

Assessment Content at Grade 8

While the assessment at each grade focuses on the Earth, physical, and life sciences, the emphasis on the fields of science and ways of knowing and doing science shifts from grade 4 to grade 8. The content of the grade 8 assessment reflects the targets established by the Governing Board in the assessment framework for that grade.

As compared to grade 4, a larger proportion of the eighth-grade assessment focused on life science (40 percent). Thirty percent was devoted to Earth science and 30 percent to physical science. The framework specifies that 45 percent of the assessment should be devoted to conceptual understanding, 30 percent to scientific investigation, and 25 percent to practical reasoning.

Eighth-graders were presented with two 25-minute sections, each containing 10 to 19 multiple-choice and constructed-response questions. One-half of the eighth-graders assessed spent an additional 30 minutes on a hands-on activity.

An example of one of the hands-on tasks administered in 1996 asked students to estimate the unknown concentration of salt in a solution after plotting the data obtained by observing the levels at which a pencil floats in distilled water and in the same amount of a 25 percent salt solution. Examples of hands-on tasks from the 2005 assessment have not yet been released.

Science Achievement Levels at Grade 8

The science achievement levels at grade 8 represent what eighth-graders know and can do in science at each level. The following are excerpts of the science achievement-level descriptions with the corresponding minimum scores noted in parentheses. The full descriptions can be found at <http://www.nagb.org/pubs/pubs.html>.

Basic (143): Students performing at the *Basic* level demonstrate some of the knowledge and reasoning required for understanding the Earth, physical, and life sciences at a level appropriate to grade 8. For example, they can carry out investigations and obtain information from graphs, diagrams, and tables. In addition, they demonstrate some understanding of concepts relating to the solar system and relative motion. Students at this level also have a beginning understanding of cause-and-effect relationships.

Proficient (170): Students performing at the *Proficient* level demonstrate much of the knowledge and many of the reasoning abilities essential for understanding the Earth, physical, and life sciences at a level appropriate to grade 8. For example, students can interpret graphic information, design simple investigations, and explain such scientific concepts as energy transfer. Students at this level also show an awareness of environmental issues, especially those addressing energy and pollution.

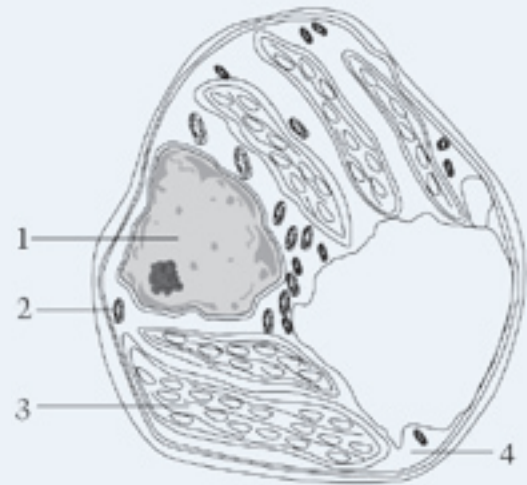
Advanced (208): Students performing at the *Advanced* level demonstrate a solid understanding of the Earth, physical, and life sciences as well as the abilities required to apply their understanding to practical situations at a level appropriate to grade 8. For example, students can perform and critique the design of investigations, relate scientific concepts to each other, explain their reasoning, and discuss the impact of human activities on the environment.

Sample Grade 8 Multiple-Choice Question

The multiple-choice question to the right assesses conceptual understanding in the field of life science.

The percentages below the sample question indicate how students performed on the question. In addition to the overall percentage of students who answered the question correctly, the percentage of the students at each achievement level who answered the question correctly is presented.

As an example of how to interpret these percentages, 52 percent of the students overall answered this question correctly. When only the students in the *Proficient* category are considered, 68 percent answered correctly.



In the picture of a cell, which label indicates the part of the cell that contains most of the cell's genetic material?

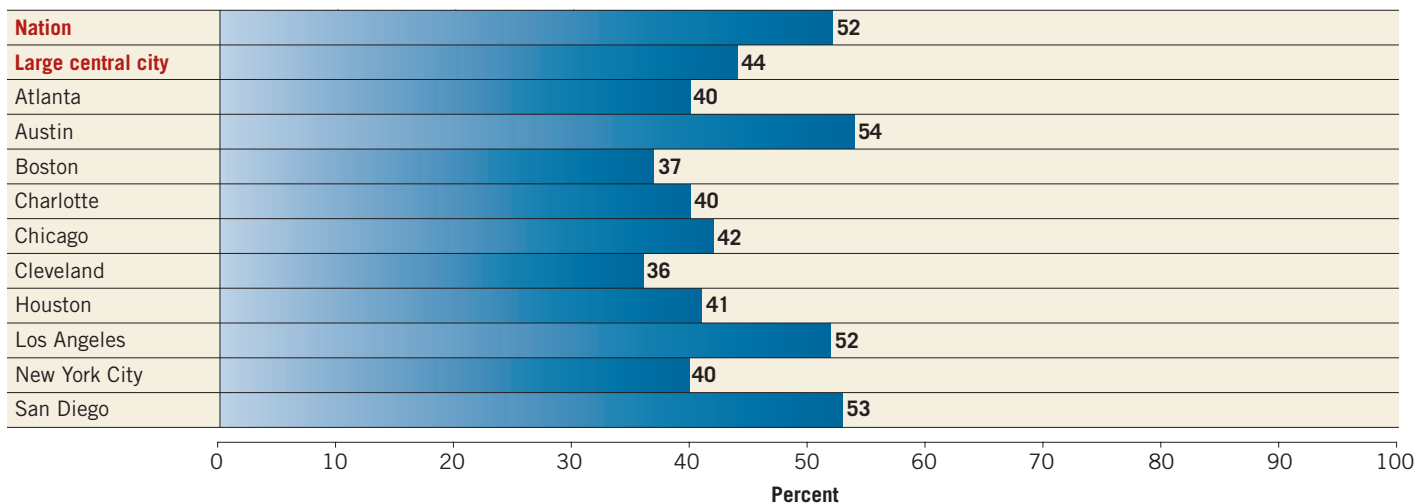
- 1
- 2
- 3
- 4

Percentage correct in nation's public schools in 2005

Overall	Below Basic	At Basic	At Proficient	At Advanced
52	40	53	68	85

Percentage of correct eighth-grade public school student responses on the question above in 2005, by jurisdiction

PERCENTAGE OF CORRECT RESPONSES



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Trial Urban District Science Assessment.

Sample Grade 8 Constructed-Response Question

The following constructed-response question assesses scientific investigation in physical science. Responses were rated using a three-level scoring guide.

Responses that showed an understanding of how to distinguish fresh water from salt water by describing both a method for determining the difference and a result were rated “Complete.” Responses that showed some understanding of the difference between fresh and salt water but provided no practical method for distinguishing them, or gave a correct method but no result, were rated “Partial.” Responses that showed no understanding of how to distinguish between fresh and salt water were rated “Incorrect.” The sample student response below was “Complete.”



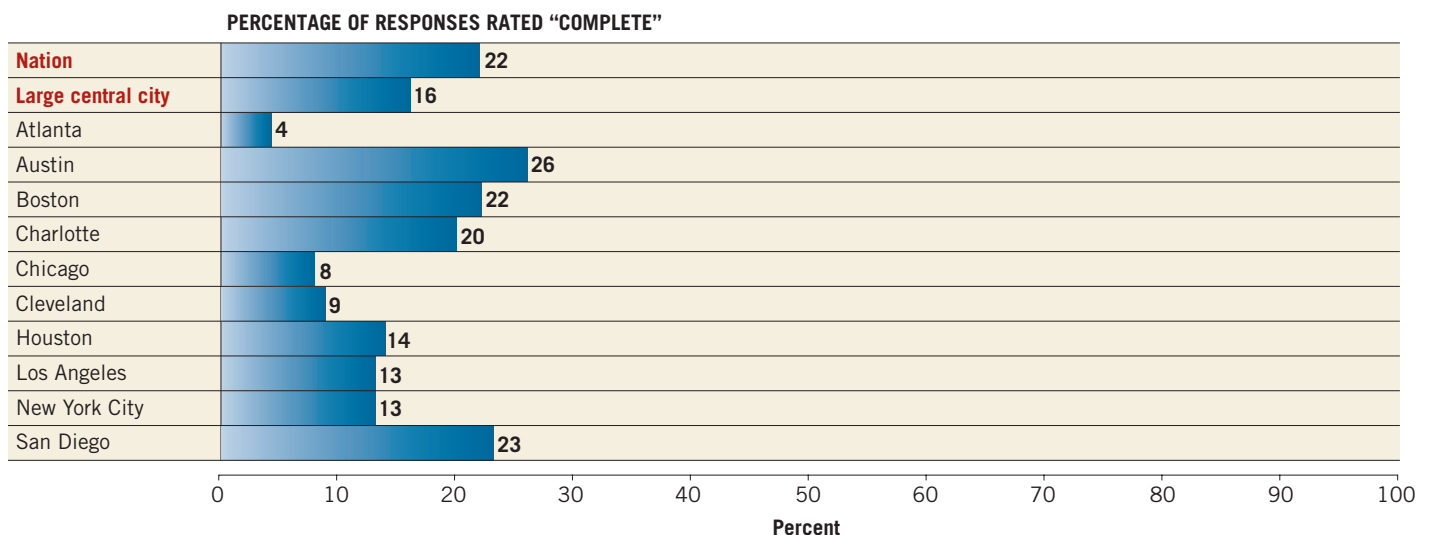
Maria has one glass of pure water and one glass of salt water, which look exactly alike. Explain what Maria could do, without tasting the water, to find out which glass contains the salt water.

Percentage “Complete” in nation’s public schools in 2005

Overall	Below Basic	At Basic	At Proficient	At Advanced
22	7	22	41	68

One thing she could do is evaporate each glass of water. The glass with salt water in it should have salt left in it when the water has evaporated.

Percentage of eighth-grade public school student responses rated “Complete” on the question above in 2005, by jurisdiction



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Trial Urban District Science Assessment.

Sample Grade 8 Constructed-Response Question

The following constructed-response question assesses conceptual understanding in the field of Earth science. A response was rated as “Complete” when the student listed three correct ways that satellites are used. A response was rated as “Partial” when one or two ways were listed. A response was judged unsatisfactory/incorrect when a student did not list any correct ways that satellites are used. The student response below was judged “Complete.” In the scaling process for this question, the “partial” and “complete” responses were added to produce the percentages in the chart.

There are many different kinds of human-made satellites orbiting the Earth. List three things that these satellites are used for.

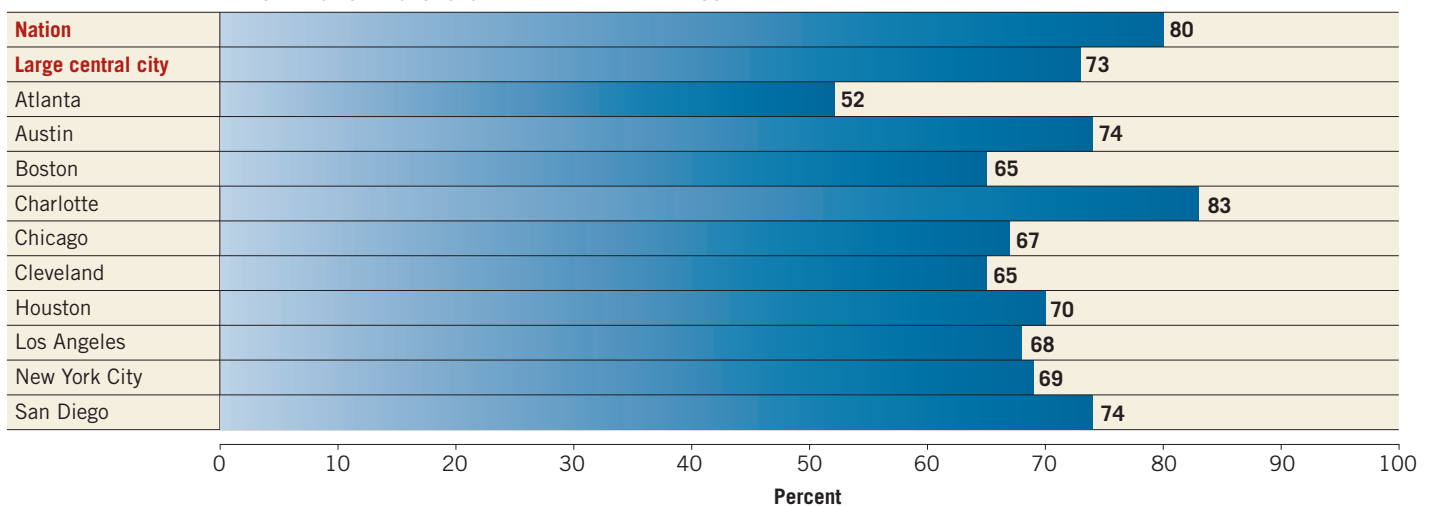
① is for your television, ② weather to tell if there's a storm coming, ③ landsat to help make maps, to show the elevation.

Percentage “Partial” and “Complete” in nation’s public schools in 2005

Overall	Below Basic	At Basic	At Proficient	At Advanced
80	65	88	94	98

Percentage of eighth-grade public school student responses rated “Partial” and “Complete” on the question above in 2005, by jurisdiction

PERCENTAGE OF RESPONSES RATED “PARTIAL” AND “COMPLETE”



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005 Trial Urban District Science Assessment.