ASSESSMENT MATTERS!

cmec

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PCAP 2013 – SCIENCE RESOURCES FOR TEACHERS

This issue of *Assessment Matters!* constitutes a valuable source of information for teachers and subject-area specialists that may be used to guide the teaching of science. It provides an overview of the Pan-Canadian Assessment Program (PCAP) and presents 14 science items from the PCAP 2013 Science Assessment with commentary on student responses. It complements *PCAP 2013 – Report on the Pan-Canadian Assessment of Science, Reading, and Mathematics,*[1] which details the performance of Grade 8 (Secondary II in Quebec) students in the third administration of PCAP, in which the primary domain was science.

What is PCAP?

PCAP is the continuation of the commitment made by the Council of Ministers of Education, Canada (CMEC) to inform Canadians about how well their education systems are meeting the needs of students and society. The information gained from this pan-Canadian assessment provides ministers of education with a basis for examining the curriculum and other aspects of their school systems.

School programs and curricula vary from jurisdiction[2] to jurisdiction across the country, so comparing results from these programs is a complex task. However, young Canadians in different jurisdictions learn many similar skills in reading, mathematics, and science. PCAP has been designed to determine whether students across Canada reach similar levels of performance in these core disciplines at about the same age, and to complement existing jurisdictional assessments with comparative Canada-wide data on the achievement levels attained by Grade 8/Secondary II students across the country.

Who writes PCAP?

PCAP 2013 was written by Grade 8/Secondary II students from all provinces in Canada. A random sample of classes with close to 32,000 students from 1,600 schools wrote the test in spring 2013. Approximately 24,000 English tests and 8,000 French tests were written. In science, the results are available both for average scores and for performance levels for Canada overall, by jurisdiction, by language, and by gender.

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1 This report is available on the CMEC Web site at http://www.cmec.ca/131/Programs-and-Initiatives/Assessment/Overview/index.html

2 "Jurisdiction" refers to provinces and territories.

What is the test like?

Each assessment unit was developed with a context followed by a series of related items or questions. The contexts chosen for assessment units are intended to captivate the interests of Canadian Grade 8/Secondary II students and, therefore, to increase their motivation to participate in writing the test. Contexts are introduced through an opening situation, which could be in the form of a brief narrative and could include tables, charts, graphs, or diagrams. Developers of the assessment items ensured that the contexts were developmentally appropriate and not culturally or geographically dependent.

The PCAP 2013 Science Assessment consisted of 105 items and included approximately 75 per cent selected-response and 25 per cent constructed-response items. Attitude questions are embedded within contexts to explore students' attitudes and opinions about science-related issues and values. These constitute approximately 5 per cent of the assessment.

French and English versions of the assessment were developed simultaneously and are considered to be equivalent. In addition, by ensuring adequate representative sampling of these groups, this assessment provides statistically valid information for jurisdictions with a sufficiently large sample size for separate reporting for students in the majority- and minority-language systems.

Reporting the results

For PCAP assessment purposes, the domain of science is divided into three competencies (science inquiry, problem solving, and scientific reasoning); four sub-domains (nature of science, life science, physical science, and Earth science); and attitudes.

Following the initial scoring process, raw scores are scaled to a mean of 500 and a standard deviation of 100 for Canada. This provides a relatively simple basis for comparing groups. On this type of scale, approximately two-thirds of the individual student scores will fall within plus or minus one standard deviation of the mean, or between 400 and 600.

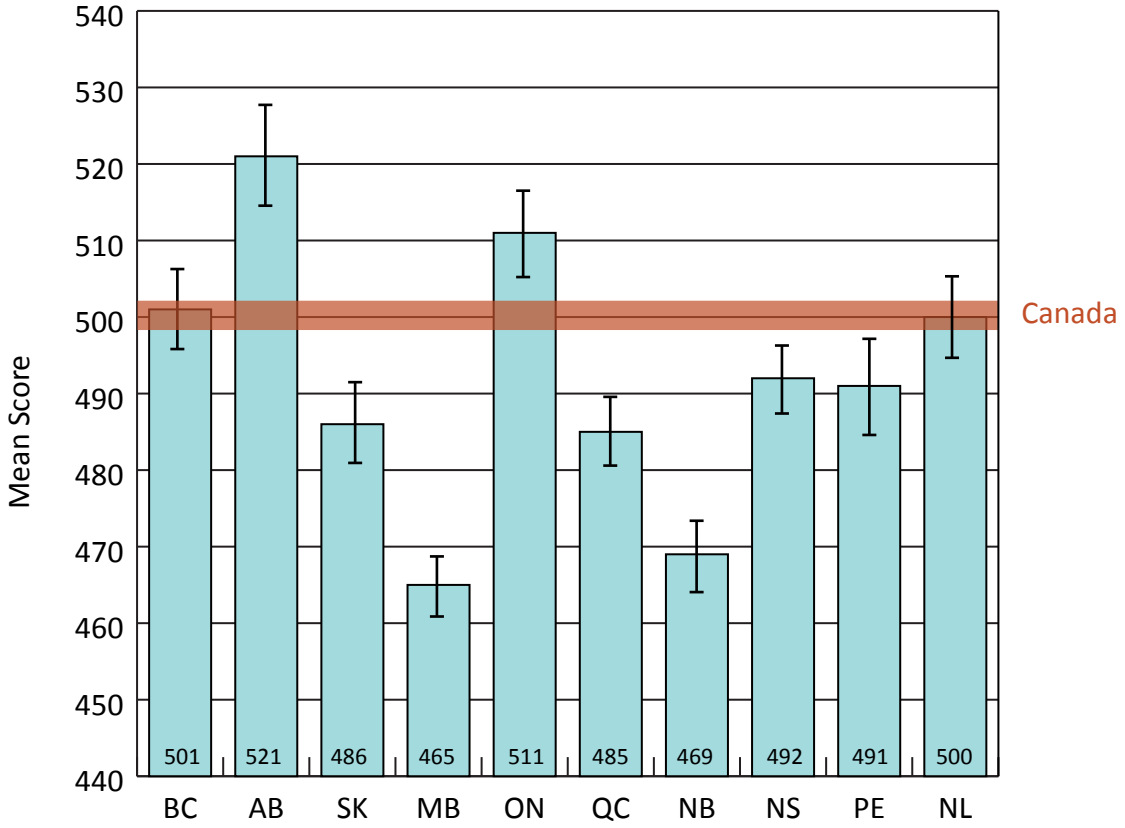
Another way of looking at science performance is to establish proficiency levels based on descriptions of what students can do at each level. For the PCAP Science assessment, four proficiency levels are defined. Level 2 is considered the acceptable or "baseline proficiency," or the level at which students begin to demonstrate the competencies needed to participate in life situations related to science. Students achieving at level 1 are below that expected of students in their grade. Performance levels are then summarized as the percentage of students reaching each level. Tasks at the lower end of the scale (Level 1) are deemed easier and less complex than tasks at the higher end (Level 4), and this progression in task difficulty/complexity applies both to overall science and to each competency and sub-domain in the assessment.

A team of experienced educators from across Canada including teachers, curriculum experts, and assessment specialists participated in setting the performance standards. During this process, all items within the range of scores that defined the four levels of performance were examined. Using these items, a description of the knowledge and skills that characterized achievement at each of the four performance levels was developed and is shown in the appendix, Tables 1 to 4.

How did the students do?

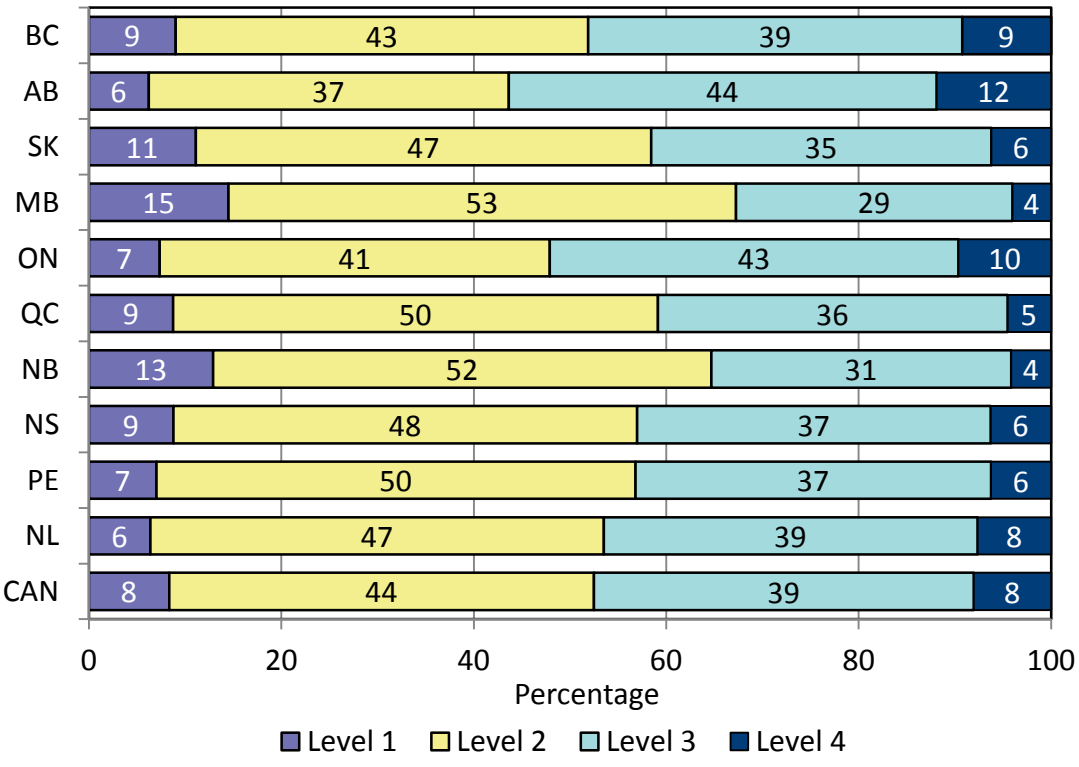
Chart 1 gives mean science scores for the jurisdictions. This shows that Alberta and Ontario students perform at a level significantly above the Canadian average and those in British Columbia and Newfoundland and Labrador perform at the Canadian average, while students in all other jurisdictions perform below the Canadian average.

CHART 1 **Results in science by jurisdiction**



As shown in Chart 2, 91 per cent of Grade 8/Secondary II students in Canada attain at or above the baseline level of achievement (level 2 and above) in science. At the higher performance levels in PCAP, 47 per cent of students attain levels 3 and 4.

CHART 2 **Distribution of students by level of performance in science**[3]



[3] Totals may not sum to exactly 100 per cent because of rounding.

Commentary on student achievement on PCAP 2013 science assessment items

Five assessment units that comprise fourteen sample items are provided to place the PCAP performance levels descriptors in the context of the assessment. Samples were chosen to represent a range of sub-domains and competencies and a variety of item types, as well as each of the performance levels. For constructed-response items, student responses are included to show examples of responses that would earn full credit. There is no penalty for spelling or grammar mistakes if they did not prevent the scorer from understanding what the student was trying to communicate. The following information is provided for each item:

- Classification by sub-domain and competency or attitude
- Correct answer or a sample student response that would obtain full credit
- Percentage of correct responses for Canada overall[4]
- Commentary on student performance on the item

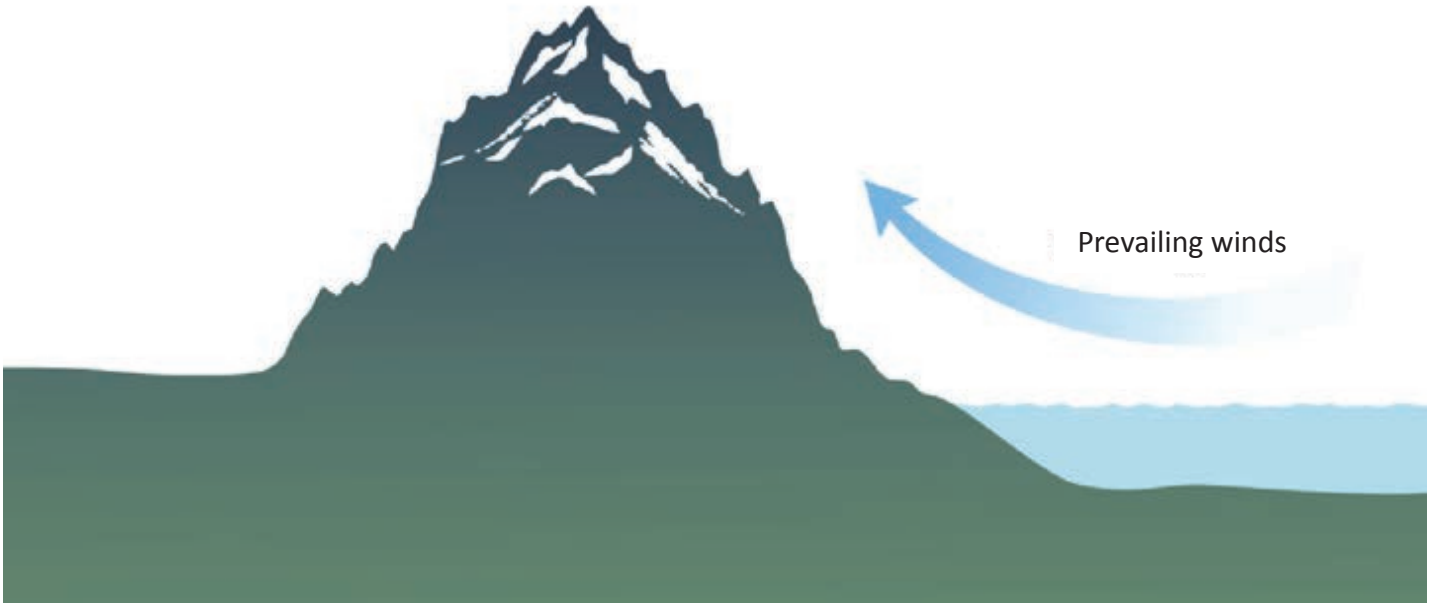
These items are no longer secured and will not be reused on future PCAP tests.

[4] Item results by jurisdiction can be found in the appendix, Table 5.

Examples of PCAP 2013 Science assessment items

The Importance of Water

The following diagram represents a mountain range near an ocean.



1. How does rain falling on a mountain range affect its size over time?

Explain your answer.

Classification: Competency – Scientific reasoning; Sub-domain – Earth science
Performance Level: 3 **Percentage of correct answers**: 23%

Example full credit

Erosion from the water eats away at the mountain causing it to lose shape or size over time.

Comment

Question 1 requires the student to address the change in size of a mountain and to offer an explanation. The student could have used the term erosion as an explanation or discussed this process in more general terms. Although recalling a process would locate this at level 2, the need for an explanation increases the difficulty of this question. Many students who did not receive credit for this question thought that the size of the mountain would increase in size (for example, because of water absorption or snow accumulation) or did not offer an explanation.

2. On Earth, in which states of matter can water be found?

A. As a liquid only
B. As a liquid and gas only
C. As a liquid and solid only
D. As a solid, liquid, and gas

Correct response: D
Classification: Competency – Scientific reasoning; Sub-domain – Physical science
Performance Level: 1 **Percentage of correct answers**: 78%

Comment

To gain credit for question 2 the student must recall the states of matter in which water exists. This item accesses both their school science knowledge and their experience with a familiar substance, which locates it at level 1.

3. Earth is referred to as the blue planet because most of the Earth's surface is covered in water. Water serves many purposes and has many roles on Earth.

Choose <u>True</u> or <u>False</u> for each of the statements below about water.

	Statement	True	False
1.	Water changes the shape of land on Earth.	☐ 1	☐ 2
2.	Plant and animal cells consist mainly of water.	☐ 1	☐ 2
3.	Most water found on Earth is suitable for drinking.	☐ 1	☐ 2

Correct response: True, True, False
Classification: Competency – Scientific reasoning; Sub-domain – Earth science and Life science
Performance Level: 1 **Percentage of correct answers**: 84%, 70%, 84%

Comment

For question 3, students must recall specific knowledge about the impact of water on landscapes, the composition of cells, and the importance of water for society. Recalling appropriate scientific facts locates these statements at level 1. For statement 3, although recalling an application or consequence typically locates a question at level 2, relating the knowledge to a familiar substance lowers the difficulty of the question.

4. Is water a living or non-living thing?

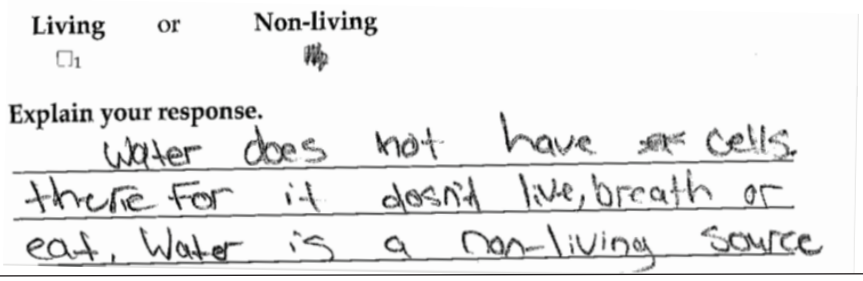
Living or Non-living

☐ ☐

Explain your answer.

Classification: Competency – Scientific reasoning; Sub-domain – Life science
Performance Level: 2 **Percentage of correct answers**: 49%

Example full credit

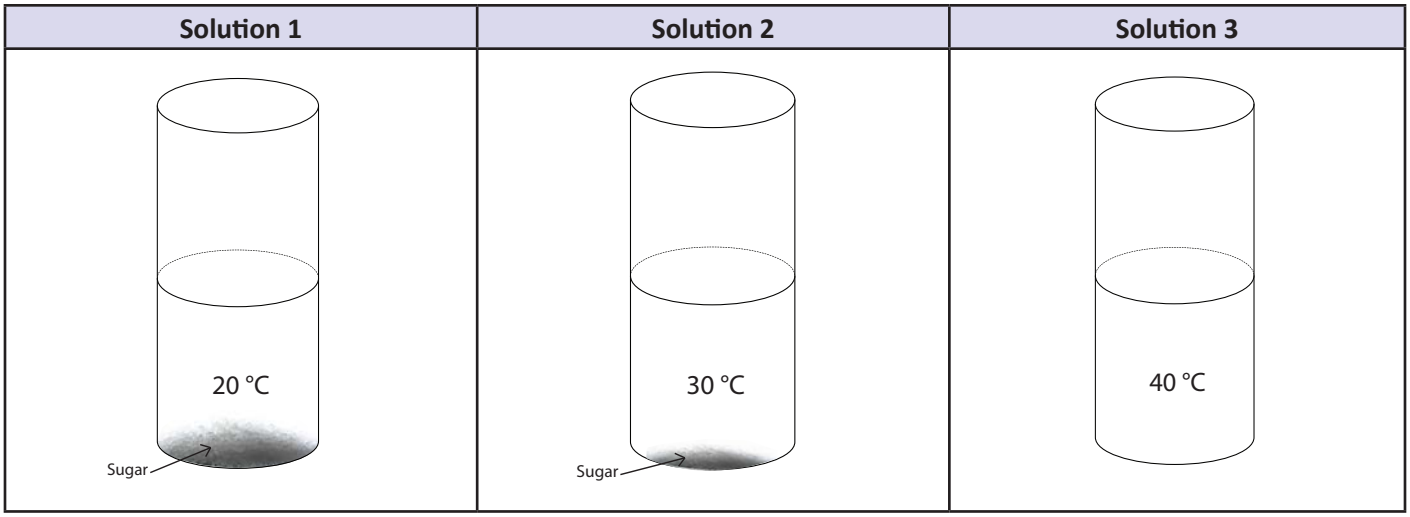


Comment

To gain credit for question 4, a student must recall the characteristics of living things and apply this knowledge to a familiar substance in order to support his or her choice. The absence of cues for this question has the characteristics of a higher performance level; however, relating the knowledge to an everyday substance lowers the difficulty of the question. Many students who did not obtain credit for this question explained that water was living because it contained living things or chose a characteristic of living things that was ambiguous. For example, even though one characteristic of living things is movement, in the absence of other correct examples, it cannot be applied to water to prove that it is alive.

Solutions

A student added an equal amount of sugar to three containers. Each container had 400 mL of water at different temperatures. His observations are shown in the diagram below.



5. What conclusion could the student draw about his experiment?

Classification: Competency – Science inquiry; Sub-domain – Physical science
Performance Level: 3 **Percentage of correct answers**: 37%

Example full credit

The conclusion that the student could draw about his experiment is that the higher the temperature the less visible the sugar becomes. This is because the heat disolves the sugar faster.

Comment

Question 5 centres on the competency of science inquiry and asks students to draw a conclusion based on observed experimental evidence. This question requires students to identify the variables that are changing and then to communicate a generalization about the relationship between these variables. For full credit, students must state a conclusion that involves the temperature of the water and the amount of sugar visible. The need to identify changed and measured variables from a diagram, together with the recognition of the relationship between these variables, locates this question at performance level 3. Many students who did not obtain credit for this question provided an observation rather than a conclusion.

6. List three pieces of equipment that the student should use to get precise results.

Classification: Competency – Science inquiry; Sub-domain – Physical science
Performance Level: 4 **Percentage awarded partial credit:** 30%; **full credit:** 9%

Example full credit

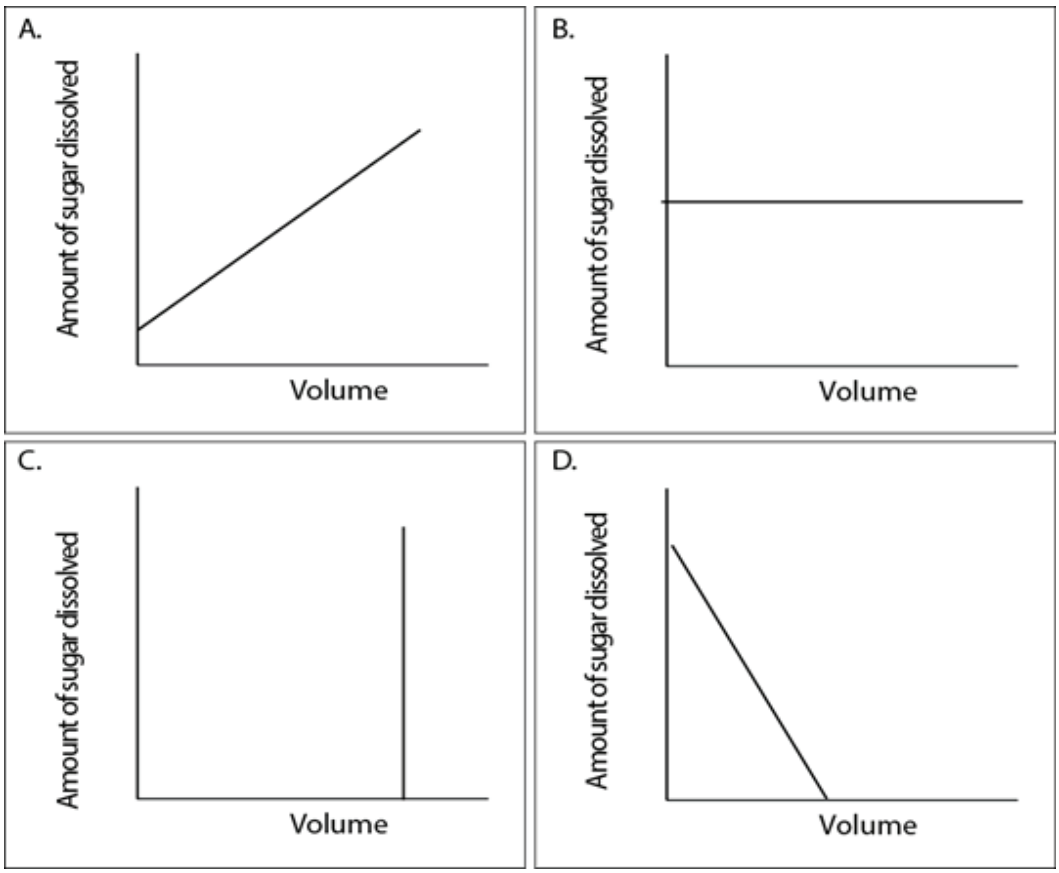
- mesuring spoons to mesure amount of sugar
- graduated cylinder to get the exact amount of water
- thermometer to get exact temperatures of water

Comment

Question 6 focuses on the competency of science inquiry and shows an example of a performance level 4 response. As a first step in gaining credit for this question, the student must have sufficient understanding of methods of investigation to recognize which measurements are needed while setting up this experiment. For full credit, the student needs to select appropriate equipment that would obtain accurate measurements for the volume and temperature of water and an appropriate amount of sugar. This requires the student to understand how precision is related to the tools used to take measurements in an investigation. Partial credit was awarded to students who identified equipment that could obtain precise results for only two measurements. Many students stated that the same amount of water and sugar were required for each trial but did not identify the type of equipment that could be used. Although many students indicated that measuring cups could be used to measure water and sugar, it was necessary to indicate that they understood that different sizes were needed because the amount of water needed was much greater than the amount of sugar.

7. The student draws a hypothesis. If the temperature is the same, then, as the volume of water increases, the amount of sugar that can be dissolved increases.

Which graph below shows the student's hypothesis?



Correct response: A
Classification: Competency – Science inquiry; Sub-domain – Physical science
Performance Level: 2 **Percentage of correct answers**: 67%

Comment

Question 7 requires the student to recognize that the hypothesis is related to a different experiment from the one shown in the context of this unit. In this experiment, the volume of water becomes a manipulated variable, which changes in the experiment. The student must relate two modes of representation, text and pictorial, which locates the question at performance level 2.

8. A well-designed investigation in science should produce the same results when it is repeated.

Choose Yes or No for each item below to indicate whether or not you agree with the statement.

	Statement	Yes	No
1.	The results will be the same if the investigation is repeated in the same way.	☐ 1	☐ 2
2.	The results will be the same if a variety of different measuring tools are used.	☐ 1	☐ 2
3.	The results will be the same if the experiment is repeated using a different procedure.	☐ 1	☐ 2

Correct response: Yes, No, No
Classification: Competency – Science inquiry; Sub-domain – Nature of science
Performance Level: 1 **Percentage of correct answers**: 76%, 75%, 81%

Comment

Question 8 requires students to recognize that a scientifically valid test in science must produce reproducible results, which cannot be done reliably with procedural or equipment changes. This question is located at performance level 1 because it is related to a basic science value with which students would be familiar from classroom investigations.

Giraffes

A giraffe has an extremely long neck that helps it to reach and eat acacia leaves. It has some features that reduce the problems of having such a long neck. The blood pressure of a giraffe is the highest of all animals, enabling the blood to reach its brain. It also has very tight skin around its legs, which prevents blood from pooling and helps circulate blood back to the heart.

Giraffes eating leaves from an acacia tree

Photograph: Trish Anthony

9. Both the giraffe and the acacia tree are composed of cells. Compare the cells of these two organisms by identifying the type of cell and stating one similarity and one difference between them.

Organism	Type of Cell	Similarity	Difference
Acacia			
Giraffe			

Classification: Competency – Scientific reasoning; Sub-domain – Life science
Performance Level: 4 **Percentage of responses – partial credit:** 18%; **full credit:** 19%

Example full credit

Organism	Type of Cell	Similarity	Difference
Acacia	Plant cell	they both need nutrients, they both have a mitochondria which is the power-house of the cell.	The plant cells have a cell wall for protection where an animal cell does not.
Giraffe	Animal Cell		

Comment

To gain full credit for question 9, students are required to identify the types of cell and to offer one similarity and one difference between them. Most students could correctly identify the type of cell. Partial credit could be obtained if the student identified the type of cell but provided only either a similarity or a difference. Students could more easily identify similarities than differences and typically provided a number of these in their responses to this section. Contrasting the cells proves more difficult for students, which moves this question to performance level 4.

10. Name four characteristics of living things.

Classification: Competency – Scientific reasoning; Sub-domain – Life science
Performance Level: 4 **Percentage of responses − partial credit:** 34%; **full credit:** 17%

Example full credit

- produces waste
- reponds to enviroment
- reproduces
- It moves

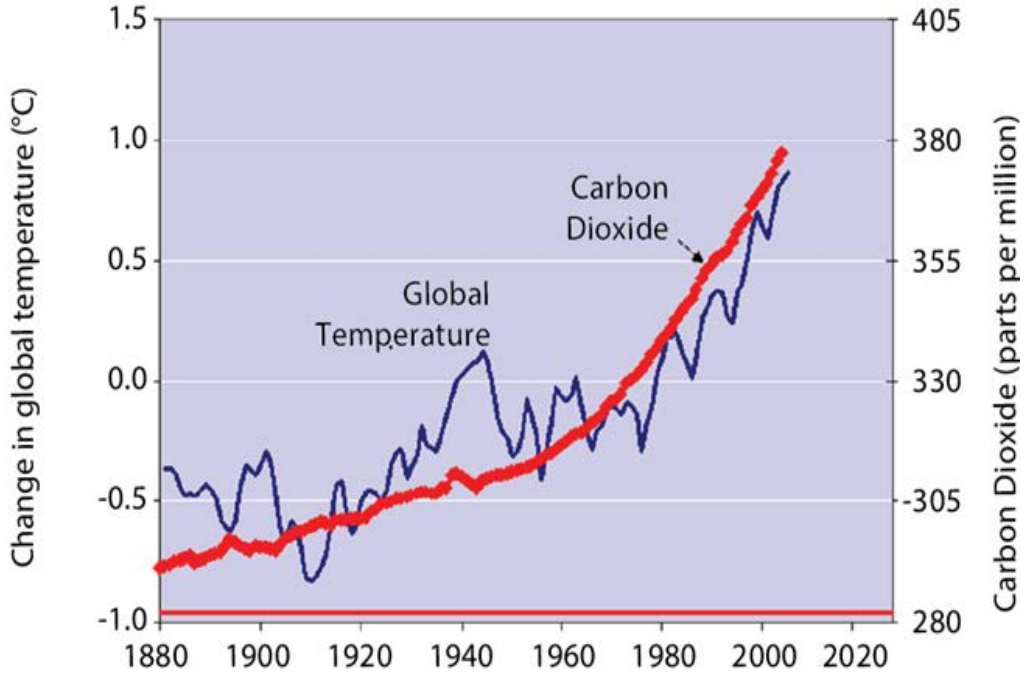
Comment

Question 10 is included in the context about giraffes. Many students who interpreted it to be specifically about the giraffe gave answers that identify physical characteristics common to giraffes (e.g., long necks) rather than identifying characteristics that are common to all living things. Many students who interpreted the question correctly had difficulty providing four characteristics of living things; however, partial credit is given to students with two or three correct characteristics. Students who received full credit for this question typically achieved performance level 4.

Climate Change

Scientists have observed that the amount of carbon dioxide (CO_2) in the atmosphere has been increasing. Data on the change in average global temperature and the amount of CO_2 in the atmosphere from 1880 to 2008 are shown in the graph below.

Global Temperature and Carbon Dioxide



11. Describe the relationship between global temperature and CO_2 shown in the graph.

Classification: Competency – Science inquiry; Sub-domain – Nature of science
Performance Level: 2 **Percentage of correct answers**: 48%

Example full credit

The temperature is all over the place, however the CO_2 is increasing with the temperature.

Comment

Question 11 requires students to recognize a relationship between the two lines; however, many students simply commented on the shapes of the two lines. The need to recognize a pattern or trend increases the difficulty of the question to performance level 2.

12. If the trend on the graph from 1980 to 2005 continues, predict how much CO_2 will be in the atmosphere in 2020.

A. 1.4
B. 1.7
C. 400
D. 415

Correct response: C
Classification: Competency – Scientific reasoning; Sub-domain – Nature of science
Performance Level: 3 **Percentage of correct answers**: 48%

Comment

Question 12 requires the student to interpret a graph that presents two different pieces of information using different y-axes. The student needs to first identify the correct data line and its corresponding axis. To find the correct answer, a portion of the graph needs to be extrapolated and the number pattern on the axis needs to be interpreted. This increases the difficulty of the question to performance level 3.

13. Choose whether you agree or disagree with each statement below.
There is no right or wrong answer.

Statement		Strongly Disagree	Disagree	Agree	Strongly Agree
1.	Climate change happens naturally. It corrects itself.	☐ 1	☐ 2	☐ 3	☐ 4
2.	I am not worried about climate change.	☐ 1	☐ 2	☐ 3	☐ 4
3.	My actions do not contribute to climate change.	☐ 1	☐ 2	☐ 3	☐ 4
4.	Climate change is my responsibility.	☐ 1	☐ 2	☐ 3	☐ 4

Correct response: None
Results: 60% to 70% of students strongly disagree or disagree with the first three statements; more than 50% of students agree or strongly agree with statement 4.
Classification: Attitude
Performance Level: None

Comment

This question is an example of a contextualized, embedded attitude item. The vast majority of Canadian jurisdictions include the development of positive attitudes as an important component to be embedded within science teaching and learning. PCAP Science gathers data about students' attitudes using both contextualized embedded attitude items and a student questionnaire. Gathering data about students' attitudes both in context and out of context provides data on whether attitudes vary between these two types of methodologies and how this affects achievement. PCAP Science contains sufficient attitude items to prepare a reliable scale; however, responses to the attitude items are not included in the overall score of scientific literacy. Nevertheless, they will provide an important component of profiling student scientific literacy. Secondary analysis undertaken as part of the forthcoming report *PCAP 2013 Contextual Report on Student Achievement in Science* will explore how resources and school and classroom conditions, as well as student characteristics and family circumstances, may impact achievement in Grade 8/Secondary II students.

States of Matter

Matter can exist in different states. The statements below describe three substances, I, II, and III, that are in three different containers of different sizes.

Substance	Statements
I	The distance between the particles that make up the substance changes depending on the size of the container.
II	The distance between the particles that make up the substance does not change, nor does the volume or shape of the substance when placed in the different containers.
III	The distance between the particles that make up the substance does not change, but the shape of the substance changes when placed in the different containers.

14. Identify the state of each of the three substances.

Substance	State of Matter		
	Gas	Liquid	Solid
I	☐ 1	☐ 2	☐ 3
II	☐ 1	☐ 2	☐ 3
III	☐ 1	☐ 2	☐ 3

Correct response: gas, solid, liquid
Classification: Competency – Scientific reasoning; Sub-domain – Physical science
Performance Level: 2 **Percentage of correct answers**: 63%, 74%, 65%

Comment

Question 14 requires students to relate the states of matter to their physical characteristics and to the particulate theory. Relating familiar characteristics of substances to an abstract model increases the difficulty of this question and locates it at performance level 2.

Conclusion

The results of the PCAP 2013 Science Assessment suggest that Canadian jurisdictions are addressing the demands and practices required of students in Grade 8/Secondary II science, and that the majority of students have attained a level of scientific literacy that enables them to use their knowledge and skills in practical day-to-day activities.

The PCAP 2013 results provide both affirmation and direction for Canadian jurisdictions and classrooms. While students appear to understand what is expected of them in science and appear to practise the key aspects when completing science tasks, there is room for improvement. As well, there are numerous students at level 1, for whom science remains a challenging subject.

The *PCAP 2013 Science Framework*[5] provides more information on the science assessment. In the next few months, CMEC will publish the context report, which will describe the relationships between contextual factors at home and at school and science achievement.

Overall, the PCAP testing reaffirms that CMEC's large-scale assessment projects offer innovative and contemporary direction on education policy, curriculum, and classroom practices in Canada.

PCAP support documents

The CMEC Web site contains several documents that provide valuable information about various aspects of the national assessment.

To access these documents, go to http://www.cmec.ca. From the home page, follow this path: *Programs & Initiatives > Key Activity Areas, Assessment > Pan-Canadian Assessment Program (PCAP)*, and then click on one of the specific document links.

The primary focus of the test rotates between assessments. In 2007, the focus was reading, and in 2010, the focus was mathematics. The next PCAP, in 2016, will focus again on reading.

[5] Available at http://www.cmec.ca/docs/pcap/pcap2013/Science-Framework-EN-April2013.pdf

Appendix

TABLE 1 **Knowledge and skills characteristic of achievement at level 4**

Level 4 – Scores of 655 and above			
Competencies Students at this level demonstrate advanced science inquiry skills. They understand the need for variables holistically and can design novel experiments to verify or validate information, and also evaluate and modify procedures to improve experiments. They understand the need for precise measurements in science and apply knowledge in complex and novel situations. When solving problems, students at this level can identify assumptions and use their knowledge and experience of science to propose solutions and communicate their reasoning. They can formulate an argument to defend their point of view on environmental or societal issues.			
Sub-domains			
Nature of science	**Life science**	**Physical science**	**Earth science**
Students understand the characteristics of measurements and the various types of scientific explanations. They interpret scientific experiments with regard to variables and design of scientifically valid tests, and they can draw valid conclusions. They can interpret data using multiple sources of information, which can include graphs, tables, and text. Students can design good experiments and select equipment for precise measurements.	Students can interpret information to explain science or natural phenomena and communicate their reasoning. They can identify the characteristics of living things; they understand the role of organisms in the environment and that chemicals are transformed by organisms into usable substances that support life.	Students demonstrate an understanding of states of matter and physical changes. They understand the impact of changes of state on the environment and can use this knowledge to design experiments.	Students understand climate in a global context in relation to science, technology, and society, and they can describe environmental impacts related to water resources and climate issues. They can also organize information and identify data patterns in order to support an argument on environmental issues.

TABLE 2 **Knowledge and skills characteristic of achievement at level 3**

Level 3 – Scores between 516 and 654			
Competencies In an experimental context, students demonstrate evidence-based decision making and can draw from multiple sources of information when making decisions. They can evaluate hypotheses, identify trends, and draw conclusions from observations and data. They demonstrate a holistic understanding of a scientifically valid test and the need for variables in science. Students at this level can identify a solution to a problem in a given context and relevant assumptions required to make predictions. They can generate a solution to a problem using two or more types of information and then communicate their reasoning. Also, they can formulate an argument to defend their point of view on environmental or societal issues.			
Sub-domains			
Nature of science	**Life science**	**Physical science**	**Earth science**
Students demonstrate solid science inquiry skills and show understanding for the requirements of accuracy and replicability in science. They understand characteristics of measurements and various types of scientific explanations. They can evaluate investigations and demonstrate an understanding of the role of variables.	Students can interpret information to explain science or natural phenomena and communicate their reasoning. They can compare and contrast types of cells and their components, and they understand the interaction between the basic needs of an organism and its habitat. In familiar contexts related to health, they can select information that supports an argument.	Student can interpret evidence, identify trends, and draw conclusions based on solution experiments. They can analyze experimental evidence and communicate their understanding using multiple modes of representations including graphs and tables. They have some understanding of how to choose equipment for experiments that would ensure precise measurements of solids and liquids. They understand the physical changes that occur during phase changes.	Students can evaluate environmental impacts of climate in relation to water resources. They can organize information and identify data patterns in order to support an argument on environmental issues.

TABLE 3 **Knowledge and skills characteristic of achievement at level 2**

Level 2 – Scores between 379 and 515			
Competencies			
At this performance level, students can identify good inquiry practices and have basic science skills. In a simple experiment in a familiar context, they can formulate a hypothesis, identify a suitable way to test a hypothesis, make a prediction, and draw direct conclusions from given evidence. They can evaluate the validity of a source of information and use it as evidence to support given statements or draw simple conclusions. At this level, students can select and apply a simple problem-solving strategy and make decisions based on their scientific knowledge. They can make connections using scientific knowledge in an everyday environment using more than one source of data.			
Sub-domains			
Nature of science	**Life science**	**Physical science**	**Earth science**
Students can draw simple conclusions based on observations or contextualized information including pictorial diagrams and data tables. They understand what is required for a scientifically valid test and can identify measurable variables. They can differentiate between scientific and non-scientific information and select appropriate methods to communicate evidence from experiments.	Students recognize characteristics and components of plant and animal cells, and they understand the interaction between the components of air and living organisms. In experiments, they can identify a good hypothesis and select the experimental design that would test a given hypothesis. Students at this level have some knowledge of the role of bacteria in contexts related to health.	Students apply knowledge of properties of matter in given contexts. They can identify states of matter and relate changes in state to the particle theory of matter. Students have knowledge of renewable and non-renewable energy sources and their application.	Students recognize patterns and changes related to weather and water, such as how weather and weather patterns affect the physical environment both locally and globally. They can interpret graphs and draw conclusions related to weather. They understand erosion and can apply a scientific approach to interpret erosion experiments.

TABLE 4 **Knowledge and skills characteristic of achievement at level 1**

Level 1– Scores of 378 and less			
Competencies In science inquiry, students can recognize some valid scientific procedures such as replicability, the importance of taking measurements, and careful observations. Given one source of information, they can use direct reasoning to interpret simple diagrams, graphs, and tables. Students at this level can provide simple explanations or literal interpretations in familiar contexts, such as the impact of water on land forms. They can also identify questions that could be answered using scientific experiments.			
Sub-domains			
Nature of science	**Life science**	**Physical science**	**Earth science**
Students at this level can identify direct relationships when given data in simple formats and make observations from diagrams. They recognize that there are scientific and non-scientific sources of information. Students can make literal interpretations of the results, and they can draw conclusions based on simple investigations.	Students can identify that relationships between organisms can be both good and bad when given explicit contexts. They can differentiate between living and nonliving things and recognize some of the basic requirements for life.	Students recognize some basic information about matter and understand that energy can be transferred between objects in an everyday context. In a familiar context, they recognize that temperature has an effect on the movement of particles and on the states of matter. They can use direct reasoning to offer simple explanations related to familiar contexts such as sports equipment.	Students understand the role of water in their everyday lives and recognize that changes in global temperature can have an impact on water supplies.

TABLE 5 **Percentage of correct responses for assessment items by jurisdiction**[6]

Question	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	CAN
1	21	29	23	18	19	24	22	28	33	27	23
2	78	82	80	73	76	81	76	78	81	68	78
3-1	87	87	88	83	83	76	85	91	91	88	84
3-2	77	75	68	72	69	69	66	73	74	61	70
3-3	85	87	84	83	82	84	75	84	93	86	84
4	56	55	48	49	49	41	46	48	53	58	49
5	36	47	35	31	34	41	27	37	34	45	37
6 – partial credit	30	29	24	22	31	40	30	28	27	29	30
6 – full credit	10	9	9	6	8	14	6	10	7	3	9
7	66	76	63	63	70	70	58	68	67	68	67
8-1	76	78	72	74	76	82	74	71	75	71	76
8-2	72	77	75	74	76	76	76	70	77	78	75
8-3	82	86	83	77	79	79	81	79	84	82	81
9 – partial credit	20	17	17	18	19	20	13	18	14	19	18
9 – full credit	26	21	17	15	22	19	11	18	16	27	19
10 – partial credit	39	35	36	34	40	24	30	37	42	29	34
10 – full credit	28	20	18	16	11	10	10	13	13	41	17
11	54	54	49	41	49	49	34	51	47	51	48
12	48	48	48	43	49	50	48	49	51	51	48
14-I	65	67	59	59	64	62	58	69	65	66	63
14-II	74	76	76	69	78	67	70	79	72	79	74
14-III	66	70	64	61	67	62	60	68	68	67	65

[6] Detailed analysis of the attitude question (13) is not included here but can be found in the forthcoming context report.