

Alberta Provincial Achievement Testing

Assessment
Highlights
2009-2010

GRADE
9

Science

Government
of Alberta ■

Alberta ■

Freedom To Create. Spirit To Achieve.

This document contains assessment highlights from the 2010 Grade 9 Science Achievement Test.

The *Assessment Highlights* document provides information about the overall test, the test blueprint, and student performance on the 2010 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 2010 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 are posted on the Alberta Education website every year in the fall.

The examination statistics that are included in this document represent all writers: both French and English. If you would like to obtain English-only statistics or French-only statistics that apply to your school, please refer to your detailed reports which are available on the Extranet.

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

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

This document was written primarily for:

Students	
Teachers	✓ of Grade 9 Science
Administrators	✓
Parents	
General Audience	
Others	

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The 2010 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 2010 Grade 9 Science Achievement Test. It complements the detailed school and jurisdiction reports.

How Many Students Wrote the Test?

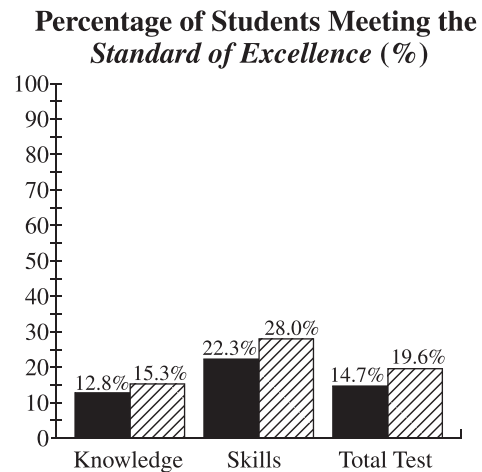
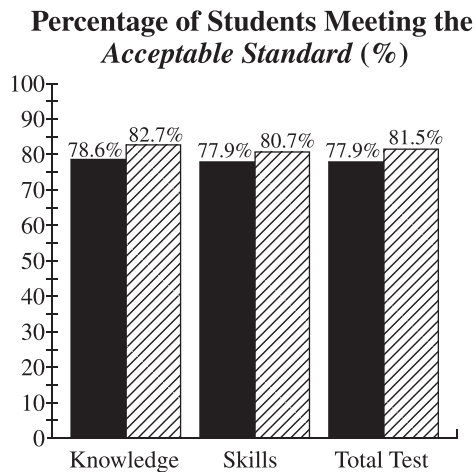
A total of 39 199 students wrote the 2010 Grade 9 Science Achievement Test.


What Was the Test Like?


The 2010 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 2010 compared with 2009 are shown in the graphs below. Out of a total possible score of 55, the provincial average was 36.6 (66.5%). The results presented in this report are based on scores achieved by all students who wrote the test. Detailed provincial assessment results are provided in school and jurisdiction reports.



 2009 Achievement Standards: The percentage of students in the province who met the *acceptable standard* and the *standard of excellence* on the 2009 Grade 9 Science Achievement Test (based on those who wrote).

 2010 Achievement Standards: The percentage of students in the province who met the *acceptable standard* and the *standard of excellence* on the 2010 Grade 9 Science Achievement Test (based on those who wrote).

2010 Test Blueprint and Student Achievement

In 2010, 81.5% of students who wrote the Grade 9 Science Achievement Test achieved the *acceptable standard*, and 19.6% of students who wrote achieved the *standard of excellence*. These results are consistent with previous administrations of the achievement test.

Student achievement on the 2010 Grade 9 Science Achievement Test averaged 36.6 out of a total score of 55 (66.5%).

The blueprint below shows the reporting categories and topics by which 2010 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			7.4/11 (67.2%)
Matter and Chemical Change			6.9/11 (62.7%)
Environmental Chemistry			7.2/11 (65.4%)
Electrical Principles and Technologies			7.6/11 (69.0%)
Space Exploration			7.4/11 (67.2%)
Provincial Student Achievement Average Raw Score and Percentage for Students Who Wrote the Test	16.4/24 (68.3%)	20.2/31 (65.1%)	Total Test 36.6/55 (66.5%)

Commentary on 2010 Student Achievement

The following is a brief summary of the areas where most students demonstrated strengths and experienced difficulties on the 2010 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.

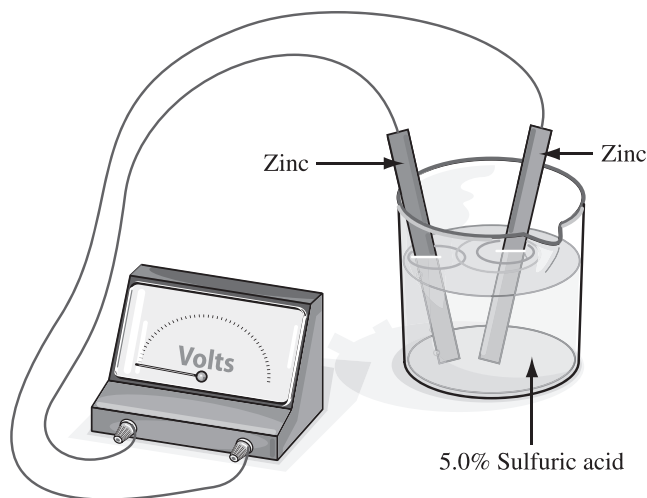
Students demonstrated relative strength by being able to:

- Determine which causes of extinction are related to human activities
- Analyze an ecological event to provide a plausible reason for the death of an organism
- Calculate the power of a simple circuit
- Recognize the use of parallax and triangulation

For **multiple-choice question 32**, a Skills question, students had to evaluate the construction of a wet cell and devise a strategy to increase the voltage produced. Approximately 84.3% of students who met the *acceptable standard* and 97.3% of students who met the *standard of excellence* answered this question correctly.

Use the following information to answer question 32.

After assembling the wet cell shown below, Roger noticed that no electricity was produced.



- 32.** Which change could Roger make to the wet cell to produce electricity?
- A.** Replace one of the zinc electrodes with copper.
 - B.** Increase the sulfuric acid concentration to 7.5%.
 - C.** Replace both of the zinc electrodes with copper.
 - D.** Decrease the sulfuric acid concentration to 2.5%.

81.4% of students chose A (correct answer)

4.2% of students chose B

12.2% of students chose C

2.2% of students chose D

For **multiple-choice question 50**, a Knowledge question, students had to identify an environmental perspective associated with the establishment of a base on the moon. Approximately 90.9% of students who met the *acceptable standard* and 97.8% of students who met the *standard of excellence* answered this question correctly.

Use the following information to answer question 50.

The year 2020 is the target date for the creation of a base on the Moon.



Speaker I

How much will establishing this base on the moon cost?

If nuclear reactors are used for power, then how will the waste be disposed of?



Speaker II

Who gets to determine how the resources on the moon are to be used and distributed?



Speaker III

How can we ensure that the moon base is used for peaceful initiatives?



Speaker IV

50. Which speaker's question reflects an environmental perspective?

- A. Speaker I
- B. Speaker II
- C. Speaker III
- D. Speaker IV

1.4% of students chose A
88.1% of students chose B (correct answer)
7.6% of students chose C
2.9% of students chose D

Students demonstrated relative difficulty with:

- Applying knowledge of the periodic table to identify the number of electrons in a particular element
- Applying knowledge of the periodic table to identify a pair of elements that have common properties
- Predicting future conditions associated with the Sun given data presented in a line graph

For **multiple-choice question 8**, a Skills question, students had to analyze four examples of variation and determine which example demonstrates diversity within a species. Approximately 47.7% of students who met the *acceptable standard* and 84.3% of students who met the *standard of excellence* answered this question correctly.

Use the following information to answer question 8.

Examples of Variation in Alberta

I	Unlike most other owl species, which prefer to nest in trees, burrowing owls nest underground.
II	A bull trout and a brook trout look quite similar, but a bull trout lacks black markings on its fins.
III	Some lodgepole pine trees grow branches near the top; some grow branches along the whole length of the tree.
IV	Grizzly bears can be distinguished from black bears by their broad, round faces and the large humps of muscle on their shoulders.

8. Variation within a species is demonstrated by example

- A.** I
- B.** II
- C.** III
- D.** IV

14.8% of students chose A

15.2% of students chose B

50.3% of students chose C (correct answer)

19.7% of students chose D

For **multiple-choice question 26**, a Knowledge question, students had to recognize the chemicals that are associated with increased algae growth in polluted lakes. Approximately 49.7% of students who met the *acceptable standard* and 82.8% of students who met the *standard of excellence* answered this question correctly.

Use the following information to answer question 26.

Algae growth typically increases in polluted lakes.

- 26.** The chemicals that are **most likely** responsible for increases in algae growth in lakes are
- A.** oxygen and carbon dioxide
 - B.** nitrates and carbon dioxide
 - C.** oxygen and phosphates
 - D.** nitrates and phosphates

11.3% of students chose A

19.5% of students chose B

17.1% of students chose C

52.1% 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 also use the released items and/or the tests that are posted on the Alberta Education website.

Parent Guides

Each school year, versions of the *Parent Guide to Provincial Achievement Testing* for Grades 3, 6, and 9 are 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.