

**Alberta Provincial
Achievement Testing**

**Assessment
Highlights
2015–2016**

**GRADE
9**

Science



Alberta  Government

This document contains assessment highlights from the 2016 Grade 9 Science Achievement Test.

The *Assessment Highlights* document provides information about the overall test, the test blueprint, and student performance on the 2016 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 2016 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 both French and English writers. 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 **Kelty Findlay, Senior Manager, Science 6 and 9**, at Kelty.Findlay@gov.ab.ca; or **Matt Dodd, Grades 6 and 9 Science Examiner**, at Matt.Dodd@gov.ab.ca; or **Nicole Lamarre, Director, Achievement Testing, Student Learning Assessments & Document Production**, at Nicole.Lamarre@gov.ab.ca at the Provincial Assessment Sector; 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	

Copyright 2016, the Crown in Right of Alberta, as represented by the Minister of Education, Alberta Education, Provincial Assessment Sector, 44 Capital Boulevard, 10044 108 Street NW, Edmonton, Alberta T5J 5E6, and its licensors. All rights reserved.

Special permission is granted to **Alberta educators only** to reproduce, for educational purposes and on a non-profit basis, parts of this document that do **not** contain excerpted material.

Excerpted material in this document **shall not** be reproduced without the written permission of the original publisher (see credits, where applicable).

Contents

The 2016 Grade 9 Science Achievement Test.....	1
2016 Test Blueprint and Student Achievement	2
Commentary on 2016 Student Achievement	3
Achievement Testing Program Support Documents.....	8

The 2016 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 2016 Grade 9 Science Achievement Test. It complements the detailed school and jurisdiction reports.

How Many Students Wrote the Test?

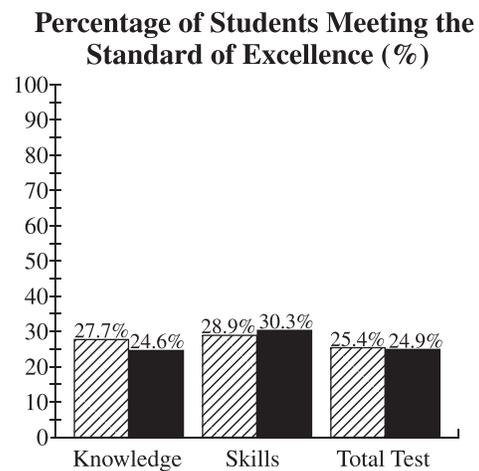
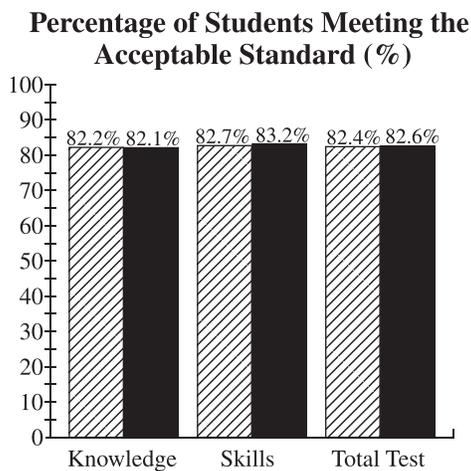
A total of 39 395 students wrote the 2016 Grade 9 Science Achievement Test.

What Was the Test Like?

The 2016 Grade 9 Science Achievement Test consisted of 50 multiple-choice items and 5 numerical-response items 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 2016 compared with 2015 are shown in the graphs below. Out of a total possible score of 55, the provincial average was 36.7 (66.7%). The examination statistics that are included in this document represent both French and English writers. If you would like to obtain English-only or French-only statistics that apply to your school, please refer to the detailed reports that are available on the Extranet.



 2015 Achievement Standards: The percentage of students in the province who met the acceptable standard and the standard of excellence on the 2015 Grade 9 Science Achievement Test (based on those who wrote).

 2016 Achievement Standards: The percentage of students in the province who met the acceptable standard and the standard of excellence on the 2016 Grade 9 Science Achievement Test (based on those who wrote).

2016 Test Blueprint and Student Achievement

In 2016, 82.6% of students who wrote the Grade 9 Science Achievement Test achieved the acceptable standard, and 24.9% of students who wrote achieved the standard of excellence. These results are consistent with previous administrations of the achievement test.

Student achievement on the 2016 Grade 9 Science Achievement Test averaged 36.7 out of a total score of 55 (66.7%).

The blueprint below shows the reporting categories and topics by which 2016 summary data are reported to schools and school authorities, and it shows the provincial average of student achievement.

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			66.6%
Matter and Chemical Change			69.3%
Environmental Chemistry			64.5%
Electrical Principles and Technologies			66.3%
Space Exploration			66.8%
Provincial Student Achievement Average Raw Score and Percentage for Students Who Wrote the Test	65.9%	67.2%	Total Test 66.7%

Commentary on 2016 Student Achievement

The following is a brief summary of the areas where most students demonstrated strengths and experienced difficulties on the 2016 Grade 9 Science Achievement Test. Four sample items are also provided to highlight some of these areas. These items are no longer secured and will not be reused on future achievement tests.

Students demonstrated relative strength by being able to:

- interpret a chemical formula and identify the elements present
- determine if a chemical substance was released in an area when given a graph of a population
- identify the primary reason why astronauts experience changes in muscle mass and bone density while in space
- analyze a pair of population maps and make a conclusion about population changes with respect to extinction and extirpation

For **multiple-choice item 11**, a Skill item, students had to determine the proper method to decrease the rate of a reaction based on a source. Approximately 81.3% of students who met the acceptable standard and 96.3% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 11.

In a science demonstration, a teacher combined low concentrations of fluorescent dye, hydrogen peroxide, and a chemical called CPPO. The resulting solution produced heat and a bright-green glow.

- 11.** If the teacher wanted to slow down the speed of this reaction, the next time the demonstration was carried out, the teacher would
- A.** increase the initial hydrogen peroxide concentration
 - B.** increase the initial fluorescent dye concentration
 - C.** warm one of the initial reactants
 - D.** cool one of the initial reactants

8.1% of students chose A

7.3% of students chose B

5.5% of students chose C

78.9% of students chose D (correct answer)

For **numerical-response question 25**, a Knowledge item, students had to identify characteristics of an acid. Approximately 76.6% of students who met the acceptable standard and 97.5% of students who met the standard of excellence answered this item correctly.

25. *A solution is classified as an acid if it has a pH *i* than 7 and can neutralize *ii* .*

The statement above is completed by the information in row

Row	<i>i</i>	<i>ii</i>
A.	less	other acids
B.	less	bases
C.	greater	other acids
D.	greater	bases

7.8% of students chose A

74.4% of students chose B (correct answer)

5.7% of students chose C

11.9% of students chose D

Students demonstrated relative difficulty when asked to:

- identify the effects of acid rain on an ecosystem
- choose the correct location for four devices in a given circuit diagram
- identify the processes involved through each stage of sexual reproduction
- determine an environmental issue that is mitigated by a technology described in a scenario

For **multiple-choice question 37**, a Knowledge item, students had to explain how circuit breakers are used in the home. Approximately 54.2% of students who met the acceptable standard and 86.2% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 37.

Modern houses incorporate circuit breakers into their electrical systems. These circuit breakers are essential safety mechanisms. Several of the circuit breakers in the panel below have been activated.



- 37.** After the circuit breakers above have been activated, they will
- A.** limit the voltage of electricity entering the home
 - B.** add resistance to the circuits in order to slow down electricity
 - C.** stop the flow of electricity to appliances that draw too much current
 - D.** provide access to additional electricity when several appliances are running at the same time

15.3% of students chose A

13.2% of students chose B

57.4% of students chose C (correct answer)

13.9% of students chose D

For **multiple-choice question 27**, a Skill item, students had to evaluate processes for biological monitoring of an ecosystem's environmental quality. Approximately 42.5% of students who met the acceptable standard and 75.3% of students who met the standard of excellence answered this item correctly.

27. Which of the following actions **most clearly** represents biological monitoring used to determine environmental quality?
- A. The number and diversity of invertebrate species in a pond near a wastewater treatment plant are measured over ten years.
 - B. The pH of a river is measured every two months for five years to track the impacts of a local industry.
 - C. The concentration of mercury in groundwater near a waste-disposal site is tracked over two years.
 - D. The population of geese in a wetland is measured and is compared to the population size ten years ago.

47.7% of students chose A (correct answer)

31.3% of students chose B

6.8% of students chose C

13.9% of students chose D

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](#). Click on one of the specific links 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 directives, guidelines, and procedures; calculator and computer policies; test accommodations; test marking and results; field testing; resources and web documents; forms and samples; and Provincial Assessment Sector contacts.

Subject Bulletins

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

Examples of the Standards for Students' Writing

For achievement tests in grades 6 and 9 English Language Arts and Français/French Language Arts, writing samples are designed for teachers and students to enhance students' writing and to assess this writing relative to the standards inherent in the scoring guides for the achievement tests. The exemplars documents contain sample responses with scoring rationales that relate student work to the scoring categories and scoring criteria.

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 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 tests that are posted on the Alberta Education website.

Parent Guides

Each school year, versions of the [Alberta Provincial Achievement Testing Parent Guide](#) for grades 6 and 9 are posted on the Alberta Education website. Each guide answers frequently asked questions about the achievement testing program and provides descriptions of and sample questions for each achievement test subject.

Involvement of Teachers

Teachers of grades 6 and 9 are encouraged to take part in activities related to the achievement testing program. These activities include item development, test validation, field testing, and marking. In addition, arrangements can be made through the Alberta Regional Professional Development Consortia for teacher in-service workshops on topics such as interpreting achievement test results to improve student learning.