

**Alberta Provincial
Achievement Testing**

**Assessment
Highlights
2016–2017**

**GRADE
9**

Science



Alberta  Government

This document contains assessment highlights from the 2017 Grade 9 Science Achievement Test.

The *Assessment Highlights* document provides information about the overall test, the test blueprint, and student performance on the 2017 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 2017 achievement test. 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 Kely Findlay, Assessment Standards Senior Manager, Achievement Testing Program Grades 6 and 9 Science, at Kely.Findlay@gov.ab.ca; Kristine Gagnon, Grades 6 and 9 Science Examiner, at Kristine.Gagnon@gov.ab.ca; Nicole Lamarre, Director, Student Learning Assessments & Provincial Achievement Testing, 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](http://www.education.alberta.ca) website 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 2017 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 2017 Grade 9 Science Achievement Test. It complements the detailed school and jurisdiction reports.

How Many Students Wrote the Test?

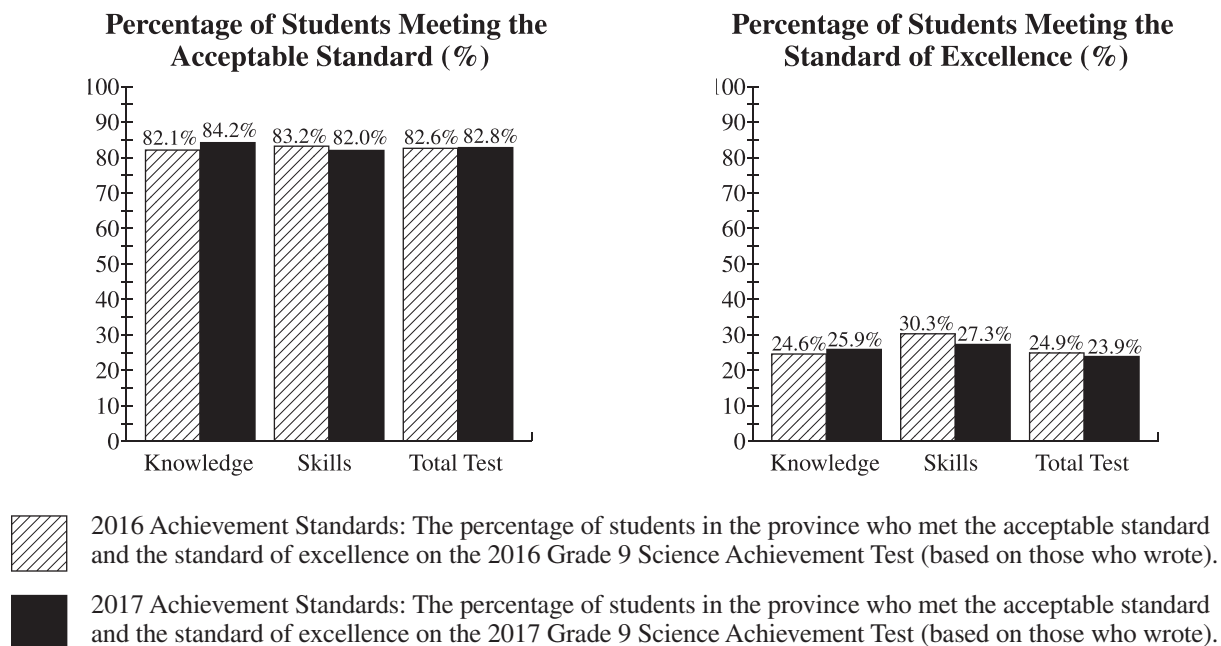
A total of 40 605 students wrote the 2017 Grade 9 Science Achievement Test.

What Was the Test Like?

The 2017 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 2017 compared with 2016 are shown in the graphs below. Out of a total possible score of 55, the provincial average was 36.6 (66.5%). 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.



2017 Test Blueprint and Student Achievement

In 2017, 82.8% of students who wrote the Grade 9 Science Achievement Test achieved the acceptable standard, and 23.9% of students who wrote achieved the standard of excellence. These results are consistent with previous administrations of the achievement test.

Student achievement on the 2017 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 2017 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			7.2/11 (65.5%)
Matter and Chemical Change			7.2/11 (65.5%)
Environmental Chemistry			7.3/11 (66.4%)
Electrical Principles and Technologies			7.4/11 (67.3%)
Space Exploration			7.4/11 (67.3%)
Provincial Student Achievement Average Raw Score and Percentage for Students Who Wrote the Test	14.8/23 (64.3%)	21.8/32 (68.1%)	Total Test 36.6/55 (66.5%)

Commentary on 2017 Student Achievement

The following is a brief summary of the areas where most students demonstrated strengths and experienced difficulties on the 2017 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

- identify the type of reproduction shown in a diagram and determine the genetic content of the offspring
- interpret a chemical formula and identify the elements present
- identify a research question reflected in a flow chart
- measure and evaluate the efficiency of different systems using given information

For **multiple-choice item 44**, a Skills item, students had to identify the primary reason why astronauts experience changes in muscle mass and bone density while in space. Approximately 80.8% of students who met the acceptable standard and 94.5% of students who met the standard of excellence answered this item correctly.

- 44.** Which of the following factors is the **main** reason an astronaut's muscle mass and bone density decrease while in space?
- A.** Astronauts do not need to support body weight in space.
 - B.** Astronauts are restricted to a confined living area in space.
 - C.** It is not possible for astronauts to exercise vigorously in space.
 - D.** It is difficult for astronauts to consume a balanced diet in space.

78.8% of the students chose A (correct answer)

5.6% of the students chose B

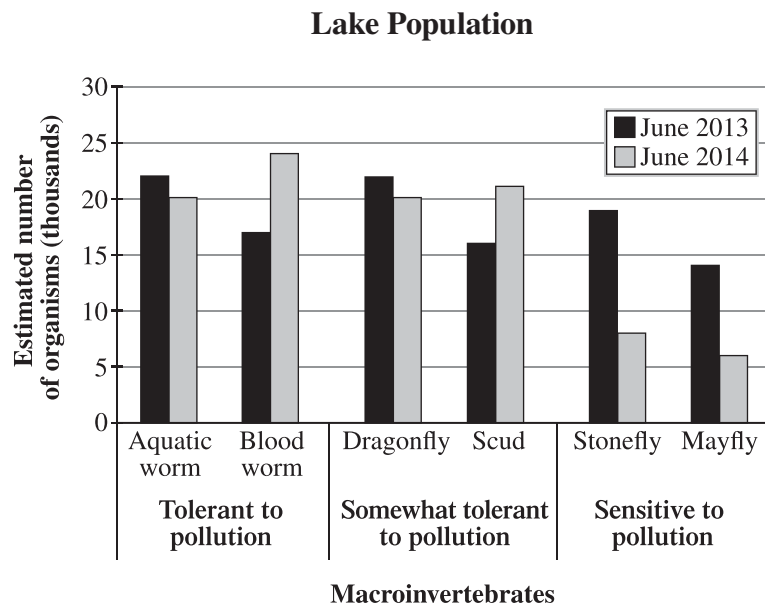
8.0% of the students chose C

7.5% of the students chose D

For **multiple-choice item 24**, a Skills item, students had to determine if a chemical substance was released in an area when given a graph of a population. Approximately 77.7% of students who met the acceptable standard and 94.4% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 24.

In 2009, citizens of Havenfield were worried that local industry might be polluting the lake water used by the town. A one-year water study was commissioned to determine if pollution was being discharged into the lake. The results of the study are summarized in the graph below.



24. Which of the following statements is **best** supported by the information presented in the graph above?
- A. The pollution discharged in the water by industries was beneficial to species survival.
 - B. The increase in the scud population indicates that the lake ecosystem was not affected by pollution.
 - C. The decrease in the stonefly population supports the conclusion that the water became more polluted.
 - D. The decrease in the aquatic worm population supports the conclusion that the water became more polluted.

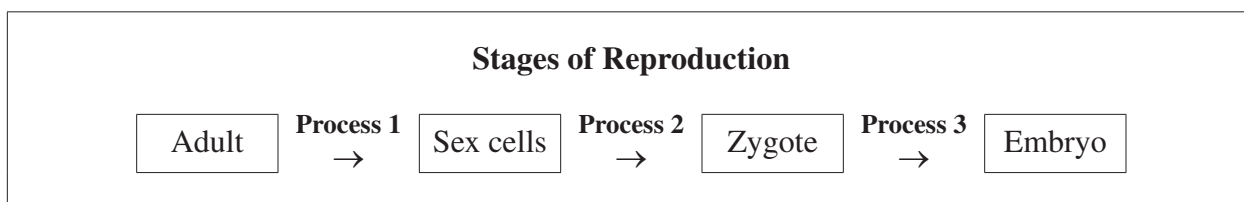
4.9% of the students chose A
 5.9% of the students chose B
 75.9% of the students chose C (correct answer)
 13.2% of the students chose D

Students demonstrated relative difficulty when asked to

- draw a conclusion from information shown in graphs
- determine the word equation for a reaction described in a scenario
- analyze a list of substances and identify which one is an organic substance
- describe the position of a celestial object using altitude and azimuth coordinates

For **multiple-choice question 5**, a Knowledge item, students had to identify the processes involved through each stage of sexual reproduction. Approximately 35.0% of students who met the acceptable standard and 73.9% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 5.



5. Which of the following rows identifies the processes above?

Row	Process 1	Process 2	Process 3
A.	Mitosis	Meiosis	Fertilization
B.	Mitosis	Fertilization	Meiosis
C.	Meiosis	Fertilization	Mitosis
D.	Meiosis	Mitosis	Fertilization

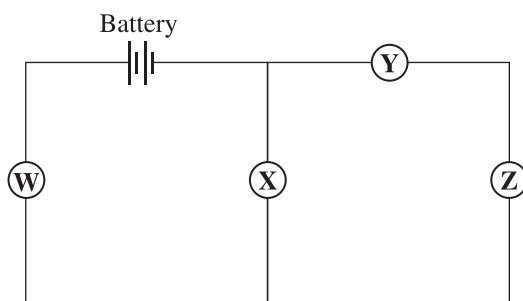
- 15.3% of the students chose A
- 27.1% of the students chose B
- 42.0% of the students chose C (correct answer)
- 15.4% of the students chose D

For **multiple-choice question 33**, a Skills item, students had to construct a circuit that meets specific criteria by choosing the correct location for four devices in a given circuit diagram. Approximately 44.2% of students who met the acceptable standard and 85.3% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 33.

When a switch, a variable resistor, a light bulb, and a motor are connected in a circuit such as the one shown below, the circuit will operate as follows:

- The switch will control both the motor and the light bulb.
- The user will be able to control the brightness of the light bulb.



33. Which of the following rows matches the electrical components to their corresponding locations in the circuit described above?

Row	W	X	Y	Z
A.	Variable resistor	Light bulb	Switch	Motor
B.	Variable resistor	Motor	Switch	Light bulb
C.	Switch	Light bulb	Variable resistor	Motor
D.	Switch	Motor	Variable resistor	Light bulb

16.4% of the students chose A

13.0% of the students chose B

19.6% of the students chose C

50.8% of the students chose D (correct answer)

Provincial Achievement Testing Program Support Documents

The Alberta Education website contains several documents that provide valuable information about various aspects of the provincial 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 provincial 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 provincial 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 provincial 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 provincial achievement tests (parts A and B) for Grade 9 semestered students are secured and must be returned to Alberta Education. All May/June provincial 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 provincial 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 provincial 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 provincial achievement test results to improve student learning.