

Alberta Provincial Achievement Testing

Assessment
Highlights
2009

GRADE
9

Science



Government
of Alberta ■

Alberta ■

Freedom To Create. Spirit To Achieve.

This document contains assessment highlights from the English 2009 Grade 9 Science Achievement Test.

Assessment highlights provide information about the overall test, the test blueprint, and student performance on the English form of the 2009 Grade 9 Science Achievement Test. Also provided is commentary on areas of strength and weakness in student performance at the *acceptable standard* and the *standard of excellence* on selected items from the 2009 achievement tests. This information is intended for teachers and is best used in conjunction with the multi-year and detailed school reports that are available to schools via the extranet. *Assessment Highlights* reports for all achievement test subjects and grades (except Grades 3, 6, and 9 Français/French Language Arts and Grade 9 Knowledge and Employability courses) will be posted on the Alberta Education website every year in the fall.

Released items from previously secured tests have been made available to teachers in print form. Print versions of released items, which contained approximately 25% of the total number of test items from previously secured tests, were mailed to school administrators each fall from 2004 to 2006.

Every second year, a complete test for all achievement test subjects and grades (except Grades 6 and 9 Social Studies; Grades 3, 6, and 9 Français/French Language Arts; and Grade 9 Knowledge and Employability courses) will be **mailed** to school administrators as an attachment to the *Assessment Highlights* report for that year. In this way, teachers will receive complete forms of achievement tests. The 2008 Grade 9 Science Achievement Test will be released this year.

For further information, contact Sean Wells, Grades 6 and 9 Science Examination Manager, at Sean.Wells@gov.ab.ca, or Jo-Anne Hug, Director, Achievement Testing, at Jo-Anne.Hug@gov.ab.ca at Learner Assessment, or call (780) 427-0010. To call toll-free from outside Edmonton, dial (780) 310-0000.

The Alberta Education Internet address is education.alberta.ca.

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The 2009 Grade 9 Science Achievement Test

This report provides teachers, school administrators, and the public with an overview of the performance of those students who wrote the 2009 Grade 9 Science Achievement Test. It complements the detailed school and jurisdiction reports.

How Many Students Wrote the Test?

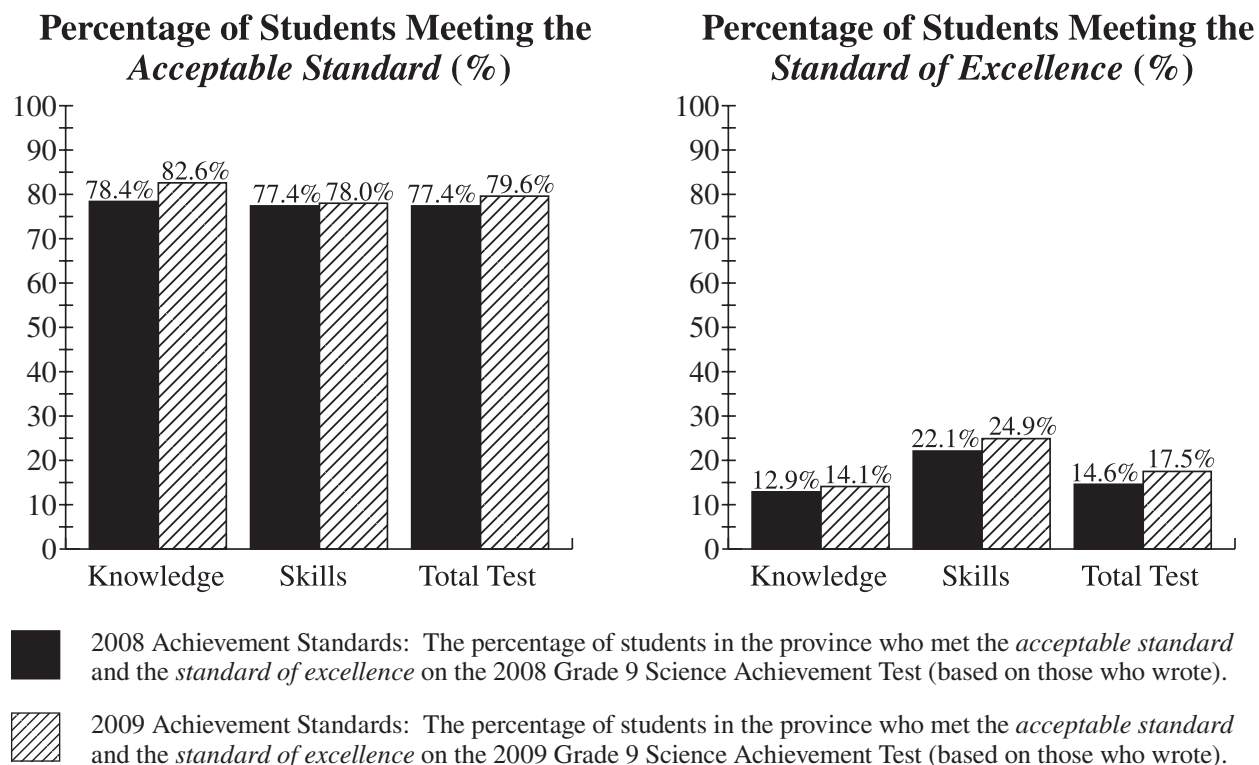
A total of 37 019 students wrote the 2009 Grade 9 Science Achievement Test.

What Was the Test Like?

The 2009 Grade 9 Science Achievement Test consisted of 50 multiple-choice questions and 5 numerical-response questions based on five science topics: Biological Diversity, Matter and Chemical Change, Environmental Chemistry, Electrical Principles and Technologies, and Space Exploration.

How Well Did Students Do?

The percentages of students meeting the *acceptable standard* and the *standard of excellence* in 2009 compared with 2008 are shown in the graphs below. Out of a total possible score of 55, the provincial average was 35.4 (64.3%). The results presented in this report are based on scores achieved by all students who wrote the test except those in French Immersion and Francophone programs (results for these students are reported separately). Detailed provincial assessment results are provided in school and jurisdiction reports.



2009 Test Blueprint and Student Achievement

In 2009, 79.6% of students who wrote the Grade 9 Science Achievement Test achieved the *acceptable standard*, and 17.5% of students who wrote achieved the *standard of excellence*. These results are consistent with previous administrations of the achievement test.

Student achievement on the 2009 Grade 9 Science Achievement Test averaged 35.4 out of a total score of 55 (64.3%).

The blueprint below shows the reporting categories and topics by which 2009 summary data are reported to schools and school authorities, and it shows the provincial average of student achievement by both raw score and percentage.

Topics	Reporting Category		Provincial Student Achievement Average (Raw Score and Percentage)
	Knowledge	Skills	
	Fundamental understanding of both the concepts and the processes of science	Application of science processes and the use of higher-level thinking to solve problems	
Biological Diversity			7.1/11 (64.5%)
Matter and Chemical Change			6.7/11 (60.9%)
Environmental Chemistry			7.0/11 (63.6%)
Electrical Principles and Technologies			7.6/11 (69.0%)
Space Exploration			7.0/11 (63.6%)
Provincial Student Achievement Average Raw Score and Percentage for Students Who Wrote the Test	14.3/22 (65.0%)	21.2/33 (64.2%)	Total Test Raw Score = 55

Commentary on 2009 Student Achievement

The following is a brief summary of the areas where most students experienced difficulties and demonstrated strengths on the 2009 Grade 9 Science Achievement Test. Four sample questions are also provided to highlight some of these areas. These questions are no longer secured and will not be reused on future achievement tests.

Students demonstrated relative strength by being able to:

- Identify an advantage of sexual reproduction
- Apply knowledge of the law of conservation of mass to determine the mass of a reactant
- Identify the statement that best defines the term LD50
- Evaluate the construction of a wet cell and devise a strategy to increase the voltage produced
- Predict the most likely effect of a new technology used for satellite disposal

For **multiple-choice question 31**, a Knowledge question, students had to recognize an example of electrical discharge. Approximately 80.1% of students who met the *acceptable standard* and 96.5% of students who met the *standard of excellence* answered this question correctly.

- 31.** When clothes are removed from a clothes dryer, sparks can be seen as the clothes are separated. These sparks are a result of
- A.** current electricity
 - B.** an electrical discharge
 - C.** a buildup of neutral atoms
 - D.** anti-static sheets absorbing neutral charges

7.3% of students chose A

76.0% of students chose B (correct answer)

10.6% of students chose C

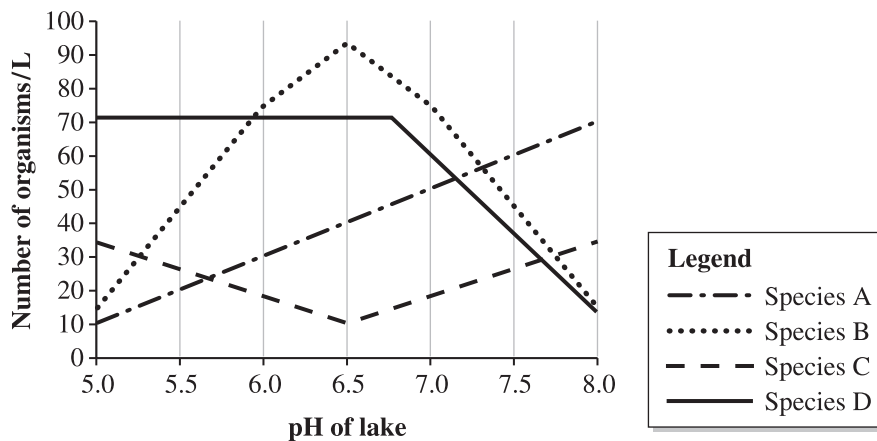
6.1% of students chose D

For **multiple-choice question 29**, a Skills question, students had to analyze a graph and apply knowledge of the pH scale to determine the concentration of a species. Approximately 84.5% of students who met the *acceptable standard* and 98.6% of students who met the *standard of excellence* answered this question correctly.

Use the following information to answer question 29.

Many organisms are sensitive to changes in the pH of their environments. The graph below shows the concentrations of organisms of four different species as a function of the pH of a lake.

Concentration of Organisms of Four Different Species in Water with Varying pH



29. Which species has the **fewest** number of organisms present in lake water that has a neutral pH?
- A. Species A
 - B. Species B
 - C. Species C
 - D. Species D

10.8% of students chose A
 3.3% of students chose B
 80.3% of students chose C (correct answer)
 5.6% of students chose D

Students demonstrated relative difficulty with:

- Analyzing four examples of variation and determining which example demonstrates diversity within a species
- Recognizing which biological process is responsible for determining the number of sperm cells in a chromosome
- Analyzing a graph to determine the effects of acidity on four aquatic species
- Analyzing a Hertzsprung-Russell diagram to determine the relative brightness and temperature of a white dwarf star

For **multiple-choice question 3**, a Skills question, students had to determine the effect of a change in one population on another given a description of an ecosystem. Approximately 52.4% of students who met the *acceptable standard* and 84.0% of students who met the *standard of excellence* answered this question correctly.

Use the following information to answer question 3.

- Wolves prey on elk.
- Elk consume willow shrubs.
- Willow shrubs along stream banks provide shade.
- Bull trout require cool water temperatures.

3. Which of the following changes is **most likely** to occur as a result of a decreased wolf population?
- A. A decreased number of elk
 - B. A decreased number of bull trout
 - C. An increased number of willow shrubs
 - D. An increased number of predators of wolves

22.7% of students chose A

51.6% of students chose B (correct answer)

14.0% of students chose C

11.7% of students chose D

For **multiple-choice question 18**, a Knowledge question, students had to recognize the type of compound that is formed when two non-metallic elements are combined. Approximately 39.4% of students who met the *acceptable standard* and 78.8% of students who met the *standard of excellence* answered this question correctly.

18. When two *i* elements are combined, *ii* compound is formed.

The statement above is completed by the information in row

Row	<i>i</i>	<i>ii</i>
A.	metallic	an ionic
B.	metallic	a molecular
C.	non-metallic	an ionic
D.	non-metallic	a molecular

22.7% of students chose A

20.8% of students chose B

14.5% of students chose C

42.0% of students chose D (correct answer)

Achievement Testing Program Support Documents

The Alberta Education website contains several documents that provide valuable information about various aspects of the achievement testing program. To access these documents, go to the Alberta Education website at education.alberta.ca. From the home page, follow this path: *Teachers > Provincial Testing > Achievement Tests*, and then click on one of the specific links under the *Achievement Tests* heading to access the following documents.

Achievement Testing Program General Information Bulletin

The *General Information Bulletin* is a compilation of several documents produced by Alberta Education and is intended to provide superintendents, principals, and teachers with easy access to information about all aspects of the achievement testing program. Sections in the bulletin contain information pertaining to schedules and significant dates; security and test rules; test administration and directives; test accommodations; field testing; resources and web documents; calculator and computer policies; test marking and results; samples, forms, and letters; and Learner Assessment contacts.

Subject Bulletins

At the beginning of each school year, subject bulletins are posted on the Alberta Education website for all achievement testing subjects for Grades 3, 6, and 9. Each bulletin provides descriptions of assessment standards, test design and blueprinting, and scoring guides (for Grades 3, 6, and 9 English Language Arts and Français/French Language Arts), as well as suggestions for preparing students to write the tests and information about how teachers can participate in test development activities.

Writing Samples

For achievement tests in Grades 3, 6, and 9 English Language Arts and Français/French Language Arts, writing samples have been designed to be used by teachers and students to enhance students' writing and to assess this writing relative to the standards inherent in the scoring guides for the *Part A: Writing* achievement tests. The writing samples documents contain sample responses with scoring rationales, student self-assessment checklists, and scoring categories and criteria for the writing assignments.

Previous Achievement Tests and Answer Keys

All January achievement tests (parts A and B) for Grade 9 semestered students are secured and must be returned to Alberta Education. All May/June achievement tests are secured except Part A of Grades 3, 6, and 9 English Language Arts and Français/French Language Arts. Unused or extra copies of only these Part A tests may be kept at the school after administration. Teachers may use the print versions of released items that have been mailed to schools and/or the tests that are posted on the Alberta Education website.

Parent Guides

Each school year, print versions of the *Parent Guide to Provincial Achievement Testing* for Grades 3, 6, and 9 are mailed to schools and posted on the Alberta Education website. Each guide presents answers to frequently asked questions about the achievement testing program, sample questions for each achievement testing subject, and excerpts from the *Curriculum Handbook for Parents* identifying what students should know and be able to do in each subject by the end of Grades 3, 6, and 9.

Involvement of Teachers

Teachers of Grades 3, 6, and 9 are encouraged to take part in a variety of activities related to the achievement testing program. These activities include item development, test validation, field testing, and marking. In addition, regional consortia can make arrangements for teacher in-service workshops on topics such as Interpreting Achievement Test Results to Improve Student Learning.