NATIONAL CENTER FOR EDUCATION STATISTICS NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

National Assessment of Educational Progress (NAEP) 2026

Appendix G
NAEP 2019 Sample Design

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The 2019 Weighting Procedures documentation is the most current version available to the public for state level NAEP assessment year. At this time, there is not a timeline for when the details for later assessment years will be publicly available.

NAEP Technical Documentation Website

NAEP Technical Documentation NAEP 2019 Sample Design

The sample design for NAEP 2019 included samples for various operational and special studies.

2019 State Assessment Sample Design

2019 National Assessment Sample Design

Representative samples were drawn for the following operational assessments:

- national assessment in science in public and private schools at grades 4 and 8; and
- national assessments in mathematics, reading, and science in public and private schools at grade 12; and
- state-by-state assessments and Trial Urban District Assessments (TUDA) in mathematics and reading in public schools at grades 4 and 8.

Representative samples were drawn for the following special studies and pilot assessments:

- national mathematics, reading, and vocabulary initial pilot tests in public and private schools at grades 4 and 8; and
- The National Indian Education Study (NIES) at grades 4 and 8.

The samples for the operational assessments were organized into six distinct groupings and sampled separately. The samples for the special studies were integrated into these various groupings:

- mathematics and reading assessments in public schools at grades 4 and 8;
- mathematics and reading assessments in private schools at grades 4 and 8;
- science assessment in public schools at grades 4 and 8;
- science assessment in private schools at grades 4 and 8;
- mathematics, reading, and science assessments in public schools at grade 12; and
- mathematics, reading, and science assessments in private schools at grade 12.

In 2019, digitally based assessments (DBA) using tablets were administered in addition to paper and pencil assessments (PBA) at the operational level. Specifically, for the mathematics and reading assessments at grades 4 and 8, all students were administered DBA using tablets. For the mathematics and reading assessments at grade 12 and science assessment at grades 4, 8, and 12, students were assigned to either DBA or PBA during student sample selection.

The national assessments were designed to achieve nationally representative samples of public and private school students in the fourth, eighth, and twelfth grades. Their target populations included all students in public, private, Bureau of Indian Education (BIE), and Department of Defense Education Activity (DoDEA) schools, who were enrolled in grades 4, 8, and 12 at the time of assessment.

For the fourth- and eighth-grade mathematics and reading assessments in public schools, the TUDA samples formed part of the corresponding state public school samples, and the state samples formed the public school grades 4 and 8 part of the national sample. Nationally representative samples were drawn for science and for the remaining populations of private school students, DoDEA students, and BIE students in the fourth, eighth, and twelfth grades.

The state assessments were designed to achieve representative samples of students in the respective grade. At grades 4 and 8, the target populations included all students in each participating jurisdiction, which included states, District of Columbia, BIE, DoDEA, and school districts chosen for the TUDA. For each grade and assessment subject, samples were designed to produce aggregate estimates with adequate precision for all the participating jurisdictions, as well as estimates for various student subpopulations of interest.

The figure below illustrates the various sample types and subjects.

Components of the NAEP samples, by assessment subject, grade, and school type: 2019

School Type	Grade	Assessment					
		Mathematics	Reading	Science	Mathematics Pilot	Reading Pilot	Vocabulary initial Pilot
Public/BIE/DoDEA	4	State/National		National	National	National	National
	8						
	12	National			N/A	N/A	N/A
Private	4	National		National	National	National	National
	8						
	12	National			N/A	N/A	N/A

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 Assessments.

NAEP Technical Documentation Sample Design for the 2019 National Assessment

The 2019 national assessment included operational assessments in mathematics, reading, and science in public and private schools at grades 4, 8, and 12.

The sample designs aimed to achieve nationally representative samples of students in the defined populations who were enrolled at the time of assessment.

The samples were based on a two-stage sample design:

- selection of schools within strata; and
- selection of students within schools.

The samples of schools were selected with probability proportional to a measure of size based on the estimated grade-specific enrollment in the schools.

For fourth- and eighth-grade public schools, the aggregate of the NAEP state student samples and assessments in mathematics and reading constitute the corresponding NAEP national student samples and assessments.

The samples for the remaining national assessments were organized into five distinct groupings and sampled separately:

- mathematics and reading assessments in private schools at grades 4 and 8;
- science assessment in public schools at grades 4 and 8;
- science assessment in private schools at grades 4 and 8;
- mathematics, reading, and science in public schools at grade 12; and
- mathematics, reading, and science in private schools at grade 12.

4th and 8th Grade Public School National Mathematics and Reading Assessment

4th and 8th Grade Private School National Mathematics and Reading Assessment

4th and 8th Grade Public School National Science Assessment

4th and 8th Grade Private School National Science Assessment

12th Grade Public School National Assessment

12th Grade Private School National Assessment

The mathematics and reading assessments in public and private schools at grades 4 and 8 were digitally based assessments (DBA) administered using tablets. The science assessments at grades 4 and 8 and the mathematics, reading, and science asssessments at grade 12 were administered in two modes: paper and pencil (paper-based assessments [PBA]) and tablets (DBA). The DBA and PBA assessments for each of the specific samples were generally in the same schools. Students were assigned to either DBA or PBA during student sample selection. Details can be found in the student sampling selection section for each assessment type.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/sample_design_for_the_2019_national_assessment.aspx

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NAEP Technical Documentation 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

- Target Population
- Sampling Frame
- Stratification of Schools
- School Sample Selection
- Substitute Schools
- Ineligible Schools
- Student Sample Selection
- School and Student Participation

The fourth- and eighth-grade private school samples for the national mathematics and reading assessments were designed to produce nationally representative samples of students enrolled in fourth and eighth grade in private schools in the United States.

The target sample sizes of assessed students for each grade and subject are shown in the table below. Prior to sampling, these target sample sizes were adjusted upward to offset expected school and student attrition due to nonresponse and ineligibility.

Samples were selected using a two-stage probability design that involved selection of schools within strata and selection of students within schools. The first-stage samples of schools were selected with probability proportional to a measure of size based on the estimated grade-specific enrollment in the schools.

The sampling of students at the second-stage involved two steps: (1) sampling of students in the targeted grade (fourth or eighth) from each sampled school, and (2) assignment of assessment subject (mathematics or reading) to the sampled students.

Target sample sizes of assessed students, private school national assessment, by subject and grade: 2019

Grade	Total	Mathematics	Reading
Total	**13,400**	**7,400**	**6,000**
4	6,700	3,700	3,000
8	6,700	3,700	3,000

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/2019_fourth_and_eighth_grade_private_school_national_assessment_in_mathematics_and_reading.aspx

NAEP Technical Documentation Ineligible Schools for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The Private School Universe Survey (PSS)-based private school frames, from which most of the sampled schools were drawn, corresponds to the 2015-2016 school year, three years prior to the assessment school year. During the intervening period, some of these schools either closed, no longer offered the grade of interest, or were ineligible for other reasons. In such cases, the sampled schools were coded as ineligible.

Total and Eligible Schools Sampled

Eligibility Status of Schools Sampled

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/ineligible_schools_for_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Eligibility Status of Schools Sampled for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The following table shows the unweighted counts and percentages of sampled schools that were eligible and ineligible, by reason for ineligibility, for the fourth- and eighth-grade private school national mathematics and reading samples.

Sampled private schools, national assessment, by grade and eligibility status: 2019

Grade and eligibility status	Unweighted count of schools	Unweighted percentage
All fourth-grade sampled private schools	**530**	**100.00**
Eligible	460	87.36
Ineligible	67	12.64
Has sampled grade, but no eligible students	9	1.70
Does not have sampled grade	5	0.94
Closed	39	7.36
Not a regular school	12	2.26
Duplicate on sampling frame	0	0.00
Other ineligible	2	0.38
All eighth-grade sampled private schools	**530**	**100.00**
Eligible	450	85.66
Ineligible	76	14.34
Has sampled grade, but no eligible students	11	2.08
Does not have sampled grade	17	3.21
Closed	32	6.04
Not a regular school	13	2.45
Duplicate on sampling frame	0	0.00
Other ineligible	3	0.57

NOTE: Numbers of schools are rounded to nearest ten, except those pertaining to ineligible schools. Detail may not sum to totals due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/eligibility_status_of_schools_sampled_for_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Total and Eligible Sampled Schools for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The following table presents unweighted counts and percentages of ineligible and eligible schools by private school affiliation in the fourth- and eighth-grade private school national mathematics and reading samples. Schools whose private school affiliation was unknown at the time of sampling subsequently had their affiliation determined during data collection. Therefore, such schools are not broken out separately and not included in the following table.

Eligibility status of sampled private schools, national assessment, by grade and private school type: 2019

Private school type	Eligibility status	Fourth grade		Eighth grade	
		Unweighted count	Unweighted percentage	Unweighted count	Unweighted percentage
All private	**Total**	**510**	**100.00**	**510**	**100.00**
	Ineligible	50	9.70	60	10.89
	Eligible	460	90.30	450	89.11
Catholic	**Total**	**140**	**100.00**	**140**	**100.00**
	Ineligible	10	4.86	10	4.29
	Eligible	140	95.14	130	95.71
Non-Catholic	**Total**	**360**	**100.00**	**370**	**100.00**
	Ineligible	40	11.63	50	13.42
	Eligible	320	88.37	320	86.58

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/total_and_eligible_sample_schools_for_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Sampling Frame for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The primary sampling frames for the 2019 fourth- and eighth-grade private school samples for the national mathematics and reading assessments were developed from the Private School Universe Survey (PSS) corresponding to the 2015-2016 school year. The PSS file is the Department of Education's primary database of elementary and secondary private schools in the 50 states and the District of Columbia, and it is based on a survey conducted by the U.S. Census Bureau during the 2015-2016 school year. These sampling frames are referred to as the PSS-based sampling frames.

Fourth- and Eighth-Grade Schools and Enrollment

New-School Sampling Frame

Nonrespondents to the PSS were also included in the primary sampling frames. Since these schools did not respond to the PSS, their private school affiliation are unknown. Because NAEP response rates differ vastly by affiliation, to better estimate the target sample size of schools for each affiliation, additional work was done to obtain affiliation for these PSS nonrespondents. If a nonresponding school responded to a previous PSS (either two or four years prior), affiliation was obtained from the previous response. For those schools that were nonrespondents for the last three cycles of the PSS, in some cases internet research was used to establish affiliation. There were still schools with unknown affiliation remaining after this process.

A secondary set of sampling frames were also created for these samples to account for schools that newly opened or became newly eligible between the 2015-2016 and 2018-2019 school years. These frames contain brand-new and newly-eligible fourth- and eighth-grade schools and are referred to as the new-school sampling frames. Because there are no sources available to identify new schools for non-Catholic private schools, the new school frame for private schools contains only Catholic schools.

Both sets of sampling frames excluded schools that were ungraded, provided only special education, were part of hospital or treatment center programs, were juvenile correctional institutions, were home-school entities, or were for adult education.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/sampling_frame_for_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Fourth- and Eighth-Grade Schools and Enrollment in the 2019 Private School Mathematics and Reading Sampling Frame

The following table presents the number of fourth- and eighth-grade private schools and their estimated enrollment as contained in the Private School Universe Survey (PSS)-based sampling frames, by private school affiliation, for the national mathematics and reading assessments. Grade-specific enrollment was estimated for each school as the average grade enrollment for grades 1 through 8.

The counts in this table are for schools with known affiliation. Schools with unknown affiliation do not appear in the table because their grade span, affiliation, and enrollment were unknown. Although PSS is a school universe survey, participation is voluntary and not all private schools respond. Since the NAEP sample must represent all private schools, not just PSS respondents, a small sample of PSS nonrespondents with unknown affiliation was selected for each of the targeted grades to improve NAEP coverage.

Number of schools and enrollment in private school sampling frame, national assessment, by grade and affiliation: 2019

Grade	Affiliation	Number of schools	Estimated enrollment
4	**Total**	**18,278**	**323,044**

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

Grade	Affiliation	Number of schools	Estimated enrollment
	Catholic	5,013	133,673
	Non-Catholic	13,265	189,371
8	**Total**	**16,587**	**315,329**
	Catholic	4,628	134,506
	Non-Catholic	11,959	180,823

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/fourth_and_eighth_grade_schools_and_enrollment_in_the_2019_private_school_sampling_frame.aspx

NAEP Technical Documentation New-School Sampling Frame for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The NAEP 2019 private school frame was constructed using the most current Private School Universe Survey (PSS) file available from NCES. This file contained schools that were in existence during the 2015-2016 school year, (i.e., it was three years out of date). During the subsequent 3-year period, undoubtedly, some schools closed, some changed structure (one school becoming two schools, for example), some newly opened, and still others changed their grade span.

A supplemental sample was selected from a list of Catholic schools that were new or had become newly eligible sometime after the 2015-2016 school year. The goal was to allow every new Catholic school a chance of selection, thereby fully covering the target population of Catholic schools in operation during the 2018-2019 school year. It was infeasible to ask every Catholic diocese in the United States to provide a supplemental school frame, so a two-stage procedure was employed. First, a sample of dioceses was selected. Then the National Catholic Educational Association (NCEA) was sent a list of the schools within their sampled dioceses that had been present on the 2015-2016 PSS file. NCEA was asked to add in any new schools and identify any schools on this list that had become newly eligible for grades 4, 8, or 12.

The new-school process began with the preparation of a diocese-level frame. The starting point was a file containing every Catholic diocese in the U.S. classified as small, medium, or large based on the number of schools and student enrollment of schools from the PSS private school frame.

A diocese was considered to be small if it contained no more than one school at each targeted grade (4, 8, and 12). During school recruitment, schools sampled from small dioceses were asked to identify schools within their dioceses that newly offered the targeted grade. Every identified new school was added to the sample. From a sampling perspective, the new school was viewed as an "annex" to the sampled school, which meant that it had a well-defined probability of selection equal to that of the sampled school. When a school in a small diocese was sampled from the PSS frame, its associated new school was automatically sampled as well.

Dioceses that were not small were further divided into two strata, one containing large-size dioceses and a second containing medium-size dioceses. These strata were defined by computing the percentage of grade 4, 8, and 12 enrollment represented by each diocese, sorting in descending order, and cumulating the percentages. All dioceses up to and including the first diocese at or above the 80th cumulative percentage were defined as large dioceses. The remaining dioceses were defined as medium dioceses.

A simplified example is given below. The dioceses are ordered by descending percentage enrollment. The first six become large dioceses and the last six become medium dioceses.

Example showing assignment of Catholic dioceses to the large-size and medium-size diocese strata, private school national mathematics and reading assessments: 2019

Diocese	Percentage enrollment	Cumulative percentage enrollment	Stratum
Diocese 1	20	20	L
Diocese 2	20	40	L
Diocese 3	15	55	L
Diocese 4	10	65	L
Diocese 5	10	75	L
Diocese 6	10	85	L
Diocese 7	5	90	M
Diocese 8	2	92	M
Diocese 9	2	94	M
Diocese 10	2	96	M
Diocese 11	2	98	M
Diocese 12	2	100	M

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

In actuality, there were 73 large and 102 medium dioceses in the sampling frame.

The target sample size was 10 dioceses total across the medium-size and large-size diocese strata: eight from the large-size diocese stratum and two from the medium-size diocese stratum.

In the medium-size diocese stratum, dioceses were selected with equal probability. In the large-size diocese stratum, dioceses were sampled with probability proportional to enrollment. These probabilities were retained and used in later stages of sampling and weighting of new schools.

NCEA was sent a listing of all the schools in the selected dioceses that appeared on the 2015-2016 PSS file and was asked to provide information about the new schools not included in the file and grade span changes of existing schools. These listings were used as sampling frames for selection of new Catholic schools and updates of existing schools.

The following table presents the number and percentage of schools and average estimated grade enrollment for the fourth- and eighth-grade "new-school" frame by census region. There were no new schools in South region.

Number and percentage of schools and mean school size in the new-school frame, national private assessment, by grade and census region: 2019

	Grade 4			Grade 8		
Census region	Schools	Percentage	Mean school size	Schools	Percentage	Mean school size
Total	**9**	**100.00**	**24**	**6**	**100.00**	**24**
Northeast	3	33.33	34	1	16.67	60
Midwest	4	44.44	19	2	33.33	22
South	0	0.00	0	0	0.00	0
West	2	22.22	18	3	50.00	14

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), 2019 National Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/new_school_sampling_frame_for_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation School and Student Participation in the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The tables linked present weighted school and student participation rates and weighted student exclusion rates for the fourth- and eighth-grade private school national mathematics and reading samples.

A weighted school participation rate indicates the percentage of the student population that is directly represented by the participating school sample.

A weighted student participation rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools.

A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment. Students are generally excluded from a NAEP assessment if they have a disability or limited English language proficiency that prevents them from taking the assessment altogether or the accommodations they require to take the assessment were unavailable.

Weighted School Response Rates

Weighted Student Response and Exclusion Rates for Mathematics

Weighted Student Response and Exclusion Rates for Reading

Weighted school participation rates are calculated by dividing the sum of school base weights, weighted by student enrollment of the targeted grade, for all participating schools by the sum of the base weights, weighted by student enrollment of the target grade, for all eligible schools. Eligible schools are all sampled schools except those considered out-of-scope. The base weight is assigned to all sampled schools and is the inverse of the probability of selection. The weighted school participation rates in these tables reflect participation prior to substitution. That is, participating substitute schools that took the place of refusing originally sampled schools are not included in the numerator.

Weighted student participation rates are calculated by dividing the sum of the student base weights for all assessed students by the sum of the student base weights for all assessable students. (See below for the response dispositions of NAEP sampled students.) Students deemed assessable are those who were assessed or absent. They do not include students that were not eligible (primarily made up of withdrawn or graduated students) or students with disabilities (SD) or English learners (EL) students who were excluded from the assessment.

Weighted student exclusion rates are calculated by dividing the sum of the school nonresponse-adjusted student base weights for all excluded students by the sum for all assessable and excluded students.

Every student sampled for NAEP is classified into one of the following response disposition categories:

1. Assessed
2. Absent
3. Excluded (must be SD students, EL students, or SD and EL students)
4. Withdrawn or Graduated (ineligible)

Assessed students were students that completed an assessment.

Absent students were students who were eligible to take an assessment but were absent from the initial session and the makeup session if one was offered. (Note, some schools, not all, had make-up sessions for students who were absent from the initial session.)

Excluded students were 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 EL.

Withdrawn or graduated students are those who have left the school before the original assessment. These students are considered ineligible for NAEP.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_and_student_participation_in_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

NAEP Technical Documentation Weighted School Response Rates for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The following table presents unweighted counts of eligible sampled and participating schools and weighted school response rates, by school type, for the fourth- and eighth-grade private school national mathematics and reading samples.

A weighted school response rate indicates the percentage of the student population that is directly represented by the participating school sample. These response rates are based on the original sample of schools (excluding substitutes).

School counts and response rates of eligible sampled schools, private schools, national assessment, by grade and school type: 2019

Grade	School type	Number of eligible sampled schools	Number of participating schools	Weighted school response rate (percent)
4	**All private**	**460**	**290**	**52.71**
	Catholic	140	120	76.64
	Non-Catholic	330	170	36.55
8	**All private**	**450**	**270**	**49.67**
	Catholic	130	120	73.00
	Non-Catholic	320	150	33.04

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_school_response_rates_for_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Fourth- and Eighth-Grade Private School National Mathematics Assessment

The following table presents weighted student response and exclusion rates, by school type, for the fourth- and eighth-grade private school national mathematics samples. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for private schools, national mathematics assessment, by grade and school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
4	**All private**	**95.03**	**0.04**	**#**
	Catholic	94.87	0.09	#
	Non-Catholic	95.22	#	#
8	**All private**	**93.58**	**0.23**	**0.03**
	Catholic	94.33	0.30	#
	Non-Catholic	92.39	0.17	0.05

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_private_school_national_mathematics_assessment.aspx

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Fourth- and Eighth-Grade Private School National Reading Assessment

The following table presents weighted student response and exclusion rates, by school type, for the fourth- and eighth-grade private school national reading samples. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for private schools, national reading assessment, by grade and school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
4	**All private**	**94.58**	**0.02**	**0.06**
	Catholic	94.91	#	0.06
	Non-Catholic	94.19	0.04	0.06
8	**All private**	**92.51**	**0.43**	**#**
	Catholic	92.92	0.25	#
	Non-Catholic	91.86	0.56	#

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Reading Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_private_school_national_reading_assessment.aspx

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NAEP Technical Documentation School Sample Selection for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The sampled schools for the fourth- and eighth-grade private school national assessments in mathematics and reading came from two frames: the primary private school sample frame constructed from the Private School Universe Survey (PSS) file and the supplemental new-school sample frame. Schools were sampled from each school frame with probability proportional-to-size (PPS) using systematic sampling. Prior to sampling, schools in each frame were sorted by the appropriate implicit stratification variables in a serpentine order within each explicit sampling stratum. (For details on explicit and implicit strata used for these samples see the stratification page.) A school's measure of size was a complex function of the school's estimated grade enrollment. Only one hit was allowed for each school.

Computation of Measures of Size

School Sample Sizes: Frame and New School

Schools from the PSS-based frame were sampled at a rate that would yield a national sample of 6,700 assessed students (3,350 each from the Catholic and non-Catholic school strata) at grade 4 and at grade 8. Catholic schools from the new-school frames were sampled at the same rate as those from the PSS-based frames.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_sample_selection_for_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation School Sample Sizes: PSS-Based and New-School for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The following table presents the number of schools selected for the fourth- and eighth-grade private school mathematics and reading samples by sampling frame (Private School Universe Survey [PSS]-based and new-school) and private school affiliation.

Number of schools in the total, PSS-based, and new-school samples, national private assessment, by grade and school type: 2019

Grade and private school type	Total school sample	PSS-based school sample	New-school sample

Rounds to zero.
† Not applicable.
NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

Grade and private school type	Total school sample	PSS-based school sample	New-school sample
Grade 4			
All private	**530**	**530**	**10**
Catholic	140	140	10
Non-Catholic	360	360	†
Unknown affiliation	30	30	†
Grade 8			
All private	**530**	**530**	**#**
Catholic	140	140	#
Non-Catholic	370	370	†
Unknown affiliation	30	30	†

Rounds to zero.
† Not applicable.
NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_sample_sizes_list_frame_based_and_new_school_for_the_2019_private_school_national_assessment.aspx

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NAEP Technical Documentation Stratification of Schools for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The purpose of school stratification is to increase the efficiency and ensure the representativeness of school samples in terms of important school-level characteristics, such as geography (e.g., census region), urbanicity, and race/ethnicity composition. NAEP school sampling utilizes two types of stratification: explicit and implicit.

Explicit stratification partitions the sampling frame into mutually exclusive groupings called strata. The systematic samples selected from these strata are independent, meaning that each sample is selected with its own unique random start. Implicit stratification involves sorting the sampling frame, as opposed to grouping the frame. For NAEP, schools are sorted in serpentine fashion by key school characteristics within sampling strata and sampled systematically using this ordering. This type of stratification ensures the representativeness of the school samples with respect to the key school characteristics.

Explicit stratification for the NAEP 2019 private school samples for mathematics and reading at grades 4 and 8 was by private school type: Catholic, non-Catholic, and unknown affiliation. Private school affiliation was unknown for schools that were nonrespondents to the NCES Private School Universe Survey (PSS) for the past three cycles.

The implicit stratification of the schools involved four dimensions. Within each explicit stratum, the private schools were hierarchically sorted by census region, urbanicity classification, race/ethnicity classification, and estimated grade enrollment. The implicit stratification in this four-fold hierarchical stratification was achieved via a "serpentine sort."

Census region was used as the first level of implicit stratification for the NAEP 2019 private school sample for mathematics and reading. All four census regions were used as strata.

The next level of stratification was an urbanicity classification based on urban-centric locale, as specified on the PSS. Within a census region-based stratum, urban-centric locale cells that were too small were collapsed. The criterion for adequacy was that the cell had to have an expected school sample size of at least six. The urbanicity variable was equal to the original urban-centric locale if no collapsing was necessary to cover an inadequate original cell. If collapsing was necessary, the scheme was to first collapse within the four major strata (city, suburbs, town, and rural). For example, if the expected number of large city schools sampled was less than six, large city was collapsed with midsize city. If the collapsed cell was still inadequate, they were further collapsed with small city. If a major stratum cell (all three cells collapsed together) was still deficient, it was collapsed with a neighboring major stratum cell. For example, city would be collapsed with suburbs.

The last stage of stratification was a division of the geographic/urbanicity strata into race/ethnicity strata if the expected number of schools sampled was large enough (i.e., at least equal to 12). This was done by deciding first on the number of race/ethnicity strata and then dividing the geography/urbanicity stratum into that many pieces. The school frame was sorted by the percentage of students in each school who were Black, Hispanic, or American Indian. The three racial/ethnic groups defining the race/ethnicity strata were those that have historically performed substantially lower on NAEP assessments than White students. The sorted list was then divided into pieces, with roughly an equal expected number of sampled schools in each piece.

Finally, schools were sorted within stratification cells by estimated grade enrollment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/stratification_of_schools_for_the_2019_fourth_and_eighth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Student Sample Selection for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and

Reading

The sampling of students for the fourth- and eighth-grade private school national assessments in mathematics and reading involved two steps: (1) sampling of students in the targeted grade (fourth or eighth) from each sampled school, and (2) assignment of assessment subject (mathematics or reading) to the sampled students. The national private school assessments in mathematics and reading at fourth- and eighth-grade were administered in digital form using tablets.

Sampling Students within Sampled Schools

Within each sampled school, a sample of students was selected from a list of students in the targeted grade such that every student had an equal chance of selection. The student lists were submitted either electronically using a system known as E-filing or on paper. In E-filing for private schools, student lists are submitted one school at a time by school coordinators in Excel files. E-filing allows schools to easily submit student demographic data electronically with the student lists, easing the burden on field supervisors and school coordinators.

Schools that are unable to submit their student lists using the E-filing system provide hardcopy lists to NAEP field supervisors. In 2019, slightly more private schools in the national assessments in mathematics and reading submitted hardcopy lists than electronic lists. At fourth grade, half of the participating schools submitted hardcopy lists and half submitted electronic lists. At eighth grade, 55 percent of the schools submitted hardcopy lists, and 45 percent submitted electronic lists.

In year-round multi-track schools, students in tracks scheduled to be on break 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 one-half, 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 was submitted for every student on the frame, students were sorted by gender and race/ethnicity before the sample was selected to implicitly stratify the sample.

In schools with up to 52 students in the targeted grade, all students were selected. In schools with more than 52 students, systematic samples of 50 students were selected.

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.

Assigning Assessment Subject to Sampled Students

Sampled students, including new enrollees, in each participating sampled school were assigned to either the mathematics or the reading assessment at rates of 55 percent and 45 percent, respectively, using a process known as spiraling. In this process, test forms were randomly assigned to sampled students from test form sets that had, on average, a ratio of 27 mathematics forms to 22 reading forms. Students receiving a mathematics form were in the mathematics assessment, and students receiving a reading form were in the reading assessment.

NAEP Technical Documentation Substitute Schools for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

Though efforts were made to secure the participation of all schools selected, it was anticipated that not all schools would choose to participate. NAEP uses school substitution to mitigate the effect of bias due to nonresponse. A nonparticipating sampled school is replaced by its substitute when the original school is considered a final refusal.

For the fourth- and eighth-grade private school mathematics and reading samples, substitute schools were preselected for all sampled schools from the Private School Universe Survey (PSS)-based sampling frames by sorting the school frame files according to the actual order used in sample selection (the implicit stratification).

Schools were disqualified as potential substitutes if they were already selected in the private school sample or assigned as a substitute for another private school (earlier in the sort ordering).

The two candidates for substitutes were then the two nearest neighbors of the originally sampled school in the frame sort order. To be eligible as a potential substitute, the neighbor needed to be a nonsampled school (for any grade) and within the same explicit sampling stratum (private school affiliation). If both nearest neighbors were eligible to be substitutes, the one with a closer grade enrollment was chosen. If both nearest neighbors had the same grade enrollment (an uncommon occurrence), one of the two was randomly selected.

In the fourth-grade private school mathematics and reading sample, 45 substitute schools ultimately participated. In the eighth-grade private school sample, 47 substitute schools participated.

NAEP Technical Documentation Target Population for the 2019 Fourth- and Eighth-Grade Private School National Assessment in Mathematics and Reading

The target populations for the 2019 fourth- and eighth-grade private school national assessments in mathematics and reading were defined as all fourth- and eighth-grade students who were enrolled in private schools located within the 50 states and the District of Columbia.

NAEP Technical Documentation2019 Fourth- and Eighth-Grade Private School National Science Assessment

The fourth- and eighth-grade private school samples for the national science assessment were designed to produce nationally representative samples of students enrolled in fourth and eighth grades in private schools in the United States and to accommodate the administration of the assessment in two modes: digitally based assessment (DBA) on tablets and paper-based assessment (PBA) using paper and pencil. The target sample size for the private school science sample was 2,800 (1,900 DBA and 900 PBA) assessed students at grade 4 and 2,900 (1,900 DBA and 1,000 PBA) at grade 8. Prior to sampling, the target sample sizes were adjusted upward to offset expected school and student attrition due to nonresponse and ineligibility.

Samples were selected using a two-stage probability-based design that involved selection of schools from within strata and selection of students within schools. The first-stage samples of schools were selected with probability proportional to a measure of size based on estimated grade-specific enrollment in the schools.

The sampling of students at the second-stage involved three steps: (1) sampling of students in the targeted grade (fourth or eighth) from each sampled school, (2) assignment of assessment mode (DBA or PBA), and (3) assignment of assessment subject (science) to the sampled students.

NAEP Technical Documentation Ineligible Schools for the 2019 Fourth- and Eighth-Grade Private School National Science Assessment

The Private School Universe Survey (PSS)-based private school frames, from which most of the sampled schools were drawn, corresponds to the 2015-2016 school year, three years prior to the assessment school year. During the intervening period, some of these schools either closed, no longer offered the grade of interest, or were ineligible for other reasons. In such cases, the sampled schools were coded as ineligible.

NAEP Technical Documentation Eligibility Status of Schools Sampled for the 2019 Fourth- and Eighth-Grade Private School National Science Assessment

The following table shows the unweighted counts and percentages of sampled schools that were eligible and ineligible, by reason for ineligibility, for the fourth- and eighth-grade private school national science samples.

Sampled private schools, national science assessment, by grade and eligibility status: 2019

Grade and eligibility status	Unweighted count of schools	Unweighted percentage
All fourth-grade sampled private schools	**370**	**100.00**
Eligible	320	85.64
Ineligible	53	14.36
Has sampled grade, but no eligible students	7	1.90
Does not have sampled grade	13	3.52
Closed	19	5.15
Not a regular school	5	1.36
Duplicate on sampling frame	1	0.27
Other ineligible	8	2.17
All eighth-grade sampled private schools	**370**	**100.00**

NOTE: Numbers of schools are rounded to nearest ten, except those pertaining to ineligible schools. Detail may not sum to totals due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

Grade and eligibility status	Unweighted count of schools	Unweighted percentage
Eligible	320	85.52
Ineligible	54	14.48
Has sampled grade, but no eligible students	7	1.88
Does not have sampled grade	11	2.95
Closed	15	4.02
Not a regular school	15	4.02
Duplicate on sampling frame	0	0.00
Other ineligible	6	1.61

NOTE: Numbers of schools are rounded to nearest ten, except those pertaining to ineligible schools. Detail may not sum to totals due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/eligibility_status_of_schools_sampled_for_the_2019_private_school_national_science_assessments.aspx

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NAEP Technical Documentation Total and Eligible Sampled Schools for the 2019 Fourth- and Eighth-Grade Private School National Science Assessment

The following table presents unweighted counts and percentages of ineligible and eligible schools by private school affiliation in the fourth- and eighth-grade private school national science samples. Schools whose private school affiliation was unknown at the time of sampling subsequently had their affiliation determined during data collection. Therefore, such schools are not broken out separately and not included in the following table.

Eligibility status of sampled private schools in the fourth- and eighth-grade national science assessments, by private school affiliation: 2019

		Grade 4		Grade 8	
Private school type	Eligibility status	Unweighted count	Unweighted percentage	Unweighted count	Unweighted percentage
All private	**Total**	**340**	**100.00**	**350**	**100.00**
	Ineligible	30	9.97	30	9.57
	Eligible	310	90.03	310	90.43
Catholic	**Total**	**100**	**100.00**	**100**	**100.00**
	Ineligible	0	4.17	0	3.13
	Eligible	90	95.83	90	96.88
Non-Catholic	**Total**	**250**	**100.00**	**250**	**100.00**
	Ineligible	30	12.24	30	12.05
	Eligible	220	87.76	220	87.95

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/total_and_eligible_sampled_schools_for_the_2019_private_school_national_science_assessments.aspx

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NAEP Technical Documentation School and Student Participation in the 2019 Fourth- and Eighth-Grade Private School National Science Assessment

The tables linked present weighted school and student participation rates and weighted student exclusion rates for the fourth- and eighth-grade private school national science samples.

A weighted school participation rate indicates the percentage of the student population that is directly represented by the participating school sample.

A weighted student participation rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools.

A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment. Students are generally excluded from a NAEP assessment if they have a disability or limited English language proficiency that prevents them from taking the assessment altogether or the accommodations they require to take the assessment were unavailable.

Weighted School Response Rates

Weighted Student Response and Exclusion Rates for Science, Digitally Based Assessment

Weighted Student Response and Exclusion Rates for Science, Paper-Based Assessment

Weighted school participation rates are calculated by dividing the sum of school base weights, weighted by student enrollment of the targeted grade, for all participating schools by the sum of the base weights, weighted by student enrollment of the target grade, for all eligible schools. Eligible schools are all sampled schools except those considered out-of-scope. The base weight is assigned to all sampled schools and is the inverse of the probability of selection. The weighted school participation rates in these tables reflect participation prior to substitution. That is, participating substitute schools that took the place of refusing originally sampled schools are not included in the numerator.

Weighted student participation rates are calculated by dividing the sum of the student base weights for all assessed students by the sum of the student base weights for all assessable students. (See below for the response dispositions of NAEP sampled students.) Students deemed assessable are those who were assessed or absent. They do not include students that were not eligible (primarily made up of withdrawn or graduated students) or students with disabilities (SD) or English learner (EL) students who were excluded from the assessment.

Weighted student exclusion rates are calculated by dividing the sum of the school nonresponse-adjusted student base weights for all excluded students by the sum for all assessable and excluded students.

Every student sampled for NAEP is classified into one of the following response disposition categories:

1. Assessed
2. Absent
3. Excluded (must be SD students, EL students, or SD and EL students)
4. Withdrawn or Graduated (ineligible)

Assessed students were students that completed an assessment.

Absent students were students who were eligible to take an assessment but were absent from the initial session and the makeup session if one was offered. (Note, some schools, not all, had make-up sessions for students who were absent from the initial session.)

Excluded students were 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 EL.

Withdrawn or graduated students are those who have left the school before the original assessment. These students are considered ineligible for NAEP.

NAEP Technical Documentation Weighted School Response Rates for the 2019 Fourth- and Eighth-Grade Private School National Science Assessments

The following table presents unweighted counts of eligible sampled and participating schools and weighted school response rates, by school type, for the fourth- and eighth-grade private school national science samples.

A weighted school response rate indicates the percentage of the student population that is directly represented by the participating school sample. These response rates are based on the original sample of schools (excluding substitutes).

School counts and response rates of eligible sampled schools, private schools, national science assessment, by grade and school type: 2019

Grade	School type	Number of eligible sampled schools	Number of participating schools	Weighted school response rate (percent)
4	**All private**	**290**	**160**	**49.99**
	Catholic	80	70	74.43
	Non-Catholic	210	90	33.54
8	**All private**	**290**	**140**	**43.78**
	Catholic	90	70	70.67
	Non-Catholic	210	70	23.17

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Fourth- and Eighth-Grade Private School National Science Assessments, Paper-Based Assessment

The following table presents weighted student response and exclusion rates, by school type, for fourth- and eighth-grade private school students in the national science paper-based assessment (PBA) samples. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for private schools, national science paper-based assessment, by grade and school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
4	**All private**	**96.61**	**0.08**	**0.10**
	Catholic	96.20	0.17	0.22
	Non-Catholic	97.34	#	#
8	**All private**	**93.76**	**#**	**0.08**
	Catholic	93.93	#	#
	Non-Catholic	93.53	#	0.15

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_private_school_national_science_assessments_pba.aspx

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NAEP Technical Documentation Stratification of Schools for the 2019 Fourth- and Eighth-Grade Private School National Science Assessment

The purpose of school stratification is to increase the efficiency and ensure the representativeness of school samples in terms of important school-level characteristics, such as geography (e.g., census region), urbanicity, and race/ethnicity composition. NAEP school sampling utilizes two types of stratification: explicit and implicit.

Explicit stratification partitions the sampling frame into mutually exclusive groupings called strata. The systematic samples selected from these strata are independent, meaning that each sample is selected with its own unique random start. Implicit stratification involves sorting the sampling frame, as opposed to grouping the frame. For NAEP, schools are sorted in serpentine fashion by key school characteristics within sampling strata and sampled systematically using this ordering. This type of stratification ensures the representativeness of the school samples with respect to the key school characteristics.

Explicit stratification for the NAEP 2019 private school samples was by private school type: Catholic, non-Catholic, and unknown affiliation. Private school affiliation was unknown for nonrespondents to the NCES Private School Universe Survey (PSS) for the past three cycles.

The implicit stratification of the private schools involved four dimensions. Within each explicit stratum, the private schools were hierarchically sorted by census region, urbanicity status, race/ethnicity status, and estimated grade enrollment. The implicit stratification in this four-fold hierarchical stratification was achieved via a "serpentine sort".

Census region was used as the first level of implicit stratification for the NAEP 2019 private school sample. All four census regions were used as strata.

The next level of stratification was an urbanicity classification based on urban-centric locale, as specified on the PSS. Within a census region-based stratum, urban-centric locale cells that were too small were collapsed. The criterion for adequacy was that the cell had to have an expected school sample size of at least six.

The urbanicity variable was equal to the original urban-centric locale if no collapsing was necessary to cover an inadequate original cell. If collapsing was necessary, the scheme was to first collapse within the four major strata (city, suburbs, town, and rural). For example, if the expected number of large city schools sampled was less than six, large city was collapsed with midsize city. If the collapsed cell was still inadequate, they were further collapsed with small city. If a major stratum cell (all three cells collapsed together) was still deficient, it was collapsed with a neighboring major stratum cell. For example, city would be collapsed with suburbs.

The last stage of stratification was a division of the geographic/urbanicity strata into race/ethnicity strata if the expected number of schools sampled was large enough (i.e., at least equal to 12). This was done by deciding first on the number of race/ethnicity strata and then dividing the geography/urbanicity stratum into that many pieces. The school frame was sorted by the percentage of students in each school who were Black, Hispanic, or American Indian. The three racial/ethnic groups defining the race/ethnicity strata were those that have historically performed substantially lower on NAEP assessments than White students. The sorted list was then divided into pieces, with roughly an equal expected number of sampled schools in each piece.

Finally, schools were sorted within stratification cells by estimated grade enrollment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/stratification_of_schools_for_the_2019_fourth_and_eighth_grade_private_school_national_science_assessments.aspx

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NAEP Technical Documentation Student Sample Selection for the 2019 Fourth- and Eighth-Grade Private School National Science Assessment

The sampling of students for the private school assessments in science at fourth and eighth grades involved three steps: (1) sampling of students in the targeted grade (fourth or eighth) from each sampled school, (2) assignment of assessment mode (digitally based [DBA] or paper-based [PBA]), and (3) assignment of assessment subject (science) to the sampled students.

Sampling Students within Sampled Schools

Within each sampled school, a sample of students was selected from a list of students in the targeted grade such that every student had an equal chance of selection. The student lists were submitted either electronically using a system known as E-filing or on paper. In E-filing for private schools, student lists are submitted one school at a time by school coordinators in Excel files. E-filing allows schools to easily submit student demographic data electronically with the student lists, easing the burden on field supervisors and school coordinators.

Schools that are unable to submit their student lists using the E-filing system provide hardcopy lists to NAEP field supervisors. In 2019, more private schools in the national assessment in science submitted hardcopy lists. At fourth grade, about 59 percent of the participating schools submitted hardcopy lists; while at eighth grade, 57 percent of the schools submitted hardcopy lists.

In year-round multi-track schools, students in tracks scheduled to be on break 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 one-half, 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 was submitted for every student in the school, students were sorted by gender and race/ethnicity before the sample was selected to implicitly stratify the sample.

In schools with up to 70 students in the targeted grade, all students were selected. In schools with more than 70 students, systematic samples of 62 students at fourth grade and 63 students at eighth grade were selected.

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.

Assigning Assessment Mode to Sampled Students

After selection, the sampled students within a school were randomly assigned assessment mode using an algorithm based on the number of students sampled.

The mode assignment algorithm differed by grade but shared three common requirements designed for operational efficiency: (1) very small schools should only be assigned one mode type, (2) schools doing both modes should avoid having DBA or PBA sessions with fewer than 5 students, and (3) schools doing both modes, where possible, should have 25 or 50 students assigned to DBA and the balance to PBA. The following describes the mode assignment algorithm to the fourth- and eighth-grade sampled students.

Grade 4 Assessment Mode Assignment

- Schools with fewer than 26 students: all students assigned to one mode (all DBA or all PBA)
- Schools with 26 to 31 students: students assigned to DBA at a rate of 50/62 and to PBA at 12/62
- Schools with 32 to 37 students: 25 students assigned to DBA and the balance to PBA
- Schools with 38 to 60 students: students assigned to DBA at a rate of 50/62 and to PBA at 12/62
- Schools with 61 to 70 students: 50 students assigned to DBA and the balance to PBA

Grade 8 Assessment Mode Assignment

- Schools with fewer than 26 students: all students assigned to one mode (all DBA or all PBA)
- Schools with 26 to 31 students: students assigned to DBA at a rate of 50/63 and to PBA at 12/63
- Schools with 32 to 37 students: 25 students assigned to DBA and the balance to PBA
- Schools with 38 to 60 students: students assigned to DBA at a rate of 50/63 and to PBA at 12/63
- Schools with 61 to 70 students: 50 students assigned to DBA and the balance to PBA

The assignment of assessment mode to very small schools (fewer than 26 students) was done in advance of student sampling. At fourth grade, 80.6 percent (50 out of 62) and 19.4 percent (12 out of 62) schools were pre-assigned to DBA and PBA only, respectively. At eighth grade, the respective pre-assigned DBA- and PBA-only rates were 79.4% (50 out of 63) and 20.6 percent (13 out of 63).

Assigning Assessment Subject to Sampled Students

Sampled students, including new enrollees, in each participating sampled school were assigned to either the science assessment or one of the pilot tests.

For students assigned to DBA, 51 percent were assigned to science and 49 percent were assigned to a pilot test using a process known as spiraling. In this process, test forms were randomly assigned to sampled students from test form sets that had, on average, a ratio of 190 science forms to 182 pilot test forms. Students receiving a science form were in the science assessment, and students receiving a pilot test form were in the pilot test.

All students assigned to PBA were assigned to science. There were no pilot tests carried out on tests administered on paper.

NAEP Technical Documentation Substitute Schools for the 2019 Fourth- and

Eighth-Grade Private School National Science Assessment

Though efforts were made to secure the participation of all schools selected, it was anticipated that not all schools would choose to participate. NAEP uses school substitution to mitigate the effect of bias due to nonresponse. A nonparticipating sampled school is replaced by its substitute when the original school is considered a final refusal.

For the fourth- and eighth-grade private school science samples, substitute schools were preselected for all sampled schools from the Private School Universe Survey (PSS)-based frames by sorting the school frame files according to the actual order used in sample selection (the implicit stratification).

Schools were disqualified as potential substitutes if they were already selected in the private school sample or assigned as a substitute for another private school (earlier in the sort ordering).

The two candidates for substitutes were then the two nearest neighbors of the originally sampled school in the frame sort order. To be eligible as a potential substitute, the neighbor needed to be a nonsampled school (for any grade) and within the same explicit sampling stratum (private school affiliation). If both nearest neighbors were eligible to be substitutes, the one with a closer grade enrollment was chosen. If both nearest neighbors had the same grade enrollment (an uncommon occurrence), one of the two was randomly selected.

In the fourth- and eighth-grade private school science samples, 33 substitute schools ultimately participated in each of the two samples.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/substitute_schools_for_the_2019_fourth_and_eighth_grade_private_school_national_science_assessments.aspx

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NAEP Technical Documentation Target Population for the 2019 Fourth- and Eighth-Grade Private School National Science Assessment

The target populations for the 2019 fourth- and eighth-grade private school national assessment in science were defined as all fourth- and eighth-grade students who were enrolled in private schools located within the 50 states and the District of Columbia.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/target_population_for_the_2019_fourth_and_eighth_grade_private_school_national_science_assessments.aspx

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NAEP Technical Documentation 2019 Fourth- and Eighth-Grade Public School National Assessment in Mathematics and Reading

For the mathematics and reading assessments in fourth- and eighth-grade public schools, the national samples were formed by the collective state assessment samples for each jurisdiction, including Bureau of Indian Education (BIE) and Department of Defense Educational Activity (DoDEA) schools. All jurisdictions participated in the mathematics and reading assessments, with the exception of Puerto Rico, where only the operational mathematics assessment was conducted.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/2019_fourth_and_eighth_grade_public_school_national_assessment_in_mathematics_and_reading.aspx

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NAEP Technical Documentation 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The fourth- and eighth-grade public school samples for the national science assessments were designed to produce nationally representative samples of students enrolled in fourth and eighth grades in public schools in the United States and to accommodate the administration of the assessment in two modes: digitally based assessment (DBA) on tablets and paper-based assessment (PBA) using paper and pencil.

The target sample sizes for the public school science sample were 25,200 (17,100 DBA and 8,100 PBA) assessed students at grade 4 and 26,100 (17,100 DBA and 9,000 PBA) at grade 8. Prior to sampling, the target sample sizes were adjusted upward to offset expected school and student attrition due to nonresponse and ineligibility.

Samples were selected using a two-stage probability-based design that involved selection of schools from within strata and selection of students within schools. The first-stage samples of schools were selected with probability proportional to a measure of size based on estimated grade-specific enrollment in the schools.

The sampling of students at the second-stage involved three steps: (1) sampling of students in the targeted grade (fourth or eighth) from each sampled school, (2) assignment of assessment mode (DBA or PBA), and (3) assignment of assessment subject (science) to the sampled students.

NAEP Technical Documentation Ineligible Schools for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The Common Core of Data (CCD)-based public school frames, from which most of the sampled schools were drawn, corresponds to the 2016-2017 school year, two years prior to the assessment school year. During the intervening period, some of these schools either closed, no longer offered the grade of interest, or were ineligible for other reasons. In such cases, the sampled school was coded as ineligible.

Total and Eligible Schools Sampled

Eligibility Status of Schools Sampled

NAEP Technical Documentation Eligibility Status of Schools Sampled for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The following table shows the unweighted counts and percentages of sampled schools that were eligible and ineligible, by reason for ineligibility, for the fourth- and eighth-grade public school national science samples.

Sampled public schools, national science assessment, by grade and eligibility status: 2019

	Grade 4		Grade 8	
Eligibility status	Unweighted count of schools	Unweighted percentage	Unweighted count of schools	Unweighted percentage
All sampled science public schools	**970**	**100.00**	**980**	**100.00**
Eligible	940	96.91	940	96.22
Ineligible	30	3.09	37	3.78
Has sampled grade, but no eligible students	0	0.00	2	0.20
Does not have sampled grade	9	0.93	11	1.12
Closed	11	1.13	7	0.72
Not a regular school	10	1.03	15	1.53
Other ineligible	0	0.00	2	0.20
Duplicate on sampling frame	0	0.00	0	0.00

NOTE: Numbers of schools are rounded to nearest ten, except those pertaining to ineligible schools. Detail may not sum to totals due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

NAEP Technical Documentation Total and Eligible Sampled Schools for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The following table presents unweighted counts and percentages of ineligible and eligible schools by census region in the fourth- and eighth-grade public school national science samples.

Eligibility status of sampled public schools in the fourth- and eighth-grade national science assessments, by census region: 2019

Census region	Eligibility status	Grade 4 Count	Grade 4 Percentage	Grade 8 Count	Grade 8 Percentage
Total	**Total**	**970**	**100.00**	**980**	**100.00**
	Ineligible	30	3.09	40	3.78
	Eligible	940	96.91	940	96.22
Northeast	**Total**	**140**	**100.00**	**140**	**100.00**
	Ineligible	10	3.65	0	2.17
	Eligible	130	96.35	140	97.83
Midwest	**Total**	**170**	**100.00**	**180**	**100.00**
	Ineligible	10	2.94	10	3.93
	Eligible	170	97.06	170	96.07
South	**Total**	**410**	**100.00**	**410**	**100.00**
	Ineligible	10	3.40	10	3.41
	Eligible	400	96.60	400	96.59
West	**Total**	**250**	**100.00**	**250**	**100.00**
	Ineligible	10	2.38	10	5.18
	Eligible	250	97.62	240	94.82

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/total_and_eligible_sampled_schools_for_the_2019_4th_and_8th_grade_public_school_national_science_assessments.aspx

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NAEP Technical Documentation Sampling Frame for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The primary sampling frames for the 2019 fourth- and eighth-grade public school samples for the national science assessment were developed from the Common Core of Data (CCD) file corresponding to the 2016-2017 school year. The CCD file is the Department of Education's primary database of public elementary and secondary schools in the United States including U.S. territories. It includes all regular public, state-operated public, Bureau of Indian Education (BIE), and Department of Defense Education Activity (DoDEA) schools open during the 2016-2017 school year. These sampling frames are referred to as the CCD-based sampling frames.

Fourth- and Eighth-Grade Schools and Enrollment

New-School Sampling Frame

A secondary set of sampling frames were also created for these fourth- and eighth-grade samples to account for schools that newly opened or became newly eligible between the 2016-2017 and 2018-2019 school years. These frames contain brand-new and newly-eligible fourth- and eighth-grade schools and are referred to as the new-school sampling frames.

Both sets of sampling frames excluded ungraded schools, vocational schools with no enrollment, special education-only schools, prison and hospital schools, home school entities, virtual or online schools, adult and evening schools, and juvenile correctional institutions. Vocational schools with no enrollment serve students who split their time between the vocational school and their home school.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/sampling_frame_for_the_2019_fourth_and_eighth_grade_public_school_national_science_assessments.aspx

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NAEP Technical Documentation Fourth- and Eighth-Grade Schools and Enrollment in the 2019 Public School Science Sampling Frame

The following table presents the number of fourth- and eighth-grade public schools and their estimated enrollment, as contained in the Common Core of Data (CCD)-based sampling frame, by census region, for the national science assessment. Grade 4 or grade 8 enrollment was estimated for each school as the average of the per-grade enrollments for grades 1 through 8, counting only the grades in that range that were offered by the school.

Number of schools and estimated enrollment in CCD-based fourth- and eighth-grade public school sampling frames, national science assessment, by census region: 2019

Census region	Grade 4 Schools	Grade 4 Estimated enrollment	Grade 8 Schools	Grade 8 Estimated enrollment
Total	**51,571**	**3,815,145**	**28,917**	**3,729,163**
Northeast	8,013	583,405	4,565	584,189

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

Census region	Grade 4 Schools	Grade 4 Estimated enrollment	Grade 8 Schools	Grade 8 Estimated enrollment
Midwest	12,329	779,043	7,823	782,651
South	17,778	1,516,934	9,394	1,446,331
West	13,451	935,763	7,135	915,992

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/fourth_and_eighth_grade_schools_and_enrollment_in_the_2019_public_school_science_sampling_frame.aspx

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NAEP Technical Documentation New-School Sampling Frame for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The primary sampling frames for the 2019 fourth- and eighth-grade public school samples for the national assessment in science were constructed using the most current Common Core of Data (CCD) file available from NCES. This file contained schools that were in existence during the 2016-2017 school year (i.e., it was two years out of date). During the subsequent 2-year period, undoubtedly some schools closed, some changed structure (one school becoming two schools, for example), some newly opened, and still others changed their grade span.

A supplemental sample was selected from a list of schools that were new or had become newly eligible sometime after the 2016-2017 school year. The goal was to allow every new school a chance of selection, thereby fully covering the target population of schools in operation during the 2018-2019 school year. It was infeasible to ask every school district in the United States to provide a supplemental school frame, so a two-stage procedure was employed. First, a sample of school districts was selected within each state. Then each State or Trial Urban District Assessment (TUDA) Coordinator was sent a list of the schools within their sampled districts that had been present on the 2016-2017 CCD file. The Coordinators were asked to add in any new schools and identify any schools on this list that had become newly eligible for grades 4, 8, or 12.

The new-school process began with the preparation of a district-level frame. The starting point was a file containing every public school district in the United States.

Specific districts were designated as in sample with certainty. They included the following districts:

- districts in jurisdictions where all schools were selected for sample at either grade 4 or 8;
- state-operated districts;
- districts in states with fewer than 10 districts;
- charter-only districts (that is, districts containing no schools other than charter schools); and
- TUDA districts.

Then noncertainty districts were classified as small, medium, or large based on the number of schools and student enrollment of schools from the CCD-based public school frame.

A district was considered to be small if it contained no more than one school at each targeted grade (4, 8, and 12). During school recruitment, the coordinators were asked to identify schools within their district that newly offered the targeted grade. Every identified new school was added to the sample. From a sampling perspective, the new school was viewed as an “annex” to the sampled school which meant that it had a well-defined probability of selection equal to that of the sampled school. When a school in a small district was sampled from the CCD-based frame, its associated new school was automatically sampled as well.

Within each jurisdiction, districts that were neither certainty selections nor small were divided into two strata, one containing large-size districts and a second containing medium-size districts. These strata were defined by computing the percentage of jurisdiction grade 4, 8, and 12 enrollment represented by each district, sorting in descending order, and cumulating the percentages. All districts up to and including the first district at or above the 80th cumulative percentage were defined as large districts. The remaining districts were defined as medium districts.

A simplified example is given below. The state's districts are ordered by descending percentage enrollment. The first six become large districts and the last six become medium districts.

Large-size and medium-size district strata example, national public science assessment, by enrollment, stratum, and district: 2019

District	Percentage enrollment	Cumulative percentage enrollment	Stratum
1	20	20	L
2	20	40	L
3	15	55	L
4	10	65	L
5	10	75	L
6	10	85	L
7	5	90	M
8	2	92	M

9	2	94	M
10	2	96	M

District	Percentage enrollment	Cumulative percentage enrollment	Stratum
11	2	98	M
12	2	100	M

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

The target sample size for each jurisdiction was 10 districts total across the medium-size and large-size district strata. Where possible, eight districts were selected from the large-size district stratum and two districts from the medium-size district stratum. However, in the example above, since there are only six large districts, all of the districts in the large district stratum and four districts from the medium district stratum would have been selected for the new-school inquiry.

If sampling was needed in the medium-size district stratum, districts in this stratum were selected with equal probability. If sampling was needed in the large-size district stratum, the districts in this stratum were sampled with probability proportional to enrollment. These probabilities were retained and used in later stages of sampling and weighting of new schools..

The selected districts in each jurisdiction were then sent a listing of all their schools that appeared on the 2016-2017 CCD file and were asked to provide information about the new schools not included in the file and grade span changes of existing schools. These listings provided by the selected districts were used as sampling frames for selection of new public schools and updates of existing schools. This process was conducted through the NAEP State or TUDA 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.

The following table presents the number and percentage of schools and average estimated grade enrollment for the fourth- and eighth-grade new-school frame by census region.

Number and percentage of schools and mean school size in the new-school frame, national public science assessment, by grade and census region: 2019

	Grade 4			Grade 8		
Census region	Schools	Percentage	Mean school size	Schools	Percentage	Mean school size
Total	**317**	**100.00**	**61**	**355**	**100.00**	**53**
Northeast	27	8.52	60	36	10.14	49
Midwest	53	16.72	52	53	14.93	40
South	175	55.21	59	211	59.44	53
West	62	19.56	73	55	15.49	63

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), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/new_school_sampling_frame_for_the_2019_fourth_and_eighth_grade_public_school_national_science_assessments.aspx

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NAEP Technical Documentation School and Student Participation in the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The tables linked present weighted school and student participation rates and weighted student exclusion rates for the fourth- and eighth-grade public school national science samples.

A weighted school participation rate indicates the percentage of the student population that is directly represented by the participating school sample.

A weighted student participation rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools.

A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment. Students are generally excluded from a NAEP assessment if they have a disability or limited English language proficiency that prevents them from taking the assessment altogether or the accommodations they require to take the assessment were unavailable.

Weighted School Response Rates

Weighted Student Response and Exclusion Rates for Science, Digitally Based Assessment

Weighted Student Response and Exclusion Rates for Science, Paper-Based Assessment

Weighted school participation rates are calculated by dividing the sum of school base weights, weighted by student enrollment of the targeted grade, for all participating schools by the sum of the base weights, weighted by student enrollment of the target grade, for all eligible schools. Eligible schools are all sampled schools except those considered out-of-scope. The base weight is assigned to all sampled schools and is the inverse of the probability of selection. The weighted school participation rates in these tables reflect participation prior to substitution. That is, participating substitute schools that took the place of refusing originally sampled schools are not included in the numerator.

Weighted student participation rates are calculated by dividing the sum of the student base weights for all assessed students by the sum of the student base weights for all assessable students. (See below for the response dispositions of NAEP sampled students.) Students deemed assessable are those who were assessed or absent. They do not include students that were not eligible (primarily made up of withdrawn or graduated students) or students with disabilities (SD) or English learner (EL) students who were excluded from the assessment.

Weighted student exclusion rates are calculated by dividing the sum of the school nonresponse-adjusted student base weights for all excluded students by the sum for all assessable and excluded students.

Every student sampled for NAEP is classified into one of the following response disposition categories:

1. Assessed
2. Absent
3. Excluded (must be SD students, EL students, or SD and EL students)
4. Withdrawn or Graduated (ineligible)

Assessed students were students that completed an assessment.

Absent students were students who were eligible to take an assessment but were absent from the initial session and the makeup session if one was offered. (Note, some schools, not all, had make-up sessions for students who were absent from the initial session.)

Excluded students were 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 EL.

Withdrawn or graduated students are those who have left the school before the original assessment. These students are considered ineligible for NAEP.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_and_student_participation_in_the_2019_4th_and_8th_grade_public_school_national_science_assessments.aspx

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NAEP Technical Documentation Weighted School Response Rates for the 2019 Fourth- and Eighth-Grade Public School National Science Assessments

The following table presents unweighted counts of eligible sampled and participating schools and weighted school response rates, by Census region, for the fourth- and eighth-grade public school national science samples.

A weighted school response rate indicates the percentage of the student population that is directly represented by the participating school sample. These response rates are based on the original sample of schools (excluding substitutes).

School counts and response rates of eligible sampled schools, public schools, national science assessment, by grade and census region: 2019

	Grade 4			Grade 8		
Census region	Eligible sampled schools	Participating schools	Weighted school response rate (percent)	Eligible sampled schools	Participating schools	Weighted school response rate (percent)
National	**930**	**900**	**96.37**	**930**	**890**	**94.72**
Northeast	130	130	97.84	130	130	90.14
Midwest	160	150	96.53	170	170	98.80
South	400	390	99.08	400	390	98.64
West	240	220	91.93	230	210	88.18

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_school_response_rates_for_the_2019_4th_and_8th_grade_public_school_national_science_assessments.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Fourth- and Eighth-Grade Public School National Science Assessments, Digitally Based Assessment

The following table presents weighted student response and exclusion rates, by census region, for fourth- and eighth-grade public school students in the national science digitally based assessment (DBA) samples. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for public schools, national science digitally based assessment, by grade and census region: 2019

Census region	Grade 4			Grade 8		
	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
National	**93.45**	**1.37**	**0.57**	**90.42**	**1.28**	**0.47**
Northeast	91.94	1.27	0.77	86.26	1.39	0.75
Midwest	94.30	1.22	0.23	91.99	1.25	0.24
South	93.73	1.43	0.56	91.68	1.39	0.50
West	93.26	1.45	0.74	89.50	1.05	0.45

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_4th_and_8th_grade_public_school_natl_science_dba_as.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Fourth- and Eighth-Grade Public School National Science Assessments, Paper-Based Assessment

The following table presents weighted student response and exclusion rates, by census region, for fourth- and eighth-grade public school students in the national science paper-based assessment (PBA) samples. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for public schools, national science paper-based assessment, by grade and census region: 2019

Census region	Grade 4			Grade 8		
	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
National	**93.80**	**1.15**	**0.50**	**91.08**	**1.22**	**0.56**
Northeast	91.91	1.12	0.45	87.34	1.27	0.44
Midwest	94.04	0.84	0.05	91.45	1.09	0.32
South	94.41	1.12	0.50	92.60	1.31	0.76
West	93.80	1.48	0.93	90.54	1.17	0.52

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_4th_and_8th_grade_public_school_natl_science_pba_as.aspx

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NAEP Technical Documentation School Sample Selection for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The sampled schools for the fourth- and eighth-grade public school national assessments in science came from two frames: the primary public school sample frame constructed from the Common Core of Data (CCD) and the supplemental new-school sample frame. Schools were sampled from each school frame with probability proportional-to-size (PPS) using systematic sampling. Prior to sampling, schools in each frame were sorted by the appropriate implicit stratification variables in a serpentine order. (For details on the implicit stratification variables used for these samples see the stratification page.) A school's measure of size was a complex function of the school's estimated grade enrollment. Only one hit was allowed for each school.

Computation of Measures of Size

School Sample Sizes: Frame and New School

Schools from the CCD-based frame were sampled at a rate that would yield a national sample of 25,200 assessed students at grade 4 and 26,100 at grade 8. Schools from the new-school frames were sampled at the same rates as those from the CCD-based frames.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_sample_selection_for_the_2019_fourth_and_eighth_grade_public_school_national_science_assessments.aspx

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NAEP Technical Documentation School Sample Sizes: CCD-Based and New-School Sampling Frames for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The following table presents the number of schools selected for the fourth- and eighth-grade public school science samples by sampling frame (Common Core of Data [CCD]-based and new-school) and census region.

Public school sample counts for grades 4 and 8 national science assessment, by census region and sampling frame (CCD-based, new-school): 2019

	Grade 4			Grade 8		
Census region	Total school sample	CCD-based school sample	New-school sample	Total school sample	CCD-based school sample	New-school sample
Total	**970**	**960**	**10**	**980**	**970**	**10**
Northeast	140	140	#	140	140	#
Midwest	170	170	0	180	180	0
South	410	410	#	410	410	10
West	250	250	#	250	250	#

Rounds to zero.
NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/ccd_based_and_new_school_sampling_frames_for_the_2019_4th_and_8th_grade_public_school_national_science.aspx

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NAEP Technical Documentation Stratification of Schools for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The purpose of school stratification is to increase the efficiency and ensure the representativeness of school samples in terms of important school-level characteristics, such as geography (e.g., census divisions), urbanicity, and race/ethnicity composition. NAEP school sampling utilizes two types of stratification: explicit and implicit.

Explicit stratification partitions the sampling frame into mutually exclusive groupings called strata. The systematic samples selected from these strata are independent, meaning that each sample is selected with its own unique random start.

Implicit stratification involves sorting the sampling frame, as opposed to grouping the frame. For NAEP, schools are sorted in serpentine fashion by key school characteristics within sampling strata and sampled systematically using this ordering. This type of stratification ensures the representativeness of the school samples with respect to the key school characteristics.

The sampling of public schools for the science assessment did not involve any explicit stratification, but it involved six dimensions of implicit stratification. The frames were hierarchically sorted by the following in the order shown to create the implicit strata:

- American Indian/Alaskan Native (AIAN) composition;
- Census division;
- urbanicity status;
- Black/Hispanic composition;
- school type (public, Bureau of Indian Education (BIE), Department of Defense Education Activity (DoDEA); and
- median income (except for California schools where achievement data is used instead).

AIAN Composition

For the fourth- and eighth-grade science assessments in the national public school samples, we created implied strata by first classifying schools on the sampling frames as either low AIAN or high AIAN based on the percentage of AIAN students in the targeted grade (the cutoff was 5 percent AIAN students). This is the first time AIAN classification was used to implicitly stratify the national NAEP public school sampling frames. It is part of an oversampling scheme to ensure sufficient numbers of AIAN students are present in the student samples. Grouping high AIAN schools together in a sampling stratum helps bring schools with relatively large numbers of AIAN students into the school sample. In turn, schools with more AIAN students improve the chance that sufficient numbers of AIAN students are included in the student samples.

Census Division

Within each of the low and high AIAN classifications, schools were further classified into groups based on census division. A census division-based grouping can consist of a single census division, a set of neighboring census divisions, or a part of an individual census division. When census divisions are combined to form implied sampling strata, it is done generally within census regions. Because there are so few high AIAN schools, the census division grouping within the high AIAN stratum consisted of several neighboring census divisions.

Within the low AIAN stratum, each census division, except the Pacific Census Division, constituted a separate census division grouping. The Pacific Census Division was split into two parts: California in one part and Alaska, Hawaii, Oregon, and Washington in the other part. This was done purposely so that California could use achievement data as the last stratification variable instead of median income. See last paragraph for more detail.

Urbanicity Status

The urbanicity classification strata were derived from the NCES urban-centric locale variable from the Common Core of Data (CCD), which classifies schools based on location ([1] city, [2] suburb, [3] town, [4] rural) and proximity to urbanized areas. Urban-centric locale has 12 possible values.

The urbanicity classification cells were created by starting with the original 12 NCES urban-centric locale categories within each AIAN classification-by-census division grouping. Any cell with an expected school sample size less than four was combined with a neighboring cell within the same census division grouping. Collapsing was first done among the subcategories within a location class. (For example, the subcategories for location class city are (1) large, (2) mid-size, and (3) small. If one of these subcategories was deficient then either 1 was collapsed with 2; 3 collapsed with 2; or 2 collapsed with the smaller of 1 or 3.) If the collapsed cell was still too small, all three subcategories within a location class were combined.

If a collapsed location class still had an expected school sample size less than four, then it was collapsed with a neighboring collapsed location class. That is, 1 would be collapsed with 2 or 3 would be collapsed with 4. If additional collapsing was necessary, all location classes were combined. No collapsing across census division strata was allowed or necessary.

The result of this was a set of sampling strata defined by AIAN classification, census division strata, and urbanicity classification having expected school sample sizes of at least four schools.

No further implicit strata for High AIAN schools were formed beyond urbanization classification.

Black/Hispanic Composition

Low AIAN schools within the nested urbanicity classification strata were further stratified into Black/Hispanic classification strata. The first division was the classification of schools as either low Black/Hispanic schools or high Black/Hispanic schools based on the percentage of Black or Hispanic students in the target grade (the cutoff was 15 percent Black and Hispanic students). Within the high Black/Hispanic classification, the number of substrata was based on the expected school sample size.

- If the expected school sample size of resultant strata was less than or equal to 8.0, then this was the final urbanicity-Black/Hispanic stratum;
- if the expected sample size was greater than or equal to 8.0 and less than 12.0, there were two substrata;
- if the expected sample size was greater than or equal to 12.0 and less than 16.0, there were three substrata; and
- if the expected sample size was greater than or equal to 16.0, there were four substrata.

The substrata were defined by percentage of Black and Hispanic students, with the cutoffs for substrata defined by weighted percentiles (with the weight equal to expected hits for each school).

- For two substrata, the cutoff was the weighted median;
- for three substrata, the weighted 33rd and 67th percentiles; and
- for four substrata, the weighted median and quartiles.

For the low Black/Hispanic classification, there were six urbanicity strata that had a large enough expected school sample size, and these were split into groups of states. Two or three state groups were formed using adjacent states if possible, while maintaining an expected school sample size of at least four for each state group for each of these six urbanicity strata.

School Type

The next implicit stratification variable was school type. School type takes on values of public, BIE, and DoDEA.

Median Income/Achievement

The last implicit stratification variable was median income of the ZIP code area containing the school, except in California, where student achievement data was used. Schools in California contain more than 12 percent of the grade 4 and grade 8 students in the nation. Using achievement data provides a benefit. Achievement is a better sort variable than median income when ordering schools within a state because it is direct measure of student performance. However, when ordering schools across state, median income is better than achievement because states generally use different achievement measures while median income is a standard measure across states.

NAEP Technical Documentation Student Sample Selection for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The sampling of students for the public school assessments in science at fourth and eighth grades involved three steps: (1) sampling of students in the targeted grade (fourth or eighth) from each sampled school, (2) assignment of assessment mode (digitally based [DBA] or paper-based [PBA]), and (3) assignment of assessment subject (science) to the sampled students.

Sampling Students within Sampled Schools

Within each sampled school, a sample of students was selected from a list of students in the targeted grade such that every student had an equal chance of selection. The student lists were submitted either electronically using a system known as E-filing or on paper. In E-filing, student lists are submitted as Excel files by either school coordinators, NAEP State Coordinators, or NAEP TUDA Coordinators. The files can be submitted for one school at a time (known as single school E-file submission) or for an entire jurisdiction at once (known as multiple school E-file submission). E-filing allows schools to easily submit student demographic data electronically with the student lists, easing the burden on field supervisors and school coordinators.

Schools that are unable to submit their student lists using the E-filing system provide hardcopy lists to NAEP field supervisors. In 2019, over 99 percent of the participating schools in the fourth-grade and eighth-grade national public school science samples E-filed their student lists while less than 1 percent of the participating

schools submitted hardcopy lists.

In year-round multi-track schools, students in tracks scheduled to be on break 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 one-half, 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 was submitted for every student in the school, students were sorted by gender and race/ethnicity before the sample was selected to implicitly stratify the sample.

In schools with up to 70 students in the targeted grade, all students were selected. In schools with more than 70 students, systematic samples of 62 students at fourth grade and 63 students at eighth grade were selected.

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.

Assigning Assessment Mode to Sampled Students

After selection, the sampled students within a school were randomly assigned assessment mode using an algorithm based on the number of students sampled.

The mode assignment algorithm differed by grade but shared three common requirements designed for operational efficiency: (1) very small schools should only be assigned one mode type, (2) schools doing both modes should avoid having DBA or PBA sessions with fewer than 5 students, and (3) schools doing both modes, where possible, should have 25 or 50 students assigned to DBA and the balance to PBA. The following describes the mode assignment algorithm to the fourth- and eighth-grade sampled students.

Grade 4 Assessment Mode Assignment

- Schools with fewer than 26 students: all students assigned to one mode (all DBA or all PBA)
- Schools with 26 to 31 students: students assigned to DBA at a rate of 50/62 and to PBA at 12/62
- Schools with 32 to 37 students: 25 students assigned to DBA and the balance to PBA
- Schools with 38 to 60 students: students assigned to DBA at a rate of 50/62 and to PBA at 12/62
- Schools with 61 to 70 students: 50 students assigned to DBA and the balance to PBA

Grade 8 Assessment Mode Assignment

- Schools with fewer than 26 students: all students assigned to one mode (all DBA or all PBA)
- Schools with 26 to 31 students: students assigned to DBA at a rate of 50/63 and to PBA at 12/63
- Schools with 32 to 37 students: 25 students assigned to DBA and the balance to PBA
- Schools with 38 to 60 students: students assigned to DBA at a rate of 50/63 and to PBA at 12/63
- Schools with 61 to 70 students: 50 students assigned to DBA and the balance to PBA

The assignment of assessment mode to very small schools (fewer than 26 students) was done in advance of student sampling. At fourth grade, 80.6 percent (50 out of 62) and 19.4 percent (12 out of 62) schools were pre-assigned to DBA and PBA only, respectively. At eighth grade, the respective pre-assigned DBA- and PBA-only rates were 79.4% (50 out of 63) and 20.6 percent (13 out of 63).

Assigning Assessment Subject to Sampled Students

Sampled students, including new enrollees, in each participating sampled school were assigned to either the science assessment or one of the pilot tests.

For students assigned to DBA, 51 percent were assigned to science and 49 percent were assigned to a pilot test using a process known as spiraling. In this process, test forms were randomly assigned to sampled students from test form sets that had, on average, a ratio of 190 science forms to 182 pilot test forms. Students receiving a science form were in the science assessment, and students receiving a pilot test form were in the pilot test.

All students assigned to PBA were assigned to science. There were no pilot tests carried out on tests administered on paper.

NAEP Technical Documentation Substitute Schools for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

Though efforts were made to secure the participation of all schools selected, it was anticipated that not all schools would choose to participate. NAEP uses school substitution to mitigate the effect of bias due to nonresponse. A nonparticipating sampled school is replaced by its substitute when the original school is considered a final refusal.

For the fourth- and eighth-grade public school science samples, substitute schools were preselected for all sampled schools from the Common Core of Data (CCD)-based sampling frames by sorting the school frame files according to a sort order very close to that used in sample selection (the implicit stratification). The two exceptions to this were as follows: (1) estimated grade enrollment replaces median income (achievement) as the last sort variable, and (2) school type in the stratification hierarchy was crossed with state (rather than used alone). The first change guaranteed that the selected substitute would have a grade enrollment very close to that of the originally selected school. The second change guaranteed that any selected substitutes would be within the same state as the originally sampled nonresponding school.

Schools were disqualified as potential substitutes if they were already selected in the public school sample or assigned as a substitute for another public school (earlier in the sort ordering). The two candidates for substitutes were then the two nearest neighbors of the originally sampled school in this revised sort order. To be eligible as a

potential substitute, the neighbor needed to be a nonsampled school (for any grade) and within the same explicit sampling stratum. If both nearest neighbors were eligible to be substitutes, the one with a closer grade enrollment was chosen.

In the fourth-grade public school science sample, only one substitute school ultimately participated. In the eighth-grade public school science sample, three substitute schools participated.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/substitute_schools_for_the_2019_fourth_and_eighth_grade_public_school_national_science_assessments.aspx

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NAEP Technical Documentation Target Population for the 2019 Fourth- and Eighth-Grade Public School National Science Assessment

The target populations for the 2019 fourth- and eighth-grade public school national assessment in science were defined as all fourth- and eighth-grade students who were enrolled in public schools, Bureau of Indian Education (BIE) schools, and Department of Defense Education Activity (DoDEA) schools located within the 50 states and the District of Columbia.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/target_population_for_the_2019_fourth_and_eighth_grade_public_school_national_science_assessments.aspx

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NAEP Technical Documentation 2019 Twelfth-Grade Private School National Assessment

- Target Population
- Sampling Frame
- Stratification of Schools
- School Sample Selection
- Substitute Schools
- Ineligible Schools
- Student Sample Selection
- School and Student Participation

The twelfth-grade private school samples for the national assessments in mathematics, reading, and science were designed to produce nationally representative samples of students enrolled in grade twelve in private schools in the United States and to accommodate the administration of the assessments in two modes: digitally based assessment (DBA) on tablets and paper-based assessment (PBA) using paper and pencil. The target sample sizes of assessed students for the twelfth-grade public school samples are shown in the table below. Prior to sampling, the target sample sizes were adjusted upward to offset expected school and student attrition due to nonresponse and ineligibility.

Samples were selected using a two-stage probability-based design that involved selection of schools from within strata and selection of students within schools. The first-stage sample of schools was selected with probability proportional to a measure of size based on estimated grade-specific enrollment in the schools.

The sampling of students at the second-stage involved three steps: (1) sampling of students in the targeted grade (twelfth) from each sampled school, (2) assignment of assessment mode (DBA or PBA), and (3) assignment of assessment subject (mathematics, reading, or science) to the sampled students.

Target sample sizes of assessed students for twelfth-grade private school national assessments by subject and assessment mode: 2019

Assessment Mode	Total	Mathematics	Reading	Science
Total	**8,600**	**2,800**	**2,800**	**3,000**
DBA	4,800	1,400	1,500	1,900
PBA	3,800	1,400	1,300	1,100

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/l2019_twelfth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Ineligible Schools for the 2019 Twelfth-Grade Private School National Assessment

The Private School Universe Survey (PSS)-based sampling frame school file, from which most of the sampled schools were drawn, corresponds to the 2015-2016 school year, three years prior to the assessment school year. During the intervening period,

Total and Eligible Schools Sampled

some of these schools either closed, no longer offered the grade of interest, or were ineligible for other reasons. In such cases, the sampled schools were coded as ineligible.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/ineligible_schools_for_the_2019_private_school_national_assessment.aspx

NAEP Technical Documentation Eligibility Status of Schools Sampled for the 2019 Twelfth-Grade Private School National Assessment

The following table shows the unweighted counts and percentages of sampled schools that were eligible and ineligible, by reason for ineligibility, for the twelfth-grade private school sample for the national assessments in mathematics, reading, and science.

Sampled private schools, twelfth-grade national assessment, by eligibility status: 2019

Eligibility status	Unweighted count of schools	Unweighted percentage
All sampled private schools	**460**	**100.00**
Eligible	350	76.96
Ineligible	106	23.04
Has sampled grade, but no eligible students	11	2.39
Does not have sampled grade	22	4.78
Closed	19	4.13
Not a regular school	48	10.43
Duplicate on sampling frame	0	0.00
Other ineligible	6	1.30

NOTE: Numbers of schools are rounded to nearest ten, except those pertaining to ineligible schools. Detail may not sum to total due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/eligibility_status_of_schools_sampled_for_the_2019_twelfth_grade_private_school_national_assessment.aspx

NAEP Technical Documentation Total and Eligible Sampled Schools for the 2019 Twelfth-Grade Private School National Assessment

The following table presents unweighted counts and percentages of ineligible and eligible schools by private school affiliation in the twelfth-grade private school sample for the national assessments in mathematics, reading, and science. Schools whose private school affiliation was unknown at the time of sampling subsequently had their affiliation determined during data collection. Therefore, such schools are not broken out separately and not included in the following table.

Eligibility status of sampled private schools, twelfth-grade national assessment, by private school type: 2019

Private school type	Eligibility status	Unweighted count	Unweighted percentage
All private	**Total**	**440**	**100.00**
	Ineligible	80	19.08
	Eligible	350	80.92
Roman Catholic	**Total**	**90**	**100.00**
	Ineligible	0	2.27
	Eligible	90	97.73
Other private	**Total**	**350**	**100.00**
	Ineligible	80	23.34
	Eligible	270	76.66

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to total due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/total_and_eligible_sampled_schools_for_the_2019_twelfth_grade_private_school_national_assessment.aspx

NAEP Technical Documentation Sampling Frame for the 2019 Twelfth-Grade Private School National Assessment

The primary sampling frame for the 2019 twelfth-grade private school sample for the national assessments in mathematics, reading, and science was developed from the Private School Universe Survey (PSS) corresponding to the 2015-2016 school year. The PSS file is the Department of Education's primary database of elementary and secondary private schools in the 50 states and the District of Columbia, and it is based on a survey conducted by the U.S. Census Bureau during the 2015-2016 school year. This sampling frame is referred to as the PSS-based sampling frame.

Twelfth-Grade Schools and Enrollment

New-School Sampling Frame

Nonrespondents to the PSS were also included in the primary sampling frame. Since these schools did not respond to the PSS, their private school affiliation are unknown. Because NAEP response rates differ vastly by affiliation, to better estimate the target sample size of schools for each affiliation, additional work was done to obtain affiliation for these PSS nonrespondents. If a nonresponding school responded to a previous PSS (either two or four years prior), affiliation was obtained from the previous response. For those schools that were nonrespondents for the last three cycles of the PSS, in some cases internet research was used to establish affiliation. There were still schools with unknown affiliation remaining after this process.

A secondary sampling frame was also created for this sample to account for schools that newly opened or became newly eligible between the 2015-2016 and 2018-2019 school years. This frame contains brand-new and newly-eligible twelfth-grade schools and is referred to as the new-school sampling frame. Because there are no sources available to identify new schools for non-Catholic private schools, the new-school frame for private schools contains only Catholic schools.

Both sets of sampling frames excluded schools that were ungraded, provided only special education, were part of hospital or treatment center programs, were juvenile correctional institutions, were home-school entities, or were for adult education.

NAEP Technical Documentation New-School Sampling Frame for the 2019 Twelfth-Grade Private School National Assessment

The NAEP 2019 private school frame was constructed using the most current Private School Universe Survey (PSS) file available from NCES. This file contained schools that were in existence during the 2015-2016 school year (i.e., it was three years out of date). During the subsequent 3-year period, undoubtedly, some schools closed, some changed structure (one school becoming two schools, for example), some newly opened, and still others changed their grade span.

A supplemental sample was selected from a list of Catholic schools that were new or had become newly eligible sometime after the 2015-2016 school year. The goal was to allow every new Catholic school a chance of selection, thereby fully covering the target population of Catholic schools in operation during the 2018-2019 school year. It was infeasible to ask every Catholic diocese in the United States to provide a supplemental school frame, so a two-stage procedure was employed. First, a sample of dioceses was selected. Then the National Catholic Educational Association (NCEA) was sent a list of the schools within their sampled dioceses that had been present on the 2015-2016 PSS file. NCEA was asked to add in any new schools and identify any schools on this list that had become newly eligible for grades 4, 8, or 12.

The new-school process began with the preparation of a diocese-level frame. The starting point was a file containing every Catholic diocese in the United States classified as small, medium, or large based on the number of schools and student enrollment of schools from the PSS private school frame.

A diocese was considered to be small if it contained no more than one school at each targeted grade (4, 8, and 12). During school recruitment, schools sampled from small dioceses were asked to identify schools within their dioceses that newly offered the targeted grade. Every identified new school was added to the sample. From a sampling perspective, the new school was viewed as an "annex" to the sampled school, which meant that it had a well-defined probability of selection equal to that of the sampled school. When a school in a small diocese was sampled from the PSS frame, its associated new school was automatically sampled as well.

Dioceses that were not small were further divided into two strata, one containing large-size dioceses and a second containing medium-size dioceses. These strata were defined by computing the percentage of grade 4, 8, and 12 enrollment represented by each diocese, sorting in descending order, and cumulating the percentages. All dioceses up to and including the first diocese at or above the 80th cumulative percentage were defined as large dioceses. The remaining dioceses were defined as medium dioceses.

A simplified example is given below. The dioceses are ordered by descending percentage enrollment. The first six become large dioceses and the last six become medium dioceses.

Example showing assignment of Catholic dioceses to the large-size and medium-size diocese strata, private school grade 12 national assessment: 2019

Diocese	Percentage enrollment	Cumulative percentage enrollment	Stratum
Diocese 1	20	20	L
Diocese 2	20	40	L
Diocese 3	15	55	L
Diocese 4	10	65	L
Diocese 5	10	75	L
Diocese 6	10	85	L
Diocese 7	5	90	M
Diocese 8	2	92	M
Diocese 9	2	94	M
Diocese 10	2	96	M
Diocese 11	2	98	M

Diocese 12	2	100	M

Diocese	Percentage enrollment	Cumulative percentage enrollment	Stratum

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

In actuality, there were 73 large and 102 medium dioceses in the sampling frame.

The target sample size was 10 dioceses total across the medium and large diocese strata: eight dioceses from the large-size diocese stratum and two from the medium-size diocese stratum.

In the medium-size diocese stratum, dioceses were selected with equal probability. In the large-size diocese stratum, dioceses were sampled with probability proportional to enrollment. These probabilities were retained and used in later stages of sampling and weighting of new schools.

NCEA was sent a listing of all the schools in the selected dioceses that appeared on the 2015-2016 PSS file and was asked to provide information about the new schools not included in the file and grade span changes of existing schools. These listings were used as sampling frames for selection of new Catholic schools and updates of existing schools.

The following table presents the number and percentage of schools and estimated grade enrollment for the twelfth-grade new-school frame by census region. There were no new schools in the Midwest, South, and West census regions.

Twelfth-grade new school frame for the private school national assessment: number and percentage of schools and estimated enrollment by census region: 2019

Census region	Schools	Percentage	Estimated enrollment	Percentage
Total	**1**	**100.00**	**43**	**100.00**
Northeast	1	100.00	43	100.00
Midwest	0	0.00	0	0.00
South	0	0.00	0	0.00
West	0	0.00	0	0.00

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/new_school_sampling_frame_for_the_2019_twelfth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Twelfth-Grade Schools and Enrollment in the 2019 Private School Sampling Frame

The following table presents the number of twelfth-grade private schools and its estimated enrollment, as contained in the Private School Universe Survey (PSS)-based sampling frame, by private school affiliation, for the national assessments in mathematics, reading, and science.

The counts presented below are of schools with known affiliation. Schools with unknown affiliation do not appear in the table because their grade span, affiliation, and enrollment were unknown. Although PSS is a school universe survey, participation is voluntary and not all private schools respond. Since the NAEP sample must represent all private schools, not just PSS respondents, a small sample of PSS nonrespondents with unknown affiliation was selected to improve NAEP coverage.

Number of schools and enrollment in twelfth-grade private school sampling frame, national assessment, by affiliation: 2019

Affiliation	Number of schools	Estimated enrollment
Total	**8,612**	**308,266**
Catholic	1,250	136,627
Non-Catholic	7,362	171,639

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/twelfth_grade_schools_and_enrollment_in_the_2019_private_school_sampling_frame.aspx

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NAEP Technical Documentation School and Student Participation in the 2019 Twelfth-Grade Private School National Assessment

The tables linked present weighted school and student participation rates and weighted student exclusion rates for the twelfth-grade private school national mathematics, reading, and science samples.

A weighted school participation rate indicates the percentage of the student population that is directly represented by the participating school sample.

Weighted School Response Rates

Weighted Student Response and Exclusion Rates for

A weighted student participation rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools.

A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment. Students are generally excluded from a NAEP assessment if they have a disability or limited English language proficiency that prevents them from taking the assessment altogether or the accommodations they require to take the assessment were unavailable.

Weighted school participation rates are calculated by dividing the sum of school base weights, weighted by student enrollment of the targeted grade, for all participating schools by the sum of the base weights, weighted by student enrollment of the target grade, for all eligible schools. Eligible schools are all sampled schools except those considered out-of-scope. The base weight is assigned to all sampled schools and is the inverse of the probability of selection. The weighted school participation rates in these tables reflect participation prior to substitution. That is, participating substitute schools that took the place of refusing originally sampled schools are not included in the numerator.

Weighted student participation rates are calculated by dividing the sum of the student base weights for all assessed students by the sum of the student base weights for all assessable students. (See below for the response dispositions of NAEP sampled students.) Students deemed assessable are those who were assessed or absent. They do not include students that were not eligible (primarily made up of withdrawn or graduated students) or students with disabilities (SD) or English learner (EL) students who were excluded from the assessment.

Weighted student exclusion rates are calculated by dividing the sum of the school nonresponse-adjusted student base weights for all excluded students by the sum for all assessable and excluded students.

Every student sampled for NAEP is classified into one of the following response disposition categories:

1. Assessed
2. Absent
3. Excluded (must be SD students, EL students, or SD and EL students)
4. Withdrawn or Graduated (ineligible)

Assessed students were students that completed an assessment.

Absent students were students who were eligible to take an assessment but were absent from the initial session and the makeup session if one was offered. (Note, some schools, not all, had make-up sessions for students who were absent from the initial session.)

Excluded students were 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 EL.

Withdrawn or graduated students are those who have left the school before the original assessment. These students are considered ineligible for NAEP.

Mathematics, Digitally Based Assessment

Weighted Student Response and Exclusion Rates for Mathematics, Paper-Based Assessment

Weighted Student Response and Exclusion Rates for Reading, Digitally Based Assessment

Weighted Student Response and Exclusion Rates for Reading, Paper-Based Assessment

Weighting Student Response and Exclusion Rates for Science, Digitally Based Assessment

Weighting Student Response and Exclusion Rates for Science, Paper-Based Assessment

NAEP Technical Documentation Weighted School Response Rates for the 2019 Twelfth-Grade Private School National Assessment

The following table presents unweighted counts of eligible sampled and participating schools and weighted school response rates, by school type, for the twelfth-grade private school national mathematics, reading, and science samples.

A weighted school response rate indicates the percentage of the student population that is directly represented by the participating school sample. These response rates are based on the original sample of schools (excluding substitutes).

School counts and response rates of eligible sampled schools, twelfth-grade private schools, national assessment, by school type: 2019

School type	Eligible sampled schools	Participating schools, including substitutes	Weighted school response rate prior to substitution (percent)
All private	**330**	**120**	**34.57**
Catholic	80	60	55.12
Non-Catholic	250	60	17.08

NOTE: Detail may not sum to total due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Private School National Mathematics

Assessment, Digitally Based Assessment

The following table presents weighted student response and exclusion rates, by school type, for twelfth-grade private school students in the national mathematics digitally based assessment (DBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade private schools, national mathematics digitally based assessment, by school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
12	**All private**	**74.80**	**0.08**	**#**
	Catholic	72.35	0.17	#
	Non-Catholic	81.81	#	#

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_private_school_national_math_assessmet.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Private School National Mathematics Assessment, Paper-Based Assessment

The following table presents weighted student response and exclusion rates, by private school affiliation, for twelfth-grade private school students in the national mathematics paper-based assessment (PBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade private schools, national mathematics paper-based assessment, by school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
12	**All private**	**77.80**	**#**	**0.09**
	Catholic	75.07	#	0.18
	Non-Catholic	85.76	#	#

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_private_school_national_math_assess_pba.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Private School National Reading Assessment, Digitally Based Assessment

The following table presents weighted student response and exclusion rates, by school type, for twelfth-grade private school students in the national reading digitally based assessment (DBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade private schools, national reading digitally based assessment, by school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
12	**All private**	**79.47**	**0.41**	**#**
	Catholic	78.32	#	#
	Non-Catholic	82.55	0.75	#

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Reading Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_private_school_national_reading_assess.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Private School National Reading Assessment, Paper-Based Assessment

The following table presents weighted student response and exclusion rates, by school type, for twelfth-grade private school students in the national reading paper-based assessment (PBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade private schools, national reading paper-based assessment, by school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
12	**All private**	**79.60**	**0.11**	**#**
	Catholic	77.52	#	#
	Non-Catholic	85.87	0.21	#

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Reading Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_private_school_national_reading_asse_pba.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Private School National Science Assessment, Digitally Based Assessment

The following table presents weighted student response and exclusion rates, by school type, for twelfth-grade private school students in the national science digitally based assessment (DBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade private schools, national science digitally based assessment, by school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
12	**All private**	**77.37**	**#**	**#**
	Catholic	76.76	#	#
	Non-Catholic	78.99	#	#

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_private_school_national_science_assess.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Private School National Science Assessment, Paper-Based Assessment

The following table presents weighted student response and exclusion rates, by school type, for twelfth-grade private school students in the national science paper-based assessment (PBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade private schools, national science paper-based assessment, by school type: 2019

Grade	School type	Weighted student response rate (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
12	**All private**	**80.81**	**0.11**	**#**
	Catholic	78.51	0.24	#
	Non-Catholic	87.44	#	#

Rounds to zero.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_private_school_national_science_asse_pba.aspx

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NAEP Technical Documentation School Sample Selection for the 2019 Twelfth-Grade Private School National Assessment

The sampled schools for the twelfth-grade private school national assessments in mathematics, reading, and science came from two frames: the primary private school sample frame constructed from the Private School Universe Survey (PSS) file and the supplemental new-school sampling frame. Schools were sampled from each school frame with probability proportional-to-size (PPS) using systematic sampling. Prior to sampling, schools in each frame were sorted by the appropriate implicit stratification variables in a serpentine order within each explicit sampling stratum. (For details on explicit and implicit strata used for these samples see the stratification page.) A school's measure of size was a complex function of the school's estimated grade enrollment. Only one hit was allowed for each school.

Computation of Measures of Size

School Sample Sizes: Frame and New School

Schools from the PSS-based frame were sampled at a rate that would yield a national sample of 8,600 assessed students (4,300 each from the Catholic and non-Catholic school strata across all subjects and assessment modes). Catholic schools from the new-school frames were sampled at the same rate as those from the PSS-based frame.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_sample_selection_for_the_2019_twelfth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation School Sample Sizes: List Frame-Based and New-School Sampling Frames for the 2019 Twelfth-Grade Private School National Assessment

The following table presents the number of schools selected for the twelfth-grade private school sample by sampling frame (Private School Universe Survey [PSS]-based and new-school) and private school affiliation.

Number of schools in the total, PSS-based and new-school samples, grade 12 private national assessment, by school type: 2019

School type	Total school sample	PSS-based school sample	New-school sample
All private	**460**	**460**	**0**
Catholic	90	90	0
Non-Catholic private	350	350	0
Unknown afffiliation	30	30	0

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP),2019 National Mathematics, Reading, and Science Assessments.

NAEP Technical Documentation Stratification of Schools for the 2019 Twelfth-Grade Private School National Assessment

The purpose of school stratification is to increase the efficiency and ensure the representativeness of school samples in terms of important school-level characteristics, such as geography (e.g., census region), urbanicity, and race/ethnicity composition. NAEP school sampling utilizes two types of stratification: explicit and implicit.

Explicit stratification partitions the sampling frame into mutually exclusive groupings called strata. The systematic samples selected from these strata are independent, meaning that each sample is selected with its own unique random start. Implicit stratification involves sorting the sampling frame, as opposed to grouping the frame. For NAEP, schools are sorted in serpentine fashion by key school characteristics within sampling strata and sampled systematically using this ordering. This type of stratification ensures the representativeness of the school samples with respect to the key school characteristics.

Explicit stratification for the NAEP 2019 private school samples was by private school type: Catholic, non-Catholic, and unknown affiliation. Private school affiliation was unknown for nonrespondents to the NCES Private School Universe Survey (PSS) for the past three cycles.

The implicit stratification of the schools involved four dimensions. Within each explicit stratum, the private schools were hierarchically sorted by census region, urbanicity status, race/ethnicity status, and estimated grade enrollment. The implicit stratification in this four-fold hierarchical stratification was achieved via a "serpentine sort".

Census region was used as the first level of implicit stratification for the NAEP 2019 private school sample. For Catholic and non-Catholic schools, all four census regions were used as strata. For schools with unknown affiliation, two strata based on census region were formed by combining the northeast and midwest into one stratum and the South and West into another.

The next level of stratification was an urbanicity classification based on urban-centric locale, as specified on the PSS. Within a census region-based stratum, urban-centric locale cells that were too small were collapsed. The criterion for adequacy was that the cell had to have an expected school sample size of at least six.

The urbanicity variable was equal to the original urban-centric locale if no collapsing was necessary to cover an inadequate original cell. If collapsing was necessary, the scheme was to first collapse within the four major strata (city, suburbs, town, and rural). For example, if the expected number of large city schools sampled was less than six, large city was collapsed with midsize city. If the collapsed cell was still inadequate, they were further collapsed with small city. If a major stratum cell (all three cells collapsed together) was still deficient, it was collapsed with a neighboring major stratum cell. For example, city would be collapsed with suburbs.

The last stage of stratification was a division of the geographic/urbanicity strata into race/ethnicity strata if the expected number of schools sampled was large enough (i.e., at least equal to 12). This was done by deciding first on the number of race/ethnicity strata and then dividing the geography/urbanicity stratum into that many pieces. The school frame was sorted by the percentage of students in each school who were Black, Hispanic, or American Indian. The three racial/ethnic groups defining the race/ethnicity strata were those that have historically performed substantially lower on NAEP assessments than White students. The sorted list was then divided into pieces, with roughly an equal expected number of sampled schools in each piece.

Finally, schools were sorted within stratification cells by estimated grade enrollment.

NAEP Technical Documentation Student Sample Selection for the 2019 Twelfth-Grade Private School National Assessment

The sampling of students for the private school assessments in mathematics, reading, and science at twelfth grade involved three steps: (1) sampling of students in the targeted grade (twelfth) from each sampled school, (2) assignment of assessment mode (digitally based [DBA] or paper-based [PBA]), and (3) assignment of assessment subject (mathematics, reading, or science) to the sampled students.

Sampling Students within Sampled Schools

Within each sampled school, a sample of students was selected from a list of students in the targeted grade such that every student had an equal chance of selection. The student lists were submitted either electronically using a system known as E-filing or on paper. In E-filing for private schools, student lists are submitted one school at a time by school coordinators in Excel files. E-filing allows schools to easily submit student demographic data electronically with the student lists, easing the burden on field supervisors and school coordinators.

Schools that are unable to submit their student lists using the E-filing system provide hardcopy lists to NAEP field supervisors. In 2019, most twelfth-grade private schools in the national assessment in mathematics, reading, and science submitted electronic lists. About 62 percent of the participating schools E-filed while 38 percent of the participating schools submitted hardcopy lists.

In year-round multi-track schools, students in tracks scheduled to be on break 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 one-half, 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 was submitted for every student in the school, students were sorted by gender and race/ethnicity before the sample was selected to implicitly stratify the sample.

In schools with up to 83 students in the targeted grade, all students were selected. In schools with more than 83 students, systematic samples of 75 students were selected.

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.

Assigning Assessment Mode to Sampled Students

After selection, the sampled students within a school were randomly assigned assessment mode using an algorithm based on the number of students sampled.

The mode assignment algorithm was based on three requirements designed for operational efficiency: (1) very small schools should only be assigned one mode type, (2) schools doing both modes should avoid having DBA or PBA sessions with fewer than 5 students, and (3) schools doing both modes, where possible, should have 25 or 50 students assigned to DBA and the balance to PBA. The following describes the mode assignment algorithm to the twelfth-grade sampled students.

Grade 12 Assessment Mode Assignment

- Schools with fewer than 20 students: all students assigned to one mode (all DBA or all PBA)
- Schools with 20 to 35 students: students assigned to DBA at a rate of 42/75 and to PBA at 33/75
- Schools with 36 to 53 students: 25 students assigned to DBA and the balance to PBA
- Schools with 54 to 75 students: students assigned to DBA at a rate of 42/75 and to PBA at 33/75
- Schools with 76 to 83 students: 33 students assigned to PBA and the balance to DBA

The assignment of assessment mode to very small schools (fewer than 20 students) was done in advance of student sampling. At twelfth grade, 56.0 percent (42 out of 75) and 44.0 percent (33 out of 75) schools were pre-assigned to DBA and PBA only, respectively.

Assigning Assessment Subject to Sampled Students

Sampled students, including new enrollees, in each participating sampled school were assigned to mathematics, reading, or science using a process known as spiraling.

In this process, test forms for DBA or booklets for PBA were randomly assigned to sampled students from test form set or booklet sets that had, on average, subject rates as shown in the table. Note, the subject rates varied by assessment mode. Students receiving a mathematics form were in the mathematics assessment, students receiving a reading form were in the reading assessment, and students receiving a science form were in the science assessment.

Assessment subject rates (in percents), twelfth-grade private school national assessment, by mode: 2019

Mode	Mathematics	Reading	Science
PBA	36.84	34.21	28.95
DBA	29.17	31.25	39.58

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/student_sample_selection_for_the_2019_twelfth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Substitute Schools for the 2019 Twelfth-Grade Private School National Assessment

Though efforts were made to secure the participation of all schools selected, it was anticipated that not all schools would choose to participate. NAEP uses school substitution to mitigate the effect of bias due to nonresponse. A nonparticipating sampled school is replaced by its substitute when the original school is considered a final refusal.

For the twelfth-grade private school national sample, substitute schools were preselected for all sampled schools from the Private School Universe Survey (PSS)-based frame by sorting the school frame file according to the actual order used in sample selection (the implicit stratification).

Schools were disqualified as potential substitutes if they were already selected in the private school sample or assigned as a substitute for another private school (earlier in the sort ordering).

The two candidates for substitutes were then the two nearest neighbors of the originally sampled school in the frame sort order. To be eligible as a potential substitute, the neighbor needed to be a nonsampled school (for any grade) and within the same explicit sampling stratum (private school affiliation). If both nearest neighbors were eligible to be substitutes, the one with a closer grade enrollment was chosen. If both nearest neighbors had the same grade enrollment (an uncommon occurrence), one of the two was randomly selected.

In the twelfth-grade private school sample, 28 substitute schools ultimately participated.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/substitute_schools_for_the_2019_twelfth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation Target Population for the 2019 Twelfth-Grade Private School National Assessment

The target populations for the 2019 twelfth-grade private school national assessment in mathematics, reading, and science were defined as all twelfth-grade students who were enrolled in private schools located within the 50 states and the District of Columbia.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/target_population_for_the_2019_twelfth_grade_private_school_national_assessment.aspx

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NAEP Technical Documentation 2019 Twelfth-Grade Public School National Assessment

The twelfth-grade public school samples for the national assessments in mathematics, reading, and science were designed to produce nationally representative samples of students enrolled in grade twelve in public schools in the United States and to accommodate the administration of the assessments in two modes: digitally based assessment (DBA) on tablets and paper-based assessment (PBA) using paper and pencil. The target sample sizes of assessed students for the twelfth-grade public school samples are shown in the table below. Prior to sampling, the target sample sizes were adjusted upward to offset expected school and student attrition due to nonresponse and ineligibility.

Samples were selected using a two-stage probability-based design that involved selection of schools from within strata and selection of students within schools. The first-stage sample of schools was selected with probability proportional to a measure of size based on estimated grade-specific enrollment in the schools.

The sampling of students at the second-stage involved three steps: (1) sampling of students in the targeted grade (twelfth) from each sampled school, (2) assignment of assessment mode (DBA or PBA), and (3) assignment of assessment subject (mathematics, reading, or science) to the sampled students.

Target sample sizes of assessed students for twelfth-grade public school national assessments by subject and assessment mode: 2019

Assessment Mode	Total	Mathematics	Reading	Science
Total	**77,400**	**25,200**	**25,200**	**27,000**
DBA	43,200	12,600	13,500	17,100
PBA	34,200	12,600	11,700	9,900

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/2019_twelfth_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Ineligible Schools for the 2019 Twelfth-Grade Public School National Assessment

The Common Core of Data (CCD)-based public school frame, from which most of the sampled schools were drawn, corresponds to the 2016-2017 school year, two years prior to the assessment school year. During the intervening period, some of these schools either closed, no longer offered the grade of interest, or were ineligible for other reasons. In such cases, the sampled school was coded as ineligible.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/ineligible_schools_for_the_2019_twelfth_grade_public_school_national_assessment.aspx

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NAEP Technical DocumentationEligibility Status of Schools for the 2019 Twelfth-Grade Public School National Assessment

The following table shows the unweighted counts and percentages of schools that were eligible and ineligible, by reason for ineligibility, for the twelfth-grade public school sample for the national assessments in mathematics, reading, and science.

Sampled public schools, twelfth-grade national assessment, by eligibility status: 2019

Eligibility status	Unweighted count of schools	Unweighted percentage
All sampled public schools	**1,930**	**100.00**
Eligible	1,810	93.72
Ineligible	121	6.28
Has sampled grade, but no eligible students	1	0.05
Does not have sampled grade	12	0.62
Closed	22	1.14
Not a regular school	77	4.00
Other ineligible	9	0.47

NOTE: Numbers of schools are rounded to nearest ten, except those pertaining to ineligible schools. Detail may not sum to totals due to rounding. Percentages are based on rounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/eligibility_status_of_schools_sampled_for_the_2019_twelfth_grade_public_school_national_assessment.aspx

NAEP Technical Documentation Total and Eligible Sampled Schools for the 2019 Twelfth-Grade Public School National Assessment

The following table presents unweighted counts and percentages of ineligible and eligible schools by census region in the twelfth-grade public school sample for the national assessments in mathematics, reading, and science.

Eligibility status of sampled public schools, twelfth-grade national assessment, by census region: 2019

Census region	Eligibility status	Unweighted count	Unweighted percentage
Total	**Total**	**1,930**	**100.00**
	Ineligible	120	6.28
	Eligible	1,810	93.72
Northeast	**Total**	**270**	**100.00**
	Ineligible	10	2.95
	Eligible	260	97.05
Midwest	**Total**	**350**	**100.00**
	Ineligible	20	6.23
	Eligible	330	93.77
South	**Total**	**760**	**100.00**
	Ineligible	30	4.23
	Eligible	730	95.77
West	**Total**	**550**	**100.00**
	Ineligible	60	10.81
	Eligible	490	89.19

NOTE: Detail may not sum to total due to rounding. Percentages are based on unrounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/total_and_eligible_sampled_schools_for_the_2019_twelfth_grade_public_school_national_assessment.aspx

NAEP Technical Documentation Sampling Frame for the 2019 Twelfth-Grade Public School National Assessment

The primary sampling frame for the 2019 twelfth-grade public school samples for the mathematics, reading, and science assessments was developed from the Common Core of Data (CCD) file corresponding to the 2016-2017 school year. The CCD file is the Department of Education's primary database of public elementary and secondary schools in the United States including U.S. territories. It includes all regular public, state-operated public, Bureau of Indian Education (BIE), and Department of Defense Education Activity (DoDEA) schools open during the 2016-2017 school year. This twelfth-grade sampling frame is referred to as the CCD-based sampling frame.

A secondary sampling frame was also created for these samples to account for schools that newly opened or became newly eligible between the 2016-2017 and 2018-2019 school years. This frame contains brand-new and newly-eligible twelfth-grade schools and is referred to as the new-school sampling frame.

Twelfth-Grade Schools and Enrollment

New-School Sampling Frame

Both sampling frames excluded ungraded schools, vocational schools with no enrollment, special education-only schools, prison and hospital schools, home school entities, virtual or online schools, adult and evening schools, and juvenile correctional institutions. Vocational schools with no enrollment serve students who split their time between the vocational school and their home school.

NAEP Technical Documentation New-School Sampling Frame for the 2019 Twelfth-Grade Public School National Assessment

The primary sampling frame for the 2019 twelfth-grade public school sample for the national assessments in mathematics, reading, and science was constructed using the most current Common Core of Data (CCD) file available from NCES. This file contained schools that were in existence during the 2016-2017 school year (i.e., it was two years out of date). During the subsequent 2-year period, undoubtedly some schools closed, some changed structure (one school becoming two schools, for example), some newly opened, and still others changed their grade span.

A supplemental sample was selected from a list of schools that were new or had become newly eligible sometime after the 2016-2017 school year. The goal was to allow every new school a chance of selection, thereby fully covering the target population of schools in operation during the 2018-2019 school year. It was infeasible to ask every school district in the United States to provide a supplemental school frame, so a two-stage procedure was employed. First, a sample of school districts was selected within each state. Then each State or Trial Urban District Assessment (TUDA) Coordinator was sent a list of the schools within their sampled districts that had been present on the 2016-2017 CCD file. The Coordinators were asked to add in any new schools and identify any schools on this list that had become newly eligible for grades 4, 8, or 12.

The new-school process began with the preparation of a district-level frame. The starting point was a file containing every public school district in the United States.

Specific districts were designated as in sample with certainty. They included the following districts:

- districts in jurisdictions where all schools were selected for sample at either grade 4 or 8;
- state-operated districts;
- districts in states with fewer than 10 districts;
- charter-only districts (that is, districts containing no schools other than charter schools); and
- TUDA districts.

Then noncertainty districts were classified as small, medium, or large based on the number of schools and student enrollment of schools from the CCD-based public school frame.

A district was considered to be small if it contained no more than one school at each targeted grade (4, 8, and 12). During school recruitment, the coordinators were asked to identify schools within their district that newly offered the targeted grade. Every identified new school was added to the sample. From a sampling perspective, the new school was viewed as an “annex” to the sampled school which meant that it had a well-defined probability of selection equal to that of the sampled school. When a school in a small district was sampled from the CCD-based frame, its associated new school was automatically sampled as well.

Within each jurisdiction, districts that were neither certainty selections nor small were divided into two strata, one containing large-size districts and a second containing medium-size districts. These strata were defined by computing the percentage of jurisdiction grade 4, 8, and 12 enrollment represented by each district, sorting in descending order, and cumulating the percentages. All districts up to and including the first district at or above the 80th cumulative percentage were defined as large districts. The remaining districts were defined as medium districts.

A simplified example is given below. The state's districts are ordered by descending percentage enrollment. The first six become large districts and the last six become medium districts.

Large-size and medium-size district strata example, national grade 12 public assessment, by enrollment, stratum, and district: 2019

District	Percentage enrollment	Cumulative percentage enrollment	Stratum
1	20	20	L
2	20	40	L
3	15	55	L
4	10	65	L
5	10	75	L
6	10	85	L
7	5	90	M
8	2	92	M
9	2	94	M
10	2	96	M
11	2	98	M
12	2	100	M

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Grade 12 Mathematics, Reading, and Science Assessments.

The target sample size for each jurisdiction was 10 districts total across the medium-size and large-size district strata. Where possible, eight districts were selected from the large-size district stratum and two districts from the medium-size district stratum. However, in the example above, since there are only six large districts, all of the districts in the large district stratum and four districts from the medium district stratum would have been selected for the new-school inquiry.

If sampling was needed in the medium-size district stratum, districts in this stratum were selected with equal probability. If sampling was needed in the large-size district stratum, the districts in this stratum were sampled with probability proportional to enrollment. These probabilities were retained and used in later stages of sampling and weighting of new schools.

The selected districts in each jurisdiction were then sent a listing of all their schools that appeared on the 2016-2017 CCD file and were asked to provide information about the new schools not included in the file and grade span changes of existing schools. These listings provided by the selected districts were used as sampling frames for selection of new public schools and updates of existing schools. This process was conducted through the NAEP State or TUDA 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.

The following table presents the number of schools and total estimated grade enrollment for the twelfth-grade new-school frame by census region.

Twelfth-grade new school frame for the public school national assessment: number and percentage of schools and estimated enrollment, by census region: 2019

Census region	Schools	Percentage	Estimated enrollment	Percentage
Total	**158**	**100.00**	**7,422**	**100.00**
Northeast	12	7.59	499	6.72
Midwest	16	10.13	780	10.51
South	110	69.62	4,894	65.94
West	20	12.66	1,249	16.83

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), 2019 National Grade 12 Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/new_school_sampling_frame_for_the_2019_twelfth_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Twelfth-Grade Schools and Enrollment in the 2019 Public School Sampling Frame

The following table presents the number of twelfth-grade public schools and its estimated enrollment, as contained in the Common Core of Data (CCD)-based sampling frame, by census region, for the national assessments in mathematics, reading, and science.

Number of schools and estimated enrollment in CCD-based twelfth-grade public school sampling frame, national assessment, by census region: 2019

Census region	Schools	Percent	Estimated enrollment	Percent
Total	**24,097**	**100.00**	**3,566,121**	**100.00**
Northeast	3,617	15.01	572,222	16.05
Midwest	6,719	27.88	768,217	21.54
South	7,744	32.14	1,303,057	36.54
West	6,017	24.97	922,625	25.87

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/twelfth_grade_schools_and_enrollment_in_the_2019_public_school_sampling_frame.aspx

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NAEP Technical Documentation School and Student Participation in the 2019 Twelfth-Grade Public School National Assessment

The tables linked present weighted school and student participation rates and weighted student exclusion rates for the twelfth-grade public school national mathematics, reading, and science samples.

A weighted school participation rate indicates the percentage of the student population that is directly represented by the participating school sample.

A weighted student participation rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools.

A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment. Students are generally excluded from a NAEP assessment if they have a disability or limited English language proficiency that

Weighted School Response Rates

Weighted Student Response and Exclusion Rates for Mathematics, Digitally Based Assessment

Weighted Student Response and Exclusion Rates for Mathematics, Paper-Based Assessment

prevents them from taking the assessment altogether or the accommodations they require to take the assessment were unavailable.

Weighted school participation rates are calculated by dividing the sum of school base weights, weighted by student enrollment of the targeted grade, for all participating schools by the sum of the base weights, weighted by student enrollment of the target grade, for all eligible schools. Eligible schools are all sampled schools except those considered out-of-scope. The base weight is assigned to all sampled schools and is the inverse of the probability of selection. The weighted school participation rates in these tables reflect participation prior to substitution. That is, participating substitute schools that took the place of refusing originally sampled schools are not included in the numerator.

Weighted student participation rates are calculated by dividing the sum of the student base weights for all assessed students by the sum of the student base weights for all assessable students. (See below for the response dispositions of NAEP sampled students.) Students deemed assessable are those who were assessed or absent. They do not include students that were not eligible (primarily made up of withdrawn or graduated students) or students with disabilities (SD) or English learner (EL) students who were excluded from the assessment.

Weighted student exclusion rates are calculated by dividing the sum of the school nonresponse-adjusted student base weights for all excluded students by the sum for all assessable and excluded students.

Every student sampled for NAEP is classified into one of the following response disposition categories:

1. Assessed
2. Absent
3. Excluded (must be SD students , EL students, or SD and EL students)
4. Withdrawn or Graduated (ineligible)

Assessed students were students that completed an assessment.

Absent students were students who were eligible to take an assessment but were absent from the initial session and the makeup session if one was offered. (Note, some schools, not all, had make-up sessions for students who were absent from the initial session.)

Excluded students were 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 EL.

Withdrawn or graduated students are those who have left the school before the original assessment. These students are considered ineligible for NAEP.

Weighted Student Response and Exclusion Rates for Reading, Digitally Based Assessment

Weighted Student Response and Exclusion Rates for Reading, Paper-Based Assessment

Weighted Student Response and Exclusion Rates for Science, Digitally Based Assessment

Weighted Student Response and Exclusion Rates for Science, Paper-Based Assessment

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_and_student_participation_in_the_2019_twelfth_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Weighted School Response Rates for the 2019 Twelfth-Grade Public School National Assessment

The following table presents unweighted counts of eligible sampled and participating schools and weighted school response rates, by Census region, for the twelfth-grade public school national mathematics, reading, and science samples.

A weighted school response rate indicates the percentage of the student population that is directly represented by the participating school sample. These response rates are based on the original sample of schools (excluding substitutes).

School counts and response rates of eligible sampled schools, twelfth-grade public schools, national assessment, by census region: 2019

Census region	Eligible sampled schools	Participating schools	Weighted school response rate (percent)
National	**1,790**	**1,630**	**87.64**
Northeast	260	250	95.09
Midwest	330	270	74.47
South	720	710	98.58
West	480	400	77.15

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_school_response_rates_for_the_2019_twelfth_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Public School National Mathematics Assessment, Digitally Based Assessment

The following table presents weighted student response and exclusion rates, by census region, for twelfth-grade public school students in the national mathematics digitally based assessment (DBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade public schools, national mathematics digitally based assessment, by census region: 2019

Census region	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
National	**71.87**	**2.20**	**0.28**
Northeast	62.01	1.71	0.12
Midwest	73.07	1.93	0.20
South	75.74	2.49	0.21
West	71.86	2.32	0.58

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_public_school_national_math_assess_dba.aspx

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Public School National Mathematics Assessment, Paper-Based Assessment

The following table presents weighted student response and exclusion rates, by census region, for twelfth-grade public school students in the national mathematics paper-based assessment (PBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade public schools, national mathematics paper-based assessment, by census region: 2019

Census region	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
National	**93.80**	**1.15**	**0.50**
Northeast	91.91	1.12	0.45
Midwest	94.04	0.84	0.05
South	94.41	1.12	0.50
West	93.80	1.48	0.93

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_public_school_national_math_assess_pba.aspx

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Public School National Reading Assessment, Digitally Based Assessment

The following table presents weighted student response and exclusion rates, by census region, for twelfth-grade public school students in the national reading digitally based assessment (DBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade public schools, national reading digitally based assessment, by census region: 2019

Census region	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded

Census region	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
National	**71.38**	**2.12**	**0.36**
Northeast	61.30	1.89	0.16
Midwest	73.31	2.36	0.25
South	75.46	2.46	0.32
West	70.50	1.53	0.63

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Reading Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Public School National Reading Assessment, Paper-Based Assessment

The following table presents weighted student response and exclusion rates, by census region, for twelfth-grade public school students in the national reading paper-based assessment (PBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade public schools, national reading paper-based assessment, by census region: 2019

Census region	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
National	**70.73**	**2.34**	**0.27**
Northeast	60.78	2.29	0.09
Midwest	72.70	2.33	0.26
South	74.44	2.71	0.21
West	70.32	1.81	0.48

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Reading Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_12th_grade_public_school_national_reading_asses_pba.aspx

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NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Public School National Science Assessment, Digitally Based Assessment

The following table presents weighted student response and exclusion rates, by census region, for twelfth-grade public school students in the national science digitally based assessment (DBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade public schools, national science digitally based assessment, by census region: 2019

Census region	Weighted student response rates (percent)	Weighted percentage of all students who were SD and excluded	Weighted percentage of all students who were EL and excluded
National	**71.58**	**2.19**	**0.27**
Northeast	61.83	1.89	0.14
Midwest	74.47	2.21	0.17
South	75.23	2.52	0.21
West	70.43	1.86	0.55

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 Twelfth-Grade Public School National Science Assessment, Paper-Based Assessment

The following table presents weighted student response and exclusion rates, by census region, for twelfth-grade public school students in the national science paper-based assessment (PBA) sample. Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates for twelfth-grade public schools, national science paper-based assessment, by census region: 2019

Census region	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
National	**70.22**	**2.05**	**0.34**
Northeast	61.15	2.26	0.15
Midwest	72.52	1.96	0.34
South	74.04	2.21	0.21
West	68.65	1.74	0.67

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Science Assessment.

NAEP Technical Documentation School Sample Selection for the 2019 Twelfth-Grade Public School National Assessment

The sampled schools for the twelfth-grade public school national assessments in mathematics, reading, and science came from two frames: the primary public school sample frame constructed from the Common Core of Data (CCD) and the supplemental new-school sample frame. Schools were sampled from each school frame with probability proportional to size using systematic sampling. Prior to sampling, schools in each frame were sorted by the appropriate implicit stratification variables in a serpentine order. (For details on the implicit stratification variables used for these samples see the stratification page.) A school's measure of size was a complex function of the school's estimated grade enrollment. Only one hit was allowed for each school.

Computation of Measures of Size

School Sample Sizes: Frame and New School

Schools from the CCD-based frame were sampled at a rate that would yield a national sample of 27,000 assessed students (across all subjects and assessment modes). Schools from the new-school frame were sampled at the same rate as those from the CCD-based frame.

NAEP Technical Documentation School Sample Sizes: CCD-Based and New-School Sampling Frames for the 2019 Twelfth-Grade Public School National Assessment

The following table presents the number of schools selected for the twelfth-grade public school sample by sampling frame (Common Core of Data [CCD]-based and new-school) and census region.

Public school sample counts for the twelfth-grade national assessments, by census region and sampling frame (CCD-based, new-school): 2019

Census region	Total school sample	CCD-based school sample	New-school sample

Census region	Total school sample	CCD-based school sample	New-school sample
Total	**1,930**	**1,920**	**10**
Northeast	270	270	#
Midwest	350	350	0
South	760	750	#
West	550	540	#

Rounds to zero.
NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/ccd_based_and_new_school_sampling_frames_for_the_2019_12th_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Stratification of Schools for the 2019 Twelfth-Grade Public School National Assessment

The purpose of school stratification is to increase the efficiency and ensure the representativeness of school samples in terms of important school-level characteristics, such as geography (e.g., census division), urbanicity, and race/ethnicity composition. NAEP school sampling utilizes two types of stratification: explicit and implicit.

Explicit stratification partitions the sampling frame into mutually exclusive groupings called strata. The systematic samples selected from these strata are independent, meaning that each sample is selected with its own unique random start.

Implicit stratification involves sorting the sampling frame, as opposed to grouping the frame. For NAEP, schools are sorted in serpentine fashion by key school characteristics within sampling strata and sampled systematically using this ordering. This type of stratification ensures the representativeness of the school samples with respect to the key school characteristics.

The sampling of public schools for the grade 12 assessments in mathematics, reading, and science did not involve any explicit stratification, but it involved six dimensions of implicit stratification. The frames were hierarchically sorted by the following in the order shown to create the implicit strata:

- American Indian/Alaskan Native (AIAN) composition;
- Census division;
- urbanicity status;
- Black/Hispanic composition;
- school type (public, Bureau of Indian Education (BIE), Department of Defense Education Activity (DoDEA); and
- median income (except for California schools where achievement data is used instead).

AIAN Composition

For the twelfth-grade mathematics, reading, and science assessments in the national public school sample, we created implied strata by first classifying schools on the sampling frame as either low AIAN or high AIAN based on the percentage of AIAN students in the targeted grade (the cutoff was 5 percent AIAN students). This is the first time AIAN classification was used to implicitly stratify the national NAEP public school sampling frames. It is part of an oversampling scheme to ensure sufficient numbers of AIAN students are present in the student samples. Grouping high AIAN schools together in a sampling stratum helps bring schools with relatively large numbers of AIAN students into the school sample. In turn, schools with more AIAN students improve the chance that sufficient numbers of AIAN students are included in the student samples.

Census Division

Within each of the low and high AIAN classifications, schools were further classified into groups based on census division. A census division-based grouping can consist of a single census division, a set of neighboring census divisions, or a part of an individual census division. When census divisions are combined to form implied sampling strata, it is done generally within census regions. Because there are so few high AIAN schools, the census division grouping within the high AIAN stratum consisted of several neighboring census divisions.

Within the low AIAN stratum, each census division, except the Pacific Census Division, constituted a separate census division grouping. The Pacific Census Division was split into two parts: California in one part and Alaska, Hawaii, Oregon, and Washington in the other part. This was done purposely so that California could use achievement data as the last stratification variable instead of median income. See last paragraph for more detail.

Urbanicity Status

The urbanicity classification strata were derived from the NCES urban-centric locale variable from the Common Core of Data (CCD), which classifies schools based on location ([1] city, [2] suburb, [3] town, [4] rural) and proximity to urbanized areas. Urban-centric locale has 12 possible values.

The urbanicity classification cells were created by starting with the original 12 NCES urban-centric locale categories within each AIAN classification-by-census division grouping. Any cell with an expected school sample size less than four was combined with a neighboring cell within the same census division grouping. Collapsing was first done among the subcategories within a location class. (For example, the subcategories for location class city are (1) large, (2) mid-size, and (3) small. If one of these subcategories was deficient then either 1 was collapsed with 2; 3 collapsed with 2; or 2 collapsed with the smaller of 1 or 3.) If the collapsed cell was still too small, all three subcategories within a location class were combined.

If a collapsed location class still had an expected school sample size less than four, then it was collapsed with a neighboring collapsed location class. That is, 1 would be collapsed with 2 or 3 would be collapsed with 4. If additional collapsing was necessary, all location classes were combined. No collapsing across census division strata was allowed or necessary.

The result of this was a set of sampling strata defined by AIAN classification, census division strata, and urbanicity classification having expected school sample sizes of at least four schools.

No further implicit strata for High AIAN schools were formed beyond urbanization classification.

Black/Hispanic Composition

Low AIAN schools within the nested urbanicity classification strata were further stratified into Black/Hispanic classification strata. The first division was the classification of schools as either low Black/Hispanic schools or high Black/Hispanic schools based on the percentage of Black or Hispanic students in the target grade (the cutoff was 15 percent Black and Hispanic students). Within the high Black/Hispanic classification, the number of substrata was based on the expected school sample size.

- If the expected school sample size of resultant strata was less than or equal to 8.0, then this was the final urbanicity-Black/Hispanic stratum;
- if the expected sample size was greater than or equal to 8.0 and less than 12.0, there were two substrata;
- if the expected sample size was greater than or equal to 12.0 and less than 16.0, there were three substrata; and
- if the expected sample size was greater than or equal to 16.0, there were four substrata.

The substrata were defined by percentage of Black and Hispanic students, with the cutoffs for substrata defined by weighted percentiles (with the weight equal to expected hits for each school).

- For two substrata, the cutoff was the weighted median;
- for three substrata, the weighted 33rd and 67th percentiles; and
- for four substrata, the weighted median and quartiles.

For the low Black/Hispanic classification, there were six urbanicity strata that had a large enough expected school sample size, and these were split into groups of states. Two or three state groups were formed using adjacent states if possible, while maintaining an expected school sample size of at least four for each state group for each of these six urbanicity strata.

School Type

The next implicit stratification variable was school type. School type takes on values of public, BIE, and DoDEA.

Median Income/Achievement

The last implicit stratification variable was median income of the ZIP code area containing the school, except in California, where student achievement data was used. Schools in California contain more than 12 percent of the grade 12 students in the nation. Using achievement data provides a benefit. Achievement is a better sort variable than median income when ordering schools within a state because it is direct measure of student performance. However, when ordering schools across state, median income is better than achievement because states generally use different achievement measures while median income is a standard measure across states.

NAEP Technical Documentation Student Sample Selection for the 2019 Twelfth-Grade Public School National Assessment

The sampling of students for the public school assessments in mathematics, reading, and science at twelfth grade involved three steps: (1) sampling of students in the targeted grade (twelfth) from each sampled school, (2) assignment of assessment mode (digitally based [DBA] or paper-based [PBA]), and (3) assignment of assessment subject (mathematics, reading, or science) to the sampled students.

Sampling Students within Sampled Schools

Within each sampled school, a sample of students was selected from a list of students in the targeted grade such that every student had an equal chance of selection. The student lists were submitted either electronically using a system known as E-filing or on paper. In E-filing, student lists are submitted as Excel files by either school coordinators, NAEP State Coordinators, or NAEP TUDA Coordinators. The files can be submitted for one school at a time (known as single school E-file submission) or for an entire jurisdiction at once (known as multiple school E-file submission). E-filing allows schools to easily submit student demographic data electronically with the student lists, easing the burden on field supervisors and school coordinators.

Schools that are unable to submit their student lists using the E-filing system provide hardcopy lists to NAEP field supervisors. In 2019, over 99 percent of the participating twelfth-grade public schools in the national assessment in mathematics, reading, and science E-filed their student lists while less than 1 percent of the participating schools submitted hardcopy lists.

In year-round multi-track schools, students in tracks scheduled to be on break 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 one-half, 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 was submitted for every student in

the school, students were sorted by gender and race/ethnicity before the sample was selected to implicitly stratify the sample.

In schools with up to 83 students in the targeted grade, all students were selected. In schools with more than 83 students, systematic samples of 75 students were selected.

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.

Assigning Assessment Mode to Sampled Students

After selection, the sampled students within a school were randomly assigned assessment mode using an algorithm based on the number of students sampled.

The mode assignment algorithm was based on three requirements designed for operational efficiency: (1) very small schools should only be assigned one mode type, (2) schools doing both modes should avoid having DBA or PBA sessions with fewer than 5 students, and (3) schools doing both modes, where possible, should have 25 or 50 students assigned to DBA and the balance to PBA. The following describes the mode assignment algorithm to the twelfth-grade sampled students.

Grade 12 Assessment Mode Assignment

- Schools with fewer than 20 students: all students assigned to one mode (all DBA or all PBA)
- Schools with 20 to 35 students: students assigned to DBA at a rate of 42/75 and to PBA at 33/75
- Schools with 36 to 53 students: 25 students assigned to DBA and the balance to PBA
- Schools with 54 to 75 students: students assigned to DBA at a rate of 42/75 and to PBA at 33/75
- Schools with 76 to 83 students: 33 students assigned to PBA and the balance to DBA

The assignment of assessment mode to very small schools (fewer than 20 students) was done in advance of student sampling. At twelfth grade, 56.0 percent (42 out of 75) and 44.0 percent (33 out of 75) schools were pre-assigned to DBA and PBA only, respectively.

Assigning Assessment Subject to Sampled Students

Sampled students, including new enrollees, in each participating sampled school were assigned to mathematics, reading, or science using a process known as spiraling.

In this process, test forms for DBA or booklets for PBA were randomly assigned to sampled students from test form sets or booklet sets that had, on average, subject rates as shown in the table. Note, the subject rates varied by assessment mode. Students receiving a mathematics form were in the mathematics assessment, students receiving a reading form were in the reading assessment, and students receiving a science form were in the science assessment.

Assessment subject rates (in percents), twelfth-grade public school national assessment, by mode : 2019

Mode	Mathematics	Reading	Science
PBA	36.84	34.21	28.95
DBA	29.17	31.25	39.58

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 National Mathematics, Reading, and Science Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/student_sample_selection_for_the_2019_twelfth_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Substitute Schools for the 2019 Twelfth-Grade Public School National Assessment

Though efforts were made to secure the participation of all schools selected, it was anticipated that not all schools would choose to participate. NAEP uses school substitution to mitigate the effect of bias due to nonresponse. A nonparticipating sampled school is replaced by its substitute when the original school is considered a final refusal.

For the twelfth-grade public school national sample, substitute schools were preselected for all sampled schools from the Common Core of Data (CCD)-based sampling frame by sorting the school frame file according to a sort order very close to that used in sample selection (the implicit stratification). The two exceptions to this were as follows: (1) estimated grade enrollment replaces median income (achievement) as the last sort variable, and (2) school type in the stratification hierarchy was crossed with state (rather than used alone). The first change guaranteed that the selected substitute would have a grade enrollment very close to that of the originally selected school. The second change guaranteed that any selected substitutes would be within the same state as the originally sampled nonresponding school.

Schools were disqualified as potential substitutes if they were already selected in the public school sample or assigned as a substitute for another public school (earlier in the sort ordering).

The two candidates for substitutes were then the two nearest neighbors of the originally sampled school in this revised sort order. To be eligible as a potential substitute, the neighbor needed to be a nonsampled school (for any grade) and within the same explicit sampling stratum. If both nearest neighbors were eligible to be substitutes, the one with a closer grade enrollment was chosen. If both nearest neighbors had the same grade enrollment (an uncommon occurrence), one of the two was randomly selected.

In the twelfth-grade public school sample, 32 substitute schools ultimately participated.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/substitute_schools_for_the_2019_twelfth_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Target Population for the 2019 Twelfth-Grade Public School National Assessment

The target population for the 2019 twelfth-grade public school national assessments in mathematics, reading, and science was defined as all twelfth-grade students who were enrolled in public schools, Bureau of Indian Education (BIE) schools, and Department of Defense Education Activity (DoDEA) schools located within the 50 states and the District of Columbia.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/target_population_for_the_2019_twelfth_grade_public_school_national_assessment.aspx

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NAEP Technical Documentation Sample Design for the 2019 State Assessment

The NAEP 2019 state assessment sampled jurisdictions comprising the 50 states, the District of Columbia, Puerto Rico, Bureau of Indian Education (BIE) schools, Department of Defense Education Activity (DoDEA) schools, and in school districts participating in the Trial Urban District Assessment (TUDA). Each sample was designed to produce aggregate estimates with approximately equal precision for all the participating jurisdictions, as well as estimates for various student populations of interest. All Bureau of Indian Education schools were included in the sample as part of the NIES study.

The target population for the NAEP 2019 state assessments covered fourth- and eighth-grade students in public schools who were enrolled in grades 4 and 8 at the time of assessment. Operational mathematics and reading assessments were conducted in all jurisdictions, including the TUDA districts, with the exception of Puerto Rico, where only the operational mathematics assessment was conducted.

At both grades, the overall target student sample size for the operational samples in each non-TUDA jurisdiction, with the exception of Puerto Rico, was 5,700. The goal was to obtain 4,900 assessed students after attrition: 2,700 for mathematics and 2,200 for reading. For the operational mathematics assessment in Puerto Rico, the target student sample size was 4,000 at both grades.

The primary sampling frame for each grade included public schools having the relevant grade in each jurisdiction. The samples were selected based on a two-stage sample design:

- selection of schools within participating jurisdictions; and
- selection of students within schools.

The first-stage samples of schools were selected with probability proportional to a measure of size based on the estimated grade-specific enrollment in the schools.

The sampling of students at the second-stage involved two steps: (1) sampling of students in the targeted grade (fourth or eighth) from each sampled school, and (2) assignment of assessment subject (mathematics or reading) to the sampled students.

For the TUDA samples, schools were sampled from the 27 participating TUDA districts at the same time schools were selected for the non-TUDA jurisdiction samples. The participating TUDA districts are listed below:

- Albuquerque Public Schools, New Mexico;
- Atlanta Public Schools, Georgia;
- Austin Independent School District, Texas;
- Baltimore City Public Schools, Maryland;
- Boston Public Schools, Massachusetts;
- Charlotte-Mecklenburg Schools, North Carolina;
- Chicago Public Schools, Illinois;
- Clark County School District, Nevada;
- Cleveland Metropolitan School District, Ohio;
- Dallas Independent School District, Texas;
- Denver Public Schools, Colorado;
- Detroit Public Schools, Michigan;
- District of Columbia Public Schools, District of Columbia;
- Duval County Public Schools, Florida;
- Fort Worth Independent School District, Texas;
- Fresno Unified School District, California;
- Guilford County Schools, North Carolina;
- Hillsborough County Public Schools, Florida;
- Houston Independent School District, Texas;
- Jefferson County Public Schools, Kentucky;
- Los Angeles Unified School District, California;
- Miami-Dade County Public Schools, Florida;
- Milwaukee Public Schools, Wisconsin;

- New York City Department of Education, New York;
- San Diego Unified School District, California;
- School District of Philadelphia, Pennsylvania; and
- Shelby County Schools, Tennessee.

These subsamples affected the design of the state samples in those states where TUDA districts were oversampled. In each of these states, there were distinct sampling rates for each TUDA district and for the balance of the state (i.e., the rest of the state not in a TUDA district). For the six large TUDA districts (i.e., New York, Los Angeles, Chicago, Miami-Dade, Clark County, and Houston) the target assessed student sample size for the operational samples was three-quarters the size of the non-

TUDA jurisdictions: 3,675. For the remaining TUDA districts, the target assessed student sample size for the operations samples was half the size of the state sample: 2,450.

Each selected school provided a list of eligible enrolled students from which a systematic sample of students was drawn. The 2019 student sample selection for the state assessment was straightforward since the transition from paper based assessment (PBA) mode to digitally based assessment (DBA) mode had been completed in 2017. In fourth- and eighth-grade schools, 50 students, if possible, were selected from each school: roughly 28 for mathematics and 22 for reading. In some very large schools, multiples of 50 students (i.e., 100, 150, etc.) were selected. Details can be found in the student sample selection page.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/sample_design_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Ineligible Schools for the 2019 State Assessment

The Common Core of Data (CCD)-based sampling frames, from which most of the sampled schools were drawn, corresponds to the 2016-2017 school year, two years prior to the assessment school year. During the intervening period, some of these schools either closed, no longer offered the grade of interest, or were ineligible for other reasons. In such cases, the sampled school was coded as ineligible.

Total and Eligible Schools Sampled

Eligibility Status of Schools Sampled

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/ineligible_schools_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Eligibility Status of Schools Sampled for the 2019 State Assessment

The following table shows the unweighted counts and percentages of sampled schools that were eligible and ineligible, by reason for ineligibility, for the fourth- and eighth-grade public school state assessment samples.

Sampled schools, state assessment, by grade and eligibility status: 2019

	Grade 4		Grade 8	
Eligibility status	Unweighted count of schools	Unweighted percentage	Unweighted count of schools	Unweighted percentage
All sampled public schools	**8,520**	**100.00**	**7,260**	**100.00**
Eligible	8,270	97.07	6,940	95.62
Ineligible	250	2.93	318	4.38
Has sampled grade, but no eligible students	35	0.41	47	0.65
Does not have sampled grade	65	0.76	81	1.12
School closed	85	1.00	66	0.91
Not a regular school	55	0.65	99	1.36
Other ineligible school	10	0.12	24	0.33
Duplicate on sampling frame	0	0	1	0.01

NOTE: Numbers of schools are rounded to nearest ten, except those pertaining to ineligible schools. Detail may not sum to totals due to rounding. Percentages are based on rounded counts.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/eligibility_status_of_schools_sampled_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Total and Eligible Sampled Schools for the 2019 State Assessment

The following table presents the numbers of total and eligible fourth- and eighth-grade schools sampled for each NAEP 2019 state assessment jurisdiction.

Total and eligible sampled schools, state assessment, by grade and jurisdiction: 2019

Jurisdiction	Grade 4		Grade 8	
	Total school sample	Eligible school sample	Total school sample	Eligible school sample
Total	**8,520**	**8,270**	**7,260**	**6,940**
Alabama	130	120	120	110
Alaska	180	180	130	120
Arizona	130	130	130	120
Arkansas	120	120	120	110
California—Fresno	60	60	20	20
California—Los Angeles	90	90	80	80
California—San Diego	60	60	40	40
California—Balance	110	110	110	100
Colorado—Denver	60	60	50	40
Colorado—Balance	110	110	110	110
Connecticut	130	120	120	110
Delaware	100	90	70	60
Florida—Duval County	60	60	40	40
Florida—Hillsborough County	60	60	50	50
Florida—Miami-Dade	90	90	80	80
Florida—Balance	90	90	90	90
Georgia—Atlanta	60	50	20	20
Georgia—Balance	110	110	110	110
Hawaii	120	120	60	60
Idaho	130	130	100	100
Illinois—Chicago	100	100	100	90
Illinois—Balance	100	100	100	100
Indiana	120	120	120	110
Iowa	130	120	120	120
Kansas	130	130	130	120
Kentucky—Jefferson County	60	60	30	20
Kentucky—Balance	100	100	110	100
Louisiana	120	120	120	110
Maine	150	150	110	110
Maryland—Baltimore City	60	60	60	60
Maryland—Balance	110	110	110	100
Massachusetts—Boston	70	70	50	40
Massachusetts—Balance	110	110	110	110
Michigan—Detroit	70	70	60	50
Michigan—Balance	120	110	120	110
Minnesota	150	130	150	130
Mississippi	120	120	110	110
Missouri	130	130	130	130
Montana	170	160	140	130
Nebraska	150	150	120	120
Nevada—Clark County	90	90	60	60
Nevada—Balance	40	40	40	30
New Hampshire	140	140	90	90
New Jersey	120	120	120	110
New Mexico—Albuquerque	60	60	40	40
New Mexico—Balance	100	90	80	80
New York—New York City	90	90	90	90
New York—Balance	80	70	80	80
North Carolina—Charlotte-Mecklenburg	60	60	40	40
North Carolina—Guilford County	60	50	30	20
North Carolina—Balance	120	120	120	120
North Dakota	170	160	140	130
Ohio—Cleveland	80	80	80	70
Ohio–Balance	120	120	120	110
Oklahoma	130	130	130	130
Oregon	140	140	130	130
Pennsylvania—Philadelphia	60	60	50	50
Pennsylvania—Balance	110	100	110	110
Rhode Island	120	110	70	60

NOTE: Numbers of schools rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

Jurisdiction	Grade 4		Grade 8	
	Total school sample	Eligible school sample	Total school sample	Eligible school sample
South Carolina	120	120	120	120
South Dakota	160	160	130	130
Tennessee—Shelby County	60	60	40	40
Tennessee—Balance	110	110	110	110
Texas—Austin	60	60	20	20
Texas—Dallas	60	60	40	40
Texas—Fort Worth	60	60	30	30
Texas—Houston	90	90	50	50
Texas—Balance	110	110	110	110
Utah	130	130	120	120
Vermont	210	210	120	120
Virginia	120	120	110	110
Washington	140	130	130	120
West Virginia	140	130	110	110
Wisconsin—Milwaukee	70	70	60	50
Wisconsin—Balance	130	130	120	120
Wyoming	140	130	100	90
Other jurisdictions				
Bureau of Indian Education (BIE)	140	140	110	110
Department of Defense Education Activity (DoDEA)	100	90	60	60
District of Columbia (DCPS)	80	80	30	30
District of Columbia—Balance	50	50	50	40
Puerto Rico	160	160	160	160

NOTE: Numbers of schools rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/total_and_eligible_sampled_schools_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Sampling Frame for the 2019 State Assessment

Fourth- and Eighth-Grade Schools and Enrollment

New-School Sampling Frame

The primary sampling frames for the 2019 fourth- and eighth-grade public school samples for the state assessments in mathematics and reading were developed from the Common Core of Data (CCD) file corresponding to the 2016-2017 school year. The CCD file is the Department of Education's primary database of public elementary and secondary schools in the United States including U.S. territories. It includes all regular public, state-operated public, Bureau of Indian Education (BIE), and Department of Defense Education Activity (DoDEA) schools open during the 2016-2017 school year. These sampling frames are referred to as the CCD-based sampling frames.

A secondary set of sampling frames were also created for these fourth- and eighth-grade samples to account for schools that newly opened or became newly eligible between the 2016-2017 and 2018-2019 school years. These frames contain brand-new and newly-eligible fourth- and eighth-grade schools and are referred to as the new-school sampling frames.

Both sets of sampling frames excluded ungraded schools, vocational schools with no enrollment, special education-only schools, prison and hospital schools, home school entities, virtual or online schools, adult and evening schools, and juvenile correctional institutions. Vocational schools with no enrollment serve students who split their time between the vocational school and their home school.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/sampling_frame_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Fourth- and Eighth-Grade Schools and Enrollment in the 2019 State Assessment Sampling Frame

The following table presents the number of fourth- and eighth-grade public schools and their estimated enrollment, as contained in the Common Core of Data (CCD)-based sampling frames, by jurisdiction, for the state mathematics and reading assessments. Grade 4 or grade 8 enrollment was estimated for each school as the average of the per-grade enrollments for grades 1 through 8, counting only the grades in that range that were offered by the school.

Number of schools and enrollment in public school sampling frame, state assessment, by grade and jurisdiction: 2019

Jurisdiction	Grade 4		Grade 8	
	Schools	Enrollment	Schools	Enrollment
Total	**52,503**	**3,847,751**	**29,354**	**3,757,911**
Alabama	715	58,328	460	54,754
Alaska	354	9,577	274	9,112
Arizona	1,223	87,474	820	85,601
Arkansas	477	37,767	302	36,011
California—Fresno	67	5,716	19	5,256
California—Los Angeles	452	39,042	118	31,431
California—San Diego	121	8,659	38	7,415
California—Balance	5,417	412,776	2,831	418,549
Colorado—Denver	105	6,987	58	6,288
Colorado—Balance	968	61,155	527	60,720
Connecticut	621	38,530	331	40,498
Delaware	118	10,629	61	10,392
Florida—Duval County	122	10,646	56	9,018
Florida—Hillsborough County	178	17,330	89	15,105
Florida—Miami-Dade County	291	26,964	188	26,891
Florida—Balance	1,657	162,828	921	155,692
Georgia—Atlanta	55	4,518	23	3,560
Georgia—Balance	1,191	130,472	548	126,699
Hawaii	207	14,773	82	13,516
Idaho	384	23,160	207	22,934
Illinois—Chicago	457	27,978	455	28,403
Illinois—Balance	1,758	119,279	1,119	123,039
Indiana	1,050	78,855	494	78,144
Iowa	623	37,406	361	36,527
Kansas	697	36,952	391	36,103
Kentucky—Jefferson County	102	7,734	43	7,134
Kentucky—Balance	621	44,334	382	43,223
Louisiana	766	55,675	500	51,882
Maine	311	13,279	199	13,393
Maryland—Baltimore	126	6,749	95	5,442
Maryland—Balance	772	62,022	278	58,092
Massachusetts—Boston	71	3,927	45	3,584
Massachusetts—Balance	885	66,910	444	68,015
Michigan—Detroit	71	3,959	56	3,131
Michigan—Balance	1,610	104,830	1,036	110,182
Minnesota	974	66,133	720	65,613
Mississippi	417	38,291	282	35,644
Missouri	1,165	69,749	707	67,914
Montana	394	11,750	276	11,125
Nebraska	523	23,689	294	23,144
Nevada—Clark County	226	25,289	77	24,474
Nevada—Balance	164	11,692	89	10,910
New Hampshire	270	13,405	144	13,829
New Jersey	1,374	99,119	771	99,817
New Mexico—Albuquerque	97	7,351	40	6,267
New Mexico—Balance	349	18,968	194	18,534
New York—New York City	799	72,428	530	66,430
New York—Balance	1,711	128,946	1,028	130,207
North Carolina—Charlotte-Mecklenburg	110	11,943	46	10,873
North Carolina—Guilford County	74	5,568	31	5,242
North Carolina—Balance	1,297	103,539	665	97,965
North Dakota	262	8,787	183	8,183
Ohio—Cleveland	79	3,320	75	3,181
Ohio—Balance	1,625	125,254	998	126,531
Oklahoma	856	52,037	586	49,250
Oregon	742	44,745	421	43,697
Pennsylvania—Philadelphia	147	11,248	114	9,158
Pennsylvania—Balance	1,431	118,466	764	122,367

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

Jurisdiction	Grade 4		Grade 8	
	Schools	Enrollment	Schools	Enrollment
Rhode Island	175	10,936	70	10,893
South Carolina	649	59,485	314	54,989
South Dakota	311	10,807	256	10,199
Tennessee—Shelby County	107	8,781	61	7,511
Tennessee—Balance	886	68,035	532	65,615
Texas—Austin	82	6,693	20	5,331
Texas—Dallas	152	12,859	41	10,369
Texas—Fort Worth	86	7,027	32	6,074
Texas—Houston	177	17,792	63	13,210
Texas—Balance	4,014	362,720	2,110	358,034
Utah	673	52,061	301	50,407
Vermont	214	6,093	121	5,894
Virginia	1,110	97,755	378	95,898
Washington	1,232	84,823	612	80,609
West Virginia	408	20,212	197	20,286
Wisconsin—Milwaukee	113	5,767	82	5,004
Wisconsin—Balance	980	55,437	566	56,560
Wyoming	191	7,545	88	7,235
Other jurisdictions				
Bureau of Indian Education (BIE)	131	3,486	106	3,087
Department of Defense Education Activity (DoDEA)	89	6,289	57	5,076
District of Columbia (TUDA)	77	3,862	28	2,301
District of Columbia–Balance	45	2,230	41	2,412
Puerto Rico	872	28,119	392	24,826

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/fourth_and_eighth_grade_schools_and_enrollment_in_the_2019_state_school_sampling_frame.aspx

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NAEP Technical Documentation New-School Sampling Frame for the 2019 State Assessment

The primary sampling frames for the 2019 fourth- and eighth-grade public school samples for the state assessment in mathematics and reading were constructed using the most current Common Core of Data (CCD) file available from NCES. This file contained schools that were in existence during the 2016-2017 school year (i.e., it was two years out of date). During the subsequent 2-year period, undoubtedly some schools closed, some changed structure (one school becoming two schools, for example), some newly opened, and still others changed their grade span.

A supplemental sample was selected from a list of schools that were new or had become newly eligible sometime after the 2016-2017 school year. The goal was to allow every new school a chance of selection, thereby fully covering the target population of schools in operation during the 2018-2019 school year. It was infeasible to ask every school district in the United States to provide a supplemental school frame, so a two-stage procedure was employed. First, a sample of school districts was selected within each state. Then each State or Trial Urban District Assessment (TUDA) Coordinator was sent a list of the schools within their sampled districts that had been present on the 2016-2017 CCD file. The Coordinators were asked to add in any new schools and identify any schools on this list that had become newly eligible for grades 4, 8, or 12.

The new-school process began with the preparation of a district-level frame. The starting point was a file containing every public school district in the United States.

Specific districts were designated as in sample with certainty. They included the following districts:

- districts in jurisdictions where all schools were selected for sample at either grade 4 or 8;
- state-operated districts;
- districts in states with fewer than 10 districts;
- charter-only districts (that is, districts containing no schools other than charter schools); and
- TUDA districts.

Then noncertainty districts were classified as small, medium, or large based on the number of schools and student enrollment of schools from the CCD-based public school frame.

A district was considered to be small if it contained no more than one school at each targeted grade (4, 8, and 12). During school recruitment, the coordinators were asked to identify schools within their district that newly offered the targeted grade. Every identified new school was added to the sample. From a sampling perspective, the new school was viewed as an “annex” to the sampled school which meant that it had a well-defined probability of selection equal to that of the sampled school. When a school in a small district was sampled from the CCD-based frame, its associated new school was automatically sampled as well.

Within each jurisdiction, districts that were neither certainty selections nor small were divided into two strata, one containing large-size districts and a second containing medium-size districts. These strata were defined by computing the percentage of jurisdiction grade 4, 8, and 12 enrollment represented by each district, sorting in descending order, and cumulating the percentages. All districts up to and including the first district at or above the 80th cumulative percentage were defined as large

districts. The remaining districts were defined as medium districts.

A simplified example is given below. The state's districts are ordered by descending percentage enrollment. The first six become large districts and the last six become medium districts.

Large-size and medium-size district strata example, state assessment, by enrollment, stratum, and district: 2019

District	Percentage enrollment	Cumulative percentage enrollment	Stratum
1	20	20	L
2	20	40	L
3	15	55	L
4	10	65	L
5	10	75	L
6	10	85	L
7	5	90	M
8	2	92	M
9	2	94	M
10	2	96	M
11	2	98	M
12	2	100	M

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

The target sample size for each jurisdiction was 10 districts total across the medium-size and large-size district strata. Where possible, eight districts were selected from the large-size district stratum and two districts from the medium-size district stratum. However, in the example above, since there are only six large districts, all of the districts in the large district stratum and four districts from the medium district stratum would have been selected for the new-school inquiry.

If sampling was needed in the medium-size district stratum, districts in this stratum were selected with equal probability. If sampling was needed in the large-size district stratum, the districts in this stratum were sampled with probability proportional to enrollment. These probabilities were retained and used in later stages of sampling and weighting of new schools.

The selected districts in each jurisdiction were then sent a listing of all their schools that appeared on the 2016-2017 CCD file and were asked to provide information about the new schools not included in the file and grade span changes of existing schools. These listings provided by the selected districts were used as sampling frames for selection of new public schools and updates of existing schools. This process was conducted through the NAEP State or TUDA Coordinator in each jurisdiction. The Coordinators were sent the information for all sampled districts in their respective jurisdictions and were responsible for returning the completed updates.

The following table presents the number and percentage of schools and average estimated grade enrollment for the fourth- and eighth-grade new-school frame by census region.

Number and percentage of schools and mean school size in the new-school frame, state assessment, by grade and census region: 2019

	Grade 4			Grade 8		
Census region	Schools	Percentage	Mean school size	Schools	Percentage	Mean school size
Total	**327**	**100.00**	**61**	**362**	**100.00**	**53**
Northeast	27	8.26	60	36	9.94	49
Midwest	54	16.51	52	53	14.64	40
South	178	54.43	60	211	58.29	53
West	64	19.57	72	56	15.47	62
Outlying areas[1]	4	1.22	103	6	1.66	72

[1]Outlying areas are not classified by census region. They include schools in Puerto Rico and Department of Defense Education Activity (DoDEA) schools not located in the 50 states or the District of Columbia.
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), 2019 State Mathematics and Reading Assessments.

NAEP Technical Documentation School and Student Participation in the 2019 State Assessment

The tables linked present weighted school and student participation rates and weighted student exclusion rates for the fourth- and eighth-grade public school state assessment samples.

A weighted school participation rate indicates the percentage of the student population that is directly represented by the participating school sample.

A weighted student participation rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools.

Weighted Response Rates of Fourth-Grade School Sample by Participating Jurisdiction

Weighted Response Rates of Eighth-Grade School Sample by Participating Jurisdiction

Weighted Student Response

A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment. Students are generally excluded from a NAEP assessment if they have a disability or limited English language proficiency that prevents them from taking the assessment altogether or the accommodations they require to take the assessment were unavailable.

and Exclusion Rates for Mathematics

Weighted Student Response and Exclusion Rates for Reading

Weighted school participation rates are calculated by dividing the sum of school base weights, weighted by student enrollment of the targeted grade, for all participating schools by the sum of the base weights, weighted by student enrollment of the target grade, for all eligible schools. Eligible schools are all sampled schools except those considered out-of-scope. The base weight is assigned to all sampled schools and is the inverse of the probability of selection. The weighted school participation rates in these tables reflect participation prior to substitution. That is, participating substitute schools that took the place of refusing originally sampled schools are not included in the numerator.

Weighted student participation rates are calculated by dividing the sum of the student base weights for all assessed students by the sum of the student base weights for all assessable students. (See below for the response dispositions of NAEP sampled students.) Students deemed assessable are those who were assessed or absent. They do not include students that were not eligible (primarily made up of withdrawn or graduated students) or students with disabilities (SD) or English learners (EL) students who were excluded from the assessment.

Weighted student exclusion rates are calculated by dividing the sum of the school nonresponse-adjusted student base weights for all excluded students by the sum for all assessable and excluded students.

Every student sampled for NAEP is classified into one of the following response disposition categories:

1. Assessed
2. Absent
3. Excluded (must be SD students, EL students, or SD and EL students)
4. Withdrawn or Graduated (ineligible)

Assessed students were students that completed an assessment.

Absent students were students who were eligible to take an assessment but were absent from the initial session and the makeup session if one was offered. (Note, some schools, not all, had make-up sessions for students who were absent from the initial session.)

Excluded students were 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 EL.

Withdrawn or graduated students are those who have left the school before the original assessment. These students are considered ineligible for NAEP.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_and_student_participation_in_the_2019_state_assessment.aspx

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NAEP Technical Documentation Weighted Response Rates of Eighth-Grade School Sample by Participating Jurisdiction for the 2019 State Assessment

The following table presents unweighted counts of eligible sampled and participating schools and weighted school response rates, by participating jurisdiction, for the eighth-grade public school state assessment sample. States with Trial Urban District Assessment (TUDA)districts are shown in multiple rows: for the TUDA district(s) and for the state as a whole (the TUDA district[s] plus the rest of the state).

A weighted school response rate indicates the percentage of the student population that is directly represented by the participating school sample. These response rates are based on the original sample of schools (excluding substitutes).

School counts and response rates of sampled eligible schools, grade 8 state assessment, by jurisdiction: 2019

Jurisdiction	Number of sampled eligible schools	Number of participating schools	Weighted school response rates (percent)
Total	**6,940**	**6,870**	**99.31**
Alabama	110	110	100.00
Alaska	120	110	98.12
Arizona	120	120	100.00
Arkansas	110	110	100.00
California—Fresno	20	20	100.00
California—Los Angeles	80	80	100.00
California—San Diego	40	40	100.00
California	230	230	96.29
Colorado—Denver	40	40	95.76
Colorado	150	150	99.64
Connecticut	110	110	100.00
Delaware	60	60	100.00
Florida—Duval County	40	40	100.00
Florida—Hillsborough County	50	50	100.00

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics

Jurisdiction	Number of sampled eligible schools	Number of participating schools	Weighted school response rates (percent)
Florida—Miami-Dade	80	80	100.00
Florida	250	250	99.09
Georgia—Atlanta	20	20	100.00
Georgia	130	130	100.00
Hawaii	60	60	100.00
Idaho	100	100	100.00
Illinois—Chicago	90	90	100.00
Illinois	190	190	100.00
Indiana	110	110	100.00
Iowa	120	120	100.00
Kansas	120	120	100.00
Kentucky—Jefferson County	20	20	100.00
Kentucky	130	130	100.00
Louisiana	110	110	100.00
Maine	110	110	100.00
Maryland—Baltimore City	60	60	100.00
Maryland	160	160	100.00
Massachusetts—Boston	40	40	100.00
Massachusetts	150	150	99.03
Michigan—Detroit	50	50	100.00
Michigan	170	170	100.00
Minnesota	130	130	99.89
Mississippi	110	110	100.00
Missouri	130	130	100.00
Montana	130	130	100.00
Nebraska	120	120	97.05
Nevada—Clark County	60	60	100.00
Nevada	90	90	100.00
New Hampshire	90	90	100.00
New Jersey	110	110	100.00
New Mexico—Albuquerque	40	40	100.00
New Mexico	120	120	100.00
New York—New York City	90	90	99.04
New York	160	160	98.81
North Carolina—Charlotte-Mecklenburg	40	40	100.00
North Carolina—Guilford County	20	20	100.00
North Carolina	170	170	100.00
North Dakota	130	130	99.39
Ohio—Cleveland	70	70	100.00
Ohio	190	190	100.00
Oklahoma	130	130	100.00
Oregon	130	130	100.00
Pennsylvania—Philadelphia	50	50	88.70
Pennsylvania	160	160	99.26
Rhode Island	60	60	100.00
South Carolina	120	120	100.00
South Dakota	130	120	99.41
Tennessee—Shelby County	40	40	100.00
Tennessee	150	150	100.00
Texas—Austin	20	20	100.00
Texas–Dallas	40	40	100.00
Texas—Fort Worth	30	30	100.00
Texas—Houston	50	50	100.00
Texas	240	240	100.00
Utah	120	120	100.00
Vermont	120	120	100.00
Virginia	110	110	100.00
Washington	120	120	99.01
West Virginia	110	110	100.00
Wisconsin—Milwaukee	50	50	100.00

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics

Jurisdiction	Number of sampled eligible schools	Number of participating schools	Weighted school response rates (percent)
Wisconsin	180	180	100.00
Wyoming	90	90	100.00
Other jurisdictions			
Bureau of Indian Education (BIE)	110	80	71.21
Department of Defense Education Activity (DoDEA)	60	50	96.51
District of Columbia (DCPS)	30	30	100.00
District of Columbia	70	70	100.00
Puerto Rico	160	160	100.00

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_response_rates_of_eighth_grade_school_sample_by_participating_jurisdiction_for_the_2019_state_assess.aspx

NAEP Technical Documentation Weighted Response Rates of Fourth-Grade School Sample by Participating Jurisdiction for the 2019 State Assessment

The following table presents unweighted counts of eligible sampled and participating schools and weighted school response rates, by participating jurisdiction, for the fourth-grade public school state assessment sample. States with Trial Urban District Assessment (TUDA) districts are shown in multiple rows: for the TUDA district(s) and for the state as a whole (the TUDA district[s] plus the rest of the state).

A weighted school response rate indicates the percentage of the student population that is directly represented by the participating school sample. These response rates are based on the original sample of schools (excluding substitutes).

School counts and response rates of sampled eligible schools, grade 4 state assessment, by jurisdiction: 2019

Jurisdiction	Number of sampled eligible schools	Number of participating schools	Weighted school response rates (percent)
Total	**8,270**	**8,200**	**99.71**
Alabama	120	120	100.00
Alaska	180	170	98.35
Arizona	130	130	100.00
Arkansas	120	120	100.00
California—Fresno	60	60	100.00
California—Los Angeles	90	90	100.00
California—San Diego	60	60	100.00
California	310	300	99.00
Colorado—Denver	60	60	100.00
Colorado	170	170	100.00
Connecticut	120	120	100.00
Delaware	90	90	100.00
Florida—Duval County	60	60	100.00
Florida—Hillsborough County	60	60	100.00
Florida—Miami-Dade	90	90	100.00
Florida	290	280	99.06
Georgia—Atlanta	50	50	99.18
Georgia	170	160	99.97
Hawaii	120	120	100.00
Idaho	130	130	100.00
Illinois—Chicago	100	100	100.00
Illinois	190	190	100.00
Indiana	120	120	100.00
Iowa	120	120	99.36
Kansas	130	130	100.00
Kentucky—Jefferson County	60	60	100.00
Kentucky	160	160	100.00
Louisiana	120	120	100.00
Maine	150	140	99.97

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics

Jurisdiction	Number of sampled eligible schools	Number of participating schools	Weighted school response rates (percent)
Maryland—Baltimore City	60	60	100.00
Maryland	160	160	100.00
Massachusetts—Boston	70	70	100.00
Massachusetts	180	180	100.00
Michigan—Detroit	70	70	100.00
Michigan	180	180	100.00
Minnesota	130	130	100.00
Mississippi	120	120	100.00
Missouri	130	130	100.00
Montana	160	160	99.80
Nebraska	150	150	100.00
Nevada—Clark County	90	90	100.00
Nevada	130	130	100.00
New Hampshire	140	140	100.00
New Jersey	120	120	99.11
New Mexico—Albuquerque	60	50	95.77
New Mexico	150	140	98.83
New York—New York City	90	90	100.00
New York	160	160	100.00
North Carolina—Charlotte-Mecklenburg	60	60	100.00
North Carolina—Guilford County	50	50	100.00
North Carolina	230	230	100.00
North Dakota	160	160	99.34
Ohio—Cleveland	80	80	100.00
Ohio	200	200	100.00
Oklahoma	130	130	100.00
Oregon	140	140	100.00
Pennsylvania—Philadelphia	60	60	95.65
Pennsylvania	160	160	99.63
Rhode Island	110	110	100.00
South Carolina	120	120	100.00
South Dakota	160	150	99.53
Tennessee—Shelby County	60	60	100.00
Tennessee	160	160	100.00
Texas—Austin	60	60	100.00
Texas—Dallas	60	60	100.00
Texas—Fort Worth	60	60	100.00
Texas—Houston	90	90	100.00
Texas	360	360	100.00
Utah	130	130	100.00
Vermont	210	210	100.00
Virginia	120	120	100.00
Washington	130	130	99.15
West Virginia	130	130	100.00
Wisconsin—Milwaukee	70	70	100.00
Wisconsin	190	190	99.19
Wyoming	130	130	100.00
Other jurisdictions			
Bureau of Indian Education (BIE)	140	100	72.54
Department of Defense Education Activity (DoDEA)	90	90	97.38
District of Columbia (DCPS)	80	80	100.00
District of Columbia	120	120	100.00
Puerto Rico	160	160	100

NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 State Mathematics Assessment

The following table presents weighted student response and exclusion rates, by participating jurisdiction, for the fourth-grade public school state assessment samples. States with Trial Urban District Assessment (TUDA) districts are shown in multiple rows: for the TUDA district(s) and for the state as a whole (the TUDA district[s] plus the rest of the state).

Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates, state mathematics assessment, by grade and jurisdiction: 2019

	Grade 4			Grade 8		
Jurisdiction	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
Total	**93.44**	**1.57**	**0.63**	**91.53**	**1.20**	**0.51**
Alabama	94.56	1.09	0.46	94.70	1.12	0.23
Alaska	91.15	0.37	0.30	87.79	0.96	0.50
Arizona	94.00	0.90	0.12	92.53	1.33	0.49
Arkansas	94.79	1.01	0.27	92.54	1.56	0.29
California—Fresno	94.47	2.05	0.68	85.86	0.77	0.65
California—Los Angeles	95.24	1.42	1.41	91.92	1.30	1.45
California—San Diego	93.51	1.82	1.44	92.27	1.74	0.57
California	94.24	2.13	1.50	92.65	1.06	0.90
Colorado—Denver	93.26	1.26	1.29	90.75	0.76	1.00
Colorado	92.66	0.75	0.69	90.35	0.86	0.39
Connecticut	93.07	0.99	0.80	90.88	1.46	0.62
Delaware	93.98	1.13	0.56	91.00	1.43	0.42
Florida—Duval County	94.55	1.56	0.49	93.64	1.96	0.64
Florida—Hillsborough County	93.04	2.25	0.88	92.84	0.97	0.37
Florida—Miami-Dade	96.25	1.84	1.89	91.07	1.38	0.94
Florida	93.49	1.68	0.79	92.31	1.44	0.66
Georgia—Atlanta	93.63	1.00	0.53	92.75	0.96	0.42
Georgia	94.13	1.38	0.43	93.80	1.60	0.13
Hawaii	93.53	1.07	0.89	89.42	1.39	1.07
Idaho	93.87	1.21	0.15	93.24	1.12	0.17
Illinois—Chicago	94.59	1.25	0.92	92.85	0.93	0.66
Illinois	93.91	0.63	0.39	91.20	0.76	0.33
Indiana	94.44	1.34	0.35	91.72	1.36	0.36
Iowa	94.71	1.04	0.50	93.45	0.99	0.19
Kansas	94.23	1.20	0.37	94.65	0.98	0.43
Kentucky—Jefferson County	94.34	1.84	1.38	90.81	1.37	0.64
Kentucky	94.89	1.49	0.49	92.28	1.48	0.35
Louisiana	93.19	1.70	0.20	91.81	1.88	0.32
Maine	91.69	0.91	0.19	88.21	1.03	0.15
Maryland—Baltimore City	93.87	0.47	1.30	87.23	0.83	0.94
Maryland	93.47	0.90	0.62	89.91	1.14	0.52
Massachusetts—Boston	95.63	2.49	2.37	92.69	2.91	3.49
Massachusetts	93.14	1.65	1.07	90.07	1.42	1.11
Michigan—Detroit	93.80	3.71	1.02	90.09	5.88	0.63
Michigan	93.28	1.59	0.31	91.93	2.18	0.33
Minnesota	92.49	1.48	0.23	88.82	1.77	0.41
Mississippi	94.71	0.79	0.18	92.08	0.90	0.26
Missouri	93.49	0.94	0.29	93.35	0.62	0.10
Montana	92.91	1.18	0.16	92.95	0.91	0.00
Nebraska	94.84	0.98	0.33	94.21	0.96	0.21
Nevada—Clark County	95.13	1.10	0.73	90.51	0.84	0.84
Nevada	94.35	1.43	0.62	91.19	0.82	0.69

NOTE: For Puerto Rico, given that the assessment was administered in Spanish, the exclusion rate for EL pertains to the exclusion rate for students with linguistic limitations in Spanish.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics Assessment.

Jurisdiction	Grade 4 Weighted student response rates (percent)	Grade 4 Weighted percentage of all students who are SD and excluded	Grade 4 Weighted percentage of all students who are EL and excluded	Grade 8 Weighted student response rates (percent)	Grade 8 Weighted percentage of all students who are SD and excluded	Grade 8 Weighted percentage of all students who are EL and excluded
New Hampshire	89.94	1.11	0.24	84.65	0.89	0.22
New Jersey	93.14	1.22	0.53	90.70	0.80	1.00
New Mexico—Albuquerque	90.89	1.27	0.65	89.94	1.93	0.50
New Mexico	92.85	1.28	0.53	92.14	1.46	0.69
New York—New York City	90.54	3.20	1.75	92.51	0.44	0.77
New York	89.07	2.26	0.95	85.15	0.94	0.74
North Carolina—Charlotte-Mecklenburg	92.44	1.58	0.63	91.02	1.00	1.48
North Carolina—Guilford County	93.88	1.07	0.26	91.59	0.69	0.16
North Carolina	92.82	1.32	0.30	90.86	0.95	0.46
North Dakota	94.51	1.30	0.26	91.84	1.10	0.14
Ohio—Cleveland	91.69	3.40	0.49	92.12	4.31	0.88
Ohio	92.95	2.40	0.26	92.66	1.56	0.10
Oklahoma	92.66	1.94	0.51	91.58	1.81	0.54
Oregon	89.77	1.08	0.47	89.35	1.21	0.44
Pennsylvania—Philadelphia	95.54	4.17	2.25	93.63	3.40	1.99
Pennsylvania	93.34	2.21	0.36	90.74	1.32	0.21
Rhode Island	94.07	0.94	0.89	91.22	0.70	0.69
South Carolina	94.53	0.74	0.33	92.97	1.06	0.23
South Dakota	94.24	0.84	0.20	91.37	1.23	0.25
Tennessee—Shelby County	93.30	1.82	0.50	89.96	1.63	0.48
Tennessee	93.65	1.48	0.71	92.13	1.39	0.42
Texas—Austin	93.04	1.72	1.17	89.18	0.87	0.92
Texas—Dallas	95.18	2.51	1.68	91.66	1.45	1.67
Texas—Fort Worth	95.07	1.78	0.58	93.08	1.47	0.14
Texas—Houston	96.10	1.70	0.83	92.46	1.41	1.00
Texas	94.93	2.15	0.64	92.62	1.09	0.49
Utah	91.85	1.30	0.57	89.80	0.71	0.29
Vermont	94.92	0.92	0.25	92.64	1.32	0.12
Virginia	93.66	1.00	0.44	92.22	1.84	0.62
Washington	91.63	2.24	0.83	89.86	1.01	0.91
West Virginia	93.70	1.02	0.12	92.78	1.23	0.00
Wisconsin—Milwaukee	92.35	1.98	0.54	87.51	2.57	0.79
Wisconsin	92.21	1.06	0.19	90.25	0.92	0.39
Wyoming	93.04	0.81	0.15	91.32	1.54	0.28
Other jurisdictions						
Bureau of Indian Education (BIE)	92.61	1.40	0.97	90.44	1.42	0.57
Department of Defense Education Activity (DoDEA)	94.24	0.88	0.89	94.62	0.92	0.39
District of Columbia (DCPS)	93.80	1.57	1.00	88.19	1.34	1.34
District of Columbia	93.48	1.08	0.66	88.51	1.06	0.79
Puerto Rico	94.31	0.00	0.10	93.63	0.08	0.03

NOTE: For Puerto Rico, given that the assessment was administered in Spanish, the exclusion rate for EL pertains to the exclusion rate for students with linguistic limitations in Spanish.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_state_mathematics_assessment.aspx

NAEP Technical Documentation Weighted Student Response and Exclusion Rates for the 2019 State Reading Assessment

The following table presents weighted student response and exclusion rates, by participating jurisdiction, for the eighth-grade public school state assessment samples. States with Trial Urban District Assessment (TUDA) districts are shown in multiple rows: for the TUDA district(s) and for the state as a whole (the TUDA district[s] plus the rest of the state).

Separate exclusion rates are provided for students with disabilities (SD) and English learners (EL).

A weighted student response rate indicates the percentage of the student population that is directly represented by the assessed students from within participating schools. A weighted exclusion rate indicates the percentage of students in the population that would be excluded from the assessment.

Weighted student response and exclusion rates, state reading assessment, by grade and jurisdiction: 2019

	Grade 4			Grade 8		
Jurisdiction	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded	Weighted student response rates (percent)	Weighted percentage of all students who are SD and excluded	Weighted percentage of all students who are EL and excluded
Total	**93.50**	**1.74**	**0.77**	**91.39**	**1.49**	**0.63**
Alabama	93.86	0.85	0.48	94.14	1.51	0.23
Alaska	91.38	0.95	0.23	89.10	0.43	0.48
Arizona	93.72	1.08	0.38	91.30	1.52	0.61
Arkansas	95.38	1.62	0.25	91.91	1.77	0.31
California—Fresno	94.25	1.84	0.67	87.86	1.48	1.17
California—Los Angeles	95.76	2.06	1.87	92.10	1.59	1.79
California—San Diego	93.02	1.72	1.30	90.98	2.97	1.89
California	94.45	2.32	1.07	92.91	1.20	0.82
Colorado—Denver	93.38	2.19	5.28	91.09	0.94	0.86
Colorado	92.52	1.32	0.92	91.46	0.96	0.53
Connecticut	92.96	1.21	0.80	92.01	1.17	1.00
Delaware	93.30	1.17	0.59	92.40	1.61	0.27
Florida—Duval County	94.79	1.90	0.59	91.04	1.41	0.91
Florida—Hillsborough County	92.80	1.65	1.18	91.38	1.57	0.43
Florida—Miami-Dade	95.80	1.85	2.10	92.73	1.22	1.85
Florida	93.37	1.57	1.01	91.62	1.65	1.06
Georgia—Atlanta	94.68	1.43	0.17	93.15	2.45	0.36
Georgia	94.86	1.68	0.49	92.08	2.47	0.68
Hawaii	93.35	1.10	1.17	89.62	1.01	0.52
Idaho	93.91	1.31	0.16	93.65	1.04	0.09
Illinois—Chicago	93.07	1.29	1.16	91.91	0.61	0.51
Illinois	93.90	1.17	0.72	91.11	0.67	0.39
Indiana	93.99	1.56	0.32	91.73	1.35	0.26
Iowa	94.32	1.05	0.71	93.41	0.90	0.29
Kansas	94.14	1.47	0.55	93.55	1.27	0.59
Kentucky—Jefferson County	95.00	2.43	2.53	90.92	1.67	0.78
Kentucky	94.92	2.22	0.65	92.03	2.07	0.37
Louisiana	93.33	1.74	0.33	91.58	3.03	0.38
Maine	92.12	1.14	0.44	88.86	1.45	0.28
Maryland—Baltimore City	92.09	1.92	1.23	88.52	3.07	1.35
Maryland	93.09	1.92	1.30	89.68	2.05	0.94
Massachusetts—Boston	92.96	3.12	2.80	91.86	3.11	3.50
Massachusetts	93.15	2.21	1.13	91.24	1.67	1.37
Michigan—Detroit	93.08	4.04	0.36	90.77	5.55	0.37
Michigan	93.29	1.75	0.25	92.54	2.07	0.59
Minnesota	92.82	1.30	0.25	89.02	1.43	0.64
Mississippi	94.78	0.75	0.08	91.97	0.88	0.12
Missouri	93.85	0.82	0.45	93.68	0.92	0.20
Montana	92.83	1.50	0.13	92.72	1.19	0.06
Nebraska	94.57	1.04	0.49	92.77	0.86	0.39
Nevada—Clark County	93.42	1.48	0.84	91.84	0.78	0.68
Nevada	93.45	1.43	0.72	91.91	0.93	0.59
New Hampshire	89.87	1.08	0.25	84.91	0.83	0.24
New Jersey	92.73	1.09	0.86	90.63	0.99	1.31
New Mexico—Albuquerque	92.53	1.30	0.30	90.81	1.49	0.49
New Mexico	93.26	1.04	0.54	91.98	2.13	0.98
New York—New York City	90.91	3.90	2.07	92.61	0.79	1.28
New York	88.77	2.40	1.09	84.36	1.44	0.88
North Carolina—Charlotte-Mecklenburg	92.06	1.80	1.38	91.10	0.80	1.93
North Carolina—Guilford County	92.91	0.91	0.00	91.28	0.92	0.24
North Carolina	92.59	1.49	0.53	90.71	1.08	0.41
North Dakota	94.03	1.43	0.21	91.51	1.07	0.28

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Reading Assessment.

Jurisdiction	Grade 4 Weighted student response rates (percent)	Grade 4 Weighted percentage of all students who are SD and excluded	Grade 4 Weighted percentage of all students who are EL and excluded	Grade 8 Weighted student response rates (percent)	Grade 8 Weighted percentage of all students who are SD and excluded	Grade 8 Weighted percentage of all students who are EL and excluded
Ohio—Cleveland	92.47	3.33	0.48	91.92	4.31	0.99
Ohio	92.85	2.13	0.22	93.30	2.05	0.10
Oklahoma	94.18	1.96	0.54	92.44	1.78	0.27
Oregon	90.87	0.88	0.28	90.19	0.97	0.42
Pennsylvania—Philadelphia	95.47	4.50	2.42	92.08	4.38	1.66
Pennsylvania	93.09	1.97	0.86	91.29	1.61	0.65
Rhode Island	94.29	1.68	1.13	91.41	1.39	0.76
South Carolina	93.67	0.86	0.30	93.17	0.98	0.49
South Dakota	92.42	1.43	0.14	91.67	1.10	0.56
Tennessee—Shelby County	93.22	1.66	0.43	90.44	1.76	0.40
Tennessee	93.73	1.51	0.76	90.88	2.02	0.50
Texas—Austin	92.28	3.22	1.89	87.16	1.54	1.57
Texas—Dallas	94.73	2.46	3.08	92.74	2.68	2.03
Texas—Fort Worth	95.34	2.08	1.20	94.35	1.01	0.17
Texas—Houston	95.57	1.55	0.92	91.89	1.11	0.97
Texas	95.40	2.74	1.39	92.44	1.85	0.68
Utah	92.34	0.83	0.32	89.64	0.95	0.24
Vermont	94.17	1.43	0.04	93.59	1.27	0.17
Virginia	93.37	0.89	0.67	89.88	1.64	0.55
Washington	92.11	1.57	0.98	90.03	1.30	0.98
West Virginia	92.90	1.27	0.07	92.85	1.39	0.06
Wisconsin—Milwaukee	92.37	2.58	0.52	87.00	2.94	0.82
Wisconsin	93.59	1.22	0.52	90.55	1.24	0.37
Wyoming	93.67	1.14	0.33	91.04	1.68	0.28
Other jurisdictions						
Bureau of Indian Education (BIE)	92.85	1.67	0.85	90.46	1.69	0.71
Department of Defense Education Activity (DoDEA)	94.16	1.09	0.73	93.35	0.99	0.30
District of Columbia (DCPS)	93.54	2.13	1.47	89.81	1.65	1.34
District of Columbia	93.42	1.75	0.92	89.05	1.30	0.74

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Reading Assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/weighted_student_response_and_exclusion_rates_for_the_2019_state_reading_assessment.aspx

NAEP Technical Documentation School Sample Selection for the 2019 State Assessment

The sampled schools for the fourth- and eighth-grade public school state assessments in mathematics and reading came from two frames: the primary public school sample frame constructed from the Common Core of Data (CCD) and the supplemental new-school sampling frame. Schools were sampled from each school frame with probability proportional to size (PPS) using systematic sampling. Prior to sampling, schools in each frame were sorted by the appropriate implicit stratification variables in a serpentine order. A school's measure of size was a complex function of the school's estimated grade enrollment. Schools whose measure of size was larger than the sampling interval could be selected or "hit" multiple times. Schools with multiple hits were selected with certainty and had larger student sample sizes.

For the CCD-based frame, schools were sampled at a rate that would yield specific target student sample sizes for each jurisdiction. At grades 4 and 8, all jurisdictions, except Puerto Rico, had a target student sample size of 5,700 students. The goal was to obtain 4,900 assessed students: 2,200 students for the reading operational assessments, and 2,700 students for the mathematics operational assessments. Puerto Rico had a target student sample size of 4,000 students. By design, Bureau of Indian Education (BIE) schools were not part of the state assessments this year. However, separate BIE school samples were selected based on target student sample sizes that were large enough to ensure that BIE schools were sufficiently represented in the national samples.

The schools in the new-school frame were sampled at the same rate as the CCD-based school frame.

Prior to selection, schools were deeply stratified in each jurisdiction to ensure that the school sample distribution reflected the school population distribution as closely as possible, with regard to the stratification variables, to minimize sampling error. The success of this approach was shown by comparing the proportion of minorities enrolled in schools (based on CCD values for each school), median income, and urban-centric locale (viewed as an interval variable) reported in the original frame against the school sample.

In addition, the distribution of state assessment achievement scores for the original frame can be compared with that of the school sample for those jurisdictions for which state assessment achievement data are available, as was done in the evaluation of the samples using state achievement data.

NAEP Technical Documentation Evaluation of the Samples for the 2019 State Assessment Using State Achievement Data

The purpose of this analysis was to determine whether public schools selected for the 2019 samples were representative of the schools on the NAEP sampling frames in terms of student achievement. Percentiles of the achievement distributions were compared between the frame and school sample for each public school jurisdiction in grades 4 and 8.

Achievement Data

For grades 4 and 8, the achievement variable used in the analysis was the same variable used in the NAEP sample design to stratify the public school frame. For most jurisdictions, the variable was an achievement score provided by the jurisdiction. However, for some jurisdictions where achievement data were not available, the 2012-2016 American Community Survey (ACS) 5-year estimates for median household income was used. (Median household income was based on the five-digit zip code area in which the school was located.) The achievement data consisted of various types of school-specific achievement measures from state assessment programs. The type of achievement data available varied by jurisdiction. For instance, in some states, the measure was the average score for a given state assessment. In other states, the measure was a percentile rank or percentage of students above a specific score. For Connecticut at grade 4, for example, we used the percentage of students in grade 4 that scored at or above proficient level on the state mathematics test.

During frame development, not every record on the Common Core of Data (CCD) file matched the achievement data files created for the National Center for Education Statistics (NCES), even in jurisdictions where those data were generally available. For schools that did not match, their achievement scores were imputed by a mean matching imputation approach using the mean achievement score for schools with complete achievement data within the same jurisdiction-urbanicity-race/ethnicity stratum combination.

Methodology

To determine whether the distributions of schools by achievement measure between the frame and school sample were different, comparisons of percentile estimates were made for the 10th, 25th, 50th, 75th, and 90th percentile levels as well as the mean for each public school jurisdiction by grade. Frame and school sample estimates were considered statistically different if the frame value fell outside the 95 percent confidence interval of the corresponding sample estimate. The percentile values for the frames were calculated by weighting each school by the estimated number of students in the given grade. The percentile estimates for the school samples were calculated using school weights and weighted by the school measure of size (estimated number of students in the given grade). The 95 percent confidence intervals for the school sample estimates were calculated in WesVar—software for computing estimates of sampling variance from complex sample survey (Westat, 2000b)—using the Woodruff method (Sarndal, Swensson, and Wretman 1992) with the use of a finite population correction factor.

Results

As mentioned above, sample and frame distributions of schools by achievement measure were determined to be different if at least one of the percentile estimates or the mean differed significantly at the 95 percent confidence level. Out of all the jurisdiction and grade comparisons (excluding jurisdictions where all schools in the frame were selected), only 14 of the 948 distributions compared were found to be significantly different. They are shown in the table below.

Summary of significant differences in achievement measures (median income) between the sample and the frame, state assessment, by grade and jurisdiction: 2019

Grade	Jurisdiction	Achievement data / median income	Estimate	Frame	Sample	Confidence interval
4	Illinois	Achievement data	25th percentile	12.49	12.12	(11.71, 12.22)
	New York	Achievement data	90th percentile	73.04	72.03	(69.97, 72.61)
	Puerto Rico	Median income	75th percentile	22574.19	22404.76	(22323.01, 22486.52)
	Albuquerque	Achievement data	75th percentile	25.91	25.93	(25.92, 25.94)
	Denver	Achievement data	90th percentile	51.81	52.17	(52, 52.33)
	Fresno	Achievement data	10th percentile	2396.47	2395.58	(2395.56, 2395.6)
	Fresno	Achievement data	50th percentile	2431.01	2429.20	(2427.79, 2430.94)
	Hillsborough County (FL)	Achievement data	90th percentile	81.35	81.84	(81.53, 82.16)
	Houston	Achievement data	25th percentile	54.36	52.74	(51.5, 54.13)
8	Arizona	Achievement data	10th percentile	12.72	13.54	(12.92, 14.55)
	South Dakota	Achievement data	10th percentile	15.01	13.70	(11.97, 14.57)
	South Dakota	Achievement data	90th percentile	60.51	58.65	(58.16, 59.13)
	Charlotte-Mecklenburg	Achievement data	75th percentile	68.28	66.29	(66.25, 66.33)
	Charlotte-Mecklenburg	Achievement data	90th percentile	75.40	75.31	(75.31, 75.32)
	Clark County (NV)	Median income	10th percentile	29656.62	30310.13	(29987.99, 30632.28)
	Jefferson County (KY)	Achievement data	90th percentile	65.08	64.30	(63.55, 64.98)
	Shelby County (TN)	Achievement data	25th percentile	29.23	29.42	(29.31, 29.53)

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

The number of significant differences found in this analysis was smaller than what would be expected to occur by chance, given the large number of comparisons that were made. Also, the number of significant differences remained small even with the added use of a finite population correction factor in the calculation of the sampling variances. Even in the statistically significant cases, the close adherence of sample values to frame values suggests there is little evidence that the school sample for NAEP 2019 is not representative of the frame from which it was selected. The achievement/median income variable is used as the fourth-level sort order variable in the school systematic selection procedure. While it may be a rather low level sort variable, it still helps control how representative the sampled schools are in terms of achievement. The close agreement between frame and sample values of these achievement/median income variables provided assurance that the selected sample is representative of the frame with respect to achievement or income status.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/evaluation_of_the_samples_for_the_2019_state_assessment_using_state_achievement_data.aspx

NAEP Technical Documentation School Sample Sizes: CCD-Based and New-School Sampling Frames for the 2019 State Assessment

The following table presents the number of schools selected for the fourth- and eighth-grade public school mathematics and reading samples by sampling frame (Common Core of Data [CCD]-based and new-school) and participating jurisdiction. The school counts shown are at the time of sampling. In the table, the first column, Jurisdiction, is either the "state name" if the state does not have a Trial Urban District Assessments (TUDA) district (e.g., Alaska) or the "state name + TUDA district name" (e.g., California—Fresno) and "state name + non-TUDA part" (e.g., California—Balance).

After school sampling, some schools in TUDA districts were discovered to be charter schools that were the responsibility of the state and not the individual TUDA district. These schools were reclassified from TUDA to "balance of the state".

Number of schools in the total, CCD-based, and new-school samples, state assessment, by grade and jurisdiction: 2019

	Grade 4			Grade 8		
Jurisdiction	Total school sample	CCD-based school sample	New-school sample	Total school sample	CCD-based school sample	New-school sample
Total	**8,520**	**8,430**	**90**	**7,260**	**7,170**	**90**
Alabama	130	120	10	120	120	#
Alaska	180	180	#	130	130	#
Arizona	130	130	#	130	130	#
Arkansas	120	120	#	120	110	#
California—Fresno	60	60	#	20	20	#
California—Los Angeles	90	90	#	80	70	#
California—San Diego	60	60	#	40	40	#
California—Balance	110	110	#	110	110	#
Colorado—Denver	60	60	#	50	50	#
Colorado—Balance	110	110	#	110	110	#
Connecticut	130	120	#	120	120	#
Delaware	100	100	#	70	60	10
Florida—Duval County	60	60	#	40	40	#
Florida—Hillsborough County	60	60	#	50	50	#
Florida—Miami-Dade County	90	90	#	80	80	#
Florida—Balance	90	90	#	90	90	#
Georgia—Atlanta	60	60	#	20	20	#
Georgia—Balance	110	110	#	110	110	#
Hawaii	120	120	#	60	60	#
Idaho	130	130	#	100	100	#
Illinois—Chicago	100	100	#	100	90	#
Illinois—Balance	100	100	#	100	100	#
Indiana	120	120	#	120	120	#
Iowa	130	130	#	120	120	#
Kansas	130	130	#	130	130	#
Kentucky—Jefferson County	60	60	#	30	30	#
Kentucky—Balance	100	100	#	110	110	#
Louisiana	120	120	#	120	120	#
Maine	150	150	#	110	110	#
Maryland—Baltimore	60	60	#	60	60	#
Maryland—Balance	110	110	#	110	110	#
Massachusetts—Boston	70	70	#	50	50	#
Massachusetts—Balance	110	110	#	110	110	#

Rounds to zero.
NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

Jurisdiction	Grade 4 Total school sample	Grade 4 CCD-based school sample	Grade 4 New-school sample	Grade 8 Total school sample	Grade 8 CCD-based school sample	Grade 8 New-school sample
Michigan—Detroit	70	70	#	60	60	#
Michigan—Balance	120	120	#	120	120	#
Minnesota	150	140	#	150	140	#
Mississippi	120	120	#	110	110	#
Missouri	130	130	#	130	130	#
Montana	170	170	#	140	130	#
Nebraska	150	150	#	120	120	#
Nevada—Clark County	90	90	10	60	60	#
Nevada—Balance	40	40	#	40	40	#
New Hampshire	140	140	#	90	90	#
New Jersey	120	120	#	120	120	#
New Mexico—Albuquerque	60	60	#	40	40	#
New Mexico—Balance	100	100	#	80	80	#
New York—New York City	90	90	#	90	90	#
New York—Balance	80	80	#	80	80	#
North Carolina—Charlotte-Mecklenburg	60	60	#	40	40	#
North Carolina—Guilford County	60	60	#	30	30	#
North Carolina—Balance	120	120	#	120	110	#
North Dakota	170	160	#	140	140	#
Ohio—Cleveland	80	80	#	80	80	#
Ohio—Balance	120	120	#	120	120	#
Oklahoma	130	130	#	130	130	#
Oregon	140	140	#	130	130	#
Pennsylvania—Philadelphia	60	60	#	50	50	#
Pennsylvania—Balance	110	110	#	110	110	#
Rhode Island	120	120	#	70	70	#
South Carolina	120	120	#	120	120	#
South Dakota	160	160	#	130	130	#
Tennessee—Shelby County	60	60	#	40	40	#
Tennessee—Balance	110	110	#	110	110	#
Texas—Austin	60	60	#	20	20	#
Texas—Dallas	60	60	#	40	40	#
Texas—Fort Worth	60	60	#	30	30	#
Texas—Houston	90	90	#	50	50	#
Texas—Balance	110	110	#	110	110	#
Utah	130	130	#	120	120	#
Vermont	210	210	#	120	120	#
Virginia	120	120	#	110	110	#
Washington	140	140	#	130	130	#
West Virginia	140	140	#	110	110	#
Wisconsin—Milwaukee	70	70	#	60	60	#
Wisconsin—Balance	130	130	#	120	120	#
Wyoming	140	140	10	100	90	10
Other jurisdictions						
Bureau of Indian Education (BIE)	140	130	#	110	110	#
Department of Defense Education Activity (DoDEA)	100	90	10	60	60	10
District of Columbia (TUDA)	80	80	#	30	30	#
District of Columbia–Balance	50	50	#	50	40	#
Puerto Rico	160	160	#	160	160	#

Rounds to zero.
NOTE: Numbers of schools are rounded to nearest ten. Detail may not sum to totals due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/school_sample_sizes_for_the_2019_state_assessment.aspx

NAEP Technical Documentation Stratification of Schools for the 2019 State Assessment

Stratification Variables

The purpose of school stratification is to increase the efficiency and ensure the representativeness of the school samples in terms of important school-level characteristics, such as geography (e.g., states and TUDA districts), urbanicity, and race/ethnicity classification. NAEP school sampling utilizes two types of stratification: explicit and implicit.

Explicit stratification partitions the sampling frame into mutually exclusive groupings called strata. The systematic samples selected from these strata are independent, meaning that each is selected with its own unique random start. The explicit school strata for the 2019 NAEP state assessments were usually states. If a state contained Trial Urban District Assessment (TUDA) districts, the explicit strata were each individual TUDA district and the balance of the state. In 2019, there were 27 participating TUDA districts in the NAEP state assessment program. They are listed below:

- Albuquerque Public Schools, New Mexico;
- Atlanta Public Schools, Georgia;
- Austin Independent School District, Texas;
- Baltimore City Public Schools, Maryland;
- Boston Public Schools, Massachusetts;
- Charlotte-Mecklenburg Schools, North Carolina;
- Chicago Public Schools, Illinois;
- Clark County School District, Nevada;
- Cleveland Metropolitan School District, Ohio;
- Dallas Independent School District, Texas;
- Denver Public Schools, Colorado;
- Detroit Public Schools, Michigan;
- District of Columbia Public Schools, District of Columbia;
- Duval County Public Schools, Florida;
- Fort Worth Independent School District, Texas;
- Fresno Unified School District, California;
- Guilford County Schools, North Carolina;
- Hillsborough County Public Schools, Florida;
- Houston Independent School District, Texas;
- Jefferson County Public Schools (Louisville), Kentucky;
- Milwaukee Public Schools, Wisconsin;
- Los Angeles Unified School District, California;
- Miami-Dade County Public Schools, Florida;
- New York City Department of Education, New York;
- School District of Philadelphia, Pennsylvania;
- San Diego Unified School District, California; and
- Shelby County Schools, Tennessee.

Implicit stratification involves sorting the sampling frame, as opposed to grouping the frame. For NAEP, schools are sorted by key school characteristics within explicit strata and sampled systematically using this ordering. This type of stratification ensures the representativeness of the school samples with respect to the key school characteristics. The implicit school stratification variables for the 2019 state assessments included urbanicity, race/ethnicity classification, achievement score/median income, and magnet school indicator. Further details about these variables can be found here.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/stratification_of_schools_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Stratification Variables for the 2019 State Assessment

The implicit stratification of public schools for the NAEP 2019 state assessments involved four dimensions:

- urbanicity classification (urban-centric locale);
- race/ethnicity classification;
- achievement data or median income; and
- magnet school indicator.

The urbanicity stratum is the top-level implicit stratification variable and is assigned within each explicit stratum. It is derived from the NCES urban-centric locale variable and classifies schools based on location (city, suburb, town, rural) and proximity to urbanized areas. It has 12 possible values.

The race/ethnicity stratum classifies schools by the relative magnitude of enrollment of non-Hispanic White, non-Hispanic

Stratification by Urbanicity Classification

Stratification by Achievement Data and Median Income

Stratification by Race/ethnicity Classification

Missing Stratification Variables

Black, Hispanic, Asian, American Indian/Alaska Native, Hawaiian/Pacific Islander, and students classified as two or more races represented in schools. The source of the race/ethnicity data is the Common Core of Data (CCD). The race/ethnicity stratum is the second-level variable in the stratification hierarchy and is nested within the urbanicity stratum.

The next stratification dimension is a classification of schools based on either achievement data or median household income. For most jurisdictions including TUDA districts, it is based on achievement data. However, not all jurisdictions provide achievement data. In these cases, median household income is used instead. Median income comes from the 2012-2016 5-year American Community Survey (ACS), and it corresponds to the zip code area where the school is located.

The final stratification dimension indicates whether a school is classified as a magnet school or not, according to the CCD. It is used to provide an additional level of classification among the highest-achieving schools, to differentiate between high-achieving magnet schools and high-achieving non-magnet schools. Many domains do not classify any schools as magnet, in which case this variable has no effect on the implicit stratification.

Missing values for stratification variables were imputed.

The implicit stratification in this hierarchical procedure was achieved via a "serpentine sort" within a given explicit stratum. This sort was accomplished by alternating between ascending and descending sort order on each variable successively through the sort hierarchy. Within this sorted list the schools were arranged in serpentine order by magnet school status and achievement data (or median household income), within each cell determined by the two higher stratification variables (urbanicity and race/ethnicity classifications). Schools were sorted in ascending order for magnet school status and descending order for achievement data/median household income used in every other cell, and in descending order for magnet school status and ascending order for achievement data/median household income used in the remaining cells, giving an ascending-descending-ascending-descending pattern. Schools in these urbanicity and race/ethnicity classification cells were also sorted in serpentine order. Within each urbanicity and race/ethnicity classification cell, schools were sorted in ascending order within one urbanicity stratum, by descending order within the next urbanicity stratum, and so on. The following table shows an oversimplified example to illustrate the ascending-descending-ascending-descending pattern of the serpentine sort. Since the magnet school indicator was not applicable in most domains, it is omitted from the example table for simplicity.

Stratification variables sorted by serpentine sort: 2019

TUDA	Urbanicity	Race/ethnicity level	Achievement score
Yes	Large City	High minority	20
			22
			27
			30
		Low minority	29
			26
			20
			18
	Mid-size City	Low minority	15
			25
			27
			31
		High minority	35
			32
			30
			28
No	Mid-size City	High minority	20
			22
			27
			30
		Low minority	29
			26
			20
			18
	Large City	Low minority	15
			25
			27
			31
		High minority	35
			32
			30
			28

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/stratification_variables_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Missing Stratification Variables for the 2019 State Assessment

Schools with missing stratification variables had their data imputed as follows:

Schools missing the urbanicity (urban-centric locale) variable were assigned the modal value of urbanicity for schools in the same five-digit zip code or the same city. The modal value is the value that occurs the most. For example, one school in zip code 32305 has missing urbanicity. In the same five-digit zip code area, there are 20

schools with non-missing urbanicity variable. 15 of them have an urbanicity value of 12, and the other five have an urbanicity value of 21. The modal value of urbanicity for schools in zip code 32305 is 12.

The mean ethnicity percentage was imputed at the five-digit zip code level only if all schools were missing ethnicity at the district level, and only at the three-digit zip code prefix if the five-digit zip code ethnicity mean was missing as well. Schools with missing or questionable values in race/ethnicity enrollment data—those in which the summation of the ethnicity percentages did not fall in the range 97 through 103, indicating a gross error—were assigned the average race/ethnicity enrollment within their school district, five-digit zip code, or three-digit zip code prefix.

Schools with missing achievement data in jurisdictions and grades for which achievement data were used in stratification were assigned the mean achievement data value within their urbanization and race/ethnicity classification. The achievement data were imputed only for those schools in jurisdictions and grades in which achievement data were used for stratification.

Schools missing median household income were assigned the mean value of median household income for the five-digit zip code prefix in which they were located. If it was not available or it was unreliable, then the mean value of median household income for the three-digit zip code prefix was used. In some cases, imputation was not possible at the three-digit zip code level, and needed to be done at the city and state level.

Schools with missing estimated grade enrollment had their estimated grade enrollment set to 20.

NAEP Technical Documentation Stratification by Achievement Data and Median Income for the 2019 State Assessment

Jurisdictions Using Achievement Data or Median Household Income in Stratification

The achievement data obtained from each jurisdiction, including TUDA districts, are derived from the results of state assessment programs. The contents of the achievement data files varied by jurisdiction and included achievement measures for a variety of subjects, grades, and multiple assessment programs. One achievement measure was selected for each responding jurisdiction to be used in the stratification process. Where available, the achievement data were used for implicit stratification by grade. Since the achievement data are more current than the median household income data, as well as more likely to be well-correlated to NAEP assessment scores, they were judged to be a more effective stratification variable. The achievement measures were selected according to the following criteria:

- At both grades 4 and 8, achievement measures from state assessments conducted in mathematics and reading were under consideration. If both were available, the mathematics measure was preferred. As a rule, the most current measures available were used. For California, the measures were from the 2016-2017 state assessment. For all remaining jurisdictions, the measures were from the 2014-2015 state assessments.
- Achievement measures should match to at least 70 percent of the schools on the sampling frames.
- Achievement measures should differentiate schools from one another. For example, district-level measures or those with high missing rates (30 percent or more), were judged not to be useful for differentiating schools. In addition, achievement measures that did not have large enough dispersion, based on inspection, were not used for stratification either.
- All other things being equal, the possibilities for score types were average scale score, median scale score, percentile rank, median percentile rank, normal curve equivalent, raw score, index score, and percentage above a particular cut point or quartile. In general, the availability varied for any given jurisdiction/grade/subject/year.

Achievement data used for implicit stratification were obtained for all 50 states and the District of Columbia for both fourth- and eighth-grade assessments. In Nevada—Clark County where the match rate was too low and in Puerto Rico where achievement data were not available, median household income was used based on the zip code area in which the school was located. The source of median household income was the 2012-2016 5-year American Community Survey (ACS). The estimated grade enrollment was used for the stratification for DoDEA and BIE schools, since neither achievement data nor median income were available. Estimated grade enrollment was obtained from the Common Core of Data (CCD) file developed by NCES.

NAEP Technical Documentation Jurisdictions Using Achievement Data or Median Household Income in Stratification for the 2019 State Assessment

This table shows whether achievement data or median household income was used as a stratification variable for participating jurisdictions and TUDA districts. All jurisdictions and TUDA districts used achievement data as a stratification variable except for Nevada—Clark County, Puerto Rico, Bureau of Indian Education (BIE), and Department of Defense Education Activity (DoDEA) schools. Nevada—Clark County used median income because of low match rate between the state assessment and NAEP sampling frame and Puerto Rico used median income because achievement data were not available. However, BIE and DoDEA schools used estimated grade enrollment because neither achievement nor median income data were available.

Use of achievement data or median household income for stratification, state assessment, by grade and jurisdiction: 2019

Jurisdiction	Grade 4		Grade 8	
	Achievement	Income	Achievement	Income
Alabama	YES	NO	YES	NO
Alaska	YES	NO	YES	NO
Arizona	YES	NO	YES	NO
Arkansas	YES	NO	YES	NO
California—Fresno	YES	NO	YES	NO
California—Los Angeles	YES	NO	YES	NO
California—San Diego	YES	NO	YES	NO
California	YES	NO	YES	NO
Colorado—Denver	YES	NO	YES	NO
Colorado	YES	NO	YES	NO
Connecticut	YES	NO	YES	NO
Delaware	YES	NO	YES	NO
Florida—Duval County	YES	NO	YES	NO
Florida—Hillsborough County	YES	NO	YES	NO
Florida—Miami-Dade County	YES	NO	YES	NO
Florida	YES	NO	YES	NO
Georgia—Atlanta	YES	NO	YES	NO
Georgia	YES	NO	YES	NO
Hawaii	YES	NO	YES	NO
Idaho	YES	NO	YES	NO
Illinois—Chicago	YES	NO	YES	NO
Illinois	YES	NO	YES	NO
Indiana	YES	NO	YES	NO
Iowa	YES	NO	YES	NO
Kansas	YES	NO	YES	NO
Kentucky—Jefferson County	YES	NO	YES	NO
Kentucky	YES	NO	YES	NO
Louisiana	YES	NO	YES	NO
Maine	YES	NO	YES	NO
Maryland—Baltimore	YES	NO	YES	NO
Maryland	YES	NO	YES	NO
Massachusetts—Boston	YES	NO	YES	NO
Massachusetts	YES	NO	YES	NO
Michigan—Detroit	YES	NO	YES	NO
Michigan	YES	NO	YES	NO
Minnesota	YES	NO	YES	NO
Mississippi	YES	NO	YES	NO
Missouri	YES	NO	YES	NO
Montana	YES	NO	YES	NO
Nebraska	YES	NO	YES	NO
Nevada—Clark County	NO	YES	NO	YES
Nevada	YES	NO	YES	NO
New Hampshire	YES	NO	YES	NO
New Jersey	YES	NO	YES	NO
New Mexico—Albuquerque	YES	NO	YES	NO
New Mexico	YES	NO	YES	NO
New York—New York City	YES	NO	YES	NO
New York	YES	NO	YES	NO
North Carolina—Charlotte-Mecklenburg	YES	NO	YES	NO
North Carolina—Guilford County	YES	NO	YES	NO
North Carolina	YES	NO	YES	NO
North Dakota	YES	NO	YES	NO
Ohio—Cleveland	YES	NO	YES	NO
Ohio	YES	NO	YES	NO
Oklahoma	YES	NO	YES	NO
Oregon	YES	NO	YES	NO
Pennsylvania—Philadelphia	YES	NO	YES	NO
Pennsylvania	YES	NO	YES	NO
Rhode Island	YES	NO	YES	NO
South Carolina	YES	NO	YES	NO

— Not available.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

Jurisdiction	Grade 4 Achievement	Grade 4 Income	Grade 8 Achievement	Grade 8 Income
South Dakota	YES	NO	YES	NO
Tennessee—Shelby County	YES	NO	YES	NO
Tennessee	YES	NO	YES	NO
Texas—Austin	YES	NO	YES	NO
Texas—Dallas	YES	NO	YES	NO
Texas—Fort Worth	YES	NO	YES	NO
Texas—Houston	YES	NO	YES	NO
Texas	YES	NO	YES	NO
Utah	YES	NO	YES	NO
Vermont	YES	NO	YES	NO
Virginia	YES	NO	YES	NO
Washington	YES	NO	YES	NO
West Virginia	YES	NO	YES	NO
Wisconsin—Milwaukee	YES	NO	YES	NO
Wisconsin	YES	NO	YES	NO
Wyoming	YES	NO	YES	NO
Other jurisdictions				
Bureau of Indian Education (BIE)	—	—	—	—
Department of Defense Education Activity (DoDEA)	—	—	—	—
District of Columbia (TUDA)	YES	NO	YES	NO
District of Columbia	YES	NO	YES	NO
Puerto Rico	NO	YES	NO	YES

— Not available.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2019 State Mathematics and Reading Assessments.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/jurisdictions_using_achievement_data_or_median_household_income_in_stratification.aspx

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NAEP Technical Documentation Stratification by Race/Ethnicity Classification for the 2019 State Assessment

Race/ethnicity classification was based on the second and third largest race/ethnicity percentages (among non-Hispanic White, non-Hispanic Black, Hispanic, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and students classified as two or more races) within each urbanicity classification stratum. The race/ethnicity strata were formed using one of three classification schemes as follows:

- Case 1: Urbanicity cells where both the second and third largest race/ethnicity groups contained less than 7 percent of students in the urbanicity cell were not stratified by race/ethnicity enrollment (race/ethnicity stratification value was set to 0). There were no race/ethnicity strata formed within these urbanicity cells.
- Case 2: Urbanicity cells where the second largest race/ethnicity group contained at least 7 percent but the second and third largest race/ethnicity groups combined contained no more than 15 percent of students in the urbanicity cell were stratified into three race/ethnicity cells. Schools were ordered by the sum of the percentage of race/ethnicity enrollment for the second and third largest groups within the urbanicity cell and then divided into three approximately equal size groups in terms of students.
- Case 3: Urbanicity cells where both the second and third largest race/ethnicity groups contained more than 15 percent of students in the urbanicity cell were stratified into four race/ethnicity cells. The second largest group provided the primary stratification variable; the third largest group provided the secondary stratification variable. Within an urbanicity cell, schools were first sorted based on the primary stratification variable. Then they were divided into two strata of schools containing approximately equal numbers of students. Within each of these two strata, the schools were sorted by the secondary stratification variable and subdivided into two substrata of schools containing approximately equal numbers of students. The four race/ethnicity classifications consisted of the following values: low primary variable/low secondary variable, low primary variable/high secondary variable, high primary variable/low secondary variable, and high primary variable/high secondary variable.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/stratification_by_race_ethnicity_classification_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Stratification by Urbanicity Classification for the 2019 State Assessment

The creation of the urbanicity classification variable was based on the NCES urban-centric locale and was defined within each explicit stratum. The NCES urban-centric locale contains the following categories:

- Large City: Territory inside an urbanized area and inside a principal city with population of 250,000 or more;
- Mid-size City: Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000;
- Small City: Territory inside an urbanized area and inside a principal city with population less than 100,000;
- Large Suburb: Territory outside a principal city and inside an urbanized area with population of 250,000 or more;
- Mid-size Suburb: Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000;
- Small Suburb: Territory outside a principal city and inside an urbanized area with population less than 100,000;
- Fringe Town: Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area;
- Distant Town: Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area;
- Remote Town: Territory inside an urban cluster that is more than 35 miles from an urbanized area;
- Fringe Rural: Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster;
- Distant Rural: Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster; and
- Remote Rural: Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

In addition to the 12 categories, the category "outside of the United States: Department of Defense Education Activity (DoDEA) overseas schools or Puerto Rico" is used. For the definitions of the geographic terms used in these descriptions, please refer to the Census Bureau's website (for example, www.census.gov/programs-surveys/metro-micro.html).

The urbanicity classification cells were created by starting with the original NCES urban-centric locale categories. Urbanicity strata were collapsed with neighboring strata until a minimum cell size criterion, in terms of the percentage of students, was met. The minimum cell size criterion varied by type of explicit stratum. The criterion for explicit strata comprising the largest TUDA districts (Los Angeles, New York City, Chicago, Miami-Dade, Houston, and Clark County) was 12 percent; for the other TUDA districts, it was 18 percent; and for all other explicit strata, it was 9 percent.

The urbanicity classification variable was equal to the original NCES urban-centric locale if no collapsing was necessary. If collapsing was necessary, the collapsing scheme first collapsed within the four major strata (city, suburbs, town, rural). For example, urbanicity categories 1, 2, and 3 within city were collapsed (1 with 2, 2 with 3) if cells 1 or 3 were deficient. If the middle cell (e.g., 2) was deficient, then it was collapsed with the smaller of the two end cells. If a collapsed pair was still deficient, it was collapsed with the remaining unit within the major stratum. That is, a single city cell would be created by collapsing the large city, mid-size city, and small city cells. If a cell was still deficient after collapsing within major stratum, further collapsing across major strata occurred as needed until the deficiency was resolved. The values of the urbanicity classification variable were set equal to the cell value of the final level of collapsing.

Prior experience with this type of stratification has shown that the greatest efficiency of stratification results when cities and suburb fringe areas are always kept separate from towns and rural areas, even if the enrollment criterion is violated.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/stratification_by_urbanicity_classification_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Student Sample Selection for the 2019 State Assessment

The sampling of students for the state assessments in mathematics and reading involved two steps: (1) sampling of students in the targeted grade (fourth or eighth) from each sampled school, and (2) assignment of assessment subject (mathematics or reading) to the sampled students. The state assessments in mathematics and reading were administered in digital form using tablets.

Sampling Students within Sampled Schools

Within each sampled school, a sample of students was selected from a list of students in the targeted grade such that every student had an equal chance of selection. The student lists were submitted either electronically using a system known as E-filing or on paper. In E-filing, student lists are submitted as Excel files by either school coordinators, NAEP State Coordinators, or NAEP TUDA Coordinators. The files can be submitted for one school at a time (known as single school E-file submission) or for an entire jurisdiction at once (known as multiple school E-file submission). E-filing allows schools to easily submit student demographic data electronically with the student lists, easing the burden on field supervisors and school coordinators.

Schools that are unable to submit their student lists using the E-filing system provide hardcopy lists to NAEP field supervisors. In 2019, across all state assessment samples combined, over 99 percent of the participating schools E-filed their student lists while less than 1 percent of the participating schools submitted hardcopy lists.

In year-round multi-track schools, students in tracks scheduled to be on break 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 one-half, 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 was submitted for every student on the frame, students were sorted by gender and race/ethnicity before the sample was selected to implicitly stratify the sample.

In some jurisdictions, every student in the targeted grade was needed to meet the overall student sample size. In these jurisdictions, all students in all schools at the targeted grade were sampled.

In the other jurisdictions except Puerto Rico, in schools with up to 52 students in the targeted grade, all students were selected. In schools with more than 52 students, systematic samples of 50 students were selected. In some cases, a larger school may have been selected with certainty during the school sample selection process, and thus may have selected more students.

For Puerto Rico, in schools with up to 26 students in the targeted grade, all students were selected. In schools with more than 26 students, systematic samples of 25

students were selected.

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.

Assigning Assessment Subject to Sampled Students

In all jurisdictions except Puerto Rico, sampled students, including new enrollees, in each participating sampled school were assigned to either the mathematics or the reading assessment at rates of 55 percent and 45 percent, respectively, using a process known as spiraling. In this process, test forms were randomly assigned to sampled students from test form sets that had, on average, a ratio of 27 mathematics forms to 22 reading forms. Students receiving a mathematics form were in the mathematics assessment, and students receiving a reading form were in the reading assessment. For Puerto Rico, all students were assigned a mathematics form since it was only participating in the operational mathematics assessment.

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/student_sample_selection_for_the_2019_state_assessment.aspx

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NAEP Technical Documentation Target Population for the 2019 State Assessment

The target population for the 2019 fourth- and eighth-grade public school state assessments in mathematics and reading was defined as all fourth and eighth grade students who were enrolled in public schools located in the 50 states, the District of Columbia, and Puerto Rico, Bureau of Indian Education (BIE) schools, and Department of Defense Education Activity (DoDEA) schools (including those located outside the United States).

http://nces.ed.gov/nationsreportcard/tdw/sample_design/2019/target_population_for_the_2019_state_assessment.aspx

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