Boat, and Barge	15,579	98.1
53-5021.03	Pilots, Ship	16,739	98.1
53-5022.00	Motorboat Operators	12,223	98.5
53-5031.00	Ship Engineers	15,671	97.2
53-6031.00	Service Station Attendants	10,724	96.5
53-6041.00	Traffic Technicians	17,906	98.1
53-6051.01	Aviation Inspectors	9,318	98.4
53-6051.02	Transportation Vehicle and Equipment Inspectors, Except Aviation	13,441	97.4
53-7011.00	Conveyor Operators and Tenders	12,644	96.6
53-7021.00	Crane and Tower Operators	9,361	96.9
53-7032.00	Excavating and Loading Machine and Dragline Operators	17,426	98.3
53-7062.00	Laborers and Freight, Stock, and Material Movers, Hand	31,770	96.4
53-7063.00	Machine Feeders and Offbearers	21,509	97.5
53-7071.00	Gas Compressor and Gas Pumping Station Operators	13,959	97.9
53-7072.00	Pump Operators, Except Wellhead Pumpers	12,659	96.8
53-7081.00	Refuse and Recyclable Material Collectors	15,045	97.7
53-7121.00	Tank Car, Truck, and Ship Loaders	7,920	97.9

References for Appendix H

- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Graham, J. W., Hofer, S. M., & Piccinin, A. M. (1994). Analysis with missing data in drug prevention research. In L. M. Collins & L. A. Seitz (Eds.), *Advances in data analysis for prevention intervention research*. Bethesda, MD: National Institute on Drug Abuse.
- Kish, L. (1965). *Survey sampling*. New York: Wiley.
- Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data*. New York: Wiley.
- Schafer, J. L. (2000). *Analysis of incomplete multivariate data*. New York: Chapman & Hall.
- Willimack, D. K., Nichols, E., & Sudman, S. (2002). Understanding unit and item nonresponse in business surveys. In R. M. Groves, D. A. Dillman, J. L. Eltinge & R. J. A. Little (Eds.), *Survey nonresponse*. New York: Wiley.

Appendix I: The Generalized Exponential Model for Sampling Weight Calibration for Extreme Values, Nonresponse, and Poststratification¹

¹ Folsom, R. E., & Singh, A. C. (2000). A generalized exponential model of sampling weight calibration for extreme values, nonresponse and poststratification. *Proceedings of the American Statistical Association, Section on Survey Research Methods*, 598–603.

THE GENERALIZED EXPONENTIAL MODEL FOR SAMPLING WEIGHT CALIBRATION FOR EXTREME VALUES, NONRESPONSE, AND POSTSTRATIFICATION

R. E. Folsom, Jr. and A.C. Singh, Research Triangle Institute
R.E. Folsom, RTI, P. O. Box 12194, Research Triangle Park, NC 27709 ref@rti.org

Key Words: Extreme Values, Nonresponse, Poststratification

1. Introduction

Consider a finite population U from which a sample of size n is selected using the design $p(s)$. Denote the data by (y_k, x_k, d_k) , $k \in s$, where for the k^{th} unit in the sample, y_k is the study variable, x_k is a p -vector of covariates or predictor variables; and d_k is the design weight. In practice, the d -weights are often adjusted to get the final w -weights in view of the triple concerns of (i) variance inflation of small domain estimates due to extreme values, (ii) bias due to nonresponse (nr), and (iii) bias due to under/over coverage. For the first one, winsorization (i.e., trimming part of the weight beyond the boundary defining extreme values) is often used to adjust extreme values but this may lose its impact after adjustments for nr and coverage; for the second one, weights are adjusted by the inverse response propensity factor (this is typically implemented by calibrating respondent weights to (random) control totals for covariates in the nr model obtained from the full sample of respondents and nonrespondents) but in the process some weights could become extreme; and for the third one, weights are adjusted by poststratification (ps) (this is typically realized by calibrating weights to nonrandom controls for covariates in the ps model) but in the process some of the final weights could also become extreme. Note that while random controls used in calibration (as in the case of nr and extreme weights resulting from calibration (for nr and ps adjustments) may have the undesirable effect of inflating the variance, this effect could be offset by the anticipated variance reduction due to the correlation between y and x .

There exist methods in the literature which impose bounds on the adjustment factor for ps, see e.g., Deville and Särndal (1992), Rao and Singh (1997) and the review by Singh and Mohl (1996). However, they do not directly restrict the adjusted weight from being too extreme. In this paper we consider the problem of developing a unified approach of weight calibration to address the above three concerns such that there are built-in controls on the adjustment factors to prevent the adjusted weight from being too extreme. For this purpose the logit-type model of Deville and Särndal (1992), denoted by DS in the sequel, is generalized to allow for more general and unit-specific bounds. A review of the DS model is provided in Section 2, and the proposed

model is described in Section 3. The asymptotic properties of the proposed calibration estimator are presented in Section 4, and a comparison with alternative methods is given in Section 5. Finally, Section 6 contains numerical results comparing different methods using the 1999 NHSDA data followed by concluding remarks in section 7.

2. The Deville-Särndal Model for Weight Calibration and Statement of the Problem

For ps, in the logit-type model of Deville-Särndal the adjustment factor for unit k is modeled as:

$$a_k(\lambda) = \frac{\ell(u-1) + u(1-\ell) \exp(Ax_k'\lambda)}{(u-1) + (1-\ell) \exp(Ax_k'\lambda)}, \quad (2.1)$$

where $\ell < 1 < u$, $A = (u-\ell)/(u-1)(1-\ell)$; ℓ, u are user-specified bounds, and λ is the column vector of p model parameters corresponding to the p covariates x . The coefficient A in (2.1) is useful to control the behavior of $a_k(\lambda)$ as the lower or the upper bound approach the center 1. For instance, in the absence of A , $a_k(\lambda)$ goes to 1 as u goes to 1 regardless of whether $x_k'\lambda$ is positive or negative which is clearly undesirable. However, in the presence of A , as u approaches 1, $a_k(\lambda)$ goes to 1 if $x_k'\lambda$ is positive, and to the lower bound if it is negative. Also note that by construction, $\ell < a_k < u$, and as $\ell \rightarrow 0$, $u \rightarrow \infty$, $a_k(\lambda) \rightarrow \exp(x_k'\lambda)$ which is the exponential model corresponding to the Raking-Ratio method of poststratification.

The model parameters λ are estimated from

$$\sum_s x_k d_k a_k(\lambda) - T_x = 0, \quad (2.2)$$

where T_x is the vector of ps controls. The adjusted weights $w_k := d_k a_k$ are close to d_k in that they minimize $\Delta(w, d)$ (defined below) subject to (2.2)

$$\frac{1}{A} \sum_s d_k \left\{ (a_k - \ell) \log \frac{a_k - \ell}{1 - \ell} + (u - a_k) \log \frac{u - a_k}{u - 1} \right\} \quad (2.3)$$

We wish to generalize the above DS model to allow for

- (i) $\ell \geq 1$; this would be useful for the nonresponse adjustment. This implies that we need to change the center from 1 to c such that $1 \leq \ell \leq c \leq u$.
- (ii) nonuniform bounds (ℓ, u) for different subgroups of weights, e.g., (ℓ_1, u_1) for high extreme values, (ℓ_2, u_2) for nonextreme, and (ℓ_3, u_3) for low extreme values. This would be

useful for providing built-in controls over final adjusted weights for initially identified extreme values.

- (iii) a separate weight adjustment for extreme values after nr and ps adjustments. This can be achieved in a manner similar to ps except that the resulting weights meet the tighter bounds on the adjustment factor while continuing to satisfy the ps controls, i.e., preserve the sample distribution of various ps variables.

3. The Proposed Model

We propose a generalized exponential model (GEM) with unit-specific bounds (ℓ_k, u_k) , $k \in s$, for the adjustment factor $a_k(\lambda)$ as follows:

$$a_k(\lambda) = \frac{\ell_k(u_k - c_k) + u_k(c_k - \ell_k) \exp(A_k x_k' \lambda)}{(u_k - c_k) + (c_k - \ell_k) \exp(A_k x_k' \lambda)}, \quad (3.1)$$

where c_k are prespecified centering constants, such that $\ell_k < c_k < u_k$ and $A_k = (u_k - \ell_k) / (u_k - c_k)(c_k - \ell_k)$. Note that when $\ell_k \rightarrow -1$, $c_k \rightarrow 2$, and $u_k \rightarrow \infty$, the $a_k(\lambda)$ approaches the inverse logistic function $1 + e^{-x_k' \lambda}$.

The λ -parameters are estimated by solving

$$\sum_s x_k d_k a_k(\lambda) - \tilde{T}_x = 0, \quad (3.2)$$

where \tilde{T}_x denote control totals which could be either nonrandom as is generally the case with ps, or random as is generally the case for nr adjustment.

The final weights $w_k := d_k a_k$ minimize the distance function $\Delta(w, d)$ defined as before except that $(\ell, 1, u)$ is replaced by (ℓ_k, c_k, u_k) , and A by A_k .

Although the proposed model allows for arbitrary unit-specific bounds, in practice, it would generally be sufficient to specify three sets of bounds on the adjustment factors, $(\ell_1 m_k, u_1 m_k)$, $(\ell_2 m_k, u_2 m_k)$, and $(\ell_3 m_k, u_3 m_k)$ for high extreme, nonextreme, and low extreme values identified among the initial weights where $m_k = b_k / d_k$, b_k is the winsorized value of the design weight d_k corresponding to different domains defining extreme values. Clearly, $m_k = 1$ for nonextreme values. In specifying bounds (ℓ, u) 's, we may first choose them for nonextremes, and then set $\ell_1 = \ell_2$, $u_3 = u_2$, and choose u_1 close to c_1 , and ℓ_3 close to c_3 . All the three centering constants are typically set to a common value; in the case of ps it is 1, in the case of nr it can be chosen as inverse of the overall response propensity, and in the case of adjustment for extreme weights, it is set to 1 as in the case of ps. It may be noted that allowing A_k to vary with k might compromise the correlation of the covariate x with y . In practice, it would be sufficient to have only three values of A_k corresponding to high extreme, nonextreme, and low extreme values, e.g., for high extremes, we can set $A_k = (u_1 - \ell_1) / (u_1 - c_1)(c_1 - \ell_1)$; i.e.,

remove the factor m_k from the denominator. Note that the factor A_k cannot be dropped for reasons mentioned earlier.

Assuming that the solution exists, the model can be fit using Newton-Raphson iterative steps as follows. Let X denote the $n \times p$ matrix of auxiliary (or predictor) variables x , and for the v th iteration, let

$$\Gamma_{\phi v} = \text{diag}(d_k \phi_k^{(v)}), \phi_k^{(0)} = 1, \\ \phi_k^{(v)} = (u_k - a_k^{(v)}) (a_k^{(v)} - \ell_k) / (u_k - c_k) (c_k - \ell_k) .$$

Now the value of the vector λ at iteration v is adjusted as

$$\lambda^{(v)} = \lambda^{(v-1)} + (X' \Gamma_{\phi, v-1} X)^{-1} (T_x - \hat{T}_x^{(v-1)}) \\ \text{where } \lambda^{(0)} = 0.$$

The convergence criterion is based on the Euclidean distance $\|T_x - \hat{T}_x^{(v)}\|$. At each iteration, it is checked whether it is decreasing or not. If not, then half-step length is used in the iteration increment.

4. Properties of the GEM Calibration Estimator

4.1 Asymptotic Consistency

Assume the asymptotic setup of Isaki and Fuller (1982). For ps when there is no coverage bias, the weight is adjusted primarily with the goal of variance reduction. In this case, under regularity conditions (see e.g., Deville, and Särndal, 1992) which include the design-consistency of the Horvitz-Thompson estimator, we have

$$\hat{\lambda}_n = O_p(n^{-1/2}), \text{ and}$$

$$N^{-1} [\sum_s y_k d_k a_k(\hat{\lambda}_n) - T_y] \rightarrow 0 \text{ (in design prob.)},$$

i.e., the calibrated estimator is also design-consistent for the population total T_y . Note that in the model for $a_k(\lambda)$ as explained in the previous section, l_1, u_1 etc are supposed to be prespecified. The m_k , however, are sample dependent and hence random. Under our asymptotics, we assume that $m_k \rightarrow 1$ in probability uniformly in k so that asymptotically we have only one set of bounds (l_2, u_2) which are nonrandom as in the DS model. This is only an heuristic argument, and needs rigorous justification. The variance estimators presented in this section do not take into account of the random variability in m_k . When there is coverage bias, assume a superpopulation model ξ_1 for the multiplicities variable $(\eta_k, \text{ say})$ taking nonnegative integer values, i.e., for each k in U

$$E_{\xi_1} (\# \text{ times the } k\text{th unit in } U \text{ is enumerated}) = a_k^{-1}(\lambda), \quad (4.1)$$

For an explanation of this model, see Singh and Folsom (2000). It follows that for known λ , the calibrated estimator is $p\xi_1$ -unbiased. Now, under regularity

conditions with respect to the joint $p\xi_1$ -distribution, the estimator $\hat{\lambda}_n$ is an asymptotically consistent estimate of λ . Next using Taylor expansion of the estimator $\hat{T}_y(\hat{\lambda}_n)$ about λ , the poststratified estimator can be shown to be $p\xi_1$ -consistent.

For nr adjustment, assume that specific to the survey objectives and conditions, one can assign a value of 1 or 0 for the response indicator to each unit in the finite population. Now suppose ξ_2 denotes the superpopulation model for the response indicator (δ_k , say), i.e., for each k in U ,

$$P_{\xi_2}(\text{kth unit in } U \text{ responds}) = a_k^{-1}(\lambda), \quad (4.2)$$

Analogous to ps, asymptotic consistency of the nr adjusted estimator follows. To show asymptotic consistency under both nr and ps adjustments, we need to assume two independent superpopulation models ξ_1 and ξ_2 giving rise to adjustment factors $a_{1k}(\lambda_1)$ and $a_{2k}(\lambda_2)$. Now as before, the estimator $\sum_s y_k d_k a_{1k}(\lambda_1) a_{2k}(\lambda_2)$ is $p\xi_1 \xi_2$ -unbiased, and asymptotic consistency of the calibration estimator involving estimates $(\hat{\lambda}_1, \hat{\lambda}_2)$ is established by Taylor expansion about (λ_1, λ_2) and the asymptotic consistency of $(\hat{\lambda}_1, \hat{\lambda}_2)$.

The extreme value adjustment is part of nr and ps under GEM. If an additional adjustment for extreme values (ev) is used after ps, then as mentioned earlier in Section 2, it is performed by another ps-type GEM such that sample distribution by various ps control variables is preserved but the extreme values are controlled by tight bounds. Thus ev adjustment is analogous to ps (for the case of no coverage bias), and the resulting estimate is design-consistent.

4.2 Asymptotic Variance

For nonresponse, the design-based variance of $\hat{T}_y(\hat{\lambda}_n)$ defined below is obtained about $\sum_U y_k \delta_k a_k(\lambda)$, which is the conditional mean given ξ_2 , and δ_k is the response indicator at the population level. For coverage, the variance is also conditional about $\sum_U y_k a_k(\lambda)$ (or $\sum_U y_k \eta_k a_k(\lambda)$) given ξ_1 where the population U' exhibits both types of coverage errors (over or under) but U denotes the actual population. Notice that values of the multiplicity factor (η_k) are not needed for unbiased estimation because the target parameter based on U' doesn't involve η_k . The design-based variance gives only the conditional variance. In fact, we need the variance about $T_y := \sum_U y_k$, but the second term in the unconditional variance is negligible by comparison. Observe that

$$\hat{T}_y(\hat{\lambda}_n) := \sum_s y_k d_k a_k(\hat{\lambda}_n) \approx \hat{T}_y(\lambda) + H_{12}(\lambda)(\hat{\lambda}_n - \lambda) \quad (4.3)$$

where

$$\hat{T}_y(\lambda) := \sum_s y_k d_k a_k(\lambda), \quad H_{12}(\lambda) = \sum_s y_k (\partial a_k(\lambda) / \partial \lambda)' d_k$$

Moreover, since $\hat{\lambda}_n$ solves (3.2), we get from Taylor,

$$0 = \hat{T}_x(\hat{\lambda}_n) - \bar{T}_x \approx (\hat{T}_x(\lambda) - \bar{T}_x) + H_{22}(\lambda)(\hat{\lambda}_n - \lambda),$$

where

$$H_{22}(\lambda) = \sum_s x_k (\partial a_k(\lambda) / \partial \lambda)' d_k.$$

Therefore,

$$\begin{aligned} \hat{T}_y(\hat{\lambda}_n) &\approx \hat{T}_y(\lambda) - H_{12}(\lambda) H_{22}^{-1}(\lambda) (\hat{T}_x(\lambda) - \bar{T}_x) \\ &= \sum_s e_k d_k a_k(\lambda) + B(\lambda) \bar{T}_x, \end{aligned} \quad (4.4)$$

where e_k are the residuals $y_k - B(\lambda)x_k$, and $B(\lambda) = H_{12}(\lambda) H_{22}^{-1}(\lambda)$.

From (4.4), Taylor variance of the calibration estimator can be estimated using standard formulas in sampling theory. Note that in the case of nr adjustment, the vector of control totals \bar{T}_x is random since it is derived from the full sample. Therefore, for the nr case the second term in (4.4) leads to an extra contribution to the variance. Also note that λ , $H_{12}(\lambda)$, and $H_{22}(\lambda)$ are replaced by their consistent estimates $\hat{\lambda}$, $H_{12}(\hat{\lambda})$, and $H_{22}(\hat{\lambda})$ in the variance expression obtained from the right hand side of (4.4). The linearization (4.4) is similar to the one obtained earlier by Folsom (1991) for nr adjustment under a somewhat different model for $a_k(\lambda)$.

Now, in the case of ps, if there is coverage bias, we have analogous to the nr bias case,

$$\hat{T}_y(\hat{\lambda}_n) \approx \sum_s e_k d_k a_k(\lambda) + B(\lambda) T_x, \quad (4.5)$$

where the control totals \bar{T}_x are now treated as nonrandom, and no longer contribute to the variance.

Observe that in the above linearized approximation to the calibration estimator, presence of the adjustment factor $a_k(\lambda)$ will tend to increase the variance; however, presence of residuals e_k will in general tend to decrease the variance, and the net effect is usually a reduction in variance after ps. As in the case of nr, the vector λ and H matrices are replaced by their consistent estimates in the estimated variance from (4.5).

In the absence of coverage bias, $\lambda=0$ and $a_k(\lambda)=1$, we get

$$\hat{T}_y(\hat{\lambda}_n) \approx \sum_s e_k d_k + B(0) T_x, \quad (4.6)$$

where $\hat{B}(0) = (\sum_s y_k x_k' d_k) (\sum_s x_k x_k' d_k)^{-1}$, and $e_k = y_k - B(0)x_k$. Note that the right hand side of (4.6) is identical to the generalized regression estimator. Thus, for ps when there is no coverage bias, GEM calibration estimator is asymptotically equivalent to the regression estimator. This extends the result of Deville and Särndal (1992) to include GEM. However, in the above linearization, the adjustment factor $a_k(\lambda)$ is absent unlike the case with coverage bias. Singh and Folsom (2000)

give a simple theoretical justification of why the factor $a_k(\lambda)$ should be included in variance estimation via the estimating function approach, and obtain an alternative but equivalent sandwich-type variance estimate which is computationally more efficient than the linearization based solution when the covariance matrix for a vector of calibration estimators is required.

So far we considered calibration estimators of totals T_y . For estimating means or ratios $R_{yv} (= T_y/T_v)$, the linearized form of the calibration estimator $\hat{R}_{yv}(\hat{\lambda}_v)$ after subtracting R_{yv} is given by

$$T_v^{-1} [\hat{T}_y(\lambda) - R_{yv}\hat{T}_v(\lambda) - B(\lambda)(\hat{T}_x(\lambda) - \tilde{T}_x)] \quad (4.7)$$

from which the approximate variance estimate can be obtained after substituting consistent estimates of λ , T_v , R_{yv} , and $B(\lambda)$.

To estimate variance of the estimator $\sum_s y_k d_k a_{1k}(\hat{\lambda}_1) a_{2k}(\hat{\lambda}_2)$, adjusted for both nonresponse and poststratification, above type of linearization can be carried through. Alternatively, the estimating function approach of Singh and Folsom (2000) provides a simple sandwich-type estimate for the Taylor variance when successive weight adjustments are performed using GEM.

5. Alternative Methods: Review and Comparison

For ps, raking-ratio and regression methods are commonly used. The generalized raking methods such as DS provide bounds on the adjustment factor. As mentioned earlier, raking-ratio (or exponential model) and DS can be obtained as special cases of GEM by choosing uniform bounds ℓ and u suitably. For raking-ratio, $\ell = 0$, and $u = \infty$ (which may give rise to extreme values) while for DS, we have $0 < \ell < 1 < u$. The regression method does not invoke any bounds, and may give rise to negative weights.

The form of the adjustment factor for the regression method is $a_k(\lambda) = 1 + x_k' \lambda$, $-\infty < a_k < \infty$. Despite no range restrictions on a_k , this method generally works well in practice, and is easy to implement without need to resort to iterative methods. Its use for nonresponse adjustment has also been recently advocated; see Fuller, Loughin, and Baker (1994) for a combined nr and ps adjustment by regression, and Lundström and Särndal (1999) for nr adjustment. Folsom and Witt (1994) proposed a modification of the DS method, termed the scaled constrained exponential model for nr adjustment such that $a_k(\lambda) \geq 1$. The basic idea is to multiply the adjustment factor by a constant $\rho^{-1} \geq 1$ such that $\rho^{-1} \ell \geq 1$. By choosing $\ell = \rho \leq 1 < u$, we get the desired lower bound as $\rho^{-1} \ell = 1 < c = \rho^{-1} < \rho^{-1} u$. They suggest choosing ρ as the overall response propensity estimated from the sample of respondents and nonrespondents. Folsom (1991), and Singh, Wu, and

Boyer (1995) also proposed a modification of the raking-ratio method for nr adjustment such that $a_k(\lambda) \geq 1$. Here the basic idea is to find $a_k^*(\lambda) (= e^{x_k' \lambda^*})$ by raking-ratio such that the deficiency control total (defined as the difference between full sample and respondent subsample totals) are met. The final adjustment factor $a_k(\lambda)$ is then defined as $1 + a_k^*(\lambda)$. This was termed as the deficiency raking method by Singh, Wu, and Boyer, and their main motivation for proposing this method was to use external control totals for nr adjustment when unit-specific information for the nonrespondents was not available in the context of longitudinal surveys. Another motivation was, of course, to generalize the usual weighting cell adjustment method to more general covariates while ensuring that the adjustment factor was at least 1 as in Folsom (1991).

The extreme values are commonly treated by winsorizing. However, as mentioned in the introduction, this may lose its impact after nr and ps, i.e., the final weights may have extreme values. The proposed method of GEM can be used to directly address this extreme value problem after nr and ps adjustments have been made to reduce biases due to nr and coverage errors. Thus, GEM provides a unified approach for weight adjustments for extreme values, nr, and ps. In addition, by choosing nonuniform bounds on $a_k(\lambda)$, GEM allows for the user to exercise control on the extent of adjustment on the initially identified extreme values at each step of weight adjustment.

6. An Illustrative Example

Using the 1999 National Household Survey on Drug Abuse data for the East South Central Census Division (consisting of states, AL, MS, TN, and KY), the three methods RR (raking-ratio or exponential model), DS (in the case of nr, it is modified DS as given by the scaled constrained exponential model), and GEM (generalized exponential model) are compared; see Chen, Penne, and Singh (2000) for more details. For this comparison, we consider weighting (referred to as weight components 12-14 in Chen, Penne, and Singh) for the second phase sample of persons selected for the drug questionnaire after the first phase sample of dwelling units selected for screening questionnaire. For all the three methods, we started with a common set of initial weights. Before respondent person level nr (res.per.nr) and respondent person level ps (res.per.ps) adjustments, a somewhat new step of selected person level ps (sel.per.ps) was introduced to take advantage of the information about selected persons (i.e., both respondents and nonrespondents) in the large first phase sample of households for screening. Here the ps controls for the selected persons are estimated from the first phase sample. This additional step is expected to lead to more

stable estimated totals needed for the next step of nonresponse adjustment. Table 1 shows summary statistics for weight adjustment factors and the resulting calibrated weights. It is seen that with the built-in control for extreme weights in GEM, one can reduce the proportion of extreme values in the adjusted weights considerably. Here the extreme value cut-off points are defined as median $\pm 3(\text{IQR})$ where IQR denotes the interquartile range. The cut-off points are specific to the domains defining extreme values. The term “outwinsor” is used to signify the proportion of weight-sum out of the total weight-sum that would be trimmed if weights were winsorized. Also the UWE (unequal weighting effect, i.e., one plus squared coefficient of variation of weights) tends to be smallest for GEM. For domains defined by age groups (12-17, 18-25, 26+), the histograms (not shown here) of adjustment factors are found to be quite similar except for slightly heavier tails for RR. It is interesting to note that for this particular example, the final estimates (not shown here) for recency of use of cigarettes, alcohol, marijuana, and cocaine at the census division level for various age groups turn out to be close to each other despite differences in treatment of extreme values. This is probably due to the fact that the outwinsor proportions are not that high for the alternative methods. The GEM SEs, interestingly, also turn out to be generally similar to the DS ones except being somewhat lower most of the time. Also the RR based estimates (with no bound restrictions on the adjustment factor) turn out to be more or less precise than either DS or GEM. This similarity between estimates is possible for our example because the final UWE for the three methods are similar in magnitude. However, for domains involving high weights under RR (and hence high UWE), we would expect RR based estimates unstable compared to DS and GEM. For a comparison of unadjusted SE, adjusted SE for ps, and adjusted SE for nr and ps, see Vaish, Gordek, and Singh (2000).

7. Concluding Remarks

Unlike earlier methods, GEM provides a unified calibration tool for weight adjustments for extreme values, nr and ps. Of special interest is its capability to have a built-in control on extreme values. Under suitable superpopulation modeling and assuming that the bounds on the adjustment factors are prespecified, the resulting calibration estimators were shown to be asymptotically consistent with respect to the $p\xi$ -distribution for nr and ps, and derivation of the asymptotic Taylor variance estimation formulas analogous to the ones based on residuals for the regression estimator (used for ps) was outlined. In our experience, we find GEM a useful practical alternative to the methods of raking-ratio and Deville-Sarndal while providing comparable results.

References

- Chen, P., Penne, M.A., and Singh, A.C. (2000). Experience with the generalized exponential model of weight calibration for the National Household Survey on Drug Abuse. *ASA Proc. Surv. Res. Meth. Sec.*
- Deville, J.-C., and Särndal, C.E. (1992). Calibration estimation in survey sampling. *JASA*, 87, 376-382.
- Folsom, R.E. Jr. (1991). Exponential and logistic weight adjustments for sampling and nonresponse error reduction. *ASA Proc. Soc. Statist. Sec.*, 197-202.
- Folsom, R.E., and Witt, M.B. (1994). Testing a new attrition nonresponse method for SIPP. *ASA Proc. Surv. Res. Meth. Sec.*, 428-433.
- Isaki, C, T. and Fuller, W.A.(1982). Survey design under the regression superpopulation model. *JASA*, 77, 89-96.
- Fuller, W.A., Loughin, M.M., and Baker, H. D. (1994). Regression weighting in the presence of nonresponse with application to the 1987-88 Nationwide Food Consumption Survey. *Survey Methodology*, 20, 75-85.
- Lundström, S. and Särndal, C. -E. (1999). Calibration as a standard method for treatment of nonresponse. *Jour. Off. Statist.*, 15, 305-327.
- Rao, J.N.K. and Singh, A.C. (1997). A ridge-shrinkage method for range-restricted weight calibration in survey sampling. *ASA Proc. Surv. Res. Sec.*, 57-65.
- Singh, A.C. and Folsom, R.E., Jr. (2000). Bias corrected estimating function approach for variance estimation adjusted for poststratification. *ASA Proc. Surv. Res. Meth. Sec.* (to appear).
- Singh, A.C., and Mohl, C.A. (1996). Understanding calibration estimators in survey sampling. *Survey Methodology*, 22, 107-115.
- Singh, A.C., Wu, S., and Boyer, R. (1995). Longitudinal survey nonresponse adjustment by weight calibration for estimation of gross flows. *ASA Proc. Surv. Res. Meth. Sec.*, 396-401.
- Vaish, A.K., Gordek, H., and Singh, A.C. (2000). Variance estimation adjusted for weight calibration via the generalized exponential model with application to the National Household Survey on Drug Abuse. *ASA Proc. Surv. Res. Meth. Sec.* (to appear).

Adjustment Factors for RR, DS & GEM (summary statistics)							
Table 1a - [sel.per.ps]		Raking Ratio(RR)		DS		GEM	
		Before	After	Before	After	Before	After
UWE		3.05	3.32	3.02	3.3	3.05	3.27
Extreme Values							
	Unwtd	0.00%	1.14%	0.00%	1.11%	0.00%	1.09%
	Wtd	0.00%	2.40%	0.00%	2.21%	0.00%	2.29%
	Outwisor	0.00%	0.60%	0.00%	0.42%	0.00%	0.35%
Weight Distribution							
	<i>Weight1-12</i>						
	Min	131.58	0.45	131.58	39.93	131.58	39.93
	25%	713.36	678.85	713.36	673.34	713.36	675.77
	Median	1,134.98	1,114.58	1,134.98	1,110.66	1,134.98	1,117.42
	75%	2,714.98	2,787.29	2,714.98	2,782.56	2,714.98	2,762.72
	Max	32,261.61	89,355.27	32,261.61	65,990.62	32,261.61	66,015.70
	<i>Weight12</i>						
	Min	n/a	0	n/a	0.3	n/a	0.3
	25%	n/a	0.84	n/a	0.83	n/a	0.83
	Median	n/a	0.96	n/a	0.96	n/a	0.96
	75%	n/a	1.11	n/a	1.12	n/a	1.12
	Max	n/a	5.86	n/a	3.49	n/a	3.49

Table 1b - [res.per.nr]

UWE		3.38	3.91	3.29	3.88	3.28	3.87
Extreme Values							
	Unwtd	0.84%	2.03%	0.95%	2.11%	0.89%	1.14%
	Wtd	2.10%	5.23%	2.04%	5.38%	1.96%	2.66%
	Outwisor	0.69%	1.19%	0.46%	0.92%	0.40%	0.40%
Weight Distribution							
	<i>Weight1-13</i>						
	Min	0.45	0.45	39.93	40.03	39.93	40.02
	25%	664.31	767.5	665.2	764.79	667.11	766.96
	Median	1,078.01	1,326.57	1,080.22	1,317.52	1,079.41	1,327.54
	75%	2,462.36	3,136.07	2,482.69	3,108.04	2,487.23	3,161.65
	Max	89,355.27	101,325.20	65,990.62	74,851.38	66,015.70	70,614.65
	<i>Weight13</i>						
	Min	n/a	1	n/a	1	n/a	0.73
	25%	n/a	1.1	n/a	1.08	n/a	1.07
	Median	n/a	1.18	n/a	1.17	n/a	1.16
	75%	n/a	1.33	n/a	1.33	n/a	1.34
	Max	n/a	17.63	n/a	3.47	n/a	3.5

Table 1c - [res.per.ps]

UWE		3.91	3.95	3.88	3.91	3.87	3.87
Extreme Values							
	Unwtd	2.28%	2.20%	2.30%	2.25%	1.44%	0.38%
	Wtd	5.74%	6.34%	5.32%	5.69%	3.09%	0.97%
	Outwisor	1.34%	1.36%	1.05%	1.04%	0.52%	0.09%
Weight Distribution							
	<i>Weight1-14</i>						
	Min	0.45	0.23	40.03	12.01	40.02	13.53
	25%	767.5	772.94	764.79	762.64	766.96	775.42
	Median	1,326.57	1,337.13	1,317.52	1,332.39	1,327.54	1,347.02
	75%	3,136.07	3,138.95	3,108.04	3,145.70	3,161.65	3,093.14
	Max	101,325.20	100,216.20	74,851.38	76,818.01	70,614.65	62,606.79
	<i>Weight14</i>						
	Min	n/a	0.05	n/a	0.3	n/a	0.3
	25%	n/a	0.96	n/a	0.96	n/a	0.97
	Median	n/a	0.99	n/a	1	n/a	1.01
	75%	n/a	1.04	n/a	1.04	n/a	1.05
	Max	n/a	4.28	n/a	2.99	n/a	2.96

***Appendix J: The Employment and Training
Administration's Responses to
the U.S. Bureau of Labor
Statistics' Questions About the
Draft O*NET OMB Clearance
Package***

Appendix J: The Employment and Training Administration's Responses to the U.S. Bureau of Labor Statistics' Questions About the Draft O*NET OMB Clearance Package

J.1 The Employment and Training Administration's Responses to the U.S. Bureau of Labor Statistics' Questions About the Draft O*NET OMB Clearance Package Dated March 17, 2008

Per the Checklist for PRA Packages and the associated explanatory reference sections, please see the following responses:

BLS Question 1. The ETA will need to complete Sections A.8 and B.5 before BLS can complete the review.

ETA Response. We have completed these sections to the extent possible at this time. In Section A.8 we could not include the *Federal Register* notice initiating the public comment period because it has not yet been published. Similarly, we could not include the public's comments and our responses to those comments, because the public comment period has not yet occurred. In Section B.1 we have provided all the information except the name(s) and phone number(s) of the BLS reviewer(s). The information currently missing from these sections will be included in the final version of the OMB clearance package.

BLS Question 2. Section A.10 states that assurances of confidentiality will be given, and describes some data-security procedures. However, I was not able to find any technical details regarding the specific statistical disclosure-limitation methods that will be used to ensure compliance with these assurances in the publication of final statistical results, e.g., tables or subpopulation estimates, per item II.3 of the checklist and reference materials.

ETA Response. We have added clarification to this section, explaining that, after a careful examination of the O*NET estimates before their release, we, in collaboration with the data collection contractor, determined that no risk existed that an individual, establishment, or other entity could be identified by means of the data released to the public.

BLS Question 3. Per Section II.5 of the checklist and reference materials, it will be important for the parameters to be fully specified. We are able to infer some of these parameters from Exhibit 2 (page 4) and subsequent text, but we need to see the list of parameters (with mathematical definitions, where

appropriate). In addition, the paragraph that begins in the middle of page 60: “If the sample yield...” is not clear.

Please rewrite this paragraph to give a detailed mathematical description of the “special frame” and “suitable supplemental frame” and the specific ways in which they will be used.

ETA Response. Regarding the parameters, the Estimation subsection of B.1.1 has been expanded to include listing and definition of the parameters to be estimated by the O*NET Data Collection Program. In addition, we have added two new subsections about supplemental frames: “Supplemental Frames,” which covers sampling issues, and “Supplemental-Frame Weighting,” which covers weighting issues.

BLS Question 4. Per Section II.6 of the checklist and reference materials, some of the mathematical details of the sample design are not clear. Please be sure to include enough mathematical detail that the reviewers can understand the specific linkage between details of the sample design and the weighting methods, respectively.

ETA Response. Section B.1.1 has been expanded to include mathematical details that link the sample design with the weighting methods.

BLS Question 5. Per Sections II.7 and II.10 of the checklist and reference materials, the package will need to provide detailed mathematical formulas for the proposed weighting procedures, to flesh out the qualitative descriptions given on pages 68–70 of the current proposal.

In addition, it would be important to provide a clear mathematical description of the probability mechanisms or models used in the “completion wave” procedures mentioned on page 60 and the quota-type sampling and “model aided sampling” described on page 61; and to include detailed mathematical explanations of the ways in which these mechanisms or models are incorporated into the weighting and variance estimation procedures.

ETA Response. An expanded subsection, “Weighting,” of Section B.1.1 now provides detailed mathematical formulas for the weighting procedures, including a specific mathematical explanation associated with Model-Aided Sampling. It is also noted, in the subsection “Sampling Waves,” that a completion wave, statistically, does not differ from the X.1, X.2, and X.3 subwave sampling process, with the same sampling, weighting, and estimation methods being used to conduct the completion wave. Essentially, a completion wave adds a fourth subwave of sampling for some difficult-to-complete occupations. Packaging together some of these occupations in a combined wave maintains operational efficiency.

BLS Question 6. Per Section II.8 of the checklist and reference materials, the OMB will expect to see detailed mathematical formulas for the variance estimators and inference procedures that will be used.

ETA Response. Variance estimation formulas have been added to the “Estimation” subsection of B.1.1. Because this study is descriptive, no formal inference procedures are implemented. A standard error and confidence interval are provided for each estimate.

J.2 The Employment and Training Administration's Responses to the U.S. Bureau of Labor Statistics' Questions About the Draft O*NET OMB Clearance Package Dated May 30, 2008

BLS Question 1. As indicated in an email from John Eltinge on April 02, 2008 the package needs to address confidentiality issues. The package does mention how the collection and protection of confidential data is handled, but it must address the specific technical procedures that will be used for disclosure limitation in the publishing of tabular data.

ETA Response. We have deleted the first paragraph in Section A.10 on page 50 and added the following two paragraphs at the end of Section A.10:

The O*NET questionnaires (see Appendix A) collect very little personal information about the respondent, and what is collected contains no identifiers, such as personal name or place of employment. No individual-level data are published, nor are they accessible or provided to anyone except the O*NET Data Collection Program staff. Published results are made available only in aggregate, as one set of estimates for an entire occupation. Furthermore, no demographic data (e.g., sex, race) are released, even in aggregate form. Finally, estimates are not produced for any subpopulations within an occupation, such as geographic region or sociodemographic group, which otherwise may have allowed the identification of an individual.

Before publishing the O*NET tables on the public Web site, the O*NET Program team thoroughly examines the tables for any risk of disclosure of confidential information. In particular, each table is analyzed to identify any “sensitive” cells (i.e., cells that may reveal too much information about an individual employee). Willenborg and Waal (1996) have recommend using an (n,k) -dominance rule that a cell be regarded as sensitive if the sum of the largest n contributions account for more than $k\%$ of the total cell value. Willenborg and Waal further recommend $n = 5$ and $k = 80$. Because every sampled employee contributes only one response, these recommendations translate into a minimum cell size of $5/80$, or about 7. In fact, the minimum cell size for the O*NET tables is 10 respondents; any cells with fewer than 10 are suppressed. In addition, the (n,k) -dominance rule assumes a complete census. As Willenborg and Waal note, when applied to tables based on samples and where the cell entries are weighted averages, the $(5,0.80)$ rule affords even greater disclosure control. This extra control ensures that these O*NET tabular data pose no disclosure risks to any individual respondent.

BLS Question 2. The package mentions (page 70) that Monte Carlo simulation is used to establish the probabilities to use for weight $w_{\{3ij\}}$, but needs to make clear the method used for running these simulations. Specifically, please provide mathematical details to make clear how the conditional probability structure was specified in the simulations.

ETA Response. In reviewing our procedures for assigning occupations to selected establishments, we have decided to simplify the process so as to make the Monte Carol simulation method unnecessary. The following text replaces our description of Step 5 on pages 68–70 and provides full information on the selection probabilities and weights.

Step 5: Assign occupations to selected establishments. To limit the burden for a particular establishment, each establishment selected in Step 4 is assigned a maximum of 10 occupations randomly selected with probability proportional to size. Here the size measure is the product of the sampling rate for the occupation (f_j) and the establishment's estimated number of employees within the occupation, M_{ij} . Before selection of a sample of the occupations, occupations certain to be selected because of their large sizes are included in the sample and removed from the frame, and the number of times they would have been "hit" (which, by the probability minimum replacement [PMR] method, can exceed 1) is recorded. Then the remaining (noncertainty) occupations are sampled and placed in a random order. The certainty occupations are listed first, followed by the randomly ordered noncertainty units. For each establishment, both the set of up to 10 occupations and the number of times each occupation was selected (which could be greater than 1 for certainty occupations) is entered into the Case Management System (CMS).

As before, we used Chromy's (1979) PMR selection method to select occupations with probability proportional to size. To understand how his method is applied here, one may suppose the i^{th} establishment has J_i occupations associated with it. The size measure for the j^{th} occupation is defined as

$$O_{ij} = f_j M_{ij},$$

so that

$$O_{i+} = \sum_j O_{ij} = \sum_j f_j M_{ij} = S_i / w_i. \quad (6)$$

A sample of 10 occupations for each establishment will be selected with the expected number of times that the j^{th} occupation is selected being $10O_{ij} / O_{i+}$, which may be greater than one for some occupations. For an occupation j where it is greater than 1, the occupation is selected with certainty and assigned an O*NET point value equal to v_{ij} by randomly rounding $10O_{ij} / O_{i+}$ to one of its two adjacent integers. That is,

$$v_{ij} = \text{Int}(10O_{ij} / O_{i+}) \text{ with probability } 1 - \text{Frac}(10O_{ij} / O_{i+})$$

and

$$v_{ij} = \text{Int}(10O_{ij} / O_{i+}) + 1 \text{ with probability } \text{Frac}(10O_{ij} / O_{i+}), \quad (7)$$

where Int and Frac are the integer and fractional parts of a decimal number. This rounding provides an integer number of selections associated with each selected establishment while retaining the correct noninteger expected value for the number of selections. The certainty occupations appear at the top of the list used by BLs to inquire about occupations at the establishment. From among the remaining occupations, a probability-proportional-to-size sample is selected. If C_i is the number of certainty-occupation sampling hits from the i^{th} establishment, $C_i = \sum_j v_{ij}$, summation over the certainty occupations, then the remaining occupations are selected with probabilities $(10 - C_i)O_{ij} / \sum O_{ij}$, summation over noncertainty occupations. The selected occupations are assigned an

O*NET point value $v_{ij} = 1$. As noted previously, the selected noncertainty occupations are then placed in a random order and follow the certainty occupations on the list of occupations used by the BLs.

When a POC is identified within each establishment, the RTI BL reviews the list of occupations with the POC, asking the POC to estimate the number of employees at that establishment in each occupation. Each time the BL receives a response that is greater than zero, a counter within the CMS is increased by the associated O*NET point value, the randomly rounded number of times the occupation was selected. If the counter reaches 5 before the BL has completed the list of occupations, the BL stops. After the maximum of 5 occupations are identified, the POC is asked to roster all individuals in the selected occupations.

To determine the final occupation selection probabilities, one must adjust for the occupations remaining on the establishment's sampling list at the point where the BL stopped as a result of having found the maximum number of occupations to be included in data collection. It is assumed that the resulting sample of up to 5 occupations is a random sample of the originally selected occupations for an establishment. This assumption is supported by the random ordering of the noncertainty occupations. Let a_i be the total number of sampling hits among all of the occupations about which the BL inquired before stopping; then, $a_i = \sum_j v_{ij}$, summation over the occupations inquired about by the BL. The final selection probability for the j^{th} occupation from the i^{th} establishment is

$$p_{3ij} = \frac{a_i}{10} \times \frac{10O_{ij}}{O_{i+}} = \frac{a_i O_{ij}}{O_{i+}}. \quad (8)$$

The associated sampling weight is

$$w_{3ij} = 1 / p_{3ij}. \quad (9)$$

This method accomplishes two important goals:

- It results in an approximate random sample of occupations with known probabilities of selection.
- It limits POC and establishment burden. This goal is achieved because the number of positive POC responses is limited to a maximum of 5. If the company is large and happens to have employees in all 10 occupations, then stopping after 5 occupations minimizes the perceived burden on the POC, as opposed to the alternative of asking for employment estimates for all 10 occupations and then subselecting 5.

BLS Question 3. On page 99 in the discussion on weight trimming includes the statement "an optimal balance of sampling variance and bias was ultimately adopted." The procedure for optimizing needs to be specified with a detailed mathematical description.

ETA Response. We have added some text to Section B.4.4 on page 99 to clarify the procedure used. Section B.4.4 now reads as follows:

A substantial component of the sampling error for O*NET estimates is due to the survey weights. Known as the *unequal weighting effect* (UWE), it can be quite large because of the disproportionate sampling methods that must be employed to achieve data collection efficiency. The UWE can be

reduced through weight trimming but only at the risk of increasing selection bias. Alternative methods for weight trimming were investigated from 2005 to 2007. This investigation involved assessing the effect of successively aggressive weight-trimming plans for a wide range of estimates and population domains. The weight-trimming analysis was comprehensive, including:

- Comparison of UWEs
- Graphical and tabular displays of current weight estimates versus aggressively-trimmed weight estimates
- Evaluation of weights on suppression of estimates
- Evaluation of statistical differences between current weight estimates and aggressively trimmed weight estimates
- Evaluation of substantive differences between current weight estimates and aggressively trimmed weight estimates.

The method and results of the evaluation are described in an internal report (Penne & Williams, 2007, July 30). The evaluation resulted in the implementation of a more aggressive weight-trimming plan that provides an optimal balance of sampling variance and bias.

BLS Question 4. On page 77 variable selection is used. How this variable selection was done needs to be specified. Mathematical details are also needed on what the "zip code information" includes.

ETA Response. We have revised the text on page 77 to clarify how the variable selection is done. With regard to the zip code information, we use zip codes to link to Census data to define owner-occupied quartiles for the geographic location of sampled establishments. Owner-occupied housing is used as a proxy measure of socioeconomic status. This measure, and the others listed on page 77, have been tested and found to be significantly correlated with nonresponse. Therefore, they are included as nonresponse model covariates.

The revised text of Weighting Step 1 is as follows (added text appears in bold typeface):

The base sampling weight, $w_i^{(1)}$, for the selected establishments in a subwave is the product of the weights in Equations (2) and (5):

$$w_i^{(1)} = w_{1i} \times w_{2i} . \quad (15)$$

The establishment sampling weights are adjusted for nonresponse, by subwave, with use of the GEM method with a model that contains different combinations of the following variables:

- industry division
- U.S. Census division
- establishment size
- headquarters/branch type
- number of occupations asked about in an establishment

- urban versus rural location
- time zone
- zip code information from the 2000 U.S. Census (**quartile distribution of owner-occupied housing**)

Variable selection proceeds by first fitting a model containing only main effects and tightening the upper and lower bounds so that all upper bounds are less than 8 and a minimal increase in the unequal weighting effect (UWE) is achieved. Two-way interactions among the variables are then added to the model. Cells that do not contain any respondents or that are collinear with other cells are removed from the model. If a convergent model cannot be obtained, some covariate levels are collapsed together; for example, U.S. Census divisions are collapsed to regions. Other variables or interactions may be removed from the model until a convergent model is obtained that maintains as many of the covariates and their two-way interactions as possible.

BLS Question 5. The table (Exhibit 11) on page 74 implies that the variables are on a Likert scale and implicitly assumes equal spacing between points. What the survey variables are and all assumptions about them need to be stated clearly here as well as any pertinent references.

ETA Response. We have revised the text for the final two paragraphs on page 73 and extending onto page 74 to provide additional information about the survey variables used in the employee sample size analysis. The revised text is as follows (added text appears in bold typeface):

The current sample size goal is based on the final technical report of Peterson et al. (1997, p. 89), which presents means and standard deviations for both 5- and 7-point **Likert scales, with consecutive integer scores**, for the descriptors within Skills, Knowledge, Generalized Work Activities, Abilities, and Work Styles. Statistics were computed separately with the reported data for each of six occupations. The data in these tables indicate that when 15 responses per descriptor are obtained, the mean values for virtually all of the 5-point and the 7-point descriptors have 95% confidence intervals that are no wider than plus or minus one to 1.5 scale points for all occupations.

Exhibit 11 displays the half-width of 95% confidence intervals (CIs) for means of 5- and 7-point **Likert scales**, by sample size, from Analysis Cycles 4 through 8 of the O*NET Data Collection Program. **The items are summarized in Exhibit 2 as those with a data source of job incumbents and are presented as part of the questionnaires in Appendix A. The scales were given consecutive integer scores and estimates produced as described in the “Estimation” subsection of B.1.1.** Across all sample sizes, nearly all of the scale means have 95% CIs that are no wider than plus or minus 1.5 scale points. For those scale means based on sample sizes of between 15 and 25 respondents, more than 95% of the 5-point scales and more than 75% of the 7-point scales have 95% CIs no wider than plus or minus 1.5 scale points. In addition, 90% of the 7-point scales have 95% CIs no wider than plus or minus 1.6 scale points.

BLS Question 6. Definitions and references concerning the alternative measures of uncertainty and association (kappa and weighted kappa) need to be included.

ETA Response. We have inserted a footnote at the end of the penultimate sentence in Section B.4.6 (pages 99 and 100) to define kappa and weighted kappa. The footnote reads as follows:

To define kappa and the weight kappa, consider the cross-classification of ratings from two raters, *A* and *B*. For a standard 5-point Likert scale, the expected proportion of entries in cell (k, k') of the AB table is $n_k n_{k'} / n^2$ for $k, k' = 1, \dots, 5$, where n_k is the number of raters in the sample that select category k . The kappa statistic is defined as

$$\kappa = \frac{P_e - P_0}{1 - P_0},$$

where P_e is the agreement rate (sum of the diagonal elements of the AB table) and P_0 is the expected agreement rate, assuming completely random ratings (i.e., all categories are equally likely). The weighted kappa is similar, except the agreement rates, P_e and P_0 , include some fraction, f_d , of disagreements, where d is the distance of a disagreement from the diagonal. (See Johnson, Jones, Butler, & Main, 1981). In the O*NET application, the f_d weights proposed by Cicchetti and Allison (1971) were used, which have also been implemented in SAS Proc Freq.

References for Appendix J

- Chromy, J. R. (1979). Sequential sample selection methods. *Proceedings of the American Statistical Association, Section on Survey Research Methods*, 401–406.
- Cicchetti, D. V., & Allison, T. (1971). A New Procedure for Assessing Reliability of Scoring EEG Sleep Recordings. *American Journal of EEG Technology*, 11, 101–109.
- Johnson, L., Jones, A., Butler, M., & Main, D. (1981). *Assessing Interrater Agreement in Job Analysis Ratings*. San Diego, CA: Naval Health Research Center.
- Penne, M., & Williams, R. (2007, July 30). *O*NET More Aggressive Weight Trimming Procedures Evaluation*. Research Triangle Park, NC: RTI International.
- Peterson, N. G., Mumford, M. D., Borman, W. C., Jeanneret, P. R., Fleishman, E. A., & Levin, K. Y. (Eds.). (1997). *O*NET final technical report*. Salt Lake City, UT: Utah Department of Workforce Services through a contract with American Institutes for Research.
- Willenborg, L., & De Waal, T. (1996). *Statistical Disclosure Control in Practice Series: Lecture Notes in Statistics* (Vol. 111). New York: Springer.