

**Alberta Provincial  
Achievement Testing**

**Assessment  
Highlights  
2010-2011**

**GRADE  
9**

# Science



**Government  
of Alberta** ■

*Alberta* ■

Freedom To Create. Spirit To Achieve.

This document contains assessment highlights from the 2011 Grade 9 Science Achievement Test.

The *Assessment Highlights* document provides information about the overall test, the test blueprint, and student performance on the 2011 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 2011 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.

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The Alberta Education Internet address is [education.alberta.ca](http://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 2011 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 2011 Grade 9 Science Achievement Test. It complements the detailed school and jurisdiction reports.

### How Many Students Wrote the Test?

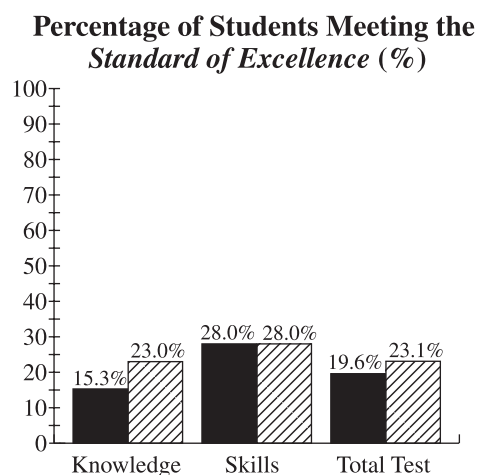
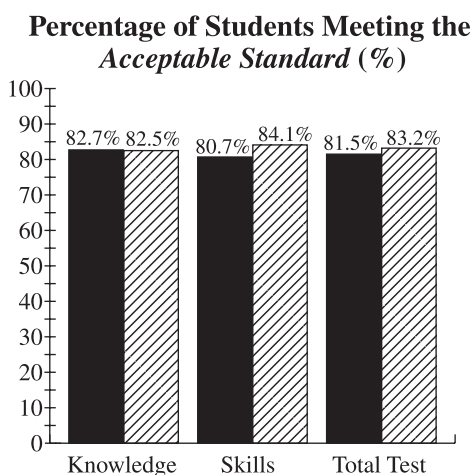
A total of 38 661 students wrote the 2011 Grade 9 Science Achievement Test.


### What Was the Test Like?


The 2011 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 2011 compared with 2010 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.



 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).

 2011 Achievement Standards: The percentage of students in the province who met the *acceptable standard* and the *standard of excellence* on the 2011 Grade 9 Science Achievement Test (based on those who wrote).

## 2011 Test Blueprint and Student Achievement

In 2011, 83.2% of students who wrote the Grade 9 Science Achievement Test achieved the *acceptable standard*, and 23.1% of students who wrote achieved the *standard of excellence*. These results are consistent with previous administrations of the achievement test.

Student achievement on the 2011 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 2011 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			7.3/11 (66.5%)
Matter and Chemical Change			7.3/11 (66.5%)
Environmental Chemistry			7.1/11 (64.6%)
Electrical Principles and Technologies			7.2/11 (65.6%)
Space Exploration			7.6/11 (69.0%)
Provincial Student Achievement Average Raw Score and Percentage for Students Who Wrote the Test	16.4/24 (68.3%)	20.2/31 (65.0%)	Total Test 36.6/55 (66.5%)

## ***Commentary on 2011 Student Achievement***

The following is a brief summary of the areas where most students demonstrated strengths and experienced difficulties on the 2011 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:**

- Examine a molecular model to determine the correct chemical formula
- Identify statements that describe static electricity
- Recognize the use of parallax and triangulation
- Determine which causes of extinction are related to human activities

For **multiple-choice question 2**, a Knowledge question, students had to recognize a benefit of asexual reproduction. Approximately 85.5% of students who met the *acceptable standard* and 98.1% of students who met the *standard of excellence* answered this question correctly.

**2.** A benefit of asexual reproduction is that it

- \***A.** produces many offspring
- B.** increases genetic diversity
- C.** increases species diversity
- D.** requires specialized structures

83.0% of students chose A (correct answer)

8.7% of students chose B

5.8% of students chose C

2.5% of students chose D

For **multiple-choice question 14**, a Skills question, students had to determine the manipulated variable in an experiment. Approximately 83.4% of students who met the *acceptable standard* and 97.5% of students who met the *standard of excellence* answered this question correctly.

*Use the following information to answer question 14.*

A group of students conducts an experiment to determine the effect of temperature on reaction rates. They perform three separate trials in this experiment. In the first trial, they drop an antacid tablet into a beaker of water at a temperature of 40 °C and record how long it takes the tablet to completely dissolve. In the second and third trials, they use the same type and amount of antacid, but they change the temperature of the water to 25 °C for the second trial and 5 °C for the third trial.

- 14.** The manipulated variable in this experiment is the
- A.** type of antacid used
  - B.** amount of antacid used
  - C.** time it takes for the reaction to occur
  - \*D.** temperature at which the reaction occurs

3.4% of students chose A

5.9% of students chose B

8.8% of students chose C

81.9% of students chose D (correct answer)

**Students demonstrated relative difficulty with:**

- Interpreting which sexual reproduction stage will have half the number of chromosomes
- Identifying a correctly named formula
- Determining the characteristics of a base and its reaction with an indicator

For **multiple-choice question 3**, a Skills question, students had to interpret the dependencies among three species. Approximately 50.2% of students who met the *acceptable standard* and 67.7% of students who met the *standard of excellence* answered this question correctly.

*Use the following information to answer question 3.*

**Information About Army Cutworm Larvae**

- Army cutworm larvae eat the foliage of many commercial crops (e.g., wheat, alfalfa).
- Army cutworm larvae feed from April to the end of May, at which time they develop into moths.
- A tiny wasp (*Copidosoma*) parasitizes army cutworm larvae by laying a single egg in a larva.
- Army cutworm larvae that are parasitized remain in the larval stage longer than those that are not parasitized.

3. If the population of *Copidosoma* is large, then the quality of wheat crops will
- A. increase, because there will be fewer larvae to feed on the crops
  - B. decrease, because there will be fewer larvae to feed on the crops
  - C. increase, because larvae will feed on the crops for a longer time
  - \*D. decrease, because larvae will feed on the crops for a longer time

32.2% of students chose A

8.6% of students chose B

7.1% of students chose C

52.1% of students chose D (correct answer)

For **multiple-choice question 23**, a Skills question, students had to infer the resulting oxygen concentration and variety of organisms in water with given characteristics. Approximately 55.4% of students who met the *acceptable standard* and 79.0% of students who met the *standard of excellence* answered this question correctly.

*Use the following information to answer question 23.*

Some electric power plants use water pumped in from rivers to absorb the excess heat they produce. This warm water is then returned to the river.

23. Which of the following rows describes what can happen to the oxygen concentration and the variety of organisms at the point in the river where the warm water is returned?

<b>Row</b>	<b>Oxygen Concentration</b>	<b>Variety of Organisms</b>
<b>A.</b>	Increases	Increases
<b>B.</b>	Increases	Decreases
<b>*C.</b>	Decreases	Decreases
<b>D.</b>	Decreases	Increases

14.0% of students chose A

23.0% of students chose B

56.6% of students chose C (correct answer)

6.4% 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 at [education.alberta.ca](http://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 the Assessment Sector 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.