NATIONAL CENTER FOR EDUCATION STATISTICS NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

National Assessment of Education Progress (NAEP) 2022

Materials Update #1

Appendix G2

NAEP 2012 Long Term Trend (LTT) Sampling Design

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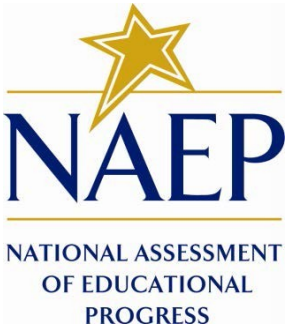

June 2021

No changes since June 2019 (1850-0928 v.15)

The 2013 Sample Design documentation is the most current version available to the public. At this time, there is not a timeline for when the details for later assessment years will be publicly available.

Contents

NAEP Technical Documentation 2012 Long-Term Trend (LTT) Assessment Sample Design

Unlike most of the NAEP operational assessment, the population target for the long-term trend (LTT) assessment is defined by age rather than grade. The three age populations for the 2012 study are as follows:

- age 9 population: all students with birth months January 2002 through December 2002 (i.e., all students who were nine-years-old on December 31, 2011)
- age 13 population: all students with birth months January 1998 through December 1998 (i.e., all students who were thirteen-years-old on December 31, 2011).
- age 17 population: all students with birth months October 1994 through September 1995 (i.e., all students who were seventeen-years-old on September 30, 2012)

The sample was designed to be nationally representative at each of these age populations. The target population included all students in these age ranges enrolled in public and private schools. The samples were selected based on a three-stage sample design as follows:

- selection of primary sampling units (PSUs)
- selection of schools within PSUs
- selection of students within schools

The overall sample sizes were driven by the targeted number of students for each subject. The 2012 LTT subjects were as follows:

- mathematics
- reading
- mathematics pilot
- reading pilot

The pilot assessments were integrated with the operational assessments with some students taking one pilot and one operational block.

The target numbers of assessments are the same for each age group (9, 13, 17) as given in the following table.

Student sample size targets for each age group (9, 13, 17), long-term trend (LTT) assessment, by subject and school type, 2012

Subject	Public school students	Private school students	Total students
Total	**15,300**	**1,700**	**17,000**
Mathematics (O)	5,900	650	6,500
Reading (O)	5,900	650	6,500
Mathematics (O/P)	1,800	200	2,000
Reading (O/P)	1,800	200	2,000

NOTE: O = Operational assessment only; O/P = Integrated Operational and Pilot assessment. Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessments.

These targets represent completed assessments. To get the overall sample sizes, these targets were adjusted upwards to allow for expected losses from absent, refusing, and/or ineligible schools and students (so that the completed assessment targets would be met). The corresponding overall students sample sizes are contained in the Participation, Exclusion, and Accommodation Rates pages.

NAEP Technical Documentation Selection of Primary Sampling Units (PSUs) for the 2012 Assessment

For the 2012 economics and long-term trend (LTT) assessments, a sample of 67 primary sampling units (PSUs) for each assessment was drawn from a frame of PSUs based on current Census information, respectively. Among the 67 PSUs for each assessment are 29 certainty PSUs and 38 noncertainty PSUs.

After the PSU frame was created, certainty PSUs (those with large measures of size that make it efficient to take them with probability of selection equal to 1) were identified and set aside. This set of 29 certainty PSUs was the same for economics and LTT.

Stratification of the noncertainty PSUs (i.e. those with probabilities of selection strictly less than 1) was carried out after analysis of Census 2000 data and NAEP achievement scores from prior years identified the stratification variables. This analysis identified the set of PSU-level, Census-based variables that had as much association with the prior assessment scores as possible. The intent is that the results of this analysis and stratification were to be used for multiple assessment years and subject matter. They were used previously in 2006 and 2008-2011. Periodically, this analysis and stratification will be conducted according to the availability of Census data and key assessment scores. Based on the stratification, measures of size and probabilities of selection were defined, and a systematic sample of PSUs was drawn. For both the 2012 economics and LTT, non-overlapping samples of 38 noncertainty PSUs were selected, respectively.

The PSUs satisfied the following criteria:

- The PSU sampling frame included all U.S. states and the District of Columbia, but excluded the U.S. territories and Puerto Rico;
- PSUs consisted of one county or contiguous multiple counties;
- Metropolitan Statistical Areas (MSAs) were designated as separate PSUs even with their large size, as they were sufficiently compact in terms of their travel costs (due to higher levels of transportation infrastructure);
- PSUs did not cross Census region boundaries;
- PSUs did not cross state boundaries, in general;
- Non-MSA PSUs in the Northeast and South Census regions had a minimum population of 15,000 youths (age 0 to 17 inclusive), and in the Midwest and West Census regions had a minimum population of 10,000 youths, in general, according to the 2009 U.S. Census Bureau's Population Estimates Program; and
- Non-MSA PSUs were to be of minimum size (defined in terms of square miles or maximum distance between points—a rough proxy for travel time) while still satisfying the minimum population constraints.

NAEP Technical Documentation Primary Sampling Unit (PSU) Generation: Metropolitan Statistical Areas for the 2012 Assessment

The 2004 definitions of Core Based Statistical Areas (CBSAs) and Combined Statistical Areas (CSAs), which are also referred to as Metropolitan Statistical Areas (MSAs), were used to define primary sampling units (PSUs). These definitions were the most recently available definitions from the U.S. Office of Management and Budget (OMB) when the PSU frame was created for the 2006 assessment. The same PSU frame was used in the 2012 assessment. There were few changes to MSA definitions between 2004 and the time of selecting the 2012 school sample. The CBSA areas consisted of clusters of one or more counties classified as metropolitan and micropolitan statistical areas.

The metropolitan PSUs were manually created by grouping counties in MSAs. Each MSA constituted a PSU, except for those areas that crossed state boundaries. These areas were split into "proto-PSUs" along state boundaries. Proto-PSUs consisted of portions of MSAs within individual states[1]. For example, the New York-Newark-Bridgeport, NY-NJ-CT-PA MSA was partitioned into four proto-PSUs by state.

If the proto-PSU did not violate the size constraints, it was defined as a PSU. In some cases, these proto-PSUs violated the minimum size constraint of 15,000 youths for the Northeast or South Census regions, and 10,000 youths for the Midwest and West Census regions. There were 14 of these proto-PSUs violating size constraints. In one of these 14 cases where the size was close to the constraint, it was defined as a PSU. In the remaining 13 smaller cases, these proto-PSUs were combined with the adjacent MSA proto-PSUs to form the final PSUs. In these cases, the combined PSUs crossed state boundaries.

A total of 29 of the newly-created PSUs were defined as certainty PSUs. The remaining 370 PSUs comprised the MSA frame for PSU sampling, covering a total of 888 counties. The table below presents estimates for the number of youths by Census region. These estimates come from the county-level estimates of numbers of persons aged 0 to 17 from the 2009 U.S. Census Bureau's Population Estimates Program[2]. The 2009 estimates were the most recent demographic data at the time of the PSU selection.

Noncertainty Metropolitan Statistical Area (MSA) primary sampling unit (PSU) frame, by Census region: 2012

Census region	PSUs	Counties	Youths	Mean number of youths per PSU
Total	**370**	**888**	**32,287,989**	**87,265**
Northeast	46	83	4,553,200	98,983
Midwest	100	246	7,425,254	74,253
South	153	458	13,376,936	87,431
West	71	101	6,932,599	97,642

NOTE: PSU = primary sampling unit.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

NAEP Technical Documentation Primary Sampling Unit Generation: Certainty PSUs for the 2012 Assessment

Any primary sampling unit (PSU) was defined as a certainty PSU if it had 500,000 or more youths. The estimated number of youths is the number of persons age 17 or under from the 2009 U.S. Census Bureau's Population Estimates Program.[3] These PSUs were so large that a sample of schools was taken from all of them (rather than from only a subsample of them, as with noncertainty PSUs). There were two exceptions to the 500,000 cutoff. The Honolulu, Hawaii, and Washington, DC PSUs were included as certainties by design: Honolulu, Hawaii in order to reduce the variability of including Asian/Pacific Islander students and Washington, DC as it is essentially a part of the larger MD-VA-DC Washington area PSU. A total of 29 PSUs were classified as certainties in the 2012 frame. The table below provides a listing of the certainty PSUs by Census region.

[1] Note that, starting in 2006, this is a change from earlier NAEP cycles. Field personnel had indicated that contacts with state officials were very important in the process of recruiting schools. Because of this, it was decided that making single-state rather than multi-state PSUs was a better approach. In a few cases, small-size proto-PSUs were combined across state lines, if it was necessary to satisfy other criteria.

[2] The U.S. Census Bureau's Population Estimates Program (http://www.Census.gov/popest/) yearly publishes total resident population estimates by demographics such as age, sex, race, and Hispanic origin for the nation, states, and counties.

[3] The U.S. Census Bureau's Population Estimates Program (http://www.Census.gov/popest/) yearly publishes total resident population estimates by demographics such as age, sex, race, and Hispanic origin for the nation, states, and counties.

Metropolitan Statistical Area (MSA) definition for certainty PSUs, by primary sampling unit (PSU): 2012

PSU	Metropolitan Statistical Area (MSA)	State	Number of counties	Number of youths
Grand total			**203**	**30,598,471**
Total Northeast			**40**	**6,734,535**
1--1	Boston-Cambridge-Quincy	MA	5	899,860
1--2	New York-Northern New Jersey-Long Island	NJ-PA	13	1,516,170
1--3	New York-Northern New Jersey-Long Island	NY	10	2,907,564
1--4	Pittsburgh	PA	7	475,909
1--5	Philadelphia-Camden-Wilmington	PA	5	935,032
Total Midwest			**40**	**5,060,310**
2--1	Chicago-Naperville-Joliet	IL	9	2,213,473
2--2	Detroit-Warren-Livonia	MI	6	1,066,545
2--3	Minneapolis-St. Paul-Bloomington	MN	11	776,007
2--4	St. Louis	MO	9	517,251
2--5	Cleveland-Elyria-Mentor	OH	5	487,035
Total South			**93**	**9,319,246**
3--1	Washington-Arlington-Alexandria	DC	1	114,036
3--2	Tampa-St. Petersburg-Clearwater	FL	4	592,661
3--3	Miami-Fort Lauderdale-Miami Beach	FL	3	1,251,716
3--4	Atlanta-Sandy Springs-Marietta	GA	28	1,476,554
3--5	Washington-Arlington-Alexandria	MD	5	563,326
3--6	Baltimore-Towson	MD	7	622,766
3--7	San Antonio	TX	8	570,624
3--8	Houston-Sugar Land-Baytown	TX	10	1,673,274
3--9	Dallas-Fort Worth-Arlington	TX	12	1,806,339
3--10	Washington-Arlington-Alexandria	VA	15	647,950
Total West			**30**	**9,484,380**
4--1	Phoenix-Mesa-Scottsdale	AZ	2	1,187,246
4--2	Sacramento-Arden-Arcade-Roseville	CA	4	533,021
4--3	San Diego-Carlsbad-San Marcos	CA	1	739,625
4--4	San Francisco-Oakland-Fremont	CA	5	932,962
4--5	Riverside-San Bernardino-Ontario	CA	2	1,216,722
4--6	Los Angeles-Long Beach-Santa Ana	CA	2	3,256,354
4--7	Denver-Aurora	CO	10	640,638
4--8	Honolulu	HI	1	201,499
4--9	Seattle-Tacoma-Bellevue	WA	3	776,313

NOTE: PSU = primary sampling unit.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

NAEP Technical Documentation Primary Sampling Unit Generation: Non-Metropolitan Statistical Areas for the 2012 Assessment

A software algorithm was utilized to define a preliminary set of primary sampling units (PSUs) satisfying the design constraints. The input set consisted of all of the non-metropolitan counties. The software formed PSUs that satisfied the minimum size constraints while not crossing state boundaries. The software also minimized the maximum point-to-point distance for the candidate PSUs, while still satisfying the minimum size constraints (15,000 youths in the Northeast and South Census regions, and 10,000 youths in the Midwest and West Census regions). 'Worst first' was the general approach: the county which had the PSU with the

largest maximum point-to-point distance was fitted first, with those counties that best fit within a PSU containing the 'worst-first' county put together to form the first PSU. The algorithm was then run on the remaining counties not yet assigned to a PSU finding the next 'worst-first' county.

Initially, there were 22 counties that could not be combined into PSUs to satisfy the minimum size constraints while still remaining within a single state. Nine of the PSUs (formed from 12 of these counties) that were below the minimum size requirement were allowed to stand, since satisfying the minimum size requirement was not reasonably possible. The remaining counties were in Alaska, for which PSUs were manually drawn to better respect interstate highways (being drawn along the axis of these highways) and mountain ranges (avoiding crossing of ranges with poor road access). For Alaska, the proto-PSUs created by the program were replaced by the PSUs created for the NAEP 2004 assessment. The end result of this procedure was that all non-metropolitan PSUs were contained within state boundaries. There were a total of 670 final non-metropolitan PSUs.

The table below presents the number of PSUs, the number of counties represented, and the estimated number of youths (total and mean per PSU) by Census region. The estimated number of youths (persons age 0 to 17) for each county comes from the 2009 U.S. Census Bureau's Population Estimates Program.

Non-Metropolitan Statistical Area primary sampling unit (PSU) frame, by census region: 2012

Census region	PSUs	Counties	Youths	Mean number of youths per PSU
Total	**670**	**2,052**	**11,661,755**	**17,406**
Northeast	50	94	1,111,662	22,233
Midwest	249	769	3,561,130	14,302
South	269	872	5,263,030	19,565
West	102	317	1,725,933	16,921

NOTE: The U.S. Census Bureau's Population Estimates Program (http://www.Census.gov/popest/) yearly publishes total resident population estimates by demographics such as age, sex, race, and Hispanic origin for the nation, states, and counties.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

NAEP Technical Documentation Primary Sampling Unit (PSU) Frame: Stratification for the 2012 Assessment

The primary sampling unit (PSU) strata were determined by Census region and metropolitan status (metropolitan or non-metropolitan)—a total of eight "primary" strata. Measures of size were defined for each of these strata, determined by the relative share of the eventual PSU sample (the sample size is designed to be proportional to the number of youths). The PSU stratum measure of size then is the total number of youths in the stratum. The table below presents these counts for each of the eight primary strata. The relative share of the PSU sample size for each stratum is the number of youths in the stratum divided by the total number of youths, multiplied by 76 (38 sampled noncertainty PSUs each for the long-term trend and economics assessments). The resulting number is then rounded to the nearest even integer (the integer needs to be even to facilitate variance estimation), except for the South metropolitan PSU stratum, which is rounded down. The results of these calculations are given in the table below.

Noncertainty primary sampling unit frame size statistics, by primary stratum: 2012

Primary stratum	PSUs	Counties	Youths	Target number of PSU strata	Set number of PSU strata	Youth per PSU stratum

Primary stratum	PSUs	Counties	Youths	Target number of PSU strata	Set number of PSU strata	Youth per PSU stratum
Total noncertainty PSUs	**1,040**	**2,940**	**43,949,744**	**76**	**76**	**578,286**
Northeast region metropolitan	46	83	4,553,200	7.9	8	569,150
Northeast region non-metropolitan	50	94	1,111,662	1.9	2	555,831
Midwest region metropolitan	100	246	7,425,254	12.8	12	618,771
Midwest region non-metropolitan	249	769	3,561,130	6.2	6	593,522
South region metropolitan	153	458	13,376,936	23.1	22	608,043
South region non-metropolitan	269	872	5,263,030	9.1	10	526,303
West region metropolitan	71	101	6,932,599	12.0	12	577,717
West region non-metropolitan	102	317	1,725,933	3.0	4	431,483

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

The division of the primary strata into the final strata was done on a stratum-by-stratum basis. The criteria for good PSU strata were 1) the strata should have as nearly equal measures of size as possible (to reduce sampling variance), and 2) the strata should be as heterogeneous in measured achievement as possible (i.e., there should be strata with low mean achievement, strata with mid-level mean achievement, and strata with high mean achievement). This second criterion will also ultimately reduce the variance of the assessment estimates since the final PSU sample will be balanced in terms of assessment means.

PSU assessment means from the current year cannot be used as assessments are only conducted after sampling is completed. Information is available about PSU sociodemographic characteristics in advance, however. An analysis was done within each primary stratum to find sociodemographic variables that were good predictors of the NAEP 2000 mathematics and science assessment results. Using these sociodemographic variables to define strata should increase the chance of having efficient strata definitions. Stepwise Regression Analysis Results for PSU Stratification describes this analysis for each primary stratum.

The final step in stratification was to define the desired number of strata using the selected stratifiers, while constructing strata that were as close to equal size as possible (with size defined by number of youths). The objective was to establish strata that had a high between-stratum variance for the stratifiers (i.e., which "spread out" the stratifiers as much as possible). This was accomplished through the use of proprietary software developed for this purpose. Adjustments were then done manually. These strata are given in Final PSU Strata.

NAEP Technical Documentation Stepwise Regression Analysis Results for Primary Sampling Unit (PSU) Stratification for the 2012 Assessments

The objective was to find the optimum set of primary sampling unit (PSU)-level sociodemographic characteristics in terms of strength of relationship to achievement. The PSU-level values of these characteristics were derived from the 2000 Census Summary Files and the 2003 county population estimates, computed by combining the county-level data (using county youth estimates as the relative weighting factor for each county within the PSU). The characteristics used, and their abbreviations as used in the tables, were as follows:

- race/ethnicity percentages in schools (percent Black, Hispanic, or American Indian/Alaska Native – "Pct BHI" below; percent Black; percent Hispanic – "Hsp" below; percent Asian; percent American Indian/Alaska Native; percent two or more races);
- income levels (median household income – "Med Inc" below, percent children below the poverty line – "Cld pov" below);
- education levels in population (i.e., percent of persons age 25 and over who completed high school but have no college degree – "HS grd" below, percent of persons age 25 and over with college degrees – "CG grd" below);
- percent of renters (i.e., percent of householders who rent rather than own their place of residence); and
- percent of female householders living alone.

These PSU-level census characteristics were examined within each of the four NAEP 2000 assessment values: fourth-grade mathematics achievement, fourth-grade science achievement, eighth-grade mathematics achievement, and eighth-grade science achievement. These PSU-level values for achievement were computed using the 2000 state NAEP database. The criterion was that good strata should be heterogeneous for each of the five characteristics (i.e., within-stratum variance for each assessment value should be low and between-stratum variance high), so that strata are defined that do a good job for both mathematics and science, in both grades, not just the best possible job for one subject and one grade. This prevents overfitting to some extent.

The analysis was done separately within each of the eight primary strata (census region by metro status), using a forward stepwise regression approach, with a p-value cutoff of 20 percent. The results are given in the tables below. The order of the regressors is the order of entry into the stepwise procedure. The p-value is for an F-test for entry of the regressor into the forward stepwise model. The minus or plus sign indicates the direction of effect (negative indicates that increase in the regressor is related to lower achievement; positive indicates that increase in the regressor is related to higher achievement). The regressor is in italics if the direction of the effect is unexpected (i.e., negative when we generally expect a positive effect, or vice versa). The stratifiers chosen to generate the final PSU strata are indicated in a note below the regression analysis result tables.

Northeast metropolitan stepwise regression analysis on NAEP 2000 achievement scores, by subject, grade, and variable: 2012

Variable	Mathematics 4	Mathematics 8	Science 4	Science 8
First variable	Cld pov - (p=0.084)	Cld pov - (p=0.174)	Black - (p=0.068)	HS grd + (p=0.026)
Second variable	Black - (p=0.159)	†	†	Black - (p=0.193)

† Not applicable.
NOTE: Stratifiers chosen were percent child poverty (Cld pov) and percent Black. HS grd = high school graduate with no college degree. Black includes African American.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Northeast metropolitan stepwise regression analysis on NAEP 2000 achievement scores, by subject, grade, and variable: 2012

Variable	Mathematics 4	Mathematics 8	Science 4	Science 8
First variable	*Renters* + (p=0.092)	CG grd + (p=0.010)	Cld pov - (p=0.085)	*Black* + (p=0.005)
Second variable	†	*Black* + (p=0.176)	*Med Inc* - (p=0.002)	HS grd + (p=0.030)
Third variable	†	†	Renters - (p=0.085)	†

† Not applicable.
NOTE: Stratifier chosen was percent child poverty (Cld pov). Renters = householders who rent rather than own their place of residence; CG grd = college graduate; Med Inc = median household income; HS grd = high school graduate with no college degree. Black includes African American

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Midwest metropolitan stepwise regression analysis on NAEP 2000 achievement scores, by subject, grade, and variable: 2012

Variable	Mathematics 4	Mathematics 8	Science 4	Science 8
First variable	Cld pov - (p=0.003)	Asian + (p=0.004)	Cld pov - (p<0.001)	†
Second variable	*Med Inc* - (p=0.200)	*Med Inc* - (p=0.055)	*Med Inc* - (p=0.001)	†
Third variable	*Pct BHI* + (p=0.100)	†	*Black* + (p=0.006)	†
Fourth variable	†	†	*HS grd* - (p=0.050)	†

† Not applicable.
NOTE: Stratifiers chosen were percent child poverty (Cld pov), median household income (Med Inc), and percent Asian. Pct BHI = percent Black, Hispanic, or American Indian/Alaska Native; HS grd = high school graduate with no college degree. Black includes African American and Hispanic includes Latino; Asian includes Native Hawaiian and other Pacific Islander.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Midwest non-metropolitan stepwise regression analysis on NAEP 2000 achievement scores, by subject, grade, and variable: 2012

Variable	Mathematics 4	Mathematics 8	Science 4	Science 8
First variable	Cld pov - (p=0.012)	Cld pov - (p=0.002)	†	CG grd + (p=0.005)
Second variable	*Pct BHI* + (p=0.128)	Asian + (p=0.124)	†	Pct BHI - (p=0.079)

† Not applicable.
NOTE: Stratifiers chosen were percent child poverty (Cld pov), percent college graduates (CG grd), and percent Black, Hispanic, or American Indian/Alaska Native (BHI). Black includes African American and Hispanic includes Latino; Asian includes Native Hawaiian and other Pacific Islander.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

South metropolitan stepwise regression analysis on NAEP 2000 achievement scores, by subject, grade, and variable: 2012

Variable	Mathematics 4	Mathematics 8	Science 4	Science 8
First variable	*Hsp* + (p=0.001)	Asian + (p=0.014)	Black - Hsp - (p=0.005)	Cld pov - (p=0.011)
Second variable	Cld pov - (p=0.001)	Black - (p=0.038)	†	Black - (p=0.127)

† Not applicable.
NOTE: Stratifiers chosen were percent child poverty (Cld pov), percent Black, and percent Hispanic (Hsp). Black includes African American and Hispanic includes Latino; Asian includes Native Hawaiian and other Pacific Islander.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.\

South non-metropolitan stepwise regression analysis on NAEP 2000 achievement scores, by subject, grade, and variable: 2012

Variable	Mathematics 4	Mathematics 8	Science 4	Science 8
First variable	Black - (p<0.001)	Black - (p=0.005)	Black - (p=0.014)	Black - (p<0.001)
Second variable	Asian + (p=0.037)	Med Inc + (p=0.037)	Asian + (p=0.036)	Med Inc + (p=0.045)
Third variable	†	*Black-Hsp* + (p=0.176)	Cld Pov - (p=0.068)	*CG grd* - (p=0.127)
Fourth variable	†	†	†	†

† Not applicable.
NOTE: Stratifiers chosen were percent Black, median household income (Med Inc), and percent Asian. Cld Pov = children below the poverty line; CG grd = college graduate. Black includes African American and Hispanic includes Latino; Asian includes Native Hawaiian and other Pacific Islander.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

West metropolitan stepwise regression analysis on NAEP 2000 achievement scores, by subject, grade, and variable: 2012

Variable	Mathematics 4	Mathematics 8	Science 4	Science 8
First variable	CG grd + (p=0.094)	Pct BHI - (p=0.049)	HS grd + (p<0.001)	*HS grd* - (p=0.160)
Second variable	HS grd + (p=0.191	†	Asian + (p=0.007)	*Med Inc* - (p=0.001)
Third variable	†	†	Black - (p=0.080)	CG grd + (p=0.003)
Fourth variable	†	†	†	Asian + (p=0.009)
Fifth variable	†	†	†	Cld pov - (p=0.037)
Sixth variable	†	†	†	Renters - (p=0.087)

† Not applicable.
NOTE: Stratifiers chosen were percent high school graduates (HS grd) and percent college graduates (CG grd). Pct BHI = percent Black, Hispanic, or American Indian/Alaska Native; Med Inc = median household income; Cld pov = children below the poverty line; Renters = householders who rent rather than own their place of residence. Black includes African American and Hispanic includes Latino; Asian includes Native Hawaiian and other Pacific Islander.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

West non-metropolitan stepwise regression analysis on NAEP 2000 achievement scores, by subject, grade, and variable: 2012

Variable	Mathematics 4	Mathematics 8	Science 4	Science 8
First variable	Renter - (p=0.013)	CG grd + (p=0.006)	HS grd + (p<0.001)	CG grd + (p=0.220)
Second variable	*Black* + (p=0.040)	†	*Cld pov* + (p=0.008)	*Med Inc* - (p=0.038)
Third variable	Cld pov - (p=0.005)	†	*Asian* - (p=0.017)	Cld pov - (p=0.135)
Fourth variable	*HS grd* - (p=0.092)	†	†	†

† Not applicable.
NOTE: Stratifiers chosen were percent college graduates (CG grd), percent child poverty (Cld pov), and percent high school graduates (HS grd). Renter = householders who rent rather than own their place of residence; Med Inc = median household income. Black includes African American; Asian includes Native Hawaiian and other Pacific Islander.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

NAEP Technical Documentation Final Primary Sampling Unit Strata for the 2012 Assessment

The strata were defined using the selected stratifiers from the stepwise regression analysis (see Stepwise Regression Analysis Results for PSU Stratification). The cutoffs were selected so that roughly equal measures of size were represented by each stratum.

Stratification for Northeast metropolitan noncertainty primary sampling units (PSUs), by stratum: 2012

Stratum	Primary stratifier	Secondary stratifier	PSUs	Measure of size
Total	†	†	**46**	**4,553,200**
1	Percent child poverty <=10.1%	Percent Black <=15.9%	8	562,721
2	Percent child poverty <=10.1%	15.9% < Percent Black <=27.7%	2	536,158
3	10.1%< Percent child poverty <=12.5%	Percent Black <=14.9%	7	586,447
4	10.1%< Percent child poverty <=12.5%	14.9%< Percent Black <=38.2%	4	627,747
5	12.5%< Percent child poverty <=13.4%	†	5	548,322
6	13.4%< Percent child poverty <=15.1%	†	7	578,078
7	15.1%< Percent child poverty <=17.0%	†	5	517,843
8	17.0%< Percent child poverty <=20.7%	†	8	595,884
Mean	†	†	†	569,150

Stratum	Primary stratifier	Secondary stratifier	PSUs	Measure of size

† Not applicable.
NOTE: Black includes African American.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Stratification for Northeast metropolitan noncertainty primary sampling units (PSUs), by stratum: 2012

Stratum	Primary stratifier	PSUs	Measure of size
Total	†	**50**	**1,111,662**
1	Percent child poverty <=15.7%	23	549,880
2	15.7%< Percent child poverty <=22.8%	27	561,782
Mean	†	†	555,831

† Not applicable.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Stratification for Midwest metropolitan noncertainty primary sampling units (PSUs), by stratum: 2012

Stratum	Primary stratifier	Secondary stratifier	Tertiary stratifier	PSUs	Measure of size
Total	†	†	†	**100**	**7,425,254**
1	Child poverty <=12.5%	†	Pct Asian<=1.1%	17	627,034
2	Child poverty <=12.5%	†	1.1%<Pct Asian<=1.4%	4	664,158
3	Child poverty <=12.5%	†	1.4% < Pct Asian <=2.4%	8	591,089
4	Child poverty <=12.5%	†	2.4% < Pct Asian <=2.6%	3	697,772
5	Child poverty <=12.5%	†	2.6% < Pct Asian <=3.4%	7	601,360
6	Child poverty <=12.5%	†	3.4% < Pct Asian <=10.3%	13	610,155
7	12.5% < Child poverty <=12.9%	†	†	6	613,473
8	12.9% < Child poverty <=14.5%	†	Pct Asian <=1.3%	7	636,134
9	12.9% < Child poverty <=14.5%	†	1.3% < Pct Asian <=2.7%	7	591,225
10	14.5% < Child poverty <=27.6%	Med HH Income <=$38,291	†	17	601,878
11	14.5% < Child poverty <=27.6%	$38,291 < Med HH Income <=$46,460	Pct Asian <=0.9%	7	572,275
12	14.5% < Child poverty <=27.6%	$38,291 < Med HH Income <=$46,460	0.9% < Pct Asian <=3.1%	4	618,701
Mean	†	†	†	†	618,771

† Not applicable.
NOTE: Med HH Income = median household income. Asian includes Pacific Islander.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Stratification for Midwest non-metropolitan noncertainty primary sampling units (PSUs), by stratum: 2012

Stratum	Primary stratifier	Secondary stratifier	Tertiary stratifier	PSUs	Measure of size
Total	†	†	†	**249**	**3,561,130**
1	Child poverty <=15.7%	Percent college grd <=12.5%	†	41	586,227
2	Child poverty <=15.7%	12.5%< Percent college grd <=36.0%	Pct BHI <=4.2%	42	588,164
3	Child poverty <=15.7%	12.5%< Percent college grd <=36.0%	4.2%< Pct BHI <=8.5%	42	592,616
4	Child poverty <=15.7%	12.5%< Percent college grd <=36.0%	8.5%< Pct BHI <=41.4%	38	604,908
5	15.7%< Child poverty <=45.5%	Percent college grd <=13.2%	†	41	589,093
6	15.7%< Child poverty <=45.5%	13.2%< Percent college grd <=23.0%	†	45	600,122
Mean	†	†	†	†	593,522

† Not applicable.
NOTE: BHI = Black, Hispanic, or American Indian/Alaska Native. Black includes African American. Hispanic includes Latino.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Stratification for South metropolitan noncertainty primary sampling units (PSUs), by stratum: 2012

Stratum	Primary stratifier	Secondary stratifier	Tertiary stratifier	PSUs	Measure of size
Total	†	†	†	**153**	**13,376,936**
1	Child poverty <=22.7%	Percent Black <=39.7%	Percent Hispanic <=1.7%	16	601,133
2	Child poverty <=22.7%	Percent Black <=39.7%	1.7%< Percent Hispanic <=2.6%	12	630,882
3	Child poverty <=22.7%	Percent Black <=39.7%	2.6%< Percent Hispanic <=2.7%	3	578,692
4	Child poverty <=22.7%	Percent Black <=39.7%	2.7%< Percent Hispanic <=3.0%	8	576,467
5	Child poverty <=22.7%	Percent Black <=39.7%	3.0%< Percent Hispanic <=3.5%	7	664,447
6	Child poverty <=22.7%	Percent Black <=39.7%	3.5%< Percent Hispanic <=4.2%	6	648,364
7	Child poverty <=22.7%	Percent Black <=39.7%	4.2%< Percent Hispanic <=4.8%	4	638,875
8	Child poverty <=22.7%	Percent Black <=39.7%	4.8%< Percent Hispanic <=5.5%	6	514,110
9	Child poverty <=22.7%	Percent Black <=39.7%	5.5%< Percent Hispanic <=7.3%	8	591,459
10	Child poverty <=22.7%	Percent Black <=39.7%	7.3%< Percent Hispanic <=8.5%	5	533,640
11	Child poverty <=22.7%	Percent Black <=39.7%	8.5%< Percent Hispanic <=9.1%	4	725,090
12	Child poverty <=22.7%	Percent Black <=39.7%	9.1%< Percent Hispanic <=11.2%	6	709,260
13	Child poverty <=22.7%	Percent Black <=39.7%	11.2%< Percent Hispanic <=14.6%	8	579,834
14	Child poverty <=22.7%	Percent Black <=39.7%	14.6%< Percent Hispanic <=21.1%	6	541,611
15	Child poverty <=22.7%	Percent Black <=39.7%	21.1%< Percent Hispanic <=30.8%	6	699,288
16	Child poverty <=22.7%	Percent Black <=39.7%	30.8%< Percent Hispanic <=51.2%	6	712,593
17	Child poverty <=22.7%	39.7%< Percent Black <=56.6%	Percent Hispanic <=2.7%	6	545,131
18	Child poverty <=22.7%	39.7%< Percent Black <=56.6%	2.7%< Percent Hispanic <=7.8%	6	663,198
19	22.7%< Child poverty <=24.3%	†	†	11	501,477
20	24.3%< Child poverty <=45.7%	Percent Black <=2.0%	†	4	736,424
21	24.3%< Child poverty <=45.7%	2.0%< Percent Black <=60.8%	Percent Hispanic <=3.8%	11	494,354
22	24.3%< Child poverty <=45.7%	2.0%< Percent Black <=60.8%	3.8%< Percent Hispanic <=64.1%	4	490,607

Stratum	Primary stratifier	Secondary stratifier	Tertiary stratifier	PSUs	Measure of size
Mean	†	†	†	†	608,043

† Not applicable.
NOTE: BHI = Black, Hispanic, or American Indian/Alaska Native. Black includes African American. Hispanic includes Latino.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Stratification for South non-metropolitan noncertainty primary samling units (PSUs), by stratum: 2012

Stratum	Primary stratifier	Secondary stratifier	Tertiary stratifier	PSUs	Measure of size
Total	†	†	†	**269**	**5,263,030**
1	Percent Black <=31.2%	Median HH Income <=$36,049	Percent Asian <=0.2%	32	523,811
2	Percent Black <=31.2%	Median HH Income <=$36,049	0.2%< Percent Asian <0.3%	29	525,860
3	Percent Black <=31.2%	Median HH Income <=$36,049	Percent Asian =0.3%	32	529,321
4	Percent Black <=31.2%	Median HH Income <=$36,049	0.3%< Percent Asian <=0.4%	29	521,822
5	Percent Black <=31.2%	Median HH Income <=$36,049	0.4%< Percent Asian <=0.7%	26	548,060
6	Percent Black <=31.2%	Median HH Income <=$36,049	0.7%< Percent Asian <=3.0%	26	545,240
7	Percent Black <=31.2%	$36,049< Median HH Income <=$54,721	†	21	557,463
8	31.2%< Percent Black <=51.3%	Median HH Income <=$29,555	†	25	519,808
9	31.2%< Percent Black <=51.3%	$29,555< Median HH Income <=$44,421	†	23	502,924
10	51.3%< Percent Black <=79.4%	†	†	26	488,721
Mean	†	†	†	†	526,303

† Not applicable.
NOTE: Black includes African American. Median HH income = median household income. Asian includes Pacific Islanders.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Stratification for West metropolitan noncertainty primary sampling units (PSUs), by stratum: 2012

Stratum	Primary stratifier	Secondary stratifier	PSUs	Measure of size
Total	†	†	**71**	**6,932,599**
1	Percent HS graduates <=70.0%	Percent college graduates <=13.5%	7	663,779
2	Percent HS graduates <=70.0%	13.5%< Percent college graduates <=22.5%	4	519,908
3	70.0%< Percent HS graduates <=78.9%	†	6	534,728
4	78.9%< Percent HS graduates <=79.6%	†	3	668,300
5	79.6%< Percent HS graduates <=88.3%	Percent college graduates <=21.8%	14	565,552
6	79.6%< Percent HS graduates <=88.3%	21.8%< Percent college graduates <=25.5%	8	599,946
7	79.6%< Percent HS graduates <=88.3%	25.5%< Percent college graduates <=26.9%	4	529,564
8	79.6%< Percent HS graduates <=88.3%	26.9%< Percent college graduates <=27.8%	3	585,362

Stratum	Primary stratifier	Secondary stratifier	PSUs	Measure of size
9	79.6%< Percent HS graduates <=88.3%	27.8%< Percent college graduates <=30.3%	3	556,359
10	79.6%< Percent HS graduates <=88.3%	30.3%< Percent college graduates <=39.5%	3	538,473
11	88.3%< Percent HS graduates <=90.1%	†	8	570,886
12	90.1%< Percent HS graduates <=93.1%	†	8	599,742
Mean	†	†	†	577,717

† Not applicable.
NOTE: Percent HS graduates = percent high school graduates.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Stratification for West non-metropolitan noncertainty primary sampling units (PSUs), by stratum: 2012

Stratum	Primary stratifier	Secondary stratifier	Tertiary stratifier	PSUs	Measure of Size
Total	†	†	†	**102**	**1,725,933**
1	Percent college graduates <=21.0%	Median child poverty <=17.3%	†	26	444,251
2	Percent college graduates <=21.0%	17.3%< Median child poverty <=43.0%	Percent HS graduates <=77.3%	23	421,744
3	Percent college graduates <=21.0%	17.3%< Median child poverty <=43.0%	77.3%< Percent HS graduates <=86.4%	28	417,700
4	21.0%< Percent college graduates <=42.6%	†	†	25	442,238
Mean	†	†	†	†	431,483

† Not applicable.
NOTE: Percent HS graduates = percent high school graduates.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

NAEP Technical Documentation Final Primary Sampling Unit Sample for the 2012 Assessment

For the Long-Term Trend (LTT) assessment, a sample of 67 primary sampling units (PSUs) was selected (29 certainties and 38 noncertainties). To accomplish this, the 76 noncertainty strata (defined in Final Primary Sampling Unit Strata) were paired and one noncertainty stratum was randomly selected from each of the 38 pairs. Then one PSU was selected from each of the 38 selected strata with probability proportionate to size (with size equal to the estimated number of youths).

For the Economics assessment, a sample of 67 PSUs was also drawn. The same certainty PSUs were included in the non-LTT sample, but the noncertainty PSUs were drawn from the 38 noncertainty strata that were not used for the LTT assessment. Thus the two sets of sampled noncertainty PSUs were distinct from each other and did not overlap. In addition, the noncertainty PSUs were selected in such a way as to minimize overlap with PSU samples from prior NAEP assessments.

Distribution of sampled primary sampling units (PSU) for long-term trend (LTT) and economics assessments by PSU type: 2012

PSU type	Number of sampled PSUs	
	LTT	Economics
Total	**67**	**67**
Metropolitan status		

PSU type	Number of sampled PSUs	
	LTT	Economics
Metropolitan	56	56
Non-metropolitan	11	11
Census Region		
Northeast	10	10
Midwest	14	14
South	26	26
West	17	17
Certainty/metropolitan status		
Certainty	29	29
Non-certainty metropolitan	27	27
Non-certainty non-metropolitan	11	11

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

NAEP Technical Documentation2012 Public School Long-Term Trend (LTT) Assessment

The NAEP 2012 long-term trend assessment (LTT) sample design yielded a nationally representative sample of public school students in each age group (9, 13, and 17) through a three-stage approach: selection of primary sampling units (PSUs), selection of schools within PSUs, and selection of students within schools. The 2012 sampling plan was designed to assess 15,300 students for each of the LTT public school age-specific samples. In addition, the design called for SD/ELL oversamples of 525 students at each of ages 9 and 13.

These students were allocated among four different tests. The operational tests were in reading and mathematics, and pilot tests in mathematics and reading.

The public school samples were drawn from a sampling frame that only included the sampled LTT primary sampling unit (PSUs). From the stratified frame of public schools for each grade associated with the age range, a systematic random sample of age-eligible schools was drawn with probability proportional to a measure of size based on the estimated age-specific enrollment of the school. The number of age-eligible students was estimated by applying population-level percentages of age-eligible students within each grade to estimated grade enrollments for each grade, and aggregating to an age-eligible total for the school.

Each selected school was asked to provide a roster of all of its students who were age-eligible. A fixed sample of 64 students was selected from these rosters, with the exception of smaller schools with total age-eligible counts less than the sample size. The combination of using the number of age-eligible students as a measure of size and a fixed sample size of students is intended to give a self-weighting sample (each student has an equal probability of selection). In practice, differences between the estimated age-eligible enrollment for the school and the actual size of the finalized roster introduce slightly differing student probabilities across schools.

NAEP Technical Documentation Target Population of the 2012 Public School Long-Term Trend (LTT) Assessment

The target population for the 2012 public school long-term trend (LTT) assessment included all students in three age populations (9, 13, and 17) who were enrolled in public schools in the 50 states and the District of Columbia. The sample frame also included Bureau of Indian Education (BIE) schools and Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS).

NAEP Technical Documentation Sampling Frame of the 2012 Public School Long-Term Trend (LTT) Assessment

Drawing the school samples for the 2012 long-term trend (LTT) assessment required a comprehensive list of public schools in each jurisdiction containing information for stratification purposes. As in previous NAEP assessments, the Common Core of Data (CCD) file developed by NCES was used to construct the sampling frame. The CCD file corresponding to the 2008-2009 school year provided the frame for all regular public, state-operated public, Bureau of Indian Education (BIE), and Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS).

The sampling frame was restricted to schools located in the primary sampling units (PSUs) selected for the NAEP 2012 long-term trend (LTT) assessments. In addition, the sampling frame excluded ungraded schools, vocational schools with no enrollment, special-education-only schools, homeschool entities, prison or hospital schools, and juvenile correctional institutions.

For quality control purposes, school and student counts from the sampling frame were compared to school and student counts from previous public school frames by grade. No major discrepancies were found.

NAEP Technical Documentation Schools and Enrollment in the Public School Frame for the 2012 Public School Long-Term Trend (LTT) Assessment

The following table presents the number of schools and estimated enrollment for the public school frame by age population. The unweighted estimated enrollment is restricted to the selected primary sampling units (PSUs). The weighted estimated enrollment incorporates the PSU weight (inverse of the probability of selecting the PSU), and the estimated age-eligible enrollment, and thus is a national estimate of the number of public school students in the age population. The age-eligible enrollment was estimated using age distribution fractions derived for each grade in the age range.

Number of schools and enrollment in public school sampling frame, long-term trend (LTT) assessment, by age: 2012

Age	School count in sampled PSUs	Estimated enrollment (unweighted)	Estimated enrollment (weighted)
9	21,800	1,678,000	3,647,000
13	19,500	1,650,000	3,569,000
17	7,700	1,722,000	3,713,000

NOTE: PSU = primary sampling unit.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-term Trend Assessment.

NAEP Technical Documentation New-School Sampling Frame for the 2012 Public School Long-Term Trend (LTT) Assessment

The most current Common Core of Data (CCD) file available was used to construct the public school frame for NAEP 2012. However, the information on that file was 3 years out of date by the time of the NAEP assessment. During that 3-year period, some schools closed, others changed grade span, and still others came into existence.

One can improve coverage by asking districts to provide information on currently open schools that were not listed on the 2008-2009 CCD file used to create the NAEP public school frame, and also to report grade span changes that may have caused a CCD-listed school to become newly eligible for ages 9, 13, or 17. Asking all districts to do this would have imposed an undue burden, so instead, a random sample of districts was contacted to obtain lists of new and newly eligible schools. The goal was to allow every new or newly eligible school a chance of selection, thereby fully covering the target population of schools in operation during the 2011-2012 school year.

The first step in this process was the development of a new-school frame through the construction of a district-level file from the CCD school-level file. Since the operational assessment was to be conducted within 67 geographically defined areas selected as Primary Sampling Units (PSUs), only districts that fell within the boundaries of those PSUs were eligible for sampling. Once the district-level file was subset to just the targeted PSUs, it was divided into three files: the first containing state-operated and charter school districts, the second containing small districts, and the third containing large districts.

State-operated districts and districts containing no schools other than charter schools require special handling. In survey years when state-level assessments are conducted, State Coordinators are asked to provide the names of all new charter-only and state-run schools. However, these types of school districts tend not to be geographically compact, and it is not feasible to link such a district to a single PSU, except at the individual school level. The smaller the proportion of a state’s population falling within sampled PSUs, the less likely that a specific new school of this type will be added to the frame and the more likely that state personnel will have expended unnecessary effort in providing updated information that will not be used. For this reason, for the NAEP 2012 assessment, the charter-only and state-run district component of the new school procedure was implemented only in states where more than 60 percent of youth fell within sampled PSUs. This meant that this component of the new-school sampling frame procedure was implemented in 9 states plus the District of Columbia, which taken together contain about 42 percent of the nation's youth.

The remaining districts were classified as small or large. A small district contains no more than eleven schools on the frame in total, with no more than one school at each targeted grade (second through twelfth). All other districts were considered to be large. The large districts were divided into 66 strata based on the NAEP 2012 PSU sampling strata. The district sample was allocated to each of the 66 strata proportional to the percent of the U.S. population of students ages 9, 13 and 17 contained in that stratum, with the caveat that each stratum had to be allocated at least one district. Once the allocation to each stratum had been fixed, districts were sampled from a sorted list using systematic sampling with probability proportional to size and a random start, the measure of size being the estimate of youth ages 9, 13 and 17 enrolled in the district. The districts were sorted by the measure of size. District selection probabilities were retained and used in all subsequent stages of sampling and weighting.

The selected districts were then sent a listing of all their schools that appeared on the 2008-2009 CCD file and were asked to provide information about any schools missing from CCD, and grade span changes of existing schools. This information provided by the sampled districts was used to construct sampling frames for the selection of new or newly eligible public schools and also for updating the status of existing schools (e.g., school closings). This process was conducted through the NAEP State Coordinator in each jurisdiction. The coordinators were sent the information for all sampled districts in their respective states and were responsible for returning the completed updates.

Because the long-term trend (LTT) assessments are age based, the new-schools-in-small-districts procedure was done in a different manner from a grade-based year because it is not always clear, based on grade alone, whether a school is age-eligible. Once the small districts were identified, we prepared listings of all schools in small districts that had an LTT sampled school. The listings in turn were sent to the state coordinators in the affected states for review and updating, in the same manner as for the large-district new-school procedure. The statistical staff reviewed the updated listings from the states and determined that no new schools from small districts needed to be added to the sample.

NAEP Technical Documentation Stratification of Public Schools in the 2012 Long-Term Trend (LTT) Assessment

Prior to stratification, the public school sampling frame was divided into age-specific files, one each for ages 9, 13, and 17. For each age-specific frame file, separate implicit stratification schemes were used to sort schools into certainty primary sampling units (PSUs) and noncertainty PSUs. In all cases, the implicit stratification was achieved via a "serpentine sort."

For certainty PSUs, the schools were hierarchically sorted by

- census region;
- urbanization classification (urban-centric locale);
- race/ethnicity strata; and
- estimated age enrollment.

If there were fewer than two expected sampled schools for a particular urbanization classification cell (nested within the Census region), the cell was collapsed with a neighboring urbanization classification cell. If the expected sampled schools exceeded four, then the race/ethnicity strata were defined based on the percentage of Blacks, Hispanics, and American Indians/Alaska Natives. The strata were defined so that there were at least two expected sampled schools for each racial/ethnic stratum. If the urbanization classification stratum had an expected sample size less than four, no race/ethnicity strata were generated, and the final sort variable was percent Blacks, Hispanics, and American Indians/Alaska Natives rather than estimated age enrollment.

Schools in noncertainty PSUs were hierarchically sorted by

- PSU stratum;
- urbanization classification (urban-centric locale); and
- percent race/ethnicity (Blacks, Hispanics, American Indians/Alaska Natives).

The collapsing of cells within the noncertainty PSUs was implemented in a fashion similar to that described for certainty PSUs.

NAEP Technical Documentation Sampling of Public Schools for the 2012 Long-Term Trend (LTT) Assessment

When designing each school sample, there are five objectives that underlie the process of determining the probability of selection for each school and how many students are to be sampled from each selected school. They are as follows:

- to meet the target student sample size for each age-specific sample
- to select an equal-probability sample of students

- to limit the number of students that are selected from a school;
- to ensure that the sample within a school does not include a very high percentage of the students in the school, unless all students are included
- to reduce the rate of sampling of small schools, in recognition of the greater cost and burden per student of conducting assessments in such schools

The goal in determining the school's measure of size (MOS) is to optimize across the last four objectives in terms of maintaining the accuracy of estimates and the cost effectiveness of the sample design.

Therefore, to meet the target student sample size objective and achieve a reasonable compromise among the other four objectives, the following algorithm was used to assign a measure of size to each school based on its age-specific enrollment as estimated from the sampling frame data.

The measures of size vary by enrollment size and within school target sample size. In general, very small schools were assigned an MOS that is one quarter of the target sample size of 64 students. The preliminary measures of size (MOS_{js}) for age j in school s were set as follows:

$$MOS_{js} = PSU\_WT_s \times \begin{cases} x_{js}, & \text{if } 64 < x_{js} \\ 64, & \text{if } 20 \le x_{js} \le 64 \\ \frac{64}{20} \times x_{js}, & \text{if } 6 \le x_{js} \le 19 \\ \frac{64}{4}, & \text{if } x_{js} \le 5 \end{cases}$$

where x_{js} is the estimated age-specific enrollment for age j in school s, and PSU_WT_s is the PSU weight for school s.

A school with more than 15 percent Black and Hispanic students and at least 10 Black or Hispanic students in the sample grade is in the high Black/Hispanic stratum for NAEP. The measures of size for schools in the high Black/Hispanic stratum are doubled to increase their chances of selection:

$$M_{js} = \begin{cases} 2 \times MOS_{js} & \text{if school is in the high Black/Hispanic stratum} \\ MOS_{js} & \text{if school is not in the high Black/Hispanic stratum} \end{cases}$$

The next task in this development is to describe b_j, the constant of proportionality for each age. It is a sampling parameter that, when multiplied with a school's preliminary measure of size (M_{js}), yields the school's final measure of size. It is computed in such a way that, when used with the systematic sampling procedure, the target student sample size is achieved. For public schools, b_j is 0.000050 for age 9, 0.000056 for age 13, and 0.000062 for age 17.

The final measure of size, E_{js}, is defined as:

$$E_{js} = \min\left(b_j \times M_{js}, u_j\right)$$

The quantity u_j (the maximum number of times a school can be selected or "hits" allowed) in this formula is designed to put an upper bound on the burden for the sampled schools. For public schools, u_j is 1.

In addition, new and newly-eligible schools were sampled from the new-school frame. The assigned measures of size for these schools

$$E_{js} = \min\left(b_j \times M_{js} \times \left(\pi_{djs}\right)^{-1}, u_j\right)$$

used the b_j and u_j values from the main school sample. The variable π_{djs} is the probability of selection of the district *d* into the new-school district sample.

Schools were ordered within each jurisdiction using the serpentine sort described under the stratification of public schools. A systematic sample was then drawn using this serpentine sorted list and the measures of size. The numbers of public schools selected, including the original and new school sample were approximately 350, 375, and 400 for ages 9, 13, and 17, respectively.

The estimated number of age-eligible students was computed using a derived linear function of estimated grade enrollments. For 9-year-olds, the frame contained schools with a second, third, fourth, or fifth grade. $M_{js}(2)$, $M_{js}(3)$, $M_{js}(4)$, and $M_{js}(5)$ denote the estimated enrollments from the frame for the four grades respectively within each school *s* for age sample *j* . $F_j(2)$, $F_j(3)$, $F_j(4)$, and $F_j(5)$ denote the global proportion of students who were 9 years old (birth months January 2002 through December 2002) within each grade, Census region, and within public schools. These proportions were derived from the NAEP 2009 reading, mathematics, and science assessments. These values are shown in the table below for public schools. Age Distribution Fractions for Ages 9 and 13 describes how these proportions are computed.

Distribution proportions based on estimated enrollment for 9-year-old students in public schools, long-term trend (LTT) assessment, by Census region: 2012

Census region	$F_j(2)$	$F_j(3)$	$F_j(4)$	$F_j(5)$	Total
Northeast	0.02	0.29	0.69	#	1.00
Midwest	0.02	0.41	0.56	#	1.00
South	0.05	0.40	0.54	#	1.00
West	0.01	0.30	0.69	#	1.00

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

The estimated number of age eligible students for the 9-year-olds component of the long-term trend (LTT) study for each school was computed as follows:

$$x_{js} = \sum_{g=2}^{5} F_j(g) * M_{js}(g)$$

For 13-year-olds, the frame contained schools with a sixth, seventh, eighth, or ninth grade. $M_{js}(6)$, $M_{js}(7)$, $M_{js}(8)$, and $M_{js}(9)$ denote the estimated enrollments from the frame for the four grades respectively within each school *s* for age sample *j*. $G_j(6)$, $G_j(7)$, $G_j(8)$, and $G_j(9)$ denote the global proportion of students who were 13 years old (birth months January 1998 through December 1998) within each grade, Census region, and within public schools. These proportions were derived from the NAEP 2009 reading, mathematics, and science assessments. These values are shown in the table below for public schools. Age Distribution Fractions for Ages 9 and 13 describes how these proportions are computed.

Distribution proportions based on estimated enrollment for 13-year-old students in public schools, long-term trend (LTT) assessment, by Census region: 2012

Census region	$G_j(6)$	$G_j(7)$	$G_j(8)$	$G_j(9)$	Total
Northeast	0.03	0.31	0.66	#	1.00
Midwest	0.03	0.42	0.54	#	1.00
South	0.07	0.40	0.52	#	0.99
West	0.01	0.31	0.67	#	1.00

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

The estimated number of age eligible students for the 13-year-olds component of the LTT study for each school was computed as follows:

$$x_{js} = \sum_{g=6}^{9} G_j(g) * M_{js}(g)$$

For the age 17 component, the frame contained schools with a ninth, tenth, eleventh, or twelfth grade. $M_{js}(9)$, $M_{js}(10)$, $M_{js}(11)$, and $M_{js}(12)$ denote the estimated enrollments from the frame for the four grades respectively within each school *s* for age sample *j* . $J_j(9)$, $J_j(10)$, $J_j(11)$, and $J_j(12)$ denote the global proportion of students born between October 1994 and September 1995 within each grade and Census region. The Current Population Survey (CPS) School Supplement (October 2009) was utilized to provide the proportions within each of ninth, tenth, eleventh, and twelfth grades for the age 17 component. The same table was used for both public and private schools since overall age distribution fractions were derived without differentiation of school enrollment by school type. The derivation of the Age Distribution Fractions for Age 17 describes how these proportions are computed.

Distribution proportions based on estimated enrollment for the age 17 component, Long-Term Trend (LTT) assessment, by Census region: 2012

Census region	$J_j(9)$	$J_j(10)$	$J_j(11)$	$J_j(12)$	Total
Northeast	0.02	0.26	0.64	0.10	1.03
Midwest	0.04	0.32	0.63	0.06	1.06
South	0.09	0.30	0.59	0.06	1.03
West	0.02	0.22	0.67	0.04	0.95

NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

The estimated number of age eligible students for the age 17 component of the LTT study for each school was computed as follows:

$$x_{js} = \sum_{g=9}^{12} J_j(g) * M_{js}(g)$$

The SD/ELL Decision Tree Experiment was conducted as part of the NAEP 2012 assessment in 50 participating schools sampled for long-term trend (LTT) at ages 9 and 13. Schools eligible for the experiment were public schools with the modal grade (4 and 8) for the corresponding age 9 and 13 samples that have at least 25 age-eligible students. Eligible schools were sub-sampled from among the originally-sampled LTT age 9 and 13 schools using the sort order from the original sample design. A fixed-size sample of 55 schools

from each age group was selected. The student sample size in the selected schools was increased to meet the sample size requirements for the experiment, as described in the student sampling section.

NAEP Technical Documentation Substitute Public Schools for the 2012 Long-Term Trend (LTT) Assessment

Substitute schools were preselected for the public school samples by sorting the school frame file according to the actual order used in the sampling process (the implicit stratification). For operational reasons, the original selection order was embedded within the sampled primary sampling unit (PSU) and state. Each sampled school had each of its nearest neighbors within the same sampling stratum on the school frame file identified as a potential substitute. When age-eligible enrollment was used as the last sort ordering variable, the nearest neighbors had age enrollment values very close to that of the sampled school. This was done to facilitate the selection of about the same number of students within the substitute as would have been selected from the original sampled school.

Schools were disqualified as potential substitutes if they were already selected in any of the original public school samples or assigned as a substitute for another public school (earlier in the sort ordering). Schools assigned as substitutes for age 17 schools were disqualified as potential substitutes for age 9 and 13 schools, and schools assigned as substitutes for age 13 schools were disqualified as potential substitutes for age 9 schools.

If both nearest neighbors were still eligible to be substitutes, the one with a closer age-eligible enrollment was chosen. If both nearest neighbors were equally distant from the sampled school in their age enrollment (an uncommon occurrence), one of the two was randomly selected.

Of the approximately 1,100 original sampled public schools for the ages 9, 13, and 17 assessments, about 30 schools had a substitute activated because the original eligible school did not participate. Ultimately, about 20 of the activated substitute public schools participated in an assessment.

NAEP Technical Documentation Ineligible Public Schools for the 2012 Long-Term Trend (LTT) Assessment

The Common Core of Data (CCD) public school file from which most of the sampled schools were drawn corresponds to the 2008-2009 school year, three years prior to the assessment school year. During the intervening period, some of these schools either closed, no longer served the age group of interest, or became ineligible for other reasons. In such cases, the sampled schools were considered to be ineligible.

The table below presents unweighted counts of sampled public schools by grade and eligibility status, including the reason for ineligibility.

Number of sampled public schools, long-term trend (LTT) assessment, by age and eligibility status: 2012

Age	Eligibility status	Unweighted count of schools	Unweighted percentage
9	**All age 9 sampled public schools**	**347**	**100.00**
	Eligible schools	331	95.39
	No eligible students in age range	6	1.73
	School closed	9	2.59
	Not a regular school	0	0.00

Age	Eligibility status	Unweighted count of schools	Unweighted percentage
	Other ineligible school	1	0.29
	Duplicate on sampling frame	0	0.00
	All age 13 sampled public schools	**375**	**100.00**
	Eligible schools	331	88.27
	No eligible students in age range	23	6.13
	School closed	13	3.47
	Not a regular school	7	1.87
	Other ineligible school	1	0.27
13	Duplicate on sampling frame	0	0.00
	All age 17 sampled public schools	**389**	**100.00**
	Eligible schools	367	94.34
	No eligible students in age range	3	0.77
	School closed	7	1.80
	Not a regular school	11	2.83
	Other ineligible school	1	0.26
17	Duplicate on sampling frame	0	0.00

NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

NAEP Technical Documentation Student Selection for the 2012 Public School Long-Term Trend (LTT) Assessment

Within each sampled school, a sample of students was selected from a listing of the age-eligible students such that every student had an equal chance of selection. The student lists were submitted in multiple ways. E-Filing is an electronic submission system. Excel files are submitted for sampled schools by school coordinators or NAEP State Coordinators. Files can be submitted for one school at a time or for an entire jurisdiction at once. This method allows schools to easily submit student demographic data electronically with the student lists, easing burden on NAEP field supervisors and school coordinators. Schools that are unable to submit their student lists using the E-Filing system provide hardcopy lists via the student listing form to NAEP field supervisors.

In year-round, multi-track schools, students who were not scheduled to be in school on the assessment day were removed from the student lists prior to sampling. Student base weights were adjusted to account for these students.

The sampling process was the same regardless of list submission type. The sampling process was systematic (e.g., if the sampling rate was 1/2, a random starting point of one or two was chosen, and every other student on the list was selected). For E-Filed schools only, where demographic data are submitted for every student on the frame, students are sorted by sex and race before the sample is selected to implicitly stratify the sample.

Some students enrolled in the school after the sample was selected. In such cases, new enrollees were sampled at the same rate as the students on the original list.

Students were randomly assigned to a reading or mathematics operational assessment, or to a reading or mathematics operational assessment with a reading or mathematics integrated pilot assessment. The proportions assigned to these four types of assessments were approximately 3/8, 3/8, 1/8, and 1/8, respectively. The booklet assignment was implemented by spiraling: the booklets assigned to sampled students were provided from booklet packets which had, on average, the correct proportion of each of the relevant assessments in a randomized order.

Some of the students who were English language learners (ELL) or students with disabilities (SD) were excluded from the assessment because they could not be assessed with the accommodations NAEP provides. Excluded students were removed from the sample.

The student sample consisted of all age-eligible students in the school if the school had 64 or fewer students, or a sample of 64 students selected without replacement, if the school had 65 or more students.

In 2012 in addition to the regular assessments described above, there was an experimental SD/ELL decision tree that was piloted in a subsample of schools selected for the ages 9 and 13 LTT samples (see the school sampling page). To increase the number of students utilizing the decision tree, extra SD and ELL students in the selected schools were sampled where possible. In these schools only, and only if the school e-filed, a special sampling procedure was implemented which required sorting the student list into two groups (SD/ELL and non-SD/ELL) and sampling from each group based on a specific rate. The result of the oversampling was an increase of about 5 SD/ELL students in the student sample for each school in the decision tree subsample of schools.

NAEP Technical Documentation 2012 Private School Long-Term Trend (LTT) Assessment

The NAEP 2012 long-term trend (LTT) assessment sample design yielded a nationally representative sample of private school students in each age group (9, 13, and 17) through a three-stage approach: selection of primary sampling units (PSUs), selection of schools within strata, and selection of students within schools. The sample of schools was selected with probability proportional to a measure of size based on the estimated age-specific enrollment in the schools.

The 2012 sampling plan was designed to assess 1,700 students for each of the LTT private school age-specific samples. These students were allocated among four different tests. The operational tests were in reading and mathematics and pilot tests were also conducted in reading and mathematics. Target sample sizes were adjusted to reflect expected private school and student response and eligibility.

The private school samples were drawn from a sampling frame that only included the sampled LTT primary sampling units (PSUs). Schools on the sampling frame were explicitly stratified prior to sampling by private school affiliation (Catholic, non-Catholic private, and unaffiliated). Within affiliation type, schools were implicitly stratified by PSU type (certainty/noncertainty). In certainty PSUs, further stratification was by census region, urbanization classification (based on urban-centric locale), and estimated age-specific enrollment. In noncertainty PSUs, additional stratification was by PSU stratum, urbanization classification (based on urban-centric locale), and estimated age-specific enrollment.

From the stratified frame of private schools, systematic random samples of schools in each age group (9, 13, and 17) were drawn with probability proportional to a measure of size based on the estimated age-specific enrollment of the school. The number of age-eligible students was estimated by applying population-level percentages of age-eligible students within each grade to estimated grade enrollments for each grade, and aggregating to an age-eligible total for the school.

Each selected school was asked to provide a roster of all of its students who were age-eligible. A fixed sample of 64 students was selected from these rosters, with the exception of smaller schools with total age-eligible counts less than the sample size. The combination of using the number of age-eligible students as a measure of size and a fixed sample size of students is intended to give a self-weighting sample (each student has an equal probability of selection). In practice, differences between the estimated age-eligible enrollment for the school and the actual size of the finalized roster introduce slightly differing student probabilities across schools.

NAEP Technical Documentation Target Population of the 2012 Private School Long-Term Trend (LTT) Assessment

The target population for the 2012 private school long-term trend assessment included all students in three age populations (9, 13, and 17) who were enrolled in private schools. The sample frame included private schools in the 50 states and the District of Columbia.

NAEP Technical Documentation Sampling Frame for the 2012 Private School Long-Term Trend (LTT) Assessment

The sampling frame for private schools was developed from the 2009-2010 Private School Universe Survey (PSS), a survey conducted by the U.S. Census Bureau for the National Center for Education Statistics (NCES). The PSS is a biennial mail survey of all private schools in the 50 states and the District of Columbia. The PSS frame of schools comprises both a list frame and an area frame. The list frame is an assembly of the 2007-2008 PSS frame and more up-to-date lists from state education agencies, private school associations, and other easily accessible sources. To improve the coverage of the PSS list frame, the Census Bureau also conducted a survey to locate private schools in a random sample of geographic areas throughout the United States. The areas were single counties or groups of counties sampled from an area frame constructed from all counties in the nation. Within each selected area, a complete list of private schools was gathered using information from telephone directories, religious institutions, local education agencies, chambers of commerce, and local government offices. Schools not already on the list frame were identified and added to the frame of private schools. A weighting component was computed by the Census Bureau so that the additional area-frame schools would represent all schools absent from the list frame, not just those in the selected areas.

The sampling frame was restricted to schools located in the primary sampling units (PSUs) selected for the long-term trend (LTT) assessment. In addition, the sampling frame excluded ungraded schools, vocational schools with no enrollment, special-education-only schools, homeschool entities, prison and hospital schools, and juvenile correctional institutions.

The following table presents the number of schools and estimated enrollment for the private school frame by age population. The unweighted estimated enrollment is restricted to the selected PSUs. The weighted estimated enrollment incorporates the PSU weight (inverse of the probability of selecting the PSU) and the estimated age-eligible enrollment, and thus is a national estimate of the number of private school students in the age population. The age-eligible enrollment was estimated using age distribution fractions derived for each grade in the age range.

Number of schools and enrollment in private school sampling frame, long-term trend (LTT) assessment, by affiliation and age: 2012

Age	Affiliation	Number of schools	Estimated enrollment (unweighted)	Estimated enrollment (weighted)
	Total	**9,500**	**191,000**	**361,000**
	Catholic	2,800	83,600	150,000
	Non-Catholic	6,400	105,000	206,000
9	Unknown affiliation	360	1,700	4,100
	Total	**10,000**	**188,000**	**357,000**
	Catholic	3,300	86,700	153,000
	Non-Catholic	6,300	99,100	200,000
13	Unknown affiliation	360	1,700	4,100
	Total	**4,400**	**181,000**	**334,000**
	Catholic	669	92,100	150,000
	Non-Catholic	3,300	86,800	181,000
17	Unknown affiliation	360	1,800	4,100

NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

For quality control purposes, school and student counts from the sampling frame were compared to school and student counts from the LTT 2008 private school frames. No major discrepancies were found.

NAEP Technical Documentation Stratification of Private Schools in the 2012 Long-Term Trend (LTT) Assessment

Prior to stratification, the private school sampling frame was divided into age-specific files, one each for ages 9, 13, and 17. For each age-specific file, schools were explicitly stratified by private school affiliation (Catholic, non-Catholic, and unknown affiliation). Private school affiliation was unknown for nonrespondents to the NCES Private School Universe Survey (PSS). Within private school type, separate implicit stratification schemes were used to sort schools in certainty primary sampling units (PSUs) and noncertainty PSUs. In all cases, the implicit stratification was achieved via a "serpentine sort."

Within each certainty PSU, the schools were hierarchically sorted by

- census region;
- urbanization classification (based on urban-centric locale); and
- estimated age-specific enrollment.

Schools in noncertainty PSUs were hierarchically sorted by

- PSU stratum;
- urbanization classification (based on urban-centric locale); and
- estimated age-specific enrollment.

NAEP Technical Documentation Sampling of Private Schools for the 2012 Long-Term Trend (LTT) Assessment

In the design of each school sample, five objectives underlie the process of determining the probability of selection for each school and how many students are to be sampled from each selected school containing the respective age-eligible students. They are as follows:

- to meet the target student sample size
- to select an equal-probability sample of students
- to limit the number of students who are selected from a school
- to ensure that the sample within a school does not include a very high percentage of the students in the school, unless all students are included
- to reduce the rate of sampling of small schools, in recognition of the greater cost and burden per student of conducting assessments in such schools

The goal in determining the school's measure of size is to optimize across the last four objectives in terms of maintaining the accuracy of estimates and the cost-effectiveness of the sample design.

Therefore, to meet the target student sample size objective and achieve a reasonable compromise among the other four objectives, the following algorithm was used to assign a measure of size to each school based on its age-specific enrollment as indicated on the sampling frame.

The measures of size vary by enrollment size. In general, very small schools were assigned a measure of size that is one quarter of the target sample size of 64 students. The preliminary measures of size (MOS_{js}) were set as follows:

$$MOS_{js} = PSCHWT_s \times PSU\_WT_s \times \begin{cases} x_{js}, & \text{if } 64 < x_{js} \\ 64, & \text{if } 20 \le x_{js} \le 64 \\ \frac{64}{20} \times x_{js}, & \text{if } 6 \le x_{js} \le 19 \\ \frac{64}{4}, & \text{if } x_{js} \le 5 \end{cases}$$

where x_{js} is the estimated age-eligible enrollment for age j in school s, $PSCHWT_S$ = the PSS area frame weight for school s, computed by the U.S. Census Bureau, and PSU_WT_S = the PSU weight for school s.

The next task in this development is to describe b_j, the constant of proportionality for each age group. It is a sampling parameter that, when multiplied with a school's preliminary measure of size (MOS_{js}), yields the school's final measure of size. It is computed in such a way that, when used with the systematic sampling procedure, the target student sample size is achieved. For private schools, this parameter varied by age group and private school affiliation (Catholic, non-Catholic, and unknown affiliation).

The final measure of size, E_{js}, is defined as:

$$E_{js} = \min(b_j \times MOS_{js}, u_j)$$

The quantity u_j (the maximum number of "hits" allowed) in this formula is designed to put an upper bound on the burden for the sampled schools. For private schools, u_j is 1.

Schools were ordered using the serpentine sort described under the stratification of private schools. A systematic sample was then drawn using this serpentine sorted list and the measures of size. The numbers of private schools selected were 137, 130, and 93 for ages 9, 13, and 17, respectively.

The estimated number of age-eligible students was computed using a derived linear function of estimated grade enrollments. For 9-year-olds, the frame contained schools with a second, third, fourth, or fifth grade. $M_{js}(2)$, $M_{js}(3)$, $M_{js}(4)$, and $M_{js}(5)$ denote the estimated enrollments from the frame for the four grades respectively within each school *s* for age sample *j*. $F_j(2)$, $F_j(3)$, $F_j(4)$, and $F_j(5)$ denote the global proportion of students who were 9-years-old (birth months January 2002 through December 2002) within each grade, Census region, and within private schools. These proportions were derived from the NAEP 2009 reading, mathematics, and science assessments. These values are shown in the table below for private schools. Age Distribution Fractions for Ages 9 and 13 describes how these proportions are computed.

Distribution proportions based on estimated enrollment for 9-year-old students in private schools, long-term trend (LTT) assessment, by Census region: 2012

Census region	$F_j(2)$	$F_j(3)$	$F_j(4)$	$F_j(5)$	Total
Northeast	0.01	0.26	0.73	0.01	1.00
Midwest	0.01	0.43	0.56	#	1.00
South	0.01	0.40	0.58	#	1.00
West	#	0.33	0.66	0.01	1.00

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

The estimated age-eligible enrollment for the 9-year-olds component of the long-term trend (LTT) study for each school was computed as follows:

$$x_{js} = \sum_{g=2}^{5} F_j(g) \times M_{js}(g)$$

For 13-year-olds, the frame contained schools with a sixth, seventh, eighth, or ninth grade. $M_{js}(6)$, $M_{js}(7)$, $M_{js}(8)$, and $M_{js}(9)$ denote the estimated enrollments from the frame for the four grades respectively within each school *s* for age sample *j*. $G_j(6)$, $G_j(7)$, $G_j(8)$, and $G_j(9)$ denote the global proportion of students who were 13-years-old (birth months January 1998 through December 1998) within each grade, Census region, and within private schools. These proportions were derived from the NAEP 2009 reading, mathematics, and science assessments. These values are shown in the table below for private schools. Age Distribution Fractions for Ages 9 and 13 describes how these proportions are computed.

Distribution proportions based on estimated enrollment for 13-year-old students in private schools, long-term trend (LTT) assessment, by Census region: 2012

Census Region	$G_j(6)$	$G_j(7)$	$G_j(8)$	$G_j(9)$	Total
Northeast	0.01	0.27	0.71	0.01	1.00
Midwest	0.01	0.44	0.54	#	1.00
South	0.02	0.37	0.59	0.01	1.00
West	0.01	0.31	0.67	0.01	1.00

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

The estimated age-eligible enrollment for the 13-year-olds component of the LTT study for each school was computed as follows:

$$x_{js} = \sum_{g=6}^{9} G_j(g) \times M_{js}(g)$$

For the age 17 component, the frame contained schools with a ninth, tenth, eleventh, or twelfth grade. $M_{js}(9)$, $M_{js}(10)$, $M_{js}(11)$, and $M_{js}(12)$ denote the estimated enrollments from the frame for the four grades respectively within each school s for age sample j . $J_j(9)$, $J_j(10)$, $J_j(11)$, and $J_j(12)$ denote the global proportion of students born between October 1994 and September 1995 within each grade and Census region. The Current Population Survey (CPS) School Supplement (October 2009) was utilized to provide the proportions within each of ninth, tenth, eleventh, and twelfth grades for the age 17 component. The same table was used for both public and private schools since overall age distribution fractions were derived without differentiation of school enrollment by school type. The derivation of the Age Distribution Fractions for Age 17 describes how these proportions are computed.

Distribution proportions based on estimated enrollment for the age 17 component, Long-Term Trend (LTT) assessment, by Census region: 2012

Census region	$J_j(9)$	$J_j(10)$	$J_j(11)$	$J_j(12)$	Total
Northeast	0.02	0.26	0.64	0.10	1.03
Midwest	0.04	0.32	0.63	0.06	1.06
South	0.09	0.30	0.59	0.06	1.03
West	0.02	0.22	0.67	0.04	0.95

NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

The estimated age-eligible enrollment for the age 17 component of the LTT study for each school was computed as follows:

$$x_{js} = \sum_{g=9}^{12} J_j(g) \times M_{js}(g)$$

NAEP Technical Documentation Substitute Private Schools for the 2012 Long-Term Trend (LTT) Assessment

Substitutes were preselected for the private school samples by sorting the school frame file according to the actual order used in the sampling process (the implicit stratification). For operational reasons, the original selection order was embedded within the sampled primary sampling unit (PSU) and state. Each sampled school had each of its nearest neighbors within the same sampling stratum on the school frame file identified as a potential substitute. Since age-specific enrollment was used as the last sort ordering variable, the nearest neighbors had age-specific enrollment values very close to that of the sampled school. This was done to facilitate the selection of about the same number of students within the substitute as would have been selected from the original sampled school.

Schools were disqualified as potential substitutes if they were already selected in any of the original private school samples or assigned as a substitute for another private school (earlier in the sort ordering). Schools assigned as substitutes for age seventeen schools were disqualified as potential substitutes for age nine and age thirteen schools, and schools assigned as substitutes for age thirteen schools were disqualified as potential substitutes for age nine schools.

If both nearest neighbors were still eligible to be substitutes, the one with a closer age-specific enrollment was chosen. If both nearest neighbors were equally distant from the sampled school in their age-specific enrollment (an uncommon occurrence), one of the two was randomly selected.

Of the 360 original sampled private schools for the long-term trend (LTT) assessment, 107 schools had substitutes activated when the original eligible schools did not participate. Ultimately, 43 of the activated substitute private schools participated.

NAEP Technical Documentation Ineligible Private Schools for the 2012 Long-Term Trend (LTT) Assessment

The Private School Universe Survey (PSS) school file from which most of the sampled schools were drawn corresponds to the 2009-2010 school year, two years prior to the assessment school year. During the intervening period, some of these schools either closed, no longer offered grades for the age group of interest, or were ineligible for other reasons. In such cases, the sampled schools were coded as ineligible.

The table below presents unweighted counts of sampled private schools by age and eligibility status, including the reason for ineligibility.

Number of sampled private schools, long-term trend (LTT) assessment, by age and eligibility status: 2012

Age	Eligibility status	Unweighted count of schools	Unweighted percentage
	All age 9 sampled private schools	**137**	**100.00**
	Eligible schools	120	87.59
	No eligible students in age range	10	7.30
	School closed	6	4.38
	Not a regular school	1	0.73
	Other ineligible school	0	0.00
9	Duplicate on sampling frame	0	0.00
	All age 13 sampled private schools	**130**	**100.00**
	Eligible schools	109	83.85
	No eligible students in age range	12	9.23
	School closed	5	3.85
	Not a regular school	3	2.31
	Other ineligible school	0	0.00
13	Duplicate on sampling frame	1	0.77
	All age 17 sampled private schools	**93**	**100.00**
	Eligible schools	65	69.89
	No eligible students in age range	16	17.20
	School closed	4	4.30
	Not a regular school	7	7.53
	Other ineligible school	1	1.08
17	Duplicate on sampling frame	0	0.00

NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

The table below presents unweighted counts of sample private schools by age, collapsed private school type, and eligibility status.

Number of sampled private schools, long-term trend (LTT) assessment, by age, private school type, and eligibility status: 2012

Age	Private school type	Eligibility status	Unweighted count of schools	Unweighted percentage
		Total	**137**	**100.00**
		Eligible	120	87.59
	All Private	Ineligible	17	12.41
		Total	**32**	**100.00**
		Eligible	30	93.75
	Catholic	Ineligible	2	6.25
		Total	**105**	**100.00**
		Eligible	90	85.71
9	Other Private	Ineligible	15	14.29
13	All Private	**Total**	**130**	**100.00**

Age	Private school type	Eligibility status	Unweighted count of schools	Unweighted percentage
		Eligible	109	83.85
		Ineligible	21	16.15
		Total	**37**	**100.00**
		Eligible	34	91.89
	Catholic	Ineligible	3	8.11
		Total	**93**	**100.00**
		Eligible	75	80.65
	Other Private	Ineligible	18	19.35
		Total	**93**	**100.00**
		Eligible	65	69.89
	All Private	Ineligible	28	30.11
		Total	**16**	**100.00**
		Eligible	15	93.75
	Catholic	Ineligible	1	6.25
		Total	**77**	**100.00**
		Eligible	50	64.94
17	Other Private	Ineligible	27	35.06

NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

NAEP Technical Documentation Student Sample Selection for the 2012 Private School Long-Term Trend (LTT) Assessment

Students in private schools were selected for the 2012 long-term trend (LTT) assessment in the same way as students in public schools.

NAEP Technical Documentation School and Student Participation Results for the 2012 Long-Term Trend (LTT) Assessment

Participation in NAEP is not mandatory. Although a portion of the participating school sample consists of substitute schools, it is preferable to calculate school response rates on the basis of school participation before substitution.

In every NAEP survey, some of the sampled students are not assessed. Examples of such students are as follows:

- withdrawn students
- excluded students with disabilities (SD)
- excluded English language learner (ELL) students
- students absent from both the original session and the makeup session (not excluded but not assessed)

Withdrawn students are those who have left the school before the original assessment. Excluded students are determined by their school to be unable to meaningfully take the NAEP assessment in their assigned subject, even with an accommodation. Excluded students must also be classified as SD and/or ELL. Other students

who are absent for the initial session are assessed in the makeup session. The last category includes students who are not excluded (i.e., “were to be assessed”) but are not assessed either due to absence from both sessions or because of a refusal to participate. Assessed students are also classified as assessed without an accommodation or assessed with an accommodation. The latter group can be divided into SD students assessed with an accommodation, ELL students assessed with an accommodation, or students who are both SD and ELL and accommodated. Note that some SD and ELL students are assessed without accommodations, and students neither SD nor ELL can only be assessed without an accommodation.

NAEP Technical Documentation School Response Rates for the 2012 Long-Term Trend (LTT) Assessment

The following table presents counts of eligible sampled schools and participating schools, as well as weighted school response rates, for the 2012 Long-Term Trend (LTT) math and reading assessments. The weighted school response rates estimate the proportion of the student population that is represented by the participating school sample prior to substitution.

School response counts and rates for public and private schools before substitution, long-term trend reading and mathematics assessments, by school type, geographic region, and age: 2012

Age	School type and geographic region	Number of sampled eligible schools	Number of participating schools	Weighted school participation rate prior to substitution (percent)
	National all	**451**	**361**	**86.64**
	National public	330	293	89.00
	Northeast public	45	45	100.00
	Midwest public	64	60	92.23
	South public	133	115	86.93
	West public	88	73	82.49
	National private	120	67	61.16
	Catholic	30	28	95.06
9	Non-Catholic private	90	39	37.71
	National all	**440**	**365**	**87.87**
	National public	331	296	89.94
	Northeast public	46	46	100.00
	Midwest public	64	61	92.51
	South public	133	119	89.99
	West public	88	70	81.29
	National private	109	69	68.63
	Catholic	34	31	91.61
13	Non-Catholic private	75	38	49.13
	National all	**432**	**349**	**83.82**
	National public	367	313	85.58
	Northeast public	55	54	97.50
	Midwest public	70	66	92.93
	South public	142	119	83.84
	West public	100	74	72.95
	National private	65	36	62.51
	Catholic	15	13	88.18
17	Non-Catholic private	50	23	40.30

Age	School type and geographic region	Number of sampled eligible schools	Number of participating schools	Weighted school participation rate prior to substitution (percent)

NOTE: National all includes national public, national private, Bureau of Indian Education, and Department of Defense Education Activity schools located in the United States.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessments.

NAEP Technical Documentation Student Response and Exclusion Rates for the 2012 Long-Term Trend (LTT) Assessment in Reading

Weighted student response and exclusion rates for public and private schools, long-term trend reading assessment, by school type, geographic region, and age: 2012

Age	School type and geographic region	Weighted student response rate (percent)	Weighted percent of all students who are SD and excluded	Weighted percent of all students who are ELL and excluded
	National all	**94.94**	**1.32**	**0.51**
	National public	95.04	1.42	0.54
	Northeast public	94.24	0.97	0.70
	Midwest public	95.00	1.18	0.40
	South public	95.39	2.12	0.59
	West public	95.10	0.84	0.48
	National private	93.80	0.17	0.26
	Catholic	97.52	0.00	0.00
9	Non-Catholic private	89.86	0.30	0.46
	National all	**93.19**	**1.67**	**0.31**
	National public	93.13	1.79	0.34
	Northeast public	91.99	1.38	0.38
	Midwest public	94.95	1.49	0.06
	South public	92.45	2.29	0.38
	West public	93.13	1.55	0.56
	National private	93.94	0.38	0.00
	Catholic	96.42	0.21	0.00
13	Non-Catholic private	91.05	0.53	0.00
	National all	**88.29**	**1.77**	**0.25**
	National public	88.34	1.90	0.27
	Northeast public	84.31	2.55	0.50
	Midwest public	89.22	1.37	0.09
	South public	90.00	2.18	0.29
	West public	88.45	1.47	0.23
	National private	87.64	0.13	0.00
	Catholic	88.10	0.28	0.00
17	Non-Catholic private	87.01	0.00	0.00

NOTE: National all includes national public, national private, Bureau of Indian Education, and Department of Defense Education Activity schools located in the United States. SD = students with disabilities; ELL = English language learners.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National

Age	School type and geographic region	Weighted student response rate (percent)	Weighted percent of all students who are SD and excluded	Weighted percent of all students who are ELL and excluded

Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

The above table presents the weighted student response and exclusion rates for the 2012 Long-Term Trend (LTT) reading assessment. The exclusion rates give the percentage excluded, among all eligible students. Excluded students must necessarily be either students with disabilities (SD) or English language learners (ELL). The response rates indicate the percentage of students assessed among those who it was intended would take the assessment from within the participating schools. Thus, students who were excluded are not included in the denominators of the response rates.

NAEP Technical Documentation Student Response and Exclusion Rates for the 2012 Long-Term Trend (LTT) Assessment in Mathematics

The following table presents the weighted student response and exclusion rates for the 2012 Long-Term Trend (LTT) math assessment. The exclusion rates give the percentage excluded, among all eligible students. Excluded students must necessarily be either students with disabilities (SD) or English language learners (ELL). The response rates indicate the percentage of students assessed among those who it was intended would take the assessment from within the participating schools. Thus, students who were excluded are not included in the denominators of the response rates.

Weighted student response and exclusion rates for public and private schools, long-term trend math assessment, by school type, geographic region, and age: 2012

Age	School type and geographic region	Weighted student response rate (percent)	Weighted percent of all students who are SD and excluded	Weighted percent of all students who are ELL and excluded
	National all	**94.83**	**1.27**	**0.34**
	National public	94.96	1.36	0.37
	Northeast public	95.01	1.58	0.67
	Midwest public	95.32	2.20	0.31
	South public	94.56	1.03	0.20
	West public	95.22	0.96	0.49
	National private	92.95	0.23	0.00
	Catholic	94.32	0.00	0.00
9	Non-Catholic private	91.50	0.39	0.00
	National all	**93.03**	**1.10**	**0.20**
	National public	92.85	1.19	0.22
	Northeast public	90.70	0.47	0.34
	Midwest public	94.75	1.10	0.05
	South public	92.04	1.59	0.29
	West public	93.75	1.09	0.19
	National private	95.10	0.16	0.00
	Catholic	95.43	0.34	0.00
13	Non-Catholic private	94.70	0.00	0.00
	National all	**88.06**	**1.60**	**0.20**
	National public	88.22	1.90	0.27
	Northeast public	85.42	2.59	0.35
	Midwest public	88.29	1.51	0.07
	South public	90.03	1.42	0.19
	West public	87.71	1.64	0.28
	National private	85.87	0.13	0.00
	Catholic	86.80	0.25	0.00
17	Non-Catholic private	84.42	0.00	0.00

NOTE: National all includes national public, national private, Bureau of Indian Education, and Department of Defense Education Activity schools located in the United States. SD = students with disabilities; ELL = English language learners.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012 Long-Term Trend Assessment.

NAEP Technical Documentation Age Distribution Fractions for the 2012 Long-Term Trend (LTT) Assessment

Age distribution fractions are estimated proportions of students in each grade that are age-eligible. The fractions are components in the school measure of size. The computation of the age distribution fractions was done differently by age group. For ages 9 and 13, a breakout by every birth-year cohort represented in the relevant grades was fully carried out. The approach was simpler for the age 17 sample, using an age range

between 16- and 17-years-old, because this age definition is based on an October-September birth cohort.

NAEP Technical Documentation Age Distribution Fractions for Ages 9 and 13 for the 2012 Long-Term Trend (LTT) Assessment

The computation of the age distribution fractions for the age 9 and age 13 assessments starts with estimates derived from the NAEP 2009 reading, mathematics and science assessments. For grades 4 and 8, estimates of the percentages of students who were born in the years 1995, 1996, 1997, etc., were computed separately for public and private schools by Census region.

These estimates were determined by first computing the weighted percentages of assessed and excluded students for the NAEP 2009 reading, mathematics and science assessments and then combined together. The nonresponse-adjusted trimmed final weights for the students were used for this purpose. The weighted aggregations are estimates of the total number of students in each birth-year group for grade 4 or grade 8 in the school year 2008-09.The tables below present these estimates by Census region for fourth grade, first for public schools and then for private schools.

Weighted proportions from grade 4 reading, mathematics and science assessments, public schools northeast region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**573,000**	**1.00**
1995	90	#
1996	376	#
1997	8,900	0.02
1998	164,000	0.29
1999	398,000	0.70
2000	1,500	#
2001	1	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 4 reading, mathematics and science assessments, public schools midwest region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**755,000**	**1.00**
1995	62	#
1996	542	#
1997	15,900	0.02
1998	312,000	0.41
1999	426,000	0.56
2000	879	#
2001	#	#
2002	2	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 4 reading, mathematics and science assessments, public schools south region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**1,300,000**	**1.00**
1995	239	#
1996	4,900	#
1997	65,000	0.05
1998	527,000	0.40
1999	712,000	0.54
2000	1,700	#
2001	16	#
2002	5	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 4 reading, mathematics and science assessments, public schools west region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**851,000**	**1.00**
1995	71	#
1996	195	#
1997	8,800	0.01
1998	252,000	0.30
1999	588,000	0.69
2000	1,600	#
2001	9	#
2002	1	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 4 reading, mathematics and science assessments, private schools northeast region, by year of birth: 2009

Weighted proportions from grade 4 reading, mathematics and science assessments, private schools northeast region, by year of birth: 2009		
Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**70,000**	**1.00**
1997	502	0.01
1998	18,000	0.26
1999	51,100	0.73
2000	436	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 4 reading, mathematics and science assessments, private schools midwest region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**96,500**	**1.00**
1996	34	#
1997	870	0.01
1998	41,100	0.43
1999	54,100	0.56
2000	351	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 4 reading, mathematics and science assessments, private schools south region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**104,000**	**1.00**
1996	235	#
1997	1,500	0.01
1998	41,700	0.40
1999	59,700	0.58
2000	500	#
2001	45	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 4 reading, mathematics and science assessments, private schools west region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**61,100**	**1.00**
1995	28	#
1996	25	#
1997	223	#
1998	20,100	0.33
1999	40,400	0.66
2000	403	0.01

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

The combined percentages of the reading, mathematics and science operational assessments are the best estimates of the percentages of fourth-graders in school year 2008-09 who were born in 1995, 1996, 1997, etc. The objective is to get the percentages of those born in a particular year (e.g., 1999) who are in grades 2, 3, 4, and 5. Since direct estimates are not available, an indirect estimate can be obtained by assuming that the other grades have the identical distribution as fourth grade, but moved back or moved forward by one year. This effectively assumes a stationary distribution of age and grade, which is only a rough approximation of reality, but it suffices to give good measures of size. The derived percentages by age and grade using this stationarity approximation are illustrated for the northeast Census region in the table below.

Grade distribution for public schools, northeast region, 2008-09 school year, assuming stationarity, by year of birth: 2009

Year of birth	Second grade	Third grade	Fourth grade	Fifth grade	Sixth grade
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
1995	#	#	#	#	0.02
1996	#	#	#	0.02	0.29
1997	#	#	0.02	0.29	0.70
1998	#	0.02	0.29	0.70	#
1999	0.02	0.29	0.70	#	#
2000	0.29	0.70	#	#	#
2001	0.70	#	#	#	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

In distribution, the third-graders are exactly one year younger, the second-graders exactly two years younger, etc. If we read across the grade distribution for those born in 1999, we see that the percentages for second through sixth grades are equal to the percentages for 1997 through 2001 for fourth grade. The same logic was applied to all eight tables provided above, yielding the percentages found in the sampling of public schools and private schools for grade distribution for youths born January 2002 through December 2002 (who were nine-years-old on January 1, 2012: the 2011-12 school year).

A similar logic applied to the age 13 sample. For the age 13 long-term trend sample, the starting point was the NAEP 2009 grade 8 reading, mathematics and science assessments. Composite estimates were computed in the same way as for the age 9 sample. The eight tables below provide these estimates by Census region.

Weighted proportions from grade 8 reading, mathematics and science assessments, public schools northeast region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**586,000**	**1.00**
1991	117	#
1992	1,300	#
1993	15,900	0.03
1994	181,000	0.31
1995	385,000	0.66
1996	2,300	#
1997	62	#
1998	9	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 8 reading, mathematics and science assessments, public schools midwest region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**764,000**	**1.00**

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
1991	88	#
1992	1,100	#
1993	23,300	0.03
1994	324,000	0.42
1995	414,300	0.54
1996	1,500	#
1997	60	#
1998	10	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 8 reading, mathematics and science assessments, public schools south region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**1,300,000**	**1.00**
1991	377	#
1992	7,600	#
1993	87,600	0.07
1994	520,000	0.40
1995	674,000	0.52
1996	3,000	#
1997	167	#
1998	31	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 8 reading, mathematics and science assessments, public schools west region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**865,000**	**1.00**
1991	202	#
1992	372	#
1993	12,200	0.01
1994	266,000	0.31
1995	583,000	0.67
1996	2,500	#
1997	43	#
1998	41	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 8 reading, mathematics and science assessments, private schools northeast region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**73,300**	**1.00**
1992	73	#
1993	931	0.01
1994	20,100	0.27
1995	51,800	0.71
1996	424	0.01

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 8 reading, mathematics and science assessments, private schools midwest region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**85,000**	**1.00**
1993	849	0.01
1994	37,500	0.44
1995	46,200	0.54
1996	407	0.01
1997	23	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 8 reading, mathematics and science assessments, private schools south region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**114,000**	**1.00**
1991	60	#
1992	383	#
1993	2,500	0.02
1994	42,500	0.37
1995	67,700	0.59
1996	793	0.01
1997	#	#
1998	29	#

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

Weighted proportions from grade 8 reading, mathematics and science assessments, private schools west region, by year of birth: 2009

Year of birth	Reading, mathematics and science weighted aggregations	Reading, mathematics and science operational weighted proportion
Total	**63,600**	**1.00**
1993	687	0.01
1994	19,500	0.31
1995	42,700	0.67
1996	683	0.01

Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2012.

NAEP Technical Documentation Age Distribution Fractions for Age 17 for the 2012 Long-Term Trend (LTT) Assessment

The derivation of the age distribution factors was much more straightforward than for the age 9 and 13 components. Estimates from the October 2009 Current Population Survey (CPS) School Supplement were utilized to provide the percentages of seventeen-year-olds within each of ninth, tenth, eleventh, and twelfth grades by Census region.

Since the age definition for Age 17 LTT covers students who are born between October of one year and September the following year, with the assessment taking place in about April, in October of the same academic year (i.e. the preceding calendar year), the eligible students are all 16 years of age. Thus the distribution of eligible students in each grade was obtained by considering the proportion of students in each grade who were age 16 from the October 2009 CPS School Supplement. Note that by the time of the LTT assessment, between March and April, the majority of these students are 17 years old. Thus not all students assessed in the Age 17 LTT assessment are aged 17 years, but for simplicity the cohort is referred to as being Age 17. In fact on September 30 of the same academic year as the assessment is conducted, all of the eligible students are aged 16 years.

NAEP Technical Documentation Website

https://nces.ed.gov/nationsreportcard/tdw/sample_design/2012/2012_sampdsgn_ltt.aspx