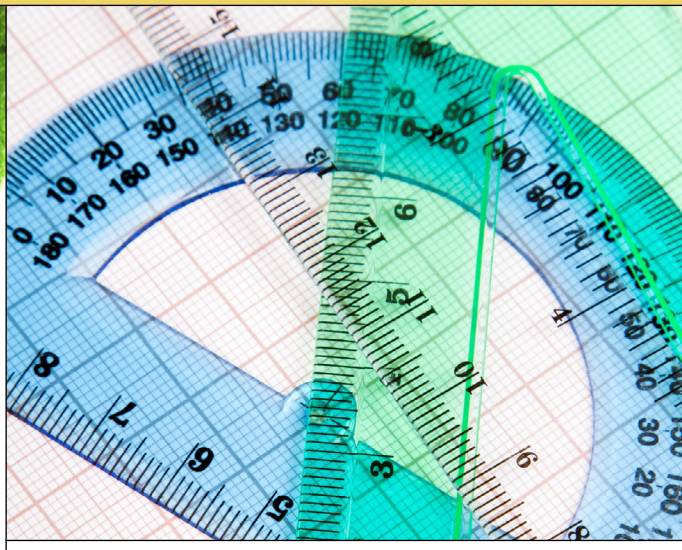
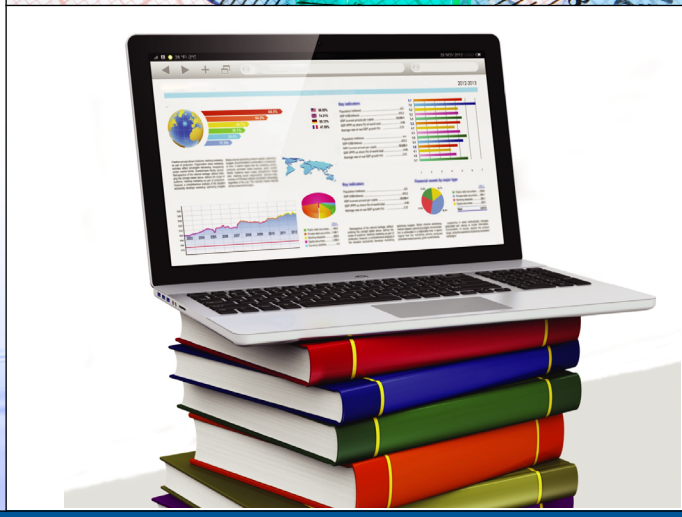
Pan-Canadian Assessment Program

PCAP 2023

Report on the Pan-Canadian Assessment of Science, Reading, and Mathematics

Highlights





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PCAP 2023 HIGHLIGHTS

What is PCAP?

The Pan-Canadian Assessment Program (PCAP) assesses the knowledge and skills of Canadian students in three core learning areas—science, reading, and mathematics. It also collects a significant range of contextual information (on family, institutional, and community factors) to enhance interpretation of prosperity outcomes (educational attainment, academic achievement, health and well-being, engagement, and social-emotional learning). PCAP was developed and is administered by the Council of Ministers of Education, Canada (CMEC) with the active involvement of all participating ministries and departments of education.

Why was PCAP developed?

CMEC developed PCAP to ensure the availability of statistically valid, comparable data on student achievement in Canada. PCAP data will be used by education researchers, policymakers, and government officials to make improvements to provincial and territorial education systems.

Who writes PCAP?

For PCAP 2023, approximately 31,500 students in Grade 8 (Secondary II in Quebec) from more than 1,400 schools across all provinces participated in the online assessment. Science was the major focus of the assessment. Reading and mathematics were also assessed. Approximately 24,000 students were assessed in English and 8,000 in French.

What does PCAP assess?

The assessment is not tied to the curriculum of a particular province or territory but is instead a fair measurement of students' abilities to apply their skills to real-life situations. It measures how well students are doing; it does not attempt to assess approaches to learning.

Provinces and territories also work to ensure that the unique qualities of our country's education systems are taken into account. Factors such as linguistic differences, rural and urban school locations, and cultural influences are all considered in both the assessment itself and in related contextual questionnaires. In addition, the common curricular framework for each subject incorporated an agreed-upon perspective for all provinces and territories that was based upon the latest pedagogical research.

PCAP 2023 was the sixth cycle of PCAP to be completed, and it focused on science. The domain of science is divided into three competencies (scientific inquiry, problem solving, and scientific reasoning) as well as four subdomains (nature of sciences, life sciences, physical sciences, and Earth sciences). The subdomains intersect with each other, and the competencies are interwoven through the subdomains.

Canadian students perform well in science.

In reporting performance levels in science, PCAP provides an overall picture of students' accumulated understanding in this domain by the end of Grade 8/Secondary II. The assessment categorizes results according to four performance levels. Students classified at a given performance level are assumed to be able to perform most of the tasks at that level as well as those at the lower levels, if any. Based on pan-Canadian curriculum expectations in science, the expected performance level is Level 2.

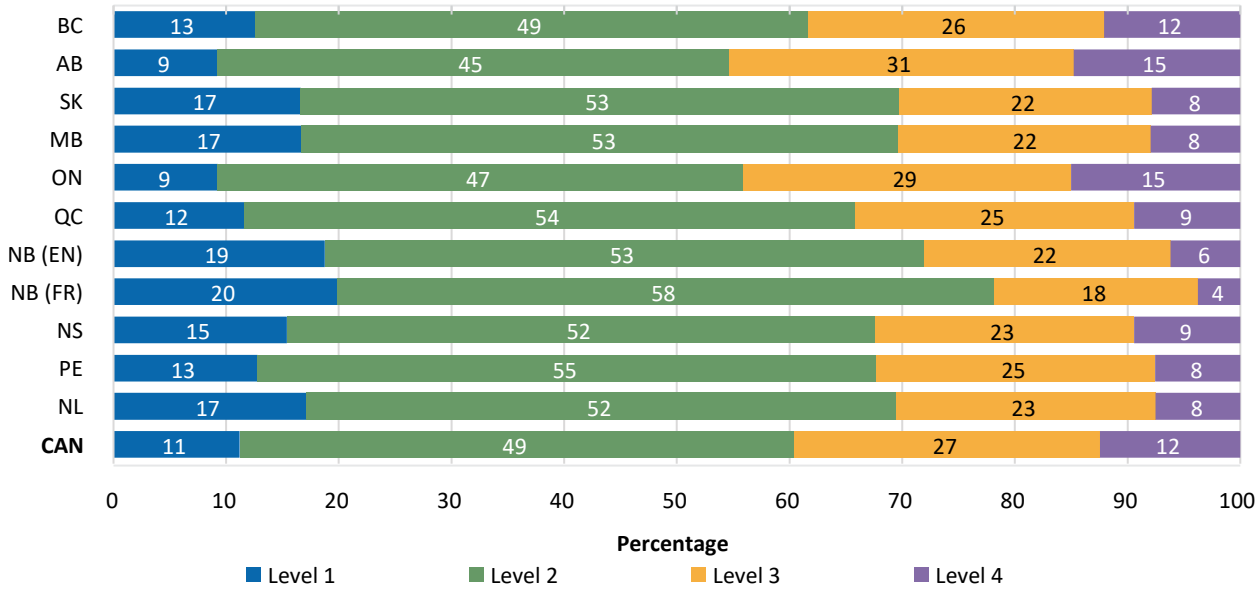
Description of science performance Level 2 (scores from 382 to 528)

Students at Level 2 were able to:

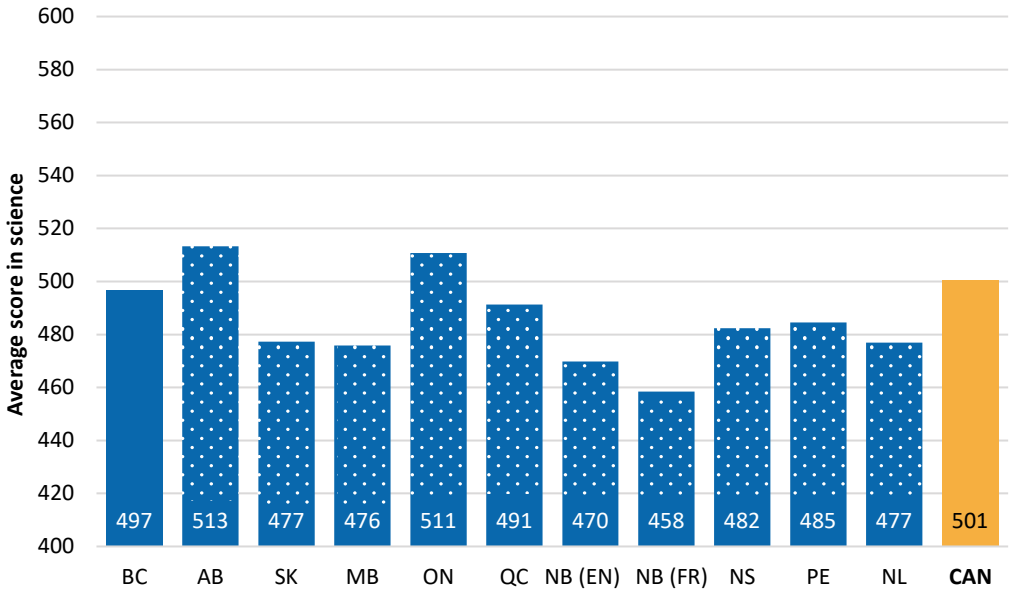
- identify good scientific inquiry practices
- demonstrate an understanding of what is required for a scientifically valid experiment, identify variables, and use data and/or their scientific knowledge to make suggestions for further investigations
- state and test a hypothesis in a simple experiment
- use observations or other data sources (e.g., pictorial diagrams, data tables) to support given statements or to draw direct conclusions
- make connections using scientific knowledge in specific contexts, drawing on more than one source of information
- select and apply simple problem-solving strategies
- demonstrate an understanding of various interactions between living organisms and their environment
- identify ways to meet the essential needs of life
- identify states of matter and use the particle theory of matter to explain changes in states
- demonstrate an understanding of some ways in which their actions affect the environment
- demonstrate an understanding of the causes and effects of erosion

Overall in Canada, 89 percent of Grade 8/Secondary II students in Canada performed at or above Level 2 in science.

At the higher end of the PCAP scale, 12 percent of Canadian students performed at Level 4. Across the provinces, between 80 and 91 percent of students achieved the expected level (Level 2), while between 4 and 15 percent of students achieved the highest level of performance (Level 4).



Alberta, Ontario, and British Columbia students performed at or above the Canadian average score in science.



Note: Dotted bars denote significant difference compared to Canada

Reading and mathematics

Although science was the major domain in PCAP 2023, the assessment also measured performance in reading and mathematics.

Highest average scores were achieved by Ontario students in reading and by Quebec students in mathematics.

	Above* the Canadian average	At the Canadian average	Below* the Canadian average
Reading	Ontario	British Columbia, Alberta, Quebec	Saskatchewan, Manitoba, New Brunswick (English and French), Nova Scotia, Prince Edward Island, Newfoundland and Labrador
Mathematics	Quebec	Alberta, Ontario	British Columbia, Saskatchewan, Manitoba, New Brunswick (English and French), Nova Scotia, Prince Edward Island, Newfoundland and Labrador

* Denotes significant difference

Students enrolled in English-language school systems achieved higher results in science than those enrolled in French-language school systems. The opposite pattern is seen for mathematics. While in reading, students enrolled in either school system achieved similar results.

In science, a similar percentage of English- and French-language students achieved Level 2 or above. However, a higher percentage of English-language students attained at performance levels of Level 3 and Level 4 compared to French-language students. When the results are examined by average scores, students in English-language school systems outperformed their peers in French-language school systems in science in Canada overall and in all provinces that oversampled to obtain results by language group, except Manitoba and Quebec, where no difference was found between the two language groups.

In reading, students in both language groups achieved similar average scores in Canada overall and in Manitoba and Quebec. In the remaining provinces for which reliable data are available, English-language students outperformed French-language students.

In mathematics, the achievement gap favoured students in French-language school systems in Canada overall, Manitoba, and New Brunswick. The opposite pattern was seen in Saskatchewan, and no difference was found between the two language groups in the remaining provinces for which reliable data are available.

	English-language school systems performed significantly better than French-language school systems	**French-language school systems performed significantly better than English-language school systems**	**No significant difference between school systems**
Science	British Columbia, Alberta, Saskatchewan, Ontario, New Brunswick, Nova Scotia, **Canada**		Manitoba, Quebec
Reading	British Columbia, Alberta, Saskatchewan, Ontario, New Brunswick, Nova Scotia		Manitoba, Quebec, **Canada**
Mathematics	Saskatchewan	Manitoba, New Brunswick, **Canada**	British Columbia, Alberta, Ontario, Quebec, Nova Scotia

Students enrolled in majority-language school systems achieved higher average scores in science and reading than those enrolled in minority-language school systems. In mathematics, by contrast, students enrolled in either school system achieved similar results.

In science and reading, students in majority-language school systems outperformed their peers in minority-language school systems in Canada overall and in all provinces that oversampled to obtain results by language group, except Manitoba and Quebec, where no difference was found between the two language groups.

In mathematics, students in majority- and minority-language school systems performed equally well in Canada overall, British Columbia, Alberta, Ontario, Quebec, and Nova Scotia. In the remaining provinces for which reliable data are available, minority-language students outperformed majority-language students in Manitoba and New Brunswick, and the opposite pattern was seen in Saskatchewan.

	Majority-language school systems performed significantly better than minority-language school systems	**Minority-language school systems performed significantly better than majority-language school systems**	**No significant difference between school systems**
Science	British Columbia, Alberta, Saskatchewan, Ontario, New Brunswick, Nova Scotia, **Canada**		Manitoba, Quebec
Reading	British Columbia, Alberta, Saskatchewan, Ontario, New Brunswick, Nova Scotia, **Canada**		Manitoba, Quebec
Mathematics	Saskatchewan	Manitoba, New Brunswick	British Columbia, Alberta, Ontario, Quebec, Nova Scotia, **Canada**

In Canada overall, there is no gender gap in science; females performed better than males in reading; and males performed better than females in mathematics.

In science, there was no gender difference in Canada overall in the percentage of students at or above the expected performance level (Level 2), as well as at performance levels of Level 3 and Level 4. There was also no gender gap in average scores in science overall, the four science subdomains, and the three science competencies at the pan-Canadian level. In reading, a gender difference favouring females was found, while the opposite pattern was found in mathematics.

At the provincial level, no gender gap in average scores in science was found in British Columbia, Alberta, Ontario, Quebec, or Newfoundland and Labrador. Males had higher average scores than females in the remaining provinces except New Brunswick (French), where females had higher average scores than males. In reading, females performed significantly better than males in all provinces except Alberta; while in mathematics, males performed significantly better than females in all provinces except British Columbia, Quebec, and New Brunswick (French).

	Females performed significantly better than males	Males performed significantly better than females	No significant difference between females and males
Science	New Brunswick (French)	Saskatchewan, Manitoba, New Brunswick (English), Nova Scotia, Prince Edward Island	British Columbia, Alberta, Ontario, Quebec, Newfoundland and Labrador, **Canada**
Reading	British Columbia, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick (English and French), Nova Scotia, Prince Edward Island, Newfoundland and Labrador, **Canada**		Alberta
Mathematics		Alberta, Saskatchewan Manitoba, Ontario, New Brunswick (English), Nova Scotia, Prince Edward Island, Newfoundland and Labrador, **Canada**	British Columbia, Quebec, New Brunswick (French)

The sixth administration of PCAP allows for comparisons of achievement over time.

Science: In 2023, average scores in science remained stable across Canada and in half the provinces compared to 2013.

Compared with the baseline established in PCAP 2013, average scores in science remained stable in 2023 in Canada overall, British Columbia, Alberta, Ontario, Quebec, and New Brunswick, while Manitoba showed improvement. The results decreased in the remaining provinces. The results in both language systems (English and French) and by gender remained stable in 2023 compared to the baseline year for Canada overall, while the results were variable at the provincial level.

Reading: At the pan-Canadian level, there was an increase in average scores in reading in 2023 over 2010.

Reading scores in PCAP 2023 improved by 5 points in Canada overall, compared to the adjusted baseline year of 2010. Reading achievement in French-language school systems improved in 2023 over 2010, while results remained stable in English-language school systems. The results for females remained stable between 2010 and 2023, while the results for males showed improvement.

Mathematics: At the pan-Canadian level, there was an increase in average scores in mathematics in 2023 over 2010.

Mathematics results at the pan-Canadian level in 2023 increased by 10 points over the baseline established in 2010. Mathematics results in English-language school systems improved over time in 2023 compared to 2010, while results were stable in French-language school systems. The results for females remained stable between 2010 and 2023, while the results for males showed improvement.

Coming soon ...

Further analysis of the information collected through PCAP will help provide a better understanding of the extent to which important background variables are related to the differences in performance highlighted here. Secondary analysis undertaken as part of the forthcoming report *PCAP 2023: Contextual Report on Student Achievement in Science* will explore family, institutional, and community factors as related to the prosperity outcomes (educational attainment, academic achievement, health and well-being, engagement, and social-emotional learning). Further analysis will be available in forthcoming issues of *Assessment Matters!*, a series of articles available on the CMEC website.

The next PCAP assessment is planned for 2027, with reading as the major domain.

Further results are available in

PCAP 2023: Report on the Pan-Canadian Assessment of Science, Reading, and Mathematics.

This publication is available on the CMEC website: http://www.cmec.ca

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