

**Alberta Provincial  
Achievement Testing**

**Assessment  
Highlights  
2014–2015**

**GRADE  
9**

# Science



*Alberta*  Government

This document contains assessment highlights from the 2015 Grade 9 Science Achievement Test.

The *Assessment Highlights* document provides information about the overall test, the test blueprint, and student performance on the 2015 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 2015 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.

For further information, contact **Matt Dodd, Grades 6 and 9 Science Examiner**, at [Matt.Dodd@gov.ab.ca](mailto:Matt.Dodd@gov.ab.ca), or **Nicole Lamarre, Director, Achievement Testing, Student Learning Assessments & Document Production**, at [Nicole.Lamarre@gov.ab.ca](mailto: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](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 2015 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 2015 Grade 9 Science Achievement Test. It complements the detailed school and jurisdiction reports.

### How Many Students Wrote the Test?

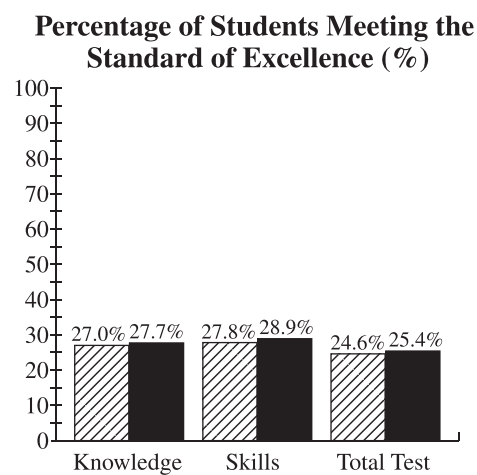
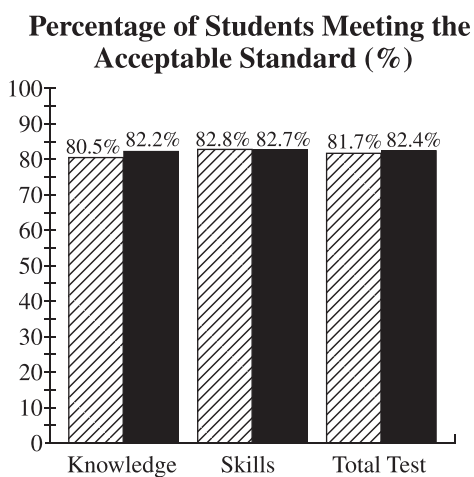
A total of 39 327 students wrote the 2015 Grade 9 Science Achievement Test.


### What Was the Test Like?


The 2015 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 2015 compared with 2014 are shown in the graphs below. Out of a total possible score of 55, the provincial average was 36.2 (65.9%). The examination statistics that are included in this document represent all writers: both French and English. 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.



 2014 Achievement Standards: The percentage of students in the province who met the *acceptable standard* and the *standard of excellence* on the 2014 Grade 9 Science Achievement Test (based on those who wrote).

 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).

## 2015 Test Blueprint and Student Achievement

In 2015, 82.4% of students who wrote the Grade 9 Science Achievement Test achieved the *acceptable standard*, and 25.4% of students who wrote achieved the *standard of excellence*. These results are consistent with previous administrations of the achievement test.

Student achievement on the 2015 Grade 9 Science Achievement Test averaged 36.2 out of a total score of 55 (65.9%).

The blueprint below shows the reporting categories and topics by which 2015 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			7.7/11 (69.9%)
Matter and Chemical Change			7.2/11 (65.8%)
Environmental Chemistry			7.2/11 (65.6%)
Electrical Principles and Technologies			6.8/11 (61.7%)
Space Exploration			7.3/11 (66.4%)
Provincial Student Achievement Average Raw Score and Percentage for Students Who Wrote the Test	15.2/23 (65.9%)	21.1/32 (65.8%)	Total Test 36.2/55 (65.9%)

## ***Commentary on 2015 Student Achievement***

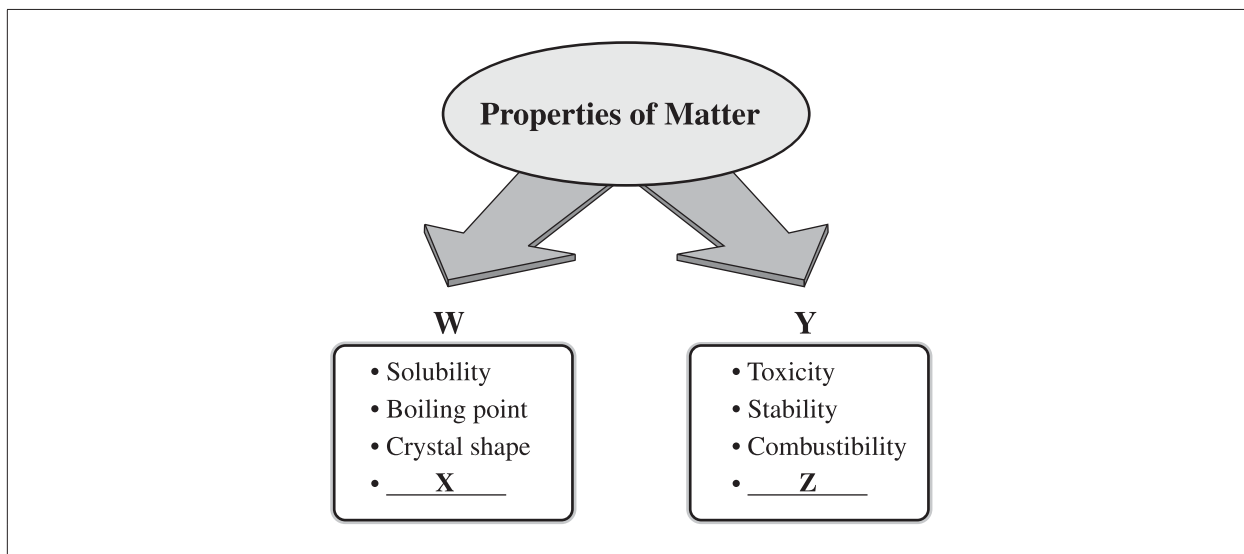
The following is a brief summary of the areas where most students demonstrated strengths and experienced difficulties on the 2015 Grade 9 Science Achievement Test. Four sample items are also provided to highlight some of these areas. These items are no longer secured and will not be reused on future achievement tests.

### **Students demonstrated relative strength by being able to:**

- analyze a reaction described in a source and describe the type of reaction that occurred
- distinguish between elements and compounds
- identify characteristics of an acid
- identify the best test to conduct in a specified experiment scenario

For **multiple-choice item 20**, a Knowledge item, students had to classify physical and chemical properties of matter. Approximately 82.3% of students who met the *acceptable standard* and 97.5% of students who met the *standard of excellence* answered this item correctly.

Use the following information to answer question 20.



20. Which of the following rows could accurately replace the labels W, X, Y, and Z in the diagram above?

Row	W	X	Y	Z
A.	Physical properties	Density	Chemical properties	Reactivity
B.	Physical properties	Reactivity	Chemical properties	Density
C.	Chemical properties	Density	Physical properties	Reactivity
D.	Chemical properties	Reactivity	Physical properties	Density

80.0% of students chose A (correct answer)

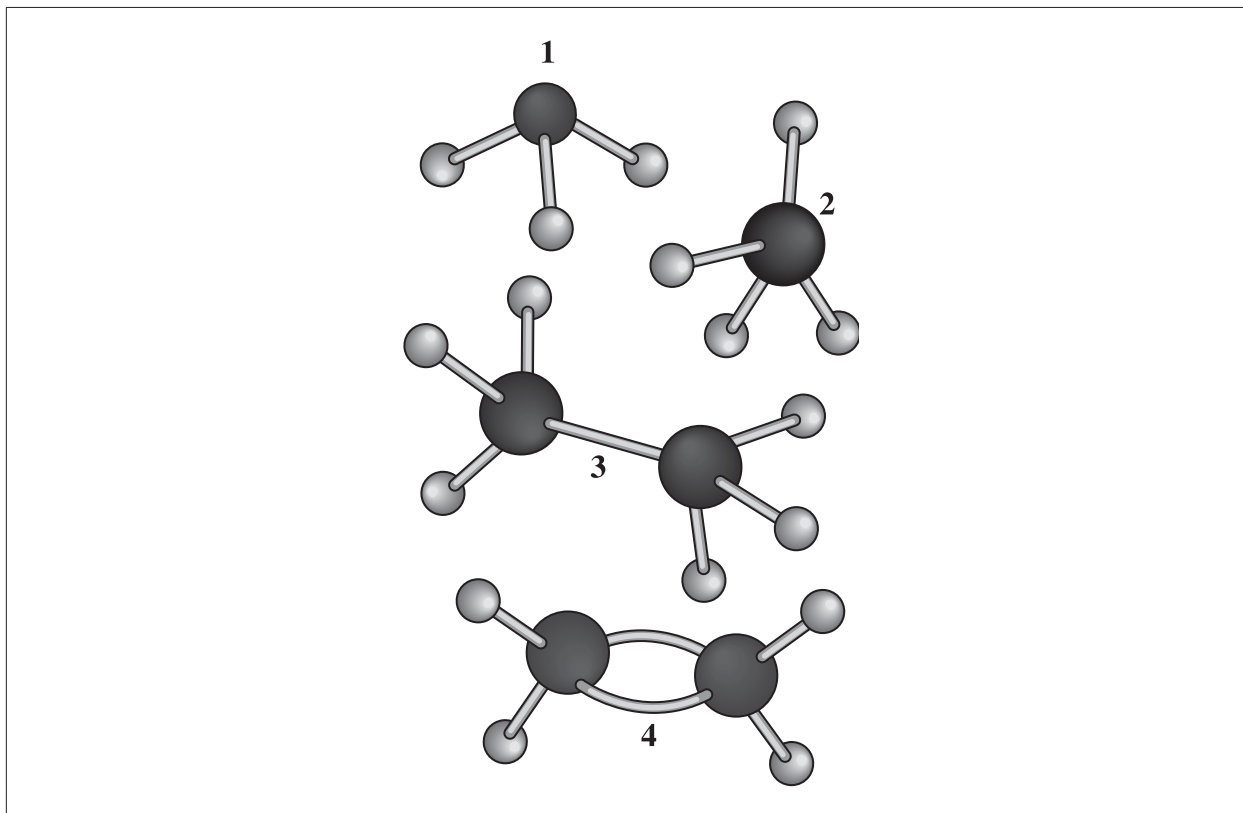
8.1% of students chose B

5.9% of students chose C

5.8% of students chose D

For **numerical-response question 2**, a Skill item, students had to analyze molecular models and match them with chemical names and formulas. Approximately 83.9% of students who met the *acceptable standard* and 97.9% of students who met the *standard of excellence* answered this item correctly.

Use the following information to answer numerical-response question 2.



### Numerical Response

2. Match the molecular models shown above with the compounds listed below.

Ammonia,  $\text{NH}_3$  \_\_\_\_\_ (Record in the **first** box)

Ethane,  $\text{C}_2\text{H}_6$  \_\_\_\_\_ (Record in the **second** box)

Ethene,  $\text{C}_2\text{H}_4$  \_\_\_\_\_ (Record in the **third** box)

Methane,  $\text{CH}_4$  \_\_\_\_\_ (Record in the **fourth** box)

(Record your answer in the response boxes at the bottom of the screen.)

79.8% of students correctly answered this question.



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

- evaluate processes for biological monitoring of an ecosystem's environmental quality
- differentiate between heliocentric or geocentric ideas of the solar system
- explain how circuit breakers are used in the home
- identify the relationship between theories and observations about matter

For **multiple-choice question 34**, a Skill item, students had to identify control variables in an experiment. Approximately 30.8% of students who met the *acceptable standard* and 67.8% of students who met the *standard of excellence* answered this item correctly.

Use the following information to answer question 34.

The diagram shows four wet cell experiments, each in a beaker with a voltmeter (V) connected between two electrodes. Cell 1 uses Copper and Zinc electrodes in Vinegar. Cell 2 uses Copper and Zinc electrodes in Tap water. Cell 3 uses Copper and Zinc electrodes in Sugar solution. Cell 4 uses Copper and Zinc electrodes in Ammonia solution.

**Wet Cell Lab Variables**

- W** Voltage
- X** Type of electrode
- Y** Type of electrolyte
- Z** Volume of solution

**34.** Which of the following pairs of variables is controlled in the lab above?

- A.** W and Y
- B.** W and Z
- C.** X and Y
- D.** X and Z

19.1% of students chose A

18.6% of students chose B

25.1% of students chose C

37.1% of students chose D (correct answer)

For **multiple-choice question 35**, a Skill item, students had to determine characteristics of a vehicle traffic model that would be used to describe current and resistance. Approximately 44.9% of students who met the *acceptable standard* and 70.6% of students who met the *standard of excellence* answered this item correctly.

*Use the following information to answer question 35.*

A teacher uses the analogy of vehicle traffic on a highway to explain electric current, resistance, and voltage to his students. The students brainstorm and suggest the following characteristics of vehicle traffic to help develop the analogy.

<b>Idea I</b>	<b>Idea II</b>	<b>Idea III</b>	<b>Idea IV</b>
Potholes and stalled cars	Number of cars	Speed of cars	Traffic lights

- 35.** Which of the students' ideas would the teacher choose to help explain the nature of electric current?
- A.** Ideas I and III
  - B.** Ideas I and IV
  - C.** Ideas II and III
  - D.** Ideas II and IV

17.9% of students chose A  
12.9% of students chose B  
48.8% of students chose C (correct answer)  
20.2% 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).

## **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 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 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 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 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.