Science 2009
State Report

Florida
Grade 8
Public Schools

This report provides selected results for Florida's public school students at grade 8 from the National Assessment of Educational Progress (NAEP) assessment in science. Results are reported by average scale scores and by achievement levels (*Basic, Proficient*, and *Advanced*).

Forty-six states and the Department of Defense Education Activity schools (DoDEA) participated in the 2009 science assessment at grades 4 and 8.

For more information about the assessment, see the NAEP website http://nces.ed.gov/nationsreportcard/ that contains
• *The Nation's Report Card: Science 2009*
• The full set of national and state results in an interactive database
• Released test questions, scoring guides, and question-level performance data

NAEP is a project of the National Center for Education Statistics (NCES), reporting on the academic achievement of elementary and secondary students in the United States.

KEY FINDINGS FOR 2009

Grade 8:

- In 2009, the average science score for eighth-grade students in Florida was 146. This was lower than that of the nation's public schools (149).
- In 2009, the percentage of students in Florida who performed at or above *Proficient* was 25 percent. This was smaller than that for the nation's public schools (29 percent).
- In 2009, the percentage of students in Florida who performed at or above *Basic* was 57 percent. This was smaller than that for the nation's public schools (62 percent).

Introduction

What Was Assessed?

The content for each NAEP assessment is determined by the National Assessment Governing Board. The framework for each assessment documents the content and process areas to be measured and sets guidelines for the types of questions to be used. The development process for the science framework required the active participation of teachers, curriculum specialists, subject-matter specialists, local school administrators, parents, and other members of the general public. The current framework is available at the Governing Board's website http://nagb.org/publications/frameworks/science-09.pdf.

The 2009 NAEP science framework approved by the Governing Board replaces the framework used for the 1996, 2000, and 2005 science assessments. A variety of factors made it necessary to create a new framework to guide the assessment of science in 2009 and beyond: the publication of *National Standards* for science literacy, advances in both science and cognitive research, the growth in national and international science assessments, advances in innovative assessment approaches, and the need to fairly assess the widest possible range of students.

Assessment Criteria

Each question in the 2009 science assessment was classified based on two criteria: *science content* and *science practices*. By considering these two criteria for each question, the framework ensures that NAEP assesses an appropriate balance of content along with a variety of ways of knowing and doing science.

SCIENCE CONTENT

The science content for the 2009 NAEP is defined by a series of statements that describe key facts, concepts, principles, laws, and theories in three broad areas:

- Physical Science
- Life Science
- Earth and Space Sciences

Physical Science deals with matter, energy, and motion; Life Science with structures and functions of living systems and changes in living systems; and Earth and Space Sciences with Earth in space and time, Earth structures, and Earth systems.

SCIENCE PRACTICES

The second aspect of the framework is defined by four science practices, which focus on what students should know and be able to do in science:

- Identifying Science Principles
- Using Science Principles
- Using Scientific Inquiry
- Using Technological Design

Assessment Design

The assessment design allowed for broad coverage at each grade of the three science content areas and four science practices, while minimizing the time burden for any one student. Each student in the state assessment was asked to complete two 25-minute sections. Each section contained between 14 and 18 questions depending on the balance between multiple-choice and constructed-response questions. Released NAEP science questions, along with student performance data by state, are available on the NAEP website at http://nces.ed.gov/nationsreportcard/itmrls/.

Who Was Assessed?

Forty-six states and the Department of Defense Schools participated in the 2009 science assessment at grades 4 and 8.

The overall participation rates for schools and students must meet guidelines established by the National Center for Education Statistics (NCES) and the National Assessment Governing Board for assessment results to be reported publicly. A participation rate of at least 85 percent for schools in each subject and grade was required. Participation rates for the 2009 science assessment are available on the NAEP website http://nationsreportcard.gov/science_2009/participation.asp.

The schools and students participating in NAEP assessments are selected to be representative both nationally and for public schools at the state level. The comparisons between national and state results in this report present the performance of public school students only. In NAEP reports, the category "nation (public)" does not include Department of Defense or Bureau of Indian Education schools.

How Is Student Science Performance Reported?

The 2009 state results are compared to results from the nation at each grade.

Scale Scores: Student performance is reported as an average score based on the NAEP science scale, which ranges from 0 to 300. Because NAEP scales are developed independently for each subject and for each content area within a subject, the scores cannot be compared across subjects or across content areas within the same subject. In addition, because the NAEP science scales are developed independently for each grade, the scores cannot be compared across the grades. Results are also reported at five percentiles (10th, 25th, 50th, 75th, and 90th) to show trends in performance for lower-, middle-, and higher-performing students.

Achievement Levels: Based on recommendations from policymakers, educators, and members of the general public, the Governing Board sets specific achievement levels for each subject area and grade. Achievement levels are performance standards indicating what students should know and be able to do. They provide another perspective with which to interpret student performance. NAEP results are reported in terms of three achievement levels—*Basic*, *Proficient*, and *Advanced*—and are expressed in terms of the percentage of students who attained each level. The achievement levels cannot be compared across grades. The three achievement levels are defined as follows:

- *Basic* denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade.
- *Proficient* represents solid academic performance for each grade assessed. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and appropriate analytical skills.
- *Advanced* represents superior performance.

The achievement levels are cumulative; therefore, students performing at the *Proficient* level also display the competencies associated with the *Basic* level, and students at the *Advanced* level also demonstrate the competencies associated with both the *Basic* and the *Proficient* levels.

As provided by law, NCES, upon review of congressionally mandated evaluations of NAEP, has determined that achievement levels are to be used on a trial basis and should be interpreted with caution. The NAEP achievement levels have been widely used by national and state officials. The science achievement-level descriptions are summarized in figure 1.

Figure 1	The Nation's Report Card 2009 State Assessment
	Descriptions of eighth-grade achievement levels for 2009 NAEP science assessment

Basic Level (141)	Students performing at the *Basic* level should be able to state or recognize correct science principles. They should be able to explain and predict observations of natural phenomena at multiple scales, from microscopic to global. They should be able to describe properties and common physical and chemical changes in materials; describe changes in potential and kinetic energy of moving objects; describe levels of organization of living systems—cells, multicellular organisms, and ecosystems; identify related organisms based on hereditary traits; describe a model of the solar system; and describe the processes of the water cycle. They should be able to design observational and experimental investigations employing appropriate tools for measuring variables. They should be able to propose and critique the scientific validity of alternative individual and local community responses to design problems.

Science Practices: Students performing at the *Basic* level should be able to state or recognize correct science principles; explain and predict observations of natural phenomena at multiple scales, from microscopic to global, using evidence to support their explanations and predictions; design investigations employing appropriate tools for measuring variables; and propose and critique the scientific validity of alternative individual and local community responses to design problems.
In the physical sciences, students at the *Basic* level should be able to recognize a class of chemical compounds by its properties; design an investigation to show changes in properties of reactants and products in a chemical process such as burning or rusting; describe the changes in kinetic and potential energy of an object such as a swinging pendulum; describe and compare the motions of two objects moving at different speeds from a table of their position and time data; describe the direction of all forces acting on an object; and suggest an example of a system in which forces are acting on an object but the motion of the object does not change.
In the life sciences, students at the *Basic* level should be able to identify levels of organization within cells, multicellular organisms, and ecosystems; describe how changes in an environment relate to an organism's survival; describe types of interdependence in ecosystems; identify related organisms based on hereditary traits; discuss the needs of animals and plants to support growth and metabolism; and analyze and display data showing simple patterns in population growth.
In the Earth and space sciences, students at the *Basic* level should be able to describe a Sun-centered model of the solar system that illustrates how gravity keeps the objects in regular motion; describe how fossils and rock formations can be used as evidence to infer events in Earth's history; relate major geologic events, such as earthquakes, volcanoes, and mountain building to the movement of lithospheric plates; use weather data to identify major weather events; and describe the processes of the water cycle including changes in the physical state of water.

Proficient Level (170)	Students performing at the *Proficient* level should be able to demonstrate relationships among closely related science principles. They should be able to identify evidence of chemical changes; explain and predict motions of objects using position-time graphs; explain metabolism, growth, and reproduction in cells, organisms, and ecosystems; use observations of the Sun, Earth, and Moon to explain visible motions in the sky; and predict surface and groundwater movements in different regions of the world. They should be able to explain and predict observations of phenomena at multiple scales, from microscopic to macroscopic and local to global, and to suggest examples of observations that illustrate a science principle. They should be able to use evidence from investigations in arguments that accept, revise, or reject scientific models. They should be able to use scientific criteria to propose and critique alternative individual and local community responses to design problems.

Science Practices: Students performing at the *Proficient* level should be able to demonstrate relationships among closely related science principles; explain and predict observations of phenomena at multiple scales, from microscopic to macroscopic and local to global, and to suggest examples of observations that illustrate a science principle; design investigations requiring control of variables to test a simple model, employing appropriate sampling techniques and data quality review processes, and use the evidence to communicate an argument that

accepts, revises, or rejects the model; and propose and critique solutions and predict the scientific validity of alternative individual and local community responses to design problems.
In the physical sciences, students at the *Proficient* level should be able to demonstrate the relationship between the properties of chemical elements and their position on the periodic table; use empirical evidence to demonstrate that a chemical change has occurred; demonstrate the relationship of the motion of an object that experiences multiple forces with the representation of the motion on a position-time graph; predict the position of a moving object based on the position-time data presented in a table; and suggest examples of systems in which potential energy is converted into other forms of energy.
In the life sciences, students at the *Proficient* level should be able to explain metabolism, growth, and reproduction at multiple levels of living systems: cells, multicellular organisms, and ecosystems; predict the effects of heredity and environment on an organism's characteristics and survival; use sampling strategies to estimate population sizes in ecosystems; and suggest examples of sustainable systems for multiple organisms.
In the Earth and space sciences, students at the *Proficient* level should be able to explain how gravity accounts for the visible patterns of motion of the Earth, Sun, and Moon; explain how fossils and rock formations are used for relative dating; use models of Earth's interior to explain lithospheric plate movement; explain the formation of Earth materials using the properties of rocks and soils; identify recurring patterns of weather phenomena; and predict surface and groundwater movement in different regions of the world.

Advanced Level (215)	Students performing at the *Advanced* level should be able to develop alternative representations of science principles and explanations of observations. They should be able to use information from the periodic table to compare families of elements; explain changes of state in terms of energy flow; trace matter and energy through living systems at multiple scales; predict changes in populations through natural selection and reproduction; use lithospheric plate movement to explain geological phenomena; and identify relationships among regional weather and atmospheric and ocean circulation patterns. They should be able to design and critique investigations involving sampling processes, data quality review processes, and control of variables. They should be able to propose and critique alternative solutions that reflect science-based trade-offs for addressing local and regional problems.

Science Practices: Students performing at the *Advanced* level should be able to demonstrate relationships among different representations of science principles. They should be able to explain and predict observations of phenomena at multiple scales, from microscopic to macroscopic and local to global, and develop alternative explanations of observations, using evidence to support their thinking. They should be able to design control of variable investigations employing appropriate sampling techniques and data quality review processes that strengthen the evidence used to argue for one alternate model over another. They should be able to propose and critique alternative solutions that reflect science-based trade-offs for addressing local and regional problems.
In the physical sciences, students at the *Advanced* level should be able to interpret diagrams, graphs, and data to demonstrate the relationship between the particulate nature of matter and state changes (for instance, melting and freezing); demonstrate relationships between position on the periodic table and the characteristics of families of the chemical elements; explain changes of state in terms of energy flow in and out of a system; identify possible scientific trade-offs in making decisions on the design of an electrical energy power plant; suggest examples of systems in which objects are undergoing transitional, vibrational, and rotational motion; and suggest examples of systems in which forces are acting both through contact and at a distance.
In the life sciences, students at the *Advanced* level should be able to explain movement and transformations of matter and energy in living systems at cellular, organismal, and ecosystem levels; predict changes in populations through natural selection and reproduction; and describe an ecosystem's populations and propose an analysis for changes based on energy flow through the system.
In the Earth and space sciences, students at the *Advanced* level should be able to explain the seasons, Moon phases, and lunar and solar eclipses; illustrate how fossils and rock formations can provide evidence of changes in environmental conditions over time; use lithospheric plate movement to explain geological phenomena; identify relationships among regional weather and atmospheric and ocean circulation patterns; and use the water cycle to propose and critique ways for obtaining drinkable water.

NOTE: The scores in parentheses indicate the lowest point on the scale at which the achievement-level range begins.
SOURCE: National Assessment Governing Board. (2008). *Science Framework for the 2009 National Assessment of Educational Progress*. Washington, DC: Author.

Assessing Students With Disabilities and/or English Language Learners

Testing accommodations, such as extra testing time or individual (rather than group) administration, are provided for students with disabilities (SD) and English language learners (ELL) who could not fairly and accurately demonstrate their abilities without modified test administration procedures. Even with the availability of accommodations, however, some students may still be excluded from the NAEP assessment. Due to differences in policies and practices regarding the identification and inclusion of SD and ELL students, variations in exclusion and accommodation rates should be considered when comparing students' performance across states. The types of accommodations used in the 2009 NAEP science assessment are available on the NAEP website at http://nationsreportcard.gov/science_2009/type_accomm.asp

Interpreting Results

The scores and percentages in this report are estimates based on samples of students rather than on entire populations. In addition, the collection of questions used at each grade level is only a sample of the many questions that could have been asked to assess the skills and abilities described in the NAEP framework. Comparisons between groups are based on statistical tests that consider both the size of the differences and the standard errors of the two statistics being compared. Standard errors are margins of error, and estimates based on smaller groups are likely to have larger margins of error. The size of the standard errors may also be influenced by other factors such as how representative the assessed students are of the entire population. Statistical tests that factor in these standard errors are used to determine whether the differences between average scores or percentages are significant. All differences were tested for statistical significance at the .05 level using unrounded numbers.

Differences between scores or between percentages are discussed in this report only when they are significant from a statistical perspective. Significant differences are marked with a notation (*) in the tables. Any differences in scores that are mentioned in the text as "higher," "lower," "greater," or "smaller" are statistically significant.

Score or percentage differences or gaps cited in this report are calculated based on differences between unrounded numbers. Therefore, the reader may find that the score or percentage difference cited in the text or tables may not be identical to the difference obtained from subtracting the rounded values shown in the accompanying tables or figures.

The reader is cautioned against making simple causal inferences between student performance and the other variables (e.g., race/ethnicity, gender, and type of school location) discussed in this report. A statistically significant relationship between a variable and measures of student performance does not imply that the variable causes differences in how well students perform. The relationship may be influenced by a number of other variables not accounted for in this report, such as family income, parental involvement, or student attitudes.

NAEP 2009 Science Overall Average Score and Achievement-Level Results for Public School Students

Overall science results are reported in this section for public school students from Florida along with regional and national results.

Overall Average Score Results

Student performance is reported as an average score based on the NAEP science scale, which ranges from 0 to 300.

Table 1 shows the overall performance results of grade 8 public school students in Florida, the nation (public), and the region in which the jurisdiction is located. The first column of results presents the average score on the NAEP science scale. The remaining columns show the scores at selected percentiles. A percentile is a score point at or below which a certain percentage of students fall. For example, the 25th percentile demarks the cut point for the lowest 25 percent of students within the distribution of scale scores.

Grade 8 Scale Score Results

- In 2009, the average scale score for students in Florida was 146. This was lower than that of students across the nation (149).

The Nation's Report Card 2009 State Assessment

Table 1 Average scale scores and selected percentile scores in NAEP science for eighth-grade public school students, by year and jurisdiction: 2009

Year and jurisdiction		Average scale score	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile
2009	Nation (public)	149	102	127	152	174	191
	South[1]	147	101	125	150	172	190
	Florida	146	102	124	147	170	188

* Value is significantly different ($p < .05$) from the value in Florida.

[1] Region in which jurisdiction is located.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Overall Achievement-Level Results

Student results are reported as the percentages of students performing relative to performance standards set by the National Assessment Governing Board. These performance standards for what students should know and be able to do were based on the recommendations of broadly representative panels of educators and members of the public.

Table 2 shows the percentage of students at grade 8 who performed below *Basic*, at or above *Basic*, at or above *Proficient*, and at *Advanced*. Because the percentages are cumulative from *Basic* to *Proficient* to *Advanced*, they will sum to more than 100 percent. Only the percentage of students performing at or above *Basic* (which includes the students at *Proficient* and *Advanced)* plus the students below *Basic* will sum to 100 percent.

Grade 8 Achievement-Level Results

- In 2009, the percentage of Florida's students who performed at or above *Proficient* was 25 percent. This was smaller than the percentage of the nation's public school students who performed at or above *Proficient* (29 percent).
- In 2009, the percentage of Florida's students who performed at or above *Basic* was 57 percent. This was smaller than the percentage of the nation's public school students who performed at or above *Basic* (62 percent).

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Table 2 Percentage of eighth-grade public school students at or above NAEP science achievement levels, by year and jurisdiction: 2009

Year and jurisdiction		Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
2009	Nation (public)	38	62	29	1
	South[1]	40	60	27	1
	Florida	43	57	25	1

* Value is significantly different ($p < .05$) from the value in Florida.

[1] Region in which jurisdiction is located.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. At or above *Basic* includes *Basic*, *Proficient*, and *Advanced*. At or above *Proficient* includes *Proficient* and *Advanced*. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Comparisons Between Florida, the Nation, and Participating States and Jurisdictions

Forty-six states and the Department of Defense Schools participated in the 2009 science assessment at grades 4 and 8. References to "jurisdictions" in the results statements may include states, the District of Columbia, and/or Department of Defense Schools.

Comparisons by Average Scores

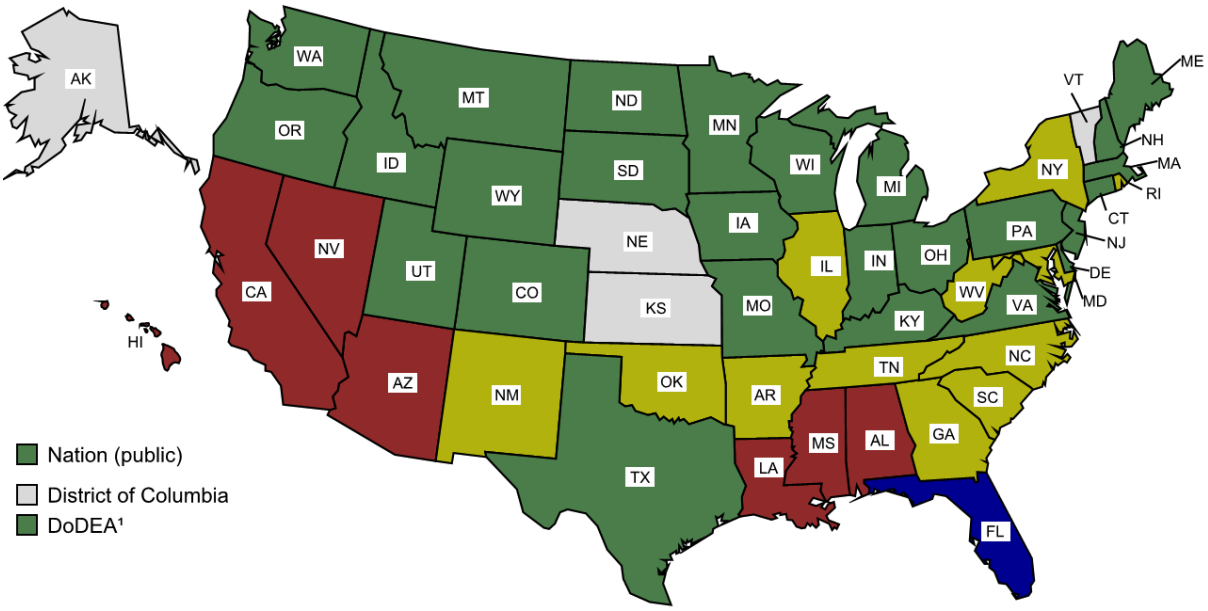
Figure 2 compares Florida's 2009 overall science average scores at grade 8 with those of public schools in the nation and all other participating states and jurisdictions. The different shadings indicate whether the average score of the nation (public), a state, or a jurisdiction was found to be higher than, not significantly different from, or lower than that of Florida in the NAEP 2009 science assessment.

Grade 8 Scale Score Comparison Results

- Students' average score in Florida was higher than the scores in 7 jurisdictions, not significantly different from those in 12 jurisdictions, and lower than those in 27 jurisdictions.

The Nation's Report Card 2009 State Assessment

Figure 2 Florida's average scale score in NAEP science for eighth-grade public school students compared with scores for the nation and other participating jurisdictions: 2009



Focal state/jurisdiction (Florida)
Higher average scale score than Florida (nation and 27 jurisdictions)
Not significantly different from Florida (12 jurisdictions)
Lower average scale score than Florida (7 jurisdictions)
5 jurisdictions did not participate.

¹ Department of Defense Education Activity (overseas and domestic schools).
NOTE: Significance tests used a multiple-comparison procedure based on all jurisdictions that participated.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Comparisons by Achievement Levels

Figure 3 permits comparisons of all jurisdictions (and the nation) participating in the NAEP 2009 science assessment in terms of percentages of grade 8 students performing at or above *Proficient*. The participating states and jurisdictions are grouped into categories reflecting whether the percentage of their students performing at or above *Proficient* (including *Advanced*) was found to be higher than, not significantly different from, or lower than the percentage in Florida.

Note that the selected state is listed first in its category, and the other states and jurisdictions within each category are listed alphabetically; statistical comparisons among jurisdictions in each of the three categories are not included in this report. However, statistical comparisons among states by achievement level can be calculated online by using the NAEP Data Explorer at http://nces.ed.gov/nationsreportcard/naepdata/.

Grade 8 Achievement-Level Comparison Results

- The percentage of students performing at or above the *Proficient* level in Florida was higher than the percentage in 6 jurisdictions, not significantly different from those in 12 jurisdictions, and lower than those in 28 jurisdictions.
- The percentage of students performing at or above the *Basic* level in Florida was higher than the percentage in 5 jurisdictions, not significantly different from those in 14 jurisdictions, and lower than those in 27 jurisdictions (data not shown).

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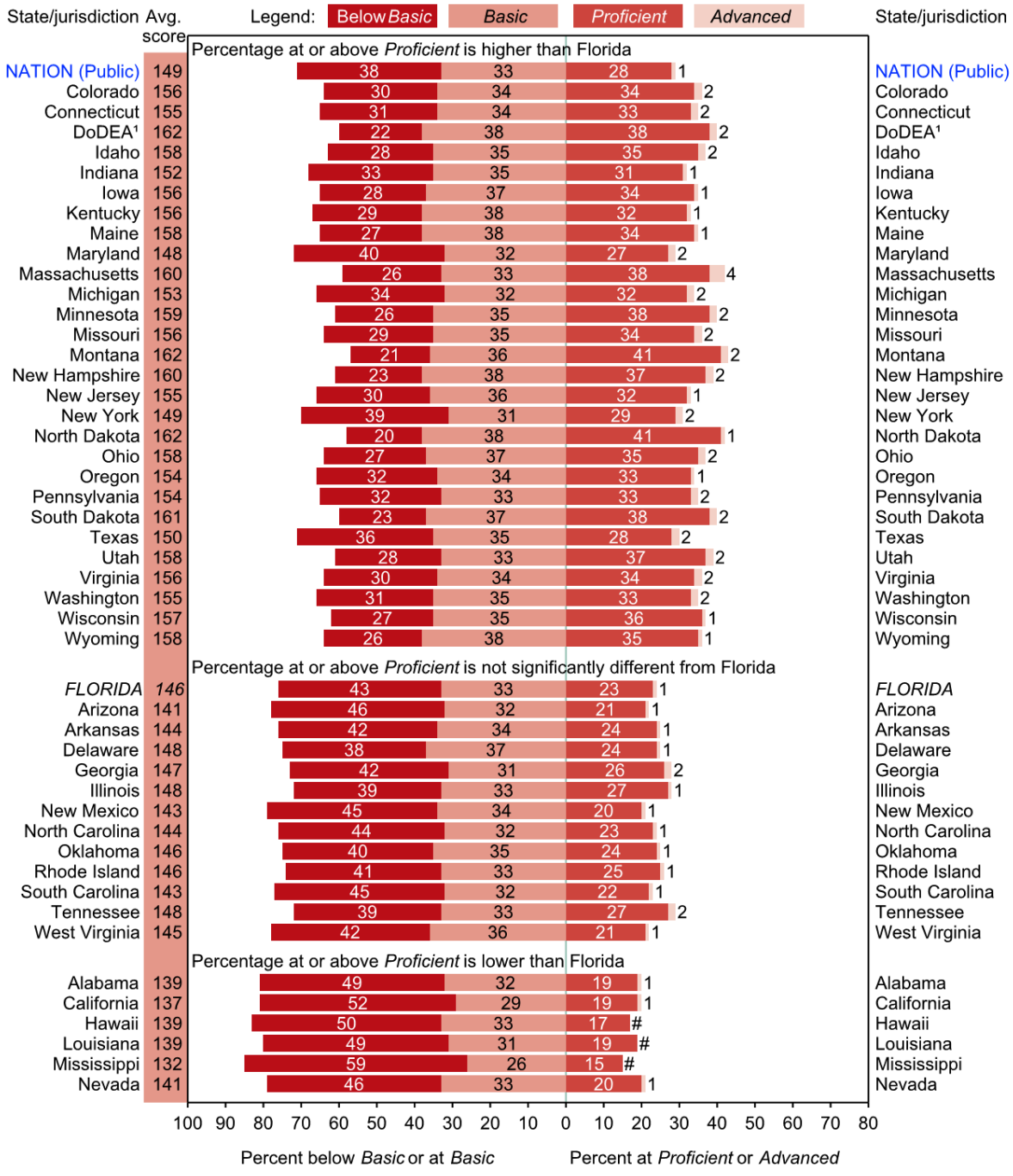
Figure 3 Average scale scores in NAEP science for eighth-grade public school students, percentage within each achievement level, and Florida's percentage at or above *Proficient* compared with the nation and other participating states/jurisdictions: 2009



Rounds to zero.

¹ Department of Defense Education Activity (overseas and domestic schools).

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. The following jurisdictions did not participate in the assessment: Alaska, District of Columbia, Kansas, Nebraska, and Vermont. The bars above contain percentages of students in each NAEP science achievement level. Achievement levels corresponding to each population of students are aligned at the point where the *Proficient* category begins, so that

they may be compared at *Proficient* and above. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers. The shaded bars are graphed using unrounded numbers. Significance tests used a multiple-comparison procedure based on all jurisdictions that participated.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Science Performance of Selected Student Groups

This section of the report presents trend results for public school students in Florida and the nation by demographic characteristics. Student performance data are reported for the listed student characteristics.

- race/ethnicity
- gender
- student eligibility for the National School Lunch Program
- type of school location
- parents' highest level of education

Results for each of the variables are reported in tables that include the percentage of students in each group in the first column and the average score in the second column. The columns to the right show the percentage of students below *Basic* and at or above each achievement level.

Results by students' race/ethnicity and gender include statements about score point differences between student groups (e.g., between White and Black or White and Hispanic students, or between male and female students) in 2009. Because these differences are calculated using unrounded values, they may differ slightly from what would be obtained by subtracting the rounded values that appear in the tables.

The reader is cautioned against making causal inferences about group differences, as a complex mix of educational and socioeconomic factors may affect student performance. NAEP collects information on many additional variables, including school and home factors related to achievement. This information is in an interactive database available on the NAEP website http://nces.ed.gov/nationsreportcard/naepdata/.

Race/Ethnicity

The race/ethnicity of each student was reported by the schools. The six mutually exclusive categories are White, Black, Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, and Unclassified. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Table 3 shows average scores and achievement-level data for public school students at grade 8 in Florida and the nation, by race/ethnicity.

Grade 8 Scale Score Results by Race/Ethnicity

- In 2009, White students in Florida had an average scale score that was higher than the average scores of Black and Hispanic students, but not significantly different from the average score of Asian/Pacific Islander students.
- In 2009 in Florida, Black students had an average score that was lower than that of White students by 32 points. This performance gap was narrower than that of the nation (36 points).
- In 2009 in Florida, Hispanic students had an average score that was lower than that of White students by 19 points. This performance gap was narrower than that of the nation (30 points).

Grade 8 Achievement-Level Results by Race/Ethnicity

- In 2009 in Florida, the percentage of White students performing at or above *Proficient* was greater than the corresponding percentages of Black and Hispanic students, but not significantly different from the percentage of Asian/Pacific Islander students.

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Table 3 Percentage of eighth-grade public school students, average scale score, and achievement-level results in NAEP science, by race/ethnicity, year, and jurisdiction: 2009

Race/ethnicity, year, and jurisdiction		Percentage of students	Average scale score	Percent			
				Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
White							
2009	Nation (public)	56	161	23	77	41	2
	Florida	46	158	28	72	36	2
Black							
2009	Nation (public)	16	125	68	32	8	#
	Florida	22	126	68	32	7	#
Hispanic							
2009	Nation (public)	21	131	59	41	12	#
	Florida	26	139	49	51	17	#
Asian/Pacific Islander							
2009	Nation (public)	5	159	28	72	40	3
	Florida	3	163	21	79	40	4
American Indian/Alaska Native							
2009	Nation (public)	1	138	51	49	18	#
	Florida	#	‡	‡	‡	‡	‡
Unclassified[1]							
2009	Nation (public)	1	149	38	62	26	2
	Florida	3	148	40	60	24	2

Rounds to zero.

‡ Reporting standards not met.

* Value is significantly different ($p < .05$) from the value for the same group in Florida.

[1] The unclassified category includes students whose school-reported race/ethnicity was 'other,' unavailable, or missing, and whose race/ethnicity category could not be determined from self-reported information.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. At or above *Basic* includes *Basic*, *Proficient*, and *Advanced*. At or above *Proficient* includes *Proficient* and *Advanced*. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Gender

Information on student gender is reported by the student's school when rosters of the students eligible to be assessed are submitted to NAEP.

Table 4 shows average scores and achievement-level data for public school students at grade 8 in Florida and the nation, by gender.

Grade 8 Scale Score Results by Gender

- In 2009 in Florida, male students had an average score in science (148) that was higher than that of female students (144). In the nation, male students had an average score in science (151) that was higher than that of female students (147).
- In 2009, male students in Florida had an average scale score in science (148) that was lower than that of male students in public schools across the nation (151). Similarly, female students in Florida had an average scale score (144) that was lower than that of female students across the nation (147).

Grade 8 Achievement-Level Results by Gender

- In the 2009 assessment, 28 percent of male students and 21 percent of female students performed at or above *Proficient* in Florida. The difference between these percentages was statistically significant.
- The percentage of male students in Florida's public schools who were at or above *Proficient* in 2009 (28 percent) was smaller than that of male students in the nation (32 percent).
- The percentage of female students in Florida's public schools who were at or above *Proficient* in 2009 (21 percent) was smaller than that of female students in the nation (26 percent).

The Nation's Report Card 2009 State Assessment

Table 4 Percentage of eighth-grade public school students, average scale score, and achievement-level results in NAEP science, by gender, year, and jurisdiction: 2009

Gender, year, and jurisdiction		Percentage of students	Average scale score	Percent			
				Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Male							
2009	Nation (public)	51	151	36	64	32	2
	Florida	50	148	41	59	28	2
Female							
2009	Nation (public)	49	147	40	60	26	1
	Florida	50	144	44	56	21	1

* Value is significantly different ($p < .05$) from the value for the same group in Florida.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. At or above *Basic* includes *Basic*, *Proficient*, and *Advanced*. At or above *Proficient* includes *Proficient* and *Advanced*. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Student Eligibility for the National School Lunch Program

NAEP collects data on eligibility for the federal program providing free or reduced-price school lunches. The free/reduced-price lunch component of the National School Lunch Program (NSLP) offered through the U.S. Department of Agriculture (USDA) is designed to ensure that children near or below the poverty line receive nourishing meals. Eligibility is determined through the USDA's Income Eligibility Guidelines, and is included as an indicator of lower family income. Additional information on eligibility may be found in the Technical Appendix or at the U.S. Department of Agriculture website at http://www.fns.usda.gov/cnd/lunch/.

Table 5 shows average scores and achievement-level data for public school students at grade 8 in Florida and the nation, by student eligibility for the NSLP.

Grade 8 Scale Score Results by Free/Reduced-Price School Lunch Eligibility

- In 2009, students in Florida eligible for free/reduced-price lunch had an average science scale score of 135. This was lower than that of students in Florida not eligible for this program (156).
- In 2009, students in Florida who were eligible for free/reduced-price school lunch had an average score that was lower than that of students who were not eligible for free/reduced-price school lunch by 22 points. This performance gap was narrower than that of the nation (28 points).
- Students in Florida eligible for free/reduced-price lunch had an average scale score (135) in 2009 that was not significantly different from that of students in the nation who were eligible (133).

Grade 8 Achievement-Level Results by Free/Reduced-Price School Lunch Eligibility

- In Florida, 13 percent of students who were eligible for free/reduced-price lunch and 35 percent of those who were not eligible for this program performed at or above *Proficient* in 2009. These percentages were significantly different from one another.
- For students in Florida in 2009 who were eligible for free/reduced-price lunch, the percentage at or above *Proficient* (13 percent) was not significantly different from the corresponding percentage for their counterparts around the nation (14 percent).

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Table 5 Percentage of eighth-grade public school students, average scale score, and achievement-level results in NAEP science, by National School Lunch Program eligibility status, year, and jurisdiction: 2009

Eligibility status, year, and jurisdiction		Percentage of students	Average scale score	Percent			
				Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Eligible							
2009	Nation (public)	43	133	57	43	14	#
	Florida	48	135	56	44	13	#
Not eligible							
2009	Nation (public)	56	161	24	76	41	2
	Florida	52	156	30	70	35	2
Information not available							
2009	Nation (public)	1	150	36	64	32	1
	Florida	#	‡	‡	‡	‡	‡

Rounds to zero.

‡ Reporting standards not met.

* Value is significantly different ($p < .05$) from the value for the same group in Florida.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. At or above *Basic* includes *Basic*, *Proficient*, and *Advanced*. At or above *Proficient* includes *Proficient* and *Advanced*. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Type of Location

Schools that participated in the assessment were classified as being located in four mutually exclusive types of communities: city, suburb, town, and rural. These categories indicate the geographic locations of schools. "City" is a geographical term meaning the principal city of a U.S. Census Bureau-defined Core-Based Statistical Area and is not synonymous with "inner city." More detail on the changes for the classification of type of location is available in the Technical Appendix or at http://nces.ed.gov/ccd/Rural_Locales.asp.

Table 6 shows average scores and achievement-level data for public school students at grade 8 in Florida and the nation, by type of location.

Grade 8 Average Scale Score Results by Type of Location

- In 2009 in Florida, the average scale score of students attending public schools in city locations was not significantly different from the scores of students in suburban, town, and rural schools.
- In 2009, students attending public schools in city locations in Florida had average scale score that was higher than the average scale score of students in city locations in the nation.
- In 2009, students attending public schools in suburban and town locations in Florida had average scale scores that were lower than the average scale scores of students in suburban and town locations in the nation.
- In 2009, students attending public schools in rural locations in Florida had average scale score that was not significantly different from the average scale score of students in rural locations in the nation.

Grade 8 Achievement-Level Results by Type of Location

- In 2009, the percentage of students in Florida's public schools in city locations who performed at or above *Proficient* was not significantly different from the corresponding percentages of students in suburban, town, and rural schools.
- The percentages of students in Florida's public schools in city and rural locations who performed at or above *Proficient* in 2009 were not significantly different from those of students in city and rural locations in the nation.
- The percentages of students in Florida's public schools in suburban and town locations who performed at or above *Proficient* in 2009 were smaller than those of students in suburban and town locations in the nation.

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Table 6 Percentage of eighth-grade public school students, average scale score, and achievement-level results in NAEP science, by type of location, year, and jurisdiction: 2009

Type of location, year, and jurisdiction		Percentage of students	Average scale score	Percent			
				Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
City							
2009	Nation (public)	27	139	50	50	21	1
	Florida	24	145	45	55	25	2
Suburb							
2009	Nation (public)	37	152	34	66	33	2
	Florida	53	146	42	58	25	1
Town							
2009	Nation (public)	14	149	37	63	28	1
	Florida	10	140	49	51	19	#
Rural							
2009	Nation (public)	23	154	31	69	33	1
	Florida	13	150	36	64	27	1

Rounds to zero.

* Value is significantly different ($p < .05$) from the value for the same group in Florida.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. At or above *Basic* includes *Basic*, *Proficient*, and *Advanced*. At or above *Proficient* includes *Proficient* and *Advanced*. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Parents' Highest Level of Education

Eighth-grade students who participated in the NAEP 2009 assessment were asked to indicate the highest level of education they thought their father and their mother had completed. Five response options—did not finish high school, graduated from high school, some education after high school, graduated from college, and "I don't know"—were offered. The highest level of education reported for either parent was used in the analysis. Fourth-graders were not asked about their parents' education level because their responses in previous NAEP assessments were not reliable, and a large percentage of them chose the "I don't know" option.

The results by highest level of parental education are shown in table 7.

Grade 8 Scale Score Results by Parents' Highest Level of Education

- In 2009, students in Florida who reported that a parent had graduated from college had an average scale score that was higher than the average scores of students with a parent in any of the following education categories: some education after high school, graduated from high school, and did not finish high school.
- In 2009, the average scale score for students in Florida who reported that a parent had graduated from college was lower than the score of students in the nation.
- In 2009, the average scale scores for students in Florida who reported that a parent had some education after high school, had graduated from high school, or had not finished high school were not significantly different from the corresponding scores of students in the nation.

Grade 8 Achievement-Level Results by Parents' Highest Level of Education

- In 2009, the percentage of students performing at or above *Proficient* in Florida who reported that a parent had graduated from college was greater than the percentage for students whose parents' highest level of education was in any of the following education categories: some education after high school, graduated from high school, and did not finish high school.
- In 2009 in Florida, the percentage of students reporting that a parent had graduated from college and who performed at or above *Proficient* was smaller than the percentage of students in the nation.
- In 2009 in Florida, the percentages of students reporting that a parent had some education after high school, had graduated from high school, or had not finished high school and who performed at or above *Proficient* were not significantly different from the corresponding percentages of students in the nation.

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Table 7 Percentage of eighth-grade public school students, average scale score, and achievement-level results in NAEP science, by highest parental education level, year, and jurisdiction: 2009

Highest parental education level, year, and jurisdiction	Percentage of students	Average scale score	Percent			
			Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Did not finish high school						
2009 Nation (public)	8	131	59	41	11	#
Florida	8	133	58	42	11	#
Graduated from high school						
2009 Nation (public)	17	139	50	50	17	#
Florida	18	137	53	47	16	#
Some education after high school						
2009 Nation (public)	17	151	34	66	29	1
Florida	17	149	38	62	25	#
Graduated from college						
2009 Nation (public)	47	160	26	74	41	3
Florida	46	154	34	66	33	2
Unknown						
2009 Nation (public)	11	129	61	39	12	#
Florida	11	133	57	43	12	#

Rounds to zero.

* Value is significantly different ($p < .05$) from the value for the same group in Florida.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. At or above *Basic* includes *Basic*, *Proficient*, and *Advanced*. At or above *Proficient* includes *Proficient* and *Advanced*. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

A More Inclusive NAEP: Students With Disabilities and English Language Learners

To ensure that the samples are representative, NAEP has established policies and procedures to maximize the inclusion of all students in the assessment. Every effort is made to ensure that all selected students who are capable of participating meaningfully in the assessment are assessed. While some students with disabilities (SD) and/or English language learners (ELL) can be assessed without any special procedures, others require accommodations to participate in NAEP. Still other SD and/or ELL students selected by NAEP may not be able to participate. Local school staff who are familiar with these students are asked a series of questions to help them decide whether each student should participate in the assessment and whether the student needs accommodations.

Within any assessment year, exclusion and accommodation rates may vary across jurisdictions. Since SD and/or ELL students tend to score below average on assessments, the exclusion of students from these groups may result in a higher average score than if those students had taken the assessment. On the other hand, providing appropriate testing accommodations (e.g., providing extended time for some SD and/or ELL students to take the assessment) removes barriers that would otherwise prevent them from demonstrating their knowledge and skills.

Table 8 displays data for 8th grade students in Florida who were identified as SD and/or ELL, by whether they were excluded, assessed with accommodations, or assessed under standard conditions, as a percent of all 8th grade students in the state.

Table 9 shows the percentages of students assessed in Florida by disability status and their performance on the NAEP assessment in terms of average scores and percentages performing below *Basic*, at or above *Basic*, at or above *Proficient*, and at *Advanced* for grade 8 .

Table 10 presents the percentages of students assessed in Florida by ELL status, their average scores, and their performance in terms of the percentages below *Basic*, the percentages at or above *Basic*, at or above *Proficient*, and at *Advanced* for grade 8 .

Table 11 presents the total number of grade 8 students assessed in each of the participating states and the percentage of students sampled who were excluded.

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Table 8 Percentage of eighth-grade public school students identified as students with disabilities (SD) and/or English language learners (ELL) excluded and assessed in NAEP science as a percentage of all students, by assessment year and testing status: 2009

Year and testing status		SD and/or ELL		SD		ELL	
		Florida	Nation (public)	Florida	Nation (public)	Florida	Nation (public)
2009	**Identified**	**19**	**18**	**15**	**13**	**5**	**6**
	Excluded	2	2	1	2	1	1
	Assessed without accommodations	1	5	1	2	#	3
	Assessed with accommodations	16	10	12	9	4	2

Rounds to zero.

NOTE: Students identified as both SD and ELL were counted only once under the combined SD and/or ELL category, but were counted separately under the SD and ELL categories. 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), 2009 Science Assessment.

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Table 9 Percentage of eighth-grade public school students, average scale score, and achievement-level results in NAEP science, by students with disabilities (SD) status, year, and jurisdiction: 2009

SD status, year, and jurisdiction		Percentage of students	Average scale score	Percent			
				Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
SD							
2009	Nation (public)	11	122	67	33	11	#
	Florida	14	127	66	34	10	1
Not SD							
2009	Nation (public)	89	152	34	66	31	2
	Florida	86	149	39	61	27	1

Rounds to zero.

* Value is significantly different ($p < .05$) from the value for the same group in Florida.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. At or above *Basic* includes *Basic*, *Proficient*, and *Advanced*. At or above *Proficient* includes *Proficient* and *Advanced*. Performance comparisons may be affected by differences in exclusion rates for students with disabilities in the NAEP samples and by differences in sample sizes. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

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Table 10 Percentage of eighth-grade public school students, average scale score, and achievement-level results in NAEP science, by English language learner (ELL) status, year, and jurisdiction: 2009

ELL status, year, and jurisdiction		Percentage of students	Average scale score	Percent			
				Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
ELL							
2009	Nation (public)	5	103	86	14	2	#
	Florida	4	106	85	15	2	#
Not ELL							
2009	Nation (public)	95	151	35	65	31	1
	Florida	96	148	41	59	26	1

Rounds to zero.

* Value is significantly different ($p < .05$) from the value for the same group in Florida.

NOTE: The NAEP grade 8 science scale ranges from 0 to 300. Achievement levels correspond to the following points on the NAEP science scales: below *Basic*, 140 or lower; *Basic*, 141–169; *Proficient*, 170–214; and *Advanced*, 215 and above. At or above *Basic* includes *Basic*, *Proficient*, and *Advanced*. At or above *Proficient* includes *Proficient* and *Advanced*. Performance comparisons may be affected by differences in exclusion rates for English language learners in the NAEP samples and by differences in sample sizes. Detail may not sum to totals because of rounding. All differences were calculated and tested using unrounded numbers.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

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Table 11 Number of eighth-grade public school students assessed in NAEP science and weighted percentage excluded, by state/jurisdiction: 2009

State/jurisdiction	Number assessed	Weighted percentage excluded
Nation (public)	**146,300**	**2**
Alabama	2,700	1
Arizona	2,900	2
Arkansas	2,600	1
California	7,200	2
Colorado	2,800	1
Connecticut	2,800	2
Delaware	2,800	1
Florida	4,300	2
Georgia	3,500	1
Hawaii	2,800	2
Idaho	2,900	1
Illinois	4,200	1
Indiana	2,700	2
Iowa	2,700	1
Kentucky	3,700	2
Louisiana	2,600	1
Maine	2,600	2
Maryland	3,400	3
Massachusetts	3,700	4
Michigan	3,400	2
Minnesota	3,000	2
Mississippi	2,800	1
Missouri	2,700	1
Montana	2,600	2
Nevada	2,900	1
New Hampshire	2,500	2
New Jersey	2,800	2
New Mexico	2,500	3
New York	3,800	2
North Carolina	4,400	2
North Dakota	2,200	4
Ohio	3,500	2
Oklahoma	2,700	3
Oregon	2,800	2
Pennsylvania	3,600	2
Rhode Island	2,700	3
South Carolina	2,800	2
South Dakota	2,800	1
Tennessee	3,000	2
Texas	5,900	4
Utah	2,900	2
Virginia	2,800	2
Washington	2,800	2
West Virginia	2,900	2
Wisconsin	3,500	2
Wyoming	1,900	2
Other jurisdictions		
DoDEA[1]	1,600	2

[1] Department of Defense Education Activity (domestic and overseas schools).

NOTE: The number of students assessed is rounded to the nearest hundred. The following jurisdictions did not participate in the assessment: Alaska, District of Colombia, Kansas, Nebraska, and Vermont.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Where to Find More Information

The NAEP Science Assessment
The latest news about the NAEP 2009 science assessment and the national results can be found on the NAEP website at http://nces.ed.gov/nationsreportcard/science/results/. The individual snapshot reports for each participating state and other jurisdictions are also available in the state results section of the website at http://nces.ed.gov/nationsreportcard/states/.

The Nation's Report Card: Science 2009 may be ordered or downloaded at the NAEP website.

The *Science Framework for the 2009 National Assessment of Educational Progress*, on which this assessment is based, is available at the National Assessment Governing Board website at http://www.nagb.org/publications/frameworks/science-09.pdf

The NAEP Data Explorer (NDE)
The interactive database at http://nces.ed.gov/nationsreportcard/naepdata/ includes student, teacher, and school variables for all participating states and other jurisdictions, the nation, and the four regions. Data tables are also available for each jurisdiction, with all background questions cross-tabulated with the major demographic variables. Users can design and create tables and can perform tests of statistical significance at this website.

Technical Documentation on the Web (TDW)
Technical documentation section of the NAEP website http://nces.ed.gov/nationsreportcard/tdw/ contains information about the technical procedures and methods of NAEP. The TDW site is organized by topic (from Item Development through Analysis and Scaling) with subtopics, including information specific to a particular assessment. The content is written for researchers and assumes knowledge of educational measurement and testing.

Publications on the inclusion of students with disabilities and English language learners
References for a variety of research publications related to the assessment of students with special needs may be found at http://nces.ed.gov/nationsreportcard/about/inclusion.asp#research.

To order publications
Recent NAEP publications related to science are listed on the science page of the NAEP website and are available electronically. Publications can also be ordered from

Education Publications Center (ED Pubs)
U.S. Department of Education
P.O. Box 22207
Alexandria, VA 22304

Call toll free: 1-877-4ED-Pubs (1-877-433-7827)
TTY/TDD: 1-877-576-7734
FAX: 1-301-470-1244
Order online at: http://www.edpubs.gov.

The NAEP State Report Generator was developed for the NAEP 2009 reports by Phillip Leung, Bobby Rampey, Rebecca Moran, Shu-Kang Chen, Rick Hasney, and Ming Kuang.

What is the Nation's Report Card™?

The Nation's Report Card™ informs the public about the academic achievement of elementary and secondary students in the United States. Report cards communicate the findings of the National Assessment of Educational Progress (NAEP), a continuing and nationally representative measure of achievement in various subjects over time.

Since 1969, NAEP assessments have been conducted periodically in reading, mathematics, science, writing, U.S. history, civics, geography, and other subjects. NAEP collects and reports information on student performance at the national, state, and local levels, making the assessment an integral part of our nation's evaluation of the condition and progress of education. Only academic achievement data and related background information are collected. The privacy of individual students and their families is protected.

NAEP is a congressionally authorized project of the National Center for Education Statistics (NCES) within the Institute of Education Sciences of the U.S. Department of Education. The Commissioner of Education Statistics is responsible for carrying out the NAEP project. The National Assessment Governing Board oversees and sets policy for NAEP.

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Appendix A

Technical Procedures for the NAEP 2009 Science Assessment

This appendix provides an overview of some of the technical procedures for the NAEP 2009 science assessment. Information is included about the content of the assessment, school and student samples and participation, inclusion of students with disabilities and/or English language learners, analysis procedures, and interpretation of results. Additional technical information about NAEP assessments is available on the Web at http://www.nces.ed.gov/nationsreportcard/tdw/.

Development of the Science Framework

The National Assessment Governing Board oversees the creation of the NAEP frameworks that describe the specific knowledge and skills that should be assessed in each subject. The frameworks also provide the theoretical basis for the assessment, direction for what types of items should be included, and how the items should be designed and scored. While the frameworks describe the general content and design of NAEP subject area assessments, the specifications provide the detailed information used by test developers for constructing the assessments and more detailed information in scoring. Both the *Science Framework for the 2009 National Assessment of Educational Progress* and *Science Assessment and Item Specifications for the 2009 National Assessment of Educational Progress* are available on the Governing Board's website at http://www.nagb.org/publications/frameworks.htm.

The 2009 NAEP science framework approved by the Governing Board replaces the framework used for the 1996, 2000, and 2005 science assessments. A variety of factors made it necessary to create a new framework to guide the assessment of science in 2009 and beyond: the publication of *National Standards* for science literacy, advances in both science and cognitive research, the growth in the prevailance of national and international science assessments, advances in innovative assessment approaches, and the need to advance the state of the art so that the widest possible range of students can be fairly assessed.

The development of the new science framework involved the critical input of hundreds of individuals across the country, including some of the nation's leading scientists, science educators, policymakers, and assessment experts. Under contract to the Governing Board, WestEd and the Council of Chief State School Officers (CCSSO) spent 18 months developing the framework; this process involved committees, regional hearings, and other public forums. The Governing Board also engaged an external review panel to evaluate the draft framework and convened a public hearing to receive additional input during the development process.

The frameworks for all main NAEP assessments are periodically updated or changed to reflect current curricula and standards. Whenever changes are made to a subject framework, every effort is made to maintain the trend lines that permit the reporting of changes in student achievement over time. If, however, the changes made to an assessment are such that the results are not comparable to earlier assessments, a new trend line is started. The assessment resulting from the 2009 framework will start a new NAEP science trend.

Framework Dimensions

Since science consists of both knowing and doing, the design of the NAEP science assessment is guided by the framework's descriptions of the science content and practices to be assessed. Students are expected to have learned science content comprised of the facts, concepts, laws, principles, and theories that have been verified by the community of scientists, as well as understand how scientists gather, organize, and evaluate empirical evidence. Each question in the 2009 science assessment was classified based on two dimensions: *science content* and *science practices*. By considering these two dimensions for each question, the framework ensures that NAEP assesses an appropriate balance of content along with a variety of ways of doing science.

SCIENCE CONTENT

The 2009 framework organizes science content into three broad content areas reflecting the science curriculum students are generally exposed to across the K–12 curriculum, including physical science, life science, and Earth and space sciences.

- Physical science includes concepts related to properties and changes of matter, forms of energy, energy transfer and conservation, position and motion of objects, and forces affecting motion.
- Life science includes concepts related to organization and development, matter and energy transformations, interdependence, heredity and reproduction, and evolution and diversity.
- Earth and space sciences include concepts related to objects in the universe, the history of the Earth, properties of Earth materials, tectonics, energy in Earth systems, climate and weather, and biogeochemical cycles.

Because of differences in curricular emphasis, the proportion of assessment time devoted to each science practices area varies by grade. The distribution of items across the four science practices is as follows. At grade 4, assessment time is distributed approximately evenly among Physical Science, Life Science, and Earth and Space Sciences. At grade 8, there is a somewhat greater emphasis on Earth and Space Sciences. At grade 12, the balance shifts toward Physical Science and Life Science, with less emphasis on Earth and Space Sciences.

SCIENCE PRACTICES

In addition to the science content, the framework assesses student understanding of how scientific knowledge is used by measuring what students are able to do with the science content. Four science practices describe how science knowledge is used—identifying science principles, using science principles, using scientific inquiry, and using technological design.

- Identifying science principles focuses on students' ability to recognize, recall, define, relate, and represent basic science principles in each of the three content areas.
- Using science principles focuses on the importance of science knowledge in making accurate predictions about and explaining observations of the natural world.
- Using scientific inquiry focuses on designing, critiquing, and evaluating scientific investigations; identifying patterns in data; and using empirical evidence to validate or criticize conclusions.
- Using technological design focuses on the systematic process of applying science knowledge and skills to propose or critique solutions to real world problems, identify trade-offs, and anticipate effects of technological design decisions.

The distribution of items across the four science practices is as follows: Identifying Science Principles and Using Science Principles (combined), 60 percent; Using Scientific Inquiry, 30 percent; and Using Technological Design, 10 percent. From grade 4 to grade 8 to grade 12, the emphasis on Using Science Principles increases and the emphasis on Identifying Science Principles decreases.

Table A-1. Percentage distribution of target and actual assessment time in NAEP science, by field of science and grade: 2009

	Physical science		Life science		Earth and space sciences	
Grade	Target	Actual	Target	Actual	Target	Actual
Grade 4	33	33	33	34	33	33
Grade 8	30	26	30	33	40	41
Grade 12	38	38	38	36	25	26

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), 2009 Science Assessment.

Content of the 2009 Science Assessment

Each NAEP assessment contains two major components: subject-specific cognitive items that measure the achievement of students in an academic subject; and background items that collect information from students, teachers, and school administrators about variables that are related to student achievement. Both the cognitive and background items are developed through a process that includes reviews by external advisory groups and field testing. Results from the cognitive items provide information about what students know and can do in a subject area. Information from the background items gives context to NAEP results and allows researchers to track factors associated with academic achievement.

The 2009 science assessment was made up of 143 cognitive questions at fourth grade, 162 questions at eighth grade, and 179 questions at twelfth grade. Students spent about one-half of the assessment time responding to multiple-choice questions and one-half responding to two types of constructed-response questions. Short constructed-response questions required students to write a concise explanation for a given situation or result, illustrate with a brief example, or describe a quantitative relationship in response to the question provided. Extended constructed-response questions were generally multidimensional and required students to solve a problem by applying and integrating science concepts and required that students analyze a science situation and explain a concept. Table A-2 shows the number of cognitive items administered in 2009 by item format at each grade level.

Table A-2 . Number of NAEP science questions at grades 4, 8, and 12, by question type: 2009

Question type	Grade 4	Grade 8	Grade 12
Total	**143**	**162**	**179**
Multiple-choice	97	104	120
Short constructed-response	39	36	44
Extended constructed-response	7	22	15

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Cognitive Blocks: The assessment design allowed for broad coverage at each grade of the three science content areas and four science practices, while minimizing the time burden for any one student. This was accomplished through the use of matrix sampling of items in which each student was required to take only a small portion of the entire pool of assessment questions.

The science item pool for each grade was divided up into subsets or "blocks." In 2009, there were a total of 9 cognitive blocks at fourth grade, 10 blocks at eighth grade, and 11 blocks at twelfth grade. Each science assessment booklet contained two separately timed 25-minute blocks. Each block contained between 14 and 18 questions, depending on the balance between multiple-choice and constructed-response questions.

The procedure used to create booklets ensured that each block was paired with every other block. In addition, the procedure controlled for possible block-position effects across the set of booklets by balancing the order of the blocks within booklets. The booklets were cycled through in such a way that each booklet was used approximately an equal number of times across the entire assessment, while no more than a few students in any given assessment session received the same booklet.

Sample released questions at all three grade levels can be viewed at the NAEP website at http://nces.ed.gov/nationsreportcard/itmrls/. Items may be sorted by difficulty and question type.

NAEP Samples

NAEP assesses representative samples of students rather than the entire population of students. The sample selection process utilizes a probability sample design in which each school and each student has a known probability of being selected (the probabilities are proportionate to the estimated number of students in the grade of an assessed school). Samples are selected according to a multistage design, with students drawn from within sampled public and private schools nationwide.

The 2005-06 Common Core of Data (CCD) file, a comprehensive list of operating public schools in each jurisdiction that is compiled each school year by the National Center for Education Statistics, served as the sampling frame for the selection of public schools in each state/jurisdiction. The sample of students in districts participating in the Trial Urban District Assessment (TUDA) represents an augmentation of the sample of students selected as part of the state samples. All students at more local geographic sampling levels also make up part of the broader samples. For example, the TUDA samples are included as part of the corresponding state samples, and the state samples are included as part of the national sample.

The 2005-06 Private School Survey (PSS), a mail survey of all U.S. private schools carried out biennially by the Census Bureau under contract to NCES, served as the sampling frame for private schools. While state and district results are based on samples of public schools only, the national results are based on the combined samples of public and private schools. Although information about the combined public and private school national samples is provided here for context, performance results in the State Report Generator and the District Report Generator are for public school students only.

Table A-3 shows the target populations and sample sizes in 2009 for the nation and participating states and jurisdictions at grades 4 and 8. Table A-4 shows the same information for participating urban districts for grades 4 and 8. Note that a total of 5 states/jurisdictions did not participate in the state level 2009 NAEP science assessment at both grades 4 and 8. For those 5 states/jurisdictions, a sample of 300–400 students was selected per state to ensure that these states are sufficiently represented in the national science sample.

Because each school that participated in the assessment, and each student assessed, represents only a portion of the larger population of interest, the results are weighted to make appropriate inferences between the student samples and the respective populations from which they are drawn. Sampling weights are adjusted for the disproportionate representation of some groups in the selected sample. This includes oversampling of schools with high concentrations of students from certain racial/ethnic groups and the lower sampling rates of students who attend very small schools.

Table A-3. Student sample sizes and target populations in NAEP science at grades 4 and 8, by state/jurisdiction: 2009

State/jurisdiction	Grade 4		Grade 8	
	Sample size	Target population	Sample size	Target population
Nation	**160,000**	**3,824,000**	**154,700**	**3,843,000**
Public	155,000	3,485,000	149,900	3,504,000
Private	2,800	330,000	3,100	331,000
Alabama	2,700	56,000	2,700	53,000
Alaska	—	—	—	—
Arizona	3,100	78,000	2,900	73,000
Arkansas	2,900	37,000	2,700	33,000
California	7,600	444,000	7,400	469,000
Colorado	2,800	55,000	2,800	54,000
Connecticut	2,800	41,000	2,800	42,000
Delaware	2,800	9,000	2,800	9,000
Florida	4,800	186,000	4,500	180,000
Georgia	4,100	117,000	3,600	109,000
Hawaii	2,800	13,000	2,900	12,000
Idaho	3,100	21,000	3,000	20,000
Illinois	4,300	146,000	4,200	154,000
Indiana	2,800	76,000	2,800	77,000
Iowa	2,900	34,000	2,700	33,000
Kansas	—	—	—	—
Kentucky	3,900	48,000	3,800	47,000
Louisiana	2,900	53,000	2,600	45,000
Maine	2,700	13,000	2,700	14,000
Maryland	3,600	56,000	3,500	58,000
Massachusetts	3,900	71,000	3,800	72,000
Michigan	3,500	117,000	3,500	117,000
Minnesota	3,400	62,000	3,000	60,000
Mississippi	2,800	39,000	2,900	37,000
Missouri	2,800	63,000	2,800	64,000
Montana	2,700	10,000	2,700	11,000
Nebraska	—	—	—	—
Nevada	3,100	32,000	2,900	32,000
New Hampshire	2,700	15,000	2,600	15,000
New Jersey	2,900	102,000	2,800	100,000
New Mexico	2,900	25,000	2,600	23,000
New York	4,100	194,000	3,900	198,000
North Carolina	4,600	105,000	4,500	112,000
North Dakota	2,100	7,000	2,300	7,000
Ohio	3,600	126,000	3,700	129,000
Oklahoma	2,900	46,000	2,800	44,000
Oregon	2,900	39,000	2,900	42,000
Pennsylvania	3,700	121,000	3,700	127,000
Rhode Island	2,500	10,000	2,800	11,000
South Carolina	3,000	53,000	2,900	50,000
South Dakota	2,800	9,000	2,900	9,000
Tennessee	3,000	75,000	3,000	75,000
Texas	6,500	318,000	6,200	322,000
Utah	3,400	42,000	3,000	38,000
Vermont	—	—	—	—
Virginia	3,000	86,000	2,900	90,000
Washington	3,200	75,000	2,900	75,000
West Virginia	2,800	20,000	3,000	23,000
Wisconsin	3,900	59,000	3,600	61,000
Wyoming	2,000	7,000	1,900	6,000
Other jurisdictions				
BIE[1]	100	3,000	100	2,000
District of Columbia	—	—	—	—
DoDEA[2]	2,100	7,000	1,600	5,000

— Not available. The jurisdiction did not participate.

[1] Bureau of Indian Education.

[2] Department of Defense Education Activity (overseas and domestic schools).

NOTE: The sample size is rounded to the nearest hundred. The target population is rounded to the nearest thousand. Data for BIE and DoDEA schools are counted in the overall nation total, but not in the nation (public) total. Data for the District of Columbia public schools are counted, along with the states, in nation (public). 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), 2009 Science Assessment.

Table A-4. Student sample sizes and target populations for Trial Urban District Assessment (TUDA) in science at grades 4 and 8, by urban district: 2009

	Grade 4		Grade 8	
District	Sample size	Target population	Sample size	Target population
Atlanta	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA
Jefferson County (KY)	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA

NOTE: The sample size is rounded to the nearest hundred. The target population is rounded to the nearest thousand.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

School and Student Participation

National Participation

To ensure unbiased samples, the National Assessment Governing Board policy on reporting requires that participation rates for original school samples be 70 percent or higher, for public and private schools respectively, to report national results separately for public and private schools. In instances where the original school participation rate falls below 85 percent, NCES statistical standards require that a nonresponse bias analysis be conducted to determine if the responding school sample is not representative of the population, thereby introducing the potential for nonresponse bias. The decision whether or not to report the results in a case where the response rate falls between 70 and 85 percent depends upon the results of this nonresponse bias analysis.

National school and student participation rates for the 2009 science assessment are presented in table A-5. Student-weighted school participation rates were 97 percent for grade 4 (100 percent for public schools and 73 percent for private schools), 97 percent for grade 8 (100 percent for public schools and 72 percent for private schools), and 83 percent for grade 12 (86 percent for public schools and 52 percent for private schools). Weighted student participation rates were 95 percent for grade 4 (95 percent for public schools and 96 percent for private schools), 93 percent for grade 8 (92 percent for public schools and 95 percent for private schools), and 80 percent for grade 12 (79 percent for public schools and 88 percent for private schools).

Table A-5. National school and student participation rates in NAEP science, by grade and type of school: 2009

	School participation					Student participation	
	Student-weighted		School-weighted				
Grade and type of school	Percent before substitution	Percent after substitution	Percent before substitution	Percent after substitution	Number of schools participating after substitution	Student-weighted percent	Number of students assessed
Grade 4							
Nation	**97**	**98**	**91**	**95**	**9,330**	**95**	**156,500**
Public	100	100	100	100	8,780	95	151,500
Private	73	85	68	80	370	96	2,800
Grade 8							
Nation	**97**	**98**	**87**	**92**	**6,920**	**93**	**151,100**
Public	100	100	100	100	6,440	92	146,300
Private	72	83	68	80	360	95	3,100
Grade 12							
Nation	**83**	**87**	**79**	**84**	**1,410**	**80**	**11,100**
Public	86	90	87	90	1,260	79	9,900
Private	52	66	57	69	160	88	1,200

NOTE: The national totals for schools include Department of Defense Education Activity (overseas and domestic schools) and Bureau of Indian Education schools, which are not included in either the public or private totals. The national totals for students include students in these schools. Columns of percentages have different denominators. The number of schools is rounded to the nearest ten. The number of students is rounded to the nearest hundred.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

The student-weighted school participation rates are calculated based on school sampling weights and grade-specific school enrollment figures. The denominator of the rate is the weighted total number of students represented by the initially selected schools that had eligible students enrolled. This includes both participating and nonparticipating schools. The numerator is the weighted total number of students represented by participating schools. This is calculated in two distinct ways: first, with participating schools defined as only the initially selected schools that participated in the assessment (which gives rise to the rate before substitution), and second, with all of the participating schools after substitution (giving the rate after substitution). On the other hand, the school-weighted school participation rates are calculated based only on the school sampling weights. They show the weighted total number of schools (either before or after substitution) divided by the weighted total number of schools in the initially selected sample.

State and District Participation

Standards established by the Governing Board require that student-weighted school participation rates for the state and district samples need to be at least 85 percent for results to be reported. In 2009, all 47 states and jurisdictions and all 17 urban districts participating in the science assessment at grades 4 and 8 met this

participation rate requirement (tables A-6 through A-8). Note that no school substitution was used for the state and district samples at grades 4 and 8.

Table A-6. Public school and student participation rates in NAEP science at grade 4, by state/jurisdiction: 2009

State/jurisdiction	School participation			Student participation	
	Student-weighted percent	School-weighted percent	Number of schools participating	Student-weighted percent	Number of students assessed
Nation (public)	**100**	**100**	**8,780**	**95**	**151,500**
Alabama	100	100	130	95	2,700
Alaska	—	—	—	—	—
Arizona	100	100	140	96	3,100
Arkansas	100	100	140	95	2,800
California	100	100	310	95	7,400
Colorado	100	100	150	95	2,700
Connecticut	100	100	130	94	2,700
Delaware	100	100	100	94	2,800
Florida	100	100	180	94	4,700
Georgia	100	100	170	96	4,000
Hawaii	100	100	140	95	2,800
Idaho	100	100	160	95	3,000
Illinois	100	100	220	95	4,100
Indiana	100	100	140	94	2,700
Iowa	100	100	180	95	2,800
Kansas	—	—	—	—	—
Kentucky	100	100	190	95	3,800
Louisiana	100	100	150	94	2,900
Maine	100	100	200	93	2,600
Maryland	99	99	200	95	3,500
Massachusetts	97	99	210	94	3,700
Michigan	100	100	190	94	3,400
Minnesota	100	99	170	95	3,300
Mississippi	100	100	130	95	2,800
Missouri	100	100	160	96	2,700
Montana	100	98	240	94	2,700
Nebraska	—	—	—	—	—
Nevada	100	100	130	95	3,000
New Hampshire	99	99	160	93	2,700
New Jersey	100	100	140	93	2,800
New Mexico	100	100	160	94	2,800
New York	100	100	180	93	4,000
North Carolina	100	100	190	95	4,500
North Dakota	100	100	240	96	2,000
Ohio	100	100	210	94	3,500
Oklahoma	100	100	180	96	2,800
Oregon	100	100	180	94	2,900
Pennsylvania	100	100	190	94	3,600
Rhode Island	100	100	150	95	2,500
South Carolina	100	100	130	95	2,900
South Dakota	100	100	290	96	2,700
Tennessee	100	100	140	94	2,900
Texas	100	100	270	95	6,300
Utah	100	100	150	94	3,300
Vermont	—	—	—	—	—
Virginia	100	100	130	95	2,900
Washington	100	100	160	94	3,100
West Virginia	100	100	200	94	2,800
Wisconsin	99	99	240	96	3,800
Wyoming	100	100	160	95	2,000
Other jurisdictions					
District of Columbia	—	—	—	—	—
DoDEA[1]	99	98	110	93	2,100

— Not available. The jurisdiction did not participate.

[1] Department of Defense Education Activity (overseas and domestic schools).

NOTE: The number of schools is rounded to the nearest ten. The number of students is rounded to the nearest hundred. The school participation rates are student-weighted percentages before substitution. Columns of percentages have different denominators. 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), 2009 Science Assessment.

Table A-7. Public school and student participation rates in NAEP science at grade 8, by state/jurisdiction: 2009

State/jurisdiction	School participation			Student participation	
	Student-weighted percent	School-weighted percent	Number of schools participating	Student-weighted percent	Number of students assessed
Nation (public)	**100**	**100**	**6,440**	**92**	**146,300**
Alabama	100	100	110	93	2,700
Alaska	—	—	—	—	—
Arizona	100	100	130	93	2,900
Arkansas	100	100	120	93	2,600
California	100	100	230	93	7,200
Colorado	100	100	120	92	2,800
Connecticut	100	100	110	91	2,800
Delaware	100	100	50	91	2,800
Florida	100	100	160	91	4,300
Georgia	100	100	120	94	3,500
Hawaii	100	100	70	91	2,800
Idaho	100	100	110	94	2,900
Illinois	100	100	200	94	4,200
Indiana	100	100	110	93	2,700
Iowa	100	100	130	93	2,700
Kansas	—	—	—	—	—
Kentucky	100	100	130	94	3,700
Louisiana	100	100	120	92	2,600
Maine	100	100	130	91	2,600
Maryland	100	100	130	92	3,400
Massachusetts	100	100	140	92	3,700
Michigan	100	100	150	92	3,400
Minnesota	100	100	140	93	3,000
Mississippi	100	100	120	93	2,800
Missouri	100	100	130	93	2,700
Montana	100	98	180	92	2,600
Nebraska	—	—	—	—	—
Nevada	100	100	90	91	2,900
New Hampshire	96	96	90	89	2,500
New Jersey	100	100	110	93	2,800
New Mexico	100	100	100	89	2,500
New York	97	98	150	90	3,800
North Carolina	100	100	150	92	4,400
North Dakota	100	100	180	95	2,200
Ohio	100	100	190	93	3,500
Oklahoma	100	100	150	93	2,700
Oregon	100	100	130	92	2,800
Pennsylvania	100	100	150	92	3,600
Rhode Island	100	100	60	93	2,700
South Carolina	100	100	110	94	2,800
South Dakota	100	100	220	95	2,800
Tennessee	100	100	120	93	3,000
Texas	99	100	170	92	5,900
Utah	100	100	110	92	2,900
Vermont	—	—	—	—	—
Virginia	100	100	110	93	2,800
Washington	100	100	130	92	2,800
West Virginia	100	100	120	93	2,900
Wisconsin	99	99	170	93	3,500
Wyoming	100	100	90	91	1,900
Other jurisdictions					
District of Columbia	—	—	—	—	—
DoDEA[1]	99	97	60	93	1,600

— Not available. The jurisdiction did not participate.

[1] Department of Defense Education Activity (overseas and domestic schools).

NOTE: The number of schools is rounded to the nearest ten. The number of students is rounded to the nearest hundred. The school participation rates are student-weighted percentages before substitution. Columns of percentages have different denominators. 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), 2009 Science Assessment.

Table A-8. Public school and student participation rates for Trial Urban District Assessment (TUDA) in science, by grade and urban district: 2009

Grade and district	School participation		Student participation	
	Student-weighted percent	Number of schools participating	Student-weighted percent	Number of students assessed
Grade 4				
Atlanta	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA
Jefferson County, KY	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA
Grade 8				
Atlanta	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA
Jefferson County, KY	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA

NOTE: The number of schools is rounded to the nearest ten. The number of students is rounded to the nearest hundred. The school participation rates are student-weighted percentages before substitution. The percentages for school-weighted and student-weighted school participation were both at 100 percent for the participating districts in 2009.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Inclusion of Students With Disabilities and/or English Language Learners

Testing all sampled students is the best way for NAEP to ensure that results are as representative as possible of the performance of students in the nation and in participating states/jurisdictions and districts. NAEP has always endeavored to assess all students selected as a part of its sampling process, including students who are classified by their schools as students with disabilities (SD) and/or as English language learners (ELL).

Accommodations

Prior to 1996, no testing accommodations were provided to students taking the NAEP assessments, resulting in the exclusion of students who could not be assessed without them. As the number of identified students with disabilities and English language learners increased over the years, the exclusion of those needing accommodations to participate in NAEP threatened the stability of trend lines (excluding more students in one assessment year than in another might lead to apparent rather than real differences), and threatened to compromise NAEP samples as optimally representative of target populations. Therefore, administration procedures allowing for many of the same testing accommodations provided on state and district assessments (e.g., extra testing time or individual rather than group administration) were introduced in 1996 for national NAEP assessments and in 2000 for NAEP state assessments.

The percentages of SD/ELL students assessed with the available accommodations in 2009 are presented in table A-9. Students assessed with accommodations typically received some combination of accommodations. For example, students assessed in small groups (as compared with standard NAEP sessions of about 30 students) were also usually given extended time and are included in counts for both groups in table A-9.

Table A-9. Percentage of fourth-, eighth-, and twelfth-grade public and nonpublic school students with disabilities (SD) and/or English language learners (ELL) assessed in NAEP science with accommodations, as a percent of all students, by SD/ELL category and type of primary accommodation: 2009

	Grade 4			Grade 8			Grade 12		
Type of accommodation	SD and/or ELL	SD	ELL	SD and/or ELL	SD	ELL	SD and/or ELL	SD	ELL
Bilingual book	0.4	#	0.4	0.1	#	0.1	—	—	—
Bilingual dictionary	0.5	#	0.5	0.5	#	0.5	0.4	#	0.4
Large-print book	0.1	0.1	#	#	#	#	#	#	#
Extended time	9.5	7.2	3.0	8.6	7.4	1.6	6.2	5.6	0.9
Read aloud	6.2	5.1	1.6	4.5	4.1	0.7	1.9	1.8	0.2
Small group	8.5	6.8	2.3	7.4	6.7	1.1	4.9	4.5	0.6
One-on-one	0.6	0.6	0.1	0.4	0.3	#	0.3	0.3	#
Scribe/computer	0.5	0.5	#	0.3	0.3	#	0.3	0.3	#
Breaks	3.8	3.2	1.0	2.4	2.1	0.5	1.3	1.1	0.3
Magnifying device	#	#	#	#	#	#	#	#	#
School staff administers	0.7	0.6	0.2	0.4	0.3	0.1	0.2	0.1	#
Directions read aloud in Spanish	0.3	#	0.3	0.2	0.1	0.2	0.1	#	0.1
Braille version of the text	#	#	#	#	#	#	#	#	#
Other	1.1	1.0	0.2	1.1	1.0	0.1	0.8	0.8	#

— Not available.

Rounds to zero.

NOTE: Students identified as both SD and ELL were counted only once under the combined SD and/or ELL category, but were counted separately under the SD and ELL categories.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Exclusion Rates

Even with the availability of accommodations, some students are excluded from the NAEP assessments by their schools. The decision to exclude any student is made by school staff who, using NAEP guidelines and each student's Individualized Education Program (IEP), decide whether the student can meaningfully be assessed.

Jurisdictions vary in their proportions of special-needs students. These variations, as well as differences in policies and practices regarding the identification and inclusion of special-needs students, lead to differences in exclusion and accommodation rates. These differences should be considered when comparing student performance over time and across jurisdictions. While the effect of exclusion is not precisely known, the validity of comparisons of performance results could be affected if exclusion rates are comparatively high or vary widely over time.

National Exclusion Rates (public and nonpublic school students): In 2009, twenty-one percent of students at grade four, 17 percent at grade eight, and 13 percent at grade twelve were identified as SD and/or ELL, with 2 percent excluded at grade four, 2 percent excluded at grade eight, and 3 percent excluded at grade twelve (table A-10). The percentages of SD and/or ELL students assessed with accommodations in 2009 ranged from 11 percent at grade four to 7 percent at grade twelve. The proportions of SD and/or ELL students excluded and assessed with and without accommodations as a percentage of students identified are provided in table A-11.

Table A-10. Percentage of fourth-, eighth-, and twelfth-grade public and nonpublic school students with disabilities (SD) and/or English language learners (ELL) excluded and assessed in NAEP science, as a percent of all students: 2009

SD/ELL category	Grade 4	Grade 8	Grade 12
SD and/or ELL			
Identified	21	17	13
Excluded	2	2	3
Assessed	19	15	11
Without accommodations	8	5	4
With accommodations	11	10	7
SD			
Identified	13	12	11
Excluded	2	2	2
Assessed	11	11	8
Without accommodations	3	2	2
With accommodations	8	9	6
ELL			
Identified	10	5	3
Excluded	1	#	#
Assessed	9	5	3
Without accommodations	5	3	2
With accommodations	4	2	1

Rounds to zero.

NOTE: Students identified as both SD and ELL were counted only once under the combined SD and/or ELL category, but were counted separately under the SD and ELL categories. 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), 2009 Science Assessment.

Table A-11. Percentage of fourth-, eighth-, and twelfth-grade public and nonpublic school students identified as students with disabilities (SD) and/or English language learners (ELL) excluded and assessed in NAEP science, as a percentage of all identified SD and/or ELL students, by grade and SD/ELL category: 2009

	Percentage of identified SD and/or ELL students			
Grade and SD/ELL category	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
Grade 4				
SD and/or ELL	9	91	39	52
SD	12	88	23	64
ELL	7	93	57	37
Grade 8				
SD and/or ELL	11	89	30	59
SD	13	87	17	70
ELL	9	91	57	34
Grade 12				
SD and/or ELL	19	81	28	52
SD	23	77	19	58
ELL	10	90	57	33

NOTE: Students identified as both SD and ELL were counted only once under the combined SD and/or ELL category, but were counted separately under the SD and ELL categories. 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), 2009 Science Assessment.

State Exclusion Rates (public school students only): The state percentages of fourth-graders identified as SD and/or ELL in 2009 ranged from 10 to 36 percent, and exclusion rates ranged from 1 to 3 percent (table A-12).

The state percentages of eighth-graders identified as SD and/or ELL in 2009 ranged from 10 to 25 percent, and exclusion rates ranged from 1 to 4 percent (table A-13).

Rates by state are reported separately for SD and ELL students at each grade in tables A-14 through A-17. Rates are also reported as the percentage of SD and/or ELL students identified in each state in tables A-18 through A-19.

Table A-12. Percentage of fourth-grade public school students identified as students with disabilities and/or English language learners excluded and assessed in NAEP science, as a percentage of all students, by state/jurisdiction: 2009

State/jurisdiction	Identified	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
Nation (public)	**23**	**2**	**20**	**9**	**12**
Alabama	12	1	11	7	4
Alaska	—	—	—	—	—
Arizona	26	2	24	11	13
Arkansas	17	1	16	3	13
California	36	2	33	27	6
Colorado	21	1	20	6	14
Connecticut	18	2	16	2	14
Delaware	18	2	17	2	14
Florida	23	2	22	4	18
Georgia	14	1	13	4	9
Hawaii	20	1	19	6	13
Idaho	15	2	13	6	8
Illinois	22	2	19	5	14
Indiana	19	2	17	6	12
Iowa	18	2	17	3	13
Kansas	—	—	—	—	—
Kentucky	17	2	15	5	10
Louisiana	22	1	20	4	16
Maine	20	1	18	4	14
Maryland	19	3	16	2	14
Massachusetts	24	3	21	7	14
Michigan	17	2	15	6	8
Minnesota	21	3	19	8	10
Mississippi	10	1	9	3	6
Missouri	16	2	14	5	9
Montana	14	1	13	4	9
Nebraska	—	—	—	—	—
Nevada	30	2	28	11	17
New Hampshire	21	2	19	4	15
New Jersey	19	2	17	2	15
New Mexico	26	2	24	9	15
New York	22	1	21	1	20
North Carolina	19	2	18	5	12
North Dakota	17	3	15	4	11
Ohio	16	2	14	3	11
Oklahoma	19	3	15	5	10
Oregon	26	3	23	8	15
Pennsylvania	18	1	17	4	12
Rhode Island	22	2	20	5	15
South Carolina	19	1	18	8	10
South Dakota	16	2	14	7	8
Tennessee	16	2	14	3	11
Texas	29	3	26	16	9
Utah	19	2	17	6	11
Vermont	—	—	—	—	—
Virginia	20	2	18	5	13
Washington	21	2	19	8	11
West Virginia	17	2	16	7	9
Wisconsin	20	2	18	3	15
Wyoming	18	1	17	4	13
Other jurisdictions					
District of Columbia	—	—	—	—	—
DoDEA[1]	18	2	16	6	10

— Not available. The jurisdiction did not participate.

[1] Department of Defense Education Activity (overseas and domestic schools).

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), 2009 Science Assessment.

Table A-13. Percentage of eighth-grade public school students identified as students with disabilities and/or English language learners excluded and assessed in NAEP science, as a percentage of all students, by state/jurisdiction: 2009

State/jurisdiction	Identified	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
Nation (public)	**18**	**2**	**16**	**5**	**10**
Alabama	11	1	10	7	3
Alaska	—	—	—	—	—
Arizona	16	2	14	5	9
Arkansas	16	1	14	3	11
California	25	2	24	18	6
Colorado	17	1	15	5	11
Connecticut	16	2	14	3	11
Delaware	17	1	16	2	14
Florida	19	2	17	1	16
Georgia	13	1	12	2	10
Hawaii	18	2	17	6	10
Idaho	12	1	11	4	7
Illinois	16	1	15	3	12
Indiana	16	2	14	3	12
Iowa	16	1	15	2	12
Kansas	—	—	—	—	—
Kentucky	13	2	10	2	9
Louisiana	16	1	14	2	12
Maine	19	2	17	3	14
Maryland	14	3	12	1	11
Massachusetts	21	4	17	3	14
Michigan	15	2	12	3	9
Minnesota	17	2	15	6	9
Mississippi	10	1	9	2	7
Missouri	14	1	12	3	10
Montana	14	2	12	3	9
Nebraska	—	—	—	—	—
Nevada	17	1	16	5	10
New Hampshire	21	2	19	5	14
New Jersey	18	2	16	1	14
New Mexico	21	3	18	8	11
New York	20	2	18	1	17
North Carolina	17	2	15	3	13
North Dakota	16	4	12	3	9
Ohio	15	2	13	1	12
Oklahoma	18	3	14	4	10
Oregon	18	2	16	8	9
Pennsylvania	19	2	17	2	15
Rhode Island	21	3	18	4	14
South Carolina	16	2	14	5	9
South Dakota	12	1	10	3	7
Tennessee	12	2	11	1	9
Texas	17	4	14	7	7
Utah	14	2	12	4	8
Vermont	—	—	—	—	—
Virginia	17	2	15	4	11
Washington	14	2	12	4	7
West Virginia	15	2	14	4	10
Wisconsin	18	2	16	3	13
Wyoming	15	2	13	3	10
Other jurisdictions					
District of Columbia	—	—	—	—	—
DoDEA[1]	13	2	11	3	7

— Not available. The jurisdiction did not participate.

[1] Department of Defense Education Activity (overseas and domestic schools).

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), 2009 Science Assessment.

Table A-14. Percentage of fourth-grade public school students identified as students with disabilities excluded and assessed in NAEP science, by state/jurisdiction: 2009

State/jurisdiction	Identified	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
Nation (public)	**13**	**2**	**12**	**3**	**9**
Alabama	10	1	9	6	4
Alaska	—	—	—	—	—
Arizona	13	2	12	5	7
Arkansas	12	1	11	2	9
California	10	2	7	3	4
Colorado	11	1	10	2	8
Connecticut	13	2	12	2	10
Delaware	15	2	14	2	12
Florida	17	1	15	3	12
Georgia	10	1	10	3	7
Hawaii	10	1	10	2	8
Idaho	10	1	9	3	6
Illinois	15	1	14	3	10
Indiana	16	2	14	5	9
Iowa	14	1	13	2	10
Kansas	—	—	—	—	—
Kentucky	15	2	13	5	9
Louisiana	20	1	18	4	15
Maine	18	1	17	3	14
Maryland	14	2	12	2	10
Massachusetts	19	3	15	2	13
Michigan	14	2	12	4	8
Minnesota	14	2	12	5	8
Mississippi	9	1	9	3	6
Missouri	14	2	13	4	8
Montana	12	1	10	3	8
Nebraska	—	—	—	—	—
Nevada	12	2	10	3	6
New Hampshire	18	2	17	3	14
New Jersey	16	1	14	2	12
New Mexico	13	2	11	3	8
New York	16	1	15	1	14
North Carolina	15	2	13	4	9
North Dakota	16	3	13	4	10
Ohio	14	2	12	2	10
Oklahoma	15	3	12	3	9
Oregon	16	3	13	5	8
Pennsylvania	15	1	14	4	11
Rhode Island	17	2	16	3	13
South Carolina	14	1	13	6	8
South Dakota	15	2	13	6	7
Tennessee	14	2	12	3	9
Texas	10	2	8	2	5
Utah	12	2	10	4	7
Vermont	—	—	—	—	—
Virginia	14	1	13	3	10
Washington	12	2	11	3	7
West Virginia	17	2	16	7	9
Wisconsin	15	2	13	2	11
Wyoming	16	1	14	3	11
Other jurisdictions					
District of Columbia	—	—	—	—	—
DoDEA[1]	12	1	11	3	8

— Not available. The jurisdiction did not participate.

[1] Department of Defense Education Activity (overseas and domestic schools).

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), 2009 Science Assessment.

Table A-15. Percentage of eighth-grade public school students identified as students with disabilities excluded and assessed in NAEP science, by state/jurisdiction: 2009

State/jurisdiction	Identified	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
Nation (public)	**13**	**2**	**11**	**2**	**9**
Alabama	10	1	9	6	3
Alaska	—	—	—	—	—
Arizona	12	2	10	2	7
Arkansas	12	1	11	2	9
California	9	1	8	3	5
Colorado	11	1	9	1	8
Connecticut	13	1	12	2	10
Delaware	15	1	14	1	13
Florida	15	1	14	1	12
Georgia	11	1	10	2	8
Hawaii	12	1	11	3	8
Idaho	9	1	8	3	5
Illinois	14	1	13	2	11
Indiana	14	2	12	1	10
Iowa	14	1	13	1	12
Kansas	—	—	—	—	—
Kentucky	12	2	9	1	8
Louisiana	15	1	13	2	12
Maine	17	2	16	3	13
Maryland	12	2	10	1	9
Massachusetts	19	3	15	2	13
Michigan	13	2	10	2	8
Minnesota	12	2	11	3	8
Mississippi	9	1	8	1	7
Missouri	13	1	12	3	9
Montana	12	2	10	1	9
Nebraska	—	—	—	—	—
Nevada	11	1	10	2	8
New Hampshire	20	2	18	5	13
New Jersey	16	2	14	1	13
New Mexico	13	3	10	3	7
New York	16	1	15	1	14
North Carolina	12	1	11	1	10
North Dakota	15	4	11	3	9
Ohio	15	2	12	1	11
Oklahoma	15	3	12	2	10
Oregon	13	2	11	5	7
Pennsylvania	17	2	16	2	14
Rhode Island	18	2	16	4	12
South Carolina	14	2	12	4	8
South Dakota	10	1	9	2	7
Tennessee	12	2	10	1	9
Texas	12	3	9	3	6
Utah	10	2	8	2	7
Vermont	—	—	—	—	—
Virginia	14	2	12	3	9
Washington	11	2	9	3	6
West Virginia	15	2	13	4	10
Wisconsin	14	2	12	2	10
Wyoming	14	1	12	3	10
Other jurisdictions					
District of Columbia	—	—	—	—	—
DoDEA[1]	8	1	8	1	6

— Not available. The jurisdiction did not participate.

[1] Department of Defense Education Activity (overseas and domestic schools).

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), 2009 Science Assessment.

Table A-16. Percentage of fourth-grade public school students identified as English language learners excluded and assessed in NAEP science, by state/jurisdiction: 2009

State/jurisdiction	Identified	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
Nation (public)	**10**	**1**	**10**	**6**	**4**
Alabama	2	#	2	2	#
Alaska	—	—	—	—	—
Arizona	15	1	14	7	7
Arkansas	6	#	6	1	4
California	30	1	29	25	3
Colorado	11	#	10	4	6
Connecticut	6	1	5	1	4
Delaware	4	#	4	1	3
Florida	8	1	7	#	7
Georgia	4	#	4	1	3
Hawaii	10	1	10	4	6
Idaho	5	#	5	3	2
Illinois	8	1	7	2	5
Indiana	5	1	4	1	3
Iowa	5	#	4	1	3
Kansas	—	—	—	—	—
Kentucky	2	#	2	1	1
Louisiana	2	#	2	1	2
Maine	1	#	1	1	1
Maryland	6	1	5	#	5
Massachusetts	7	1	6	4	2
Michigan	4	#	3	3	1
Minnesota	8	1	7	4	3
Mississippi	1	#	1	#	1
Missouri	2	#	2	1	1
Montana	3	#	3	2	2
Nebraska	—	—	—	—	—
Nevada	20	1	20	8	12
New Hampshire	3	#	3	1	2
New Jersey	4	1	3	#	3
New Mexico	16	1	15	6	9
New York	8	1	7	#	7
North Carolina	6	#	6	2	4
North Dakota	2	#	1	#	1
Ohio	3	#	2	1	2
Oklahoma	4	1	4	2	2
Oregon	12	1	11	4	7
Pennsylvania	3	#	3	#	2
Rhode Island	6	1	6	2	3
South Carolina	5	#	5	3	2
South Dakota	2	#	2	1	1
Tennessee	3	#	2	#	2
Texas	21	2	19	15	5
Utah	9	1	8	3	5
Vermont	—	—	—	—	—
Virginia	6	1	6	2	4
Washington	10	1	9	4	5
West Virginia	#	#	#	#	#
Wisconsin	7	1	6	1	5
Wyoming	3	#	3	#	2
Other jurisdictions					
District of Columbia	—	—	—	—	—
DoDEA[1]	7	1	5	3	2

— Not available. The jurisdiction did not participate.

Rounds to zero.

[1] Department of Defense Education Activity (overseas and domestic schools).

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), 2009 Science Assessment.

Table A-17. Percentage of eighth-grade public school students identified as English language learners excluded and assessed in NAEP science, by state/jurisdiction: 2009

State/jurisdiction	Identified	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
Nation (public)	**6**	**1**	**5**	**3**	**2**
Alabama	1	#	1	1	#
Alaska	—	—	—	—	—
Arizona	6	1	6	3	3
Arkansas	4	#	4	1	3
California	20	1	19	16	3
Colorado	7	#	7	3	3
Connecticut	4	1	3	1	2
Delaware	2	#	2	#	2
Florida	5	1	4	#	4
Georgia	2	#	2	#	1
Hawaii	7	1	6	3	3
Idaho	4	#	4	2	2
Illinois	3	1	3	1	2
Indiana	3	#	3	1	1
Iowa	2	#	2	1	1
Kansas	—	—	—	—	—
Kentucky	1	#	1	#	1
Louisiana	1	#	1	#	1
Maine	2	#	2	1	1
Maryland	2	#	2	#	2
Massachusetts	3	1	2	1	1
Michigan	2	#	2	2	#
Minnesota	6	1	5	4	1
Mississippi	1	#	1	#	#
Missouri	1	#	1	#	#
Montana	3	#	3	2	1
Nebraska	—	—	—	—	—
Nevada	8	#	8	4	4
New Hampshire	1	#	1	1	1
New Jersey	3	1	2	#	2
New Mexico	11	1	10	5	5
New York	5	1	4	#	4
North Carolina	5	#	5	2	3
North Dakota	2	1	1	1	#
Ohio	1	#	1	#	#
Oklahoma	3	#	3	2	1
Oregon	6	#	6	3	3
Pennsylvania	2	#	2	1	1
Rhode Island	3	1	2	1	1
South Carolina	3	#	3	1	2
South Dakota	1	#	1	1	#
Tennessee	1	#	1	#	1
Texas	7	1	6	4	1
Utah	5	#	4	2	2
Vermont	—	—	—	—	—
Virginia	3	#	3	1	2
Washington	4	#	3	2	2
West Virginia	1	#	1	#	#
Wisconsin	4	1	4	1	3
Wyoming	1	#	1	#	1
Other jurisdictions					
District of Columbia	—	—	—	—	—
DoDEA[1]	5	1	4	2	1

— Not available. The jurisdiction did not participate.

Rounds to zero.

[1] Department of Defense Education Activity (overseas and domestic schools).

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), 2009 Science Assessment.

Table A-18. Percentage of fourth-grade public school students identified as students with disabilities (SD) and/or English language learners (ELL) excluded and assessed in NAEP science, as a percentage of all identified SD and/or ELL students, by state/jurisdiction: 2009

State/jurisdiction	Percentage of identified SD and/or ELL students											
	SD and/or ELL				SD				ELL			
	Excluded	Assessed	Assessed without accom-modations	Assessed with accom-modations	Excluded	Assessed	Assessed without accom-modations	Assessed with accom-modations	Excluded	Assessed	Assessed without accom-modations	Assessed with accom-modations
Nation (public)	**9**	**91**	**39**	**52**	**13**	**87**	**23**	**64**	**7**	**93**	**57**	**37**
Alabama	8	92	60	31	9	91	56	36	5	95	82	14
Alaska	—	—	—	—	—	—	—	—	—	—	—	—
Arizona	7	93	43	51	12	88	34	54	4	96	49	48
Arkansas	8	92	19	73	10	90	16	73	7	93	23	71
California	7	93	76	17	23	77	32	46	4	96	85	11
Colorado	7	93	29	64	11	89	15	74	3	97	42	55
Connecticut	13	87	11	76	14	86	11	75	13	87	10	77
Delaware	9	91	13	78	10	90	11	78	7	93	18	75
Florida	7	93	15	77	8	92	19	73	8	92	4	88
Georgia	6	94	30	64	7	93	31	62	2	98	28	70
Hawaii	7	93	28	65	7	93	16	76	8	92	37	55
Idaho	11	89	37	52	14	86	27	59	8	92	56	35
Illinois	10	90	23	67	7	93	23	69	16	84	21	63
Indiana	11	89	29	61	11	89	31	58	15	85	17	69
Iowa	9	91	19	72	10	90	15	74	3	97	29	68
Kansas	—	—	—	—	—	—	—	—	—	—	—	—
Kentucky	12	88	30	57	12	88	30	58	19	81	29	52
Louisiana	7	93	19	74	7	93	18	75	7	93	27	66
Maine	7	93	20	73	8	92	18	74	3	97	44	53
Maryland	15	85	12	73	17	83	14	69	16	84	6	78
Massachusetts	14	86	28	58	17	83	13	70	11	89	61	28
Michigan	13	87	37	50	15	85	28	57	8	92	72	20
Minnesota	12	88	39	49	14	86	34	52	13	87	44	43
Mississippi	8	92	33	59	8	92	33	59	8	92	39	54
Missouri	11	89	31	58	12	88	30	57	6	94	29	65
Montana	11	89	29	61	13	87	23	65	2	98	50	49
Nebraska	—	—	—	—	—	—	—	—	—	—	—	—
Nevada	8	92	36	56	17	83	28	55	5	95	38	58
New Hampshire	8	92	19	73	9	91	17	74	3	97	25	72
New Jersey	9	91	11	80	8	92	12	80	15	85	4	81
New Mexico	8	92	33	58	14	86	21	66	6	94	39	55
New York	7	93	6	88	5	95	7	88	9	91	2	89
North Carolina	10	90	27	63	12	88	26	62	5	95	29	66
North Dakota	16	84	23	61	17	83	22	61	21	79	25	54
Ohio	11	89	18	71	13	87	17	70	13	87	19	68
Oklahoma	19	81	28	54	21	79	22	58	14	86	48	38
Oregon	11	89	32	57	17	83	29	54	6	94	33	61
Pennsylvania	8	92	22	69	8	92	23	69	6	94	16	78
Rhode Island	10	90	23	67	10	90	16	74	11	89	39	50
South Carolina	7	93	43	51	8	92	39	53	3	97	51	46
South Dakota	11	89	41	48	12	88	40	49	10	90	46	44
Tennessee	10	90	22	68	12	88	22	66	2	98	15	83
Texas	11	89	57	32	24	76	22	54	7	93	70	23
Utah	11	89	33	56	15	85	29	57	7	93	33	59
Vermont	—	—	—	—	—	—	—	—	—	—	—	—
Virginia	9	91	24	67	10	90	22	68	8	92	26	66
Washington	11	89	37	52	14	86	27	58	7	93	44	49
West Virginia	9	91	39	52	9	91	39	52	#	100	51	49
Wisconsin	10	90	16	74	12	88	14	74	9	91	16	75
Wyoming	8	92	22	71	9	91	22	70	2	98	19	79
Other jurisdictions												
District of Columbia	—	—	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	11	89	33	56	9	91	25	67	17	83	46	37

— Not available. The jurisdiction did not participate.

Rounds to zero.

[1] Department of Defense Education Activity (overseas and domestic schools).

NOTE: Students identified as both SD and ELL were counted only once under the combined SD and/or ELL category, but were counted separately under the SD and ELL categories. 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), 2009 Science Assessment.

Table A-19. Percentage of eighth-grade public school students identified as students with disabilities (SD) and/or English language learners (ELL) excluded and assessed in NAEP science, as a percentage of all identified SD and/or ELL students, by state/jurisdiction: 2009

State/jurisdiction	Percentage of identified SD and/or ELL students											
	SD and/or ELL				SD				ELL			
	Excluded	Assessed	Assessed without accom-modations	Assessed with accom-modations	Excluded	Assessed	Assessed without accom-modations	Assessed with accom-modations	Excluded	Assessed	Assessed without accom-modations	Assessed with accom-modations
Nation (public)	**11**	**89**	**30**	**58**	**14**	**86**	**17**	**70**	**9**	**91**	**56**	**35**
Alabama	12	88	61	27	12	88	59	29	13	87	79	8
Alaska	—	—	—	—	—	—	—	—	—	—	—	—
Arizona	13	87	30	57	16	84	20	65	9	91	43	47
Arkansas	8	92	19	73	9	91	16	74	5	95	27	68
California	7	93	70	23	16	84	30	54	4	96	80	16
Colorado	9	91	27	64	12	88	12	76	5	95	47	47
Connecticut	10	90	20	70	10	90	17	73	17	83	29	53
Delaware	8	92	9	83	8	92	8	84	12	88	13	74
Florida	9	91	8	83	9	91	8	83	12	88	6	82
Georgia	11	89	16	73	13	87	14	73	#	100	25	75
Hawaii	9	91	34	56	8	92	27	65	13	87	45	42
Idaho	10	90	33	57	13	87	28	59	2	98	45	53
Illinois	9	91	18	73	6	94	16	78	22	78	25	53
Indiana	13	87	17	70	14	86	11	75	7	93	45	48
Iowa	7	93	15	78	8	92	10	82	10	90	41	49
Kansas	—	—	—	—	—	—	—	—	—	—	—	—
Kentucky	19	81	14	67	19	81	13	68	30	70	21	49
Louisiana	9	91	15	76	10	90	13	78	5	95	45	50
Maine	8	92	18	73	9	91	16	75	3	97	38	59
Maryland	18	82	9	73	20	80	9	71	10	90	6	83
Massachusetts	17	83	15	68	17	83	13	70	18	82	29	52
Michigan	17	83	23	60	19	81	15	67	11	89	74	15
Minnesota	13	87	36	50	14	86	22	63	13	87	64	23
Mississippi	10	90	17	73	10	90	15	75	12	88	50	38
Missouri	9	91	21	70	8	92	20	72	28	72	35	38
Montana	14	86	21	65	16	84	12	73	4	96	59	37
Nebraska	—	—	—	—	—	—	—	—	—	—	—	—
Nevada	8	92	31	61	12	88	19	69	4	96	43	52
New Hampshire	10	90	24	66	10	90	23	67	9	91	35	57
New Jersey	12	88	8	80	11	89	8	81	22	78	3	75
New Mexico	15	85	36	49	23	77	21	57	9	91	47	43
New York	9	91	5	86	7	93	4	89	16	84	5	79
North Carolina	10	90	16	74	11	89	9	80	8	92	34	58
North Dakota	25	75	19	55	27	73	17	57	35	65	38	27
Ohio	15	85	8	76	14	86	7	78	44	56	18	38
Oklahoma	19	81	23	58	21	79	16	63	12	88	58	31
Oregon	9	91	43	47	13	87	36	52	1	99	53	45
Pennsylvania	8	92	13	79	9	91	11	80	9	91	27	65
Rhode Island	14	86	21	66	10	90	20	69	38	62	23	39
South Carolina	13	87	31	56	14	86	28	58	8	92	39	53
South Dakota	11	89	27	62	12	88	23	65	5	95	60	35
Tennessee	13	87	11	76	14	86	11	75	16	84	12	73
Texas	21	79	41	39	26	74	25	49	15	85	64	22
Utah	12	88	27	61	15	85	18	67	5	95	43	51
Vermont	—	—	—	—	—	—	—	—	—	—	—	—
Virginia	11	89	25	64	12	88	21	67	8	92	39	53
Washington	15	85	32	52	17	83	27	56	12	88	43	45
West Virginia	10	90	26	64	11	89	24	66	#	100	73	27
Wisconsin	12	88	16	72	13	87	14	73	12	88	21	67
Wyoming	10	90	21	69	11	89	20	70	10	90	34	57
Other jurisdictions												
District of Columbia	—	—	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	16	84	26	58	9	91	14	76	26	74	45	29

— Not available. The jurisdiction did not participate.

Rounds to zero.

[1] Department of Defense Education Activity (overseas and domestic schools).

NOTE: Students identified as both SD and ELL were counted only once under the combined SD and/or ELL category, but were counted separately under the SD and ELL categories. 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), 2009 Science Assessment.

Table A-20. Percentage of fourth-grade public school students with disabilities (SD) and/or English language learners (ELL) excluded and assessed in NAEP science, as a percent of all students, by SD/ELL category and urban district: 2009

SD/ELL category and district	Identified	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
SD and/or ELL					
Nation (public)	TBA	TBA	TBA	TBA	TBA
Large city (public)	TBA	TBA	TBA	TBA	TBA
Atlanta	TBA	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA	TBA
Jefferson County (KY)	TBA	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA	TBA
SD					
Nation (public)	TBA	TBA	TBA	TBA	TBA
Large city (public)	TBA	TBA	TBA	TBA	TBA
Atlanta	TBA	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA	TBA
Jefferson County (KY)	TBA	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA	TBA
ELL					
Nation (public)	TBA	TBA	TBA	TBA	TBA
Large city (public)	TBA	TBA	TBA	TBA	TBA
Atlanta	TBA	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA	TBA
Jefferson County (KY)	TBA	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA	TBA

Rounds to zero.

NOTE: Students identified as both SD and ELL were counted only once under the combined SD and/or ELL category, but were counted separately under the SD and ELL categories. 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), 2009 Science Assessment.

Table A-21. Percentage of eighth-grade public school students with disabilities (SD) and/or English language learners (ELL) excluded and assessed in NAEP science, as a percent of all students, by SD/ELL category and urban district: 2009

SD/ELL category and district	Identified	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
SD and/or ELL					
Nation (public)	TBA	TBA	TBA	TBA	TBA
Large city (public)	TBA	TBA	TBA	TBA	TBA
Atlanta	TBA	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA	TBA
Jefferson County (KY)	TBA	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA	TBA
SD					
Nation (public)	TBA	TBA	TBA	TBA	TBA
Large city (public)	TBA	TBA	TBA	TBA	TBA
Atlanta	TBA	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA	TBA
Jefferson County (KY)	TBA	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA	TBA
ELL					
Nation (public)	TBA	TBA	TBA	TBA	TBA
Large city (public)	TBA	TBA	TBA	TBA	TBA
Atlanta	TBA	TBA	TBA	TBA	TBA
Austin	TBA	TBA	TBA	TBA	TBA
Baltimore City	TBA	TBA	TBA	TBA	TBA
Boston	TBA	TBA	TBA	TBA	TBA
Charlotte	TBA	TBA	TBA	TBA	TBA
Chicago	TBA	TBA	TBA	TBA	TBA
Cleveland	TBA	TBA	TBA	TBA	TBA
Detroit	TBA	TBA	TBA	TBA	TBA
Fresno	TBA	TBA	TBA	TBA	TBA
Houston	TBA	TBA	TBA	TBA	TBA
Jefferson County (KY)	TBA	TBA	TBA	TBA	TBA
Los Angeles	TBA	TBA	TBA	TBA	TBA
Miami-Dade	TBA	TBA	TBA	TBA	TBA
Milwaukee	TBA	TBA	TBA	TBA	TBA
New York City	TBA	TBA	TBA	TBA	TBA
Philadelphia	TBA	TBA	TBA	TBA	TBA
San Diego	TBA	TBA	TBA	TBA	TBA

Rounds to zero.

NOTE: Students identified as both SD and ELL were counted only once under the combined SD and/or ELL category, but were counted separately under the SD and ELL categories. 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), 2009 Science Assessment.

Data Collection

The NAEP 2009 science assessment was conducted from January to March 2009 by contractors to the U.S. Department of Education. Data collection for NAEP involves a collaborative effort among the participating schools, school districts, states, and NAEP staff. To reduce the burden on the participating schools, NAEP field staff perform most of the work associated with the assessment. The cooperation of the schools involves enlisting a school staff member to assist in coordinating selected students and providing space to administer the assessments.

Assessment sessions are scripted so that all students are given the same instructions and opportunity to demonstrate what they know and can do. Assessment administrators conduct the sessions under the supervision of their team's assessment coordinator. Training of assessment administrators focuses on their responsibilities in the classroom and on reading the scripts verbatim to administer the sessions in a uniform manner.

NAEP procedures guarantee the anonymity of participants. The names of students are never removed from the schools. The results of NAEP are reported on the national level and by region of the country, state, and for some urban districts—not by school or individual student.

Scoring

Four types of cognitive items were scored for the NAEP science assessment. Responses to multiple-choice questions were scored by high-speed scanners during student booklet processing. Dichotomous constructed-response (correct and incorrect), short constructed-response (correct, partial, and incorrect) and the extended constructed-response questions (those with four or five valid score points) were scored by trained personnel using high-definition images of student responses also captured during processing.

Scoring a large number of short and extended constructed-responses with a high level of accuracy and reliability within a limited time frame is essential to the success of NAEP. To to ensure reliable, efficient scoring, NAEP does the following:

- develops focused, explicit scoring guides for each item that match the criteria delineated in the assessment frameworks;
- pilot tests all items and adjusts the scoring guides (if necessary) to reflect actual student responses;
- recruits qualified and experienced scorers, trains them, and verifies their ability to score particular questions through qualifying tests;
- employs an image-processing and scoring system that routes images of student responses directly to the scorers so they can focus on scoring rather than paper routing;
- monitors scorer consistency through a second scoring. This procedure randomly selects 5 percent of state samples and 25 percent of the national sample to score twice by different scorers;
- assesses the quality of scorer decision-making through constant monitoring by NAEP assessment experts; and
- documents all training, scoring, and quality control procedures in the technical reports.

For the 2009 science assessment, more than four million individual student responses were scored in all three grades (including second scoring to monitor within-year interrater reliability). There are approximately 3/4 of the 2009 science items that had 90 percent or higher exact agreement between raters of the same student responses. Note that for scoring purposes, each individual part of a multipart item or the bilingual versions of a regular item that is given to the bilingual accommodated students were scored as separate items.

Data Analysis and Scaling

The goal of the analysis of NAEP data is to summarize the performance of groups of students. Initial analysis activities verify the accuracy of the data and data files used in the analysis and provide the first indication of aspects of the data and analysis that require special consideration and attention. The first step is to determine the percentages of students who gave various responses to each cognitive item. Next, the properties of the items are further examined using classical test theory measures of item difficulty and item discrimination. Some of these activities are conducted without student weights or with preliminary student weights, but final student weights are used whenever possible.

After the initial activities are completed, Item Response Theory (IRT) models are used to describe the relationships between the item responses provided by students and the underlying scale. The primary purpose of IRT scaling is to provide a common scale on which performance can be compared, even when students receive different blocks of items. Item parameters that are used in the models are estimated from student response data for each item. Different IRT models with different types of item parameters are used to describe multiple-choice items, dichotomous constructed-response items, and polytomous constructed-response items.

Because the NAEP matrix design gives each student a small proportion of the pool of assessment items, the assessment cannot provide reliable information about individual student performance. Traditional test scores for individual students, even those based on IRT, would result in misleading estimates of population characteristics, such as student group means and percentages of students at or above a certain scale-score level. However, it is NAEP's goal to estimate these population characteristics. NAEP's objectives can be achieved with methodologies that produce estimates of the population-level parameters using marginal estimation techniques for latent variables. Under the assumptions of the analysis models, these population estimates will be consistent in the sense that the estimates approach the population values as the sample size increases.

Prior to 2009, the overall science scale for each grade was a composite scale as a weighted average of subscales estimated for each of the science content areas. Starting with the new 2009 science framework, the overall science scale for each grade is estimated as a single scale. IRT and the NAEP marginal estimation methodology are used to estimate the overall score scale. The overall scale for each grade ranges from 0 to 300, and summarizes student performance across all three science content areas (Physical Science, Life Science, and Earth and Space Sciences) and across all three types of questions in the assessment (multiple choice, short constructed response, and extended constructed response). Summary statistics of the scale scores are estimated, and statistical tests are used to make inferences about the comparisons of results for different groups of students. Finally, NAEP scale score distributions are described via achievement levels and/or item mapping procedures. Additionally, score scales are estimated for each of the three science content areas (Physical Science, Life Science, and Earth and Space Sciences). These subscale scores are also reported on a 0 to 300 scale. For more information about NAEP analysis, IRT, and scaling see http://nces.ed.gov/nationsreportcard/tdw/analysis/.

Variance Estimation

The averages and percentages in this report are estimates based on samples of students rather than on entire populations. Moreover, the collection of questions used at each grade level is only a sample of the many questions that could have been asked to assess the skills and abilities described in the NAEP framework, and each assessed student takes only a subset of the entire collection of questions. Therefore, the results are subject to a measure of uncertainty, reflected in the standard error of the estimates—a range of up to a few points above or below the score or percentage—which takes into account potential score fluctuation due to both sampling error and measurement error.

Because NAEP uses complex sampling procedures, conventional formulas for estimating sampling variability that assume simple random sampling are inappropriate. NAEP uses a jackknife replication procedure to estimate standard errors. The jackknife standard error provides a reasonable measure of uncertainty for any student information that can be observed without error. However, because each student typically responds to only a few questions within any science content area, the estimated scale score for any single student would be imprecise. In this case, NAEP's marginal estimation methodology is used to describe the performance of groups of students without requiring precise estimates of individual student performance. The estimate of the variance of the students' scale score distributions (which reflect the imprecision due to lack of measurement accuracy) is computed. This component of variability is then included in the standard errors of NAEP scale scores.

Drawing Inferences from the NAEP Results

Drawing correct inferences from NAEP assessment results depends on the use of appropriate statistical procedures for comparing assessment results for population groups of interest and following guidelines to ensure the validity of the inferences. Comparisons of different groups of students with respect to scores or percentages of a certain attribute are of primary interest to users of NAEP results. The user is cautioned to rely on the results of statistical tests, rather than on the apparent magnitude of the difference between two numbers when determining whether differences are likely to represent actual differences among the groups in the population.

***t* Test Comparison:** By convention, references to differences in NAEP reports indicate that scores or percentages from two groups are different (e.g., one group performed higher or lower than another group) only when the difference in the point estimates for the groups being compared is statistically significant at a level of .05.

Since 1998, *t* tests have been used for most NAEP comparisons. These tests are more appropriate than *z* tests (based on normal distribution approximations) when the statistics that are being compared are from distributions with proportionally larger extremes (i.e., thicker tails) than the normal distribution. One aspect of the use of *t* tests that contributes to the difficulty in their use for large-scale surveys is the determination of the appropriate degrees of freedom for the *t* distribution of interest.

Multiple Comparison Procedures: The *t* test used by NAEP and the certainty ascribed to intervals (e.g., a 95 percent confidence interval) are based on statistical theory that assumes that only one confidence interval is being examined or one test of statistical significance is being performed. However, in some sections of a report, many different groups may be compared (i.e., multiple sets of confidence intervals are being analyzed). In sets of confidence intervals, statistical theory indicates that certainty associated with the entire set of intervals is less than that attributable to each individual comparison from the set. To hold the significance level for the set of comparisons at a particular level (e.g., .05), adjustments—called multiple comparison procedures—must be made to the methods.

To ensure that comparisons made using NAEP data are as accurate as possible, error rates are controlled when multiple comparisons are made. When making a number of comparisons in a single analysis, such as analyzing White student performance versus the performance of Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native students, the probability of finding significant differences by chance, for at least one comparison, increases with the family size or number of comparisons. There are several ways to take into account how many related comparisons are being made. In NAEP, the Benjamini-Hochberg False Discovery Rate (FDR) procedure is used to control for this.

Unlike other multiple comparison procedures (e.g., the Bonferroni procedure) that control the familywise error rate (i.e., the probability of making even one false rejection in the set of comparisons), the FDR procedure controls the expected proportion of falsely rejected hypotheses. Familywise procedures are considered conservative for large families of comparisons; therefore the FDR procedure is more suitable for multiple comparisons in NAEP than other procedures. There are two exceptions where the FDR is not applied: when comparing multiple years and when comparing a state's overall results to the nation, but not to other states.

NAEP Reporting Groups

In addition to overall results for each grade assessed, NAEP results are reported for certain student groups provided there are sufficient numbers of students and adequate school representation. Results for some student groups may not be available for certain years, grades, or jurisdictions.

Race/Ethnicity: The school-recorded race/ethnicity variable records the race/ethnicity of each student as reported by the student's school. When the school-recorded information is missing, student-reported data derived from the student background questions are used. The mutually exclusive racial/ethnic categories are White, Black, Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, and Other. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin unless specified. Unclassified students are those whose school-reported race/ethnicity was "other" or "unavailable" or was missing, and whose race/ethnicity category could not be determined from self-reported information.

Gender: The gender of the student assessed is taken from school records.

Eligibility for the National School Lunch Program: The school lunch variable is based on available school records. Students are classified as either currently eligible or not currently eligible for the national lunch component of the Department of Agriculture's National School Lunch Program. The classification refers only to the school year when the assessment was administered and is not based on eligibility in previous years. If school records are not available, the student is classified as "Information not available." If the school did not participate in the program, all students in that school were classified as "Information not available." Eligibility for the program is determined by students' family income in relation to the federally established poverty level. Free lunch qualification is set at 130 percent of the poverty level or below, and reduced-price lunch qualification is set at between 130 and 185 percent of the poverty level. (For the period July 1, 2008 through June 30, 2009, for a family of four, 130 percent of the poverty level was $27,560, and 185 percent was $39,220.) Additional information on eligibility may be found at the U.S. Department of Agriculture website at http://www.fns.usda.gov/cnd/lunch/.

Type of Location: Results for four mutually exclusive categories of school location are also reported: city, suburb, town, and rural. The categories are based on standard definitions established by the Federal Office of Management and Budget using population and geographic information from the U.S. Census Bureau. Schools are assigned to these categories in the NCES Common Core of Data based on their physical address. The classification system was revised for 2007; therefore, trend comparisons to previous years are not available. The new locale codes are based on an address's proximity to an urbanized area (a densely settled core with densely settled surrounding areas). This is a change from the original system based on metropolitan statistical areas. To distinguish the two systems, the new system is referred to as "urban-centric locale codes."

Parental Education: Eighth- and twelfth-graders were asked the following two questions, the responses to which were combined to derive the parental education variable:

How far in school did your mother go?

- She did not finish high school
- She graduated from high school
- She had some education after high school
- She graduated from college
- I don't know

How far in school did your father go?

- He did not finish high school
- He graduated from high school

- He had some education after high school
- He graduated from college
- I don't know

The information was combined into one parental-education reporting variable in the following way:

- If a student indicated the extent of education for only one parent, that level was included in the data. If a student indicated the extent of education for both parents, the higher of the two levels was included in the data.
- If a student responded "I don't know" for both parents, or responded "I don't know" for one parent and did not respond for the other, the parental education level was classified as "I don't know."
- If the student did not respond for either parent, the student was recorded as having provided no response.

Because fourth-graders' responses to the questions tend to be not reliable, the questions were not presented to students at grade 4 in 2009.

Region of the Country: Prior to 2003, NAEP results were reported for four NAEP-defined regions of the nation: Northeast, Southeast, Central, and West. To align NAEP with other federal data collections, NAEP analysis and reports have used the U.S. Census Bureau's definition of "region" beginning in 2003. The four regions defined by the U.S. Census Bureau are Northeast, South, Midwest, and West. Therefore, trend data by region are not provided for assessment years prior to 2003.

Figure A-1 shows how states are divided into these census regions. All 50 states and the District of Columbia are listed. Other jurisdictions, including the Department of Defense Education Activity schools, are not assigned to any region.

Figure A-1. States within regions of the country defined by the U.S. Census Bureau

Northeast	South	Midwest	West
Connecticut	Alabama	Illinois	Alaska
Maine	Arkansas	Indiana	Arizona
Massachusetts	Delaware	Iowa	California
New Hampshire	District of Columbia	Kansas	Colorado
New Jersey	Florida	Michigan	Hawaii
New York	Georgia	Minnesota	Idaho
Pennsylvania	Kentucky	Missouri	Montana
Rhode Island	Louisiana	Nebraska	Nevada
Vermont	Maryland	North Dakota	New Mexico
	Mississippi	Ohio	Oregon
	North Carolina	South Dakota	Utah
	Oklahoma	Wisconsin	Washington
	South Carolina		Wyoming
	Tennessee		
	Texas		
	Virginia		
	West Virginia		

SOURCE: U.S. Department of Commerce Economics and Statistics Administration, U.S. Census Bureau.

Caution in Interpretations

The NAEP science scale makes it possible to examine relationships between students' performance and various background factors that NAEP measures. However, because NAEP assessment is a type of observational study, the relationship between achievement and another variable does not warrant any causal inferences. The results about student group performance are most useful when considered in combination with other knowledge about the student population and the educational system, such as trends in instruction, changes in the school-age population, and societal demands and expectations.