The Nation's Report Card

Science 2009

NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS AT GRADES 4, 8, AND 12

ies NATIONAL CENTER FOR EDUCATION STATISTICS
Institute of Education Sciences

U.S. Department of Education
NCES 2011-451

Contents

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 and state 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.

Executive Summary

New 2009 science assessment measures students' knowledge of physical science, life science, and Earth and space sciences

The National Assessment of Educational Progress (NAEP) in science was updated in 2009 to keep the content current with key developments in science, curriculum standards, assessments, and research. Because of the recent changes to the assessment, the results from 2009 cannot be compared to those from previous assessment years; however, they provide a current snapshot of what the nation's fourth-, eighth-, and twelfth-graders know and can do in science that will serve as the basis for comparisons on future science assessments.

National and state samples of 156,500 fourth-graders and 151,100 eighth-graders, and a national sample of 11,100 twelfth-graders, responded to questions designed to measure their knowledge and abilities in physical science, life science, and Earth and space sciences. A proficiency scale was developed in 2009 to facilitate NAEP science reporting and to establish the baseline for future science assessment results. For all three grades, the scales were set ranging from 0 to 300 with a mean of 150. That is, the overall average student performance for each grade corresponds to a score of 150. The 2009 results highlight differences in students' performance based on demographic characteristics and how participating states compare to the national average.

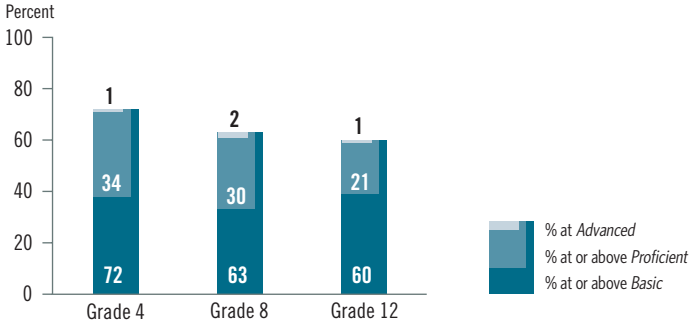
Percentages of students performing at or above *Proficient* range from 21 percent at grade 12 to 34 percent at grade 4

The NAEP *Proficient* level represents solid academic performance for each grade assessed, with the ultimate achievement goal of all students performing at the *Proficient* level or higher. Students reaching this level have demonstrated competency over challenging subject matter. Thirty-four percent of fourth-graders, 30 percent of eighth-graders, and 21 percent of twelfth-graders performed at or above the *Proficient* level in science in 2009 (figure **A**).

The *Basic* level denotes partial mastery of the knowledge and skills fundamental for proficient work at each grade. Seventy-two percent of fourth-graders, 63 percent of eighth-graders, and 60 percent of twelfth-graders performed at or above the *Basic* level in science in 2009.

The *Advanced* level represents superior performance. One percent of fourth-graders, 2 percent of eighth-graders, and 1 percent of twelfth-graders performed at the *Advanced* level.

Figure A. Achievement-level results in NAEP science at grades 4, 8, and 12: 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.

Scores higher for White, Asian/Pacific Islander, and male students

Results varied for students of different racial/ethnic groups. At grades 4 and 8, White students had higher average scores than other racial/ethnic groups, and Asian/Pacific Islander students scored higher than Black, Hispanic, and American Indian/Alaska Native students (table **A**). At grade 12, there was no significant difference in scores for White and Asian/Pacific Islander students, and both groups scored higher on average than other racial/ethnic groups. Male students scored higher on average than female students at all three grades.

Students' performance on the science assessment also differed based on the location of the schools they attended. At grades 4 and 8, students attending schools in city locations scored lower on average than students in schools in other locations. At grade 12, the average score for students in city schools was lower than the score for students attending suburban schools, but was not significantly different from the scores for students in town and rural locations.

Table **A.** Average scores in NAEP science at grades 4, 8, and 12, by selected student and school characteristics: 2009

Characteristic	Grade 4	Grade 8	Grade 12
Race/ethnicity			
White	163	162	159
Black	127	126	125
Hispanic	131	132	134
Asian/Pacific Islander	160	160	164
American Indian/ Alaska Native	135	137	144
Gender			
Male	151	152	153
Female	149	148	147
School location			
City	142	142	146
Suburb	154	154	154
Town	150	149	150
Rural	155	154	150

NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Examples of skills demonstrated by students performing at the *Basic* level

- Explain the benefit of an adaptation for an organism (grade 4).
- Relate oxygen level to atmospheric conditions at higher elevations (grade 8).
- Solve a design problem related to the electric force between objects (grade 12).

Examples of skills demonstrated by students performing at the *Proficient* level

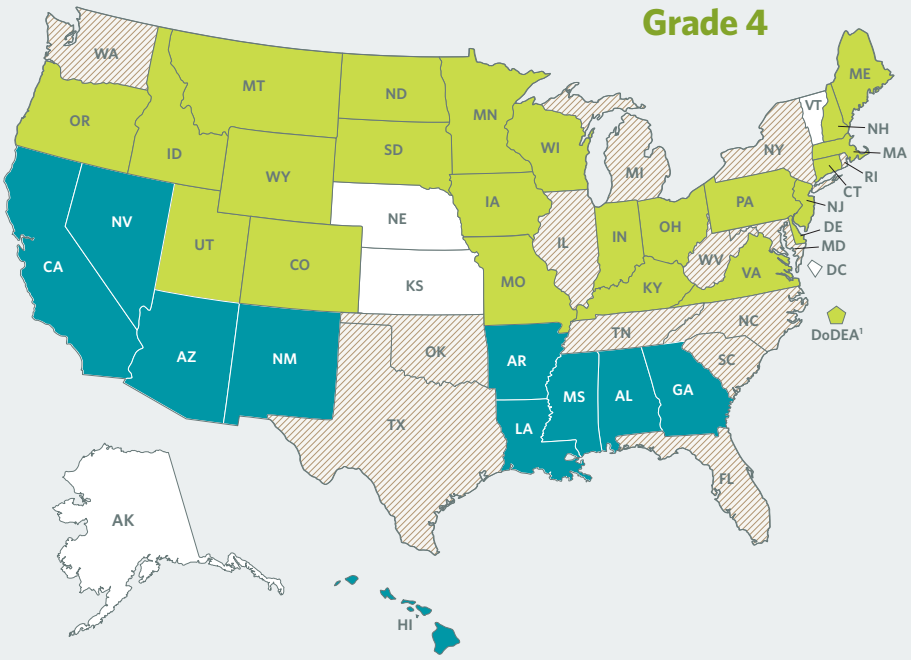
- Recognize that gravitational force constantly affects an object (grade 4).
- Relate characteristics of air masses to global regions (grade 8).
- Evaluate two methods to help control an invasive species (grade 12).

Examples of skills demonstrated by students performing at the *Advanced* level

- Design an investigation to compare types of bird food (grade 4).
- Predict the Sun's position in the sky (grade 8).
- Recognize a nuclear fission reaction (grade 12).

Scores higher than the national average in 24 states/jurisdictions at grade 4 and 25 score higher at grade 8

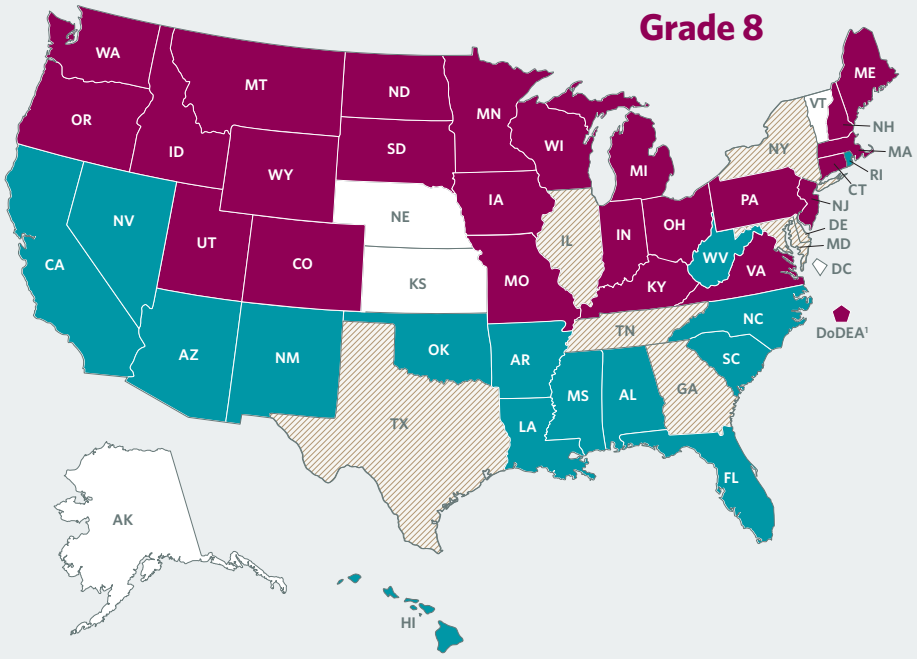
All 50 states, the District of Columbia, and Department of Defense schools volunteered to participate in the 2009 NAEP science assessment and contributed to results for the nation at grades 4 and 8. However, only 46 states and the Department of Defense schools had sufficient participation to report results separately for grades 4 and 8. These 47 states/jurisdictions are all referred to as "states" in the summary of results.



Compared to the nation, average **fourth-grade** science scores were

- higher in 24 states,
- lower in 10 states, and
- not significantly different in 13 states.

- State did not meet participation guidelines for reporting.



Compared to the nation, average **eighth-grade** science scores were

- higher in 25 states,
- lower in 15 states, and
- not significantly different in 7 states.

- State did not meet participation guidelines for reporting.

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

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

Introduction

Results from the 2009 NAEP science assessment provide a snapshot of what the nation's fourth-, eighth-, and twelfth-graders know and can do in science. Because the 2009 assessment is based on a new framework, these results cannot be compared to those from previous assessments but instead will provide a baseline for measuring students' progress on future NAEP science assessments.

The New Science Framework

The National Assessment Governing Board oversees the development of NAEP frameworks that describe the specific knowledge and skills that should be assessed in each subject. Frameworks incorporate ideas and input from subject-area experts, educators, policymakers, parents, and others. The NAEP science assessment is a key measure in informing the nation on how well the goal of scientific literacy for all students is being met. Thus, the new *Science Framework for the 2009 National Assessment of Educational Progress* was developed to keep the assessment content current with key developments in science standards (including the *National Science Education Standards*[1] and *Benchmarks for Science Literacy*[2]), innovative assessment approaches, and recent research in both science and cognition. The 2009 framework, therefore, replaces the framework that was used for earlier NAEP science assessments in 1996, 2000, and 2005.

In contrast to the earlier framework, the 2009 science framework employs crosscutting questions, that is, questions classified as one content area that also require knowledge of one or both of the other content areas. In addition, the framework gives greater emphasis to Earth and space sciences in the eighth-grade assessment and to life and physical sciences in the twelfth-grade assessment. It defines four science practices that take into account cognitive conceptual complexity and describe how students use their science knowledge. It also recommends the use of new question types and the inclusion of questions on technological design. The complete science framework for the 2009 assessment, including additional information on how it differs from the previous framework, is available at http://www.nagb.org/publications/frameworks/science-09.pdf.

Science content

The 2009 framework organizes science content into three broad content areas, physical science, life science, and Earth

Science Content Areas

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.

[1] National Research Council (1996). *National Science Education Standards.* Coordinating Council for Education, National Committee on Science Education Standards and Assessment. Washington, DC: National Academy Press.
[2] American Association for the Advancement of Science (1993). *Benchmarks for Science Literacy*. New York: Oxford University Press.

and space sciences, reflecting the science curriculum students are generally exposed to across grades K through 12. The new framework recommends an approximately equal distribution of questions across the three content areas at grade 4. At grade 8, there is a greater emphasis on Earth and space sciences, and at grade 12, there is an emphasis on physical science and life science.

Science practices

Four science practices are defined in the framework in addition to the science content areas. These four practices—identifying science principles, using science principles, using scientific inquiry, and using technological design—describe *how* students use their scientific knowledge by measuring what they *are able to do* with the science content. Sixty percent of the 2009 assessment focused on conceptual understanding (i.e., identifying and using science principles), 30 percent focused on scientific inquiry, and 10 percent focused on using technological design.

Science Practices

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.

Types of Questions

The results presented in this report are based on students' responses to both multiple-choice and constructed-response (open-ended) 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 generally required students to solve a problem by applying and integrating science concepts and/or required students to analyze a science situation and explain a concept. At all three grades, students spent approximately one-half of the assessment time answering constructed-response questions.

A separate sample of students also completed hands-on performance or interactive computer tasks to further probe their abilities to combine their understanding with the investigative skills that reflect science practices as specified in the 2009 framework. The hands-on and interactive computer tasks in the 2009 science assessment were administered as part of a NAEP research study. Results for these tasks did not contribute to the results in this report and will be reported separately.

Reporting NAEP Results

The assessment results are based on nationally representative samples of fourth-, eighth-, and twelfth-graders. Results for the nation reflect the performance of students attending public schools, private schools, and Department of Defense schools. Results for states and other jurisdictions at grades 4 and 8 reflect the performance of students in public schools only and are reported along with the results for public school students in the nation. The number of schools and students participating at grades 4 and 8 were larger than at grade 12 to allow reporting of results for individual states (table **1**).

Table **1.** Number of participating schools and students in NAEP science assessment, by grade: 2009

Grade	Number of schools	Number of students
Grade 4	9,330	156,500
Grade 8	6,920	151,100
Grade 12	1,410	11,100

NOTE: The number of schools is rounded to the nearest ten. The number of students is rounded to the nearest hundred.

Scale scores

A proficiency scale was developed in 2009 to facilitate NAEP science reporting and to establish the baseline for future science assessment results. The scale at each grade ranged from 0 to 300 with a mean of 150 and a standard deviation of 35. That is, the average overall performance for each grade corresponds to a score of 150. Because NAEP scales are developed independently for each subject, scores cannot be compared across subjects. Similarly, although the scales are identical, the scale scores for grades 4, 8, and 12 were derived independently; therefore, scores cannot be compared across grades. For example, the average score of 163 for White students at grade 4 does not denote higher performance than the score of 159 for White students at grade 12.

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

Average scores for each of the three science content areas specified in the framework are also available and are reported on the 0–300 scale for each grade. Because subscales are set separately for each content area, comparisons cannot be made from one area to another.

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. Science achievement levels are performance standards showing what students know and can do at the *Basic*, *Proficient*, and *Advanced* levels. NAEP results are reported as percentages of students performing at or above each level.

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. NAEP achievement levels have been widely used by national and state officials.

NAEP Achievement Levels

Basic denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade.

Proficient represents solid academic performance. Students reaching this level have demonstrated competency over challenging subject matter.

Advanced represents superior performance.

Additional information about NAEP achievement levels can be found at http://nces.ed.gov/nationsreportcard/tdw/analysis/describing_achiev.asp.

Interpreting the Results

NAEP reports results using widely accepted statistical standards; findings are reported based on statistical significance set at .05 with appropriate adjustments for multiple comparisons (see the Technical Notes for more information). Only those differences that are found to be statistically significant are discussed as higher or lower.

Although comparisons are made in students' performance based on demographic characteristics, the results cannot be used to establish a cause-and-effect relationship between student characteristics and achievement. Many factors may influence student achievement, including educational policies and practices, available resources, and demographic characteristics of the student body.

Accommodations and exclusions in NAEP

It is important to assess all selected students from the target population, including students with disabilities (SD) and English language learners (ELL). To accomplish this goal, many of the same testing accommodations allowed on state testing (e.g., extra testing time or individual rather than group administration) are provided for SD and ELL students participating in NAEP.

Even with the availability of accommodations, some students may still be excluded. The exclusion rates for the 2009 science assessment were 2 percent at grades 4 and 8, and 3 percent at grade 12.

Variations in exclusion and accommodation rates, due to differences in policies and practices for identifying and including SD and ELL students, should be considered when comparing student performance across states. States and jurisdictions also vary in their proportions of special-needs students, particularly ELL students. While the effect of exclusion is not precisely known, comparisons of performance results could be affected if exclusion rates are markedly different among states.

See appendix tables **A–1** through **A–6** for the percentages of students accommodated and excluded at the national and state levels. More information about NAEP's policy on the inclusion of special-needs students is available at http://nces.ed.gov/nationsreportcard/about/inclusion.asp.

Explore Additional Results

Not all of the data for results discussed in this report are presented in corresponding tables or figures. These and other results can be found in the NAEP Data Explorer at http://nces.ed.gov/nationsreportcard/naepdata/.

GRADE 4

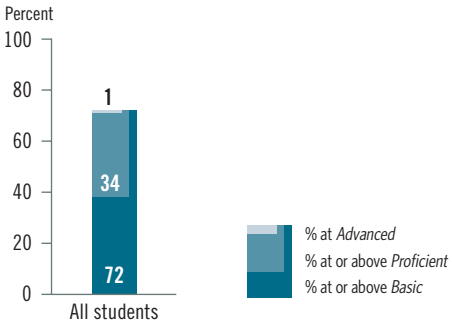
For this first assessment based on the new science framework, the overall average student performance at grade 4 is represented by a score of 150 on the 0 to 300 scale. Performance at or above *Proficient* represents a score of 167 or higher on the NAEP science assessment. Thirty-four percent of fourth-graders performed at or above the *Proficient* achievement level.

Students' performance varied based on demographic characteristics, with higher average scores for White students and for male students, and lower scores for students from lower-income families, those attending public schools, and those in city schools. Among the 47 states and jurisdictions that participated in the 2009 science assessment, 24 had scores higher than the score for public school students in the nation, and 10 had scores that were lower.

Thirty-four percent of fourth-graders perform at or above *Proficient*

Seventy-two percent of fourth-graders performed at or above the *Basic* level in 2009. Thirty-four percent performed at or above the *Proficient* level, demonstrating their competency over challenging science content (figure **1**). One percent of fourth-graders performed at the *Advanced* level in 2009.

Figure 1. Achievement-level results in NAEP science at grade 4: 2009



Examples of skills demonstrated by students performing at the *Basic* level

- Explain the benefit of an adaptation for an organism.
- Recognize how the Sun affects the Earth's surface.
- Predict the relative motion of an object based on a diagram.

Examples of skills demonstrated by students performing at the *Proficient* level

- Predict an environmental effect of the use of a chemical.
- Recognize the cycle of Moon phases.
- Predict the motion of an object when different forces act on it.

Examples of skills demonstrated by students performing at the *Advanced* level

- Identify what an organism needs to live.
- Predict the shape of the Moon.
- Investigate the speed of a runner.

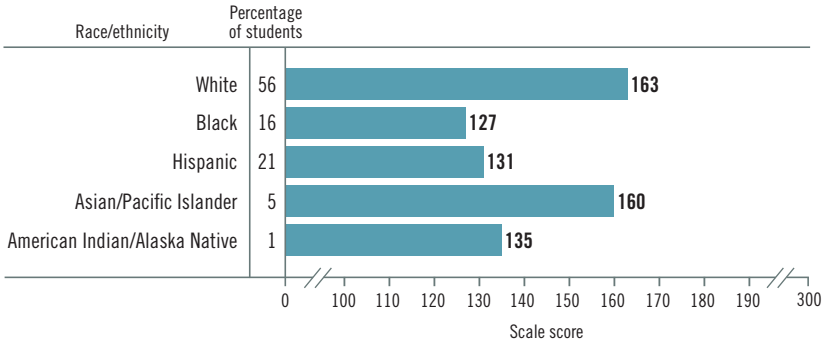
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

White students score higher than other racial/ethnic groups

White students scored higher on average in science than Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native students (figure 2). The score gap between White and Black students was 36 points, and the gap between White and Hispanic students was 32 points.

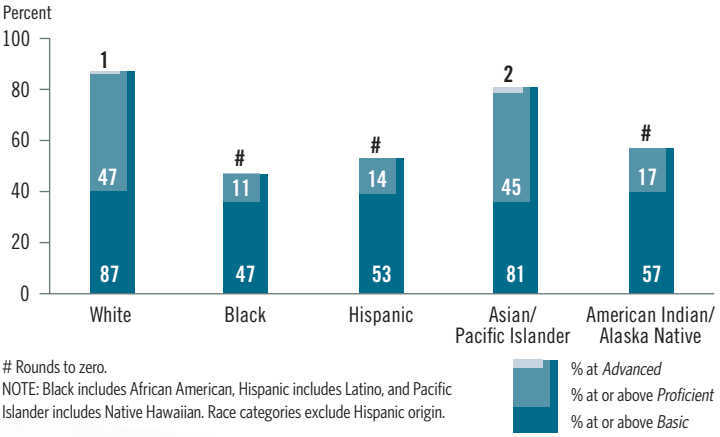
Eighty-seven percent of White students performed at or above the *Basic* level in 2009, and 47 percent performed at or above *Proficient* (figure 3). Both percentages were higher than those for Black, Hispanic, and American Indian/Alaska Native students. While the percentage of Asian/Pacific Islander students at or above *Basic* was lower than the percentage for White students, the percentages at or above *Proficient* for the two groups were not significantly different. The percentages of White and Asian/Pacific Islander students at *Advanced* were higher than the percentages for Black and Hispanic students.

Figure 2. Percentage of students and average scores in NAEP science at grade 4, by race/ethnicity: 2009



NOTE: 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 results are not shown for students whose race/ethnicity was unclassified.

Figure 3. Achievement-level results in NAEP science at grade 4, by race/ethnicity: 2009



Rounds to zero.
NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

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 differences vary by content area

The overall average science score in 2009 was higher for male fourth-graders than for female fourth-graders (figure **4**). Although not shown here, female students scored higher in life science (151) than did male students (149), even though their overall science score was lower.

Differences in the performance of male and female students were reflected in achievement-level results. The percentages of male and female students performing at or above the *Basic* level or at the *Advanced* level were not significantly different in 2009, while the percentage of male students at or above *Proficient* was higher than the percentage of female students (figure **5**).

Figure 4. Percentage of students and average scores in NAEP science at grade 4, by gender: 2009

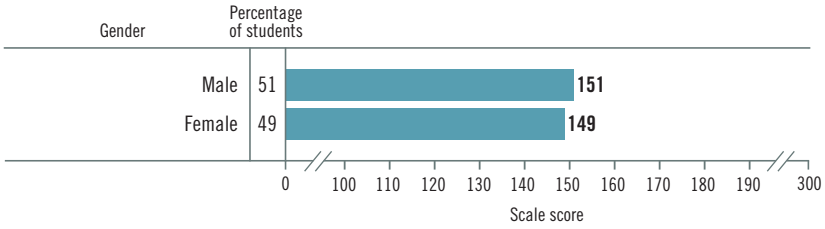
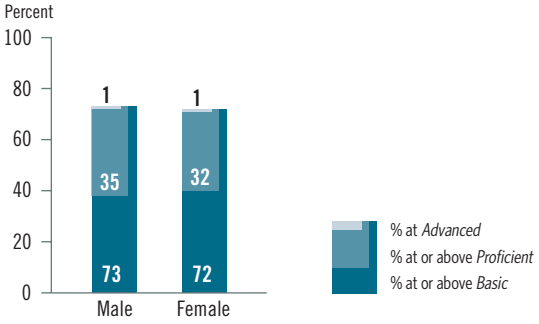


Figure 5. Achievement-level results in NAEP science at grade 4, by gender: 2009



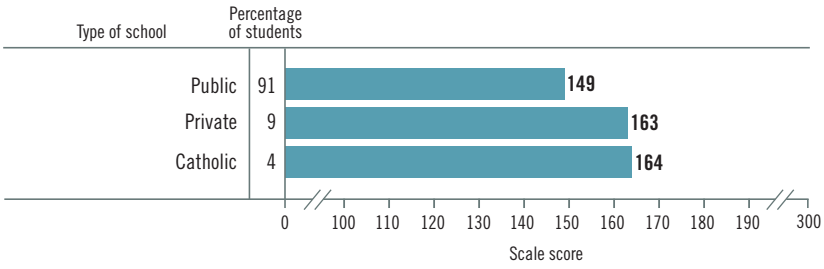
Public school students score below private school students

The average science score for students attending public schools (91 percent of fourth-graders) was 14 points lower than the overall score for students attending private schools and 15 points lower than for students in Catholic schools specifically (figure **6**).

Lower percentages of public school students than private school students performed at or above the *Basic* and *Proficient* levels (figure **7**). There was no significant difference in the percentages of public and private school students at *Advanced*.

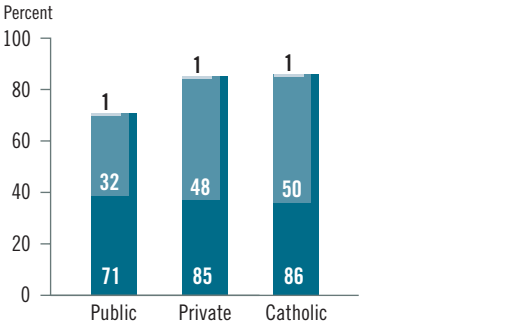
There may be many reasons why private school students perform differently, on average, from public school students. Differences in demographic composition, availability of resources, admissions policies, science curriculum, parental involvement, and other factors not measured in NAEP may influence average student performance.

Figure 6. Percentage of students and average scores in NAEP science at grade 4, by type of school: 2009



NOTE: Private schools include Catholic, other religious, and nonsectarian private schools.

Figure 7. Achievement-level results in NAEP science at grade 4, by type of school: 2009



NOTE: Private schools include Catholic, other religious, and nonsectarian private schools.

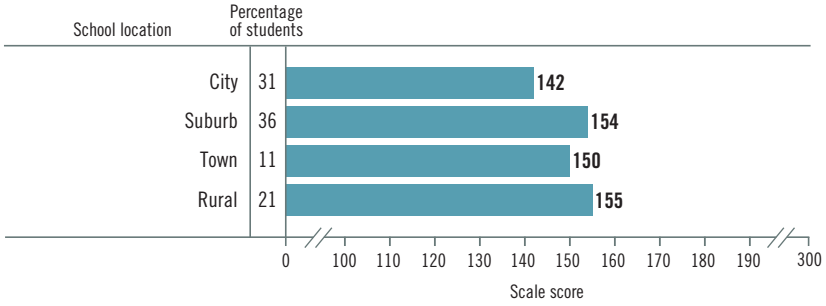
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Students in city schools score lower than students elsewhere

Students' performance on the 2009 science assessment differed based on the location of the schools they attended. Students attending schools in city locations (31 percent of fourth-graders) scored lower on average in science than students in schools in other locations (figure 8). Scores for students in suburban and rural locations were not significantly different from each other, and students in both locations had higher scores than students attending schools in towns.

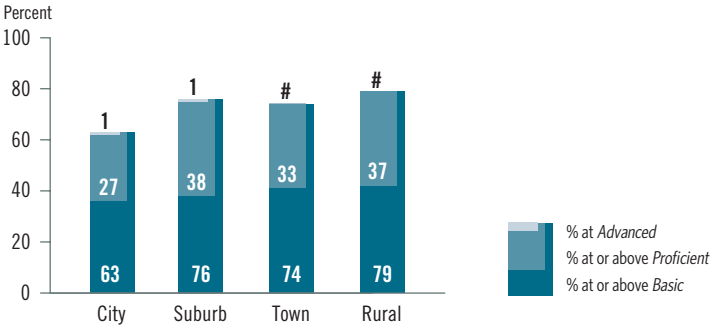
The percentages of fourth-graders performing at or above *Basic* and at or above *Proficient* were also lower in cities than in other locations (figure 9). See the Technical Notes for more information on how school location categories were defined.

Figure 8. Percentage of students and average scores in NAEP science at grade 4, by school location: 2009



NOTE: Detail may not sum to totals because of rounding.

Figure 9. Achievement-level results in NAEP science at grade 4, by school location: 2009



Rounds to zero.

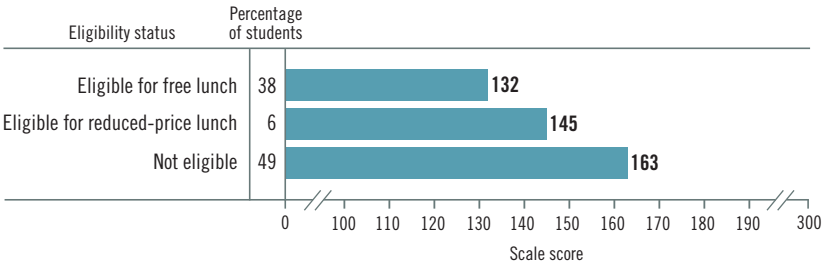
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Students' performance varies by family income

NAEP uses students' eligibility for the National School Lunch Program as an indicator of low income. Students from lower-income families are eligible for either free or reduced-price school lunches, while students from higher-income families are not (see the Technical Notes for eligibility criteria).

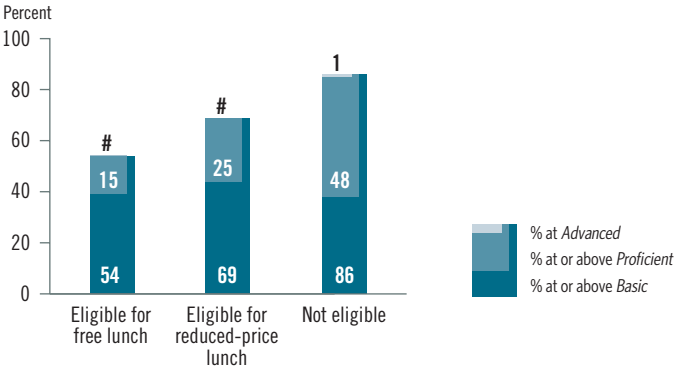
Students who were not eligible (49 percent of fourth-graders) scored higher on average than those eligible for reduced-price lunch, who in turn scored higher than those eligible for free lunch (figure **10**). The percentages of students at or above *Basic* and *Proficient* were also highest for students who were not eligible and lowest for those eligible for free lunch (figure **11**). The percentage of students who were not eligible at *Advanced* was higher than the percentage of students eligible for free lunch.

Figure 10. Percentage of students and average scores in NAEP science at grade 4, by eligibility for free or reduced-price school lunch: 2009



NOTE: Detail may not sum to totals because results are not shown for the "Information not available" category.

Figure 11. Achievement-level results in NAEP science at grade 4, by eligibility for free or reduced-price school lunch: 2009



Rounds to zero.

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

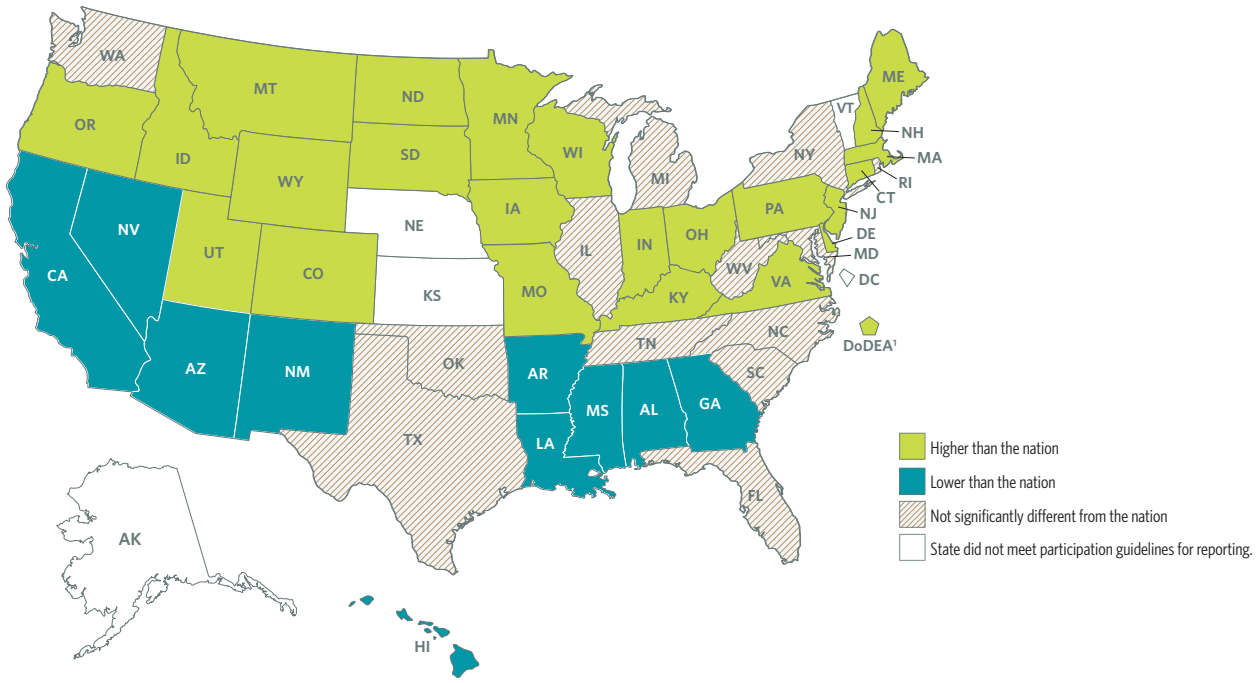
State Performance at Grade 4

NAEP state results make it possible to examine the performance of public school students in each participating state in relation to the overall performance of public school students in the nation. Forty-six states and the Department of Defense schools participated in the 2009 science assessment. These 47 states/jurisdictions are all referred to as "states" in the following summary of results.

Twenty-four states score higher than national public school average

The map shown below highlights differences in the states' average science scores in comparison to the score for public school students in the nation (figure **12**). Science scores in 24 states were higher than the nation, scores in 13 states were not significantly different, and scores in 10 states were lower.

Figure **12.** Comparison of state/jurisdiction and national average scores in NAEP science for public school students at grade 4: 2009



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

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

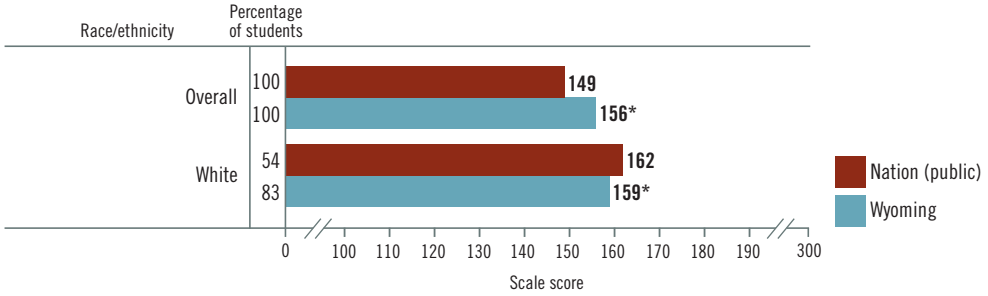
A Closer Look at State Demographics and Performance

It is useful to examine the differences between how a state performs overall and how students within a demographic group in that state perform. Some might assume that states that score above the national average would have student groups that exhibit similar performance, but that is not necessarily true. For example, 24 states scored higher than the nation. In 8 of those states, one of their racial/ethnic groups had scores that were lower than their peers nationwide (figure **16**). For example, while the average score for **Wyoming** was higher than the score for the nation, White students (83 percent of the state's fourth-graders) scored lower than their peers nationally (figure **13**).

On the other hand, 10 states scored lower than the nation. In each of these states, however, the score of either Black or Hispanic students was higher or comparable to their peers in the nation. For example, even though the overall score in **New Mexico** was lower than the nation, their Hispanic students scored above the national average for Hispanic students (figure **14**).

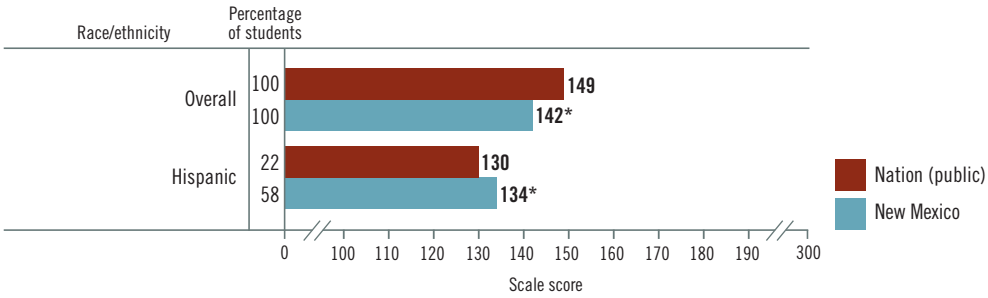
In addition, in 13 states the overall average scores were not significantly different from the nation. In 4 of those states, scores were higher for one or more racial/ethnic groups other than White students. In **Maryland**, for example, the overall average score was not significantly different from the score for the nation; however, scores for Black students and for Hispanic students were both higher than the national scores for these groups (figure **15**).

Figure 13. Percentage of students and average scores in NAEP science for public school students at grade 4 in the nation and **Wyoming**, by selected racial/ethnic groups: 2009



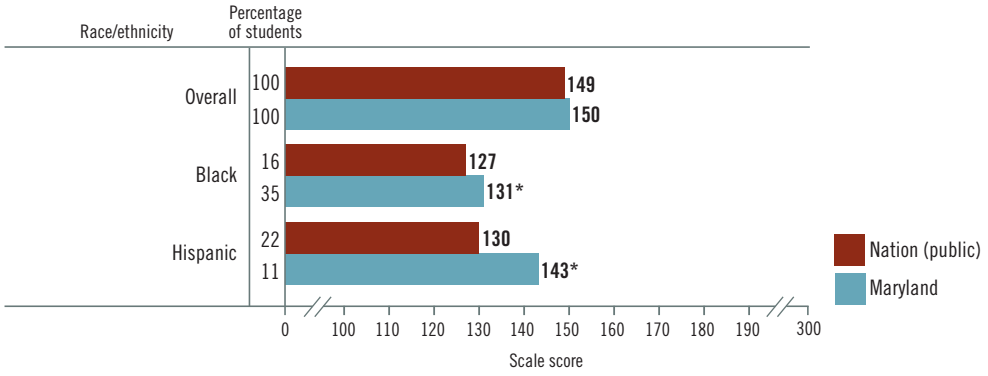
* Significantly different ($p < .05$) from the nation.
NOTE: Race categories exclude Hispanic origin.

Figure 14. Percentage of students and average scores in NAEP science for public school students at grade 4 in the nation and **New Mexico**, by selected racial/ethnic groups: 2009



* Significantly different ($p < .05$) from the nation.
NOTE: Hispanic includes Latino.

Figure 15. Percentage of students and average scores in NAEP science for public school students at grade 4 in the nation and **Maryland**, by selected racial/ethnic groups: 2009



* Significantly different ($p < .05$) from the nation.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin.

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

Figure 16. Comparison of state/jurisdiction and national average scores in NAEP science for public school students at grade 4, by race/ethnicity and state/jurisdiction: 2009

State/jurisdiction	Overall	Race/ethnicity: White	Black	Hispanic	Asian/Pacific Islander
Nation (public)	**149**	**162**	**127**	**130**	**160**
Alabama (143)	▼	▼	▼	◆	‡
Arizona (138)	▼	▼	◆	▼	◆
Arkansas (146)	▼	▼	▼	◆	◆
California (136)	▼	▼	◆	▼	◆
Colorado (155)	▲	▲	◆	▲	◆
Connecticut (156)	▲	▲	◆	◆	◆
Delaware (153)	▲	▲	▲	▲	▲
DoDEA[1] (159)	▲	▲	▲	▲	◆
Florida (151)	◆	◆	▲	▲	◆
Georgia (144)	▼	▼	◆	◆	◆
Hawaii (140)	▼	◆	◆	◆	▼
Idaho (154)	▲	▼	‡	◆	◆
Illinois (148)	◆	◆	▼	◆	◆
Indiana (153)	▲	▼	◆	◆	‡
Iowa (157)	▲	◆	◆	▲	◆
Kentucky (161)	▲	◆	▲	▲	▲
Louisiana (141)	▼	▼	▼	▲	‡
Maine (160)	▲	◆	▲	‡	‡
Maryland (150)	◆	◆	▲	▲	◆
Massachusetts (160)	▲	▲	▲	◆	◆
Michigan (150)	◆	◆	▼	▲	◆
Minnesota (158)	▲	▲	◆	◆	▼
Mississippi (133)	▼	▼	▼	▲	‡
Missouri (156)	▲	◆	◆	▲	‡
Montana (160)	▲	▲	‡	▲	‡
Nevada (141)	▼	▼	▼	◆	▼
New Hampshire (163)	▲	▲	‡	▲	▲
New Jersey (155)	▲	▲	▲	▲	▲
New Mexico (142)	▼	◆	◆	▲	‡
New York (148)	◆	◆	◆	◆	◆
North Carolina (148)	◆	◆	◆	◆	◆
North Dakota (162)	▲	▲	‡	‡	‡
Ohio (157)	▲	▲	◆	▲	‡
Oklahoma (148)	◆	▼	◆	◆	‡
Oregon (151)	▲	▼	◆	◆	◆
Pennsylvania (154)	▲	◆	▼	◆	◆
Rhode Island (150)	◆	◆	◆	▼	◆
South Carolina (149)	◆	◆	◆	◆	‡
South Dakota (157)	▲	◆	‡	▲	‡
Tennessee (148)	◆	▼	▼	◆	‡
Texas (148)	◆	▲	▲	▲	◆
Utah (154)	▲	◆	‡	◆	▼
Virginia (162)	▲	▲	▲	▲	▲
Washington (151)	◆	◆	◆	▼	◆
West Virginia (148)	◆	▼	◆	‡	‡
Wisconsin (157)	▲	▲	▼	▲	◆
Wyoming (156)	▲	▼	‡	▲	‡

‡ Sample size insufficient to permit a reliable estimate.
[1] Department of Defense Education Activity (overseas and domestic schools).
NOTE: The overall average scores for each state are shown in parentheses. Alaska, the District of Columbia, Kansas, Nebraska, and Vermont did not participate in the 2009 science assessment at the state level. Results are not shown separately for students whose race/ethnicity was American Indian/Alaska Native or unclassified, but they are included in the overall results. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

Additional State Results

The percentages of fourth-graders and performance results by race/ethnicity in participating states are provided in appendix tables **A-7** and **A-8**.

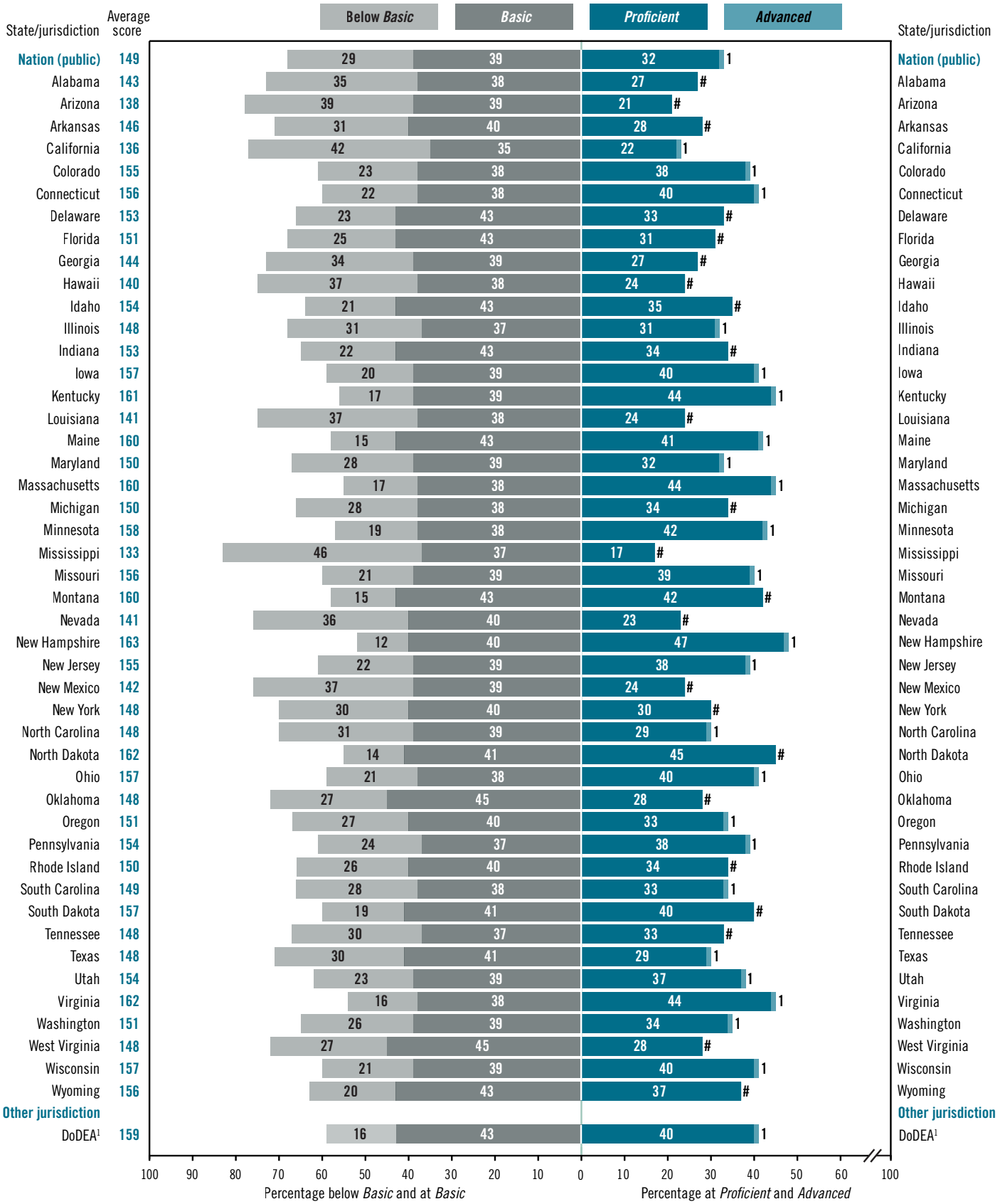
Additional state results for grade 4 are provided in figure **17** and appendix tables **A-9** through **A-12**.

Web-generated profiles of state results and a one-page snapshot report that presents key findings are available for each participating state and jurisdiction at http://nces.ed.gov/nationsreportcard/states/.

▲ Higher than the nation
▼ Lower than the nation
◆ Not significantly different from the nation

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

Figure 17. Average scores and achievement-level results in NAEP science for public school students at grade 4, by state/jurisdiction: 2009



Rounds to zero.

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

NOTE: Alaska, the District of Columbia, Kansas, Nebraska, and Vermont did not participate in the 2009 science assessment at the state level. The shaded bars are graphed using unrounded numbers. 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.

Assessment Content at Grade 4

The proportion of the science assessment devoted to each of the three broad content areas specified in the 2009 science framework varies by grade to reflect differences in curricular emphasis.

$33\frac{1}{3}$% Physical Science

These questions focus on students' understanding of physical science principles, including physical properties of common substances, changes of state of substances, examples of different forms of energy, electrical circuits, descriptions of the position and motion of objects, and changes in the motion of objects from applied or gravitational forces.

$33\frac{1}{3}$% Life Science

These questions focus on students' understanding of life science principles, including the basic needs of organisms for survival and growth, interdependence of organisms, life cycles, and differences and adaptations of organisms.

$33\frac{1}{3}$% Earth and Space Sciences

These questions focus on students' understanding of patterns of objects in the sky, evidence of Earth changes, natural and human-made materials, role of the Sun, weather changes, and uses of Earth's resources.

Because NAEP assessments cover a breadth of content in each subject area and include more questions than any one student could reasonably answer, each student takes just a portion of the assessment. The 143 questions included in the fourth-grade science assessment were divided into nine sections, each containing between 15 and 17 questions depending on the balance between multiple-choice and constructed-response questions. Each student responded to two 25-minute sections.

NAEP Science Achievement-Level Descriptions for Grade 4

The specific descriptions of what fourth-graders should know and be able to do at the *Basic*, *Proficient*, and *Advanced* science achievement levels are presented below. (Note: Shaded text is a short, general summary to describe performance at each achievement level.) NAEP achievement levels are cumulative; therefore, student performance at the *Proficient* level includes the competencies associated with the *Basic* level, and the *Advanced* level also includes the skills and knowledge associated with both the *Basic* and the *Proficient* levels. The cut score indicating the lower end of the score range for each level is noted in parentheses.

Basic (131)

Students performing at the *Basic* level should be able to describe, measure, and classify familiar objects in the world around them, as well as explain and make predictions about familiar processes. These processes include changes of states of matter, movements of objects, basic needs and life cycles of plants and animals, changes in shadows during the day, and changes in weather. They should be able to critique simple observational studies, communicating observations and basic measurements of familiar systems and processes, and look for patterns in their observations. With regard to scientific constraints, they should also be able to propose and critique alternative solutions to problems involving familiar systems and processes.

Science Practices: Students performing at the *Basic* level should be able to describe, measure, and classify familiar objects in the world around them, as well as explain and make predictions about familiar processes, using evidence to support their observations and conclusions. They should be able to critique simple observational studies, communicate observations and basic measurements of familiar systems and processes, and look for patterns in their observations. They should also be able to propose and recognize alternative solutions to problems involving familiar systems and processes.

In the physical sciences, students performing at the *Basic* level should be able to describe the properties of the states of matter, describe how to change matter from one state to another, describe different forms of energy, predict the electrical energy transfers that will take place in a simple circuit, critique alternative explanations for changes in a moving object's position, and design an investigation to show how exerting a force on an object changes the object's motion.

In the life sciences, students performing at the *Basic* level should be able to identify the stages in the life cycles of familiar organisms; describe how familiar animals meet their basic needs for food, air, water, and shelter; observe and describe the changes in plants and animals during their life cycles; and describe how environments meet the survival needs of familiar plants and animals.

In the Earth and space sciences, students performing at the *Basic* level should be able to predict changes in the length and position of shadows cast by the sun, describe how slow Earth processes (e.g., erosion) and fast Earth processes (e.g., volcanic eruption) can change Earth's surface, distinguish between natural and manmade materials, choose and use a tool to monitor how weather conditions change, and identify Earth resources that are limited.

Proficient (167)

Students performing at the *Proficient* level should be able to demonstrate relationships among closely related science concepts, as well as analyze alternative explanations or predictions. They should be able to explain how changes in temperature cause changes of state, how forces can change motion, how adaptations help plants and animals meet their basic needs, how environmental changes can affect their growth and survival, how land formations can result from Earth processes, and how recycling can help conserve limited resources. They should be able to identify patterns in data and/or explain these patterns. They should also be able to identify and critique alternative responses to design problems.

Science Practices: Students performing at the *Proficient* level should be able to demonstrate relationships among closely related science concepts and familiar phenomena around them, as well as analyze alternative explanations or predictions, using evidence to support their explanations and predictions; critique observational studies and simple investigations; identify patterns in data and/or explain those patterns in data; and apply scientific ideas to identify and critique alternative designs to problems that personally affect them.

In the physical sciences, students performing at the *Proficient* level should be able to demonstrate the relationship between temperature change and changes in the physical properties of matter, explain how energy in one form can be changed into another form, design an investigation that measures how temperature changes when energy is added to a substance, propose a design for a container that will maintain the temperature of an object that is above or below room temperature, and measure changes in position of an object in motion as different forces are applied.

In the life sciences, students performing at the *Proficient* level should be able to describe needs of familiar plants and animals at different stages of their life cycles, explain adaptations of familiar plants and animals to their environments, predict effects of environmental changes on plant or animal growth and survival, and apply information about an animal's basic needs to propose a supportive environment.

In the Earth and space sciences, students performing at the *Proficient* level should be able to explain how the Sun's changing position in the sky during the day affects shadows; interpret land formations as resulting from either slow (e.g., erosion) or rapid (e.g., volcanic eruption) Earth processes; explain how natural materials can help sustain the lives of familiar plants and animals; identify how patterns of weather conditions change from season to season; and explain how the practices of recycling, reusing, and reducing help to conserve limited resources.

Advanced (224)

Students performing at the *Advanced* level should be able to demonstrate relationships among different representations of science principles, as well as propose alternative explanations or predictions of phenomena. They should be able to use numbers, drawings, and graphs to describe and explain motions of objects; analyze how environmental conditions affect growth and survival of plants and animals; describe changes in the Sun's path through the sky at different times of year; and describe how human uses of Earth materials affect the environment. They should be able to design studies that use sampling strategies to obtain evidence. They should also be able to propose and critique alternative individual and local community responses to design problems.

Science Practices: Students performing at the *Advanced* level should be able to demonstrate relationships among different representations of principles, as well as propose alternative explanations or predictions of familiar phenomena, using evidence to support their explanations and predictions; design observational studies or simple investigations to validate or criticize explanations or predictions and use sampling strategies to obtain evidence; and propose and critique alternative individual and local community responses to design problems.

In the physical sciences, students at the *Advanced* level should be able to demonstrate the relationship between the quantity of energy needed to change the state of a sample of a substance and the weight of the sample, demonstrate how different representations (i.e., verbal, numerical, graphical) can be used to show the motion of an object, suggest an example of how the motion of an object can be changed without touching it, and design an investigation that demonstrates how long it takes different forms of energy to change the temperature of matter.

In the life sciences, students at the *Advanced* level should be able to evaluate relationships between changing environmental conditions and organisms' growth, survival, and reproduction; analyze environments for how they may have different effects on the growth and survival of plants or animals of the same kind; and investigate the relationship between light and plant growth.

In the Earth and space sciences, students at the *Advanced* level should be able to relate changes in the Sun's daily path through the sky to different times of year, suggest examples of Earth materials that can be modified to meet human needs, explain how erosion is caused by daily/seasonal weather events, propose methods of reducing the amount of erosion, describe how humans can change environments that can be either detrimental or beneficial for themselves and other organisms, and describe how the use of Earth materials by humans impacts the environment.

What Fourth-Graders Know and Can Do in Science

The item map below is useful for understanding performance at different levels on the NAEP scale. The scale scores on the left represent the scores for students who were likely to get the items correct or complete. The cut score at the lower end of the range for each achievement level is boxed. The descriptions of selected assessment questions indicating what students need to do to answer the question correctly are listed on the right, along with the corresponding science content areas.

For example, the map on this page shows that fourth-graders performing in the middle of the *Basic* range (students with a score of 153) were likely to be able to predict the impact of habitat loss. Students performing near the middle of the *Proficient* range (with a score of 190) were likely to be able to relate the calendar to the amount of daylight.

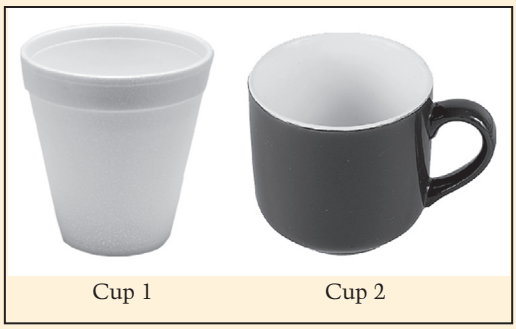
GRADE 4 NAEP SCIENCE ITEM MAP

	Scale score	Content area	Question description
	300 //		
Advanced	293	**Physical science**	Investigate the speed of a runner
	285	**Life science**	Design an investigation to compare types of bird food
	278	**Earth and space sciences**	*Predict the shape of the Moon*
	264	**Physical science**	*Determine the source of sound during an investigation about the pitch of sounds*
	264	**Life science**	Explain differences between related individuals (**shown on page 23**)
	253	**Life science**	Identify what an organism needs to live
	233	**Earth and space sciences**	*Draw a conclusion about differences in air temperatures based on data*
	224		
Proficient	222	**Life science**	Describe the different stages of the life cycle of an organism
	220	**Earth and space sciences**	*Recognize the cycle of Moon phases*
	212	**Earth and space sciences**	Critique a prediction about the amount of soil runoff
	210	**Physical science**	*Design an investigation to determine the volume of a container* (**shown on page 21**)
	205	**Earth and space sciences**	Recognize human-made versus natural materials
	204	**Physical science**	*Use evidence to critique a conclusion about the transparency of a material*
	194	**Physical science**	*Recognize that gravitational force constantly affects an object*
	190	**Earth and space sciences**	*Relate the calendar to amount of daylight*
	186	**Earth and space sciences**	*Interpret a temperature graph*
	175	**Physical science**	Predict the motion of an object when different forces act on it
	173	**Life science**	Predict an environmental effect of the use of a chemical
	169	**Physical science**	*Explain an example of heat (thermal energy) transfer*
	167		
Basic	165	**Physical science**	*Predict the relative motion of an object based on a diagram*
	164	**Life science**	*Investigate the range of bird population*
	161	**Earth and space sciences**	Explain the choice of material based on protection of the environment (**shown on page 22**)
	157	**Life science**	*Identify an essential characteristic of a plant*
	153	**Life science**	*Predict the impact of habitat loss*
	146	**Life science**	*Explain the benefit of an adaptation for an organism*
	143	**Earth and space sciences**	*Recognize how the Sun affects the Earth's surface*
	138	**Physical science**	*Recognize an example of a change of state*
	133	**Earth and space sciences**	*Modify a landscape to help prevent a natural disaster*
	131		
	128	**Life science**	*Identify the organism with a change in habitat from young to adult*
	118	**Physical science**	*Identify the data on a motion chart*
	113	**Earth and space sciences**	*Recognize a renewable source of energy*
	106	**Earth and space sciences**	*Identify the best tool to measure rainfall*
	94	**Life science**	*Place stages of a life cycle in correct order*
	77	**Physical science**	*Identify the source of energy used by a home appliance*
	56	**Life science**	*Recognize a related individual based on physical characteristics*
	// 0		

NOTE: Regular type denotes a constructed-response question. *Italic* type denotes a multiple-choice question. The position of a question on the scale represents the scale score attained by students who had a 65 percent probability of successfully answering a constructed-response question, or a 74 percent probability of correctly answering a four-option multiple-choice question. For constructed-response questions, the question description represents students' performance at the highest scoring level. Scale score ranges for science achievement levels are referenced on the map.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Sample Question: Physical Science

A student wants to know whether two cups hold the same volume of water. The two cups have different weights (masses).



Cup 1 Cup 2

The student completely fills Cup 1 with water. The student wants to measure if Cup 2 holds the same volume of water.

What should the student do next to complete the measurements?

- (A) Completely fill Cup 2 with water and then look at the cups side by side
- (B) Pour half of the water from Cup 1 into Cup 2, weigh each cup and then compare their weights
- (C) Pour all of the water from Cup 1 into Cup 2 to see if the water completely fills Cup 2 without spilling over
- (D) Completely fill Cup 2 with water, weigh each filled cup, and then compare the weights

This sample question from the 2009 fourth-grade assessment measures students' performance in the physical science content area. The question asks students to design an investigation to determine the volume of a container.

Thirty-five percent of fourth-grade students answered correctly (Choice C). The most common incorrect answer (Choice B), which was selected by 25 percent of the students, represents a conceptual misunderstanding that both containers have the same masses (weights).

Percentage of fourth-grade students in each response category: 2009

Choice A	Choice B	Choice C	Choice D	Omitted
17	25	35	21	2

The table below shows the percentage of fourth-graders at each achievement level who answered this question correctly. For example, 28 percent of fourth-graders at the *Basic* level selected the correct answer choice.

Percentage correct for fourth-grade students at each achievement level: 2009

Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
35	23	28	51	88

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

Sample Question: Earth and Space Sciences

When people buy groceries, they may have their groceries packed in plastic bags, paper bags, or cloth bags they bring with them.

Complete response #1:

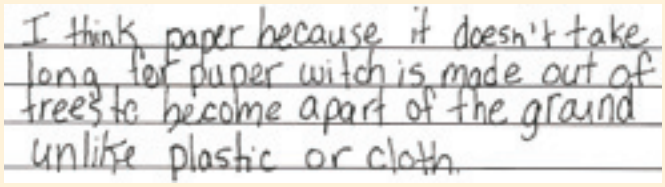
Which type of grocery bag is best to use to help protect the environment?

Ⓐ Plastic

Ⓑ Paper

Ⓒ Cloth

Explain why your choice helps protect the environment.



Complete response #2:

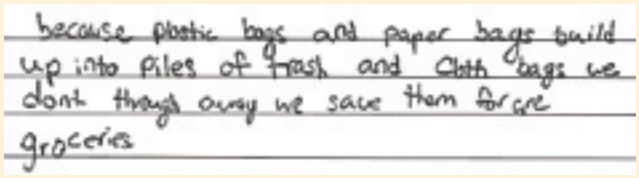
Which type of grocery bag is best to use to help protect the environment?

Ⓐ Plastic

Ⓑ Paper

Ⓒ Cloth

Explain why your choice helps protect the environment.



This sample of a short constructed-response question measures fourth-graders' performance in the Earth and space sciences content area. It requires students to choose a type of material and to explain how using this material can help protect the environment. Student responses to this question were rated using two scoring levels.

Complete responses either

- indicated one type of grocery bag and correctly explained why using this type of bag helps protect the environment by indicating reusing, recycling, or biodegradation of the bags, as appropriate, or
- indicated one type of grocery bag and correctly explained why not using bags made of one of the other materials helps protect the environment.

Unsatisfactory/Incorrect responses were inadequate or incorrect.

The sample student responses shown on the left were rated as "Complete" because they correctly answered all parts of the question. Fifty-five percent of fourth-graders' responses to this question received a "Complete" rating.

Percentage of fourth-grade students in each response category: 2009

Complete	Unsatisfactory/Incorrect	Omitted
55	44	1

NOTE: The percentage of responses rated as "Off-task" is not shown but rounds to zero. Off-task responses are those that do not provide any information related to the assessment task.

The table below shows the percentage of fourth-graders at each achievement level whose response to this question was rated as "Complete." For example, 58 percent of fourth-graders at the *Basic* level provided a response rated as "Complete."

Percentage of answers rated as "Complete" for fourth-grade students at each achievement level: 2009

Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
55	21	58	80	94

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

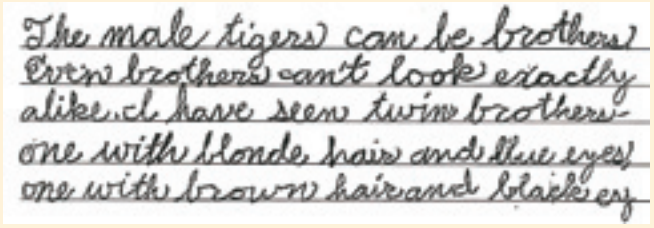
Sample Question: Life Science

Jaime and Manuel visit the zoo. They see two male tigers who are brothers. Jaime points out that the fur of one of the tigers has stripes that are a darker brown than the other tiger's stripes.

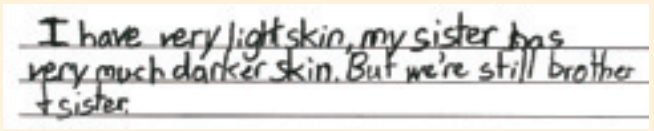
Manuel says the tigers cannot be brothers.

How can Jaime explain to Manuel that tigers with different-colored stripes can be brothers? In your answer, use a specific example of what you have observed about similarities and differences between people who are related.

Complete response #1:



Complete response #2:



This sample of a short constructed-response question measures fourth-graders' performance in the life science content area. It requires students to explain differences between related individuals. Student responses to this question were rated using three scoring levels.

Complete responses correctly indicated that people or animals that are related can look different, and provided a comparison of a specific characteristic of individuals.

Partial responses correctly indicated that people or animals that are related can look different, but did not provide a comparison of a specific characteristic of individuals.

Unsatisfactory/Incorrect responses were inadequate or incorrect.

The sample student responses shown above were rated as "Complete" because both correctly explain that people or animals that are related can look different and provide a specific characteristic of individuals. Seven percent of fourth-graders' responses to this question received a "Complete" rating.

Percentage of fourth-grade students in each response category: 2009

Complete	Partial	Unsatisfactory/ Incorrect	Omitted
7	15	72	5

NOTE: Detail may not sum to totals because the percentage of responses rated as "Off-task" is not shown. Off-task responses are those that do not provide any information related to the assessment task.

The table below shows the percentage of fourth-graders at each achievement level whose responses to this question were rated as "Complete." For example, five percent of fourth-graders at the *Basic* level provided a response rated as "Complete."

Percentage of answers rated as "Complete" for fourth-grade students at each achievement level: 2009

Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
7	1	5	15	40

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

GRADE 8

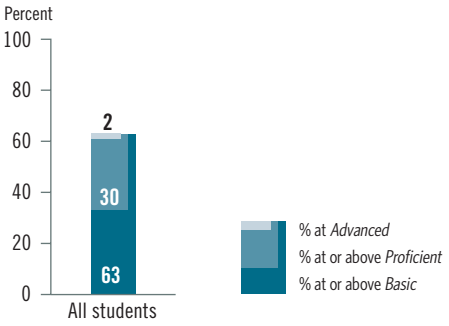
For this first assessment based on the new science framework, the overall average student performance at grade 8 is represented by a score of 150 on the 0 to 300 scale. Performance at or above *Proficient* represents a score of 170 or higher on the NAEP science assessment. Thirty percent of the students performed at or above the *Proficient* achievement level.

Students' performance varied based on demographic characteristics, with higher average scores for White students, male students, and students whose parents had higher levels of education, and lower scores for students from lower-income families, those attending public schools, and those in city schools. Among the 47 states and jurisdictions that participated in the 2009 science assessment, 25 had scores higher than the score for public school students in the nation, and 15 had scores that were lower.

Thirty percent of eighth-graders perform at or above *Proficient*

Sixty-three percent of eighth-graders performed at or above the *Basic* level, demonstrating a partial mastery of the knowledge and skills fundamental for proficient work in science (figure **18**). Thirty percent of students performed at or above the *Proficient* level, and 2 percent demonstrated the knowledge and skills associated with the *Advanced* level.

Figure 18. Achievement-level results in NAEP science at grade 8: 2009



Examples of skills demonstrated by students performing at the *Basic* level

- Describe the competition between two species.
- Relate oxygen level to atmospheric conditions at higher elevations.
- Read a motion graph.

Examples of skills demonstrated by students performing at the *Proficient* level

- Recognize that plants produce their own food.
- Predict the long-term pattern in the volcanic activity of a region.
- Select and explain the useful properties of a material used in an industrial process.

Examples of skills demonstrated by students performing at the *Advanced* level

- Form a conclusion based on data about the behavior of an organism.
- Explain the formation of a rock based on its features.
- Recognize the direction of the force of friction.

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

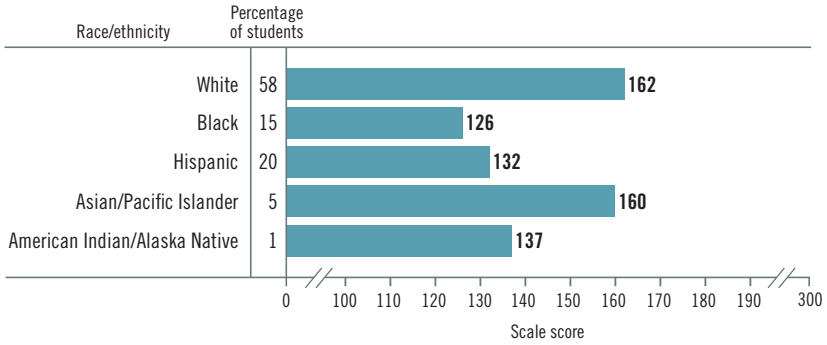
White students score higher in science than other racial/ethnic groups

The pattern of differences in average science scores by students' race/ethnicity at grade 8 was similar to the pattern at grade 4. The average score for White students was higher than the scores for the other four racial/ethnic groups (figure **19**). The score gap between White and Black students was 36 points, and the gap between White and Hispanic students was 30 points.

Seventy-eight percent of White students performed at or above the *Basic* level in 2009, and 42 percent performed at or above *Proficient* (figure **20**). Both percentages were higher than those for Black, Hispanic, and American Indian/Alaska Native students. While the percentage of Asian/Pacific Islander students at or above *Basic* was lower than the percentage of White students, the percentages at or above *Proficient* for the two groups were not significantly different.

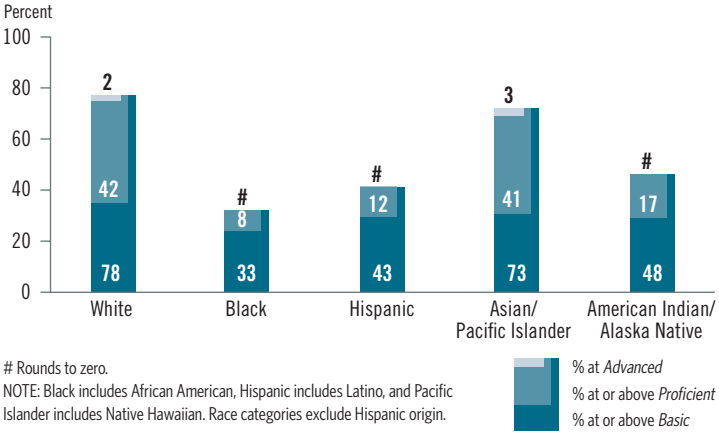
The percentage of Asian/Pacific Islander students at *Advanced* was higher than the percentage for White students, and the percentages for both groups were higher than the percentages of Black and Hispanic students at *Advanced*.

Figure 19. Percentage of students and average scores in NAEP science at grade 8, by race/ethnicity: 2009



NOTE: 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 results are not shown for students whose race/ethnicity was unclassified.

Figure 20. Achievement-level results in NAEP science at grade 8, by race/ethnicity: 2009



Rounds to zero.
NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

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

Male students score higher than female students

The average science score in 2009 for male eighth-graders was higher than the score for female eighth-graders (figure **21**). The percentages of male students performing at or above the *Basic* and *Proficient* levels and at the *Advanced* level were also higher than the percentages of female students (figure **22**).

Figure 21. Percentage of students and average scores in NAEP science at grade 8, by gender: 2009

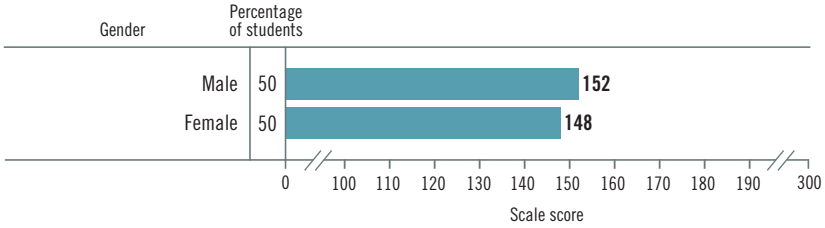
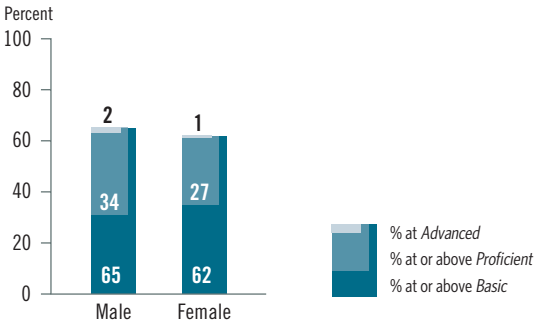


Figure 22. Achievement-level results in NAEP science at grade 8, by gender: 2009



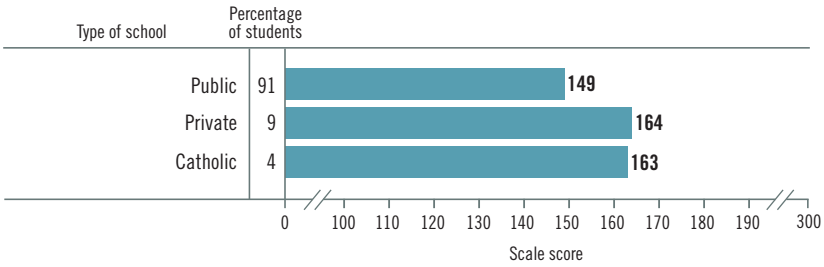
Private school students outperform public school students

The average science score for students attending private schools was higher than the score for students attending public schools (figure **23**).

Higher percentages of private school students than public school students performed at or above *Basic*, at or above *Proficient*, and at *Advanced* (figure **24**). The percentages of public and Catholic school students at *Advanced* were not significantly different from each other.

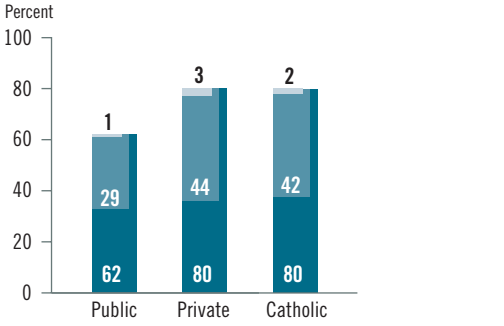
There may be many reasons why private school students perform differently, on average, from public school students. Differences in demographic composition, availability of resources, admissions policies, science curriculum, parental involvement, and other factors not measured in NAEP may influence average student performance.

Figure 23. Percentage of students and average scores in NAEP science at grade 8, by type of school: 2009



NOTE: Private schools include Catholic, other religious, and nonsectarian private schools.

Figure 24. Achievement-level results in NAEP science at grade 8, by type of school: 2009



NOTE: Private schools include Catholic, other religious, and nonsectarian private schools.

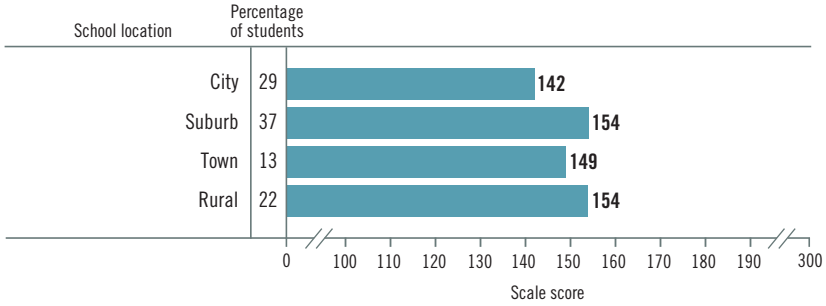
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Students in city schools score lower than students in other locations

Students' performance on the science assessment differed based on the location of the schools they attended. Students attending schools in city locations (29 percent of eighth-graders) had a lower average science score than students in schools in other locations (figure **25**). Scores for students in suburban and rural locations were not significantly different from each other, and students in both locations had higher scores than students attending schools in towns.

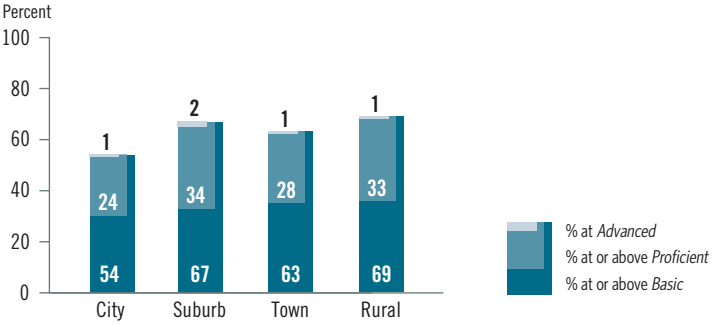
The percentages of eighth-graders performing at or above *Basic* and at or above *Proficient* were also lower in cities than in other locations (figure **26**). Students attending schools in suburban locations had a higher percentage at *Advanced* than students attending schools in other locations. See the Technical Notes for more information on how school location categories were defined.

Figure **25.** Percentage of students and average scores in NAEP science at grade 8, by school location: 2009



NOTE: Detail may not sum to totals because of rounding.

Figure **26.** Achievement-level results in NAEP science at grade 8, by school location: 2009



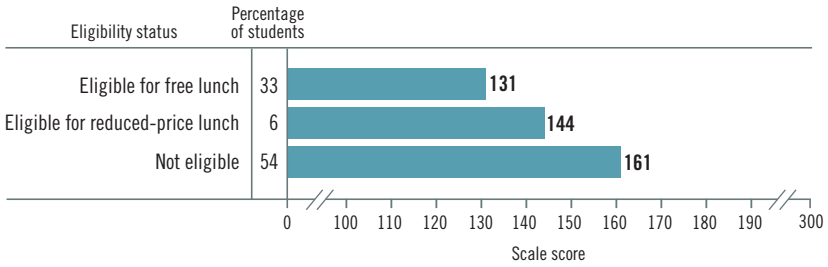
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Students' performance varies by family income

Eighth-graders who were not eligible for the National School Lunch Program scored higher on average than those eligible for reduced-price lunch, who in turn scored higher than those eligible for free lunch (figure **27**). See the Technical Notes for eligibility criteria.

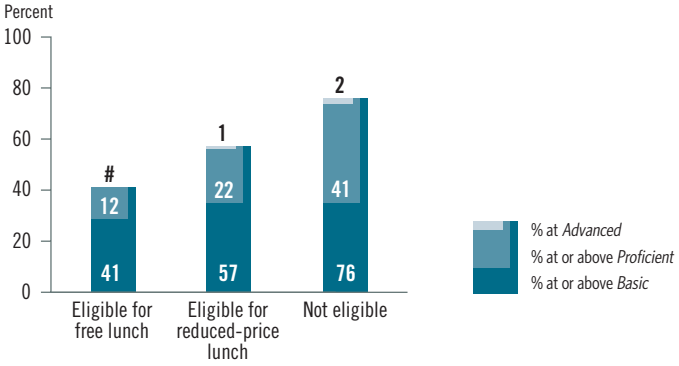
The percentages of students at or above *Basic*, at or above *Proficient*, and at *Advanced* were also highest for students who were not eligible and lowest for those eligible for free lunch (figure **28**).

Figure **27.** Percentage of students and average scores in NAEP science at grade 8, by eligibility for free or reduced-price school lunch: 2009



NOTE: Detail may not sum to totals because results are not shown for the "Information not available" category.

Figure **28.** Achievement-level results in NAEP science at grade 8, by eligibility for free or reduced-price school lunch: 2009



Rounds to zero.

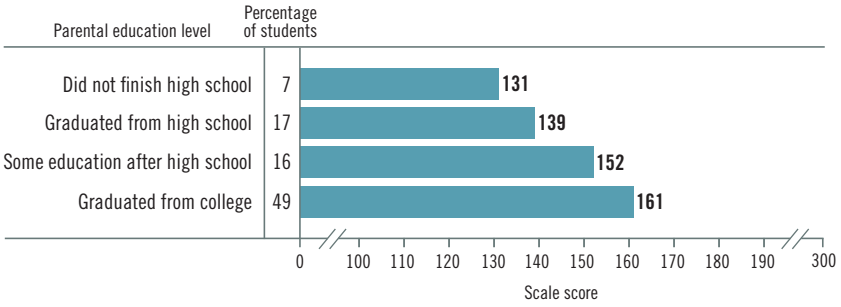
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Higher levels of parental education associated with higher science scores

Based on students' reports on the highest level of education for either parent, average science scores increased as parental education increased (figure **29**). Students who reported that at least one parent graduated from college (about 49 percent of eighth-graders) scored higher on average than students whose parents had lower levels of education. Students whose parents did not finish high school scored lowest.

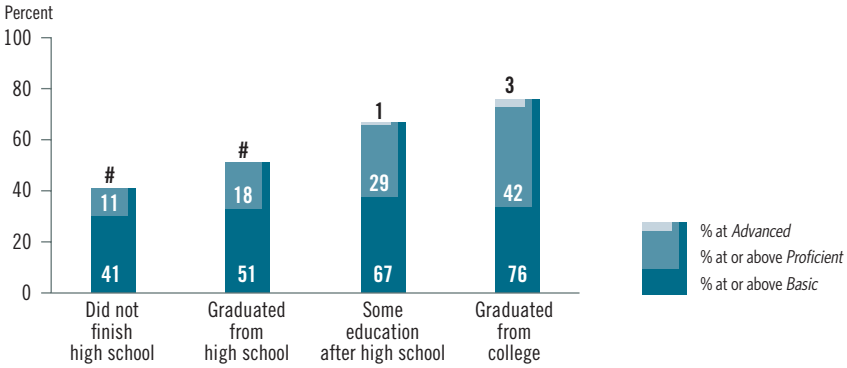
The same pattern held for the percentages of students at or above *Basic* and at or above *Proficient*. There was no significant difference in the percentages at *Advanced* for students whose parents did not finish high school or graduated from high school, and both groups had lower percentages at *Advanced* than students who reported higher levels of parental education (figure **30**).

Figure 29. Percentage of students and average scores in NAEP science at grade 8, by highest level of parental education: 2009



NOTE: Detail may not sum to totals because results are not shown for students who reported that they did not know the highest education level for either of their parents.

Figure 30. Achievement-level results in NAEP science at grade 8, by highest level of parental education: 2009



Rounds to zero.

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

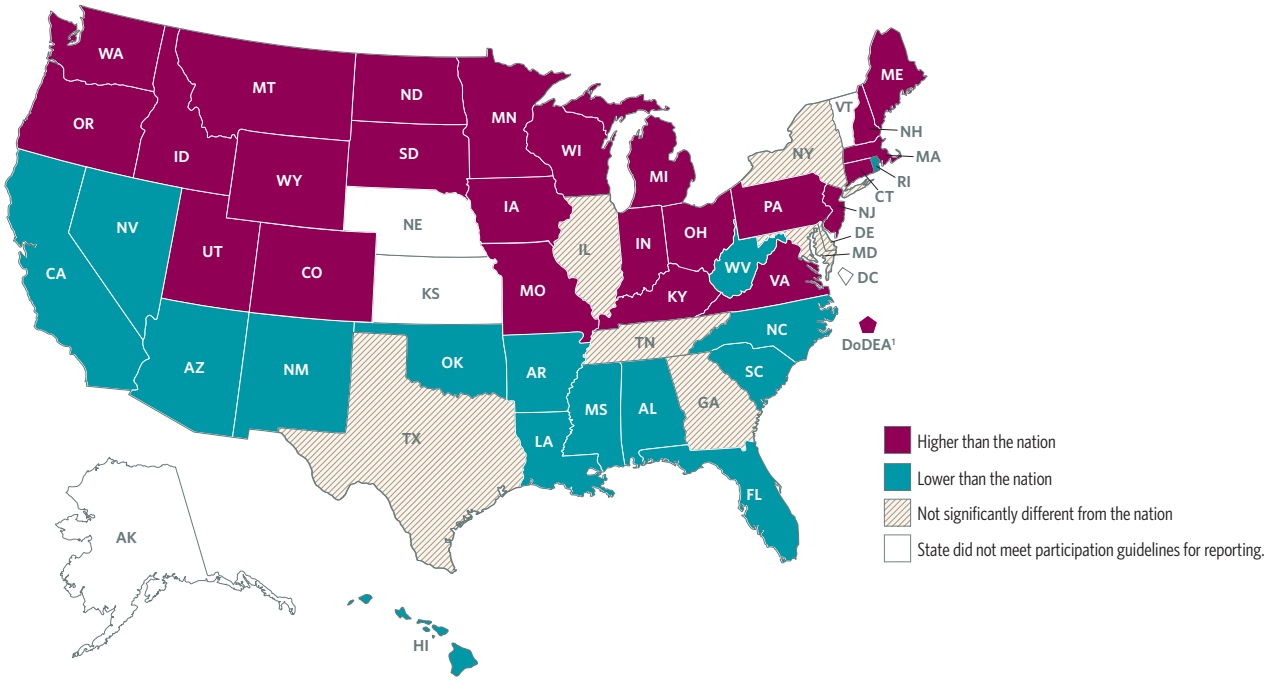
State Performance at Grade 8

Forty-six states and the Department of Defense schools participated in the 2009 science assessment. These 47 states and jurisdictions are all referred to as "states" in the following summary of results.

Twenty-five states score higher than national public school average

The map shown below highlights differences in states' average science scores in comparison to the score for public school students in the nation (figure **31**). Science scores in 25 states were higher than the nation, scores in 7 states were not significantly different, and scores in 15 states were lower.

Figure **31.** Comparison of state/jurisdiction and national average scores in NAEP science for public school students at grade 8: 2009



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

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

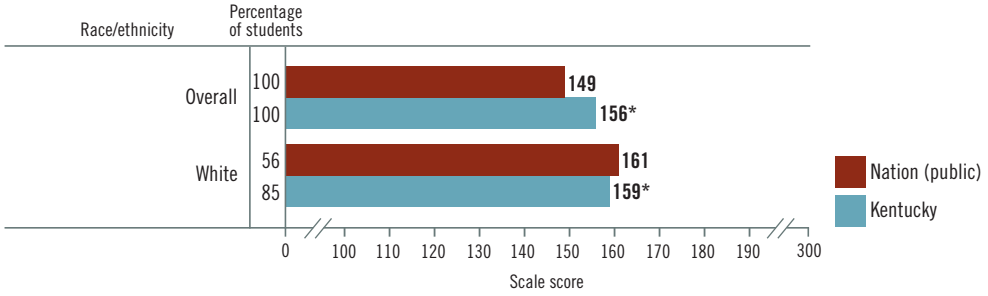
A Closer Look at State Demographics and Performance

It is helpful to examine the differences between how a state performs overall and how students within a demographic group in that state perform. Some might assume that states that score above the national average would have student groups that exhibit similar performance, but that is not necessarily true. For example, 25 states scored higher than the nation. In 6 of those states, one of their racial/ethnic groups had scores that were lower than their peers nationwide (figure **35**). For example, while the average score for **Kentucky** was higher than the score for the nation, White students (85 percent of the state's eighth-graders) scored lower than their peers nationally (figure **32**).

On the other hand, 15 states scored lower than the nation. In 13 of these states, however, the scores of either Black or Hispanic students were higher or comparable to their peers in the nation. For example, even though the overall score in **Florida** was lower than the nation, their Hispanic students scored above the national average for Hispanic students (figure **33**).

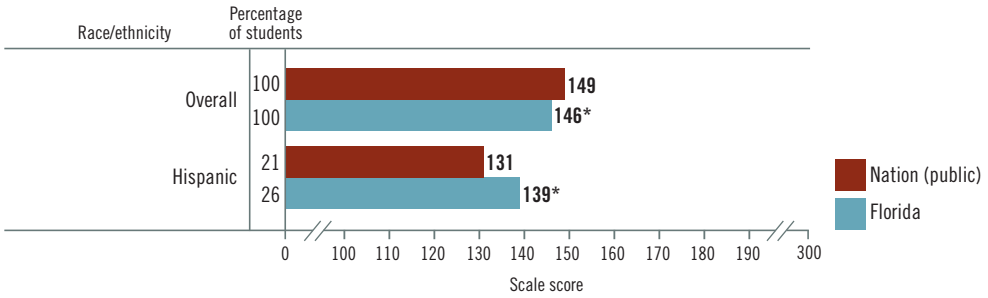
In addition, in 7 states the overall average scores were not significantly different from the nation. In 6 of those states, scores were higher than the nation for one or more racial/ethnic groups other than White students. In **Texas**, for example, the overall average score was not significantly different from the score for the nation; however, scores for Black, Hispanic, and Asian/Pacific Islander students were higher than the national scores for these groups (figure **34**).

Figure 32. Percentage of students and average scores in NAEP science for public school students at grade 8 in the nation and Kentucky, by selected racial/ethnic groups: 2009



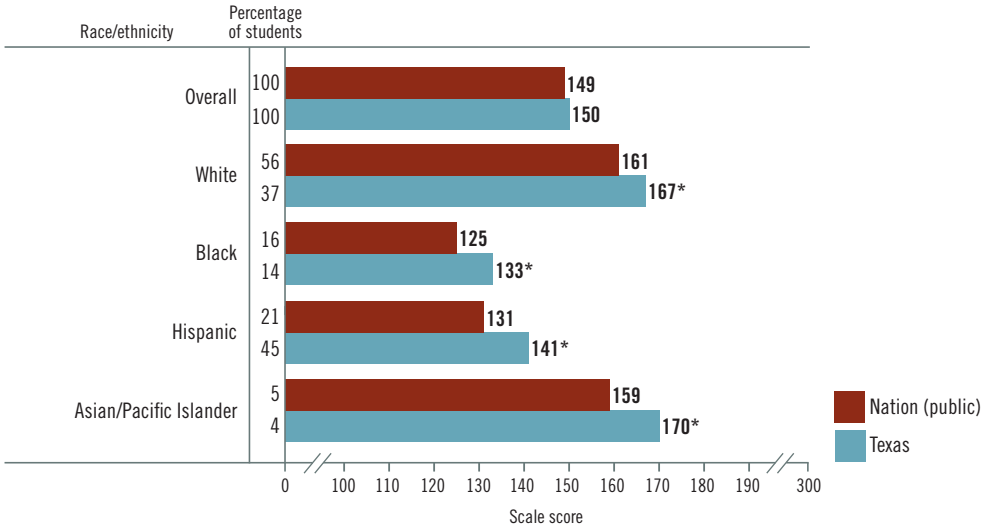
* Significantly different ($p < .05$) from the nation.
NOTE: Race categories exclude Hispanic origin.

Figure 33. Percentage of students and average scores in NAEP science for public school students at grade 8 in the nation and Florida, by selected racial/ethnic groups: 2009



* Significantly different ($p < .05$) from the nation.
NOTE: Hispanic includes Latino.

Figure 34. Percentage of students and average scores in NAEP science for public school students at grade 8 in the nation and Texas, by race/ethnicity: 2009



* Significantly different ($p < .05$) from the nation.
NOTE: 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 results are not shown for students whose race/ethnicity was unclassified.

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

Figure 35. Comparison of state/jurisdiction and national average scores in NAEP science for public school students at grade 8, by race/ethnicity and state/jurisdiction: 2009

State/jurisdiction	Overall	Race/ethnicity			
		White	Black	Hispanic	Asian/Pacific Islander
Nation (public)	**149**	**161**	**125**	**131**	**159**
Alabama (139)	▼	▼	▼	◆	‡
Arizona (141)	▼	▼	◆	▼	◆
Arkansas (144)	▼	▼	▼	◆	‡
California (137)	▼	◆	◆	▼	▼
Colorado (156)	▲	▲	▲	▲	◆
Connecticut (155)	▲	▲	◆	◆	▲
Delaware (148)	◆	▼	▲	▲	◆
DoDEA[1] (162)	▲	▲	▲	▲	◆
Florida (146)	▼	▼	◆	▲	◆
Georgia (147)	◆	◆	▲	▲	▲
Hawaii (139)	▼	▼	◆	▲	▼
Idaho (158)	▲	◆	‡	▲	‡
Illinois (148)	◆	◆	▼	◆	▲
Indiana (152)	▲	▼	◆	◆	‡
Iowa (156)	▲	◆	◆	◆	‡
Kentucky (156)	▲	▼	▲	▲	‡
Louisiana (139)	▼	▼	▼	‡	‡
Maine (158)	▲	▼	◆	‡	‡
Maryland (148)	◆	▲	◆	◆	▲
Massachusetts (160)	▲	▲	▲	◆	▲
Michigan (153)	▲	◆	◆	▲	‡
Minnesota (159)	▲	▲	◆	◆	▼
Mississippi (132)	▼	▼	▼	‡	‡
Missouri (156)	▲	◆	◆	▲	◆
Montana (162)	▲	▲	‡	▲	‡
Nevada (141)	▼	▼	◆	◆	▼
New Hampshire (160)	▲	◆	‡	◆	‡
New Jersey (155)	▲	▲	◆	▲	▲
New Mexico (143)	▼	◆	‡	▲	‡
New York (149)	◆	▲	◆	▼	◆
North Carolina (144)	▼	▼	▼	◆	◆
North Dakota (162)	▲	▲	‡	‡	‡
Ohio (158)	▲	▲	◆	◆	‡
Oklahoma (146)	▼	▼	◆	◆	‡
Oregon (154)	▲	◆	▲	◆	◆
Pennsylvania (154)	▲	◆	◆	◆	◆
Rhode Island (146)	▼	▼	◆	▼	▼
South Carolina (143)	▼	▼	◆	◆	‡
South Dakota (161)	▲	▲	▲	◆	‡
Tennessee (148)	◆	▼	◆	▲	‡
Texas (150)	◆	▲	▲	▲	▲
Utah (158)	▲	▲	‡	◆	▼
Virginia (156)	▲	▲	▲	▲	▲
Washington (155)	▲	◆	▲	◆	◆
West Virginia (145)	▼	▼	◆	‡	‡
Wisconsin (157)	▲	▲	▼	◆	◆
Wyoming (158)	▲	◆	‡	▲	‡

‡ Sample size insufficient to permit a reliable estimate.

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

NOTE: The overall average scores for each state are shown in parentheses. Alaska, the District of Columbia, Kansas, Nebraska, and Vermont did not participate in the 2009 science assessment at the state level. Results are not shown separately for students whose race/ethnicity was American Indian/Alaska Native or unclassified, but they are included in the overall results. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

Additional State Results

The percentages of eighth-graders and performance results by race/ethnicity in participating states are provided in appendix tables **A-13** and **A-14**.

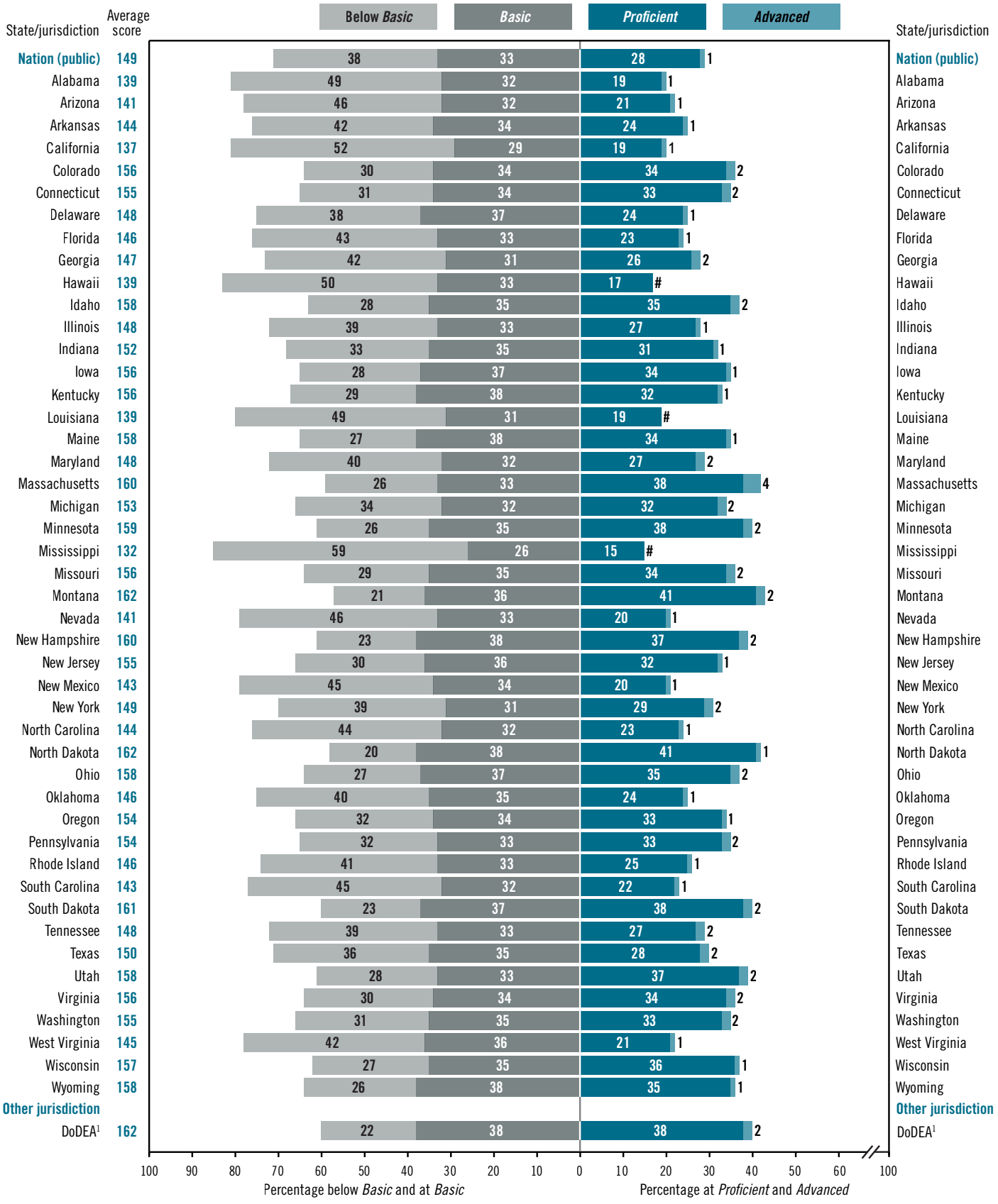
Additional state results for grade 8 are provided in figure **36** and appendix tables **A-15** through **A-18**.

Web-generated profiles of state results and a one-page snapshot report that presents key findings are available for each participating state and jurisdiction at http://nces.ed.gov/nationsreportcard/states/.

▲ Higher than the nation
▼ Lower than the nation
◆ Not significantly different from the nation

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

Figure **36.** Average scores and achievement-level results in NAEP science for public school students at grade 8, by state/jurisdiction: 2009



Rounds to zero.

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

NOTE: Alaska, the District of Columbia, Kansas, Nebraska, and Vermont did not participate in the 2009 science assessment at the state level. The shaded bars are graphed using unrounded numbers. 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.

Assessment Content at Grade 8

The distribution of items among the three content areas reflects the relative emphasis in each area specified in the 2009 science framework for each grade.

30% Physical Science

These questions focus on students' understanding of physical science principles, including the chemical properties of substances and particulate nature of matter, the organization of the Periodic Table of Elements, changes of matter and conservation of mass, kinetic energy and potential energy, energy transfer and conservation of energy, speed as a quantitative description of motion, characteristics of forces, and the net force on an object and its relationship to the object's motion.

30% Life Science

These questions focus on students' understanding of life science principles, including the levels of organization of living systems, the role of carbon compounds in growth and metabolism, specific types of interdependence, reproduction and the influence of heredity and the environment on an offspring's characteristics, and preferential survival and relatedness of organisms.

40% Earth and Space Sciences

These questions focus on students' understanding of a model of the solar system, estimating the timing and sequence of geologic events, soil analysis and layers of the atmosphere, the basics of tectonic theory and Earth's magnetism, the Sun's observable effects, global weather patterns, and natural and human-induced changes in Earth's materials and systems.

Because NAEP assessments cover a breadth of content in each subject area and include more questions than any one student could reasonably answer, each student takes just a portion of the assessment. The 162 questions included in the eighth-grade science assessment were divided into 10 sections, each containing between 14 and 18 questions depending on the balance between multiple-choice and constructed-response questions. Each student responded to two 25-minute sections.

NAEP Science Achievement-Level Descriptions for Grade 8

The specific descriptions of what eighth-graders should know and be able to do at the *Basic*, *Proficient*, and *Advanced* science achievement levels are presented below. (Note: Shaded text is a short, general summary to describe performance at each achievement level.) NAEP achievement levels are cumulative; therefore, student performance at the *Proficient* level includes the competencies associated with the *Basic* level, and the *Advanced* level also includes the skills and knowledge associated with both the *Basic* and the *Proficient* levels. The cut score indicating the lower end of the score range for each level is noted in parentheses.

Basic (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 (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.

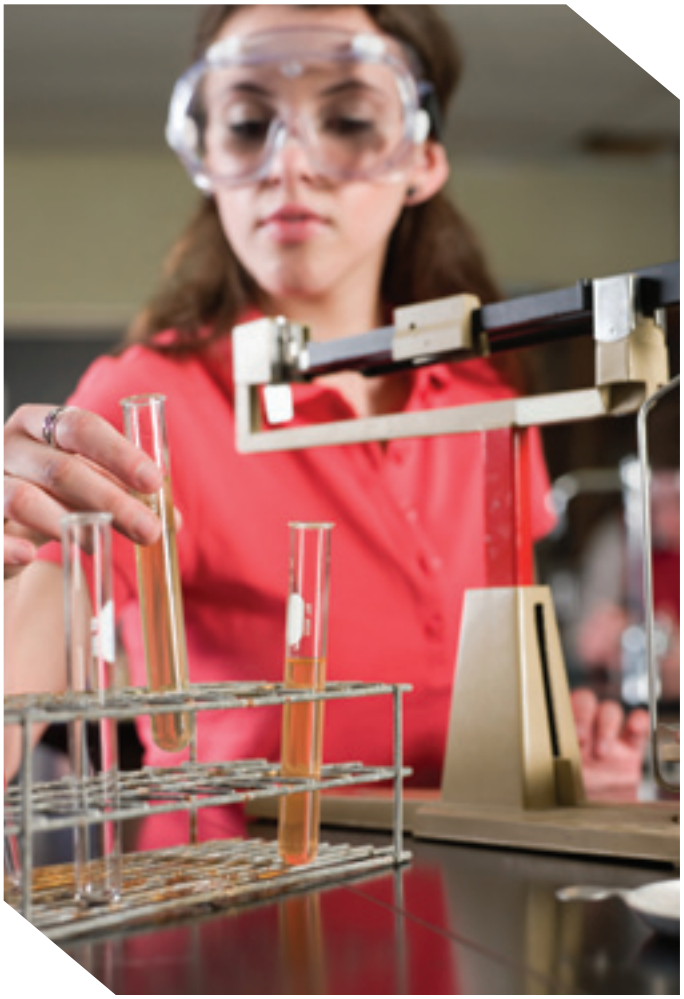
In the physical sciences, students at the *Proficient* level should be able to demonstrate the relationship between the properties of chemical elements and their position on the periodic table; use empirical evidence to demonstrate that a chemical change has occurred; demonstrate the relationship of 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 (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.

What Eighth-Graders Know and Can Do in Science

The item map below illustrates the range of science skills demonstrated by eighth-graders. The scale scores on the left represent the scores for students who were likely to get the items correct or complete. The cut score at the lower end of the range for each achievement level is boxed. The descriptions of selected assessment questions indicating what students need to do to answer the question correctly are listed on the right, along with the corresponding science content areas.

For example, students performing in the middle of the *Basic* range (with a score of 157) were likely to be able to draw a conclusion based on fossil evidence. Students performing in the middle of the *Proficient* range (with a score of 194) were likely to be able to determine a controlled variable of a chemistry investigation.

GRADE 8 NAEP SCIENCE ITEM MAP

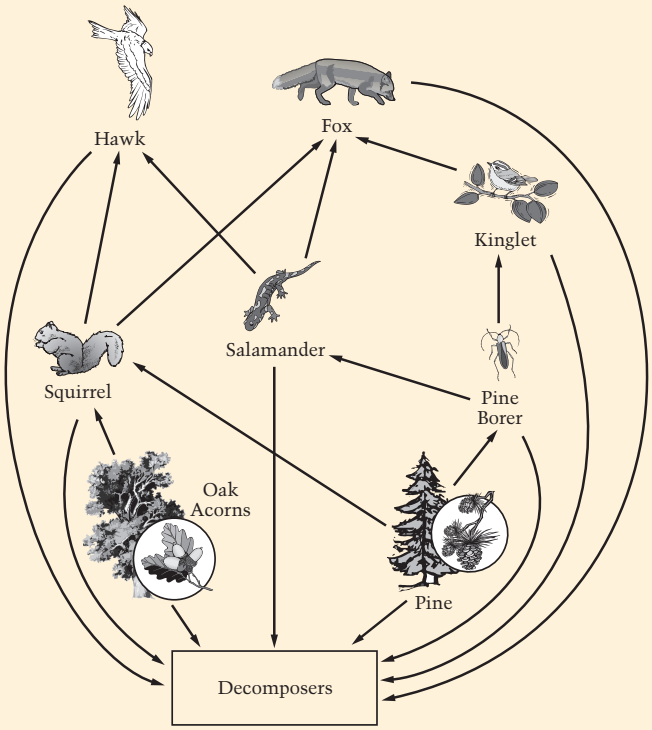
	Scale score	Content area	Question description
	300		
	//		
Advanced	286	**Earth and space sciences**	Explain and critique two plans to prevent erosion (**shown on pages 42 and 43**)
	266	**Physical science**	Describe the evidence for chemical change
	254	**Earth and space sciences**	Explain the formation of a rock based on its features
	246	**Life science**	Form a conclusion based on data about the behavior of an organism
	228	**Physical science**	*Recognize the direction of the force of friction*
	223	**Earth and space sciences**	*Predict the Sun's position in the sky*
	215	**Earth and space sciences**	*Predict lunar phenomena*
	215		
	212	**Earth and space sciences**	Explain effects of human land use on wildlife
	202	**Physical science**	Select and explain the useful properties of a material used in an industrial process
	201	**Earth and space sciences**	*List soils in order of permeability* (**shown on page 44**)
	200	**Earth and space sciences**	*Relate characteristics of air masses to global regions*
Proficient	199	**Life science**	*Identify the main source of energy for certain organisms*
	194	**Physical science**	*Determine a controlled variable of a chemistry investigation*
	188	**Earth and space sciences**	*Predict the long-term pattern in the volcanic activity of a region*
	186	**Life science**	*Recognize that plants produce their own food*
	183	**Physical science**	*Recognize an effect of electrical forces*
	174	**Life science**	*Identify a function of a human organ system*
	172	**Earth and space sciences**	*Investigate the magnetic properties of some common objects*
	170		
	169	**Life science**	Describe the competition between two species
	165	**Physical science**	Describe the energy transfer between two systems
	163	**Life science**	*Recognize the role of decomposers* (**shown on page 39**)
	163	**Physical science**	*Read a motion graph*
	160	**Earth and space sciences**	*Relate oxygen level to atmospheric conditions at higher elevations*
Basic	157	**Earth and space sciences**	*Draw a conclusion based on fossil evidence*
	152	**Physical science**	Critique and improve an investigation about forces (**shown on pages 40 and 41**)
	149	**Life science**	*Recognize a factor that affects the success of a species*
	148	**Earth and space sciences**	*Identify the mechanism of a weather pattern*
	145	**Earth and space sciences**	*Identify how some lunar surface features are formed*
	141		
	140	**Earth and space sciences**	*Identify sequence of formation of Earth features*
	138	**Physical science**	*Identify an example of kinetic energy*
	130	**Life science**	*Predict the effect of an environmental change on an organism*
	127	**Life science**	*Explain an experimental setup to study populations of organisms*
	127	**Life science**	Predict changes in populations based on a food web
	119	**Physical science**	Describe part of a valid experiment to compare heating rates of different materials
	//		
	0		

NOTE: Regular type denotes a constructed-response question. *Italic* type denotes a multiple-choice question. The position of a question on the scale represents the scale score attained by students who had a 65 percent probability of successfully answering a constructed-response question, or a 74 percent probability of correctly answering a four-option multiple-choice question. For constructed-response questions, the question description represents students' performance at the highest scoring level (with the exception of the description at a score of 119 which represents the performance of students receiving partial credit on their response). Scale score ranges for science achievement levels are referenced on the map.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Sample Question: Life Science

The diagram below shows a food web. The arrows show the direction of energy flow. Each arrow points from the organism that is consumed to the organism that consumes it. Use the information in the food web to answer the question that follows.

FOOD WEB



Which statement best explains why decomposers are an important part of this food web?

- (A) They use sunlight to make their own food.
- (B) They give off oxygen for animals to breathe.
- (C) They provide camouflage for small animals.
- (D) They make nutrients available to plants.

This sample question from the 2009 eighth-grade assessment measures students' performance in the life science content area. This question (as part of a two-question set) asks students to identify the role a decomposer plays in a food web.

Approximately two-thirds (65 percent) of eighth-grade students answered correctly (Choice D). The most common incorrect answer (Choice B), which was selected by 17 percent of the students, represents a conceptual misunderstanding that decomposers are like producers, performing photosynthesis to release oxygen into the air.

Percentage of eighth-grade students in each response category: 2009

Choice A	Choice B	Choice C	Choice D	Omitted
12	17	5	65	1

The table below shows the percentage of eighth-graders at each achievement level who answered this question correctly. For example, 68 percent of eighth-graders at the *Basic* level selected the correct answer choice.

Percentage correct for eighth-grade students at each achievement level: 2009

Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
65	43	68	86	96

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

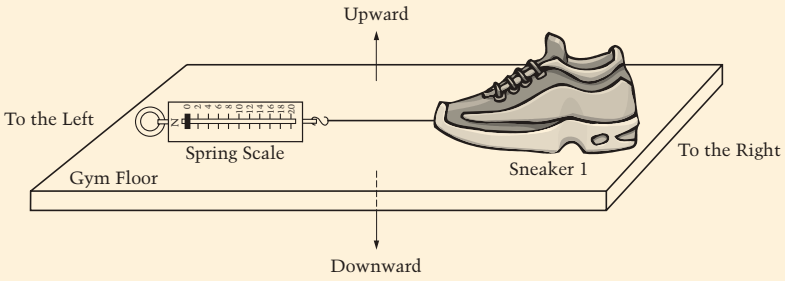
Sample Question: Physical Science

Meg designs an experiment to see which of three types of sneakers provides the most friction.

She uses the equipment listed below.

- Sneaker 1
- Sneaker 2
- Sneaker 3
- Spring scale

She uses the setup shown below and pulls the spring scale to the left.



Complete response #1:

Meg tests one type of sneaker on a gym floor, a second type of sneaker on a grass field, and a third type of sneaker on a cement sidewalk. Her teacher is not satisfied with the way Meg designed her experiment. Describe one error in Meg's experiment.

Meg's error in the experiment was that she did not have a controlled variable. She had too many variables being the type of shoes and where each was tested.

Describe how Meg could improve the experiment to find out which of the three types of sneakers provides the most friction.

To improve her experiment Meg could test all three shoes on the same ground.

Complete response #2:

Meg tests one type of sneaker on a gym floor, a second type of sneaker on a grass field, and a third type of sneaker on a cement sidewalk. Her teacher is not satisfied with the way Meg designed her experiment. Describe one error in Meg's experiment.

She tested them in different places so her measurements were not accurate

Describe how Meg could improve the experiment to find out which of the three types of sneakers provides the most friction.

test them all in the same place

This sample of a short constructed-response question (shown on the previous page) measures eighth-graders' performance in the physical science content area. It requires students to critique an investigation on friction and identify a way to improve the investigation. Student responses to this question were rated using three scoring levels.

Complete responses indicated that the experiment did not control all variables except for the variable being tested, and indicated a valid way to redesign the experiment.

Partial responses either

- indicated that the experiment did not control all variables except for the variable being tested, or
- indicated a valid way to redesign the experiment.

Unsatisfactory/Incorrect responses were inadequate or incorrect.

The sample student responses shown on the previous page were rated as "Complete" because they correctly answered the question. Thirty percent of eighth-graders' responses to this question received a "Complete" rating.

Percentage of eighth-grade students in each response category: 2009

Complete	Partial	Unsatisfactory/Incorrect	Omitted
30	31	33	6

NOTE: The percentage of responses rated as "Off-task" is not shown but rounds to zero. Off-task responses are those that do not provide any information related to the assessment task.

The table below shows the percentage of eighth-graders at each achievement level whose response to this question was rated as "Complete." For example, 31 percent of eighth-graders at the *Basic* level provided a response rated as "Complete."

Percentage of answers rated as "Complete" for eighth-grade students at each achievement level: 2009

Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
30	11	31	49	68

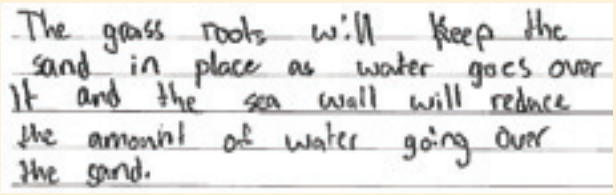
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Sample Question: Earth and Space Sciences

Some homes were built near the shoreline of the ocean. Sand dunes lie between the homes and the water. Each year a portion of the sand dunes is eroded by the ocean. To prevent erosion, some citizens suggest planting grasses on the sand dunes, and others suggest building a seawall, a solid barrier along the shoreline.

Complete response #1:

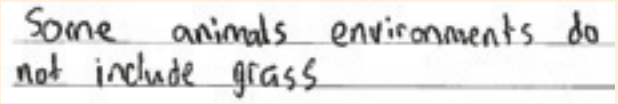
Explain how each plan would prevent erosion of the dunes.



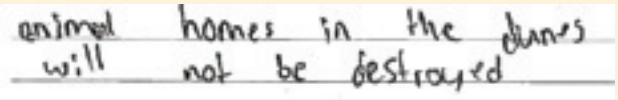
Give an environmental advantage and disadvantage of each plan.

Environmental advantage of planting grasses:

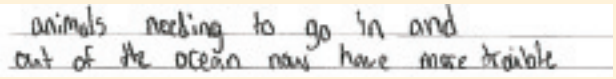
Environmental disadvantage of planting grasses:



Environmental advantage of building a seawall:

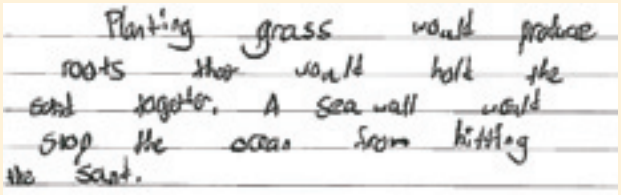


Environmental disadvantage of building a seawall:



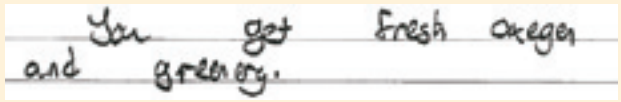
Complete response #2:

Explain how each plan would prevent erosion of the dunes.

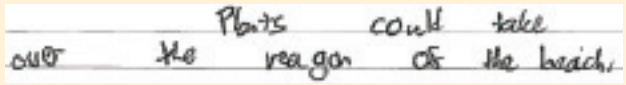


Give an environmental advantage and disadvantage of each plan.

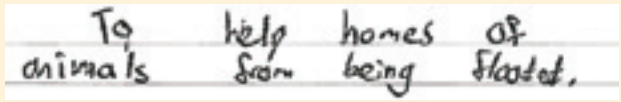
Environmental advantage of planting grasses:



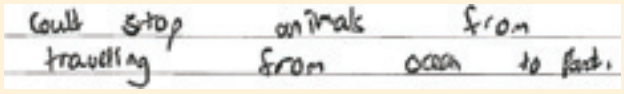
Environmental disadvantage of planting grasses:



Environmental advantage of building a seawall:



Environmental disadvantage of building a seawall:



This sample of an extended constructed-response question (shown on the previous page) measures eighth-graders' performance in the Earth and space sciences content area. It requires students to evaluate two proposed plans for preventing sand erosion. Student responses to this question were rated in three parts with three scoring levels for each part.

Part A: Explanation of both plans

Complete responses correctly explained how planting grasses and building a seawall would prevent erosion.

Partial responses correctly explained either how planting grasses or building a seawall would prevent erosion.

Unsatisfactory/Incorrect responses were inadequate or incorrect.

Part B: Planting grasses

Complete responses provided a plausible advantage and disadvantage of planting grasses.

Partial responses provided a plausible advantage or a plausible disadvantage of planting grasses.

Unsatisfactory/Incorrect responses were inadequate or incorrect.

Part C: Building a seawall

Complete responses provided a plausible advantage and disadvantage of building a seawall.

Partial responses provided a plausible advantage or a plausible disadvantage of building a seawall.

Unsatisfactory/Incorrect responses were inadequate or incorrect.

The sample student responses shown on the previous page were rated as "Complete" because they correctly answered all parts of the question. One percent of eighth-graders' responses to this question received a "Complete" rating.

Percentage of eighth-grade students in each response category: 2009

Part A

Complete	Partial	Unsatisfactory/Incorrect	Omitted
18	35	32	14

Part B

Complete	Partial	Unsatisfactory/Incorrect	Omitted
8	31	42	17

Part C

Complete	Partial	Unsatisfactory/Incorrect	Omitted
2	26	50	20

NOTE: Detail may not sum to totals because the percentage of responses rated as "Off-task" is not shown. Off-task responses are those that do not provide any information related to the assessment task.

The table below shows the percentage of eighth-graders at each achievement level whose responses to this question were rated as "Complete" or "Satisfactory." Students received an overall combined rating of "Complete" for providing a complete response for each part. Students received an overall combined rating of "Satisfactory" for providing a complete response for two parts and a partial response for the third part.

Percentage of answers rated as "Complete" and "Satisfactory" for eighth-grade students at each achievement level: 2009

Scoring level	Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
Complete	1	#	#	1	6
Satisfactory	2	#	1	5	17

Rounds to zero.

More information about this sample question is available at http://nces.ed.gov/nationsreportcard/itmrlsx/search.aspx?subject=science.

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

Sample Question: Earth and Space Sciences

Three funnels were filled with equal volumes of pebbles, fine sand, and coarse sand, as shown in the diagram below. The same amount of water was poured into each funnel.

Which correctly lists the order in which the water passed through the funnels, from fastest to slowest?

Ⓐ Pebbles, fine sand, coarse sand
Ⓑ Pebbles, coarse sand, fine sand
Ⓒ Fine sand, coarse sand, pebbles
Ⓓ Coarse sand, pebbles, fine sand

This sample question from the 2009 eighth-grade assessment measures students' performance in the Earth and space sciences content area. The question asks students to list the soils in order according to the rate at which water would flow through them. Forty-five percent of eighth-graders answered the question correctly (Choice B). The most common incorrect answer (Choice C), which was selected by 33 percent of the students, represents a conceptual misunderstanding that the smaller the (soil) particles are, the faster water flows through them.

Percentage of eighth-grade students in each response category: 2009

Choice A	Choice B	Choice C	Choice D	Omitted
19	45	33	2	#

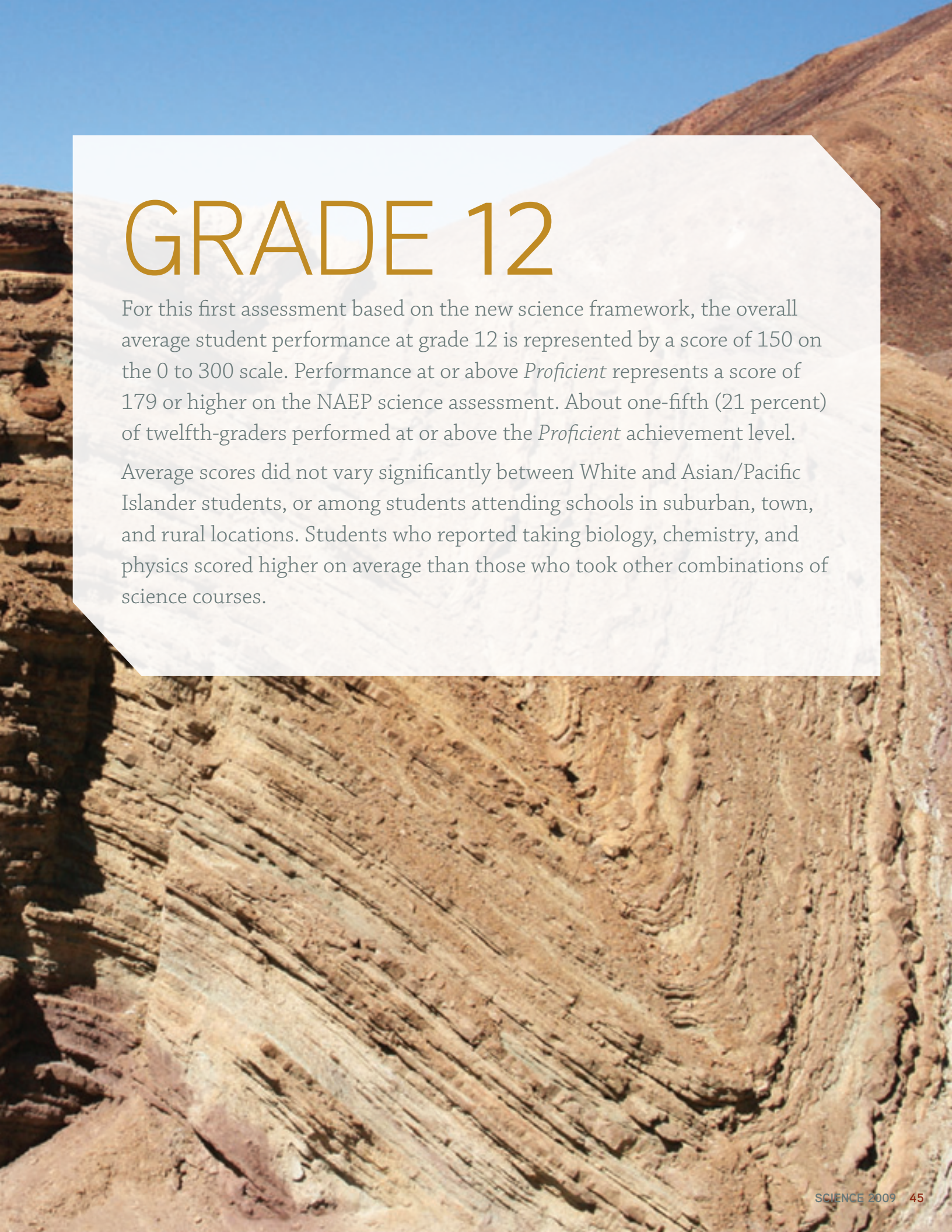
Rounds to zero.
NOTE: Detail may not sum to totals because of rounding.

The table below shows the percentage of eighth-graders at each achievement level who answered this question correctly. For example, 63 percent of eighth-graders at the *Proficient* level selected the correct answer choice.

Percentage correct for eighth-grade students at each achievement level: 2009

Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
45	31	41	63	88

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



GRADE 12

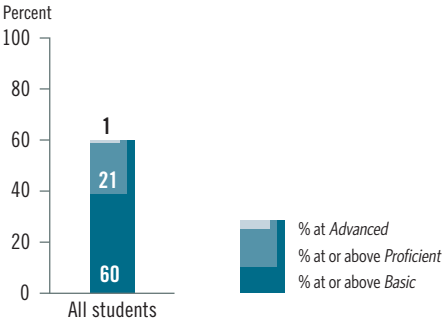
For this first assessment based on the new science framework, the overall average student performance at grade 12 is represented by a score of 150 on the 0 to 300 scale. Performance at or above *Proficient* represents a score of 179 or higher on the NAEP science assessment. About one-fifth (21 percent) of twelfth-graders performed at or above the *Proficient* achievement level.

Average scores did not vary significantly between White and Asian/Pacific Islander students, or among students attending schools in suburban, town, and rural locations. Students who reported taking biology, chemistry, and physics scored higher on average than those who took other combinations of science courses.

Twenty-one percent of twelfth-graders perform at or above *Proficient*

In 2009, sixty percent of twelfth-graders performed at or above the *Basic* level in science, and 21 percent performed at or above the *Proficient* level (figure **37**). One percent of students performed at the *Advanced* level.

Figure 37. Achievement-level results in NAEP science at grade 12: 2009



Examples of skills demonstrated by students performing at the *Basic* level

- Predict the effect of a major disruption to a trophic level of an ecosystem.
- Predict differences in climate based on topography.
- Solve a design problem related to the electric force between objects.

Examples of skills demonstrated by students performing at the *Proficient* level

- Draw a conclusion based on gases released during photosynthesis and respiration.
- Explain an alternative hypothesis about the effect of emissions released into the atmosphere.
- Predict motion when unbalanced forces are applied.

Examples of skills demonstrated by students performing at the *Advanced* level

- Critique a conclusion about photosynthesis based on observations.
- Compare methods for determining the age of the Earth.
- Identify nuclear force.

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

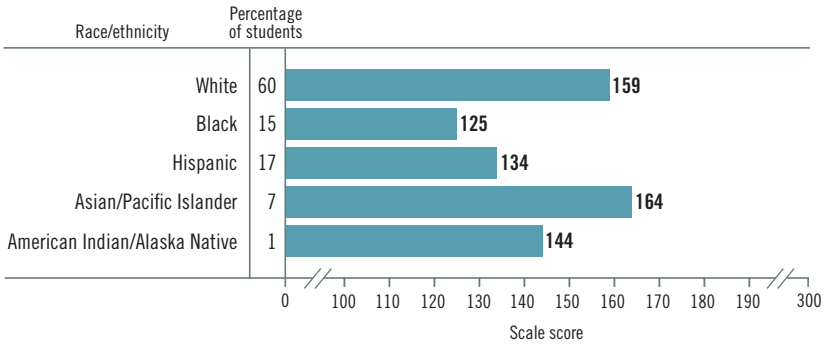
White and Asian/Pacific Islander students score comparably

Average scores for White and Asian/Pacific Islander students were higher than the scores for Black, Hispanic, and American Indian/Alaska Native students (figure **38**). The score gap between White and Black students was 34 points, and the gap between White and Hispanic students was 25 points.

Though not shown here, Asian/Pacific Islander students scored higher (166) than White students (159) on physical science even though their overall scores were not significantly different.

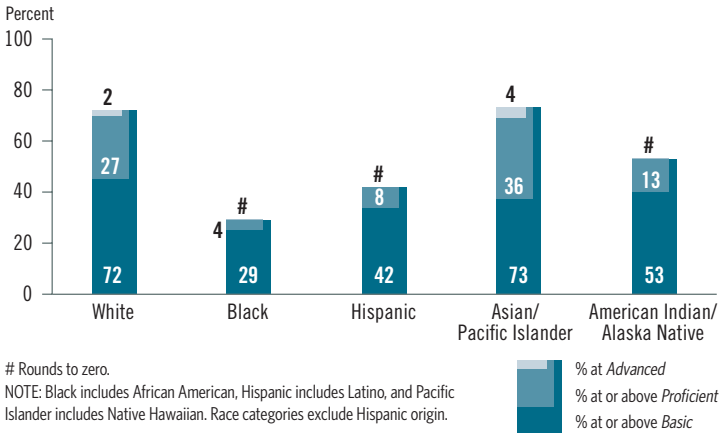
The percentages of White and Asian/Pacific Islander students performing at or above *Basic* and at or above *Proficient* were higher than the percentages for Black, Hispanic, and American Indian/Alaska Native students (figure **39**). While there was no significant difference in the percentages of White and Asian/Pacific Islander students at or above *Basic* or at *Advanced*, the percentage of Asian/Pacific Islander students at or above *Proficient* was higher than the percentage of White students.

Figure 38. Percentage of students and average scores in NAEP science at grade 12, by race/ethnicity: 2009



NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Results are not shown for students whose race/ethnicity was unclassified, and the percentage rounds to zero.

Figure 39. Achievement-level results in NAEP science at grade 12, by race/ethnicity: 2009



Rounds to zero.
NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin.

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

Male students score higher overall than female students

The overall average science score in 2009 for male twelfth-graders was higher than the score for female twelfth-graders (figure **40**). Although not shown here, the score for male students in life science (151) was not significantly different from the score for female students (149), even though the overall score was higher for male students.

Higher percentages of male students than female students performed at or above *Basic*, at or above *Proficient*, and at *Advanced* (figure **41**).

Figure 40. Percentage of students and average scores in NAEP science at grade 12, by gender: 2009

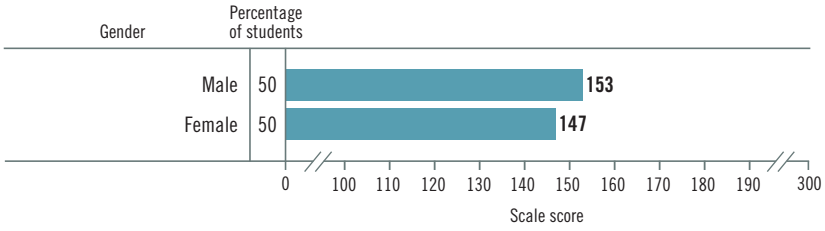
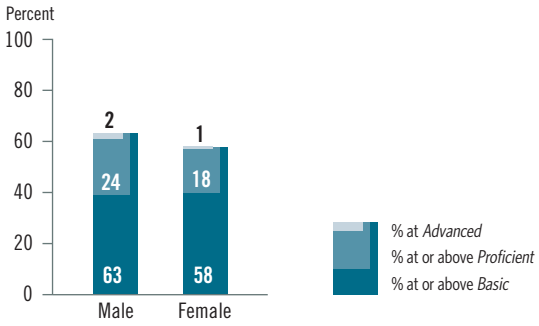


Figure 41. Achievement-level results in NAEP science at grade 12, by gender: 2009

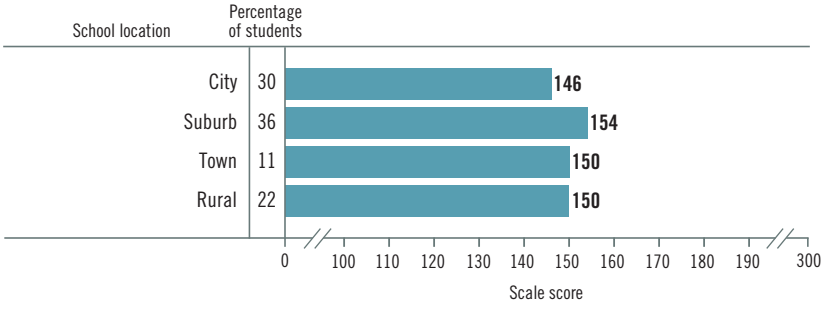


Students in suburban schools score higher than students in city schools

Students attending schools in suburban locations (36 percent of twelfth-graders) scored higher on average than students in city schools (figure **42**). Scores for students in town and rural locations were not significantly different from each other or from the scores for students attending schools in suburban and city locations.

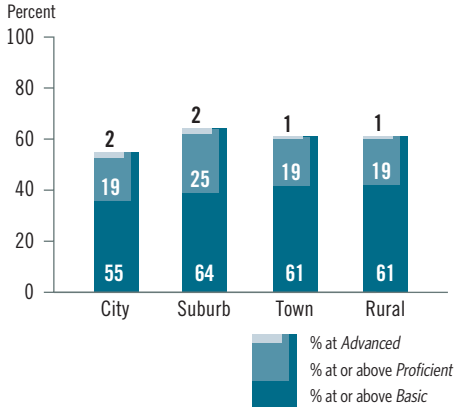
The percentage of students performing at or above *Basic* was lower for twelfth-graders in city schools than in other school locations (figure **43**). The percentage of students in suburban schools performing at or above *Proficient* was higher than the percentages of students in city, town, and rural locations. There were no significant differences in the percentages of students at *Advanced* based on the location of the schools they attended. See the Technical Notes for more information on how school location categories were determined.

Figure 42. Percentage of students and average scores in NAEP science at grade 12, by school location: 2009



NOTE: Detail may not sum to totals because of rounding.

Figure 43. Achievement-level results in NAEP science at grade 12, by school location: 2009



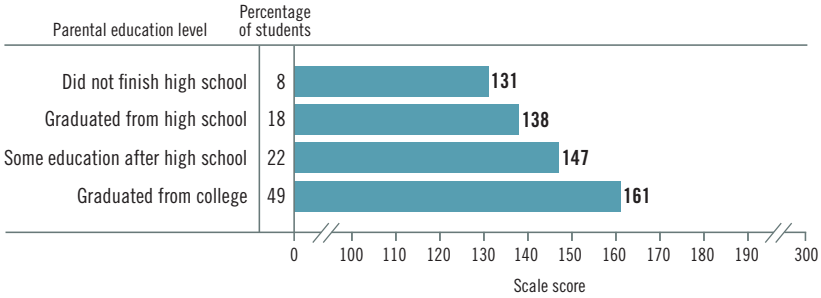
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Higher levels of parental education associated with higher science scores

As was seen in the results for grade 8, students who reported higher levels of parental education scored higher on average than those who reported lower levels (figure **44**). Students who reported that at least one parent graduated from college (about 49 percent of twelfth-graders) scored higher on average than students whose parents had lower levels of education. Students whose parents did not finish high school scored lowest.

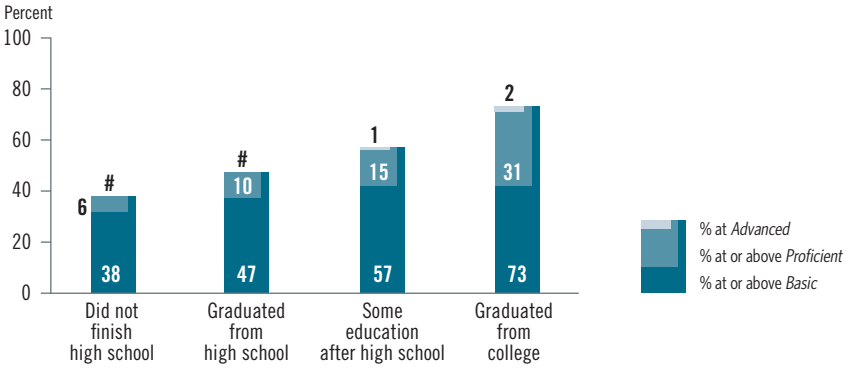
The same pattern held for the percentages of students at or above *Basic* and at or above *Proficient*. Students whose parents graduated from college had a higher percentage at *Advanced* than students whose parents graduated from high school or completed some education after high school (figure **45**).

Figure 44. Percentage of students and average scores in NAEP science at grade 12, by highest level of parental education: 2009



NOTE: Detail may not sum to totals because results are not shown for students who reported that they did not know the highest education level for either of their parents.

Figure 45. Achievement-level results in NAEP science at grade 12, by highest level of parental education: 2009



Rounds to zero.

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

More advanced science coursework associated with higher scores

Twelfth-grade students assessed in NAEP science in 2009 were asked what science courses they had completed or were taking currently. Their responses were then collapsed into three categories to create the 2009 science coursetaking results presented below.

Twelfth-graders who took biology, chemistry, and physics scored higher on average than students who took just biology and chemistry, and both groups scored higher than those who took just biology or other science courses (figure **46**). The overall percentage of students who took all three science courses was lower than the percentage of students who took biology and chemistry and higher than the percentage of students who took just biology or other science courses (figure **47**).

The proportion of students in each of the three coursetaking categories varied by student group. A higher percentage (58 percent) of Asian/Pacific Islander students than students in other racial/ethnic groups reported taking biology, chemistry, and physics, and the percentage of White students taking all three was higher than the percentages of Black and Hispanic students taking the same courses. There were no significant differences in the percentages of White, Black, and Hispanic students taking just biology and chemistry.

The percentage of male students who reported taking biology, chemistry, and physics was higher than the percentage of female students taking the same courses; the reverse was true for male and female students taking biology and chemistry but not physics.

Average scores for student groups based on science courses completed are available in the NAEP Data Explorer at http://nces.ed.gov.nationsreportcard/naepdata/.

Figure **46.** Average scores in NAEP science at grade 12, by coursetaking category: 2009

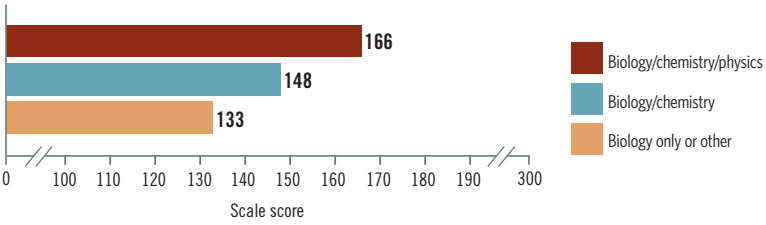
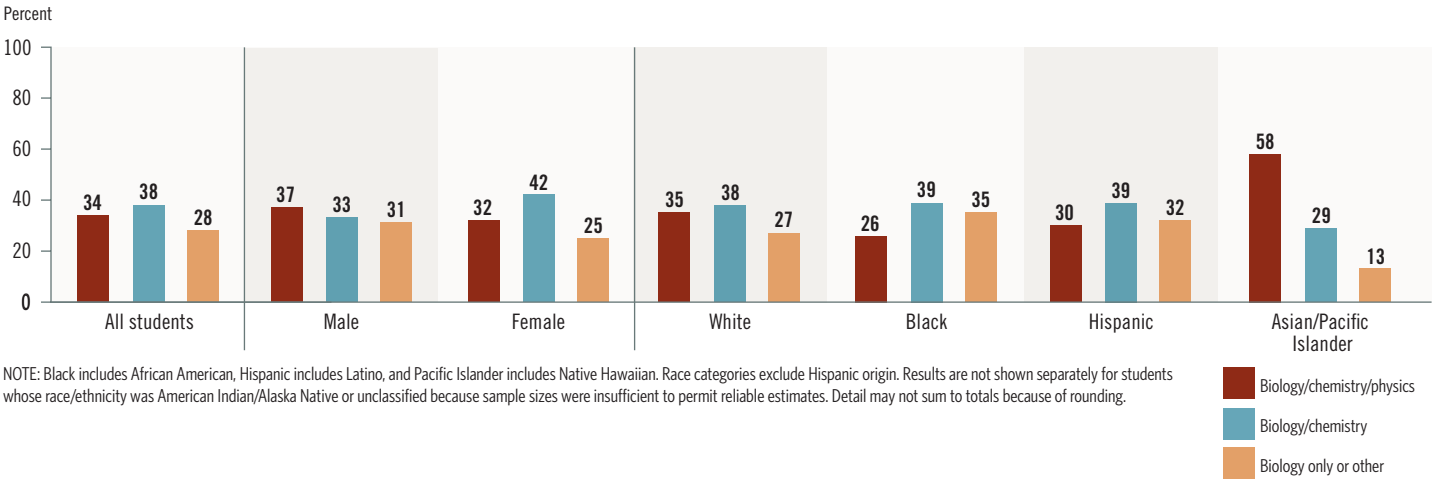


Figure **47.** Percentage of students in NAEP science at grade 12, by gender, race/ethnicity, and coursetaking category: 2009



NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Results are not shown separately for students whose race/ethnicity was American Indian/Alaska Native or unclassified because sample sizes were insufficient to permit reliable estimates. 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.

Assessment Content at Grade 12

In the 2009 science framework, science principles are broadly conceived and encompass not only the key principles but also the facts, concepts, laws, and theories of science. The content of the assessment measures what students know and are able to do in science at each grade.

$37\frac{1}{2}$% Physical Science

These questions focus on students' understanding of physical science principles, including characteristics of subatomic particles and atomic structure; changes at the atomic and molecular levels during chemical changes; nuclear energy and electromagnetic waves; energies of atoms and molecules, and chemical and nuclear reactions; velocity and acceleration as descriptions of motion; and universal gravitational and electric forces, and relationships among force, mass, and acceleration.

$37\frac{1}{2}$% Life Science

These questions focus on students' understanding of life science principles, including the chemical basis of matter and energy transformation in living systems, consequences of interdependence, the molecular basis of heredity, and the mechanisms of evolutionary change and the history of life on Earth.

25% Earth and Space Sciences

These questions focus on students' understanding of a vision of the universe, theories about Earth's history, the physical mechanism that drives tectonics and its supporting evidence, internal and external sources of energy in Earth's systems, systems that influence climate, and biogeochemical cycles in Earth's systems.

Because NAEP assessments cover a breadth of content in each subject area and include more questions than any one student could reasonably answer, each student takes just a portion of the assessment. The 179 questions included in the twelfth-grade science assessment were divided into 11 sections, each containing between 16 and 18 questions depending on the balance between multiple-choice and constructed-response questions. Each student responded to two 25-minute sections.

NAEP Science Achievement-Level Descriptions for Grade 12

The specific descriptions of what twelfth-graders should know and be able to do at the *Basic*, *Proficient*, and *Advanced* science achievement levels are presented below. (Note: Shaded text is a short, general summary to describe performance at each achievement level.) NAEP achievement levels are cumulative; therefore, student performance at the *Proficient* level includes the competencies associated with the *Basic* level, and the *Advanced* level also includes the skills and knowledge associated with both the *Basic* and the *Proficient* levels. The cut score indicating the lower end of the score range for each level is noted in parentheses.

Basic (142)

Students performing at the *Basic* level should be able to describe, measure, classify, explain, and predict phenomena at multiple scales, from atomic/molecular to interstellar. These phenomena include the structure of atoms and molecules; transformations of matter and energy in physical, Earth, and living systems; motions of objects; the genetic role of DNA; changes in populations and ecosystems due to selection pressures; earthquakes and volcanoes; patterns in weather and climate; and biogeochemical cycles. They should be able to design and critique observational and experimental studies, and they should be able to propose and critique solutions to problems at local or regional scales.

Science Practices: Students performing at the *Basic* level should be able to describe, measure, classify, explain, and predict phenomena at multiple scales, from atomic/molecular to cosmic; design and critique observational and experimental studies, controlling single variables, making basic decisions about sampling, analyzing reliability of data, and using scientific models to explain results; and propose, critique, and predict scientific outcomes of responses to problems at local or regional scales.

In the physical sciences, students at the *Basic* level should be able to explain the differences in atomic structure across families in the periodic table and explain how the structures of molecules change in chemical reactions; distinguish linear velocity and acceleration as each is represented graphically and suggest ways in which forces can be measured; critique data that claim to show how gravitational potential energy changes with distance from the Earth's surface; predict the situations in which a net force changes the motion of an object; and predict how the energy packets of electromagnetic waves change as the frequency of the waves change.

In the life sciences, students at the *Basic* level should be able to identify changes in populations due to selection pressures and trace matter and energy through organisms and ecosystems; explain changes in ecosystem structure and function and identify ways in which humans can permanently alter ecosystems through intentional design or unintended consequences; and describe the relationship between DNA and an individual's hereditary traits.

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 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 (179)

Students performing at the *Proficient* level should be able to demonstrate relationships and compare alternative models, predictions, and explanations. They should be able to explain trends among elements in the periodic table; conservation laws; chemical mechanisms for metabolism, growth, and reproduction; changes in populations due to natural selection; the evolution of the Universe; and evidence for boundaries and movements of tectonic plates. They should be able to design and critique observational and experimental studies, controlling multiple variables, using scientific models to explain results, and choosing among alternative conclusions based on arguments from evidence. They should be able to compare scientific costs or risks and benefits of alternative solutions to problems at local or regional scales.

Science Practices: Students performing at the *Proficient* level should be able to describe, measure, classify, explain, and predict phenomena at multiple scales, from atomic/molecular to cosmic; demonstrate relationships and compare alternative models, predictions, and explanations; design and critique observational and experimental studies, controlling multiple variables, making basic decisions about sampling, analyzing reliability of data, using scientific models to explain results, and choosing among alternative conclusions based on arguments from evidence; and compare scientific costs or risks and benefits of alternative solutions to problems at local or regional scales.

In the physical sciences, students at the *Proficient* level should be able to identify the unique properties of water and their implications for Earth's organisms and climate; describe the pattern of data expected within a family of elements from the periodic table; predict the nature of an unbalanced force on an object by the object's motion and describe observations that would imply a conservation principle in science; suggest examples of how energy gets transferred in different processes; and design an experiment that will yield the average speed of an object under a free-fall situation.

In the life sciences, students at the *Proficient* level should be able to explain chemical mechanisms for metabolism, growth, and reproduction in living systems; analyze cases of evolutionary change in populations using the following related science principles: the potential of a species to increase its numbers, the genetic variability of its offspring, limitations on the resources required for life, and the ensuing selection of those organisms better able to survive and leave offspring; and use scientific models to explain data patterns related to metabolism, genetics, or changes in ecosystems.

In the Earth and space sciences, students at the *Proficient* level should be able to describe the theory that the Universe expanded from a single point billions of years ago and that most elements are formed in stars; given data about fossils, reconstruct the possible environment in which the organisms lived; select geologic data to infer Earth's tectonic plate boundaries; explain the factors that affect regional climates; use knowledge of biogeochemical cycles to predict how an ecosystem may change due to pollutant or change in land use; and propose methods to lessen negative impacts on ecosystems.

Advanced (222)

Students performing at the *Advanced* level should be able to use alternative models to generate predictions and explanations. They should be able to explain differences among physical, chemical, and nuclear changes; the wave and particle nature of light; paths of specific elements through living systems; responses of ecosystems to disturbances; evidence for the theory of an expanding Universe; and evidence for human effects on the Earth's biogeochemical cycles. They should be able to design and critique investigations that relate data to alternative models of phenomena. They should be able to compare costs or risks and benefits of alternative solutions to problems at local, regional, and global scales.

Science Practices: Students performing at the *Advanced* level should be able to describe, measure, classify, explain, and predict phenomena at multiple scales, from atomic/molecular to cosmic; demonstrate relationships and use alternative models to generate predictions and explanations; design and critique observational and experimental studies, controlling multiple variables, making complex decisions about sampling, analyzing reliability of data, using scientific models to explain results, and choosing among alternative conclusions based on arguments from evidence; and compare scientific costs or risks and benefits of alternative solutions to problems at local, regional, and global scales.

In the physical sciences, students at the *Advanced* level should be able to describe how physical, chemical, and nuclear reactions differ; state the changes to a gas in a closed system with the addition of energy; suggest empirical evidence to demonstrate the conservation of matter in physical and chemical changes; describe energy transformations that occur in the transmission of electromagnetic waves and design an investigation to identify the characteristics of electromagnetic waves; demonstrate the relationship of mass and velocity in conserving momentum during a two-body collision; analyze conflicting claims about scientific evidence related to issues such as effects of extended use of cell phones on the human brain and effective methods of containment of nuclear waste materials; and critique an experimental setup that measures velocities of an object to obtain average acceleration.

In the life sciences, students at the *Advanced* level should be able to predict changes in ecosystems in response to disturbances and trace elements through physical and chemical changes in cells, organisms, and ecosystems; analyze conflicting claims about scientific evidence related to biological issues such as genetically modified organisms and ecological effects of climate change; and design technological systems that mitigate harmful science-related effects on humans and ecosystems.

In the Earth and space sciences, students at the *Advanced* level should be able to cite evidence (e.g., red shift) that the Universe expanded from a single point billions of years ago and that all but the lightest elements are formed in stars; use data from an excavation site to infer the age of a fossil; explain the mechanisms for phenomena at plate boundaries by employing earthquake data and using conceptual models; identify scientific trade-offs among energy sources; analyze conflicting claims about scientific evidence related to water resource issues such as ground water contamination and effects of stream channelization, levees, or dams on flood control and flood plains; and apply knowledge of biogeochemical cycles to predict changes that may occur if there is a disturbance in Earth's systems due to a pollutant or the removal of a natural resource in an ecosystem.

What Twelfth-Graders Know and Can Do in Science

The item map below illustrates the range of science skills demonstrated by twelfth-graders. The scale scores on the left represent the scores for students who were likely to get the items correct or complete. The cut score at the lower end of the range for each achievement level is boxed. The descriptions of selected assessment questions indicating what students need to do to answer the question correctly are listed on the right, along with the corresponding science content areas.

For example, students performing toward the top of the *Basic* range (with a score of 177) were likely to be able to recognize atomic particles in an ion. Students performing toward the top of the *Proficient* range (with a score of 215) were likely to be able to provide evidence of nuclear structure.

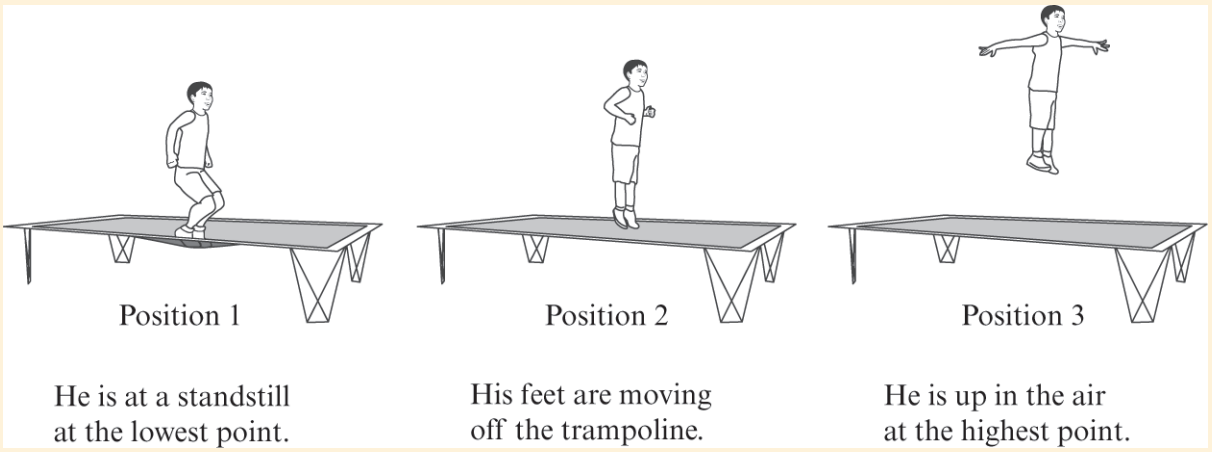
GRADE 12 NAEP SCIENCE ITEM MAP

	Scale score	Content area	Question description
Advanced	300 //		
	292	**Life science**	Explain the cellular response to an external stimulus
	280	**Physical science**	*Identify nuclear force*
	269	**Life science**	Critique a conclusion about photosynthesis based on observations (**shown on pages 56 and 57**)
	244	**Physical science**	*Recognize a nuclear fission reaction*
	232	**Earth and space sciences**	*Compare methods for determining the age of the Earth*
	222		
Proficient	221	**Physical science**	*Explain a physical property in molecular terms*
	215	**Physical science**	Provide evidence of nuclear structure
	212	**Earth and space sciences**	*Identify a characteristic that distinguishes stars from planets*
	204	**Life science**	*Order levels of organization in living systems*
	198	**Physical science**	*Relate motion to conversion of kinetic energy to potential energy* (**shown on page 55**)
	194	**Physical science**	*Predict motion when unbalanced forces are applied*
	188	**Earth and space sciences**	Explain an alternative hypothesis about the effect of emissions released into the atmosphere
	186	**Life science**	Evaluate two methods to help control an invasive species
	184	**Life science**	*Draw a conclusion based on gases released during photosynthesis and respiration*
	180	**Physical science**	*Draw a conclusion based on observed physical properties*
	179		
Basic	178	**Life science**	*Predict the genetic makeup of individuals*
	177	**Physical science**	*Recognize atomic particles in an ion*
	176	**Earth and space sciences**	Predict differences in climate based on topography
	174	**Earth and space sciences**	*Draw a conclusion about the age of a sediment layer based on data*
	168	**Physical science**	*Solve a design problem related to the electric force between objects*
	167	**Life science**	*Recognize a useful product of photosynthesis*
	159	**Life science**	Predict the effect of a major disruption to a trophic level of an ecosystem
	155	**Earth and space sciences**	*Indicate a geologic event that explains a rock formation* (**shown on page 58**)
	150	**Physical science**	Improve the accuracy of an investigation about conservation of energy
	148	**Physical science**	*Relate an observation of a gas to molecular motion*
	143	**Life science**	*Determine relationships between species based on an evolutionary tree*
	142		
	135	**Earth and space sciences**	Design and evaluate a trade-off of a method to obtain drinking water
	128	**Life science**	*Draw a conclusion about population growth based on data*
	120	**Physical science**	Relate differences in chemical properties to differences in chemical bonds
	106	**Physical science**	*Interpret a motion graph*
	96	**Life science**	*Identify evidence to determine heredity*
	74	**Life science**	*Determine degree of relatedness based on traits*
	// 0		

NOTE: Regular type denotes a constructed-response question. *Italic* type denotes a multiple-choice question. The position of a question on the scale represents the scale score attained by students who had a 65 percent probability of successfully answering a constructed-response question, or a 74 percent probability of correctly answering a four-option multiple-choice question. For constructed-response questions, the question description represents students' performance at the highest scoring level used in the analysis. Scale score ranges for science achievement levels are referenced on the map.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Science Assessment.

Sample Question: Physical Science

The question below refers to the following diagram, which shows a boy jumping on a trampoline.



Which statement best explains the energy transfer as the boy moves from Position 2 to Position 3?

- (A) The boy's kinetic energy is transferred to the boy's gravitational potential energy.
- (B) The boy's gravitational potential energy is transferred to the boy's kinetic energy.
- (C) The boy's gravitational potential energy is transferred to the kinetic energy of the air molecules around him.
- (D) The kinetic energy of the air molecules around the boy is transferred to the boy's kinetic energy.

This sample question from the 2009 twelfth-grade assessment measures students' performance in the physical science content area. The question asks students to explain motion in terms of energy transfer. Forty-four percent of twelfth-graders answered the question correctly (Choice A). The most common incorrect answer (Choice B), which was selected by 29 percent of the students, represents a conceptual misunderstanding of how energy is transferred between kinetic energy and gravitational potential energy.

Percentage of twelfth-grade students in each response category: 2009

Choice A	Choice B	Choice C	Choice D	Omitted
44	29	17	10	1

NOTE: Detail may not sum to totals because of rounding.

The table below shows the percentage of twelfth-graders at each achievement level who answered this question correctly. For example, 44 percent of twelfth-graders at the *Basic* level selected the correct answer choice.

Percentage correct for twelfth-grade students at each achievement level: 2009

Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
44	30	44	71	‡

‡ Sample size insufficient to permit a reliable estimate.

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

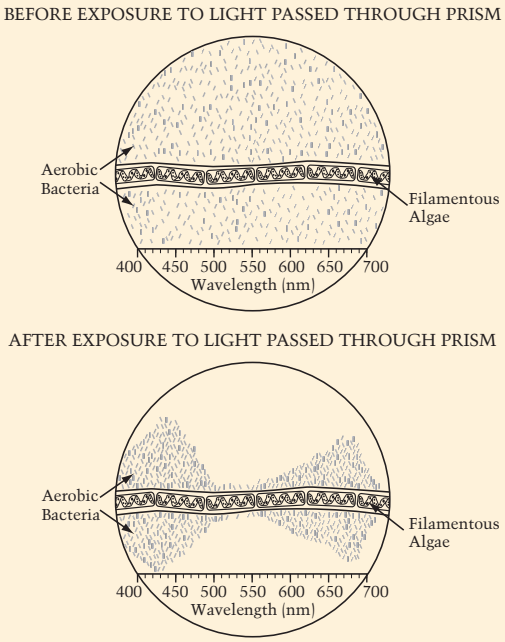
Sample Question: Life Science

An experiment was conducted to determine which wavelengths of visible light are most effective for photosynthesis. The units shown here are in nanometers (nm).

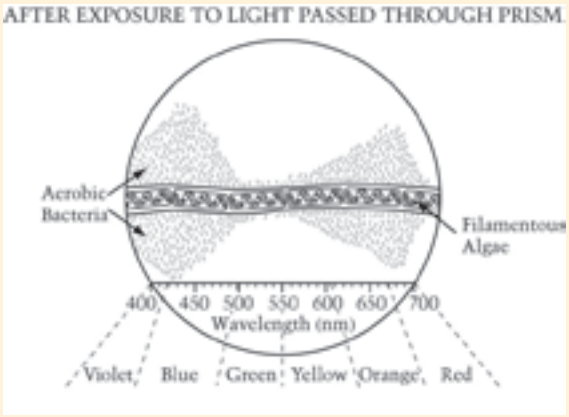
Two organisms were used: filamentous algae, which are capable of photosynthesis, and some aerobic bacteria, which are not capable of photosynthesis.

Both organisms were suspended in a water droplet and placed on a microscope slide. The slide was exposed to light that was passed through a crystal prism. (The prism was used to separate visible light into its wavelengths.)

The diagram on the right illustrates what was seen on the microscope slide before and one hour after exposure to light that was passed through the prism.



The diagram below illustrates what was seen on the microscope slide one hour after exposure to light that was passed through a prism. The colors associated with the wavelengths of light are also indicated.



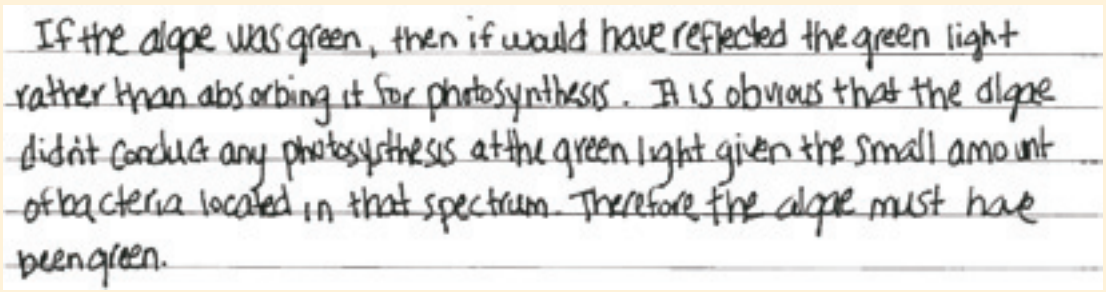
Based on the results of the experiment, a student concludes that the scientist used algae that was green.

Do you agree with the student's conclusion?

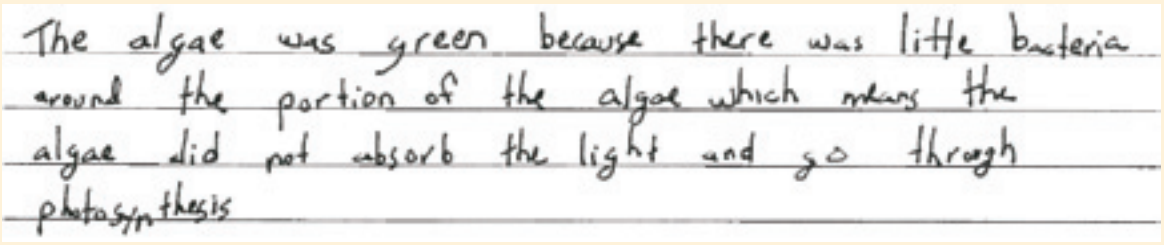
- (A) Yes
- (B) No

Refer to the results from the experiment to support your answer.

Complete response #1:



Complete response #2:



This sample of a short constructed-response question (shown on the previous page) measures twelfth-graders' performance in the life science content area. It requires students to critique a conclusion based on results of a scientific investigation. Student responses to this question were rated using four scoring levels.

Complete responses selected "Yes" and provided a correct explanation that consists of the following three parts:

- explained that green light is not used or is least effective for photosynthesis,
- referred to the data that very few bacteria are clustered between 500–550 nm (green region), and
- indicated that green light could be reflected or not absorbed.

Essential responses either

- selected "Yes" and addressed two parts of a correct explanation, or
- selected "No" or made no selection but addressed three parts of a correct explanation.

Partial responses either

- indicated "Yes" and addressed one part of a complete response correctly, or
- selected "No" or made no selection but addressed one or two parts of a complete response correctly.

Unsatisfactory/Incorrect responses were inadequate or incorrect.

The sample student responses shown above were rated as "Complete" because they correctly answered all parts of the question. One percent of twelfth-graders' responses to this question received a "Complete" rating.

Percentage of twelfth-grade students in each response category: 2009

Complete	Essential	Partial	Unsatisfactory/ Incorrect	Omitted
1	3	19	71	6

NOTE: The percentage of responses rated as "Off-task" is not shown but rounds to zero. Off-task responses are those that do not provide any information related to the assessment task.

The table below shows the percentage of twelfth-graders at each achievement level whose responses to this question were rated "Complete, "Essential," or "Partial." For example, 3 percent of twelfth-graders at the *Proficient* level provided a response rated as "Complete."

Percentage of answers rated as "Complete," "Essential," and "Partial" for twelfth-grade students at each achievement level: 2009

Scoring level	Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
Complete	1	#	#	3	‡
Essential	3	#	1	13	‡
Partial	19	5	21	42	‡

Rounds to zero.
‡ Sample size insufficient to permit a reliable estimate.

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

Sample Question: Earth and Space Sciences

The picture below shows a rock formation with folded layers.

ROCK FORMATION

Which statement best explains how the rock layers folded?

- (A) The rock melted and flowed downhill.
- (B) The rock was deformed by a meteorite impact.
- (C) The rock was suddenly pulled apart during an earthquake.
- (D) The rock was slowly compressed due to tectonic plate movement.

This sample question from the 2009 twelfth-grade assessment measures students' performance in the Earth and space sciences content area. The question asks students to explain a natural phenomenon involving rock folding.

Sixty-nine percent of twelfth-grade students answered correctly (Choice D). The most common incorrect answer (Choice A), which was selected by 18 percent of the students, represents a conceptual misunderstanding that rock folding results from the melting of rock.

Percentage of twelfth-grade students in each response category: 2009

Choice A	Choice B	Choice C	Choice D	Omitted
18	6	7	69	#

Rounds to zero.

The table below shows the percentage of twelfth-graders at each achievement level who answered this question correctly. For example, 76 percent of twelfth-graders at the *Basic* level selected the correct answer choice.

Percentage correct for twelfth-grade students at each achievement level: 2009

Overall	Below *Basic*	At *Basic*	At *Proficient*	At *Advanced*
69	55	76	85	‡

‡ Sample size insufficient to permit a reliable estimate.

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

Technical Notes

Sampling and Weighting

The schools and students participating in NAEP assessments are selected to be representative of all schools nationally and of public schools at the state level. Samples of schools and students are drawn from participating states and from the District of Columbia and Department of Defense schools. While results for students assessed in Alaska, the District of Columbia, Kansas, Nebraska, and Vermont contributed to the results for the nation, sample sizes were not large enough to report results for these states/jurisdictions separately at grades 4 and 8. The results from the assessed students are combined to provide accurate estimates of the overall performance of students in the nation and in individual states and other jurisdictions.

While national results reflect the performance of students in both public schools and nonpublic schools (i.e., private schools, Bureau of Indian Education schools, and Department of Defense schools), state-level results reflect the performance of public school students only. Results are also reported separately for Department of Defense schools in state tables and maps. More information on sampling can be found at http://nces.ed.gov/nationsreportcard/about/nathow.asp.

Because each school that participated in the assessment, and each student assessed, represents a portion of the population of interest, the results are weighted to account for the disproportionate representation of the selected sample. This includes the oversampling of schools with high concentrations of students from certain racial/ethnic groups and the lower sampling rates of students who attend very small nonpublic schools.

School and Student Participation

National participation

To ensure unbiased samples, NAEP statistical standards require that participation rates for original school samples be 70 percent or higher to report national results separately for public and private schools. While the school participation rate for private schools met the standard for reporting at grades 4 and 8, it fell below the standard at grade 12, and participation rates for non-Catholic private schools were insufficient for reporting results at all three grades. Although the non-Catholic private school participation rates were insufficient to report results separately, these schools contributed to the national results at all three grades. Weighted student participation rates were 95 percent at grade 4, 93 percent at grade 8, and 80 percent at grade 12 (table **TN-1**).

In instances where participation rates meet the 70 percent criterion but fall below 85 percent, a nonresponse bias analysis is conducted to determine if the responding sample is not representative of the population, thereby introducing the potential for nonresponse bias. School nonresponse bias analysis was conducted for private school samples at grades 4 and 8, as their response rates fell below 85 percent. The following school characteristics were considered to compare the distribution of the responding private school sample to that of the entire eligible original school sample: census region, private schools reporting subgroups (Roman Catholic/Non-Catholic), metro-centric locale, urban-centric locale, and estimated grade enrollment divided into three equally sized categories. The nonresponse bias analysis shows that compared to the entire eligible original private school sample, the original responding private schools at grades 4 and 8 could be potentially biased. For example, the weighted percentage of schools in the two private schools reporting subgroups (Roman Catholic/Non-Catholic) obtained from the original responding private school sample was significantly different from the weighted percentages in the entire eligible original private school sample for both grades. That is, there were more Roman Catholic schools and fewer non-Catholic schools in the original responding private schools sample than in the eligible original private schools sample. In addition, the nonresponse bias analysis shows that the potential school nonresponse bias may still exist due to nonresponding schools, but was reduced by including substitute schools and by adjusting the sampling weights to account for school nonresponse.

Table **TN-1.** National school and student participation rates in NAEP science, by grade and type of school: 2009

Grade and type of school	School participation		Student participation	
	Weighted percent	Number of schools participating	Weighted percent	Number of students assessed
Grade 4				
Nation	**97**	**9,330**	**95**	**156,500**
Public	100	8,780	95	151,500
Private	73	370	96	2,800
Catholic	88	160	96	1,400
Non-Catholic	59	210	96	1,400
Grade 8				
Nation	**97**	**6,920**	**93**	**151,100**
Public	100	6,440	92	146,300
Private	72	360	95	3,100
Catholic	86	150	95	1,500
Non-Catholic	58	210	95	1,600
Grade 12				
Nation	**83**	**1,410**	**80**	**11,100**
Public	86	1,260	79	9,900
Private	52	160	88	1,200
Catholic	60	30	87	500
Non-Catholic	44	130	88	800

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. 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.

Student nonresponse bias analysis was also conducted for grade 12 public school students, as the student response rate was 79 percent. The following student characteristics were considered to compare the distribution of the responding student sample with that of the entire eligible sample of students: gender, race/ethnicity, relative age, eligibility for the National School Lunch Program, student disability (SD) status, and English language learner (ELL) status. In summary, based on the student characteristics available, there does not appear to be evidence of substantial bias resulting from student nonresponse, and adjusting student sampling weights for nonresponse in general decreased or did not change the potential nonresponse bias.

State participation

Standards established by the National Assessment Governing Board require that school participation rates for the original state samples need to be at least 85 percent for results to be reported. Forty-seven states and jurisdictions participating in the science assessment at grades 4 and 8 met this participation rate requirement in 2009 with rates ranging from 96 percent to 100 percent.

Interpreting Statistical Significance

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.

When an estimate has a large standard error, a numerical difference that seems large may not be statistically significant. Differences of the same magnitude may or may not be statistically significant depending upon the size of the standard errors of the estimates. Standard errors for the estimates presented in this report are available at http://nces.ed.gov/nationsreportcard/naepdata/.

To ensure that significant differences in NAEP data reflect actual differences and not mere chance, error rates need to be controlled when making multiple simultaneous comparisons. The more comparisons that are made (e.g., comparing the performance of White, Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native students), the higher the probability of finding significant differences by chance. In NAEP, the Benjamini-Hochberg False Discovery Rate (FDR) procedure is used to control the expected proportion of falsely rejected hypotheses relative to the number of comparisons that are conducted. A detailed explanation of this procedure can be found at http://nces.ed.gov/nationsreportcard/tdw/analysis/infer.asp. NAEP employs a number of rules to determine the number of comparisons conducted, which in most cases is simply the number of possible statistical tests. However, when comparing multiple jurisdictions to the nation, the number of jurisdictions does not count toward the number of comparisons.

National School Lunch Program

NAEP collects data on student eligibility for the National School Lunch Program (NSLP) as an indicator of low income. Under the guidelines of NSLP, children from families with incomes below 130 percent of the poverty level are eligible for free meals. Those from families with incomes between 130 and 185 percent of the poverty level are eligible for reduced-price meals. (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.) Some schools provide free meals to all students irrespective of individual eligibility, using their own funds to cover the costs of noneligible students. Under special provisions of the National School Lunch Act intended to reduce the administrative burden of determining student eligibility every year, schools can be reimbursed based on eligibility data for a single base year. Participating schools might have high percentages of eligible students and report all students as eligible for free lunch.

Because students' eligibility for free or reduced-price school lunch may be underreported at grade 12, the results are not included in this report but are available on the NAEP Data Explorer at http://nces.ed.gov/nationsreportcard/naepdata/.

School Location

NAEP results are reported for four mutually exclusive categories of school location: 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 locale codes based on their physical address. The locale codes are based on an address's proximity to an urbanized area (a densely settled core with densely settled surrounding areas). More details on the classification system can be found at http://nces.ed.gov/ccd/rural_locales.asp.

Parents' Highest Level of Education

Eighth- and twelfth-grade students who participated in the NAEP 2009 science assessment were asked to indicate the highest level of education they thought their parents 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 of this question. The question was not posed to fourth-graders because their responses in previous NAEP assessments were highly variable, and a large percentage of them chose the "I don't know" option.

Appendix Tables

Tables A-1 through **A-6** provide the percentages of students with disabilities and English language learners identified, excluded, and assessed for the nation at all three grades and by state for grades 4 and 8. Additional state results are provided in **tables A-7** through **A-12** for grade 4 and in **tables A-13** through **A-18** for grade 8.

Table **A-1.** Percentage of fourth-, eighth-, and twelfth-grade public and nonpublic school students with disabilities (SD) and/or English language learners (ELL) identified, excluded, and assessed in NAEP science, as a percentage of all students, by SD/ELL category: 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-2.** Percentage of fourth-, eighth-, and twelfth-grade public and nonpublic school students with disabilities (SD) and/or English language learners (ELL) identified, excluded, and assessed in NAEP science, as a percentage of all students, by selected racial/ethnic groups and SD/ELL category: 2009

	Grade 4			Grade 8			Grade 12		
SD/ELL category	White	Black	Hispanic	White	Black	Hispanic	White	Black	Hispanic
SD and/or ELL									
Identified	14	15	43	12	17	29	11	14	21
Excluded	1	2	3	1	3	3	2	3	4
Assessed	13	13	40	11	14	26	9	11	18
Without accommodations	4	3	23	2	2	14	2	3	9
With accommodations	9	11	17	9	12	12	6	8	8
SD									
Identified	13	14	11	12	16	11	11	13	10
Excluded	1	2	2	1	3	2	2	3	3
Assessed	12	12	9	11	14	9	8	10	7
Without accommodations	3	3	2	2	2	2	2	2	2
With accommodations	8	10	7	9	11	7	6	8	5
ELL									
Identified	1	1	37	#	1	22	#	1	13
Excluded	#	#	2	#	#	2	#	#	1
Assessed	1	1	35	#	1	20	#	1	12
Without accommodations	#	#	21	#	#	13	#	#	8
With accommodations	#	1	13	#	1	8	#	#	4

Rounds to zero.

NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. 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-3.** 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.

Table **A-4.** Percentage of fourth- and eighth-grade public school students with disabilities (SD) and English language learners (ELL) identified, excluded, and accommodated in NAEP science, as a percentage of all students, by state/jurisdiction: 2009

State/jurisdiction	Grade 4							Grade 8						
		SD			ELL				SD			ELL		
	Overall excluded	Identified	Excluded	Accom-modated	Identified	Excluded	Accom-modated	Overall excluded	Identified	Excluded	Accom-modated	Identified	Excluded	Accom-modated
Nation (public)	**2**	**13**	**2**	**9**	**10**	**1**	**4**	**2**	**13**	**2**	**9**	**6**	**1**	**2**
Alabama	1	10	1	4	2	#	#	1	10	1	3	1	#	#
Alaska	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Arizona	2	13	2	7	15	1	7	2	12	2	7	6	1	3
Arkansas	1	12	1	9	6	#	4	1	12	1	9	4	#	3
California	2	10	2	4	30	1	3	2	9	1	5	20	1	3
Colorado	1	11	1	8	11	#	6	1	11	1	8	7	#	3
Connecticut	2	13	2	10	6	1	4	2	13	1	10	4	1	2
Delaware	2	15	2	12	4	#	3	1	15	1	13	2	#	2
Florida	2	17	1	12	8	1	7	2	15	1	12	5	1	4
Georgia	1	10	1	7	4	#	3	1	11	1	8	2	#	1
Hawaii	1	10	1	8	10	1	6	2	12	1	8	7	1	3
Idaho	2	10	1	6	5	#	2	1	9	1	5	4	#	2
Illinois	2	15	1	10	8	1	5	1	14	1	11	3	1	2
Indiana	2	16	2	9	5	1	3	2	14	2	10	3	#	1
Iowa	2	14	1	10	5	#	3	1	14	1	12	2	#	1
Kansas	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Kentucky	2	15	2	9	2	#	1	2	12	2	8	1	#	1
Louisiana	1	20	1	15	2	#	2	1	15	1	12	1	#	1
Maine	1	18	1	14	1	#	1	2	17	2	13	2	#	1
Maryland	3	14	2	10	6	1	5	3	12	2	9	2	#	2
Massachusetts	3	19	3	13	7	1	2	4	19	3	13	3	1	1
Michigan	2	14	2	8	4	#	1	2	13	2	8	2	#	#
Minnesota	3	14	2	8	8	1	3	2	12	2	8	6	1	1
Mississippi	1	9	1	6	1	#	1	1	9	1	7	1	#	#
Missouri	2	14	2	8	2	#	1	1	13	1	9	1	#	#
Montana	1	12	1	8	3	#	2	2	12	2	9	3	#	1
Nebraska	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Nevada	2	12	2	6	20	1	12	1	11	1	8	8	#	4
New Hampshire	2	18	2	14	3	#	2	2	20	2	13	1	#	1
New Jersey	2	16	1	12	4	1	3	2	16	2	13	3	1	2
New Mexico	2	13	2	8	16	1	9	3	13	3	7	11	1	5
New York	1	16	1	14	8	1	7	2	16	1	14	5	1	4
North Carolina	2	15	2	9	6	#	4	2	12	1	10	5	#	3
North Dakota	3	16	3	10	2	#	1	4	15	4	9	2	1	#
Ohio	2	14	2	10	3	#	2	2	15	2	11	1	#	#
Oklahoma	3	15	3	9	4	1	2	3	15	3	10	3	#	1
Oregon	3	16	3	8	12	1	7	2	13	2	7	6	#	3
Pennsylvania	1	15	1	11	3	#	2	2	17	2	14	2	#	1
Rhode Island	2	17	2	13	6	1	3	3	18	2	12	3	1	1
South Carolina	1	14	1	8	5	#	2	2	14	2	8	3	#	2
South Dakota	2	15	2	7	2	#	1	1	10	1	7	1	#	#
Tennessee	2	14	2	9	3	#	2	2	12	2	9	1	#	1
Texas	3	10	2	5	21	2	5	4	12	3	6	7	1	1
Utah	2	12	2	7	9	1	5	2	10	2	7	5	#	2
Vermont	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Virginia	2	14	1	10	6	1	4	2	14	2	9	3	#	2
Washington	2	12	2	7	10	1	5	2	11	2	6	4	#	2
West Virginia	2	17	2	9	#	#	#	2	15	2	10	1	#	#
Wisconsin	2	15	2	11	7	1	5	2	14	2	10	4	1	3
Wyoming	1	16	1	11	3	#	2	2	14	1	10	1	#	1
Other jurisdictions														
District of Columbia	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	2	12	1	8	7	1	2	2	8	1	6	5	1	1

— Not available.
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 in overall, 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.

Table **A-5.** 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 accommodations	Assessed with accommodations	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
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.
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-6.** 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 accommodations	Assessed with accommodations	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations	Excluded	Assessed	Assessed without accommodations	Assessed with accommodations
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.
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-7.** Percentage of fourth-grade public school students assessed in NAEP science, by race/ethnicity, eligibility for free/reduced-price school lunch, and state/jurisdiction: 2009

State/jurisdiction	Race/ethnicity					Eligibility for free/reduced-price school lunch	
	White	Black	Hispanic	Asian/Pacific Islander	American Indian/ Alaska Native	Eligible	Not eligible
Nation (public)	**54**	**16**	**22**	**5**	**1**	**48**	**51**
Alabama	61	33	4	1	#	54	46
Alaska	—	—	—	—	—	—	—
Arizona	40	6	45	3	6	54	45
Arkansas	66	24	8	2	1	59	41
California	28	7	51	11	1	53	45
Colorado	61	5	28	4	1	37	61
Connecticut	66	12	17	4	#	30	70
Delaware	51	33	12	3	#	43	57
Florida	46	22	25	2	#	55	45
Georgia	46	36	11	3	#	56	44
Hawaii	14	3	3	65	1	45	55
Idaho	82	1	14	2	1	43	57
Illinois	51	19	22	5	#	46	53
Indiana	77	11	6	2	#	45	55
Iowa	84	5	8	2	#	37	63
Kansas	—	—	—	—	—	—	—
Kentucky	84	10	3	1	#	52	48
Louisiana	47	48	4	1	#	70	30
Maine	94	3	1	1	1	40	60
Maryland	48	35	11	6	#	40	60
Massachusetts	68	8	17	5	#	34	66
Michigan	71	20	5	3	#	43	56
Minnesota	76	9	7	6	2	31	68
Mississippi	45	52	2	1	#	69	31
Missouri	77	17	4	2	#	44	55
Montana	83	1	3	1	12	41	58
Nebraska	—	—	—	—	—	—	—
Nevada	42	10	39	8	1	41	57
New Hampshire	91	2	4	3	#	22	77
New Jersey	55	16	21	8	#	33	66
New Mexico	29	3	58	2	9	68	32
New York	52	19	20	9	#	52	46
North Carolina	54	28	11	2	1	48	51
North Dakota	86	2	2	1	9	33	67
Ohio	72	19	3	2	#	40	60
Oklahoma	58	12	9	2	20	54	46
Oregon	69	4	17	6	2	46	52
Pennsylvania	71	15	9	4	#	39	61
Rhode Island	69	9	18	3	1	41	59
South Carolina	55	35	6	1	#	56	44
South Dakota	80	2	3	1	13	37	63
Tennessee	69	24	5	2	#	52	48
Texas	31	13	51	4	#	59	40
Utah	77	2	16	4	1	35	61
Vermont	—	—	—	—	—	—	—
Virginia	57	26	8	6	#	34	66
Washington	62	6	18	9	3	45	54
West Virginia	92	6	1	1	#	58	42
Wisconsin	75	11	9	3	2	39	60
Wyoming	83	1	11	1	3	35	65
Other jurisdictions							
District of Columbia	—	—	—	—	—	—	—
DoDEA[1]	49	16	16	7	1	‡	‡

— Not available.
Rounds to zero.
‡ Reporting standards not met. Sample size insufficient to permit a reliable estimate.
[1] Department of Defense Education Activity (overseas and domestic schools).
NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Results are not shown for students whose race/ethnicity was unclassified and for students whose eligibility status for free/reduced-price school lunch was not available.
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.** Average scores and achievement-level results in NAEP science for fourth-grade public school students, by race/ethnicity and state/jurisdiction: 2009

State/jurisdiction	White					Black					Hispanic				
		Percentage of students					Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**162**	**14**	**86**	**46**	**1**	**127**	**54**	**46**	**10**	**#**	**130**	**48**	**52**	**13**	**#**
Alabama	155	20	80	39	#	121	61	39	6	#	125	55	45	9	#
Alaska	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Arizona	155	19	81	37	1	129	48	52	13	#	124	55	45	9	#
Arkansas	157	18	82	38	#	117	66	34	6	#	136	42	58	15	#
California	157	19	81	41	1	122	59	41	9	#	121	58	42	8	#
Colorado	166	11	89	53	1	128	48	52	12	#	134	44	56	15	#
Connecticut	167	10	90	53	1	129	51	49	9	#	128	52	48	11	#
Delaware	166	9	91	50	#	135	43	57	11	#	142	34	66	20	#
Florida	163	12	88	46	#	131	49	51	10	#	144	30	70	23	#
Georgia	159	16	84	42	#	126	55	45	10	#	133	47	53	15	#
Hawaii	159	18	82	43	1	134	43	57	16	#	134	42	58	22	#
Idaho	159	16	84	40	#	‡	‡	‡	‡	‡	128	53	47	10	#
Illinois	164	13	87	48	1	120	63	37	9	#	129	49	51	10	#
Indiana	158	16	84	41	1	129	50	50	9	#	136	41	59	15	#
Iowa	161	15	85	45	1	130	50	50	14	#	134	40	60	15	#
Kansas	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Kentucky	164	13	87	49	1	135	43	57	15	#	150	27	73	31	2
Louisiana	159	15	85	42	1	123	60	40	8	#	144	31	69	23	1
Maine	161	14	86	43	1	139	38	62	26	1	‡	‡	‡	‡	‡
Maryland	164	13	87	48	1	131	50	50	12	#	143	34	66	21	#
Massachusetts	169	8	92	56	1	138	39	61	17	#	132	44	56	12	#
Michigan	160	17	83	43	1	118	66	34	6	#	138	40	60	20	#
Minnesota	166	11	89	51	1	129	50	50	12	#	134	45	55	16	#
Mississippi	152	22	78	31	#	116	68	32	4	#	142	34	66	21	#
Missouri	164	13	87	47	1	127	54	46	12	#	141	34	66	21	#
Montana	164	10	90	47	1	‡	‡	‡	‡	‡	149	27	73	26	#
Nebraska	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Nevada	156	19	81	37	#	122	59	41	8	#	128	51	49	12	#
New Hampshire	165	11	89	49	1	‡	‡	‡	‡	‡	139	39	61	20	#
New Jersey	166	10	90	52	1	133	46	54	12	#	136	42	58	15	#
New Mexico	163	14	86	48	1	134	44	56	16	#	134	45	55	15	#
New York	161	14	86	44	1	127	55	45	9	#	130	49	51	13	#
North Carolina	162	14	86	45	1	126	56	44	9	#	132	49	51	11	#
North Dakota	165	10	90	49	1	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Ohio	165	11	89	50	1	129	53	47	10	#	140	42	58	26	1
Oklahoma	156	17	83	37	#	125	56	44	8	#	131	47	53	12	#
Oregon	157	20	80	40	1	131	47	53	12	#	128	53	47	12	#
Pennsylvania	164	13	87	48	1	121	61	39	7	#	125	54	46	12	#
Rhode Island	161	14	86	44	#	126	54	46	10	#	124	56	44	9	#
South Carolina	163	13	87	49	1	128	53	47	10	#	140	35	65	23	#
South Dakota	162	13	87	46	1	‡	‡	‡	‡	‡	145	28	72	23	#
Tennessee	159	19	81	43	1	121	61	39	8	#	134	44	56	17	#
Texas	168	10	90	53	2	139	38	62	18	#	136	42	58	16	#
Utah	161	16	84	45	1	‡	‡	‡	‡	‡	129	50	50	12	#
Vermont	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Virginia	172	7	93	59	2	141	36	64	18	#	152	20	80	32	#
Washington	160	15	85	44	1	127	51	49	8	#	125	56	44	10	#
West Virginia	150	25	75	29	#	130	50	50	11	#	‡	‡	‡	‡	‡
Wisconsin	164	12	88	49	1	121	62	38	8	#	138	40	60	17	#
Wyoming	159	16	84	41	#	‡	‡	‡	‡	‡	140	38	62	18	#
Other jurisdictions															
District of Columbia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	166	9	91	51	1	141	35	65	16	#	153	22	78	32	#

See notes at end of table.

Table **A-8.** Average scores and achievement-level results in NAEP science for fourth-grade public school students, by race/ethnicity and state/jurisdiction: 2009—Continued

State/jurisdiction	Asian/Pacific Islander					American Indian/Alaska Native				
		Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**160**	**20**	**80**	**45**	**2**	**137**	**40**	**60**	**19**	**#**
Alabama	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Alaska	—	—	—	—	—	—	—	—	—	—
Arizona	156	22	78	43	#	123	57	43	9	#
Arkansas	152	23	77	34	1	‡	‡	‡	‡	‡
California	160	19	81	45	3	‡	‡	‡	‡	‡
Colorado	162	15	85	48	1	‡	‡	‡	‡	‡
Connecticut	164	14	86	48	#	‡	‡	‡	‡	‡
Delaware	169	11	89	53	5	‡	‡	‡	‡	‡
Florida	158	19	81	44	2	‡	‡	‡	‡	‡
Georgia	167	11	89	50	1	‡	‡	‡	‡	‡
Hawaii	138	40	60	21	#	‡	‡	‡	‡	‡
Idaho	156	23	77	39	3	‡	‡	‡	‡	‡
Illinois	166	14	86	51	3	‡	‡	‡	‡	‡
Indiana	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Iowa	156	24	76	43	1	‡	‡	‡	‡	‡
Kansas	—	—	—	—	—	—	—	—	—	—
Kentucky	172	11	89	65	3	‡	‡	‡	‡	‡
Louisiana	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Maine	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Maryland	164	14	86	47	1	‡	‡	‡	‡	‡
Massachusetts	167	14	86	53	4	‡	‡	‡	‡	‡
Michigan	162	21	79	49	2	‡	‡	‡	‡	‡
Minnesota	147	33	67	31	#	134	42	58	12	#
Mississippi	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Missouri	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Montana	‡	‡	‡	‡	‡	137	39	61	16	#
Nebraska	—	—	—	—	—	—	—	—	—	—
Nevada	151	25	75	32	#	‡	‡	‡	‡	‡
New Hampshire	171	8	92	57	2	‡	‡	‡	‡	‡
New Jersey	173	10	90	63	4	‡	‡	‡	‡	‡
New Mexico	‡	‡	‡	‡	‡	126	56	44	8	#
New York	156	20	80	38	1	‡	‡	‡	‡	‡
North Carolina	163	17	83	52	#	128	54	46	10	#
North Dakota	‡	‡	‡	‡	‡	135	45	55	15	#
Ohio	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Oklahoma	‡	‡	‡	‡	‡	145	29	71	23	#
Oregon	159	20	80	44	3	143	35	65	25	#
Pennsylvania	166	16	84	53	2	‡	‡	‡	‡	‡
Rhode Island	152	29	71	37	1	‡	‡	‡	‡	‡
South Carolina	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
South Dakota	‡	‡	‡	‡	‡	128	52	48	11	#
Tennessee	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Texas	163	16	84	47	2	‡	‡	‡	‡	‡
Utah	147	30	70	28	1	124	64	36	9	#
Vermont	—	—	—	—	—	—	—	—	—	—
Virginia	174	7	93	61	4	‡	‡	‡	‡	‡
Washington	156	22	78	41	1	137	37	63	18	#
West Virginia	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Wisconsin	153	27	73	37	#	145	29	71	20	#
Wyoming	‡	‡	‡	‡	‡	134	43	57	9	#
Other jurisdictions										
District of Columbia	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	161	15	85	44	#	‡	‡	‡	‡	‡

— Not available.
Rounds to zero.
‡ Reporting standards not met. Sample size insufficient to permit a reliable estimate.
[1] Department of Defense Education Activity (overseas and domestic schools).
NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Results are not shown for students whose race/ethnicity was unclassified. 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-9.** Average scores and achievement-level results in NAEP science for fourth-grade public school students, by gender and state/jurisdiction: 2009

State/jurisdiction	Male					Female				
		Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**149**	**29**	**71**	**34**	**1**	**148**	**29**	**71**	**31**	**#**
Alabama	144	34	66	29	#	142	36	64	25	#
Alaska	—	—	—	—	—	—	—	—	—	—
Arizona	137	40	60	23	#	138	39	61	21	#
Arkansas	146	31	69	30	#	146	31	69	27	#
California	136	43	57	22	#	137	42	58	22	1
Colorado	156	22	78	40	1	153	24	76	37	1
Connecticut	156	22	78	42	1	155	22	78	38	1
Delaware	153	24	76	35	1	152	23	77	32	#
Florida	151	25	75	33	#	150	25	75	31	#
Georgia	145	33	67	29	#	143	35	65	25	#
Hawaii	137	41	59	24	1	143	33	67	25	#
Idaho	154	21	79	37	#	153	22	78	34	#
Illinois	148	31	69	34	1	147	31	69	30	1
Indiana	153	22	78	36	1	152	23	77	34	#
Iowa	158	20	80	42	1	157	20	80	40	1
Kansas	—	—	—	—	—	—	—	—	—	—
Kentucky	161	16	84	46	1	160	17	83	43	1
Louisiana	141	37	63	26	1	141	37	63	24	#
Maine	161	14	86	44	1	158	16	84	39	#
Maryland	151	27	73	33	1	149	30	70	32	#
Massachusetts	162	16	84	47	1	159	18	82	43	1
Michigan	151	27	73	37	#	149	28	72	32	1
Minnesota	159	19	81	45	1	158	18	82	41	1
Mississippi	134	45	55	18	#	132	48	52	16	#
Missouri	155	22	78	40	1	158	19	81	40	1
Montana	160	15	85	43	#	160	14	86	42	#
Nebraska	—	—	—	—	—	—	—	—	—	—
Nevada	142	35	65	26	#	139	38	62	21	#
New Hampshire	163	12	88	47	1	163	13	87	48	1
New Jersey	156	22	78	41	1	154	23	77	37	#
New Mexico	142	36	64	25	#	141	37	63	23	#
New York	148	29	71	31	1	147	30	70	29	#
North Carolina	149	30	70	33	1	146	32	68	27	#
North Dakota	164	13	87	49	1	160	14	86	42	#
Ohio	159	19	81	45	1	155	22	78	38	1
Oklahoma	148	28	72	29	#	148	26	74	28	#
Oregon	151	27	73	34	1	151	26	74	34	#
Pennsylvania	156	23	77	41	1	151	26	74	36	#
Rhode Island	151	26	74	36	#	149	27	73	32	#
South Carolina	150	28	72	34	1	149	29	71	33	#
South Dakota	158	18	82	42	1	156	20	80	38	#
Tennessee	149	30	70	33	1	148	31	69	33	#
Texas	148	30	70	30	1	147	31	69	28	1
Utah	155	22	78	39	1	153	24	76	36	1
Vermont	—	—	—	—	—	—	—	—	—	—
Virginia	161	17	83	45	1	162	16	84	47	1
Washington	151	26	74	34	1	151	26	74	35	1
West Virginia	149	27	73	30	#	147	28	72	26	#
Wisconsin	157	21	79	41	1	156	20	80	40	1
Wyoming	157	18	82	38	#	154	21	79	36	#
Other jurisdictions										
District of Columbia	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	158	18	82	40	1	159	15	85	41	#

— Not available.

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-10.** Average scores and achievement-level results in NAEP science for fourth-grade public school students, by eligibility for free/reduced-price school lunch and state/jurisdiction: 2009

State/jurisdiction	Eligible					Not eligible					Information not available				
		Percentage of students					Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**134**	**44**	**56**	**16**	**#**	**163**	**14**	**86**	**48**	**1**	**143**	**36**	**64**	**27**	**#**
Alabama	129	50	50	13	#	160	16	84	44	#	‡	‡	‡	‡	‡
Alaska	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Arizona	125	53	47	11	#	153	22	78	35	#	‡	‡	‡	‡	‡
Arkansas	135	43	57	19	#	161	14	86	43	1	‡	‡	‡	‡	‡
California	122	57	43	10	#	154	24	76	38	1	127	52	48	11	#
Colorado	136	41	59	16	#	166	12	88	53	1	‡	‡	‡	‡	‡
Connecticut	130	49	51	12	#	166	11	89	52	1	‡	‡	‡	‡	‡
Delaware	138	38	62	16	#	164	12	88	47	1	‡	‡	‡	‡	‡
Florida	141	34	66	20	#	162	14	86	47	1	‡	‡	‡	‡	‡
Georgia	132	48	52	13	#	160	17	83	45	1	‡	‡	‡	‡	‡
Hawaii	126	51	49	13	#	151	26	74	34	1	‡	‡	‡	‡	‡
Idaho	145	31	69	24	#	160	15	85	44	#	‡	‡	‡	‡	‡
Illinois	129	50	50	14	#	163	14	86	48	1	‡	‡	‡	‡	‡
Indiana	141	34	66	21	#	162	13	87	46	1	‡	‡	‡	‡	‡
Iowa	142	34	66	21	#	167	11	89	53	1	‡	‡	‡	‡	‡
Kansas	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Kentucky	150	25	75	30	#	172	7	93	60	1	‡	‡	‡	‡	‡
Louisiana	132	48	52	15	#	164	12	88	48	1	‡	‡	‡	‡	‡
Maine	151	23	77	29	#	166	10	90	50	1	‡	‡	‡	‡	‡
Maryland	131	49	51	12	#	162	15	85	46	1	‡	‡	‡	‡	‡
Massachusetts	140	36	64	19	#	171	7	93	59	1	‡	‡	‡	‡	‡
Michigan	134	45	55	18	#	163	14	86	47	1	‡	‡	‡	‡	‡
Minnesota	140	38	62	21	#	167	10	90	53	1	‡	‡	‡	‡	‡
Mississippi	125	57	43	10	#	152	23	77	32	#	‡	‡	‡	‡	‡
Missouri	143	34	66	24	#	167	11	89	52	1	‡	‡	‡	‡	‡
Montana	149	25	75	28	#	168	8	92	53	1	‡	‡	‡	‡	‡
Nebraska	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Nevada	130	47	53	15	#	149	28	72	30	#	‡	‡	‡	‡	‡
New Hampshire	149	26	74	28	#	168	9	91	53	1	‡	‡	‡	‡	‡
New Jersey	134	45	55	13	#	166	11	89	51	1	‡	‡	‡	‡	‡
New Mexico	133	45	55	15	#	159	18	82	43	1	‡	‡	‡	‡	‡
New York	135	44	56	17	#	162	14	86	45	1	158	19	81	39	1
North Carolina	133	47	53	13	#	162	16	84	46	1	‡	‡	‡	‡	‡
North Dakota	149	25	75	30	#	167	8	92	53	1	‡	‡	‡	‡	‡
Ohio	139	38	62	20	#	169	9	91	56	2	‡	‡	‡	‡	‡
Oklahoma	139	37	63	18	#	159	15	85	41	#	‡	‡	‡	‡	‡
Oregon	138	40	60	19	#	163	14	86	47	1	‡	‡	‡	‡	‡
Pennsylvania	133	46	54	17	#	167	11	89	52	1	‡	‡	‡	‡	‡
Rhode Island	132	47	53	14	#	163	12	88	48	#	‡	‡	‡	‡	‡
South Carolina	137	41	59	19	#	165	12	88	52	1	‡	‡	‡	‡	‡
South Dakota	143	34	66	23	#	165	10	90	50	1	‡	‡	‡	‡	‡
Tennessee	136	43	57	20	#	161	16	84	47	1	‡	‡	‡	‡	‡
Texas	135	42	58	15	#	166	12	88	51	2	‡	‡	‡	‡	‡
Utah	139	39	61	22	#	162	14	86	46	1	164	14	86	52	1
Vermont	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Virginia	145	31	69	23	#	171	9	91	58	2	‡	‡	‡	‡	‡
Washington	135	42	58	17	#	164	12	88	49	1	‡	‡	‡	‡	‡
West Virginia	141	36	64	19	#	158	16	84	40	#	‡	‡	‡	‡	‡
Wisconsin	141	37	63	23	#	166	10	90	52	1	‡	‡	‡	‡	‡
Wyoming	145	32	68	24	#	161	13	87	44	#	‡	‡	‡	‡	‡
Other jurisdictions															
District of Columbia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	159	16	84	40	1

— Not available.
Rounds to zero.
‡ Reporting standards not met. Sample size insufficient to permit a reliable estimate.
[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-11.** Average scores and achievement-level results in NAEP science for fourth-grade public school students, by status as students with disabilities (SD) and state/jurisdiction: 2009

State/jurisdiction	SD					Not SD				
		Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**129**	**50**	**50**	**16**	**#**	**151**	**26**	**74**	**35**	**1**
Alabama	104	70	30	8	#	147	31	69	29	#
Alaska	—	—	—	—	—	—	—	—	—	—
Arizona	115	64	36	11	#	141	36	64	23	#
Arkansas	120	59	41	12	#	149	28	72	31	#
California	105	72	28	11	#	139	40	60	23	1
Colorado	135	43	57	18	#	157	21	79	41	1
Connecticut	135	45	55	21	#	158	19	81	43	1
Delaware	130	51	49	14	#	156	19	81	37	1
Florida	137	40	60	20	#	153	22	78	34	#
Georgia	124	56	44	13	#	146	32	68	29	#
Hawaii	95	80	20	6	#	145	33	67	27	#
Idaho	131	50	50	15	#	156	19	81	37	#
Illinois	127	53	47	16	#	151	27	73	35	1
Indiana	134	43	57	19	#	156	19	81	38	#
Iowa	130	49	51	14	#	161	15	85	45	1
Kansas	—	—	—	—	—	—	—	—	—	—
Kentucky	144	35	65	26	1	163	14	86	48	1
Louisiana	123	59	41	13	#	145	33	67	27	#
Maine	147	29	71	25	#	162	12	88	45	1
Maryland	133	46	54	15	#	152	26	74	35	1
Massachusetts	139	39	61	19	#	164	13	87	50	1
Michigan	133	46	54	19	#	152	25	75	36	1
Minnesota	136	42	58	20	#	162	15	85	46	1
Mississippi	116	63	37	7	#	135	45	55	18	#
Missouri	141	36	64	25	#	159	18	82	42	1
Montana	141	34	66	20	#	162	12	88	45	1
Nebraska	—	—	—	—	—	—	—	—	—	—
Nevada	118	59	41	12	#	143	34	66	25	#
New Hampshire	144	31	69	22	#	167	9	91	53	1
New Jersey	137	41	59	20	#	158	19	81	42	1
New Mexico	124	57	43	13	#	144	34	66	25	#
New York	127	52	48	12	#	152	25	75	34	1
North Carolina	129	52	48	15	#	150	27	73	32	1
North Dakota	148	28	72	30	#	164	11	89	48	1
Ohio	135	44	56	20	#	160	17	83	44	1
Oklahoma	129	49	51	11	#	151	24	76	31	#
Oregon	134	45	55	20	#	153	24	76	36	1
Pennsylvania	130	49	51	18	#	158	20	80	42	1
Rhode Island	126	54	46	13	#	155	21	79	38	#
South Carolina	125	54	46	15	#	153	25	75	36	1
South Dakota	138	40	60	21	#	160	16	84	43	1
Tennessee	127	54	46	17	#	151	27	73	35	#
Texas	128	49	51	13	#	149	29	71	31	1
Utah	134	46	54	21	#	156	20	80	40	1
Vermont	—	—	—	—	—	—	—	—	—	—
Virginia	142	37	63	24	#	165	13	87	49	2
Washington	127	52	48	14	1	154	23	77	37	1
West Virginia	130	49	51	14	#	152	23	77	31	#
Wisconsin	134	45	55	17	#	160	17	83	44	1
Wyoming	140	37	63	18	#	158	17	83	40	#
Other jurisdictions										
District of Columbia	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	142	38	62	21	#	161	14	86	43	1

— Not available.

Rounds to zero.

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

NOTE: The results for students with disabilities are based on students who were assessed and cannot be generalized to the total population of such students. 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-12.** Average scores and achievement-level results in NAEP science for fourth-grade public school students, by status as English language learners (ELL) and state/jurisdiction: 2009

State/jurisdiction	ELL					Not ELL				
		Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**114**	**67**	**33**	**5**	**#**	**153**	**25**	**75**	**35**	**1**
Alabama	‡	‡	‡	‡	‡	144	34	66	28	#
Alaska	—	—	—	—	—	—	—	—	—	—
Arizona	98	84	16	2	#	144	32	68	25	#
Arkansas	127	54	46	8	#	147	30	70	30	#
California	107	74	26	3	#	148	29	71	30	1
Colorado	116	68	32	5	#	159	18	82	43	1
Connecticut	109	70	30	4	#	158	20	80	42	1
Delaware	126	52	48	7	#	154	22	78	35	#
Florida	122	53	47	6	#	153	23	77	34	#
Georgia	114	72	28	2	#	145	33	67	28	#
Hawaii	104	75	25	4	#	144	33	67	27	1
Idaho	109	77	23	2	#	156	19	81	37	#
Illinois	113	65	35	5	#	150	28	72	34	1
Indiana	123	52	48	6	#	154	21	79	36	#
Iowa	127	49	51	11	#	159	18	82	42	1
Kansas	—	—	—	—	—	—	—	—	—	—
Kentucky	‡	‡	‡	‡	‡	161	16	84	45	1
Louisiana	132	45	55	14	#	141	37	63	25	#
Maine	‡	‡	‡	‡	‡	160	14	86	42	1
Maryland	130	51	49	10	#	151	27	73	34	1
Massachusetts	120	60	40	7	#	163	14	86	48	1
Michigan	120	60	40	9	#	151	27	73	35	#
Minnesota	123	59	41	6	#	161	16	84	46	1
Mississippi	‡	‡	‡	‡	‡	133	46	54	17	#
Missouri	‡	‡	‡	‡	‡	157	20	80	41	1
Montana	118	64	36	6	#	161	13	87	44	#
Nebraska	—	—	—	—	—	—	—	—	—	—
Nevada	116	66	34	4	#	147	29	71	28	#
New Hampshire	136	45	55	18	#	164	11	89	48	1
New Jersey	114	71	29	4	#	157	21	79	40	1
New Mexico	109	78	22	2	#	148	29	71	28	#
New York	112	73	27	5	#	150	26	74	32	#
North Carolina	122	64	36	6	#	149	29	71	31	1
North Dakota	‡	‡	‡	‡	‡	162	13	87	46	#
Ohio	134	50	50	19	#	158	20	80	42	1
Oklahoma	113	72	28	4	#	149	25	75	29	#
Oregon	118	65	35	4	#	155	22	78	38	1
Pennsylvania	104	74	26	5	#	155	23	77	39	1
Rhode Island	105	78	22	3	#	153	23	77	36	#
South Carolina	139	37	63	24	#	150	28	72	34	1
South Dakota	‡	‡	‡	‡	‡	158	18	82	41	#
Tennessee	122	58	42	7	#	149	29	71	34	#
Texas	122	59	41	6	#	154	23	77	35	1
Utah	114	66	34	5	#	158	19	81	41	1
Vermont	—	—	—	—	—	—	—	—	—	—
Virginia	143	29	71	20	#	163	15	85	47	1
Washington	101	84	16	1	#	156	20	80	38	1
West Virginia	‡	‡	‡	‡	‡	148	27	73	28	#
Wisconsin	131	50	50	11	#	158	19	81	42	1
Wyoming	‡	‡	‡	‡	‡	157	19	81	38	#
Other jurisdictions										
District of Columbia	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	138	40	60	14	#	160	15	85	42	1

— Not available.
Rounds to zero.
‡ Reporting standards not met. Sample size insufficient to permit a reliable estimate.
[1] Department of Defense Education Activity (overseas and domestic schools).
NOTE: The results for English language learners are based on students who were assessed and cannot be generalized to the total population of such students. 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 assessed in NAEP science, by race/ethnicity, eligibility for free/reduced-price school lunch, and state/jurisdiction: 2009

State/jurisdiction	Race/ethnicity					Eligibility for free/reduced-price school lunch	
	White	Black	Hispanic	Asian/ Pacific Islander	American Indian/ Alaska Native	Eligible	Not eligible
Nation (public)	**56**	**16**	**21**	**5**	**1**	**43**	**56**
Alabama	60	35	3	1	1	50	50
Alaska	—	—	—	—	—	—	—
Arizona	45	5	42	3	5	47	51
Arkansas	69	21	7	1	1	53	47
California	28	6	51	13	1	53	45
Colorado	60	6	28	4	1	35	62
Connecticut	70	11	15	4	#	26	74
Delaware	53	34	9	3	#	38	62
Florida	46	22	26	3	#	48	52
Georgia	47	37	10	3	#	49	50
Hawaii	14	3	3	68	#	41	59
Idaho	81	1	14	2	2	36	62
Illinois	58	19	18	4	#	39	61
Indiana	76	12	7	2	#	37	63
Iowa	86	5	7	2	1	34	66
Kansas	—	—	—	—	—	—	—
Kentucky	85	10	2	1	#	48	51
Louisiana	52	43	2	2	1	62	38
Maine	94	2	1	2	1	35	65
Maryland	47	36	10	6	#	32	68
Massachusetts	73	8	11	6	#	30	70
Michigan	74	18	4	2	1	38	62
Minnesota	79	7	5	6	2	26	73
Mississippi	47	50	2	1	#	67	33
Missouri	80	14	3	2	#	36	64
Montana	85	1	3	1	10	34	66
Nebraska	—	—	—	—	—	—	—
Nevada	44	11	35	8	1	35	64
New Hampshire	92	2	3	2	#	20	77
New Jersey	59	16	17	7	#	27	71
New Mexico	29	3	58	1	9	63	35
New York	54	19	20	7	#	44	52
North Carolina	55	28	10	2	1	44	55
North Dakota	88	1	2	1	8	29	71
Ohio	78	15	2	1	#	35	65
Oklahoma	59	10	11	2	19	49	51
Oregon	72	2	16	5	2	41	57
Pennsylvania	77	13	6	3	#	33	67
Rhode Island	71	8	17	3	1	37	63
South Carolina	54	39	5	1	#	52	48
South Dakota	84	2	2	1	11	32	68
Tennessee	70	25	4	1	#	44	56
Texas	37	14	45	4	#	52	47
Utah	80	1	14	3	1	27	64
Vermont	—	—	—	—	—	—	—
Virginia	59	26	8	6	#	32	68
Washington	68	5	15	8	3	37	63
West Virginia	93	5	1	1	#	52	48
Wisconsin	79	10	7	4	1	31	65
Wyoming	84	1	10	1	3	29	71
Other jurisdictions							
District of Columbia	—	—	—	—	—	—	—
DoDEA[1]	46	16	16	8	1	#	#

— Not available.

Rounds to zero.

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

NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Results are not shown for students whose race/ethnicity was unclassified and for students whose eligibility status for free/reduced-price school lunch was not available.

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.** Average scores and achievement-level results in NAEP science for eighth-grade public school students, by race/ethnicity and state/jurisdiction: 2009

State/jurisdiction	White					Black					Hispanic				
		Percentage of students					Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**161**	**23**	**77**	**41**	**2**	**125**	**68**	**32**	**8**	**#**	**131**	**59**	**41**	**12**	**#**
Alabama	152	32	68	28	1	115	77	23	4	#	129	66	34	10	#
Alaska	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Arizona	157	26	74	35	1	126	63	37	8	#	127	64	36	10	#
Arkansas	154	29	71	32	1	111	81	19	4	#	134	54	46	12	#
California	157	29	71	38	2	122	69	31	8	#	122	67	33	7	#
Colorado	166	17	83	48	2	135	56	44	13	#	137	52	48	14	#
Connecticut	164	18	82	44	2	126	65	35	9	#	128	65	35	9	#
Delaware	159	23	77	35	1	133	59	41	10	#	141	51	49	16	#
Florida	158	28	72	36	2	126	68	32	7	#	139	49	51	17	#
Georgia	161	25	75	41	3	129	64	36	10	#	137	49	51	15	#
Hawaii	153	32	68	30	#	133	55	45	15	#	148	38	62	25	1
Idaho	162	23	77	42	2	‡	‡	‡	‡	‡	137	53	47	14	#
Illinois	162	21	79	41	2	118	77	23	4	#	131	60	40	10	#
Indiana	159	25	75	38	2	126	66	34	8	#	135	54	46	16	#
Iowa	160	24	76	38	1	127	62	38	9	#	133	55	45	12	#
Kansas	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Kentucky	159	25	75	36	2	137	54	46	16	#	145	42	58	24	2
Louisiana	155	30	70	31	1	120	73	27	5	#	‡	‡	‡	‡	‡
Maine	159	26	74	36	1	126	67	33	11	#	‡	‡	‡	‡	‡
Maryland	164	20	80	44	2	127	66	34	8	#	136	54	46	12	1
Massachusetts	167	18	82	48	4	132	58	42	13	1	131	57	43	14	#
Michigan	162	23	77	42	3	121	73	27	6	#	139	50	50	20	1
Minnesota	166	17	83	46	2	128	64	36	11	#	132	60	40	14	#
Mississippi	150	35	65	27	#	114	81	19	3	#	‡	‡	‡	‡	‡
Missouri	161	23	77	40	2	129	62	38	9	#	150	38	62	29	2
Montana	166	17	83	46	2	‡	‡	‡	‡	‡	155	29	71	33	1
Nebraska	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Nevada	153	32	68	30	1	127	66	34	9	#	129	61	39	10	#
New Hampshire	161	22	78	40	2	‡	‡	‡	‡	‡	131	59	41	12	#
New Jersey	165	17	83	44	2	127	65	35	8	#	138	51	49	13	#
New Mexico	163	19	81	39	2	‡	‡	‡	‡	‡	135	56	44	14	#
New York	164	20	80	45	3	123	70	30	7	#	125	66	34	11	#
North Carolina	158	27	73	36	2	121	75	25	5	#	132	59	41	11	#
North Dakota	166	16	84	46	1	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Ohio	164	18	82	43	2	126	68	32	6	#	140	52	48	18	#
Oklahoma	155	30	70	33	1	124	68	32	7	#	127	63	37	9	#
Oregon	160	25	75	40	2	135	52	48	13	#	130	60	40	12	#
Pennsylvania	162	22	78	42	2	123	70	30	7	#	121	73	27	7	#
Rhode Island	155	30	70	33	2	125	68	32	8	#	119	74	26	5	#
South Carolina	158	26	74	35	2	124	70	30	6	#	129	58	42	13	#
South Dakota	165	17	83	45	2	141	45	55	24	1	135	55	45	10	1
Tennessee	157	28	72	36	2	122	70	30	6	#	139	52	48	21	1
Texas	167	17	83	47	3	133	57	43	13	#	141	47	53	17	#
Utah	164	21	79	45	2	‡	‡	‡	‡	‡	129	60	40	13	#
Vermont	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Virginia	166	18	82	48	2	135	57	43	11	#	144	41	59	20	#
Washington	161	23	77	41	2	135	54	46	16	#	132	57	43	9	#
West Virginia	146	41	59	23	1	127	65	35	10	#	‡	‡	‡	‡	‡
Wisconsin	165	18	82	44	2	120	74	26	6	#	134	54	46	15	#
Wyoming	162	21	79	40	2	‡	‡	‡	‡	‡	137	51	49	12	#
Other jurisdictions															
District of Columbia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	170	13	87	53	3	144	45	55	14	#	155	28	72	28	1

See notes at end of table.

Table **A-14.** Average scores and achievement-level results in NAEP science for eighth-grade public school students, by race/ethnicity and state/jurisdiction: 2009—Continued

State/jurisdiction	Asian/Pacific Islander					American Indian/Alaska Native				
		Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**159**	**28**	**72**	**40**	**3**	**138**	**51**	**49**	**18**	**#**
Alabama	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Alaska	—	—	—	—	—	—	—	—	—	—
Arizona	159	32	68	43	5	126	65	35	7	#
Arkansas	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
California	154	31	69	34	2	‡	‡	‡	‡	‡
Colorado	161	21	79	41	2	‡	‡	‡	‡	‡
Connecticut	169	22	78	52	7	‡	‡	‡	‡	‡
Delaware	160	25	75	40	3	‡	‡	‡	‡	‡
Florida	163	21	79	40	4	‡	‡	‡	‡	‡
Georgia	172	15	85	58	6	‡	‡	‡	‡	‡
Hawaii	136	54	46	14	#	‡	‡	‡	‡	‡
Idaho	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Illinois	167	20	80	48	5	‡	‡	‡	‡	‡
Indiana	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Iowa	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Kansas	—	—	—	—	—	—	—	—	—	—
Kentucky	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Louisiana	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Maine	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Maryland	169	14	86	51	5	‡	‡	‡	‡	‡
Massachusetts	168	22	78	49	10	‡	‡	‡	‡	‡
Michigan	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Minnesota	141	50	50	23	2	141	44	56	14	#
Mississippi	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Missouri	167	22	78	48	7	‡	‡	‡	‡	‡
Montana	‡	‡	‡	‡	‡	138	51	49	18	#
Nebraska	—	—	—	—	—	—	—	—	—	—
Nevada	148	37	63	26	1	‡	‡	‡	‡	‡
New Hampshire	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
New Jersey	174	10	90	58	4	‡	‡	‡	‡	‡
New Mexico	‡	‡	‡	‡	‡	130	64	36	10	#
New York	161	25	75	43	4	‡	‡	‡	‡	‡
North Carolina	165	21	79	44	5	119	70	30	6	#
North Dakota	‡	‡	‡	‡	‡	135	56	44	11	#
Ohio	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Oklahoma	‡	‡	‡	‡	‡	142	47	53	19	#
Oregon	160	26	74	45	2	153	34	66	35	#
Pennsylvania	159	26	74	41	2	‡	‡	‡	‡	‡
Rhode Island	146	41	59	21	2	‡	‡	‡	‡	‡
South Carolina	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
South Dakota	‡	‡	‡	‡	‡	137	52	48	16	#
Tennessee	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Texas	170	18	82	55	5	‡	‡	‡	‡	‡
Utah	147	43	57	31	2	130	59	41	10	#
Vermont	—	—	—	—	—	—	—	—	—	—
Virginia	168	17	83	49	4	‡	‡	‡	‡	‡
Washington	157	31	69	39	3	142	47	53	20	#
West Virginia	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Wisconsin	152	35	65	28	2	‡	‡	‡	‡	‡
Wyoming	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
Other jurisdictions										
District of Columbia	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	160	23	77	41	1	‡	‡	‡	‡	‡

— Not available.
Rounds to zero.
‡ Reporting standards not met. Sample size insufficient to permit a reliable estimate.
[1] Department of Defense Education Activity (overseas and domestic schools).
NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. Results are not shown for students whose race/ethnicity was unclassified. 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.** Average scores and achievement-level results in NAEP science for eighth-grade public school students, by gender and state/jurisdiction: 2009

State/jurisdiction	Male					Female				
		Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**151**	**36**	**64**	**32**	**2**	**147**	**40**	**60**	**26**	**1**
Alabama	142	46	54	24	1	136	52	48	15	#
Alaska	—	—	—	—	—	—	—	—	—	—
Arizona	143	44	56	26	1	139	49	51	18	#
Arkansas	145	41	59	28	1	142	44	56	20	#
California	138	50	50	22	1	135	53	47	17	1
Colorado	158	28	72	39	2	153	32	68	32	1
Connecticut	157	29	71	38	2	153	32	68	32	1
Delaware	151	35	65	29	1	146	41	59	21	#
Florida	148	41	59	28	2	144	44	56	21	1
Georgia	150	39	61	30	2	144	45	55	24	1
Hawaii	140	47	53	19	1	137	52	48	15	#
Idaho	160	26	74	42	3	155	29	71	33	1
Illinois	150	36	64	32	2	146	42	58	25	1
Indiana	155	30	70	35	2	150	35	65	28	1
Iowa	158	26	74	38	2	154	30	70	31	#
Kansas	—	—	—	—	—	—	—	—	—	—
Kentucky	159	26	74	37	2	154	31	69	30	1
Louisiana	141	47	53	22	1	138	51	49	18	#
Maine	160	25	75	38	2	156	28	72	33	1
Maryland	150	38	62	32	2	146	41	59	25	1
Massachusetts	162	26	74	44	5	158	26	74	38	2
Michigan	155	32	68	38	2	152	35	65	31	2
Minnesota	161	25	75	43	3	157	26	74	36	1
Mississippi	134	56	44	17	#	130	61	39	13	#
Missouri	158	28	72	38	2	154	31	69	33	1
Montana	165	18	82	47	2	159	24	76	38	1
Nebraska	—	—	—	—	—	—	—	—	—	—
Nevada	142	45	55	21	1	140	48	52	19	#
New Hampshire	164	21	79	44	2	157	25	75	33	1
New Jersey	156	29	71	37	2	153	32	68	31	1
New Mexico	147	40	60	24	1	140	50	50	18	#
New York	150	38	62	34	2	147	40	60	27	1
North Carolina	145	43	57	25	2	143	45	55	22	1
North Dakota	166	17	83	47	2	159	23	77	37	1
Ohio	161	24	76	41	3	154	29	71	32	1
Oklahoma	149	37	63	28	1	144	43	57	22	#
Oregon	156	29	71	37	2	152	34	66	32	1
Pennsylvania	157	30	70	39	2	151	35	65	31	1
Rhode Island	149	38	62	30	1	143	45	55	22	1
South Carolina	144	44	56	24	1	142	46	54	22	1
South Dakota	164	20	80	45	2	157	25	75	35	1
Tennessee	149	37	63	32	2	146	42	58	24	1
Texas	152	33	67	32	2	148	39	61	26	1
Utah	159	27	73	43	3	156	28	72	36	1
Vermont	—	—	—	—	—	—	—	—	—	—
Virginia	157	29	71	39	2	155	30	70	33	1
Washington	156	30	70	38	2	153	32	68	30	1
West Virginia	148	39	61	26	1	142	46	54	18	#
Wisconsin	160	25	75	43	2	155	29	71	33	1
Wyoming	162	22	78	42	2	154	29	71	30	1
Other jurisdictions										
District of Columbia	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	164	21	79	44	2	159	24	76	36	1

— Not available.

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-16.** Average scores and achievement-level results in NAEP science for eighth-grade public school students, by eligibility for free/reduced-price school lunch and state/jurisdiction: 2009

State/jurisdiction	Eligible					Not eligible					Information not available				
		Percentage of students					Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**133**	**57**	**43**	**14**	**#**	**161**	**24**	**76**	**41**	**2**	**150**	**36**	**64**	**32**	**1**
Alabama	125	65	35	9	#	152	33	67	30	1	‡	‡	‡	‡	‡
Alaska	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Arizona	127	64	36	10	#	154	31	69	32	1	‡	‡	‡	‡	‡
Arkansas	131	57	43	14	#	158	25	75	35	1	‡	‡	‡	‡	‡
California	122	67	33	8	#	153	33	67	34	2	137	53	47	17	#
Colorado	140	49	51	18	#	164	20	80	45	2	169	19	81	50	5
Connecticut	130	61	39	12	#	164	20	80	44	2	‡	‡	‡	‡	‡
Delaware	135	55	45	12	#	157	27	73	33	1	‡	‡	‡	‡	‡
Florida	135	56	44	13	#	156	30	70	35	2	‡	‡	‡	‡	‡
Georgia	133	60	40	13	#	161	25	75	41	3	‡	‡	‡	‡	‡
Hawaii	127	64	36	9	#	147	40	60	23	#	‡	‡	‡	‡	‡
Idaho	146	41	59	23	1	164	20	80	45	3	‡	‡	‡	‡	‡
Illinois	127	65	35	9	#	161	22	78	41	2	‡	‡	‡	‡	‡
Indiana	136	53	47	17	#	162	21	79	41	2	‡	‡	‡	‡	‡
Iowa	142	45	55	20	#	163	20	80	42	2	‡	‡	‡	‡	‡
Kansas	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Kentucky	147	40	60	23	1	165	18	82	44	2	‡	‡	‡	‡	‡
Louisiana	129	62	38	11	#	156	28	72	35	1	‡	‡	‡	‡	‡
Maine	148	38	62	22	#	163	20	80	42	2	‡	‡	‡	‡	‡
Maryland	129	63	37	9	#	157	29	71	37	2	‡	‡	‡	‡	‡
Massachusetts	137	51	49	17	#	169	16	84	51	5	‡	‡	‡	‡	‡
Michigan	138	51	49	20	1	163	23	77	43	3	‡	‡	‡	‡	‡
Minnesota	140	47	53	19	1	166	18	82	47	3	‡	‡	‡	‡	‡
Mississippi	122	71	29	7	#	152	34	66	30	1	‡	‡	‡	‡	‡
Missouri	142	46	54	19	#	165	20	80	45	3	‡	‡	‡	‡	‡
Montana	151	35	65	28	1	168	14	86	50	2	‡	‡	‡	‡	‡
Nebraska	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Nevada	129	61	39	9	#	148	38	62	26	1	‡	‡	‡	‡	‡
New Hampshire	144	42	58	21	#	164	18	82	43	2	168	15	85	50	2
New Jersey	132	59	41	12	#	163	20	80	42	2	‡	‡	‡	‡	‡
New Mexico	134	57	43	13	#	158	25	75	35	2	‡	‡	‡	‡	‡
New York	131	60	40	13	#	163	21	79	45	3	153	34	66	40	1
North Carolina	129	63	37	10	#	156	29	71	35	2	‡	‡	‡	‡	‡
North Dakota	151	34	66	28	1	167	14	86	48	2	‡	‡	‡	‡	‡
Ohio	142	45	55	20	#	166	17	83	46	3	‡	‡	‡	‡	‡
Oklahoma	137	51	49	17	#	155	29	71	33	1	‡	‡	‡	‡	‡
Oregon	141	47	53	20	1	164	20	80	46	2	‡	‡	‡	‡	‡
Pennsylvania	133	57	43	14	#	165	19	81	45	2	‡	‡	‡	‡	‡
Rhode Island	127	64	36	9	#	157	27	73	36	2	‡	‡	‡	‡	‡
South Carolina	129	62	38	11	#	158	27	73	36	2	‡	‡	‡	‡	‡
South Dakota	148	38	62	25	1	167	16	84	48	2	‡	‡	‡	‡	‡
Tennessee	133	56	44	14	#	159	26	74	39	3	‡	‡	‡	‡	‡
Texas	140	48	52	17	#	162	23	77	43	3	‡	‡	‡	‡	‡
Utah	142	45	55	24	1	163	21	79	45	2	163	23	77	42	3
Vermont	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Virginia	141	48	52	17	#	163	22	78	45	2	‡	‡	‡	‡	‡
Washington	139	50	50	18	#	164	20	80	44	2	‡	‡	‡	‡	‡
West Virginia	136	54	46	14	#	155	30	70	31	1	‡	‡	‡	‡	‡
Wisconsin	139	49	51	18	#	166	16	84	47	2	158	27	73	36	2
Wyoming	147	38	62	23	#	163	21	79	41	2	‡	‡	‡	‡	‡
Other jurisdictions															
District of Columbia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	162	22	78	40	2

— Not available.
Rounds to zero.
‡ Reporting standards not met. Sample size insufficient to permit a reliable estimate.
[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.** Average scores and achievement-level results in NAEP science for eighth-grade public school students, by status as students with disabilities (SD) and state/jurisdiction: 2009

State/jurisdiction	SD					Not SD				
		Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**122**	**67**	**33**	**11**	**#**	**152**	**34**	**66**	**31**	**2**
Alabama	98	84	16	4	#	143	46	54	21	1
Alaska	—	—	—	—	—	—	—	—	—	—
Arizona	105	81	19	5	#	145	43	57	24	1
Arkansas	106	79	21	6	#	148	38	62	27	1
California	97	86	14	5	1	140	49	51	21	1
Colorado	131	59	41	14	1	158	27	73	38	2
Connecticut	130	59	41	15	#	158	27	73	38	2
Delaware	124	69	31	8	#	153	33	67	28	1
Florida	127	66	34	10	1	149	39	61	27	1
Georgia	119	71	29	7	#	150	39	61	29	2
Hawaii	103	85	15	3	#	143	45	55	19	#
Idaho	130	61	39	14	#	160	25	75	39	2
Illinois	120	68	32	12	#	152	35	65	31	1
Indiana	123	66	34	11	#	156	28	72	35	1
Iowa	126	66	34	7	#	161	22	78	39	1
Kansas	—	—	—	—	—	—	—	—	—	—
Kentucky	135	57	43	13	#	159	25	75	36	1
Louisiana	115	72	28	8	#	143	46	54	22	1
Maine	137	56	44	14	#	162	21	79	39	1
Maryland	126	61	39	14	1	151	37	63	30	2
Massachusetts	138	51	49	20	1	164	21	79	45	4
Michigan	126	63	37	12	#	157	30	70	37	2
Minnesota	132	59	41	14	#	162	22	78	43	2
Mississippi	99	88	12	1	#	135	56	44	16	#
Missouri	129	62	38	11	#	160	25	75	39	2
Montana	133	57	43	12	#	166	17	83	46	2
Nebraska	—	—	—	—	—	—	—	—	—	—
Nevada	112	79	21	6	#	144	43	57	22	1
New Hampshire	140	50	50	19	1	165	17	83	43	2
New Jersey	133	56	44	15	#	158	26	74	37	2
New Mexico	116	77	23	9	#	147	41	59	23	1
New York	126	64	36	14	#	152	34	66	34	2
North Carolina	118	71	29	9	1	147	41	59	26	1
North Dakota	140	51	49	17	#	165	16	84	46	2
Ohio	137	49	51	16	#	161	23	77	40	2
Oklahoma	120	71	29	7	#	150	36	64	28	1
Oregon	126	65	35	15	1	158	27	73	37	2
Pennsylvania	129	62	38	12	#	159	26	74	39	2
Rhode Island	117	73	27	7	#	152	35	65	30	1
South Carolina	113	75	25	7	#	147	41	59	25	1
South Dakota	131	60	40	12	#	164	19	81	43	2
Tennessee	107	81	19	6	#	152	35	65	31	2
Texas	122	68	32	9	1	153	33	67	31	2
Utah	124	68	32	9	#	161	24	76	42	2
Vermont	—	—	—	—	—	—	—	—	—	—
Virginia	134	58	42	14	#	159	26	74	39	2
Washington	123	68	32	9	#	158	27	73	37	2
West Virginia	118	74	26	7	#	150	37	63	24	1
Wisconsin	130	57	43	13	#	161	22	78	41	2
Wyoming	135	57	43	13	1	161	21	79	39	2
Other jurisdictions										
District of Columbia	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	132	63	37	10	1	164	19	81	42	2

— Not available.
Rounds to zero.
[1] Department of Defense Education Activity (overseas and domestic schools).
NOTE: The results for students with disabilities are based on students who were assessed and cannot be generalized to the total population of such students. 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.** Average scores and achievement-level results in NAEP science for eighth-grade public school students, by status as English language learners (ELL) and state/jurisdiction: 2009

State/jurisdiction	ELL					Not ELL				
		Percentage of students					Percentage of students			
	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*	Average scale score	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Nation (public)	**103**	**86**	**14**	**2**	**#**	**151**	**35**	**65**	**31**	**1**
Alabama	‡	‡	‡	‡	‡	139	49	51	20	1
Alaska	—	—	—	—	—	—	—	—	—	—
Arizona	86	98	2	#	#	145	43	57	23	1
Arkansas	121	73	27	4	#	144	41	59	25	1
California	98	89	11	2	#	146	43	57	24	1
Colorado	110	84	16	1	#	159	26	74	38	2
Connecticut	100	91	9	2	#	157	29	71	36	2
Delaware	‡	‡	‡	‡	‡	149	37	63	26	1
Florida	106	85	15	2	#	148	41	59	26	1
Georgia	107	82	18	4	#	148	41	59	28	2
Hawaii	101	90	10	1	#	141	47	53	18	#
Idaho	114	81	19	3	#	159	26	74	39	2
Illinois	102	88	12	1	#	149	38	62	29	1
Indiana	120	71	29	12	#	153	32	68	33	1
Iowa	111	77	23	5	#	157	27	73	35	1
Kansas	—	—	—	—	—	—	—	—	—	—
Kentucky	‡	‡	‡	‡	‡	157	28	72	34	1
Louisiana	‡	‡	‡	‡	‡	139	49	51	20	#
Maine	‡	‡	‡	‡	‡	159	26	74	36	1
Maryland	‡	‡	‡	‡	‡	149	39	61	29	2
Massachusetts	93	86	14	3	#	161	25	75	42	4
Michigan	128	61	39	7	#	154	33	67	35	2
Minnesota	113	80	20	3	#	161	23	77	42	2
Mississippi	‡	‡	‡	‡	‡	132	58	42	15	#
Missouri	‡	‡	‡	‡	‡	157	29	71	36	2
Montana	112	86	14	3	#	164	19	81	44	2
Nebraska	—	—	—	—	—	—	—	—	—	—
Nevada	94	95	5	#	#	145	42	58	22	1
New Hampshire	‡	‡	‡	‡	‡	161	22	78	39	2
New Jersey	‡	‡	‡	‡	‡	156	29	71	35	2
New Mexico	109	87	13	1	#	147	40	60	23	1
New York	98	92	8	2	#	151	36	64	32	2
North Carolina	116	77	23	4	#	145	43	57	25	1
North Dakota	‡	‡	‡	‡	‡	163	20	80	43	1
Ohio	136	59	41	23	5	158	26	74	37	2
Oklahoma	98	88	12	2	#	148	39	61	26	1
Oregon	106	88	12	1	#	158	28	72	37	2
Pennsylvania	106	82	18	6	#	155	31	69	36	2
Rhode Island	‡	‡	‡	‡	‡	147	40	60	26	1
South Carolina	114	73	27	5	#	144	44	56	24	1
South Dakota	‡	‡	‡	‡	‡	161	22	78	41	2
Tennessee	‡	‡	‡	‡	‡	148	39	61	28	2
Texas	108	83	17	2	#	153	33	67	31	2
Utah	103	83	17	4	#	160	25	75	41	2
Vermont	—	—	—	—	—	—	—	—	—	—
Virginia	124	66	34	5	#	157	29	71	37	2
Washington	102	86	14	4	#	156	29	71	35	2
West Virginia	‡	‡	‡	‡	‡	145	42	58	22	1
Wisconsin	128	63	37	10	#	159	25	75	39	2
Wyoming	‡	‡	‡	‡	‡	159	25	75	36	1
Other jurisdictions										
District of Columbia	—	—	—	—	—	—	—	—	—	—
DoDEA[1]	‡	‡	‡	‡	‡	163	21	79	41	2

— Not available.
Rounds to zero.
‡ Reporting standards not met. Sample size insufficient to permit a reliable estimate.
[1] Department of Defense Education Activity (overseas and domestic schools).
NOTE: The results for English language learners are based on students who were assessed and cannot be generalized to the total population of such students. 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.

U.S. Department of Education

The National Assessment of Educational Progress (NAEP) is a congressionally authorized project sponsored by the U.S. Department of Education. The National Center for Education Statistics, within the Institute of Education Sciences, administers NAEP. The Commissioner of Education Statistics is responsible by law for carrying out the NAEP project.

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