

Grade 9
Assessment Highlights
Science

Alberta Provincial Achievement Testing
2017–2018

This document contains assessment highlights from the 2018 Grade 9 Science Provincial Achievement Test.

The *Assessment Highlights* document provides information about the overall test, the test blueprint, and student performance on the 2018 Grade 9 Science Provincial 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 2018 provincial 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 Stakeholder File Exchange (SFX). *Assessment Highlights* reports for all provincial 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 SFX.

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The [Alberta Education](http://www.education.alberta.ca) website address is [education.alberta.ca](http://www.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 2018 Grade 9 Science Provincial Achievement Test

This report provides teachers, school administrators, and the public with an overview of the performance of those students who wrote the 2018 Grade 9 Science Provincial Achievement Test. It complements the detailed school and jurisdiction reports.

How Many Students Wrote the Test?

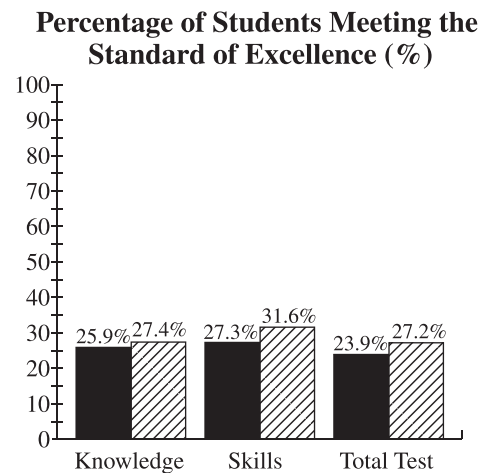
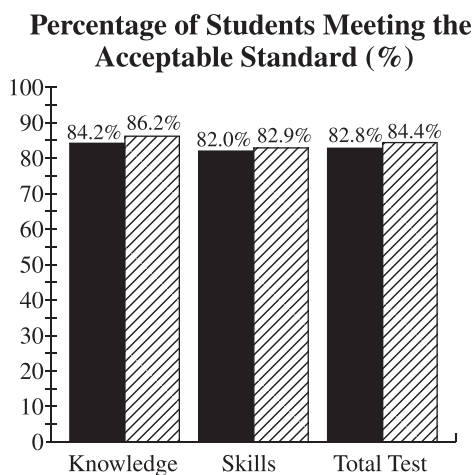
A total of 41 978 students wrote the 2018 Grade 9 Science Provincial Achievement Test.


What Was the Test Like?


The 2018 Grade 9 Science Provincial 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 2018 compared with 2017 are shown in the graphs below. Out of a total possible score of 55, the provincial average was 37.5 (68.2%). 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 Achievement Standards: The percentage of students in the province who met the acceptable standard and the standard of excellence on the 2017 Grade 9 Science Provincial Achievement Test (based on those who wrote).

 2018 Achievement Standards: The percentage of students in the province who met the acceptable standard and the standard of excellence on the 2018 Grade 9 Science Provincial Achievement Test (based on those who wrote).

2018 Test Blueprint and Student Achievement

In 2018, 84.4% of students who wrote the Grade 9 Science Provincial Achievement Test achieved the acceptable standard, and 27.2% of students who wrote achieved the standard of excellence. These results are consistent with previous administrations of the provincial achievement test.

Student achievement on the 2018 Grade 9 Science Provincial Achievement Test averaged 37.5 out of a total score of 55 (68.2%).

The blueprint below shows the reporting categories and topics by which 2018 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			7.5/11 (68.2%)
Matter and Chemical Change			7.3/11 (66.4%)
Environmental Chemistry			7.4/11 (67.3%)
Electrical Principles and Technologies			7.5/11 (68.2%)
Space Exploration			7.8/11 (70.9%)
Provincial Student Achievement Average Raw Score and Percentage for Students Who Wrote the Test	15.0/22 (68.2%)	22.4/33 (67.9%)	Total Test 37.5/55 (68.2%)

Commentary on 2018 Student Achievement

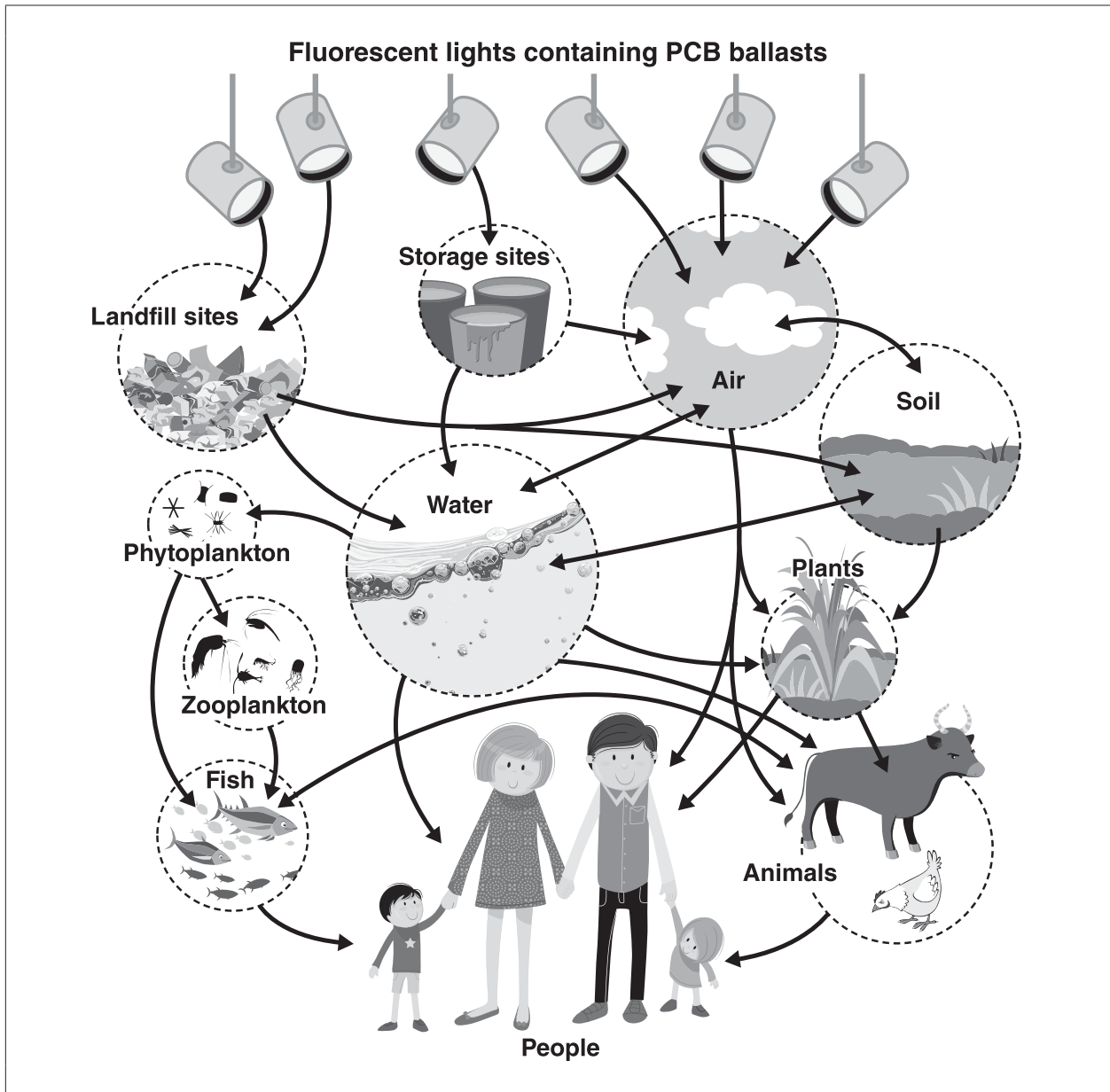
The following is a brief summary of the areas where most students demonstrated strengths and experienced difficulties on the 2018 Grade 9 Science Provincial Achievement Test. Four sample items are also provided to highlight some of these areas. These items are no longer secured and will not be reused on future provincial achievement tests.

Students demonstrated relative strength by being able to

- evaluate a list of organism characteristics and identify the ones related to ecological niche
- identify a description and an example of a mechanical mixture
- analyze experimental data about biodegradation and identify a conclusion supported by those data
- identify the energy transformation given evidence of that transformation

For **multiple-choice question 30**, a Skills item, students had to identify a research question identified in a flow chart. Approximately 80.3% of students who met the acceptable standard and 96.4% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 30.



30. Which of the following research questions **best** reflects the information shown above?

- A. How do PCBs form in the environment?
- B. How do PCBs move through an ecosystem?
- C. What impact do PCBs have on water quality?
- D. What are the various ways that PCBs are stored?

7.9% of the students chose A
78.9% of the students chose B (correct answer)
7.4% of the students chose C
5.7% of the students chose D

For **multiple-choice question 41**, a Knowledge item, students had to identify characteristics of planets. Approximately 76.5% of students who met the acceptable standard and 97.6% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 41.

The first four planets from the Sun are called the inner planets. The four planets that are furthest from the Sun are called outer planets.

41. Which of the tables below lists some of the key characteristics that distinguish outer planets from inner planets in our solar system?

A.

Inner Planets	Outer Planets
Gaseous	Terrestrial
Large	Small
Many natural satellites	Few natural satellites

B.

Inner Planets	Outer Planets
Gaseous	Terrestrial
Small	Large
Many natural satellites	Few natural satellites

C.

Inner Planets	Outer Planets
Terrestrial	Gaseous
Large	Small
Few natural satellites	Many natural satellites

D.

Inner Planets	Outer Planets
Terrestrial	Gaseous
Small	Large
Few natural satellites	Many natural satellites

- 6.7% of the students chose A
- 10.5% of the students chose B
- 7.5% of the students chose C
- 75.2% of the students chose D (correct answer)

Students experienced relative difficulty when asked to

- determine the relative concentrations of three solutions in parts per million or parts per trillion
- determine the word equation for a reaction described in a scenario
- given a context, identify examples of remote sensing
- determine the line of best fit on a scatterplot graph

For **multiple-choice question 21**, a Knowledge item, students had to analyze a list of substances and identify which one is organic. Approximately 41.0% of students who met the acceptable standard and 80.6% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 21.

Chemical Name	Chemical Formula	Common Name
Iron	Fe(s)	Iron
Sucrose	C ₁₂ H ₂₂ O ₁₁ (s)	Table sugar
Sodium chloride	NaCl(s)	Table salt
Magnesium hydroxide	Mg(OH) ₂ (s)	Milk of magnesia

21. Which of the substances listed above is classified as an organic substance?

- A.** Iron
- B.** Sucrose
- C.** Sodium chloride
- D.** Magnesium hydroxide

29.9% of the students chose A

48.6% of the students chose B (correct answer)

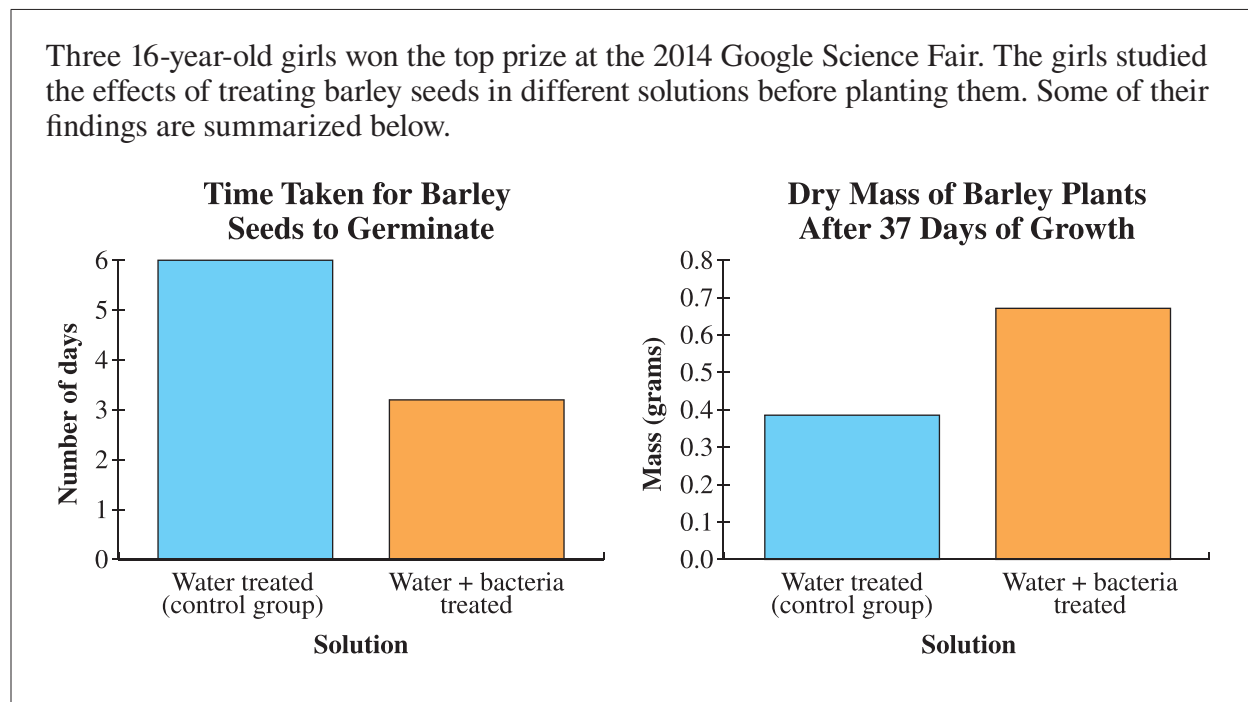
12.3% of the students chose C

9.1% of the students chose D

For **multiple-choice question 10**, a Skills item, students had to draw a conclusion from provided graphs. Approximately 42.7% of students who met the acceptable standard and 71.8% of students who met the standard of excellence answered this item correctly.

Use the following information to answer question 10.

Three 16-year-old girls won the top prize at the 2014 Google Science Fair. The girls studied the effects of treating barley seeds in different solutions before planting them. Some of their findings are summarized below.



- 10.** Compared to control group seeds, the water + bacteria treated seeds produce
- A. slower-germinating and more massive crops
 - B. slower-germinating and less massive crops
 - C. faster-germinating and more massive crops
 - D. faster-germinating and less massive crops

39.8% of the students chose A
5.6% of the students chose B
48.1% of the students chose C (correct answer)
6.4% of the students chose D

Provincial Achievement Testing Program Support Documents

The Alberta Education website contains several documents that provide valuable information about various aspects of the Provincial Achievement Test program. To access these documents, go to the [Alberta Education website](#). Click on one of the specific links to access the following documents.

Provincial 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 Test 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. The exemplars documents contain sample responses with scoring rationales that relate student work to the scoring categories and scoring criteria.

Previous Provincial 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 Test program and provides descriptions of and sample questions for each Provincial Achievement Test subject.

Involvement of Teachers

Teachers of grades 6 and 9 are encouraged to take part in activities related to the Provincial Achievement Test 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.