

**Alberta Provincial  
Achievement Testing**

**Assessment  
Highlights  
2012–2013**

**GRADE  
9**

# Science



*Alberta*  Government

This document contains assessment highlights from the 2013 Grade 9 Science Achievement Test.

The *Assessment Highlights* document provides information about the overall test, the test blueprint, and student performance on the 2013 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 2013 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 2013 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 2013 Grade 9 Science Achievement Test. It complements the detailed school and jurisdiction reports.

### How Many Students Wrote the Test?

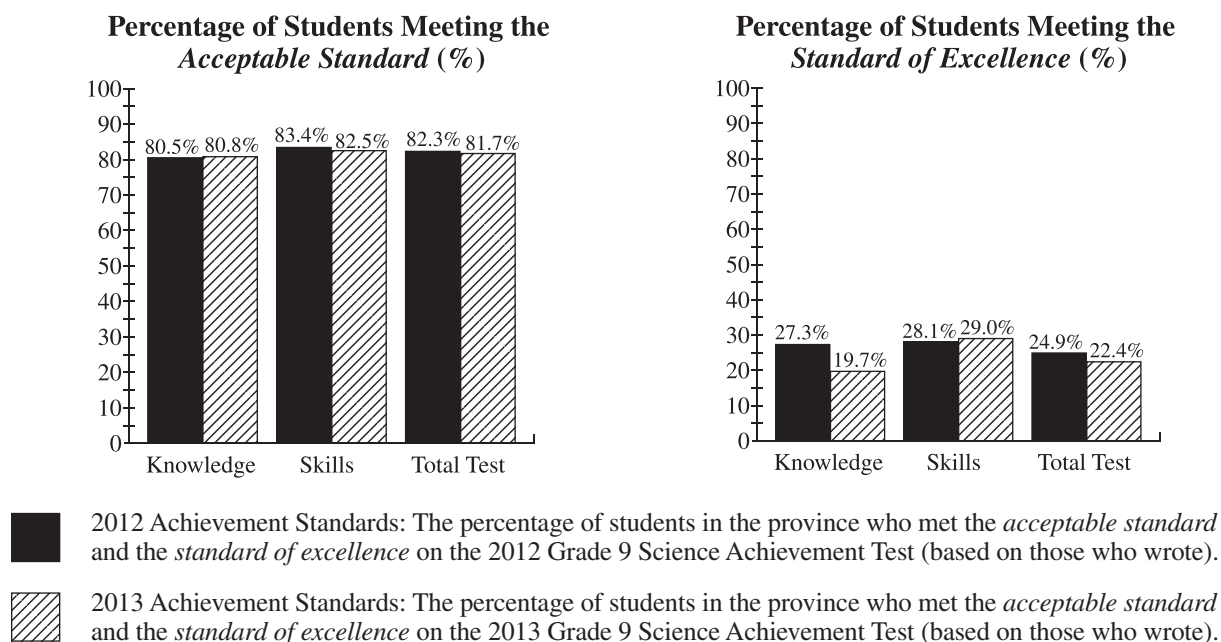
A total of 25 615 students wrote the 2013 Grade 9 Science Achievement Test.

### What Was the Test Like?

The 2013 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. One of the test items, multiple-choice 20, was dropped from the test, and therefore the test was scored out of a possible 54 items.

### How Well Did Students Do?

The percentages of students meeting the *acceptable standard* and the *standard of excellence* in 2013 compared with 2012 are shown in the graphs below. Out of a total possible score of 54, the provincial average was 35.0 (64.8%). 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.



## 2013 Test Blueprint and Student Achievement

In 2013, 81.7% of students who wrote the Grade 9 Science Achievement Test achieved the *acceptable standard*, and 22.4% of students who wrote achieved the *standard of excellence*. These results are consistent with previous administrations of the achievement test.

Student achievement on the 2013 Grade 9 Science Achievement Test averaged 35.0 out of a total score of 54 (64.8%).

The blueprint below shows the reporting categories and topics by which 2013 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			7.0/11 (63.8%)
Matter and Chemical Change			6.6/10 (66.0%)
Environmental Chemistry			7.1/11 (64.3%)
Electrical Principles and Technologies			6.8/11 (61.6%)
Space Exploration			7.4/11 (67.3%)
Provincial Student Achievement Average Raw Score and Percentage for Students Who Wrote the Test	14.5/21 (68.8%)	20.5/33 (62.2%)	Total Test 35.0/54 (64.8%)

## ***Commentary on 2013 Student Achievement***

The following is a brief summary of the areas where most students demonstrated strengths and experienced difficulties on the 2013 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:**

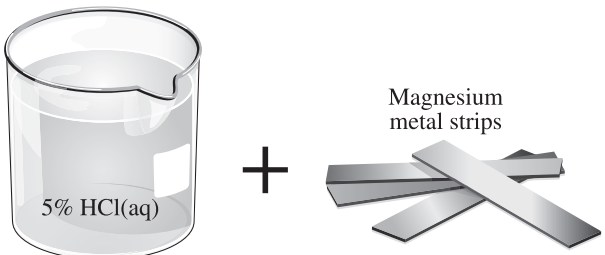
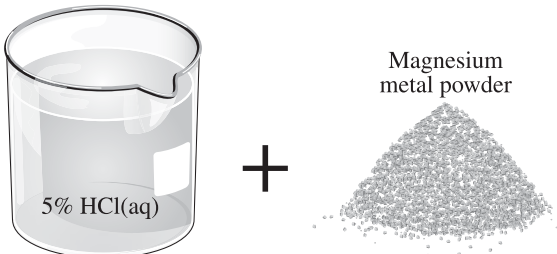
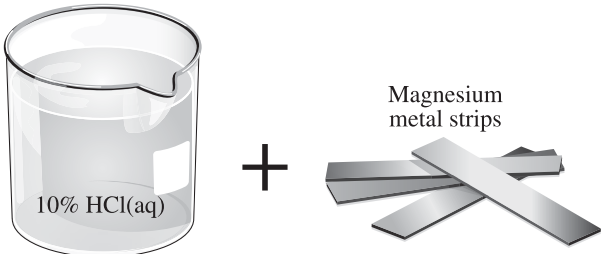
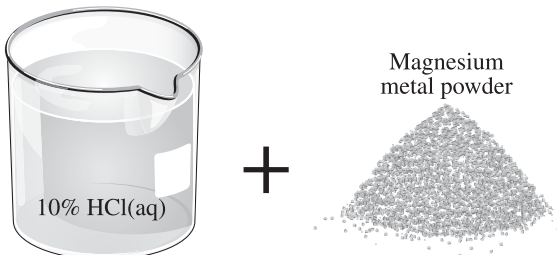
- Analyze a reactivity table and formulate a conclusion about the safe handling of the elements
- Evaluate plant growth data and infer the graphical relationship based on the data
- Identify modifications to a St. Louis motor to produce a desired action
- Analyze the descriptions of four celestial bodies and identify a potential risk to space exploration

For **multiple-choice question 19**, a Knowledge item, students had to identify factors that increase the rate of reaction. Approximately 83.9% of students who met the *acceptable standard* and 96.7% of students who met the *standard of excellence* answered this item correctly.

Use the following information to answer question 19.

When magnesium metal is placed in hydrochloric acid, hydrogen gas bubbles are produced.

19. Which of the following combinations of reactants would have the **fastest** reaction rate?

Row	
A.	 <p>5% HCl(aq) + Magnesium metal strips</p>
B.	 <p>5% HCl(aq) + Magnesium metal powder</p>
C.	 <p>10% HCl(aq) + Magnesium metal strips</p>
D.	 <p>10% HCl(aq) + Magnesium metal powder</p>

1.5% of students chose A

6.3% of students chose B

9.6% of students chose C

82.6% of students chose D (correct answer)

For **numerical-response item 5**, a Skills item, students had to classify statements as political, environmental, or ethical. Approximately 83.9% of students who met the *acceptable standard* and 96.7% of students who met the *standard of excellence* answered this item correctly.

*Use the following information to answer numerical-response question 5.*

- Statement 1**    Humans should send animals into space to test the effects of zero gravity.  
**Statement 2**    There are no regulations regarding military uses of space.  
**Statement 3**    Dead satellites and other space junk litter Earth’s orbit.

**Numerical Response**

**5.** Match each of the statements listed above with the type of issue to which it refers below.

Political                    \_\_\_\_\_ (Record in the **first** column)

Environmental            \_\_\_\_\_ (Record in the **second** column)

Ethical                     \_\_\_\_\_ (Record in the **third** column)

(Record all **three digits** of your answer in the numerical-response section on the answer sheet.)

78% of students provided the correct response of 231.

The top two incorrect responses for this item were 123 and 321 with 1.6% of students providing each of these responses.



**Students demonstrated relative difficulty when asked to:**

- Describe the relative number and types of species in ecosystems in relation to the equator
- Formulate the chemical formula for a given ionic compound
- Identify the responding variable in an experiment
- Evaluate energy transfers to determine the device being used

For **multiple-choice question 50**, a Knowledge item, students had to identify a celestial object based on a definition. Approximately 41.1% of students who met the *acceptable standard* and 71% of students who met the *standard of excellence* answered this item correctly.

- 50.** A vast collection of stars held together by gravitational attraction is called a
- A.** galaxy
  - B.** nebula
  - C.** solar system
  - D.** constellation

46.5% of students chose A (correct answer)

10.3% of students chose B

10.5% of students chose C

32.7% of students chose D

For **multiple-choice question 45**, a Skills item, students had to analyze planetary data to infer the position of an unknown planet. Approximately 40.9% of students who met the *acceptable standard* and 71.9% of students who met the *standard of excellence* answered this item correctly.

*Use the following information to answer question 45.*

An unknown gaseous planet has a radius of 24 764 km, a period of rotation of 0.67 Earth days, and a period of revolution of 60 190 Earth days.

Planet	Radius (km)	Period of Rotation (Earth days)	Period of Revolution (Earth days)	Planet Composition
Earth	6 378	1.00	365	Terrestrial
Mars	3 397	1.03	687	Terrestrial
Saturn	60 268	0.44	10 756	Gaseous
Uranus	25 559	0.72	30 687	Gaseous

- 45.** The unknown planet would be found
- A.** inside Earth's orbit
  - B.** outside Uranus's orbit
  - C.** between the orbits of Earth and Mars
  - D.** between the orbits of Saturn and Uranus

3.0% of students chose A  
 44.4% of students chose B (correct answer)  
 6.8% of students chose C  
 45.8% 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 directives, guidelines, and procedures; calculator and computer policies; test accommodations; test marking and results; field testing; resources and web documents; forms and samples; and 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 3, 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 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 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 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 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 as well as descriptions of and sample questions for each achievement test subject.

### ***Involvement of Teachers***

Teachers of grades 3, 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.