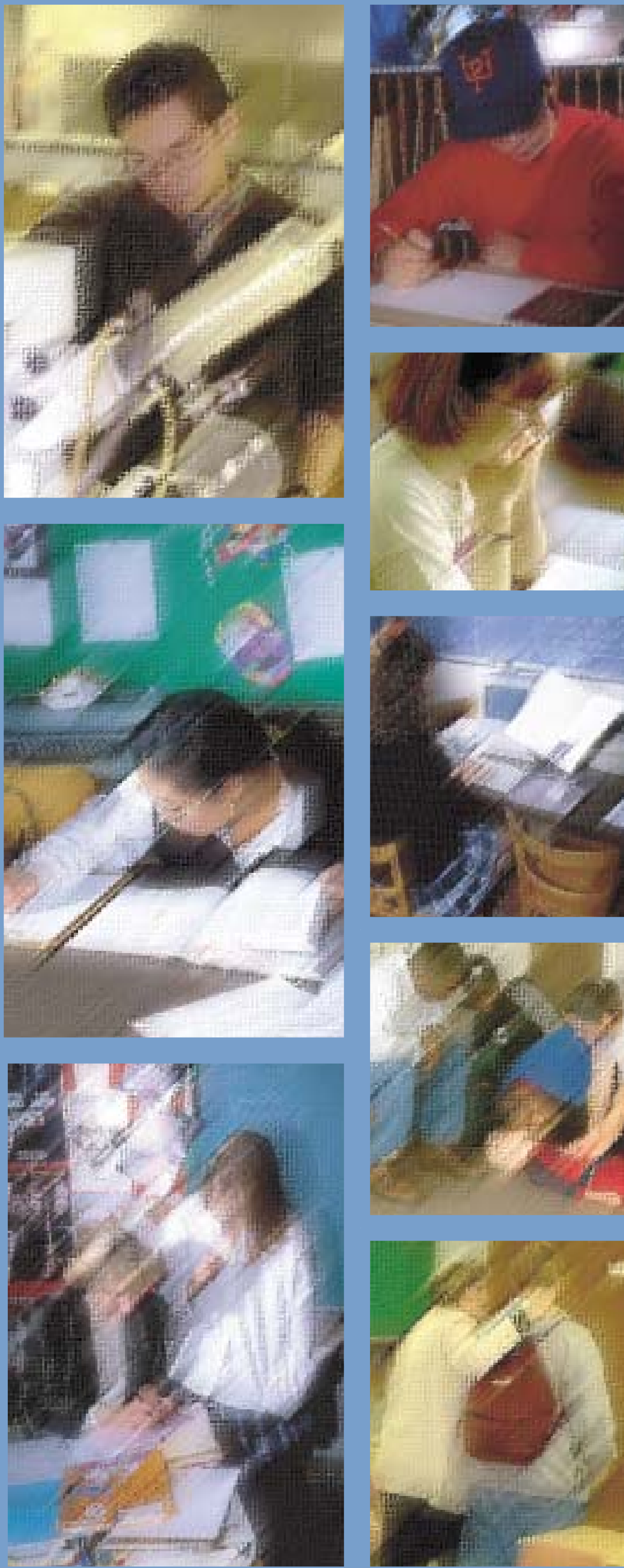

School Achievement Indicators Program

SAIP

Science III

2004

Council of Ministers of Education, Canada

Conseil des ministres de l'Éducation (Canada)

Report on Science III Assessment

SAIP

School Achievement Indicators Program

2004

Council of Ministers of Education, Canada

The Council of Ministers of Education, Canada (CMEC), created in 1967, provides the ministers responsible for education in the provinces and territories with a mechanism for consultation on educational matters of mutual interest and concern and facilitates cooperation among the provinces and territories on a broad range of activities at the elementary, secondary, and postsecondary levels. CMEC Secretariat offices are located in Toronto.

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INTRODUCTION

A CONTEXT FOR THIS REPORT

This document forms the report to the public on the results of the pan-Canadian assessment of science achievement for 13-year-old and 16-year-old students, administered in the spring of 2004 by the Council of Ministers of Education, Canada (CMEC), as a part of the ongoing School Achievement Indicators Program (SAIP).

SAIP is a cyclical program of pan-Canadian assessments of student achievement in science, reading, writing, and mathematics that has been conducted by CMEC since 1993. These assessments measure, at the provincial/territorial and pan-Canadian levels, student achievement and the context in which learning takes place, in order to assist governments and policy makers in making decisions about programs offered and resources allocated for schools. The SAIP assessments are not designed to measure achievement at the school or individual student levels but are designed to assess program delivery across Canada and within individual jurisdictions.

The SAIP Science III Assessment (2004) is the third in the series of science assessments, and the results are compared to those of similar assessments conducted in 1996 and 1999.

In addition to the results for Canada and for the individual jurisdictions, this public report outlines the curriculum framework and criteria upon which the test is based and describes briefly the development and modification of the test instruments. A preliminary discussion of the data is included, as are the results of a pan-Canadian expectations-setting process, in which actual student results are compared to expectations set by a pan-Canadian panel.

An important aspect of this assessment is the collection of contextual data on the opportunities students have had to learn science and on their attitudes toward science, as well as other information on their interests and activities. Additional contextual information was gathered from school principals and science teachers. An analysis of a selection of data from this information is included in this report, while complete information including a more detailed statistical analysis of data and a more detailed discussion of methodology will be found in the technical report for this assessment, which will be released by CMEC during the months ahead.

Box 1

SAIP Reports

Two reports will be released for this assessment.

- This public report, intended to give a summary of results and how they were obtained, as well as analysis of selected data from student, teacher, and school questionnaires, providing contextual information related to science teaching and learning.
- A technical report, which usually follows the public report by several months and contains both a more detailed description of development and administration and a more complete and detailed data set. This report is intended for researchers and education officials.

The public report is also available on the CMEC Web site at **www.cmec.ca**.

Background

Canadians want their children to have the best educational preparation possible. Do our students have the thinking skills, the problem-solving skills, and the communication skills to meet the challenges of their future?

To provide jurisdictions with a wider pan-Canadian and international context in which to answer these important questions, ministries[1] of education have participated in a variety of studies since the mid-eighties. At the international level, through CMEC, they have participated in the International Educational Indicators Program of the Organisation for Economic Co-operation and Development (OECD), including the 2000 and 2003 Programme for International Student Assessment (PISA), involving over 40 nations. Individual jurisdictions participated in various achievement studies such as the International Association for the Evaluation of Educational Achievment (IEA) Reading Literacy Study, the Trends in International Mathematics and Science Study (TIMSS), and the Progress in International Reading Literacy Study (PIRLS). In addition, most jurisdictions conduct their own evaluations of students at different stages in their schooling.

Since all ministers of education strive to bring the highest degree of effectiveness and quality to their systems, they recognize a need for collective action to assess these systems in a Canadian context. To the extent that all Canadian students learn common skills in the key subject areas of language, mathematics, and science, these subjects provide a common ground for performance assessment on a pan-Canadian level. Consequently, achievement in these school subjects can serve as a useful indicator of an education system's performance.

To study and report on student achievement in a Canadian context, CMEC initiated the School Achievement Indicators Program in 1989. In a 1991 memorandum of understanding, the ministers agreed to assess the achievement of 13- and 16-year-olds in reading, writing, and mathematics. In 1993, the ministers further agreed to include the assessment of science. The information collected through the SAIP assessments would be used by each jurisdiction to set educational priorities and plan program improvements.

It was decided to administer the assessments in the spring of each year as shown in table 1.

Table 1

SAIP Assessment Schedules

Mathematics	Reading and Writing	Science
1993	1994	1996 (Written and Practical)
1997	1998	1999 (Written and Practical)
2001	2002 (Writing)	2004 (Written)

Copies of reports for assessments administered since 1996 can be found in both official languages through the CMEC Web site at **www.cmec.ca** by following the link to SAIP. For earlier reports, contact CMEC directly.

[1] In this report, "ministry" means "department" as well, and "jurisdiction" means both "province" and "territory."

Curriculum Framework and Criteria

School curricula differ from one part of the country to another, so comparing test data resulting from these diverse curricula is a complex and delicate task. Young Canadians in different jurisdictions, however, do learn many similar skills in reading, writing, mathematics, and science. Throughout the history of SAIP assessments, development teams composed of representatives from various jurisdictions have worked with CMEC staff to consult with all jurisdictions to establish a common framework and set of criteria for each subject area studied. These were intended to be representative of the commonly accepted knowledge and skills that students should acquire during their elementary and secondary education.

Within each subject area, separate strands (or domains) were defined that provided "organizers" for the assessment. Then sets of criteria (and separate assessment tools) were developed to assess both the knowledge and the skill components within the strands. In mathematics, both mathematics content and problem-solving assessments were developed; in science, both written and practical task assessments were developed;[2] and both reading and writing assessments were developed to assess language skills.

Five Levels of Achievement

Achievement criteria[3] were described on a five-level scale, representing a continuum of knowledge and skills acquired by students over the entire elementary and secondary school experience. Criteria for level 1 were representative of knowledge and skills typically acquired during early elementary education, while level 5 criteria were typical of those acquired by the most capable students taking specialized science courses near the end of their secondary school program.

It should be noted that the same assessment instruments were administered to both age groups (13-year-olds and 16-year-olds) to study the change in student knowledge and skills due to the additional years of instruction. When determining the assessment framework and criteria, development teams designed assessments in which most 13-year-olds would be expected to achieve at or above level 2 and most 16-year-olds might achieve at or above level 3. For 16-year-olds in particular, the number of specialized courses completed in the subject area being tested would greatly influence the level of achievement expected. In spite of these potential differences in course selection by individual students, SAIP assessments should still help to determine whether students attain similar levels of performance at about the same age.

One should also note that the differences between successive levels are not equal. For example, the difference in achievement between level 2 and level 3 is rather larger than the difference in achievement between level 4 and level 5. More details on the levels of achievement and sample questions with student responses can be found on page 8 of this report in the section SAIP Science Assessment Framework and Criteria.

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2 Only the written portion of the science assessment was administered in 2004.

3 See SAIP Science Assessment Framework and Criteria, on page 8.

A Program Assessment, not a Student Assessment

In the SAIP assessments, the achievement of individual students is not identified, and no attempt is made to relate an individual's achievement to that of other students. It is intended that the SAIP assessments will be used as one tool to help in measuring how well the education system of each jurisdiction is doing in teaching the assessed subjects. They do not replace individual student assessments, which are the responsibility of teachers, school boards, and ministries of education. Similarly, no attempt is made to compare schools or school districts. The results are reported at the pan-Canadian and jurisdictional levels only.

Harmonization of English and French Assessment Materials

From the outset, the content instruments used in all SAIP assessments were developed by anglophone and francophone educators working together for the purpose of minimizing any possible linguistic bias. Whether they wrote in English or in French, the students were asked to respond to the same questions. A linguistic analysis of each question and problem was also conducted to make sure English and French items functioned in the same manner. For the scoring sessions, anglophone and francophone scorers were jointly trained and did the scoring together. Consequently, the statistical results presented for each language group in this report can be compared with reasonable confidence.

Assessments Over Time

Another important factor to be considered is the impact of changes in curriculum and in teaching practice over time, as a result of both developments in educational research and changing public understandings of the role of education in society. SAIP assessments in all subject areas studied therefore have been designed to retain sufficient items from one administration to the next to allow longitudinal comparisons of student achievement, while making enough modifications to reflect changes in educational policies and practices.

In the case of the SAIP Science III Assessment (2004), a few criteria were modified slightly and a small number of questions were changed to reflect changes in the field of science and science education since the last administration.

Science Education in Canada

During the past two decades, much attention has been given, both within Canada and throughout the world, to the importance of science education in developing a population that is able to participate fully in the political and social changes facing an increasingly technological society. From the ground-breaking 1984 report of the Science Council of Canada, *Science for Every Student: Educating Canadians for Tomorrow's World*,[4] through the 1997 release of the *Common Framework of Science Learning Outcomes*,[5] a product of the CMEC Pan-Canadian Protocol for Collaboration on School Curriculum, and the publication of *Science Literacy and the World of Work*[6] by the Conference Board of Canada, the importance of providing engaging, relevant, and accessible science education for all students has been encouraged.

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4 Science Council of Canada. 1984. *Science for Every Student: Educating Canadians for Tomorrow's World*. Report 36. Ottawa: Science Council of Canada.

5 Council of Ministers of Education, Canada. 1997.*Common Framework of Science Learning Outcomes*. Toronto: Council of Ministers of Education, Canada.

6 The Conference Board of Canada. 1996. *Science Literacy and the World of Work*. Ottawa: The Conference Board of Canada.

Since the early 1990s, curriculum development in Canada and in other countries has emphasized the importance of fostering a scientifically literate population, while at the same time providing opportunities to grow in a challenging learning environment for those students with special aptitudes and interest in these fields. The evolution of a significant role for Science–Technology–Society–Environment (STSE) in emerging curricula is a strong indication of the influence of these reports and others like it. *The Foundation for the Atlantic Canada Science Curriculum* released in 1997, and in use in most of the Atlantic provinces, is a good example of the type of cooperative curriculum development that makes use of these underlying principles of effective science education.

The SAIP *Science Assessment Framework and Criteria* reflects the intent of many of these recent initiatives. While the understanding of the process of teaching and learning about science is continually being refined, the framework and criteria used in 2004 are essentially the same as those used in 1996 and 1999. This is to facilitate the comparison of results among the three assessments — an important feature of SAIP.

Box 2

Science Education on the Web

The SAIP Science Consortium has gathered a list of useful Web sites that are offered as a resource for interested readers.

While by no means intended to be a complete list, it is presented with the intention that Canadian science educators share it as a useful resource.

The list may be found through the CMEC Web site at **www.cmec.ca/saip**.

Learning about Science

Science is more than a body of complex and abstract knowledge and theories about the universe. It is also more than a set of processes that guide scientific inquiry and discovery. While both of these images of science are important to the working scientist, for effective learning, science must relate to the everyday life of students and must engage them in the process of learning about the world around them. All students learn most effectively about their world by guided, direct observation and hands-on experiences that allow them to gain knowledge and acquire skills that are relevant and applicable to their daily lives.

Box 3

Practical Task Assessment Package

The administration of the practical task items during the 1996 and 1999 science assessments generated considerable interest among science educators in Canada.

In the interest of providing a useful assessment resource for teachers, CMEC has released a package of items that have been used during past practical task components. Schools are welcome to use these items for their own purposes.

The package may be found through the CMEC Web site at **www.cmec.ca/saip**.

The Assessment of Scientific Literacy

For many students, the SAIP Science III Assessment may have been a somewhat different testing experience. Rather than a test that emphasizes the simple recall of information, students encountered an assessment that asked them to relate their understanding of science to real-life situations that were familiar to them.

In the written component, common to all three administrations, students' knowledge of science concepts and their application to society around them, as well as their understanding of the nature of science, were measured by responses to multiple-choice and written-response questions. The questions were presented in groups within common scenarios that required the application of knowledge to situations familiar to young people.

While the attainment of science inquiry skills is universally acknowledged as an essential aspect of science education, the assessment of achievement in this area, particularly on a large scale, often has been seen as difficult, if not impossible. In both 1996 and 1999, the SAIP Science Assessment administered a practical task component, challenging students to apply science inquiry and problem-solving skills to straightforward, hands-on tasks. Unfortunately, fiscal and other constraints prohibited the administration of this component in 2004. Readers of this report are encouraged to refer to the public reports of the 1996 and 1999 administrations to learn more about this aspect of the assessments.[7]

Important Assumptions and Limitations for this Assessment

The primary assumption for this assessment is that the five levels of performance represent the potential progression of all students in the sample. However, not all students continue in formal science programs throughout their secondary school careers. Since the sample included 13-year-olds and 16-year-olds, some participants, particularly in the older population, may not have taken science courses for two years or more. The sequence of science courses is also not the same for all students in all jurisdictions. The number of required courses, their degree of specialization in the traditional areas of science, and the stress on particular topics vary from jurisdiction to jurisdiction. For example, some students may take several courses related to biological and environmental sciences, while avoiding courses in physical sciences. In addition, scientific backgrounds of students may vary greatly. For these reasons, the SAIP *Science Assessment Framework and Criteria* was originally drafted to reflect the breadth of what students should know and be able to do in the four areas of the assessment framework.

Although the content of the SAIP Science III Assessment was consistent with that of science programs across Canada, there are some limitations that should be noted. The assessment focuses on knowledge and skills that can be measured by a paper-and-pencil test. The skills and knowledge assessed in the practical task component were not addressed in the 2004 administration.

[7] These reports are available through www.cmec.ca.

Table 2

Overview of SAIP Science III Assessment (2004)

Participating jurisdictions	Canada, including all 10 provinces and 2 of 3 territories.[1]
Populations sampled	13-year-old students and 16-year-old students (*Note that both populations were administered the same test questions.*)
Number of participating students	25,700 students 13,900 13-year-old students 11,800 16-year-old students
Languages in which the test was developed and administered	Both official languages 19,300 anglophone students 6,400 francophone students[2]
Framework	SAIP *Science Assessment Framework and Criteria*[3]
Assessment administration	All students completed a short science placement test, which allowed them to be assigned to a particular set of questions. All students completed a student questionnaire. Students were given $2\frac{1}{2}$ hours to complete the assessment and 30 minutes to complete the questionnaire. The teacher and school principal each completed a separate questionnaire.
Results	Reported for Canada Reported by language Reported for jurisdictions Pan-Canadian expectations set by a broadly representative panel of Canadians
Scoring	Five levels of achievement
Reports	Public report (this report) Technical report (to be released later)

1 Nunavut did not participate in this assessment.

2 Five provinces with significant populations in both languages (MB, ON, QC, NB, and NS) chose to report results for both language groups. In Manitoba, French immersion students wrote the assessment in French.

3 Unlike previous SAIP assessments, no practical task component was administered in 2004.

SAIP SCIENCE ASSESSMENT FRAMEWORK AND CRITERIA

The SAIP *Science Assessment Framework and Criteria* was developed through extensive consultation with educators and policy developers in all jurisdictions. The *Framework and Criteria* reflects the principles of science education described earlier in this report.

While this framework is not intended to be an exhaustive listing of knowledge, concepts, and skills acquired during science learning, it represents in five levels of achievement, increasing in complexity from levels 1 to 5, a sample of the typical science learnings experienced throughout elementary and secondary education.

Each question in the assessment measures at least one criterion, but not all criteria are assessed, given that there are over 300 criteria and only 129 questions.

The framework is defined by a series of *strands* or "curriculum organizers."

Questions dealing with **science concepts** assessed student understanding in the following areas:

- knowledge and concepts of science
  - physical sciences — chemistry
  - life sciences — biology
  - physical sciences — physics
  - earth and space sciences
- nature of science
- relationship of science to technology and societal issues

Questions also dealt with conceptual knowledge and understanding, procedural knowledge and skills, and the ability to use science to solve problems.

Questions that assessed **conceptual knowledge and understanding** asked students to

- outline, explain, or define concepts
- identify suitable examples of concepts
- suggest new ways of representing concepts

Questions that assessed **procedural knowledge and skills** asked students to

- recognize when a particular procedure should be used
- suggest procedures to solve particular problems
- modify familiar procedures to solve new problems

Questions that assessed the **ability to use science to solve problems** asked students to

- formulate problems
- apply a variety of strategies to solve problems
- produce solutions to problems
- assess given solutions to problems

A detailed description of the assessment domains and the associated criteria for each of the five levels was included in the *Handbook for Schools*, which may be found on the CMEC Web site at **www.cmec.ca**.

The exemplars presented with each level include representative multiple-choice questions and written-response questions for that level. Correct responses to the multiple-choice questions are indicated, and sample acceptable student responses to the written-response questions[8] are also provided.

Criteria — Level 1

At level 1, the student can

- describe physical properties of objects
- distinguish living things from non-living things
- recognize that energy can appear in different forms
- recognize that objects in the universe undergo change
- demonstrate care and accuracy during scientific investigations
- identify various technologies important to society

Field Trip

A science class goes on an overnight trip to the Gaspé Peninsula.

While on the trip, the students will be experiencing more hours of daylight than at any other time of the year.

During which month are they going?

A. March
* B. June
C. September
D. December

Maria and Raphael use a variety of instruments to help them in their investigation of the pond.

Name a piece of equipment that they could use in their investigation. Briefly tell how this equipment will help them.

Equipment: water tester

How does it help?

to see if the water is poluted or not

[8] Written-response questions require students to respond with a few sentences or phases, or with a simple graphic.

At level 2, the student can

- classify substances according to their physical properties
- compare various plant and animal adaptations
- know that the amount of energy in the universe is conserved but that it can change form and be transferred
- know that the movement and the tilt of Earth affect cycles such as years, days, and seasons
- explain that there are different forms of scientific investigations and that their results may contradict each other
- identify technologies that influence science, and science knowledge that leads to new technologies

Canoe Trip

Three friends decide to celebrate the Canada Day holiday by taking a short canoe trip on a nearby lake.

Alice describes the behaviour of the birds. Some behaviours were inherited and others were learned.

Which of the following describes a behaviour that the birds most likely would have learned?

A. Bringing food back to the nest to feed their young

* B. Looking for their food near picnic tables

C. Sleeping while perched on a branch

D. Building nests

Sun Protection Factor

Helen knows that overexposure to ultraviolet rays is harmful to the skin. She devises an experiment to compare the effectiveness of a lotion with a Sun Protection Factor (SPF) 15 to one with SPF 30.

Helen's hypothesis: "The higher the SPF value, the better the protection."

She needs:

- samples of SPF 15 and SPF 30 lotions from the same company
- 10 volunteers with similar skin type and skin colour

Why did Helen choose volunteers of the same skin type?

She chose volunteers of the same skin type because, if she used different skin types., some people would burn more or more easily then others leaving the experiment with innacurate conclusions

Criteria — Level 3

At level 3, the student can

- use chemical properties to compare and classify substances
- know that some life forms are unicellular and others are multicellular, and that life forms are involved in the transfer of energy
- compare gravitational and electrical forces
- compare distances from Earth to the Moon, Sun, and other stars
- analyze experiments and judge their validity
- identify areas where science knowledge and technologies address societal problems

Amateur Astronomer

Michelle, an amateur astronomer, observes the night sky with her binoculars and her telescope.

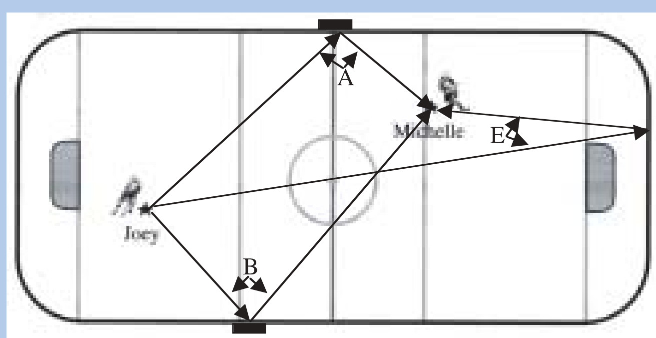
Michelle knows that light from the Moon reaches Earth in about one second. She also knows that light from Alpha Centauri, the star nearest our solar system, takes about five years to reach Earth.

About how long does it take for light to travel from the Sun to Earth?

A. 1 second
* B. 8 minutes
C. 5 years
D. 10 years

Every winter after school, Richard plays a game of pick-up hockey at the local arena with his friends Joey and Michelle. Joey shoots the puck off the boards, and it goes to Michelle.

Draw lines to show the path of the puck as it goes from Joey to the boards and then to Michelle.



Criteria — Level 4

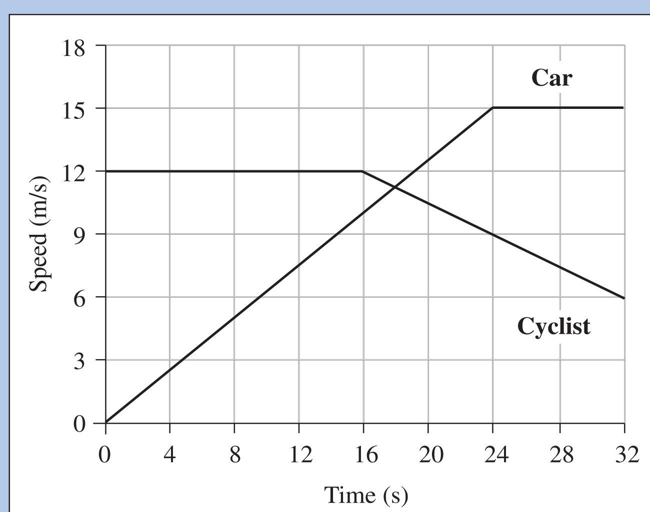
At level 4, the student can

- describe and compare particles in terms of protons, neutrons, and electrons
- state the importance and role of DNA
- analyze uniform motion in one dimension
- use the theory of plate tectonics to explain various geological activities
- explain that scientific progress is the result of ongoing experimentation and evaluation
- describe a situation where science or technology has affected our view of what the world is like

Car Ride

Rita fastens her seat belt and goes for a drive.

As soon as Rita resumes driving, a cyclist passes her car. A speed versus time graph representing the car and the cyclist follows:



At 32s, which one will be ahead of the other and by what distance?

A. The car, by 96 m
B. The cyclist, by 96 m
C. The car, by 36 m
* D. The cyclist, by 36 m

Farm

Richard and his family work together on their farm.

Oxygen, $O_{2(g)}$, is an important component of the air found in the soil. Like many other substances, oxygen is cycled in nature.

Describe the oxygen cycle in nature. Use a diagram if you wish.

Vegetation absorbs the CO_2 in their surroundings and use it to create energy through photosynthesis. The by-product is O_2, which is then released back into their surroundings

At level 5, the student can

- relate properties of substances to their molecular structure
- know that various factors can mutate DNA and that some mutations may be passed on to offspring
- analyze uniform motion in two dimensions
- evaluate evidence for the theory of plate tectonics
- explain conditions used to evaluate scientific theories
- show the influence of world views on science and technology

Methane, $CH_{4(g)}$, is another fuel used in homes. Both methane and propane are gases at room temperature and pressure. Water, $H_2O_{(l)}$, on the other hand, is a liquid at room temperature and pressure.

Under these conditions, why is water a liquid when methane and propane are both gases?

A. Methane and propane have more hydrogen, making them more gaseous.

B. Water molecules are non-polar, and methane and propane molecules are polar.

* C. Water molecules are polar, and methane and propane molecules are non-polar.

D. Water molecules are smaller and will pack together more tightly.

The Hike

Cindy and Jeff are on a hike in the Rocky Mountains.

Continuing on their hike, they see a cliff. Above the cliffs, they notice some peregrine falcons. The falcons prey on swallows, and these in turn prey on mosquitoes.

What specific effect could human activity have on these and other species in this area?

if you spray to kil mosquitos the poison transfers from small amounts in each mosquito to medium amounts in swallows, to larger amounts in falcons (biomagnification)

DEVELOPMENT OF THE ASSESSMENT MATERIALS

The 1996 Assessment

The development of the components of the SAIP Science Assessment (1996) began in the fall of 1993 when CMEC created a consortium of subject and assessment specialists from the ministries of education in Alberta, Saskatchewan, Ontario, and New Brunswick (francophone). The consortium worked in cooperation with other ministries of education.

Provincial curricular materials present science as a continuum of learnings from elementary through to the end of secondary school. Criteria for the assessment were drafted to reflect the breadth of what students in Canadian schools are expected to know and be able to do with respect to science knowledge and skills acquired. In keeping with an emphasis on conceptual understanding of science, points of progress along the continuum were organized to represent five levels of progress.

As the SAIP *Science Assessment Framework and Criteria* evolved, each ministry of education reviewed draft proposals in the context of its curriculum and according to its own consultation procedures. Classroom teachers and professional groups also reviewed the proposed assessment framework and criteria. Student evaluation and curriculum specialists from the universities, science experts, and representatives from nongovernmental organizations also reviewed the criteria.

The 1999 Assessment

In April 1998, a team from Saskatchewan, Ontario, Quebec, Nova Scotia, and Newfoundland and Labrador came together to review the assessments and prepare them for re-administration.

In all of its work, the 1999 consortium team strove to make the second cycle of the assessment comparable to the 1996 assessment. Attention was paid to this factor at all levels — instrumentation, administration, scoring, data collection and analysis, and reporting.

The 2004 Assessment

As before, a pan-Canadian consortium team carefully reviewed the assessment materials. This team consisted of representatives from Ontario, Quebec, British Columbia, and Nova Scotia.

As with previous assessments, the 2004 consortium team strove to make the third cycle of the assessment comparable, as much as possible, to the previous assessments. During the development process, the team considered all aspects of the assessment process from the framework and criteria, through the instruments, the scoring, and data management, to the reporting process.

Twelve questions were replaced out of 129 questions in total, mostly because of editing and other considerations. These new questions were carefully field tested during the autumn of 2003, before finalizing the 2004 assessment materials.

ADMINISTERING THE ASSESSMENT

All students writing this assessment began by doing section A, which contained 12 questions at level 3. Teachers supervising the administration then scored these immediately. On the basis of their scores on those 12 questions, students were directed to continue with a particular set of pages in their test booklet. Section B contained 71 questions covering levels 1, 2, and 3. Section C contained 71 questions covering levels 3, 4, and 5, level 5 being the highest. The questions in each section were a combination of multiple-choice and written-response questions.

SCORING THE 2004 ASSESSMENT

Teams of thoroughly trained scorers matched student responses with the criteria developed to measure student achievement. Scoring sessions involving about 60 scorers were held in Moncton and Charlottetown during June and July 2004. Rigorous statistical tests were carried out on a regular basis to ensure both the reliability of individual scorers and the consistency of applying the scoring criteria. In addition, sophisticated management techniques have been developed over the history of SAIP assessments to ensure a reliable and efficient process of managing student booklets and the data resulting from the scoring process.

PAN-CANADIAN EXPECTATIONS FOR PERFORMANCE IN SCIENCE

An important question that must be asked for any assessment is one of expectations. "What percentage of Canadian students should achieve at or above each of the five performance levels, as illustrated by the framework and criteria and by the questions asked?" The answer to this question must come not only from educators, but also from the broadest possible spectrum of Canadians.

Box 4

How well did Canadian students REALLY do?

To ensure that the design and the results of SAIP assessments are really representative of the expectations that Canadians have for their students and schools, a broadly based panel was gathered from across Canada of both educators and representatives from business and the general public.

In sessions held in three different locations in Canada, members examined all of the testing materials and shared their expectations of how well Canadian students should perform.

Results of these sessions were then compared with the actual results and reported in the public report.

To assist with the interpretation of SAIP assessments, CMEC regularly convenes pan-Canadian panels of educators and non-educators to examine the framework and criteria and to review the assessment instruments and scoring procedures. For the Science III Assessment, panellists attended one of the three sessions held in Charlottetown, Ottawa, and Winnipeg during the late summer of 2004. This anonymous panel consisted of teachers, students, parents, university academics and curriculum specialists, teacher trainers, business and industry leaders, Aboriginal and community leaders, and members of national organizations with an interest in science education. The panel featured representatives from across Canada.

The 100-member panel reviewed all assessment instruments, scoring procedures, and actual student results to determine the percentage of 13- and 16-year-old students who should achieve each of the five performance levels. Full and open disclosure was provided to panellists of any information pertinent to the assessment, including sampling of students and the varying opportunities that students across the country have in learning science.

A collaborative process was used to define pan-Canadian expectations for student achievement in science. Specifically, participants were asked to answer independently the question "What percentage of Canadian students should achieve at or above each of the five performance levels, as illustrated by the framework and criteria and by the questions asked?"

Panellists' answers to that question were collected to determine the desired Canadian student performance as pan-Canadian expectations and to help interpret how students should do in comparison with actual results.

Box 5

Levels of Achievement

In this report, performance-by-level charts are based upon cumulative results and actually show percentages of students **at or above** each level. Each bar on a graph indicates the percentage of students **at or above** a particular level of performance while excluding those students performing at lower levels. For example, the bar for level 3 or above represents all those students who scored at levels 3, 4, or 5. Students who scored below level 3 are not included.

Therefore, textual references to “students achieving level X” refer to students achieving **level X or above**.

NOTES ON STATISTICAL INFORMATION

Confidence Intervals

In this study, the percentages calculated are based on samples of students. Therefore, these are estimates of the actual achievement students would have demonstrated had all of the students in the population taken the assessment. Because an estimate based on a sample is rarely exact, it is common practice to provide a range of percentages within which the actual achievement is likely to fall. This range of percentage values is called a confidence interval. The confidence interval represents the high- and low-end points between which the actual achievement level would fall 95% of the time. In other words, one can be confident that the actual achievement level of all students would fall somewhere into the established range 19 times out of 20 if the assessment were repeated with different samples from the same population.

In the charts of this report, confidence intervals are represented by |–|. In tables, confidence intervals are represented in parentheses. If the confidence intervals of two groups overlap, the differences between the two are not statistically significant. It should be noted that the size of the confidence interval depends upon the size of the sample. In smaller jurisdictions, a large interval may indicate difficulties in obtaining a large sample and does not reflect upon the competency of the students to whom the assessment was administered.

Box 6

Statistical Comparisons

The performance of students in Canada (and within each jurisdiction) was compared by looking at the proportion of students meeting or exceeding each level of performance in each jurisdiction and at the cumulative distributions of these proportions.

Since the available scores were based on samples of students from each jurisdiction, we cannot say with certainty that these scores are the same as those that would have been obtained had all 13- and 16-year-old students been tested. We use a statistic called the **standard error** to express the degree of uncertainty in the scores for the sample compared with the population. Using the standard error, we can construct **a confidence interval**, which is a range of scores within which we can say, with a known probability (such as 95%), that the score for the full population is likely to fall. The 95% confidence interval used in this report represents a range of plus or minus about two standard errors around the average.

The following charts are intended as representations of numerical data and as such cannot always be interpreted with the same degree of precision as the actual numbers. This is particularly true for small percentages and small confidence intervals. For more precise data, please refer to the numerical tables in the appendix to this report and to the forthcoming technical report.

Differences

In this report the terms "difference" and "different," used in the context of performance levels and percentages, refer to a difference that is not due to chance. In a technical sense, they refer to a statistically significant difference.

Statistical vs. Educational Difference

Statistical significance is determined by mathematical formulas and considers issues such as sampling. It is a matter of interpretation as to whether a difference in results has educational significance. There are situations where a statistically significant difference may have little educational significance (i.e., the difference is very small). There are also situations where a difference that is perceived to have educational significance may not in fact have statistical significance. For example, when one compares the 1996, 1999, and 2004 performances, the statistical differences may not be educationally significant in the light of even small changes to the test design. What may be educationally significant, however, is the smaller gap between any one jurisdiction's level of student performance and the pan-Canadian performance in 2004 compared to 1999.

Percentages

For most charts in this report, percentages are rounded to one decimal point.

SAMPLE CHART

The following chart is provided to help readers interpret the confidence intervals used in this report. For example, there is no significant difference between population L and populations A, C, E, F, H, I, J, and K, but there is a significant difference between population L and populations B, D, and G because their confidence intervals do not overlap.

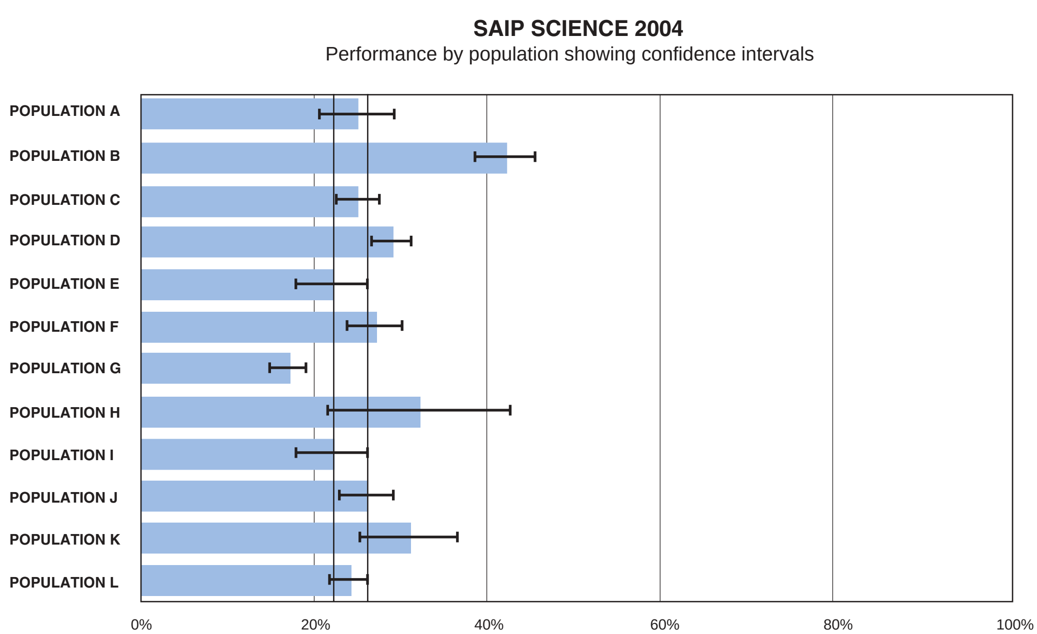
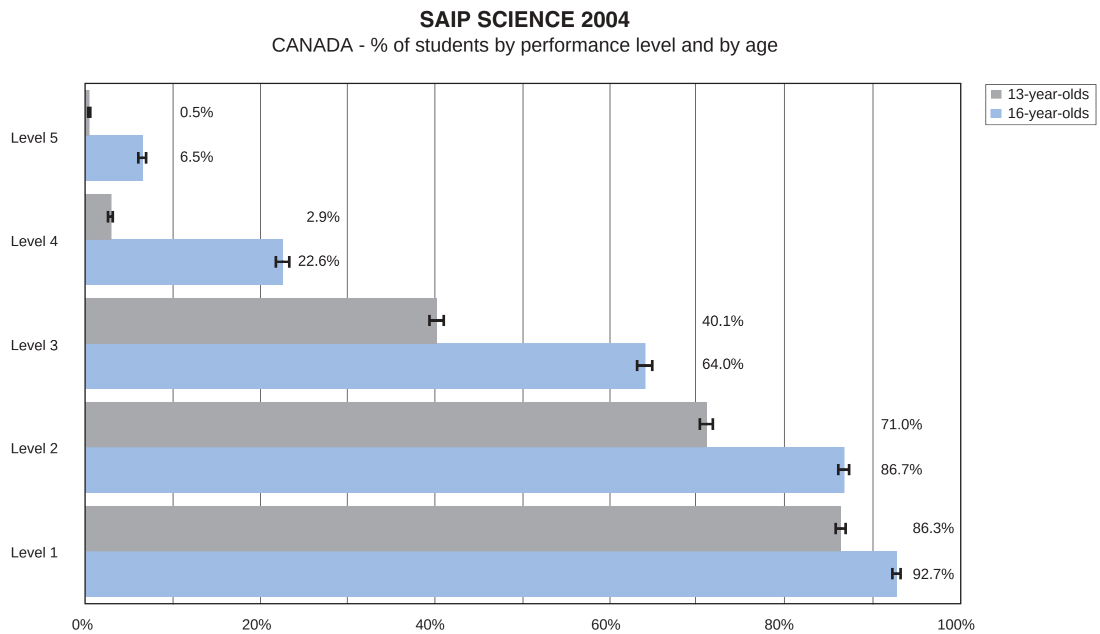


Chart C1 compares overall results combining performances in all jurisdictions and both languages for both age groups in 2004. Frequency tables on which the various charts are based and which contain actual percentages and confidence intervals are included in the appendix.

As might be expected, since students from both age groups were presented with identical instruments, there are more students from the 16-year-old population at higher levels. With this data, what once would only have been an expectation can now be stated with some certainty.

CHART C1



Over 70% of 13-year-olds were able to reach level 2, where they demonstrated such abilities as comparing various plant and animal adaptations and identifying technologies that influence science and the science knowledge that leads to new technologies. Nearly two-thirds of 16-year-olds reached level 3 and were able to demonstrate such abilities as using chemical properties to compare and classify substances and analyze experiments and judge their validity.

Box 7

Below Level 1

Student ability was only one of the factors that can cause student achievement to be recorded at this level.

Other reasons include

- The school designates student ability below level 1, assigns the score "below level 1," and exempts the student.
- The student is not motivated to make a serious attempt at completing the assessment.

The relatively high proportion of students below level 1 in this assessment, particularly in some jurisdictions, is an issue that will cause careful review of the detailed results by administrators.

ACHIEVEMENT DIFFERENCES BETWEEN 1996, 1999, AND 2004

If one considers the standards expected by the design team of level 2 or above for most 13-year-olds and level 3 or above for most 16-year-olds, the following comparisons may be made:

Table 3

Canada Results	1996		1999		2004
	Written	Practical Task	Written	Practical Task	Written
Percentage of 13-year-olds achieving level 2 or higher	71.9 (0.8)	92.8 (0.7)	73.3 (0.8)	90.0 (1.0)	71.0 (0.8)
Percentage of 16-year-olds achieving level 3 or higher	69.0 (0.8)	64.6 (1.2)	76.1 (0.8)	75.7 (1.4)	64.0 (0.9)

The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses.

CHART C2

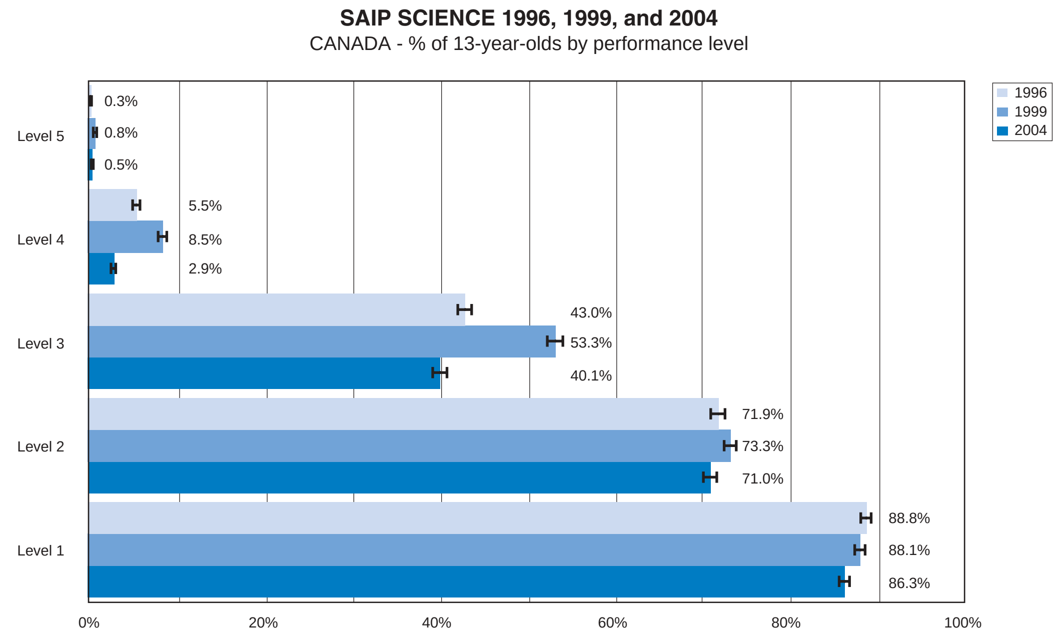
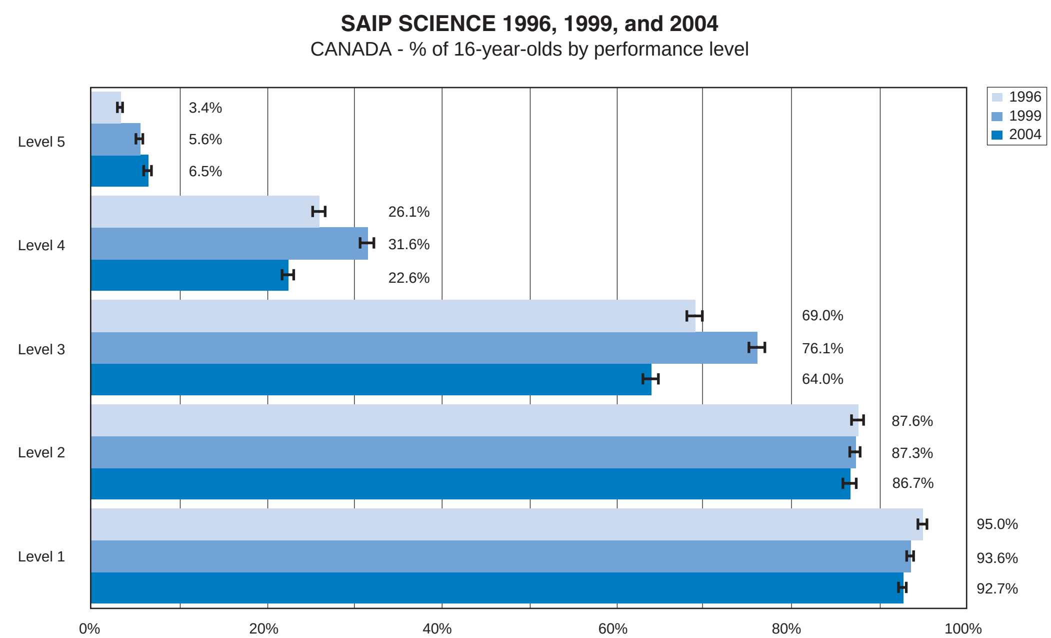


CHART C3



Examination of these data suggests that relative proportions of students attaining each level were relatively consistent from year to year.

Table 4		
Achievement Consistency Over Time		
Written	*13-year-olds*	*16-year-olds*
Level 1	More than 85%	More than 90%
Level 2	More than 70%	More than 85%
Level 3	More than 40%	More than 64%
Level 4	3% to 8.5%	23% to 32%
Level 5	Less than 1%	3.4% to 6.5%

While achievement levels showed an improvement at almost all levels and for both populations between SAIP Science I (1996) and SAIP Science II (1999), there was a significant decrease in achievement at most levels in SAIP Science III (2004).

Exceptions to the above trends occurred for 16-year-olds at level 2, where achievement levels were relatively constant, and at level 5, where there was a slight increase in achievement in 2004.

The reasons for the relative decrease in performance in 2004 could be many, although there are no data in this assessment to support any particular explanation. Some possible reasons that suggest further investigation might include

- decreasing congruence between curricula and a test design that has remained essentially the same since 1996
- decreasing congruence between classroom practices and learning strategies and the items tested during the intervening years
- increased emphasis on literacy and numeracy in schools, sometimes at the expense of other subject areas
- an "assessment fatigue" factor for both teachers and students arising from the increasing curriculum load in the classroom and perceived interruptions by a variety of local, jurisdictional, national, and international large-scale assessments
- changes in jurisdictional policies and/or directions that may affect this particular assessment

More detailed data may be found in the technical reports for the earlier assessments, available from CMEC, and in the forthcoming technical report for this assessment.

CHART C4

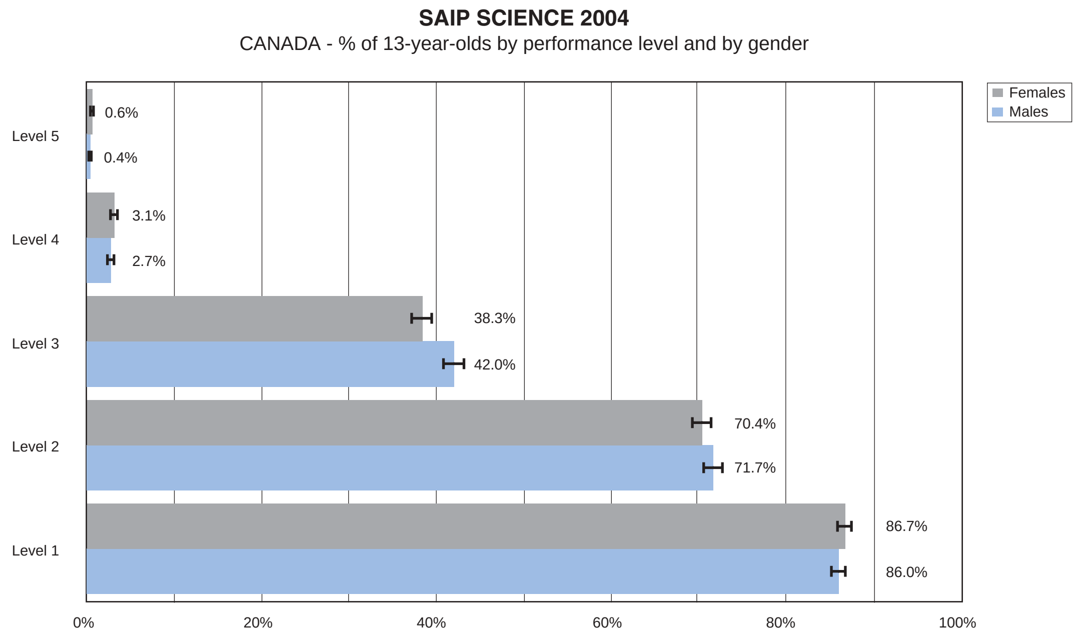
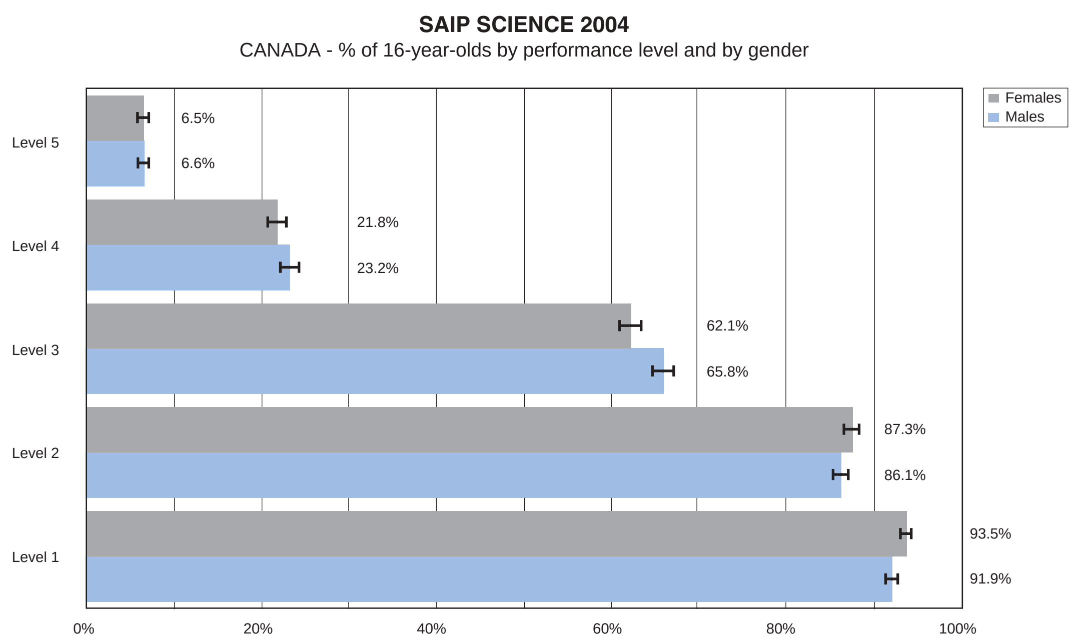


CHART C5



Charts C4 and C5 show that there is no significant difference in achievement between males and females at all levels except at level 3 where both 13- and 16-year-old males outperformed their female counterparts. There are slightly more 13-year-old males at level 3 or above. For 16-year-olds, there are slightly more females at level 1 or above. These data suggest that the efforts to make science education more relevant to, and more inclusive of, young women continue to have a positive influence on science achievement.

ACHIEVEMENT DIFFERENCES BY LANGUAGE

CHART C6

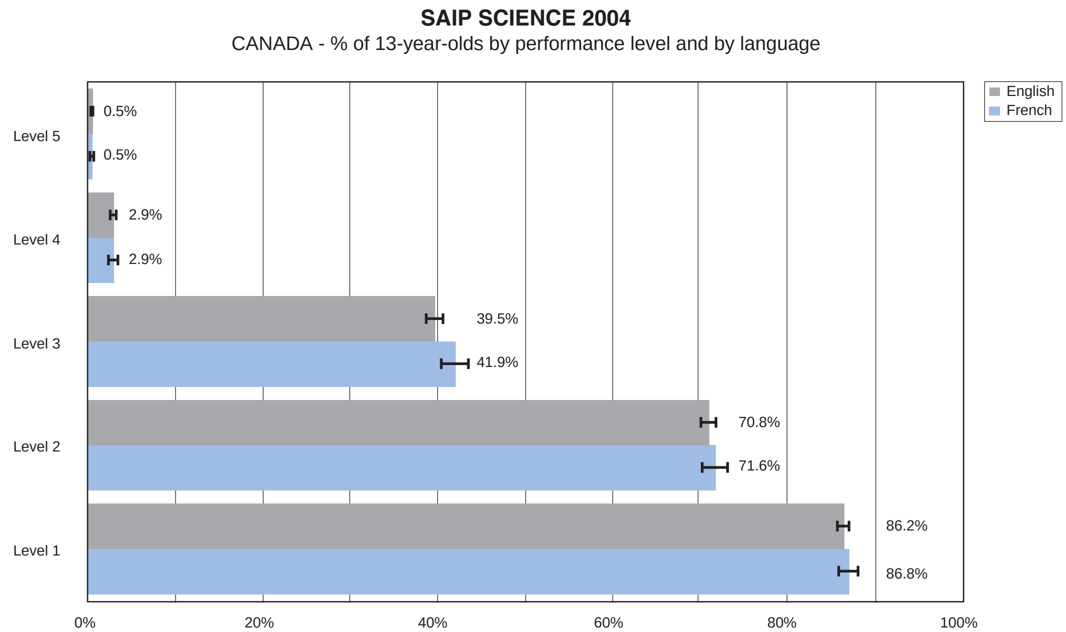
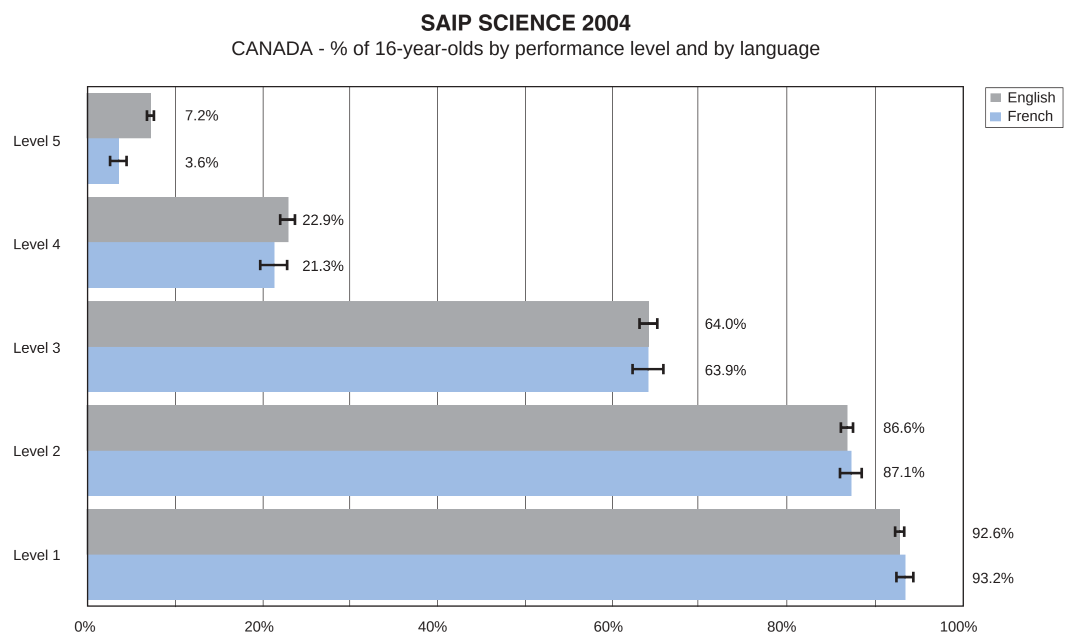


CHART C7



Charts C6 and C7 show that the difference in achievement at all levels for both age groups and in both languages was not significant, except at level 5 for 16-year-olds, where more students who wrote the assessment in English achieved this level.

Participants in the expectations-setting sessions were asked to answer independently the question: "What percentage of Canadian students should achieve at or above each of the five performance levels, as illustrated by the Framework and Criteria and by the questions asked?" Panellists' answers to that question were collected to determine the desired Canadian student performance — the pan-Canadian expectations — and to help interpret how students should do in comparison with actual results. Ministries of education will take these expectations into consideration in reviewing the SAIP results.

CHART C8

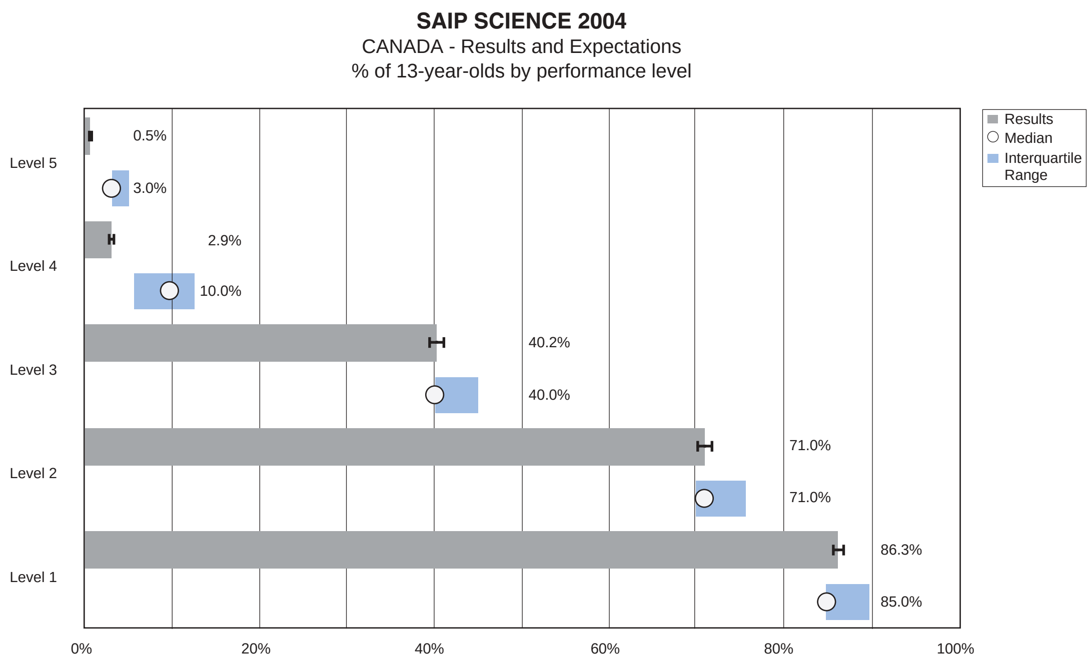


CHART C9

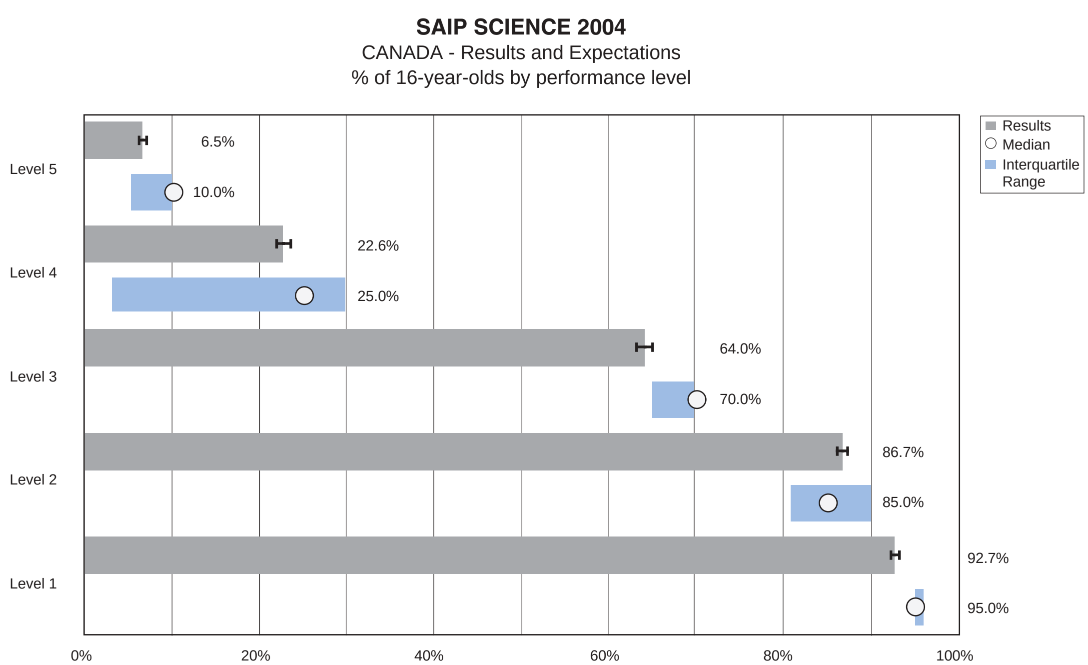


Chart C8 shows that 13-year-old students met the expectations of the panel at levels 1, 2, and 3, while the panel expected significantly more students to reach levels 4 and 5. Generally, this compares with the panellists views in the 1999 assessment, whose expectations closely matched performance at levels 1 and 2, while performance exceeded expectations at level 3.

With respect to 16-year-olds, chart C9 shows that in 2004 panellists were satisfied with the performance of 16-year-old students at levels 2, 3, 4, and 5. At level 1, there was a small but significant difference that indicates that expectations only slightly exceeded performance. Generally, these expectations matched 1999 expectations except at level 4, where both results and expectations are lower in 2004.

Box 5

Levels of Achievement

In this report, performance-by-level charts are based upon cumulative results and actually show percentages of students **at or above** each level. Each bar on a graph indicates the percentage of students **at or above** a particular level of performance while excluding those students performing at lower levels. For example, the bar for level 3 or above represents all those students who scored at levels 3, 4, or 5. Students who scored below level 3 are not included.

Therefore, textual references to "students achieving level X" refer to students achieving **level X or above**.

NOTES ON STATISTICAL INFORMATION

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Since the available scores were based on samples of students from each jurisdiction, we cannot say with certainty that these scores are the same as those that would have been obtained had all 13- and 16-year-old students been tested. We use a statistic called the **standard error** to express the degree of uncertainty in the scores for the sample compared with the population. Using the standard error, we can construct **a confidence interval**, which is a range of scores within which we can say, with a known probability (such as 95%), that the score for the full population is likely to fall. The 95% confidence interval used in this report represents a range of plus or minus about two standard errors around the average.

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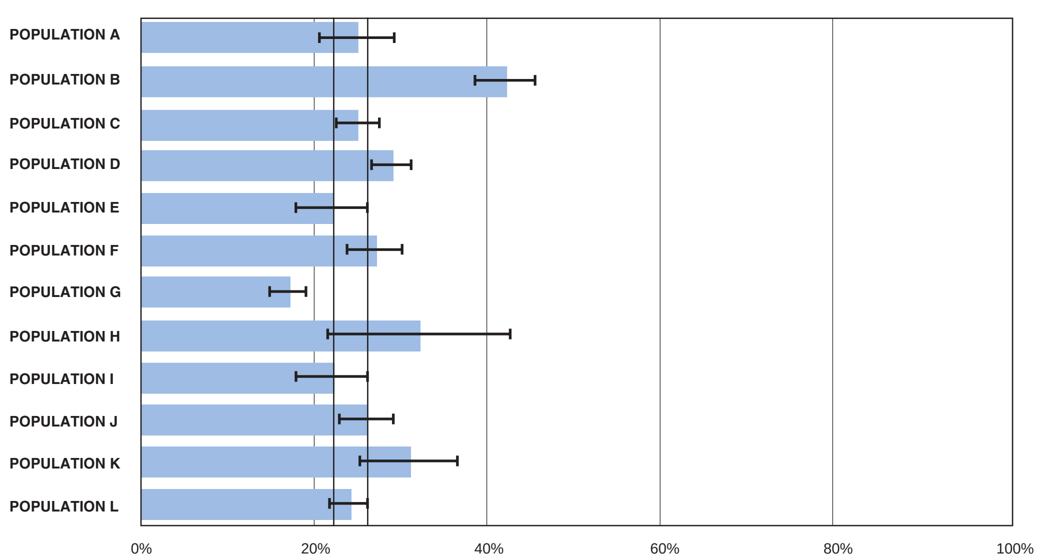
SAIP SCIENCE 2004

Performance by population showing confidence intervals



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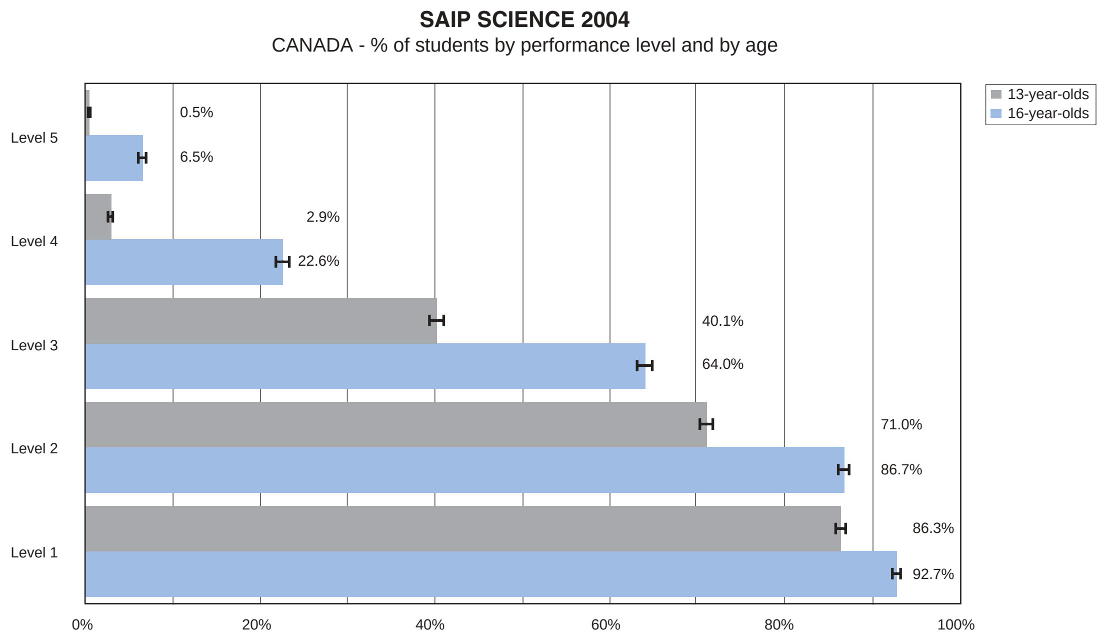

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CHART C2

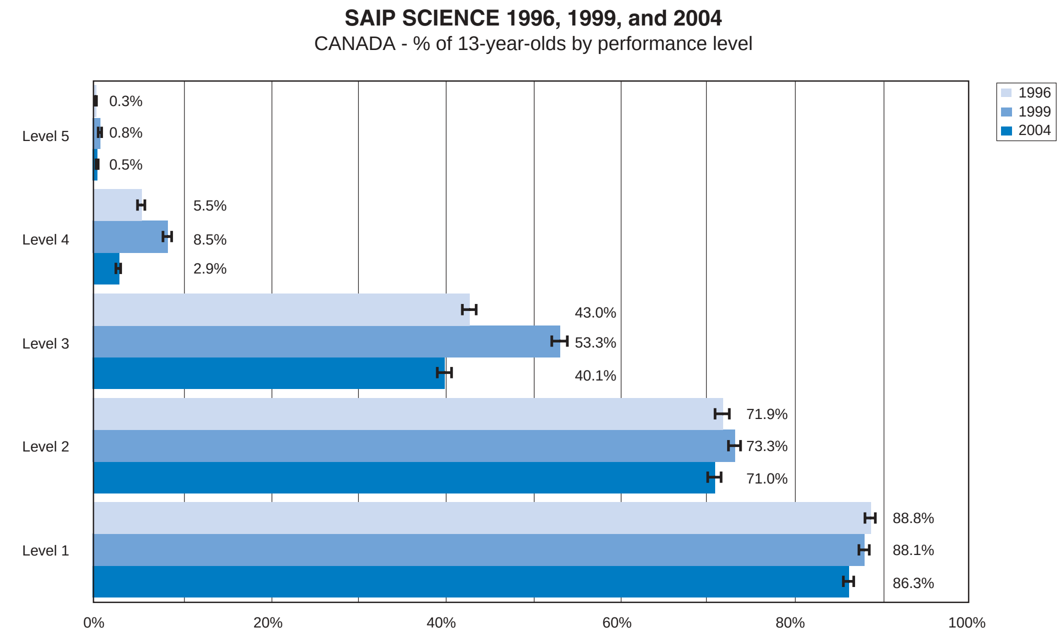

CHART C3

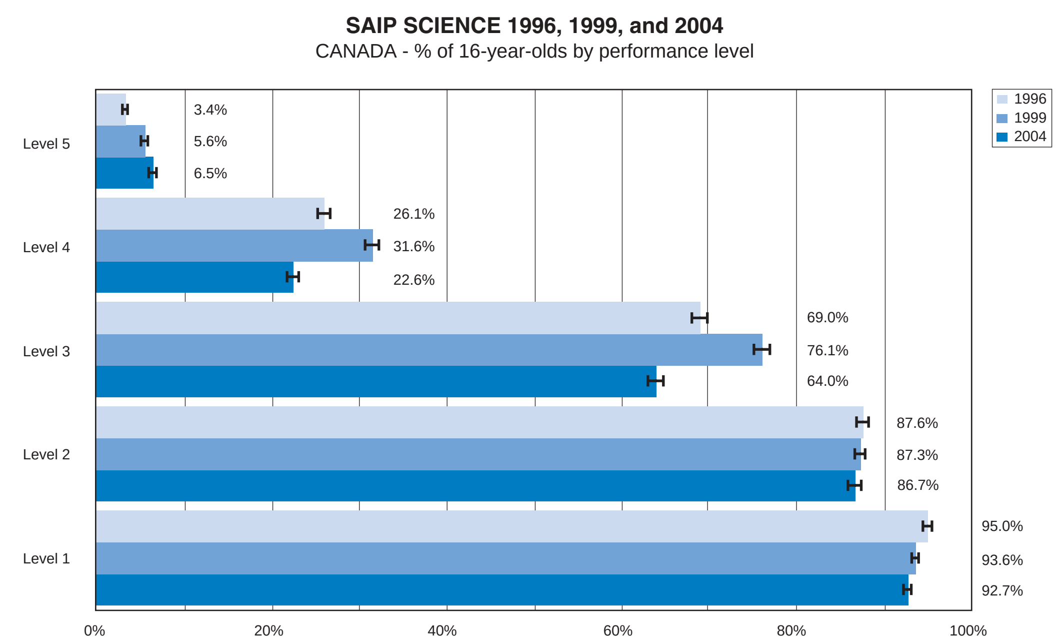

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CHART C4

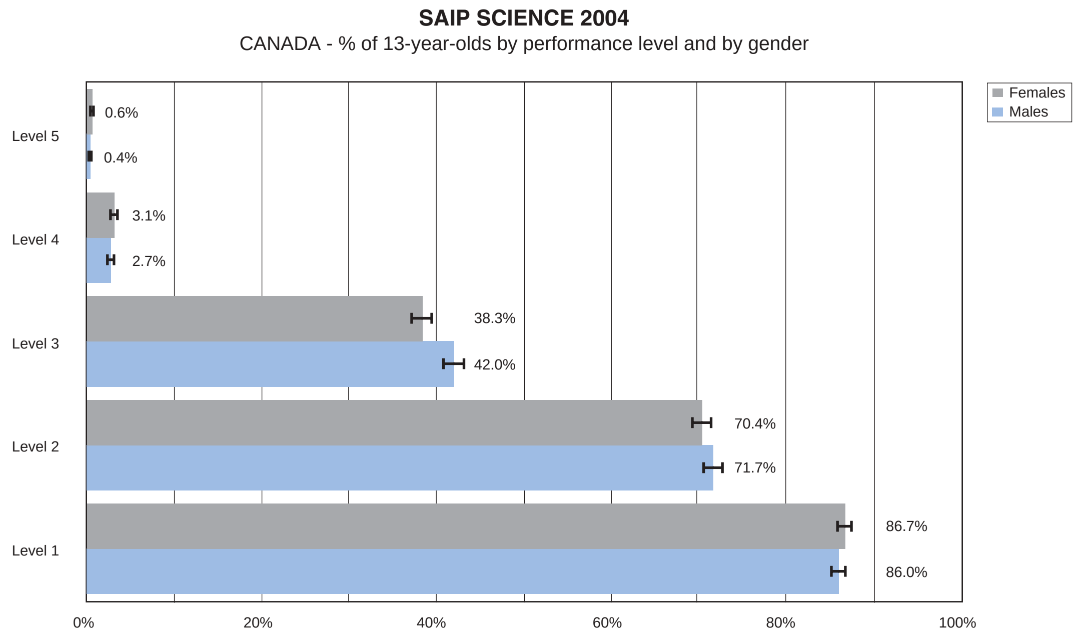
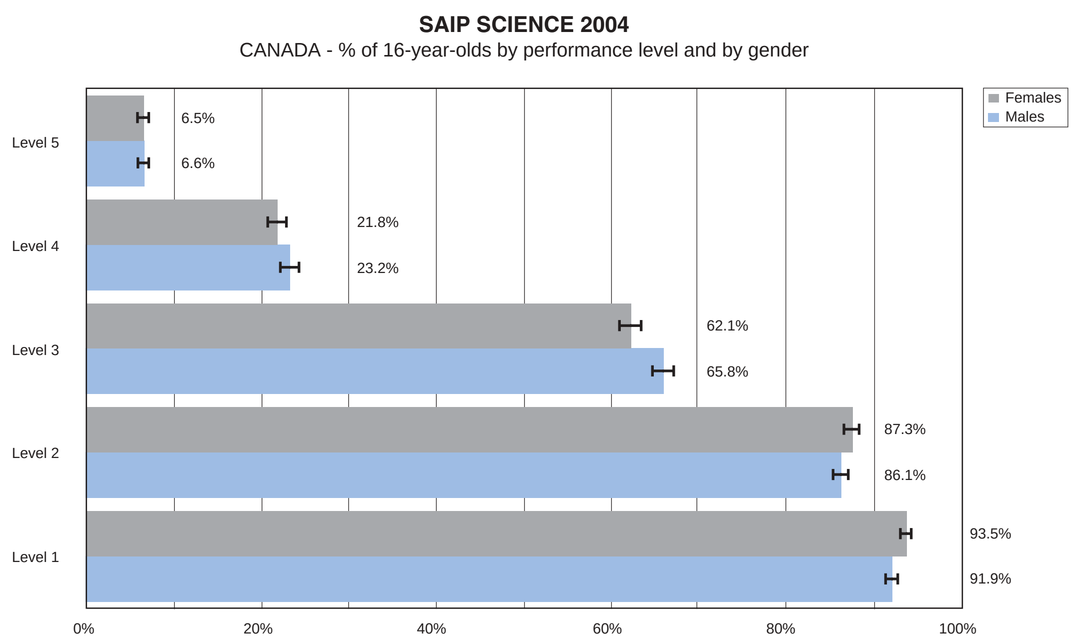


CHART C5



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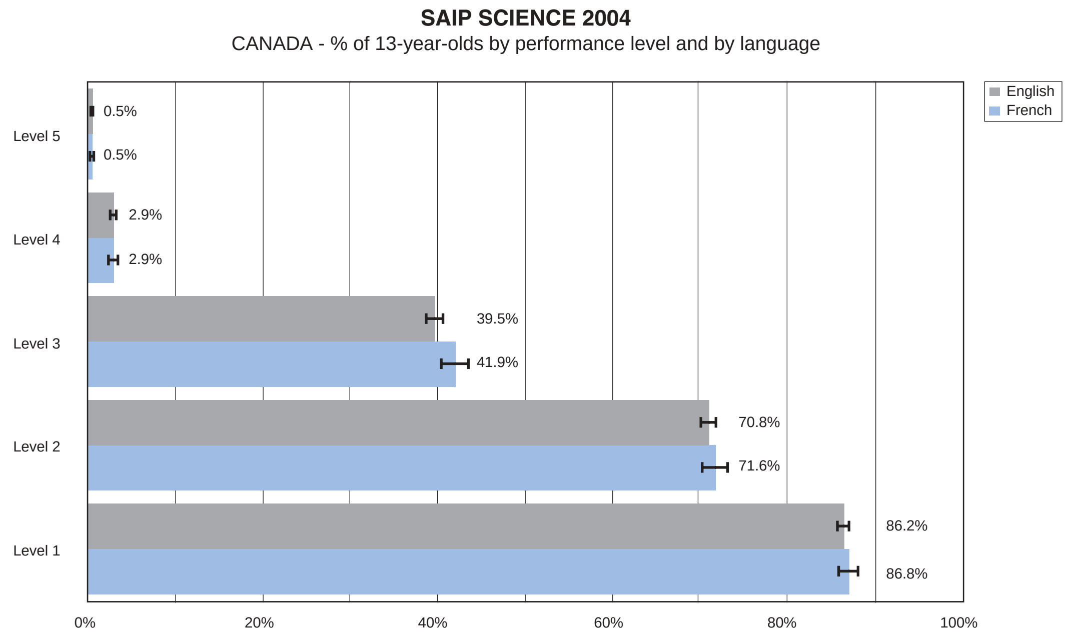

CHART C7

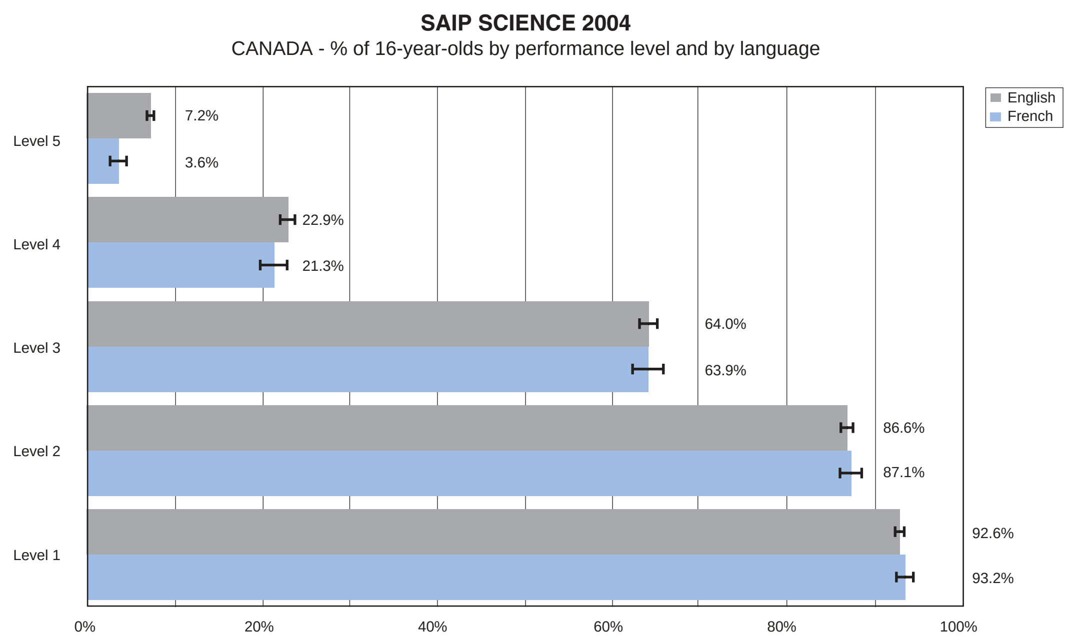

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CHART C8

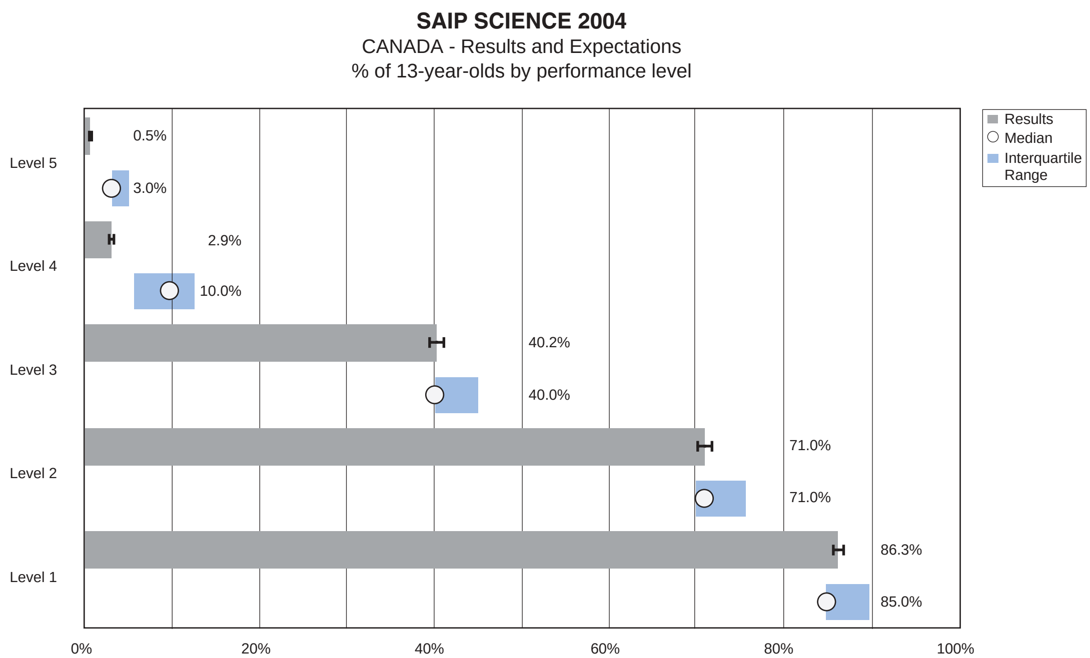
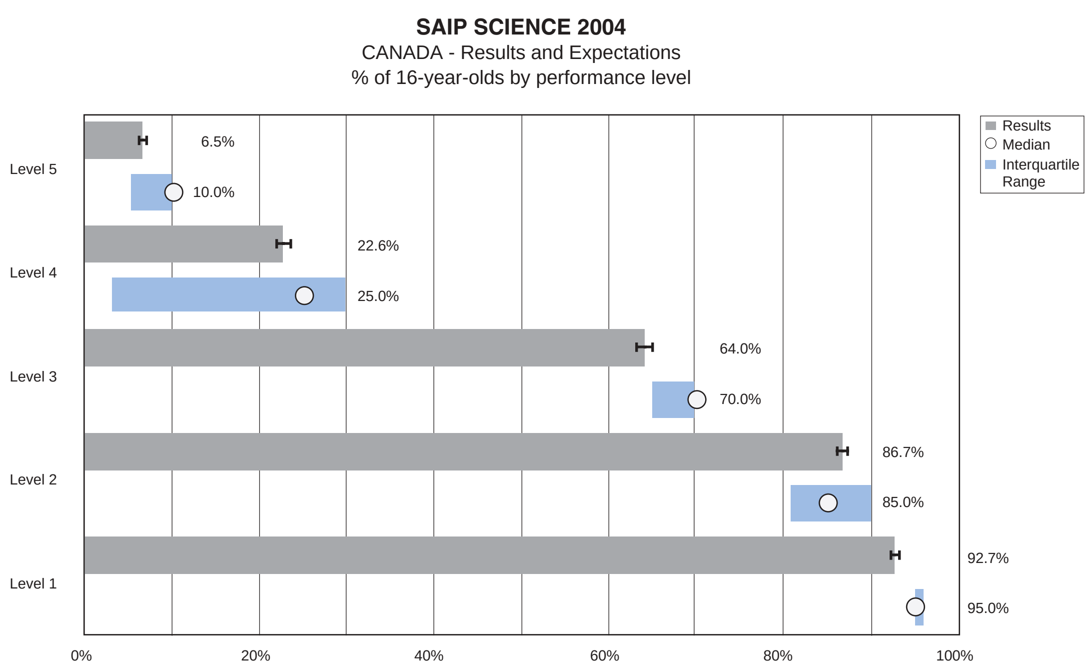


CHART C9



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With respect to 16-year-olds, chart C9 shows that in 2004 panellists were satisfied with the performance of 16-year-old students at levels 2, 3, 4, and 5. At level 1, there was a small but significant difference that indicates that expectations only slightly exceeded performance. Generally, these expectations matched 1999 expectations except at level 4, where both results and expectations are lower in 2004.

Overview of Achievement by Level

This section of the report presents a series of charts entitled "Overview of Achievement by Level." This is then followed by results for each individual jurisdiction. Please note that in table 5, jurisdictions are listed in alphabetical order.

Box 8

Benchmarks of Achievement

The questions in the SAIP Science Assessment were designed with the expectation that most 13-year-olds would achieve level 2 or higher, while most 16-year-olds would achieve level 3 or higher.

Readers are referred to the SAIP *Science Assessment Framework and Criteria* for a description of these levels.

Table 5

Jurisdictional Results in Science in Relation to the Canadian Results

	Jurisdictions performing better than the Canadian average	*Jurisdictions performing about the same as the Canadian average*	*Jurisdictions performing lower than the Canadian average*
13-year-old students at level 2			
Canada (71.0% reached level 2 or above)	Alberta	British Columbia Manitoba (E) Ontario (E) Quebec (E) Quebec (F)	Manitoba (F) New Brunswick (E) New Brunswick (F) Newfoundland and Labrador Northwest Territories Nova Scotia (E) Nova Scotia (F) Ontario (F) Prince Edward Island Saskatchewan Yukon
16-year-old students at level 3			
Canada (64.0% reached level 3 or above)	Alberta	British Columbia Newfoundland and Labrador Ontario (E) Quebec (F) Yukon	Manitoba (E) Manitoba (F) New Brunswick (E) New Brunswick (F) Northwest Territories Nova Scotia (E) Nova Scotia (F) Ontario (F) Prince Edward Island Quebec (E) Saskatchewan

Note: Differences in scores are significant when confidence intervals DO NOT overlap.

The following charts present the cumulative achievement levels for all jurisdictions. The data shown are an overview and display the percentage of students at or above a particular level. This is a useful way to present comparisons between jurisdictional results and the Canadian results, as the percentage of students at or above a particular level is more directly comparable than performance at any one level, except level 5. It is not always better to have a high percentage of students achieve a particular level (for example, a high percentage of students achieving level 1 would not be desirable). Percentages are weighted to represent more accurately the total student population of 13- and 16-year-olds.

The results do vary from jurisdiction to jurisdiction. The charts show that some jurisdictions perform better than others. Achievement in some jurisdictions is significantly higher or lower than the Canadian results.

As before, percentages are based on samples of students. In each case, the proportion of 13-year-olds achieving level 2 or higher and the proportion of 16-year-olds achieving level 3 or higher is highlighted in the accompanying comments.

For all populations, performances are only statistical estimates of the actual achievement students would have demonstrated if all of the students in the population had taken the assessment. These estimates are shown through the use of confidence intervals as described in the Notes on Statistical Information found on page 17. Where confidence intervals overlap, there is not a statistically significant difference in the two percentages.

CHART C10

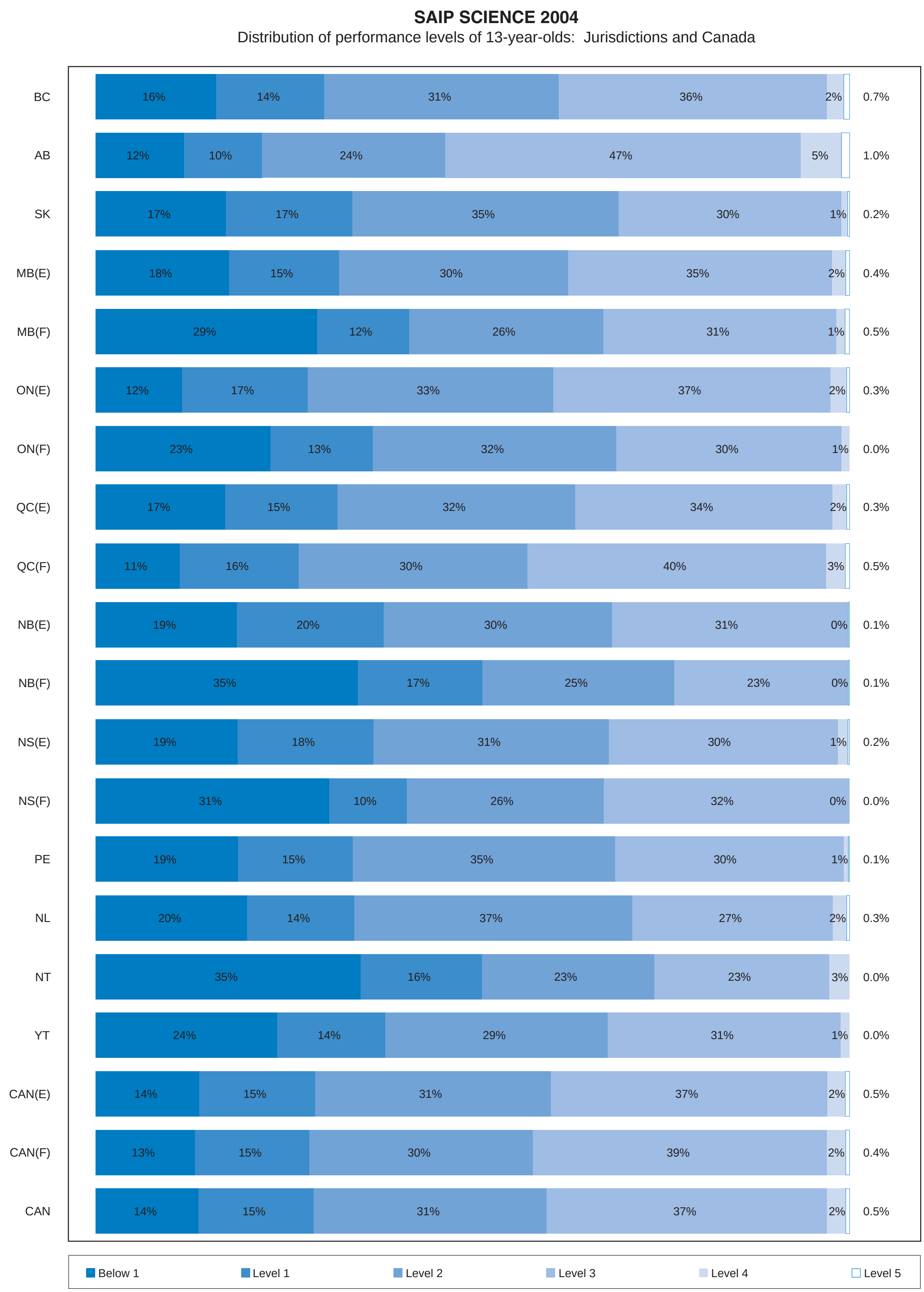
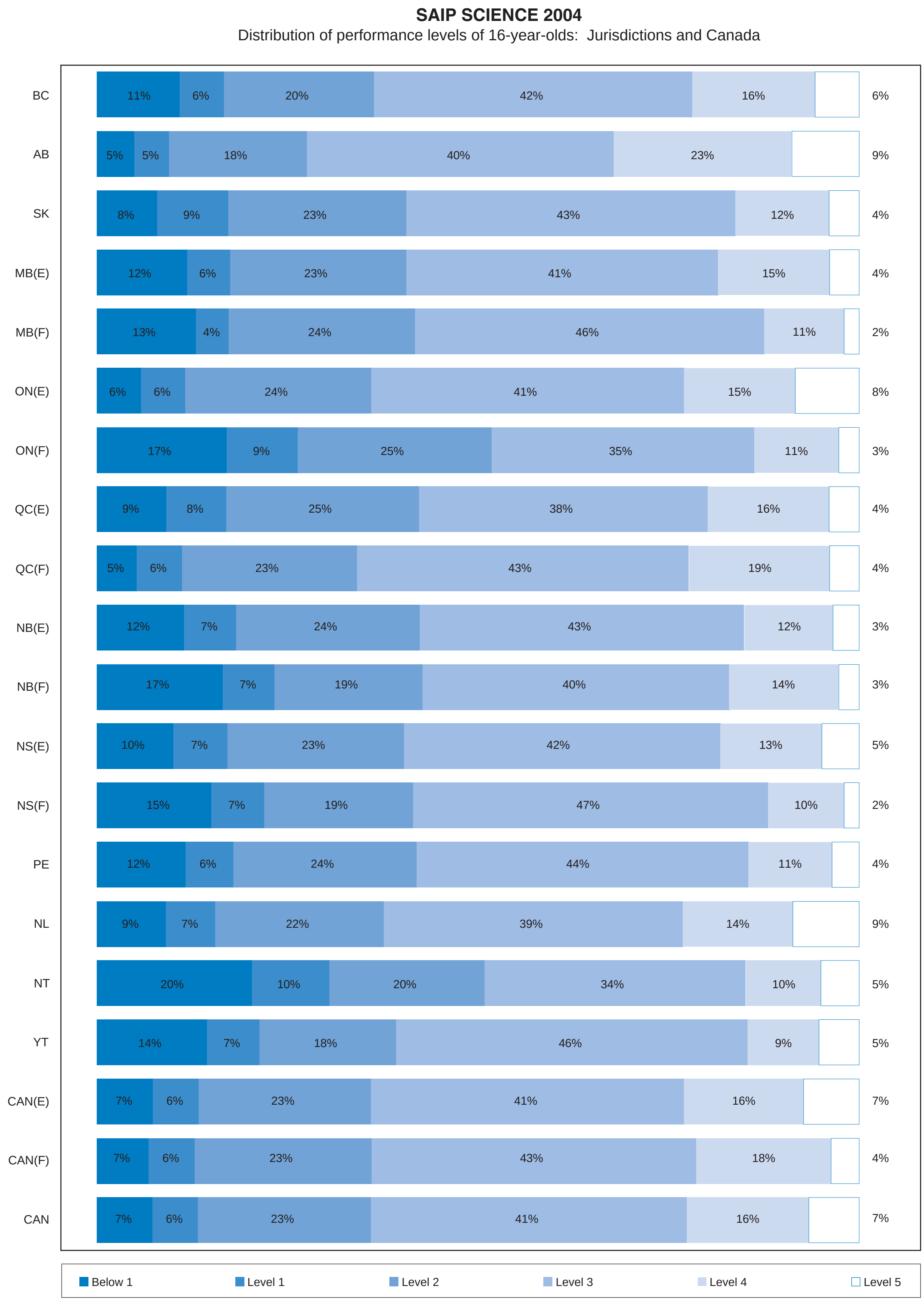

SAIP SCIENCE 2004
Distribution of performance levels of 13-year-olds: Jurisdictions and Canada
BC 16% 14% 31% 36% 2% 0.7%
AB 12% 10% 24% 47% 5% 1.0%
SK 17% 17% 35% 30% 1% 0.2%
MB(E) 18% 15% 30% 35% 2% 0.4%
MB(F) 29% 12% 26% 31% 1% 0.5%
ON(E) 12% 17% 33% 37% 2% 0.3%
ON(F) 23% 13% 32% 30% 1% 0.0%
QC(E) 17% 15% 32% 34% 2% 0.3%
QC(F) 11% 16% 30% 40% 3% 0.5%
NB(E) 19% 20% 30% 31% 0% 0.1%
NB(F) 35% 17% 25% 23% 0% 0.1%
NS(E) 19% 18% 31% 30% 1% 0.2%
NS(F) 31% 10% 26% 32% 0% 0.0%
PE 19% 15% 35% 30% 1% 0.1%
NL 20% 14% 37% 27% 2% 0.3%
NT 35% 16% 23% 23% 3% 0.0%
YT 24% 14% 29% 31% 1% 0.0%
CAN(E) 14% 15% 31% 37% 2% 0.5%
CAN(F) 13% 15% 30% 39% 2% 0.4%
CAN 14% 15% 31% 37% 2% 0.5%
Below 1
Level 1
Level 2
Level 3
Level 4
Level 5

CHART C11



SAIP SCIENCE 2004
Distribution of performance levels of 16-year-olds: Jurisdictions and Canada
BC 11% 6% 20% 42% 16% 6%
AB 5% 5% 18% 40% 23% 9%
SK 8% 9% 23% 43% 12% 4%
MB(E) 12% 6% 23% 41% 15% 4%
MB(F) 13% 4% 24% 46% 11% 2%
ON(E) 6% 6% 24% 41% 15% 8%
ON(F) 17% 9% 25% 35% 11% 3%
QC(E) 9% 8% 25% 38% 16% 4%
QC(F) 5% 6% 23% 43% 19% 4%
NB(E) 12% 7% 24% 43% 12% 3%
NB(F) 17% 7% 19% 40% 14% 3%
NS(E) 10% 7% 23% 42% 13% 5%
NS(F) 15% 7% 19% 47% 10% 2%
PE 12% 6% 24% 44% 11% 4%
NL 9% 7% 22% 39% 14% 9%
NT 20% 10% 20% 34% 10% 5%
YT 14% 7% 18% 46% 9% 5%
CAN(E) 7% 6% 23% 41% 16% 7%
CAN(F) 7% 6% 23% 43% 18% 4%
CAN 7% 6% 23% 41% 16% 7%
Below 1
Level 1
Level 2
Level 3
Level 4
Level 5

Context Statement

Social Context

British Columbia has a population of approximately four million. Eighty-six per cent of the population lives in urban areas, the largest portion of which is concentrated in the Greater Vancouver region. The province promotes achievement for all students, regardless of their background.

Organization of the School System

Approximately 600,000 students are enrolled in the public school system, 60,000 in independent schools, and over 4,000 in home schools. The province has 60 school districts, including the Conseil scolaire francophone. Most 13-year-old students are in grade 8 or 9, while most 16-year-olds are in grade 11 or 12.

Science Teaching

British Columbia is reviewing its K–10 science curriculum, and revisions will be made to Integrated Resource Packages (IRPs) for implementation in schools across the province. The learning outcomes statements contained in the IRPs are content standards for the provincial education system. They are statements of what students are expected to know and do at an indicated grade and comprise the prescribed curriculum. Teachers select the appropriate methods of instruction, and a wide range of teaching and learning strategies are used, based on the needs of the learner and the preferences of the teacher.

The science curriculum in British Columbia provides a foundation for the scientific literacy of citizens, for the development of a highly skilled and adaptable work force, and the development of new technologies. It is the foundation on which teachers can develop a science program that provides a comprehensive set of knowledge, skills, and experience related to science. The intent is to encourage cooperative learning and authentic science opportunities and experiences for students.

Science Assessment

All students taking chemistry, biology, physics, or geology at the grade 12 level are required to write the provincial examinations, which count for 40% of their final grade.

In the 2004–05 school year, British Columbia will introduce a new graduation program requiring students to write subject exams, including grade 10 science. The exam scores will count for 20% of the final grade.

British Columbia students also participate in national (SAIP) and international (PISA) assessments.

Results for British Columbia

In nearly all cases, there were few significant differences between the results of British Columbia students in both age groups and those from across Canada. One exception was that there were slightly fewer 16-year-olds reported at levels 1 and 2.

Nearly 70% of British Columbia 13-year-olds achieved level 2 or higher, and nearly two-thirds of 16-year-olds reached level 3 or higher.

CHART BC1

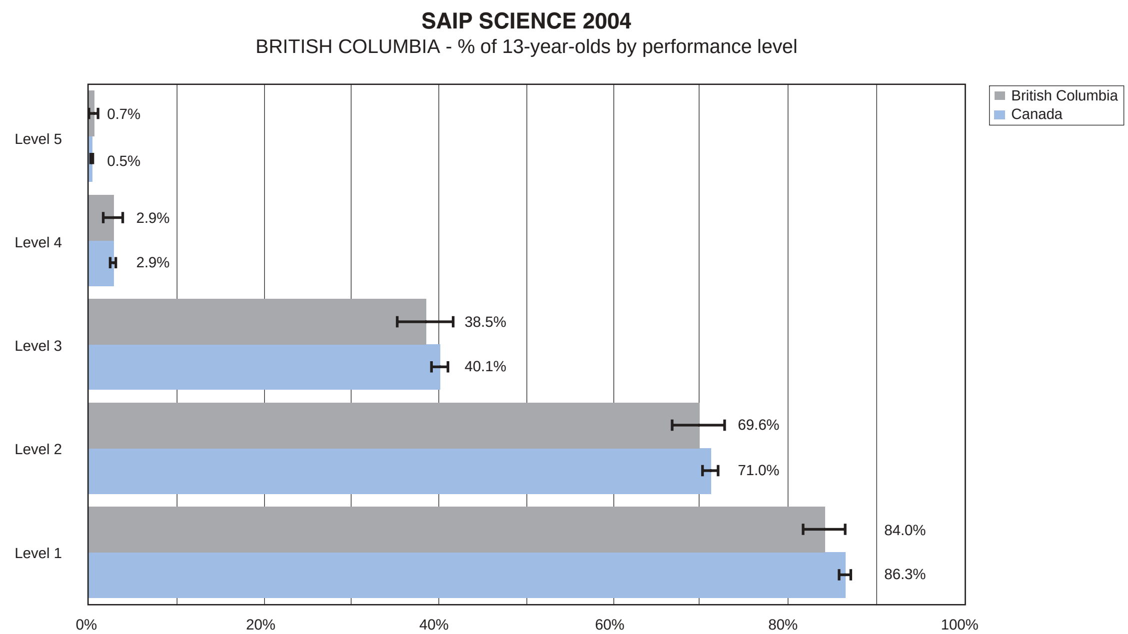
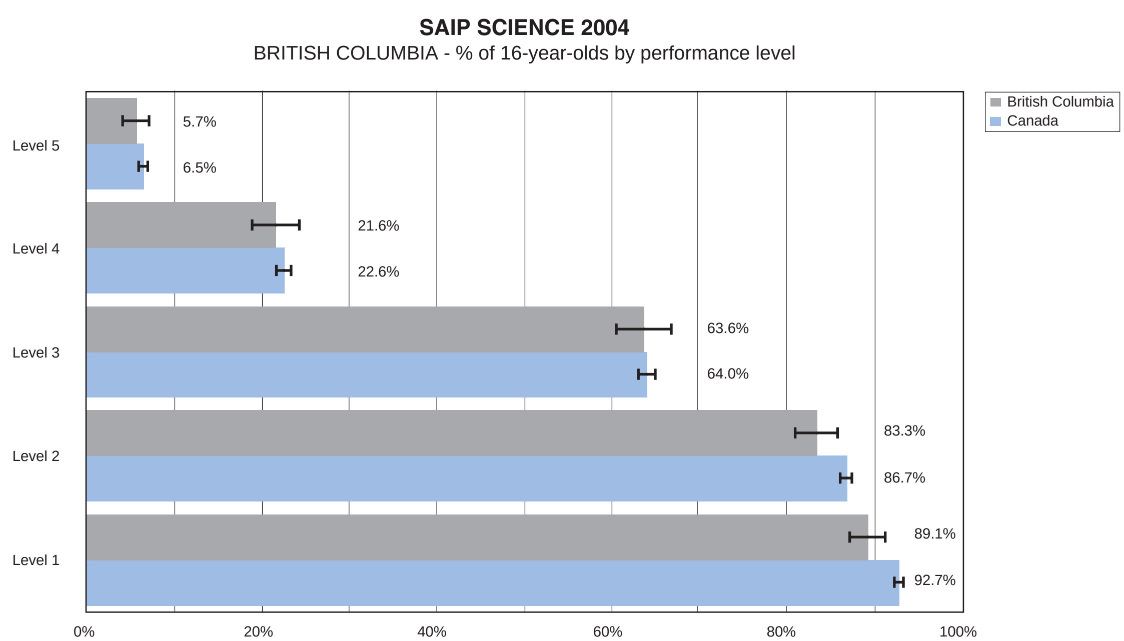


CHART BC2



Context Statement

Social Context

Alberta has a population of approximately three million. All children are required to attend school from the ages of 6 to 16.

The Minister of Education defines the curriculum and standards for student achievement in consultation with teachers, parents, school authorities, employers, and other stakeholders. Schools, school authorities, and the Department of Education assess and report yearly to the public on a range of learner outcomes.

Organization of the School System

Nearly all (99.1%) of the 46,345 thirteen-year-old students in Alberta in the 2003–04 school year are enrolled in junior high school. Only one science course is offered at each of grades 7, 8, and 9. The distribution of 13-year-old students by grade is shown below.

	1995–96	1998–99	2003–04
Grade 7	9.6	6.5	5.5
Grade 8	63.2	66.0	65.7
Grade 9	24.6	26.5	27.9

Of the 43,415 sixteen-year-old students in the province in the 2003–04 school year, nearly all (99.2%) are enrolled in senior high school. The senior high school science program has six course sequences: Science 10–20–30; Science 10, Biology 20–30; Science 10, Chemistry 20–30; Science 10, Physics 20–30; Science 14–24; Science 16–26. Students who have passed Biology 20, Chemistry 20, or Physics 20 may also enrol in Science 30. The 10–30 sequences are designed for students in academically focused programs contemplating postsecondary study; the 14–24 sequence is for general program students, some of whom are not planning postsecondary studies; and the 16–26 sequence is for students enrolled in the Integrated Occupational Program.

Science Teaching

Alberta Education reviews programs regularly and revises science curriculum in approximately a ten-year cycle. As core programs, science programs provide opportunities for students to develop the knowledge, skills, and attitudes they need for responsible citizenship and, at the same time, to explore related personal interests and prepare for further education and careers.

To become scientifically literate, students must develop a knowledge of science and an understanding of its relationship to technologies and society. Students must also develop the skills needed to identify and analyze problems, to explore and test solutions, and to seek, interpret, and evaluate information. To ensure that the science program is relevant to all students as well as meeting societal needs, the program presents science in a meaningful context — it provides opportunities for students to explore the process of science, its applications and implications, and related technological problems and issues. By studying science, students become aware of the role of science in responding to social and cultural change and in meeting needs for a sustainable environment, economy, and society. The secondary science program is guided by the vision that all students should have the opportunity to develop scientific literacy.

The following goals for Canadian science education are addressed through the Alberta science program. Science education will

- encourage students at all grade levels to develop a critical sense of wonder and curiosity about scientific and technological endeavours
- enable students to use science and technology to acquire new knowledge and solve problems, so that they may improve the quality of their own lives and the lives of others
- prepare students to critically address science-related societal, economic, ethical, and environmental issues
- provide students with a foundation in science that enables them to pursue progressively higher levels of study, prepares them for science-related occupations, and engages them in science-related hobbies appropriate to their interests and abilities
- develop in students of varying aptitudes and interests a knowledge of the wide spectrum of careers related to science, technology, and the environment

Science Assessment

Alberta students have participated in the previous two SAIP Science assessments, as well as in international assessments, including TIMSS and PISA.

Since 1982, data about student performance in science has been collected through a provincial student evaluation program for grades 6 and 9. Since 1995, these achievement tests have been administered annually. As well, since 1984, provincial diploma examinations have counted for 50% of a student's final mark in Biology 30, Chemistry 30, and Physics 30. A diploma examination in Science 30 has been offered since 1996. All diploma examinations include a written component that emphasizes the connections among science, technology, and society.

Provincial tests are based on Alberta's Programs of Study. The tests help communicate provincial standards and provide information on the degree to which students in the province have met these standards.

For more information, see Alberta Education's Web site at http://www.education.gov.ab.ca/k_12.

Results for Alberta

In comparison with students from across Canada, more 13-year-olds in Alberta were reported at levels 2, 3, and 4. Results for levels 1 and 5 were similar to the Canadian average. These results suggest that significantly more 13-year-olds in Alberta are achieving higher levels than the Canadian average.

In the case of 16-year-olds, more students reached levels 1 through 4, with the number of students achieving level 5 being similar to the pan-Canadian results.

Nearly 80% of Alberta 13-year-olds achieved level 2 or higher, and over 70% of 16-year-olds reached level 3 or higher.

CHART AB1

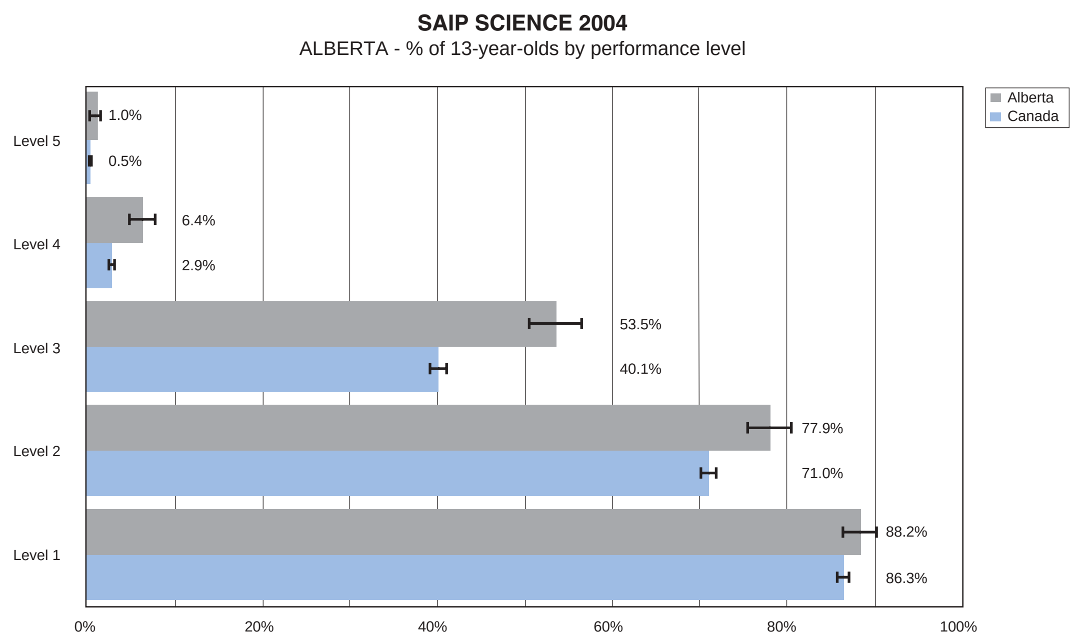
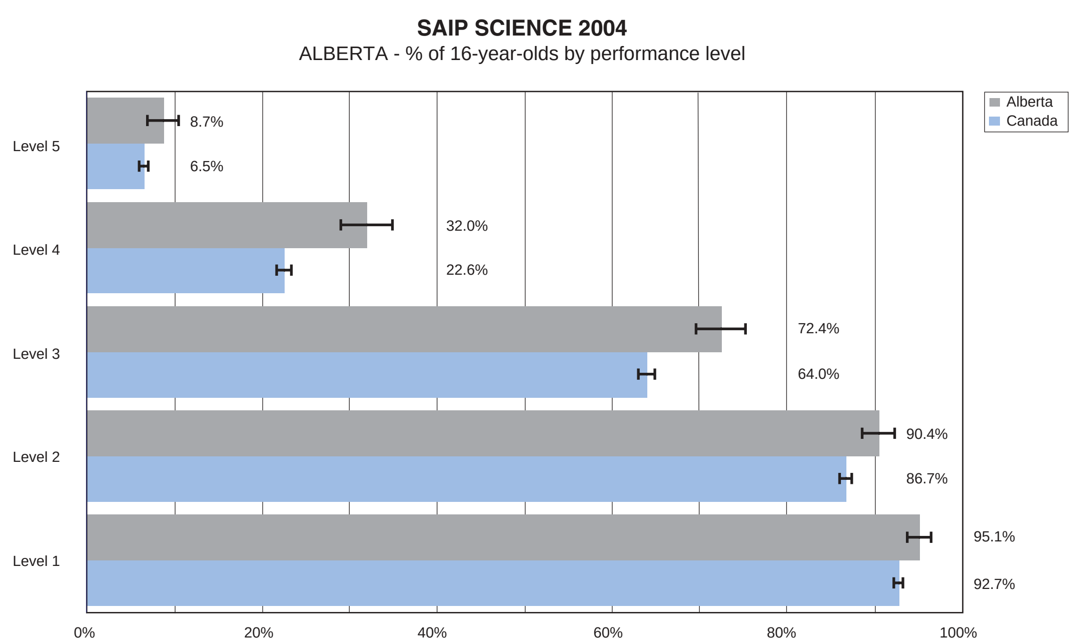


CHART AB2



Context Statement

Social Context

Saskatchewan has a population of approximately one million spread throughout a vast geographic area. About half of Saskatchewan's population lives in towns, villages, and rural municipalities or on First Nation reserves, giving a strong rural influence in the province. Agriculture, potash and uranium mining, oil production, and forestry are major industries. Saskatchewan's people come from diverse cultural backgrounds and experiences. First Nations and Métis peoples account for a young and growing segment of the province's population.

Organization of the School System

In 2002–03, Saskatchewan's kindergarten to grade 12 student population was about 195,000. Approximately 90% of these students attended provincially funded schools, 8% attended First Nations schools, and the remainder attended independent schools or were home-schooled. Including administrators, consultants, and other specialists, there were just under 11,400 educators, resulting in a student to educator ratio of 15.1. Average class size was 20.6. About one-quarter of all classes had more than 25 students.

The 777 provincially funded schools consist of three main types: 647 public schools, 119 separate schools, and 11 Fransaskois schools. Almost 40% of these schools have 150 or fewer students.

Schools are encouraged to organize program delivery across the elementary level (kindergarten to grade 5), the middle level (grades 6–9) and the secondary level (grades 10–12). For the two age groups that participate in SAIP, most 13-year-old students are in grade 8, and most 16-year-old students are in grade 11. Beginning in grade 11, students have choices as to whether they study one or more science courses in biology, chemistry, and physics.

Science Teaching

The purpose of the Saskatchewan science curricula is to guide the continuous growth and development of students' scientific literacy. An integrated, resource-based approach to instruction aims to develop students' understanding and appreciation of science, technology, and the world in which they live through authentic inquiry activities. For Saskatchewan schools, scientific literacy has been defined by seven Dimensions of Scientific Literacy (Hart, 1987). Actively participating in K–12 science will enable a student to

- understand the **nature of science** and scientific knowledge as a unique way of knowing
- understand and accurately apply appropriate science **concepts**, principles, laws, and theories in interacting with society and the environment
- use the **processes of science** in solving problems, making decisions, and furthering understanding
- understand and appreciate the joint enterprises of **science** and **technology** and the relationships of these to each other in the context of **society** and the **environment**
- develop numerous manipulative **skills** associated with science and technology, especially with measurement
- interact with the various aspects of society and the environment in ways that are consistent with the **values** that underlie science
- develop a unique view of technology, society, and the environment as a result of science education, and continue to extend this **interest and attitude** throughout life

The current renewal of Science 10 signals the beginning of a period of science curriculum renewal in Saskatchewan. All current science curricula were last renewed between 1990 and 1993, except Computer Science 20/30, which was renewed in 1999. Renewed science courses will be consistent with the *Common Framework of Science Learning Outcomes K–12* that is part of the Pan-Canadian Protocol for Collaboration on School Curriculum, while still honouring the foundation expressed in the Dimensions of Scientific Literacy.

Science Assessment

Classroom teachers in Saskatchewan are responsible for assessment, evaluation, and promotion of students from kindergarten through grade 11. At grade 12, teachers are responsible for at least 60% of each student's final mark, and those teachers accredited in a particular subject are responsible for assigning 100% of the grade 12 final mark.

Students are assessed on the full range of knowledge, skills, attitudes, and values they have been using and developing during instruction. Teachers are encouraged to develop diversified evaluation plans that reflect the various instructional methods they use in adapting instruction to each class and to each student.

For more information on education in Saskatchewan, visit Saskatchewan Learning's Web site at www.sasked.gov.sk.ca.

Results for Saskatchewan

For 13-year-olds, fewer Saskatchewan students achieved levels 1, 2, 3, and 4 than did students from across Canada, while performance at level 5 was similar to the Canadian average.

For 16-year-olds, fewer students from Saskatchewan reached levels 2 through 5 when compared with the results of Canadian 16-year-olds. Results at level 1 were comparable to the Canadian average.

Two-thirds of Saskatchewan 13-year-olds achieved level 2 or higher, and nearly 60% of 16-year-olds reached level 3 or higher.

CHART SK1

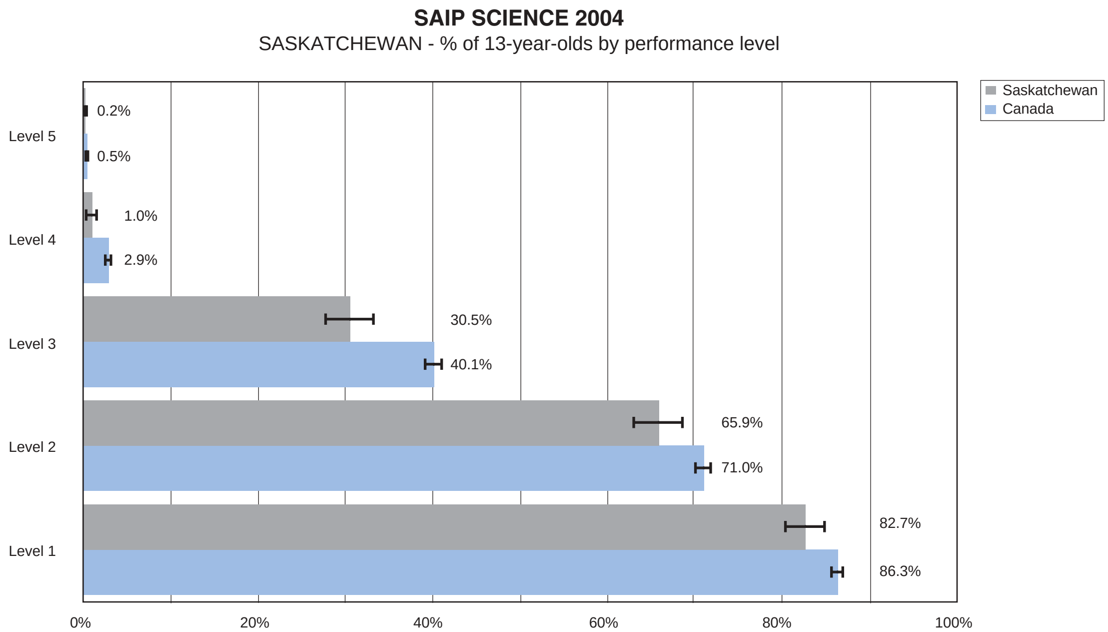
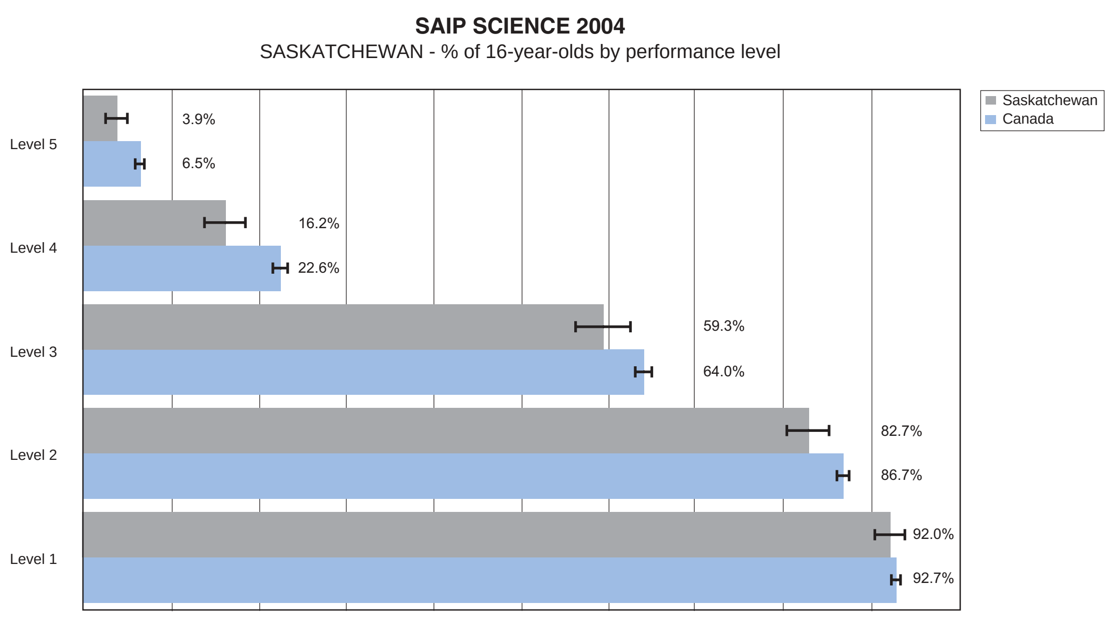


CHART SK2



Context Statement

Social Context

Manitoba has a population of approximately 1.1 million, 60% of whom reside in the capital city of Winnipeg. Manitoba must meet the educational needs of a wide range of ethnic and cultural groups. English-as-a-second-language (ESL) instruction is provided for immigrant students. There is a strong Franco-Manitoban community in the province with students enrolled in the Français program. The French Immersion program has become an option for about 9% of students. In addition, there is a notable representation in the public schools of the Aboriginal community in both urban and rural/remote regions of the province. Manitoba has a broad and diverse economic base.

Organization of the School System

Manitoba's school system enrols over 200,000 students in kindergarten to senior 4 (grade 12). It employs about 13,500 teachers in 39 school divisions and districts. For program delivery purposes, schools are encouraged to group grades according to early years (kindergarten to grade 4), middle years (grades 5 to 8), and senior years (senior 1 to 4). Students may choose courses from four school programs — an English Program, a Français Program, a French Immersion Program, and a senior years Technology Education Program. The students selected to participate in the SAIP Science assessment were either 13 or 16 years of age. Most 13-year-old students were in grade 8 or senior 1 (grade 9), and most 16-year-old students were in senior 3 or senior 4.

Science Teaching

Manitoba is currently in the process of implementing new science curricula based on the *Common Framework of Science Learning Outcomes, K to 12*. The new Manitoba science curricula are designed with the goal of increasing students' scientific literacy. The curricula have general learning outcomes in the following areas:

- nature of science and technology
- science, technology, society, and environment (STSE)
- science and technology skills and attitudes
- essential science knowledge
- unifying concepts

Specific student learning outcomes are identified at each grade and linked to one or more of the general learning outcomes. New curricula emphasize the importance of teaching and learning science in real and relevant contexts and the acquisition of scientific and technological skills and attitudes. Science teachers are encouraged to use a wide variety of instructional strategies to address the needs of all students and to connect classroom teaching with the real world. Science curriculum information and updates are available on the Web at http://www.edu.gov.mb.ca/ks4/cur/science/default.asp.

Science Assessment

From 1979 to 1994, Manitoba Education and Training administered a provincial curriculum assessment program in major subject areas at early, middle, and senior years. There are no provincial assessments in science. Manitoba participated in the OECD PISA evaluations in 2000 and 2003.

For the SAIP Science assessment, students were tested in the language of instruction.

Results for Manitoba (English)

For 13-year-old Manitoba students who responded in English, results for levels 2, 3, 4, and 5 were similar to those across Canada, and somewhat lower at level 1. For 16-year-old Manitoba English-language students, results did not meet the Canadian average at all levels.

Over two-thirds of Manitoba English-language 13-year-olds achieved level 2 or higher, and nearly 60% of 16-year-olds reached level 3 or higher.

CHART MB(E)1

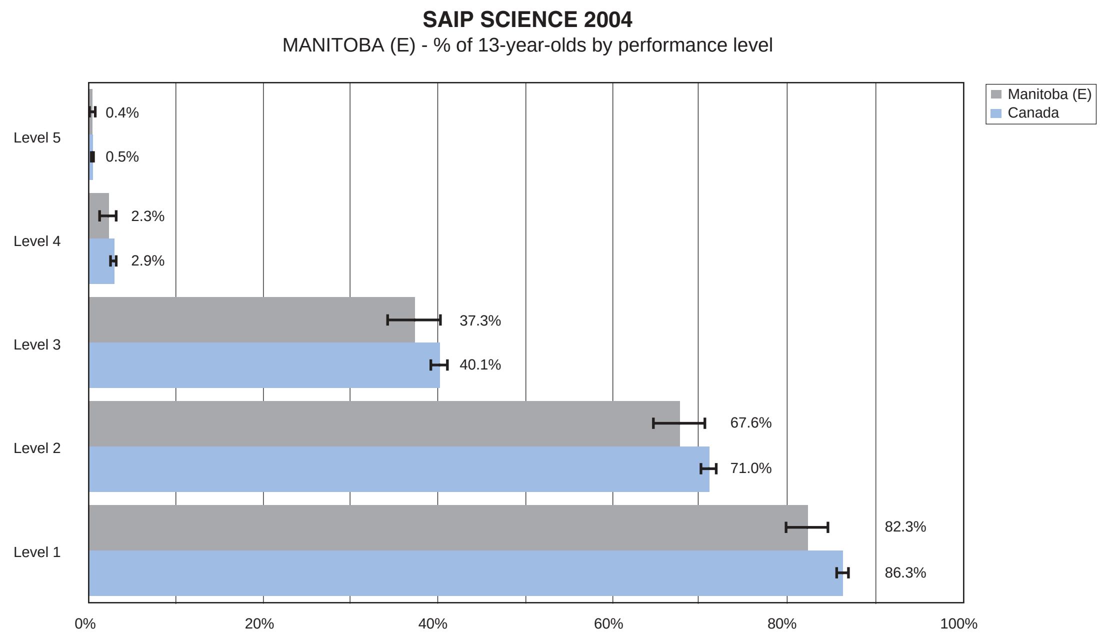
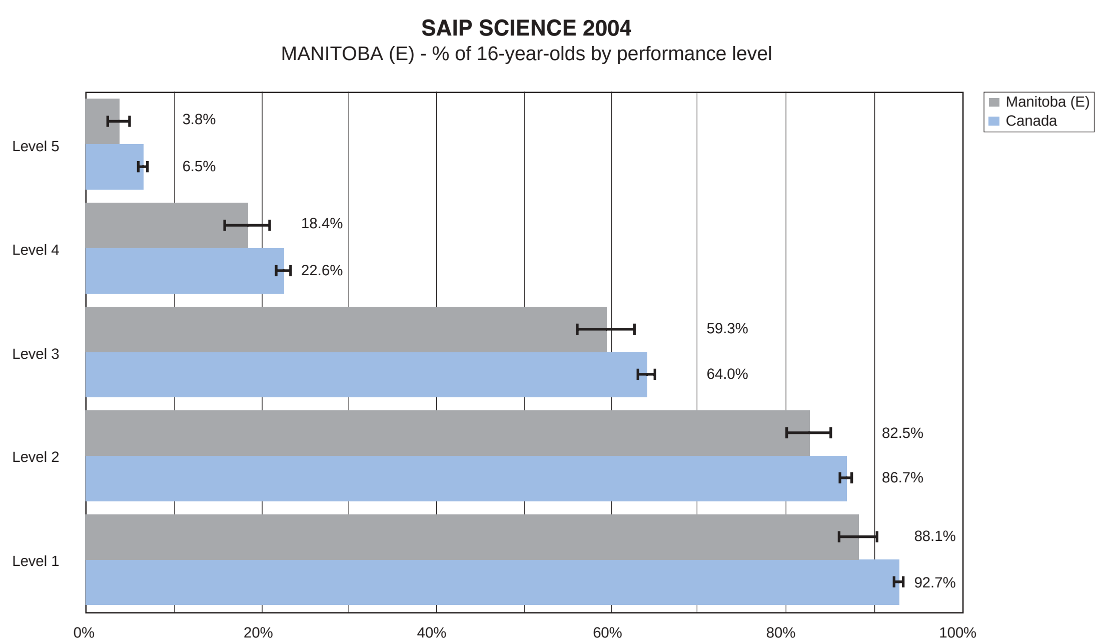


CHART MB(E)2



Results for Manitoba (French)

For 13-year-old Manitoba students who responded in French, fewer achieved all levels except level 5 when compared with students from across Canada. Nearly 30% did not reach level 1.

In the case of 16-year-olds, fewer students achieved all levels than did the Canadian average.

Nearly 60% of Manitoba French-language 13-year-olds achieved level 2 or higher, and nearly 60% of 16-year-olds reached level 3 or higher.

CHART MB(F)1

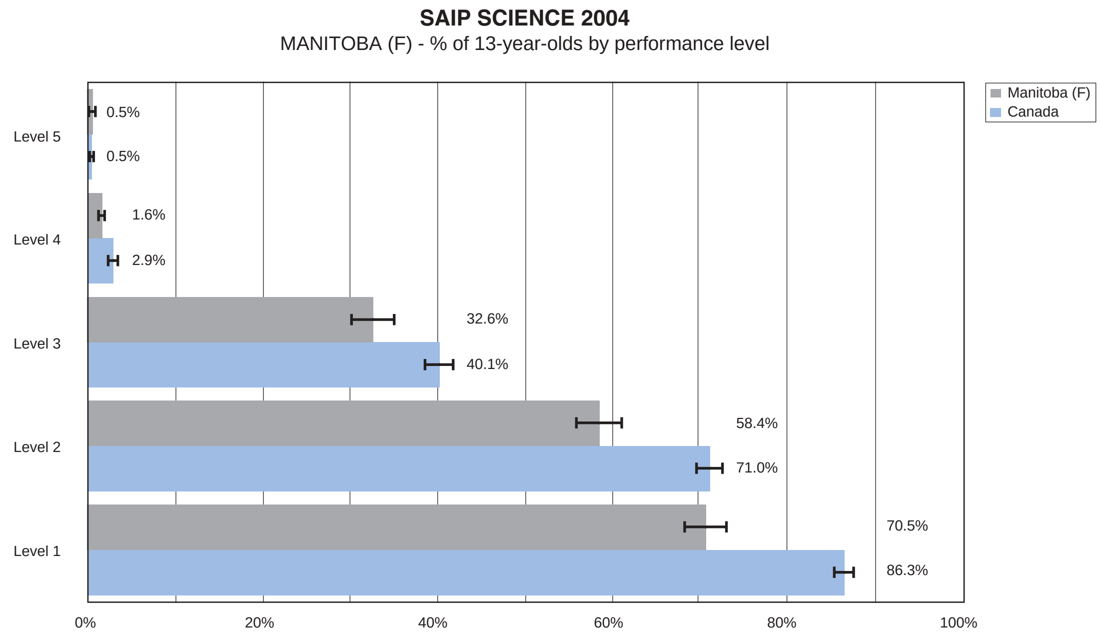
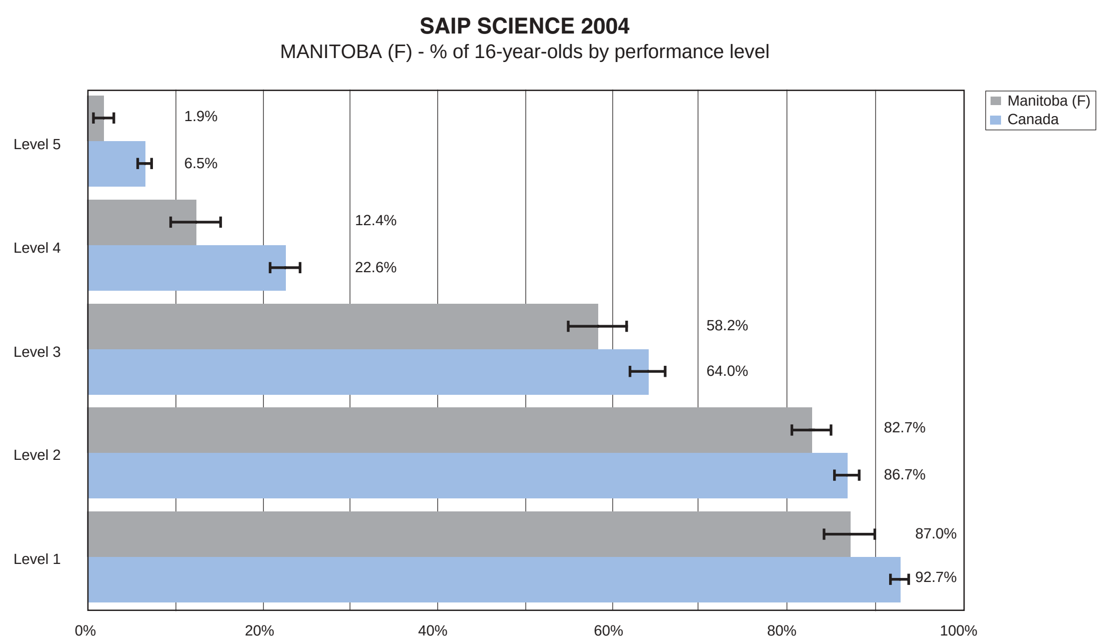


CHART MB(F)2



Context Statement

Social Context

In 2004, Ontario had a population of approximately 12 million. A critical issue in the provision of education programs and services is the diverse ethnocultural composition of Ontario's student population. Through immigration, Ontario receives approximately 68% of Canada's newcomers. To overcome language and cultural barriers that could affect student achievement, English-language boards and schools (especially in urban areas) provide instruction in English as a second language, as well as community outreach services. French-language boards and schools offer language accommodation and upgrading programs in Français as well as a beginners' English program. School boards provide community programs and services through partnerships between the school and the community.

Ontario is characterized by a variety of district school boards, ranging from large urban boards that serve densely populated communities to northern boards that serve small numbers of students spread over wide geographic areas. The school board system is made up of 60 English-language boards, 12 French-language boards, and 34 school authorities that are responsible for schools in small and remote communities.

Organization of the School System

Ontario has two types of publicly funded school boards: public boards, which enrol approximately 70% of the student population, and Catholic boards, which enrol the other 30% of the student population.

In 2002–03, Ontario had 1,451,051 students enrolled in 3,989 elementary schools and 713,786 students enrolled in 856 secondary schools. There were approximately 118,000 full-time teachers and administrators. Five per cent of the student population was enrolled in French-language schools. The majority of the English-language boards offer French Immersion. The school program extends from junior kindergarten to grade 12.

Science Teaching

Beginning in 1998, Ontario has published and implemented a new science curriculum. The Ontario Curriculum is more specific than previous curricula with respect to both the knowledge and skills that students are expected to develop and demonstrate in each grade. In the curriculum policy documents for all subjects/disciplines and grades, teachers are provided with the curriculum expectations as well as achievement charts that describe four levels of student achievement. Teachers are expected to use the achievement charts to assess and evaluate student achievement of the curriculum expectations in relation to four categories of knowledge and skills:

- understanding basic concepts
- inquiry and design skills
- communication of required knowledge
- relating science and technology to each other and the world outside the school

The science expectations are included in the science and technology curriculum document for grades 1–8 and two science curriculum documents for grades 9–12. Since 1998, earth and space science has been an important component of Ontario's science curriculum. In the grades 1–8 science and technology curriculum, one of the five strands is dedicated to earth and space systems, as is one of the four strands in the grades 9 and 10 curriculum. The grades 11 and 12 curriculum now includes an earth and space course at the grade 12 level.

Science from grades 1 to 8 is presented in an integrated science and technology, activity-based curriculum that encourages the exploration of a variety of areas in science and technology. The science program in grades 9–10 provides a broad overview of science including the subdisciplines of biology, chemistry, earth and space science, and physics. Grades 9 and 10 are the first years in which science courses are offered either as an applied or academic course. Students are required to take science to the end of grade 10. In order to obtain an Ontario Secondary School Diploma, students require two science credits.

In grades 11 and 12, science programs are delivered in the more specialized areas of chemistry, physics, biology, and earth and space science and are offered as university, college, university/college, and workplace courses.

Most 13-year-old students in this assessment are enrolled in either grade 9 science or grade 8 science and technology, both of which are mandatory core subjects. The science experiences of 16-year-old students vary considerably from taking no science courses after grade 10 to taking one or more specialized courses at the senior level.

Science Assessment

Classroom teachers are responsible for the assessment, evaluation, and reporting of student achievement of the science curriculum expectations for both the elementary and secondary grades. Ontario does not develop and administer province-wide assessments in science.

In order to assist teachers in their classroom assessment and evaluation of student achievement, the Ministry of Education has developed "exemplars" for all grades for most of the subjects/courses, including science. The exemplars are samples of student work that were done in response to specific tasks. The samples represent work at each of the four levels of achievement in relation to the four categories of knowledge and skills.

Teams of subject specialists from across the province developed the exemplars. Each exemplar document includes tasks, rubrics, and teachers' notes and comments. The rubrics were developed in relation to the achievement charts in the curriculum policy documents. The exemplars serve as models for boards, schools, and teachers in designing assessment tasks within the context of regular classroom work, developing rubrics, assessing the achievement of students, and planning for the improvement of students' learning. The exemplars also provide parents with a resource to help them monitor their children's progress and can be used as a basis for discussions regarding student achievement and progress among teachers, parents, and students. The exemplars serve to promote greater consistency in the assessment of student work across the province and provide an approach to improving student learning by demonstrating the use of clear criteria applied to student work in response to a clearly defined assessment task.

In Ontario, in addition to performance assessment, teachers also make use of a variety of other classroom assessment strategies for science, such as teacher developed tests, portfolios, and conferences.

In addition to classroom assessment and participation in SAIP, Ontario monitors student achievement in science by participating in the Trends in International Mathematics and Science Study (TIMSS) conducted by the International Association for the Evaluation of Educational Achievement (IEA) and the Programme for International Student Assessment (PISA) conducted by the Organisation for Economic Co-operation and Development (OECD).

More information about Ontario's education system is available on the ministry's Web site at www.edu.gov.on.ca.

Results for Ontario (English)

For students in both age groups, results were not significantly different from the Canadian average at all levels of achievement. Since Ontario's population of English-language students is equal to or greater than that of the remaining jurisdictions combined, this is not an unusual result.

Over 70% of Ontario English-language 13-year-olds achieved level 2 or higher, and nearly two-thirds of 16-year-olds reached level 3 or higher.

CHART ON(E)1

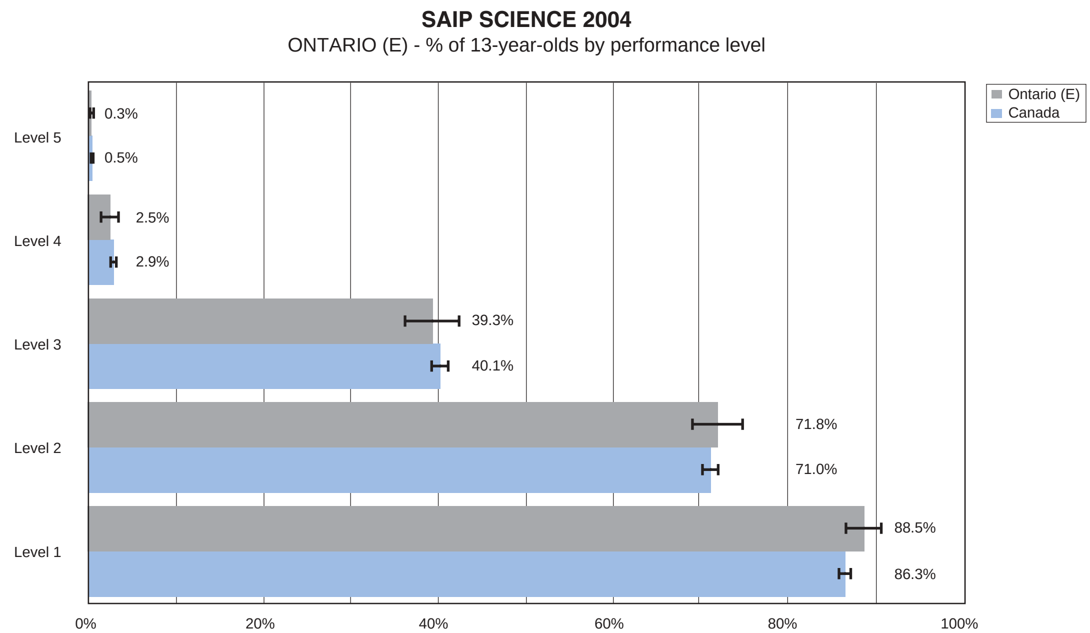
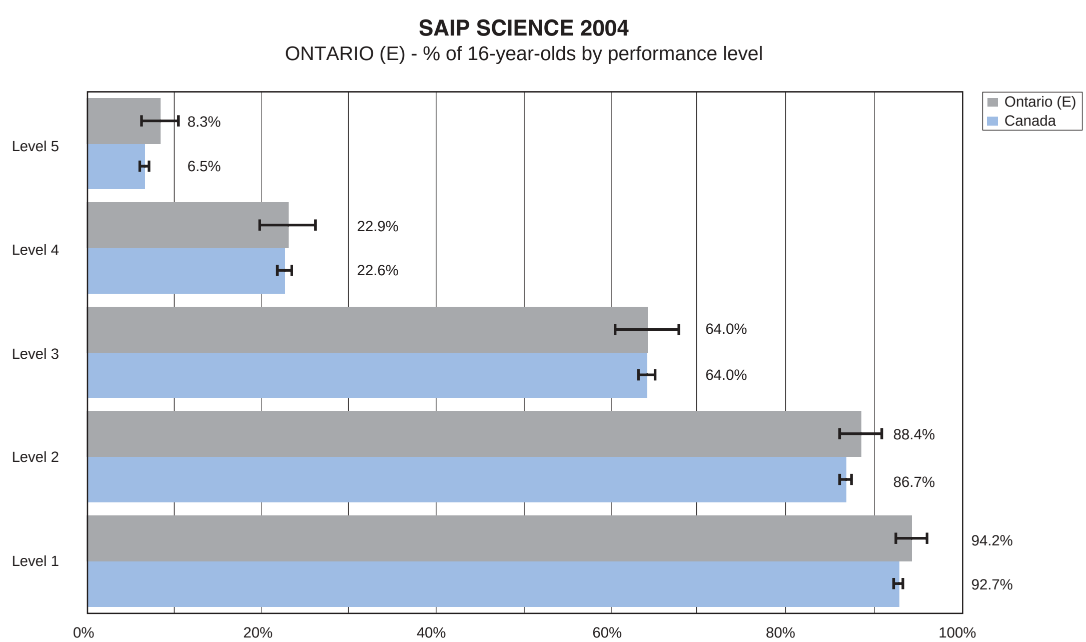


CHART ON(E)2



Results for Ontario (French)

For both 13-year-old and 16-year-old Ontario students who responded in French, fewer students achieved all levels than the Canadian average.

Over 60% of Ontario French-language 13-year-old students achieved level 2 or higher, and not quite half of 16-year-old students reached level 3 or higher.

CHART ON(F)1

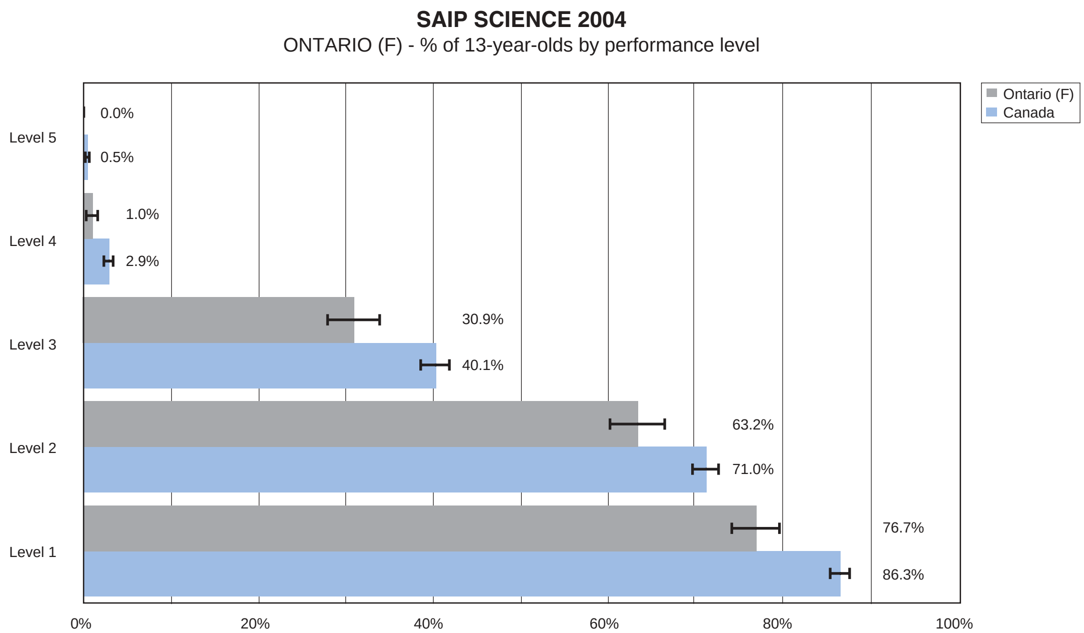
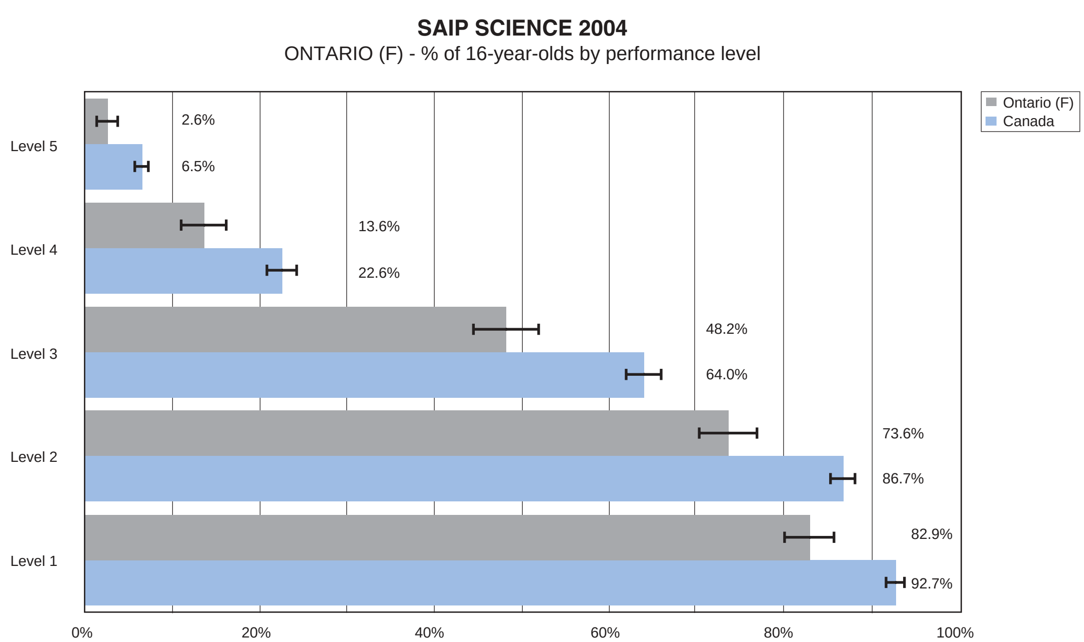


CHART ON(F)2



Context Statement

Social Context

Quebec's population of over seven million is concentrated in the south of the province, mostly in its largest city, Montreal, and its capital, Quebec City. The official language of Quebec is French. Francophones account for around 80% of Quebec total population. Anglophones make up around 9% and have access to a full system of English educational institutions from preschool to university. There are 11 Native peoples in Quebec, who account for about 1% of the population. Under the Indian Act, the Government of Canada is responsible for ensuring that Aboriginal children receive educational services. However, under agreements signed with three First Nations in the 1970s, the Government of Quebec determines the legal framework applicable to educational services delivered to Cree, Inuit, and Naskapi communities.

In addition, an increase in immigration, especially in the Greater Montreal area, has resulted in a massive inflow of students whose mother tongue is neither French nor English. These students attend French schools. To meet the needs of this new client group, schools have implemented special measures, including initiation and francization programs and welcoming classes.

Organization of the School System

Quebec has four levels of education: elementary, secondary, college, and university. Children are admitted to elementary school at six years of age, and school attendance is compulsory until the age of 16. The official language of instruction at the elementary and secondary levels is French. Education in English is available mainly to students whose father or mother pursued elementary studies in English in Canada. Approximately 10% of Quebec students are educated in English.

Elementary school is usually preceded by one year of full-time kindergarten for five-year-olds. Almost all five-year-olds attend kindergarten, even though it is not compulsory. Some children from underprivileged backgrounds may have access to half-day kindergarten from the age of four.

Elementary school lasts six years. The school year is made up of 180 days of classroom teaching. A normal school week consists of five full days and 23.5 hours of teaching. Students who experience learning difficulties or who have behavioural problems or minor disabilities are integrated into regular classrooms. Those with more significant problems attend special classes with fewer students.

Secondary school lasts five years and is divided into two levels. The school week is made up of five days and must include a minimum of 25 hours of educational activities. The first level or "cycle" (years 1 to 3) focuses on basic education. In the second cycle (years 4 and 5), students continue their general education but also take optional courses to explore other avenues of learning before going on to college.

In year 4, students can also undertake a two- or three-year vocational course of studies to prepare for a trade. Requirements for the secondary and vocational school diplomas are set in the basic school regulation.

At age 13, most students are in the second year of secondary school. At age 16, most are completing the fifth year of secondary school, while some are starting college studies.

In 2003–04, a total of 1,097,938 students were registered in Quebec's 2,779 public and private elementary and secondary schools. Of these, 2,437 are public schools run by 72 school boards and 342 are private schools.

Science Teaching

In Quebec, science is a compulsory subject from the beginning of elementary school to the fourth year of secondary school inclusive. It is an optional subject in the fifth year of secondary school; however, students wishing to study science or enrol in certain technical programs at the college level (college in Quebec being the twelfth and thirteenth years of schooling) must take and pass at least either physics or chemistry in the fifth year of secondary school.

The following optional and compulsory programs and courses are offered in Quebec's schools in compliance with the basic school regulation, which recommends the time allotment for each subject.

Program	Status	Recommended Time
Natural science and technology Elementary I (1st and 2nd years)	Compulsory	Across other curriculum areas
Natural science and technology Elementary II and III (3rd, 4th, 5th, and 6th years)	Compulsory	1 hour/week
Ecology, Secondary I	Compulsory	100 hours/year
Physical Science, Secondary II	Compulsory	100 hours/year
Human Biology, Secondary III	Compulsory	100 hours/year
Physical Science, Secondary IV	Compulsory	150 hours/year
General Biology, Secondary IV or V	Optional	100 hours/year
Geology, Secondary IV or V	Optional	100 hours/year
Techniques and Methods of Science Secondary IV or V	Optional	50 hours/year
Chemistry, Secondary V	Optional	100 hours/year
Physics, Secondary V	Optional	100 hours/year

The Ministry of Education, Recreation and Sports determines curriculum content in close collaboration with professional groups of experts in various subjects, curriculum developers, teachers, and school board consultants.

The science and technology curriculum at the elementary level, and soon (2005–06) at the secondary level, focuses on the development of students' skills through acquiring methods of reasoning, using methods and processes, and adequate verbal and written communication in science and technology.

This curriculum is designed to provide all students with good basic scientific and technical literacy and to prepare some students for more advanced science or specialized technical studies. It tries to convey a real-world vision of science by highlighting the links between science, technology, society, and the environment. Through a discovery and problem-solving approach in a laboratory setting, students learn to construct concepts and acquire work methods and thought processes that prepare them for life in society.

Science Assessment

At the secondary level, schools develop their own tests for regularly assessing student learning in science. Students need not pass a natural science course in order to earn their secondary school diploma.

In the second cycle of secondary school (years 4 and 5), summative evaluation in physical science, chemistry, and physics involves two examinations: written and laboratory. The pass mark is 60%. In chemistry and physics, the first component counts for 75% of the final mark, and the second, for 25%. Summative assessment in physical sciences is performed through an examination set by the Ministry of Education, Recreation and Sports. The final mark takes into account the student's mark for work done throughout the school year (42.5%), the student's mark on the examination set by the Ministry of Education, Recreation and Sports (42.5%), and the mark on the laboratory test (15%).

Results for Quebec (French)

For those Quebec students who responded in French, there were few significant differences when compared with the achievement of students from across Canada. In the case of 16-year-olds, somewhat fewer achieved level 5 than the average of Canadian 16-year-old students.

Almost three-quarters of Quebec French-language 13-year-old students achieved level 2 or higher, and about two-thirds of 16-year-old students reached level 3 or higher.

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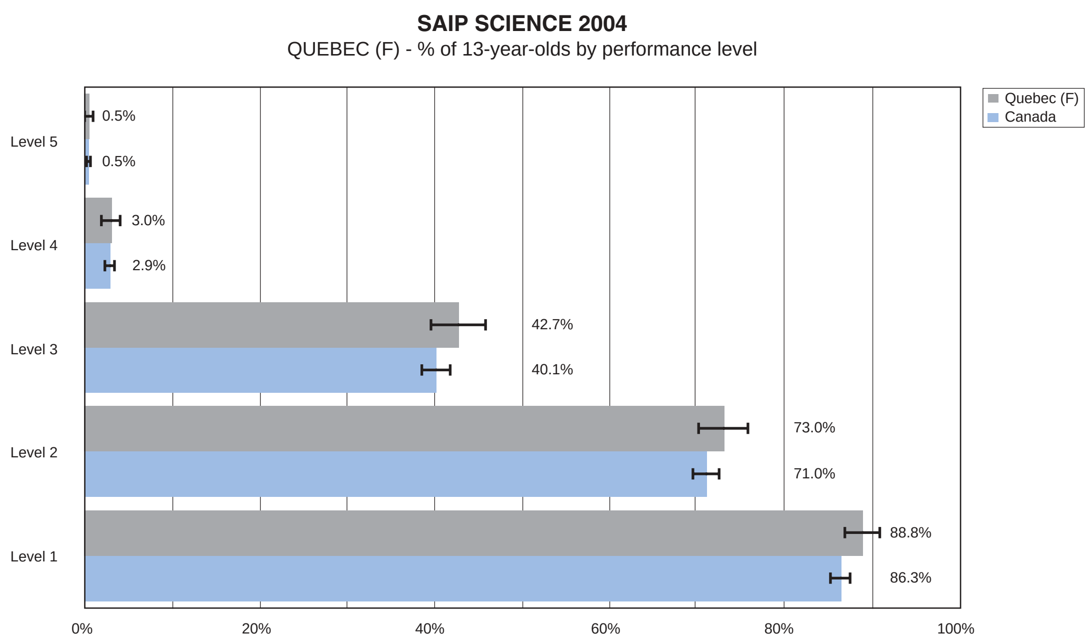

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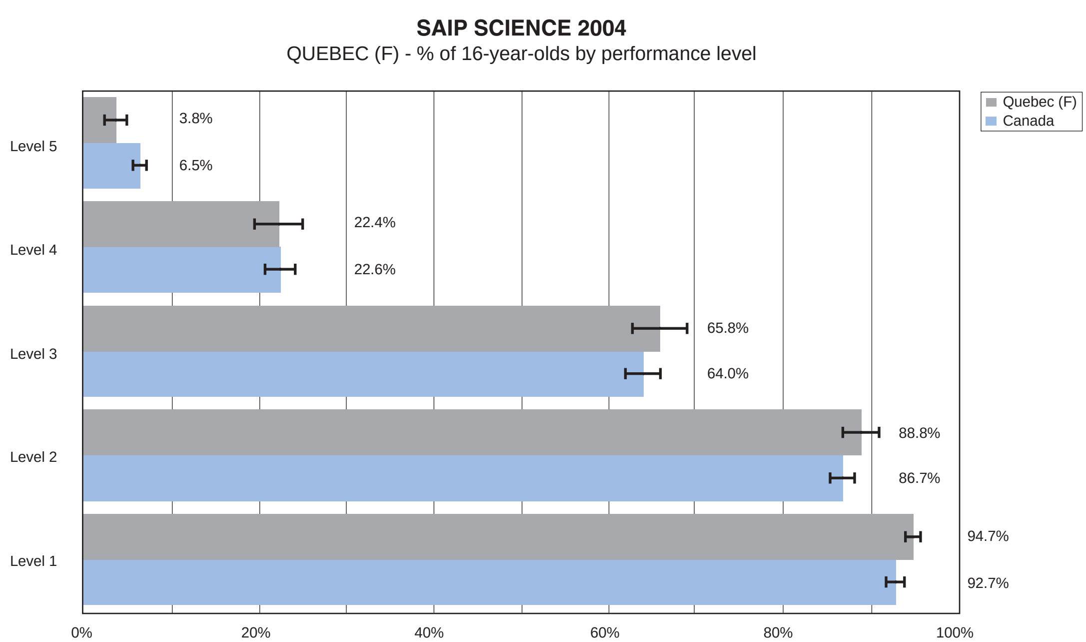

Results for Quebec (English)

In general, 13-year-old Quebec students responding in English also achieved similar levels to the average of Canadian students. The one difference is that somewhat fewer 13-year-olds reached level 1.

For Quebec English-language 16-year-olds, fewer achieved levels 2, 3, and 5 than the Canadian average, while results at levels 1 and 4 were comparable with other Canadian students.

About 68% of Quebec English-language 13-year-old students achieved level 2 or higher, and almost 60% of 16-year-old students reached level 3 or higher.

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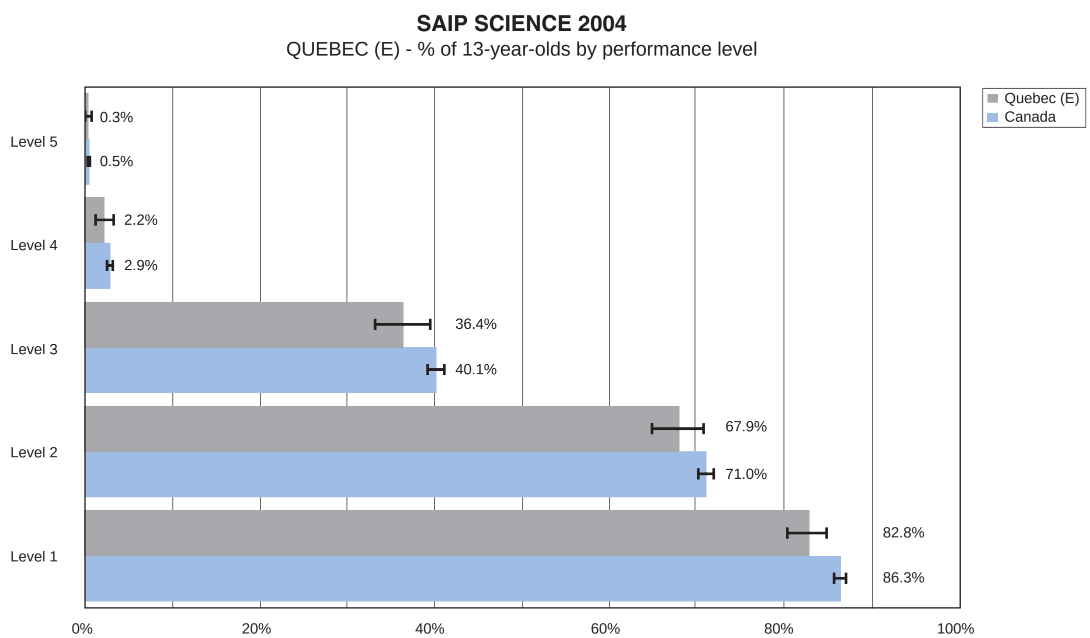

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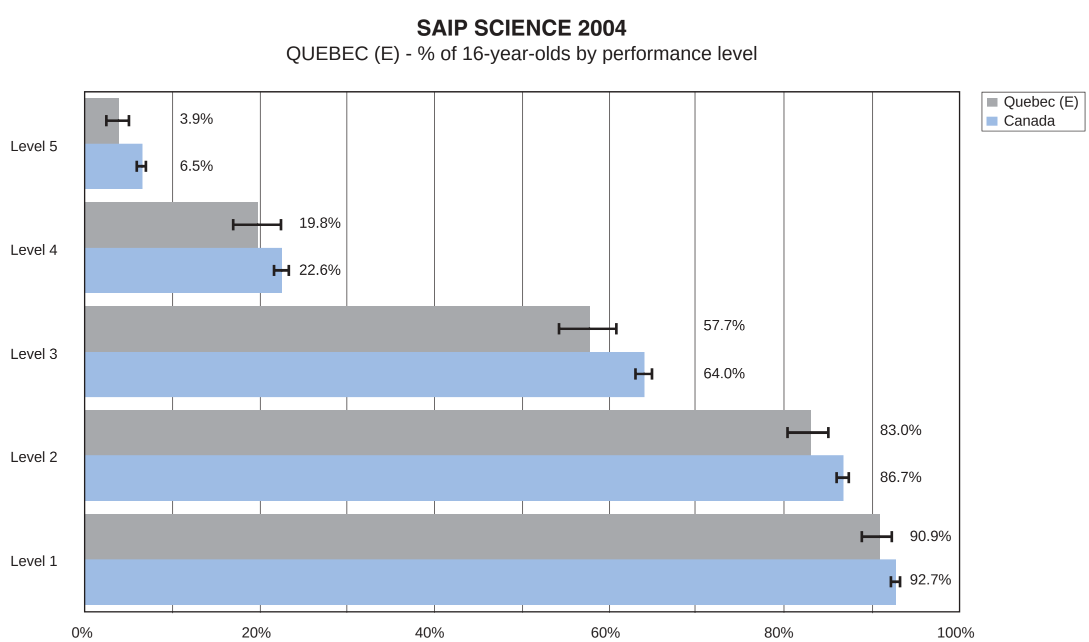

Context Statement

Social Context

New Brunswick's population as of July 1, 2002, stands at 750,183. Serving Canada's only officially bilingual province, the New Brunswick public education system plays an important role in offering students the opportunity to learn in both French and English. The province's dual system provides a full curriculum and services in both official languages.

The Department of Education has made a considerable effort to develop a school system that will meet the needs of all students. It has put in place programs to reduce school-leaving by identifying potential dropouts, to enable physically challenged students to attend school, and to facilitate the integration into the school system of as many students as possible. As a result, the province has high rates of retention (students who stay in school) within an education system that is committed to the principles of inclusion for students with special needs.

Organization of the School System

Since 1967, the provincial government has had sole responsibility for financing public schools and is committed to equal opportunity for all students. The minister of education has the authority to prescribe curriculum and establishes educational goals and standards.

The province of New Brunswick became officially bilingual in 1969. In 1974, in recognition of its linguistic duality, the province established two parallel but separate education systems. Each linguistic sector of the Department of Education is responsible for its own curriculum and assessment.

The public education governance structure in New Brunswick has undergone a number of reforms in the past decade. In 1996, school boards were dissolved. Between 1996 and 2001, the province's 18 school district offices (organized in eight administrative units) held responsibility for the operation of the schools. A network of parental governance structures was established at the school, district, and provincial levels. In 2001, the number of school districts was reduced to 14 independently administered units; five French and nine English school districts. District education councils (DECs) were created, consisting of publicly and locally elected members. DECs are responsible for establishing the direction and priorities for the school district and for making decisions as to how the district and schools are operated. The DECs have broad policy and planning responsibilities and are ultimately responsible to the community for the performance of the schools and for meeting provincial standards.

Kindergarten through grade 12 enrolment for the 2002–03 school year totaled 120,600 (84,575 students in the anglophone sector and 36,025 students in the francophone sector). The starting age for school is five, and attendance is mandatory until the age of 18. The number of instructional days currently stands at 185 per year.

Science Teaching

New Brunswick's science curriculum for the anglophone sector, as defined in *Foundation for the Atlantic Canada Science Curriculum*, is aimed at enabling students to become scientifically literate. To achieve scientific literacy for all students, science programs are expected to address the three basic scientific fields of study — physical, earth, and life sciences. Attempts are made to develop the connections among the basic sciences and expose students to the various cognitive, scientific, and technical skills. These include the processes of science, such as predicting and formulating hypotheses, as well as higher-level skills such as critical thinking and evaluating, and manipulative skills such as the use of a microscope, a balance, and various forms of data collection. Every effort is made to present science in connection with students' own lives and interests, using hands-on experiences that are integral to the instructional sequence.

The science curriculum contributes to the achievement of the general science curriculum outcomes found in the *Foundation for the Atlantic Canada Science Curriculum*. As a result of achieving the science outcomes, students should understand the nature of science and scientific knowledge, the nature of technology, and the fact that science, technology, the environment, and society are inter-related. They should also be able to use scientific knowledge and cognitive and technical skills to investigate the natural world, to solve problems, to make informed decisions, and to learn and apply safe laboratory techniques. In addition, they should be able to communicate an understanding of the major concepts and principles of science and related technology and understand the interdependence of global social, economic, and ecological systems. Finally, students should demonstrate positive attitudes toward science and technology, be aware of careers in science and technology, and develop the habits of lifelong learning.

Areas of ongoing development within the province's science curriculum include the following:

- cooperation among four Atlantic provinces at all grade levels in science — a common science curriculum has recently been completed
- emphasis on Canadian content via Canadian resources where possible
- relevance of science to the everyday world being emphasized at all grade levels
- recent implementation of new resources and curriculum for grades K–10, with current pilots in Physics 11 and 12
- development, pilot, and implementation of all new science curriculum for grades 11 and 12
- encouragement of the use of technology within science programs
- enhancement of student learning through hands-on experiences
- development of curriculum that strongly emphasizes science–technology–society connections

Science Assessment

The Department of Education administers a comprehensive provincial evaluation program to monitor overall student achievement at particular points in the system. This provides important feedback at provincial and local levels about the knowledge and skills students are expected to acquire.

In recent years, grade 3 and grade 5 science assessments for the anglophone sector have been specific to learning outcomes identified in the provincial curriculum documents, and group data have been provided. The current emphasis on literacy and numeracy at the elementary level has contributed to large-scale science testing being repositioned to the middle school and high school with a focus on individual results. Beginning in 2006, students will write provincial science assessments at grade 10 and, in 2007, at grade 6. These will be curriculum-based.

For further information, please consult the following Web site: http://www.gnb.ca/education.

Results for New Brunswick (English)

The results of both New Brunswick 13-year-olds and 16-year-olds who responded in English showed fewer students achieving all levels than those from across Canada.

Over 60% of New Brunswick English-language 13-year-old students achieved level 2 or higher, and nearly 60% of 16-year-old students reached level 3 or higher.

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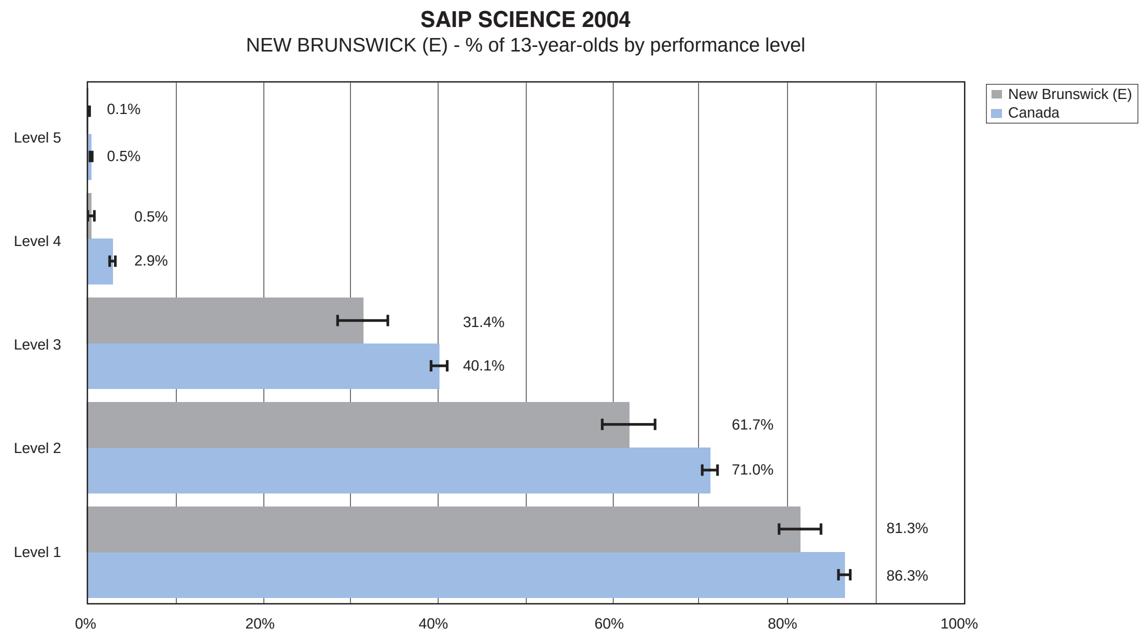

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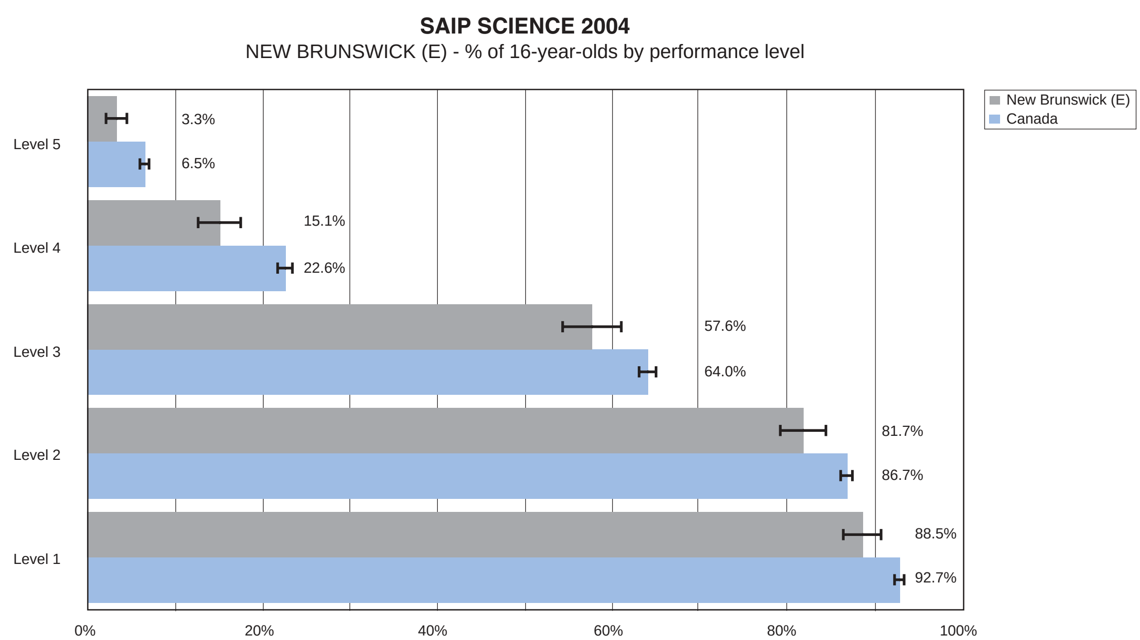


Context Statement

Social Context

As of July 1, 2002, New Brunswick's population was 750,183. Rural residents make up 49.6% of the population, and urban residents, 50.4%. Socioeconomic development has improved in New Brunswick over the past few years. In spite of this trend, the unemployment rate is higher than the Canadian average, especially in the francophone regions of the province.

New Brunswick has been officially bilingual since 1969. The native language of more than one-third of its population is French. School enrolment is 120,600 students, of whom 29.9% attend francophone schools.

Almost half of students enrolled in francophone schools live in a majority anglophone environment.

Organization of the School System

The New Brunswick school system begins in kindergarten and continues to grade 12. Children are enrolled in kindergarten in the calendar year in which they reach the age of 5 by December 31.

School attendance is compulsory until the end of secondary schooling or age 18.

In 1974, the province created an educational system composed of two parallel and distinct divisions, one for each linguistic community. The francophone section of the Department of Education is responsible for providing curriculum and assessment that respond to the needs of the francophone population. The province is divided into five francophone school districts (administered by three general administrative units) with 36,025 students and nine anglophone school districts (administered by five general administrative units) with 84,575 students.

In recent years, considerable efforts have been made to respond to the particular needs of students and to make school accessible to all. In accordance with the New Brunswick Education Act and regulations, school administrators are required to place students with special needs in regular classrooms, providing that the educational requirements of all students are considered. This has led to a high level of school integration; from kindergarten to grade 8, almost 100% of special-needs students are integrated into regular classrooms, while the rate is almost 80% from grades 9 to 12. The school dropout rate is the lowest in Canada: for the 2001–02 school year, francophone schools recorded a dropout rate of 2.9%.

The Measurement and Evaluation Branch published a provincial outcomes assessment policy in 2002. There are no external summative assessments in elementary-level science, nor for other parts of the curriculum. In grades 9, 10, 11, and 12, the minimum passing grade for credit is 55%. Since 1991, provincial secondary school examinations are given to all students at the end of their studies and count for 40% of their final grade in seven required subjects, including physics in grade 10 and chemistry in grade 11.

Science Teaching

The science curriculum in the francophone sector aims to develop scientific literacy in students from kindergarten to grade 12. Building on students' knowledge, their natural environment, and the various social, economic, political, and environmental contexts, the science curriculum allows students to develop notions and concepts highlighting the interdependency between living beings and their environment. Students will develop the necessary understanding to take on their responsibilities as beings integrated in nature. Students are also expected to demonstrate their scientific literacy through attitudes characterized by an understanding of life, the environment, and society as a whole.

From kindergarten to grade 8, major themes studied include concepts related to life sciences, the physical sciences, and earth and space sciences. Expectations are progressive over the years of study. As part of the regular program, science makes up at least 4% of teaching time in grade 1, rising to a minimum of 12% in grade 8.

From grades 9 to 12, i.e., at the secondary level, science courses are on a semester system, and the minimum teaching time for these subjects is 115 hours per semester. Biology in grade 9, physics in grade 10, and chemistry in grade 11 are the three science courses required for graduation. Optional courses are also offered in these subjects, including an environmental science source. The aspects covered in SAIP assessments are included in the science curriculum, except for the earth science dimension, which is covered in social sciences (geography).

Science Assessment

Since 1991, the francophone sector of the Department of Education has administered province-wide examinations in grade 10 physics and grade 11 chemistry, i.e., at the end of the required course in these subjects at the secondary level. Results of these examinations make up 40% of the students' final mark. The examinations include multiple-choice, short-answer, and essay questions and cover the essential dimensions of the curriculum, including the nature of science, which is a component of all science programs. A detailed statistical report is later provided to school districts and schools.

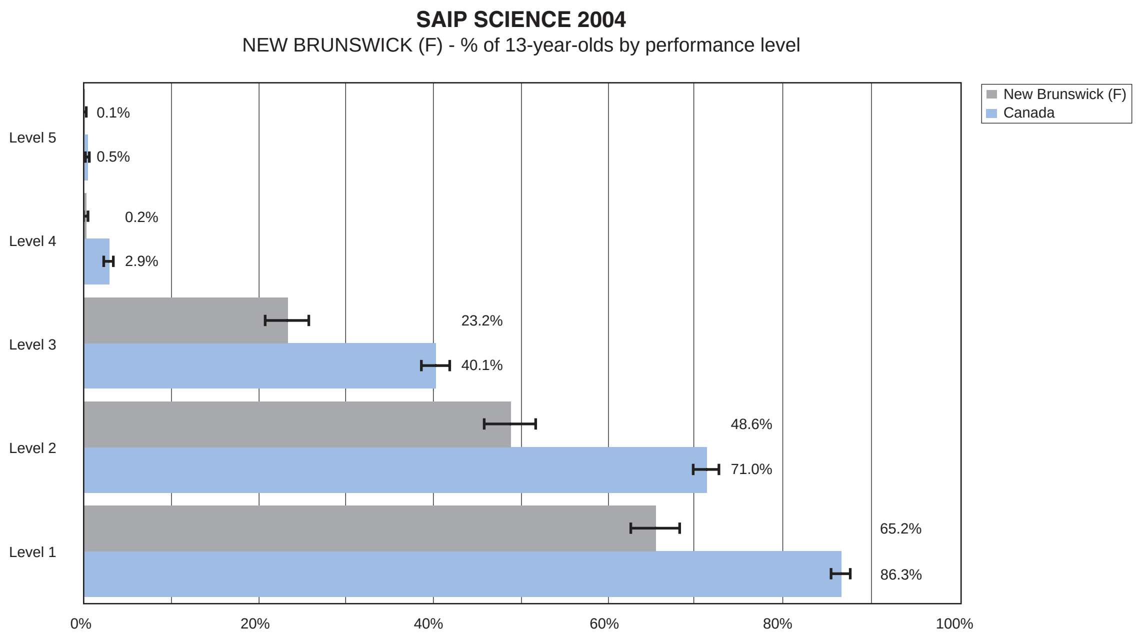
The participation of teachers is essential at every stage of development, administration, and marking of the examinations. Such participation is very helpful to teachers in their own science assessment practices.

Results for New Brunswick (French)

Both New Brunswick 13-year-olds and 16-year-olds who responded in French showed lower achievement than that of the Canadian average at all levels. Almost 35% of 13-year-olds did not reach level 1.

Nearly one-half of New Brunswick French-language 13-year-old students achieved level 2 or higher, and nearly 60% of 16-year-old students reached level 3 or higher.

CHART NB(F)1



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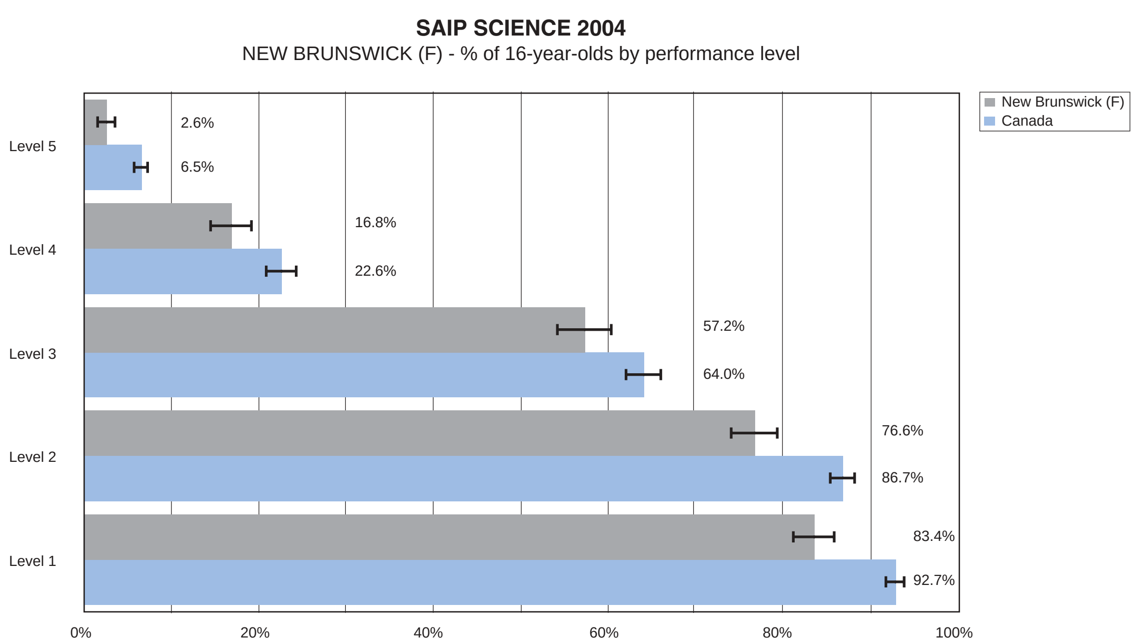


Context Statement

Social Context

Nova Scotia is a small province with a population of 936,025 and a higher rural population than the Canadian average. Immigration is low both in absolute numbers and in comparison to immigration in Canada as a whole. About 10% of the population speaks both English and French, or French only. Among the total population, about 3.8% consists of visible minorities. The unemployment rate in Nova Scotia is typically above the Canadian average.

Organization of the School System

Nova Scotia's total school population is 150,599 from primary to grade 12. The province has a teaching force of 9,592 and is divided into seven school boards. About 97% of students are enrolled in anglophone school boards, and about 3% in the Conseil scolaire acadien provincial. Overall, school enrolment is expected to decrease over the next few years.

Children who are five years old on or before October 1 are admitted to elementary school. Students must attend school until they are 16 years old. Most 13-year olds are in grade 7 or 8, and most 16-year-olds are in grade 10 or 11.

Science Teaching

Foundation for the Atlantic Canada Science Curriculum (Atlantic Provinces Education Foundation, 1998) is the framework for the development of a common science curriculum for the Atlantic Provinces. Currently, the departments of education, through the Atlantic Provinces Education Foundation (APEF), are implementing new science curriculum guidelines for grades entry to 12. The science curriculum is based on an outcomes framework that includes statements of essential graduation learning, general curriculum outcomes, key-stage curriculum outcomes, and specific curriculum outcomes. General, key-stage, and specific curriculum outcomes have been adapted from the pan-Canadian *Common Framework of Science Learning Outcomes K–12*.

New curricula for grades primary–2 and 7–10 science and for grades 11 and 12 chemistry, physics, and biology have been implemented. In addition, new curriculum has been introduced for grade 12 geology. Two new science courses have been implemented: Agriculture/Agrifood 11 and Food Science 12. Teachers work closely with the department to develop curriculum and related assessments.

The aim of science education, as defined in *Foundation for the Atlantic Canada Science Curriculum*, is to develop scientific literacy.

Science literacy is an evolving combination of the science-related knowledge, skills, and attitudes students need to develop inquiry, problem-solving, and decision-making abilities, to become lifelong learners and to maintain a sense of wonder about the world around them. To develop scientific literacy, students require diverse learning experiences that provide opportunities to explore, analyze, evaluate, and synthesize. Through these experiences, students will come to appreciate and understand the interrelationships among science, technology, society, and the environment that will affect their personal lives, their careers, and their future. The development of students' science literacy is shaped by many factors including gender, social and cultural backgrounds, and the extent to which individual needs are met. In designing learning experiences for students, teachers are expected to consider the learning needs, experiences, interests, and values of all students.

Science Assessment

There are currently no provincial assessments in elementary and junior high schools. In senior high schools, Nova Scotia examinations are administered to science students completing grade 12 courses in physics and chemistry.

Nova Scotia Examinations are conducted in January and June of each school year and count for 30% of students' final course marks. The results of the Nova Scotia Examinations are published annually in the *Minister's Report to Parents*.

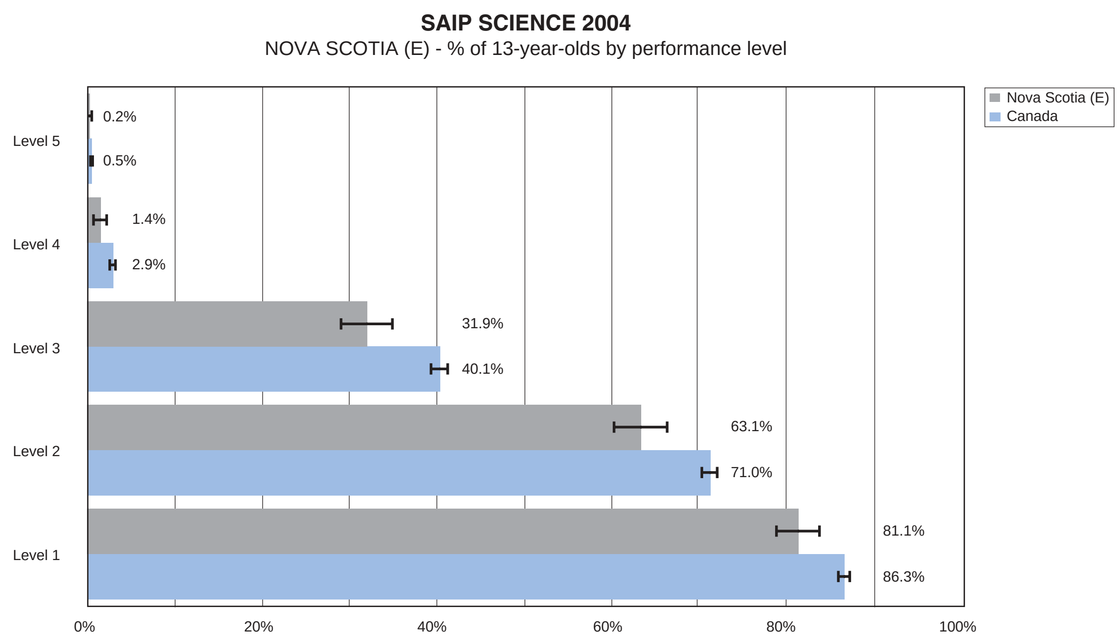
Results for Nova Scotia (English)

The results for Nova Scotia 13-year-olds who responded in English showed fewer students achieving levels 1 through 4 than the Canadian average, with a similar proportion reaching level 5 as is found in the Canadian average.

Nova Scotia 16-year-olds who responded in English demonstrated results that were lower than the Canadian average at levels 1 to 4, with a similar proportion reaching level 5 as is found in the Canadian average.

Over 60% of Nova Scotia English-language 13-year-old students achieved level 2 or higher, and about 60% of 16-year-old students reached level 3 or higher.

CHART NS(E)1



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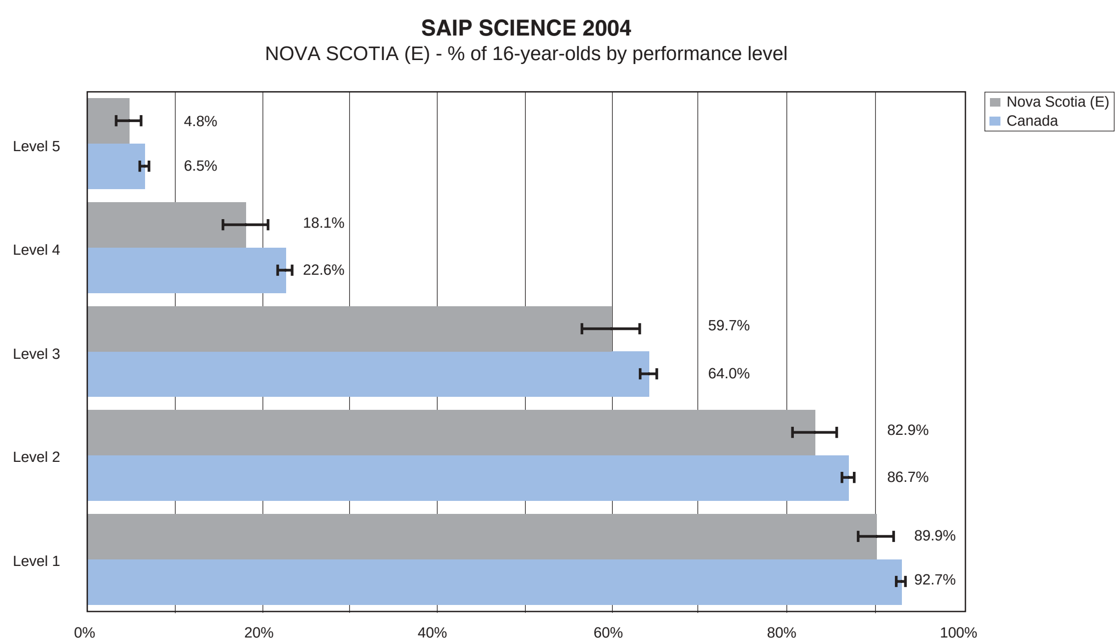


Context Statement

Social Context

Nova Scotia is a small province with a population of 936,025, with a higher rural population than the Canadian average. Immigration is low both in absolute numbers and in comparison to Canada as a whole. About 10% of the population speaks both French and English, or French only. Among the total population, about 3.8% consist of visible minorities. The unemployment rate in Nova Scotia is typically above the Canadian average.

Organization of the School System

Nova Scotia's total school population is 150,599 from primary to grade 12. The province has a teaching force of 9,592 and is divided into seven school boards. About 97% of students are enrolled in anglophone school boards, and about 3% in the Conseil scolaire acadien provincial. Overall, school enrolment is expected to decrease over the next few years.

Children who are five years old on or before October 1 are admitted to elementary school. Students must attend school until they are 16 years old. Most 13-year-olds are in grade 7 or 8, and most 16-year-olds are in grade 10 or 11.

Science Teaching

The science curriculum for grades 1–12 has been harmonized with the pan-Canadian common framework of science learning outcomes. Schools in the Conseil scolaire acadien provincial (CSAP) have reached various stages of testing this new curriculum from kindergarten to grade 6. However, curriculum implementation for grades 7 to 12 is in force in all CSAP schools. Nova Scotia science curriculum is designed to provide children with essential skills, knowledge, and attitudes essential to the acquisition of scientific and technological literacy in a social and environmental context. Therefore, science is not considered as an isolated set of ideas and skills within the curriculum. Nova Scotia seeks to attain this objective based on the following principles in its curriculum:

- Science is an effective way to know the world.
- Technology is a social process through which society draws on its natural and human resources to resolve practical problems.
- There are links between science, its application through the use of technology, and its consequences for the environment and society.
- Diverse methodologies and assessment strategies need to be available to take into account the diversity of learners.
- Learning science is an active process, involving creativity, inquiry, problem solving, and decision making.
- Learners are not passive but goal-driven and are ultimately responsible for their own learning; they bring their own experiences and perceptions to bear on learning situations.
- More emphasis needs to be placed on oral expression, small-group learning, social skills, and cooperative learning, as well as independent learning.
- We must draw on a broad range of resources (text-based and other) from diverse levels and genres and having a multicultural character.
- Assessment is an integral part of teaching and learning.

Teachers throughout the province work closely with department staff to develop curriculum and related assessment. Francophone Nova Scotia currently has an outcomes-based curriculum for grades 1 through 12.

Science Assessment

Classroom student assessment has been improving for the last several years in Nova Scotia, thanks in part to in-service training and to the new science curriculum, which includes a broad range of assessment activities. Assessment instruments allow for variety and diversity by asking questions at various levels of difficulty, using many styles of questions (multiple-choice, short-answer, essay-type based on a social context, and practical tasks).

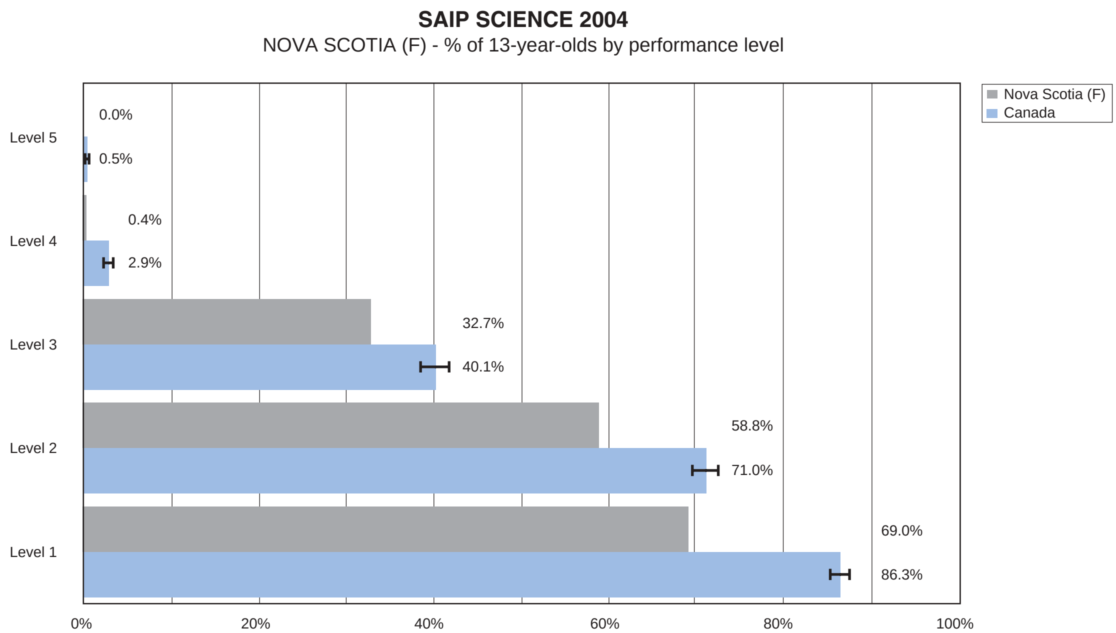
Currently, there are no measurement instruments being developed at the provincial level for science courses delivered to Nova Scotia francophones.

Results for Nova Scotia (French)

Both Nova Scotia 13-year-olds and 16-year-olds who responded in French achieved below the Canadian average at all levels. Over 30% of these students did not reach level 1.

Nearly 60% of Nova Scotia French-language 13-year-old students achieved level 2 or higher, and nearly 60% of 16-year-old students reached level 3 or higher.

CHART NS(F)1



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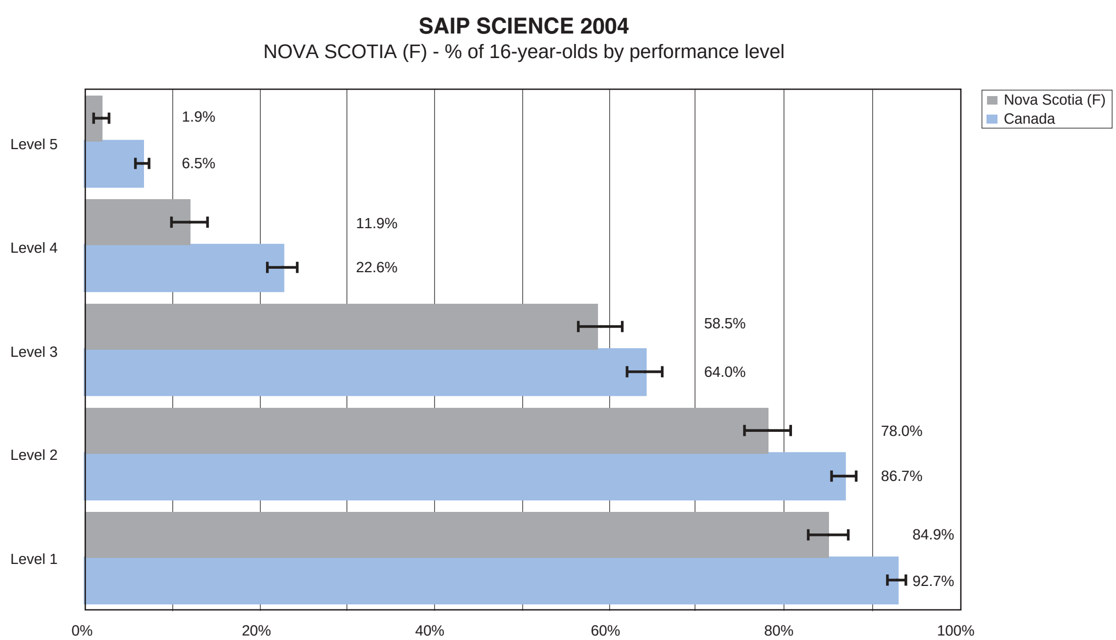


Context Statement

Social Context

Prince Edward Island is the smallest province in Canada, both in terms of land (5,600 square kilometres) and population (137,800). Ninety-five per cent of the population speaks English. Approximately 11% speaks French. Sixty per cent of the population is rural, with about 7% living on farms. The setting is predominantly rural with agriculture, tourism, fishing, and manufacturing constituting the major industries. The Confederation Bridge, the world's longest continuous multi-span bridge, which opened in 1997, connects Prince Edward Island to mainland New Brunswick.

Organization of the School System

At the time of the 2004 SAIP Science assessment, Prince Edward Island's public school system was composed of three school boards and had an enrolment of 23,944 students in 70 public schools. Approximately 2.5% of the total student population was enrolled in five French schools, and 17% in French immersion courses. In addition, there were four private schools with a total of 178 students and one First-Nations-operated school. Prince Edward Island has a teaching force of approximately 1,500 teachers employed by the school boards.

The school system consists of grades 1–12. Students entering grade 1 must be six years of age by the end of January of their first school year. In 2001, Prince Edward Island introduced a province-wide publicly funded community-based kindergarten program, attracting approximately 97% of the province's eligible 5-year-olds.

Prince Edward Island's students are accommodated within facilities that contain a number of grade configurations, including grades 1–3, 1–4, 1–6, 5–8, 4–6, 1–8, 1–9, 7–9, 9–12, and 10–12. This diversity results from demands placed on the school by the local community, the school enrolment, and existing facilities. In this province, high school consists of grades 10–12.

In Prince Edward Island, the 13-year-old students who participated in the SAIP Science III assessment were predominantly in grades 7 and 8, while the majority of 16-year-old students were in grades 10 or 11. In order for high school students to meet graduation requirements, they must complete two high-school-level science courses.

Science Teaching

In 1998, the Atlantic Provinces Education Foundation (APEF) published the *Foundation for the Atlantic Canada Science Curriculum*, which articulated a vision of scientific literacy for all students and identified expectations for the development of the science curriculum at each grade level. Four general curriculum outcomes were identified to delineate the four critical aspects of students' scientific literacy: science, technology, society, and the environment (STSE); skills; knowledge; and attitudes.

From grade 1 to grade 10, all students are exposed to the three basic scientific fields of study — life, physical, and earth and space science. At high school, students may opt to take specific science courses.

A wide variety of print and non-print resources is used to engage students in the processes of scientific literacy. Inquiry, problem solving, and decision-making situations give meaning and relevance to the science curriculum. Skills include predicting and formulating hypotheses, analyzing and evaluating, and manipulative skills that include the use of a microscope, balance, or other scientific equipment. Instructional strategies incorporate assessment approaches that are aligned philosophically with the curriculum and correlate with specific outcomes at each grade.

Prince Edward Island's science curriculum recognizes that the development of scientific literacy in students is a function of the kinds of tasks they engage in, the discourse in which they participate, and the settings in which these activities occur. Learning experiences in science education vary and include opportunities for group and individual work, discussion among students as well as between teacher and students, and hands-on/minds-on activities that allow students to construct and evaluate explanations for the phenomena under investigation.

Prince Edward Island uses a collaborative approach in the development and implementation of curriculum. Curriculum committees, comprising of teachers, departmental consultants, and other partners, provide feedback on curriculum development, resource selection and planning, and teacher support. The Department of Education provides common resources to support the science curriculum at all levels.

New curriculum has been implemented in grades 1, 2, and 3 and in grades 7 and 8. Plans are under way to implement grades 4, 5, 6, 9, and 10 over the next two years.

Science Assessment

Prince Edward Island does not have large-scale provincial assessment programs. Teachers are encouraged to use a multi-faceted approach within their classrooms, to integrate assessment with instruction, and to use the collected information to inform students, parents, and other school personnel about student progress.

Results for Prince Edward Island

Prince Edward Island 13-year-olds and 16-year-olds achieved below the Canadian average at all levels.

About two-thirds of Prince Edward Island 13-year-old students achieved level 2 or higher, and nearly 60% of 16-year-old students reached level 3 or higher.

CHART PE1

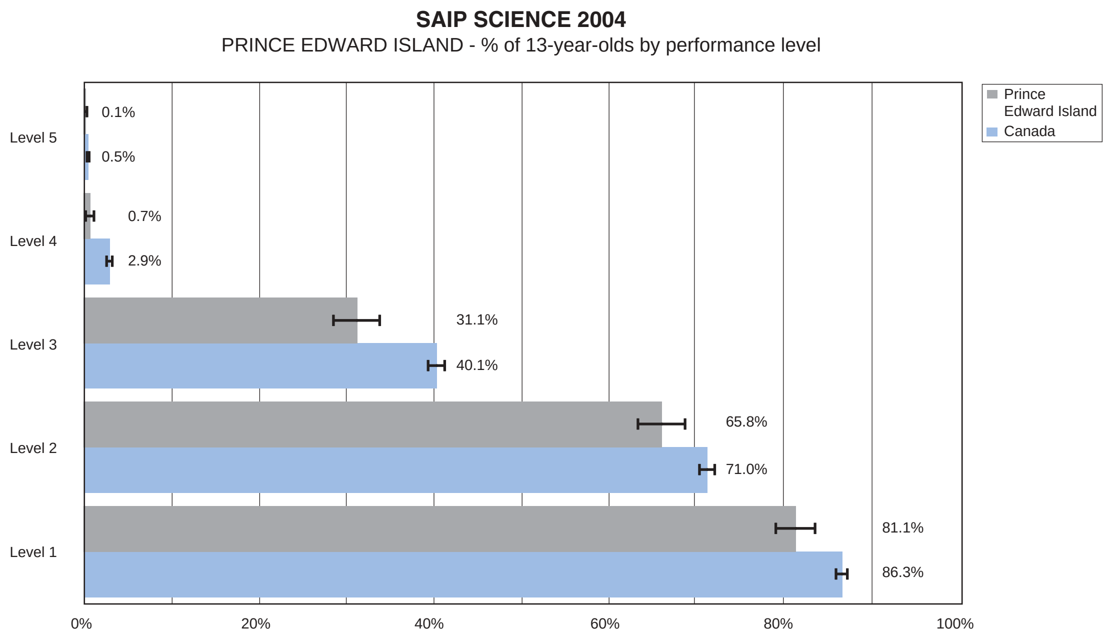
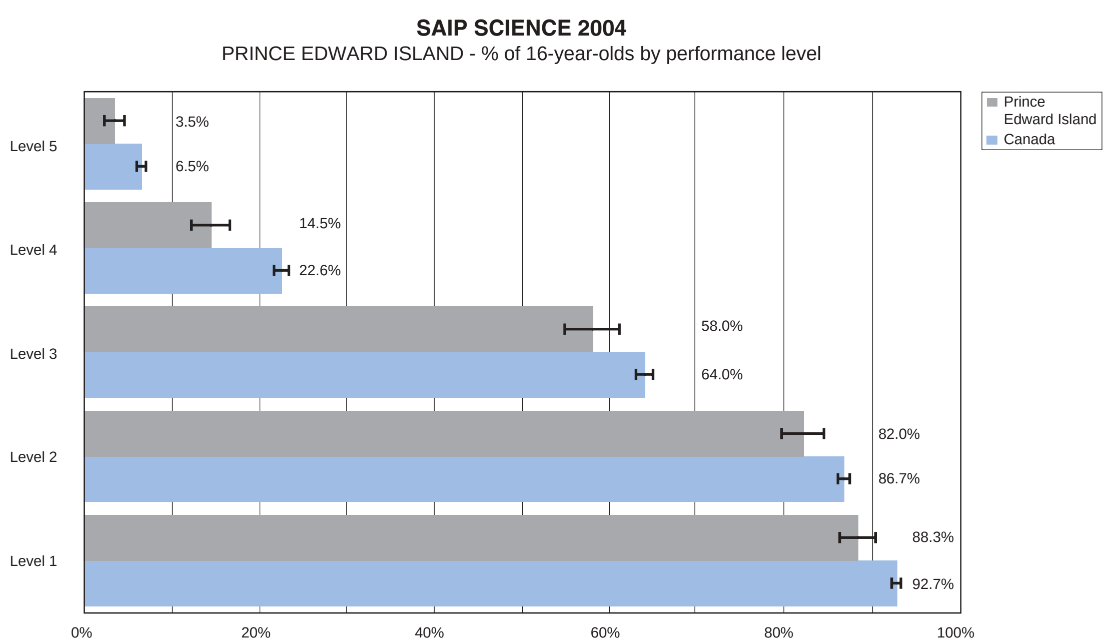


CHART PE2



Context Statement

Social Context

In Newfoundland and Labrador, there are approximately 520,000 people spread over a large geographical area. The population of rural areas has been declining, while the population of urban areas, such as the capital city of St. John's, has been rising to a point where it currently contains 33% of the total population of the province. The declining population in the rural communities, along with the large size of the province, provide many challenges for the delivery of educational programs and services. As a result, it has become increasingly difficult to maintain appropriate levels of programming in rural communities.

However, thanks to increased activity in oil exploration, mining, and tourism, the economy is expected to increase significantly with a predicted growth in the GDP of 2.9% by the end of 2004. As well, employment is expected to increase by 1.6% over the next year.

Organization of the School System

The province's education system is made up of 11 public school districts and 4 private schools. One of these school districts is francophone. The districts contain 317 schools with a total student enrolment of 84,268 and 6,065 school-based educators. The Avalon Peninsula, on the eastern part of the province, contains two public school districts and comprises 47% of the provincial student enrolment.

French Immersion is offered in eight public school districts. Early French Immersion (K–12) is offered in seven districts, and late French Immersion (7–12) is offered in two districts. Approximately 6% of the total student population is enrolled in either early or late French immersion.

Even though school entry is compulsory for children who are six years of age by December 31, most enter kindergarten if they are five by that date. Typically, 13-year-olds are in grade 8, and 16-year-olds are in grade 11.

Science Teaching

Students in Newfoundland and Labrador are learning science through the Atlantic Provinces Education Foundation (APEF) science outcomes at the elementary and high school levels. The APEF science outcomes at these levels are based on the pan-Canadian outcomes. In Newfoundland and Labrador, the APEF outcomes have been regionalized by the provincial department of education to meet local needs.

Students at the primary and intermediate levels, and in the general stream of high school, learn science through provincial curriculum developed by the Newfoundland and Labrador Department of Education. Most 13-year-old students in the province would be completing grade 8 science this year, and most 16-year-old students would be completing courses in either the academic or the general stream of high school science.

Most high school students take a two-credit science course in each of three years of high school. However, students require four science credits (two courses) to graduate from high school. Approximately 85% of all grade 10 students take Science 1206, which is a two-credit interdisciplinary academic course introducing students to biology, chemistry, earth systems, and physics. Non-academic students can take two-credit courses in General Science 1200, Physical Science 2205, Science, Technology, and Society 2206, and Environmental Science 3205. Four credits are available to academic students in biology, chemistry, and physics, and two credits are available to academic students in earth systems.

Science Assessment

In recent years, Newfoundland and Labrador has placed a strong emphasis on standardized provincial assessments throughout K–12 in an effort to improve student learning. Students are assessed in knowledge, comprehension, application, and synthesis.

Criterion-referenced tests in science were administered to grade 9 students in 1998, 1999, and 2003. They will continue to be administered every three years, with the next one taking place in June 2006. Preliminary plans are under way to develop an elementary science criterion-referenced test that will be administered in June 2005 to grade 6 students.

As of June 2001, provincial examinations for senior high school students were reinstated and administered in biology, chemistry, and physics. In June 2002, a provincial examination in earth systems was administered. These examinations, administered annually, include a selected response and a constructed response component.

For more information about K–12 education in Newfoundland and Labrador, view the Department of Education Web site at http://www.gov.nf.ca/edu/.

Results for Newfoundland and Labrador

Newfoundland and Labrador 13-year-olds performed the same as those from across Canada at levels 4 and 5 but below the Canadian average at levels 1, 2, and 3.

In comparison with the results across Canada, 16-year-old students from Newfoundland and Labrador achieved at the Canadian average at all levels.

About two-thirds of Newfoundland and Labrador 13-year-old students achieved level 2 or higher, and more than 60% of 16-year-old students reached level 3 or higher.

CHART NL1

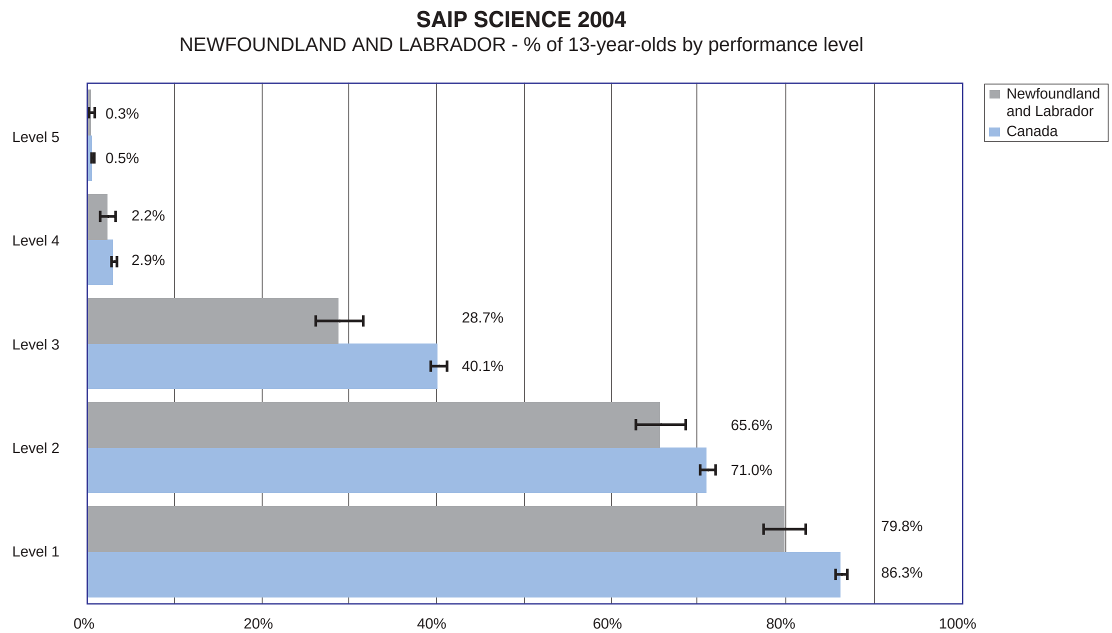
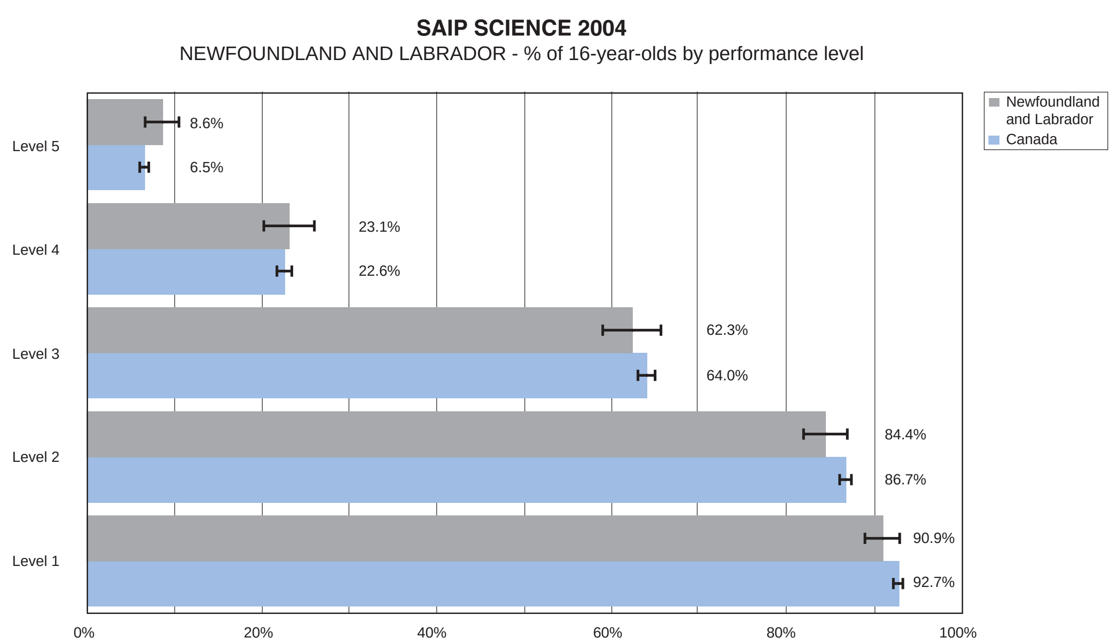


CHART NL2



Context Statement

Social Context

The Northwest Territories has a land mass of 1,171,918 square kilometres. The total population is about 43,000, approximately half of whom are Aboriginal. An estimated 2% of the total population is francophone. There are 33 communities, ranging in size from 18,500 to 36.

Most non-Aboriginal people live in the larger communities. In Yellowknife, 77% of residents are non-Aboriginal. In smaller communities, Dene, Métis, and Inuit constitute 84% of the population. Official languages spoken in the Northwest Territories are Chipewyan, Cree, Dogrib, English, French, Gwich'in, Inuinnaqtun, Inuktitut, Inuvialuktun, North Slavey, and South Slavey. About half of the Aboriginal people in the NWT speak an Aboriginal language. While English is primarily the language of instruction in schools, Aboriginal languages and cultures are integral to the culture-based education system.

Organization of the School System

In 2003–04, the Northwest Territories enrolled 9,845 students in kindergarten through grade 12 and employed 743 teachers in 49 public schools. The Department of Education, Culture and Employment provides policy and curriculum direction to eight education jurisdictions. These jurisdictions implement and adapt curriculum and develop programs in order to meet the needs of all students in their district.

In recent years, the territories have implemented grade extensions in small schools. In 1990, only 73% of students could complete their high school education in their home community. That proportion had increased to 92% by 1998–99. As a result, more students are staying in school, and more young people who left school before earning a grade 12 diploma are returning to school. The challenge is to provide a choice of quality programs in schools where as few as 1 or 2 students may be enrolled in a grade. Innovative program development, use of computer technology, and distance education support many courses offered in small communities.

Science Teaching

The science curriculum for grades K–12 is currently being brought in line with the Pan-Canadian Science Framework. The NWT elementary and junior high science curricula were developed in 1986 and 1991 respectively to meet the scientific literacy and numeracy needs of each student. Science program delivery can be taught in any of the eleven official languages of the NWT. To meet the diverse cultural needs of each student, the curriculum documents Inuuqatigiit (Eastern Arctic) and Dene Kede (Western Arctic) were developed to enhance subject curricula and make programming more culturally relevant to the students. These documents are student-centred, with a community-based philosophy on education. These documents encourage a melding of western science concepts and traditional knowledge. The senior secondary science programs (10–12) are based on the Alberta curricula, with students writing grade 12 departmental examinations. The strategic plan, "Our Students, Our Future," emphasizes the importance of a balance in curricular goals, so that schooling includes the social, emotional, spiritual, intellectual, and physical aspects of students' lives. To this end, science in the classroom is student-centred and culturally based; reflects the community in which the children live; and encourages curiosity, careers in science, and the pursuit of lifelong learning. Advances in satellite communications and technology has given students in the NWT access to electronic educational programming, electronic bulletin boards, and the World Wide Web. This enables students to become active participants in the "global science village" and to explore science/technology and society connections and careers.

Science Assessment

There is currently no territorial-wide science assessment done, other than the Alberta grade 12 diploma examinations. Each board of education is responsible for its own methods of assessment. Performance assessments are carried out by a few boards annually at the grades 3, 6, 9, and 12 levels. Since 1991, the Department of Education and all boards in the NWT have participated in the pan-Canadian SAIP assessments.

The *Departmental Directive: Student Assessment, Evaluation and Reporting* was completed in February 2001. The directive applies to the assessment and evaluation of students in kindergarten to grade 12 for the purposes of

- determining individual student performance
- determining the performance of the education system

Initial implementation commenced in September 2001 and is ongoing. A team with representatives from the department and each regional district education council/district education authority is responsible for guiding and supporting the two-year implementation process and for ensuring that plans are sustainable. In-services on classroom-based assessment commenced in September 2002.

Results for Northwest Territories

Northwest Territories 13-year-old students did not reach the Canadian average at all levels except at level 4 where results were similar to the Canadian average. In addition, over one-third of these students did not reach level 1.

Northwest Territories 16-year-old students achieved the Canadian average at level 5, with fewer achieving levels 1 through 4.

Almost half of Northwest Territories 13-year-old students achieved level 2 or higher, and about half of 16-year-old students reached level 3 or higher.

CHART NT1

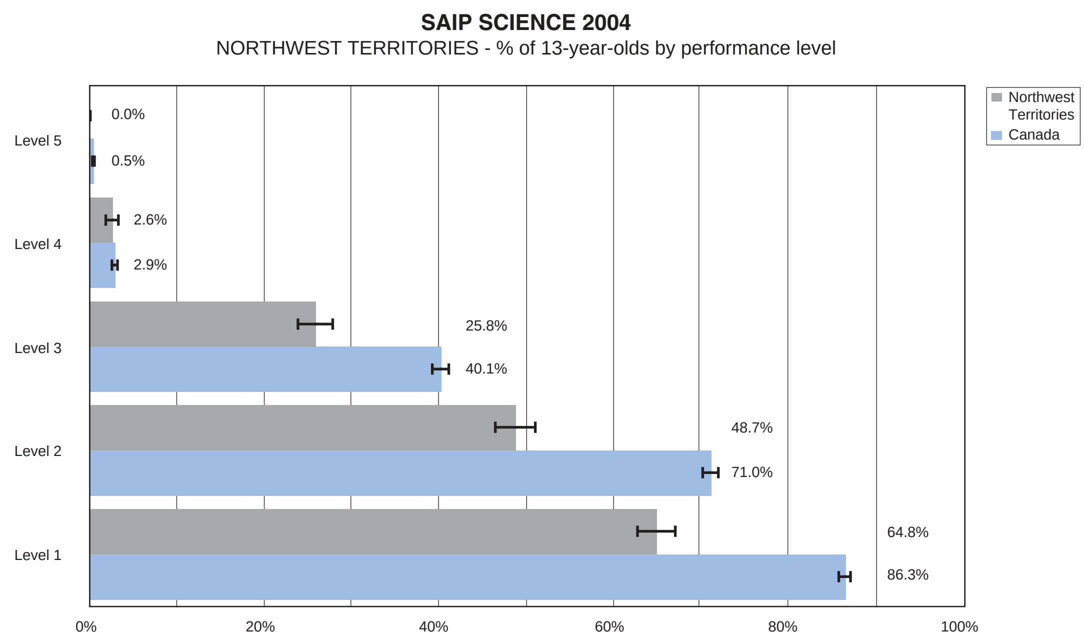
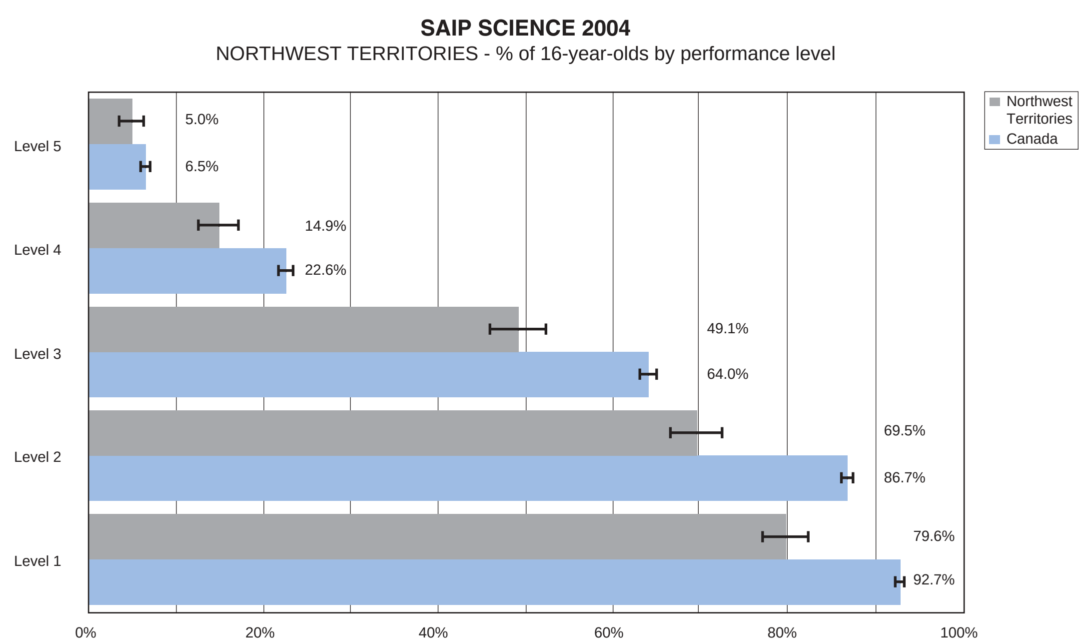


CHART NT2



Context Statement

Social Context

Yukon has a total land area of 483,450 square kilometres and a population of 30,255, of whom 22,425 live in Whitehorse, the capital city. The remaining population is divided among the 19 rural communities.

Organization of the School System

There are 28 schools with a total enrolment from kindergarten to grade 12 of 5,435. Half the schools are designated as rural. These schools typically have low student populations, several multi-level classes, and low pupil/teacher ratios. Many rural schools do not offer grades 11 and 12 and may have fewer optional programs offered in the secondary grades.

Unlike most jurisdictions in Canada, there are no school taxes in Yukon and only one school board, for École Émilie-Tremblay, the territory's only French school. School superintendents work for the Department of Education, which is responsible for most aspects of school operations. Almost every school has a school council, a body that has some but not all the powers of a school board, including responsibility for school rules, school plans, and dispute resolution, to name a few.

Yukon follows the British Columbia curriculum in all subject areas. This curriculum is sometimes modified — with departmental approval — to reflect local needs and conditions. As well, up to 20% of a student's educational program may be locally developed. Schools are organized into two segments: elementary (K–7) and secondary (8–12). There are three Catholic schools within the Yukon public school system. Instructional time allotments for each subject vary in the elementary grades but are standardized to 120 hours per course for grades 8 to 12.

Approximately 28% of Yukon students are of First Nations ancestry. These students often participate in Native language programs and/or in various locally developed courses aimed at developing awareness, appreciation, and knowledge of First Nations culture and traditions. The remainder of the student population is predominantly of European or British ancestry. Approximately 7% of Yukon students are enrolled in a French Immersion program, while nearly 2.1% attend French school.

Science Teaching

Major changes in the science curriculum in the past 10 years include

- increased number of girls taking senior science courses
- increased emphasis on demonstration of science activities such as "science fairs"
- increased number of science options available at both the junior and senior high school levels
- integrated experiential science programming offered through a common site

As noted above, Yukon follows, with appropriate adaptations and modifications, the British Columbia curriculum. Most modifications involve the selection and use of materials that are relevant to Yukon's biology, chemistry, and geology.

Science Assessment

Classroom teachers are encouraged to use a variety of testing measures — performance, projects, teacher-made tests, and student self-evaluation. Typically, both practical tests and content tests at the end of a chapter or unit are developed and administered by teachers. Marks are criterion-referenced (i.e., compared to an absolute standard) and are based on goals and objectives outlined in the curriculum guide.

For further information about science teaching in Yukon, and the Department of Education, visit our Web site at http://www.education.gov.yk.ca/.

Results for Yukon

Among 13-year-olds, fewer Yukon students achieved all levels than the Canadian average. Almost one-quarter of Yukon 13-year-olds did not reach level 1.

In the case of 16-year-old students from Yukon, fewer students achieved levels 1, 2, and 4 than those from across Canada. Achievement at levels 3 and 5 was similar to the Canadian average. Approximately 15% of Yukon 16-year-olds did not reach level 1.

Over 60% of Yukon 13-year-old students achieved level 2 or higher, and over 60% of 16-year-old students reached level 3 or higher.

CHART YT1

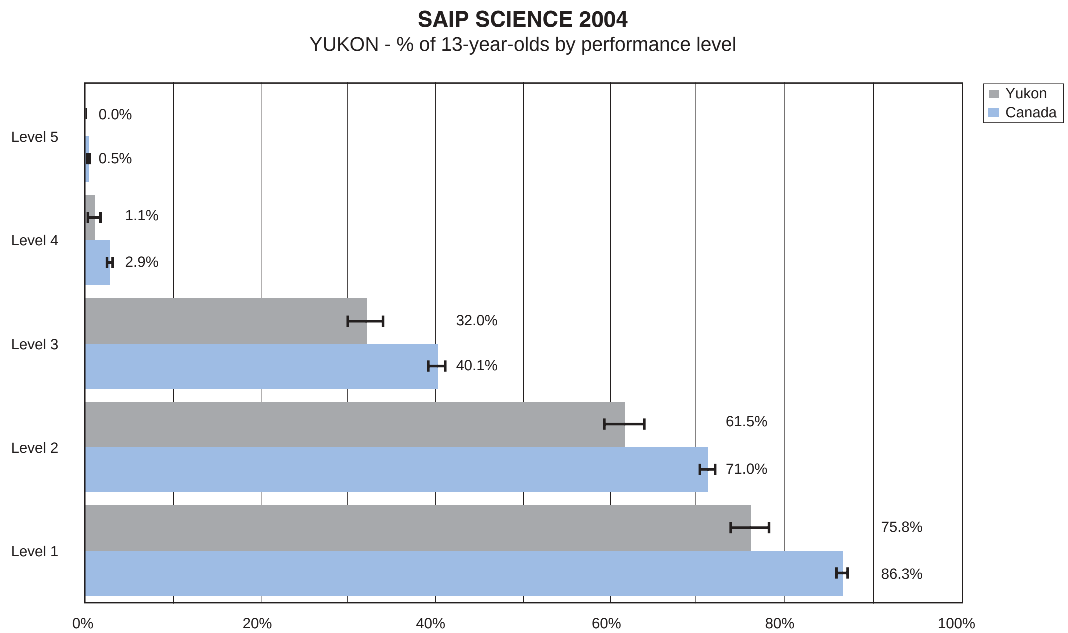
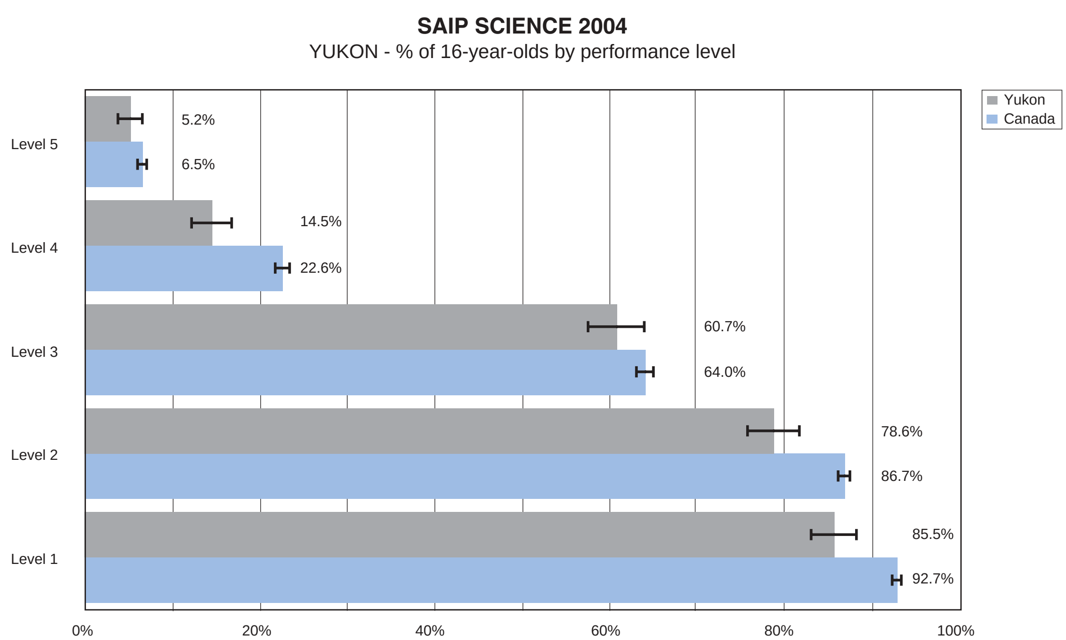


CHART YT2



THE CONTEXT FOR LEARNING SCIENCE IN CANADA

This section of the public report for SAIP Science III presents an overview of the results of a major objective of SAIP — an investigation of the myriad of contextual factors that affect the learning of science in Canadian schools.

THE SAIP QUESTIONNAIRES

Since 1998, all students completing the achievement assessments were also asked to complete a questionnaire. In addition, teachers identified as teaching science to the sampled students, along with the principals of all sampled schools, were asked to complete questionnaires. As well as student backgrounds and activities, the questionnaires included items about school characteristics, decision making, resources, classroom practices, opportunity to learn, attitudes toward school and science, and teacher backgrounds and specialization.

Since 1999, each SAIP assessment has included this collection of contextual data, and separate contextual reports were subsequently released.[9] For this assessment, however, both the public report on achievement and the contextual report are included in this one document.

CONCEPTUAL FRAMEWORK: THE FACTORS THAT INFLUENCE LEARNING

Learning is a complex process affected by many factors within student background and experience — school and classroom conditions, resources, motivation, quality of schooling and teaching, attitudes, and expectations. The achievement of an individual student or group of students is influenced by a large number of variables.

While some of the important influences on achievement are related to ability and socioeconomic status, which are beyond the control of the school, it is also generally acknowledged that variations in educational policies and practices can also influence learning. Some of the variables affecting learning would be expected to be more important for policy, more amenable to change, or more efficient as ways of enhancing learning than others. Improving learning can be expected to require intervention at the individual student, classroom, school, or jurisdictional level. Some ways of improving learning might require significant outlays of resources, while others might be accomplished relatively easily.

Most educational indicator systems are built around the concept that student learning *outcomes* are influenced by *inputs* and by the *processes* arising from these inputs. It is also generally recognized that education operates in an overall *context* determined by demographic features, social and economic conditions, infrastructure, and other broad characteristics of the society in which the enterprise operates.

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[9] See *Science Learning: The Canadian Context 1999; Mathematics Learning: the Canadian Context 2001;* and *Student Writing: the Canadian Context 2002*. Each of these reports is available on the CMEC Web site at **www.cmec.ca**.

While outcomes are clearly defined in a program such as SAIP as the results of the achievement assessment, it is not immediately obvious which specific context, input, or process variables are most worth investigating. Careful consideration of the research is required to assist in determining which variables should be included in studies of the factors influencing achievement. Most of the variables included in comprehensive surveys have some basis in previous research or may be justified by their policy relevance.[10] The variables used in SAIP are

1. Program design (e.g., curriculum and instruction)
2. Out-of-school contextual variables (e.g., home environment, out-of-school use of time)
3. Classroom instruction and climate (e.g., classroom management)
4. Student variables (e.g., motivation, placement)
5. School-level variables (e.g., parent involvement policy)
6. Jurisdictional variables (e.g., jurisdictional-level policy)

This gathering of contextual data was organized along the lines of these six main categories, plus a "teacher" level, which captures certain policy-relevant issues, such as teacher qualifications.

POPULATIONS AND SAMPLING

The first part of this report includes a detailed description of the populations sampled and the sampling methods used in this assessment. The importance of "weighting" samples is described to account for the vast differences in size of the various populations sampled. In addition, the methods of presenting results and the significance of sampling errors and confidence intervals are discussed.

When considering the results and comments that follow, it is important to realize that similar procedures and reporting methods apply to these contextual results as well. Student questionnaires are "weighted" to account for differences in sizes of the different populations. Large populations, particularly Ontario English and Quebec French, contribute more to the Canadian composite than smaller populations.

Sampling Error

Most of the results presented here are in the form of percentages responding to a particular category or combination of categories. Because the responses are based on samples, they are only estimates of the responses that would have been received had all members of the relevant populations been surveyed. Readers are directed to a discussion of confidence intervals and statistical differences found on page 17 in the section Notes on Statistical Information.

Confidence intervals are based on the number of schools with 13- and 16-year- olds in each jurisdiction. School data within jurisdictions are not weighted, as the size of each school could not be reliably reported.

The Canadian composite could not be computed for the teacher questionnaire because the size of the teacher population was not known. Comparisons across jurisdictions for the teacher questionnaire are therefore made cautiously.

[10] For further information on the research basis for the design, readers are referred to more detailed discussions in previous SAIP context reports, available at **www.cmec.ca**.

In practice, with large samples, the difference between jurisdictions required for policy or practical importance is in most cases much larger than the width of the typical confidence interval. For example, confidence intervals for student responses are typically ±4% or less. However, readers are cautioned not to attach much practical significance to observed differences less than ±10%. In almost all cases, the differences highlighted in this report are larger than the width of the confidence intervals.

PURPOSE AND STRUCTURE OF THE CONTEXTUAL REPORT

The ultimate goal of questionnaire analysis is to link the responses to the three questionnaires with the achievement levels of students, in order to examine in detail how contextual factors are related to achievement. The linking of these factors to student achievement is a complex and difficult application of statistical data.

Some information on correlations between student achievement and selected questionnaire variables is given in a separate section of this report.

In the main section of this report on the context of learning science, however, the results are presented mainly in descriptive/comparative form, with a view to offering a snapshot of students, teachers, and schools in Canada and in the separate populations used by SAIP. It is hoped that this will serve to stimulate discussion about important features of our schools, teachers, and students — and to generate the more complex analyses required to indicate what factors are more or less closely associated with science achievement.

This portion of the public report is divided into sections as follows:

- This first section gives an outline of the conceptual framework for the questionnaires, the developmental procedures, and the questionnaire specifications.
- The next three sections report on the detailed responses to the questionnaires by students, teachers, and principals, respectively.
- The section Context Factors and Achievement explores some of the links between student achievement and the context in which it was developed.
- The last section draws some conclusions with respect to the Canadian context for learning science.

The student questionnaire contained 26 multi-part questions about student home backgrounds, perceptions of school and science, educational and career aspirations, out-of-school activities, and attributions for success and failure. Students were also asked questions about classroom practices and resources similar to those asked of teachers. Many of these questions contained several specific items requiring separate responses, giving a total of close to 140 item responses. To keep the report at a manageable size, a carefully considered selection of items was made on which to present detailed results in chart form based on variables providing the most useful information to orient policy directions. Results on all questions are included in the technical report to be released later this year.

Statistical Notes

In most cases, the charts in this section contain separate breakdowns for the two age groups. In cases where there were no significant differences between the age groups, the two age groups have been combined. As is the case for the school questionnaire, weighted mean results have been computed for CAN(E) [Canada English], CAN(F) [Canada French], and CAN [all of Canada] populations. Also, there are no confidence intervals for Nova Scotia francophone 13-year-olds, as the entire population of students responded.

STUDENT HOME BACKGROUND

Language Use

Chart S-1 shows that, of the students who participated in the assessment, over 90% of 13-year-olds and about 85% of 16-year-olds were born in Canada. Exceptions are British Columbia and Ontario anglophone students, whose data show that they are favoured destinations for immigrants to Canada.

However, **charts S-2** through **S-6** show how the languages spoken at home tell of the wide variety of home backgrounds of the students. **Charts S-2** and **S-3** show that almost all students in anglophone populations often speak English at home. However, only in Quebec and New Brunswick is a similar pattern found for francophone students speaking French at home, while the remaining three francophone populations show that around 60% speak French at home, and slightly larger proportions speak English at home. Generally, less than 10% of students in anglophone populations (students who wrote the test in English) speak French at home, while close to 10% in Quebec francophone and about 20% in New Brunswick francophone populations often speak English at home. **Chart S-4** shows that, based on this SAIP sample, an Aboriginal language is spoken at home in about 2% of homes across Canada — with the exception of the Northwest Territories, where the proportion rises to close to 10%. It should be noted that band-operated schools, for the most part, are not included in the SAIP sample. **Chart S-5** gives a much more comprehensive picture of the variety of languages to which students are exposed at home. In the large provinces such as British Columbia, Ontario, and Quebec, over 20% of anglophone students report using a language other than the official languages at home. This shows that a significant proportion of students may face serious challenges when the language of instruction or the language of the test is different from their first language. In addition, **chart S-6** shows that students speaking more than one language at home are concentrated in the francophone populations outside of Quebec and in the Quebec anglophone population.

The official language of the school defines its populations. However, this is not necessarily the same as the language spoken by students at school but outside of classes. **Charts S-7** and **S-8** actually show a pattern very similar to that for home language. In general, the results indicate that substantial numbers of francophone students speak English at school (except in Quebec), while only small proportions of anglophone students speak French at school. Again, the pattern for the Manitoba, Ontario, and Nova Scotia francophone populations is different from that for francophone students in Quebec and New Brunswick.

Parental Educational Background

Students were asked about the level of education completed by their parents. **Charts S-9** and **S-10** provide a snapshot of the information reported by the students on the university education of their parents. They show that nearly 30% of Canadian 13-year-olds and only slightly fewer 16-year-olds report that their parents have a university education. The highest proportions tend to be located in Manitoba francophone, Ontario anglophone, and Quebec anglophone. The fewest parents with a university education are reported in Newfoundland and Labrador and in Saskatchewan.

Support at Home

The home environment is well known as an important factor in student success. **Charts S-11** and **S-12** indicate that while about 75% of both age groups often discuss daily activities with their parents, rather less than 15% of 13-year-olds and much less than 10% of 16-year-olds work together with their parents on science homework.

Resources at Home

Several questions were asked about resources available in the home that might be related to school work. It should be noted that many of these resources are related to some extent to the socioeconomic status of the students.

The increasing access to computers and the Internet was demonstrated by the data in **chart S-13**. The distribution was fairly uniform across Canada, with more than 90% of both 13-year-olds and 16-year-olds reporting a computer at home. Internet access at home is nearly as high, with only New Brunswick francophone and Northwest Territories students reporting below 80%.

Students were also asked to estimate the number of books in their homes. The percentage reporting that they possess 200 or more books is given in **chart S-14**. The results vary widely, with only Yukon 16-year-olds reaching 40% and 13% of Manitoba francophone 13-year-olds reporting this many books at home.

INDIVIDUAL CHARACTERISTICS

Educational Aspirations

Most students have postsecondary educational aspirations (i.e., they intend to continue their formal study after high school). **Chart S-15** shows that about 70% of Canadian 13-year-olds and 80% of 16-year-olds report this goal. The highest percentages of both populations aspiring to further education are found in Ontario. **Chart S-16** shows that about 65% of 13-year-olds and over 70% of 16-year-olds report that they plan to further their education at college or university.

Many of these participating students expect to work eventually in a science- or technology-related field. **Chart S-17** shows that about 40% of 16-year-olds and 35% of 13-year-olds report this.

Importance of Doing Well in School and in Science Study

Students were asked if they themselves, their parents, and their teachers thought it important that they do well in school and in science courses. **Charts S-18** through **S-22** provide several different perspectives on this concept.

Charts S-18, **S-19**, and **S-20** give the point of view of the student. About 60% believe it is very important to do well in school, and about 40% believe that this applies to science courses specifically. Highest percentages come from Newfoundland and Labrador in both categories. In a report of self-assessment in **Chart S-20**, about 20% of 13-year-olds and nearly 40% of 16-year-olds are not happy with their personal progress this year in science courses. The highest level of personal dissatisfaction is reported by Ontario anglophone 16-year-olds and Northwest Territories 13-year-olds and 16-year-olds.

Charts S-21 and **S-22** show that students report a surprisingly low set of expectations from parents and rather higher from teachers. In most jurisdictions, 16-year-old students believe that less than 40% of their parents think doing well in science is very important. The results for teachers show that overall ratings for teachers are higher than for parents. This being said, about half of the students felt that their teachers did not think it was very important for them to do well in science. In each case, expectations are highest in Newfoundland and Labrador.

Multivariate analyses may shed more light on how some of these factors are related to each other and to student achievement.

Out-of-School Activities Related to School Work and to Science

Students were asked several questions about how they spend their time outside of school hours. **Chart S-23** shows the amount of time spent with tutors or on extra school lessons varies widely across Canada. Generally, more 16-year-olds than 13-year-olds take advantage of this outside tutoring. Overall, the highest percentages are reported in four francophone jurisdictions, New Brunswick, Quebec, Manitoba, and Nova Scotia.

Chart S-24 records the proportion of students spending one hour per week or more on science homework. Again, amounts vary somewhat, but on average nearly 40% of 13-year-olds and 45% of 16-year-olds so report.

Chart S-25 shows that just over 40% of all students report spending one hour or more per week reading for pleasure. **Chart S-26** shows that just over 60% of all students spend 3 hours or more a week using a computer for entertainment.

WATCHING TELEVISION

A single item was used to measure the number of hours per week spent watching television. The percentages of students indicating that they spend 15 hours or more per week watching television are given in **chart S-27**. While not very high generally, these percentages varied somewhat by age. The 13-year-olds reported more television watching than 16-year-olds. Yukon students reported the lowest frequency for both age groups at 16%.

PERCEPTIONS OF SCIENCE

Student perceptions of science and science courses were explored in several questions. **Chart S-28** shows that almost half of 13-year-olds and nearly 60% of 16-year-olds agree that science is more difficult than other subjects. **Chart S-29**, however, shows that a larger proportion believes that science is one of the most important subjects in school. For both age groups, over 80% of Newfoundland and Labrador students believe that this is so, while just over half of Quebec anglophone students agree.

Students were also asked if they were not interested in science subjects. Considering that the assessment was administered to a sample from all students, including those who do not take science courses, the data in **chart S-30** show that less than 30% of 13-year-olds and about one-third of 16-year-olds agree that science subjects are **not** interesting to them, with the lowest percentages in Newfoundland and Labrador for both age groups.

MOTIVATION AND ITS ATTRIBUTIONS

Questions in this cluster had to do with those factors to which students attribute success or failure and those to whom they would turn for help if they were having difficulty in science. Students responded to questions about the need for hard work, ability, and encouragement among other attributes.

Chart S-31 indicates the perception of the need for natural ability to do well in science. The lowest percentages are found in all of the francophone populations, with 40% of 16-year-olds and just 24% of 13-year-olds agreeing. For anglophone students, the proportions are 67% for 16-year-olds and 53% for 13-year-olds who believe in the need for natural ability. However, there is overwhelming agreement from both populations across Canada — over 95% — that hard work is essential, as **chart S-32** indicates. This potential language effect is worth further analysis.

Encouragement is also important, and **charts S-33** and **S-34** show the importance all students place on encouragement by teachers and parents.

Students were asked several questions about the reasons behind both unusually low marks and unusually high marks. Examples of their responses are found in **charts S-35** to **S-39**. Students agree that the most frequent causes of low marks are lack of hard work and a difficult course (**S-35, S-36**). About 35% of 13-year-olds and nearly half of 16-year-olds felt that the cause of a low mark was due to poor teaching (**S-37**). On the other hand, high marks were universally attributed to good teaching (**S-38**) and lots of studying (**S-39**).

When seeking extra help in science, most students would approach the teacher as shown in **chart S-40**, with about 85% of students agreeing. Fewer would seek help from their parents (**chart S-41**), with about two-thirds of 13-year-olds and less than 40% of 16-year-olds reporting this avenue of assistance.

SCHOOL LIFE

Students were asked to respond to a 15-item agree/disagree scale, containing a series of propositions about the quality of their school life. Generally, the responses showed a pattern of positive feelings about school.

Chart S-42 shows that nearly 60% of the students reported enjoying going to school. Over 60% of both 13- and 16-year-old anglophone populations reported enjoying school. Fewer francophone students did so, with 48% of francophone 13-year-olds and 53% of francophone 16-year-olds reporting that they enjoyed school. However, students who said they were genuinely interested in school work were more evenly distributed across languages. **Chart S-43** shows that about 50% of all students so reported.

Charts S-44 and **S-45** show that students generally feel they are treated fairly by their teachers — and get the marks they deserve. Over 80% of anglophone students and nearly the same proportion of francophone students reported fair treatment by their teachers, and well over 80% of all students report that they receive the marks they deserve.

In **chart S-46**, students report their absences from school. Roughly 20% of all students report missing more than 10 days of school in the school year (2003–04). The highest levels were found in the Northwest Territories, with 40% of 16-year-olds and 33% of 13-year-olds. The lowest levels were reported by Quebec francophone and New Brunswick francophone 13-year-old students, both at 13%, and by New Brunswick francophone 16-year-olds, with 9% reporting more than 10 days of absence.

Science Classroom Activities and Resource Use

Students were asked to respond to a series of items on frequency of various activities in their science classrooms. The responses offered were “rarely or never,” “a few times a month,” “a few times a week,” or “almost every day.”

Classroom Activities

Charts S-47 to **S-50** indicate to some extent the degree of practical problem solving through laboratory work and small group work that is reported by students. Results from these questions may be somewhat uncertain because of the variety of ways that students may have interpreted the questions as they apply to their own experiences. However, the responses indicate a fairly low level of student-directed activity in science classrooms. Surprisingly, more such activities are reported by 13-year-olds than by 16-year-olds.

Over half of all students report working frequently in pairs or small groups (**S-47**), with the highest percentage among Quebec francophone students, where almost 70% report this activity. The lowest is in Newfoundland and Labrador where almost half of the 13-year-olds and only 38% of 16-year-olds report this.

Fewer students report participating in laboratory work a few times a week or more (**S-48**). The percentages reported vary widely between Quebec francophone 13-year-olds at 58% and Newfoundland and Labrador 16-year-olds at only 9%. Significantly more francophone students across Canada (55% of 13-year-olds and 41% of 16-year-olds) than anglophone students (27% of 13-year-olds and 32% of 16-year-olds) report frequent laboratory use. Somewhat more teacher demonstrations are reported, with similar jurisdictional distribution, although still at what might be considered a low level for science programs (**S-49**).

Students reported varied participation in scientific projects (**S-50**). Rates of participation in such activities a few times a week or more varied from as high as 60% for Yukon 13-year-olds to a low of 26% for Newfoundland and Labrador 16-year-olds.

Charts S-51 to **S-53** report on a variety of other activities. Quizzes or tests a few times a week or more are reported at a varied frequency, from over 40% of 16-year-olds in British Columbia, Alberta, Manitoba francophone, and Yukon to less than 20% for both age groups in Newfoundland and Labrador (**S-51**). Homework is often assigned (**S-52**). The highest frequencies are reported by British Columbia, Alberta, Northwest Territories, and Yukon students (over 80%). Others range downward to Quebec francophone 13-year-olds and 16-year-olds at 53% and 64% respectively.

Educational outings a few times a month or more are reported in **chart S-53**. Rates range from about 40% of Saskatchewan, New Brunswick francophone, Northwest Territories, and Yukon 13-year-olds to 16% of Quebec and New Brunswick 16-year-old francophone students.

Use of Resources

Students were asked a series of 10 questions about their experiences with a variety of classroom resources, from science books to audiovisual equipment. Some selected responses follow.

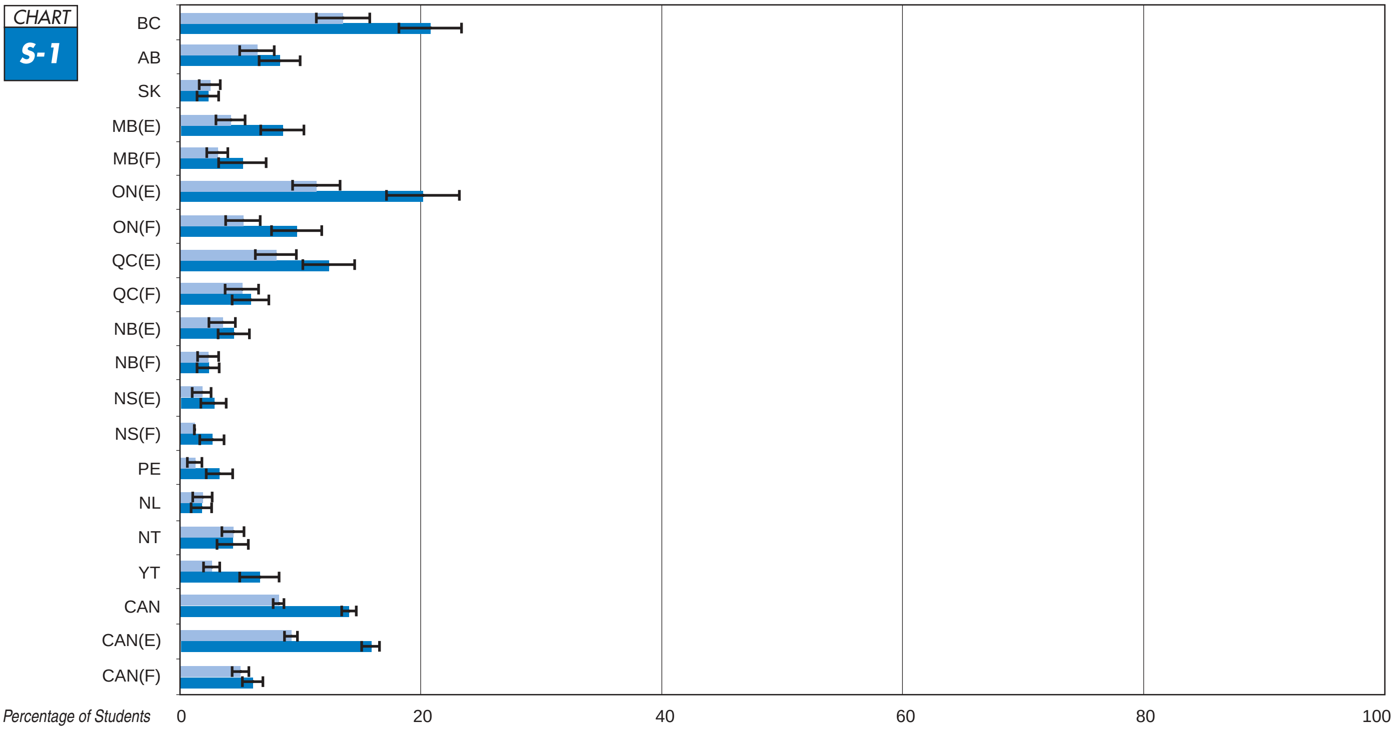
Chart S-54 indicates that textual resources other than textbooks are frequently used across Canada, with nearly 80% of students in most jurisdictions reporting this. Significant exceptions are Quebec francophone students with 64% of 13-year-olds and 55% of 16-year-olds reporting frequent use.

Chart S-55 shows the frequency of computer use by students in the classroom. This likely includes the increasing use of probeware that allows direct input of experimental data to computers for analysis. Rates of computer use vary widely across Canada, from about 60% in Northwest Territories to about 15% in Quebec francophone schools.

Chart S-56 shows that audiovisual materials are frequently used, with over three-quarters of Canadian students reporting frequent use. **Chart S-57**, on the other hand, shows that visits to science-related non-school sites are not frequent, with an average of 20% of Canadian students reporting a few times a year or more often.

Percentage of students who were born outside of Canada

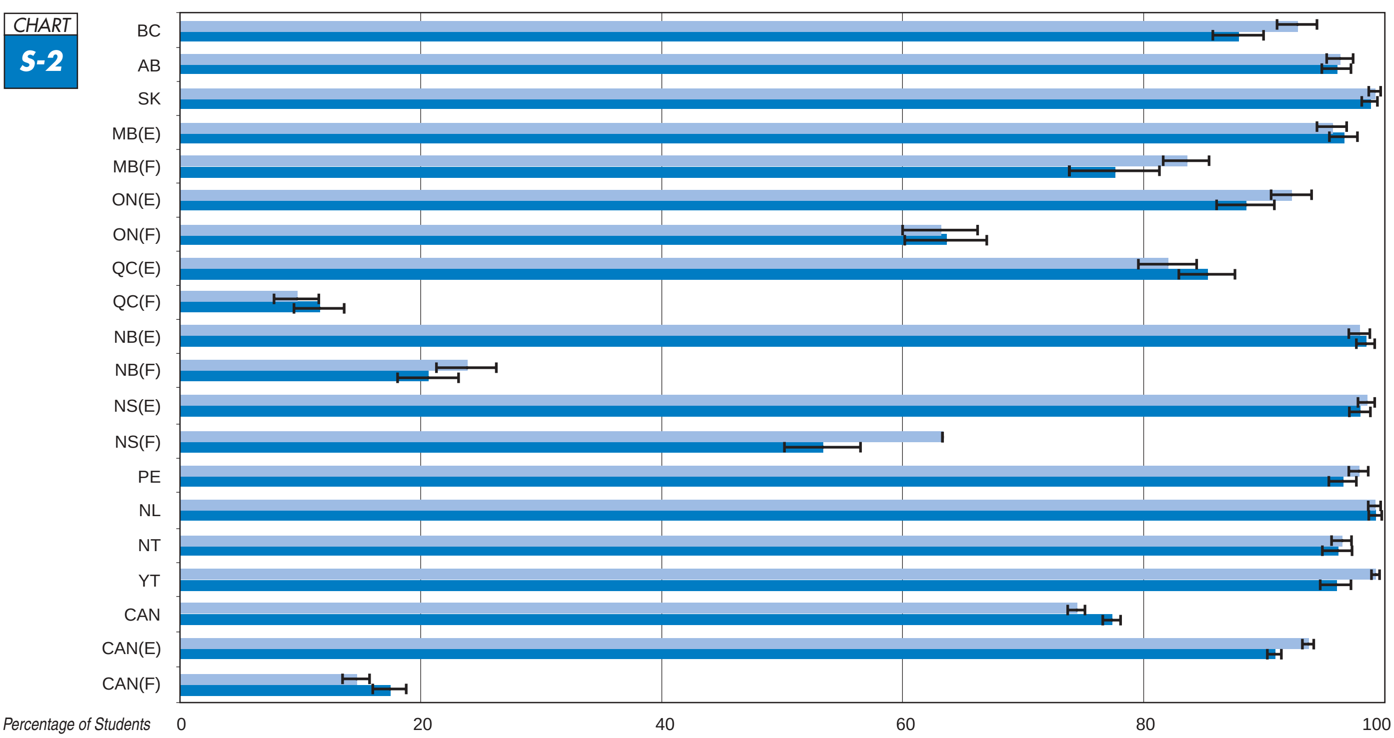
CHART
S-1



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	13	6	2	4	3	11	5	8	5	3	2	2	1	1	2	4	3	8	9	5
16-year-olds	21	8	2	8	5	20	10	12	6	4	2	3	3	3	2	4	7	14	16	6

Percentage of students speaking English often at home

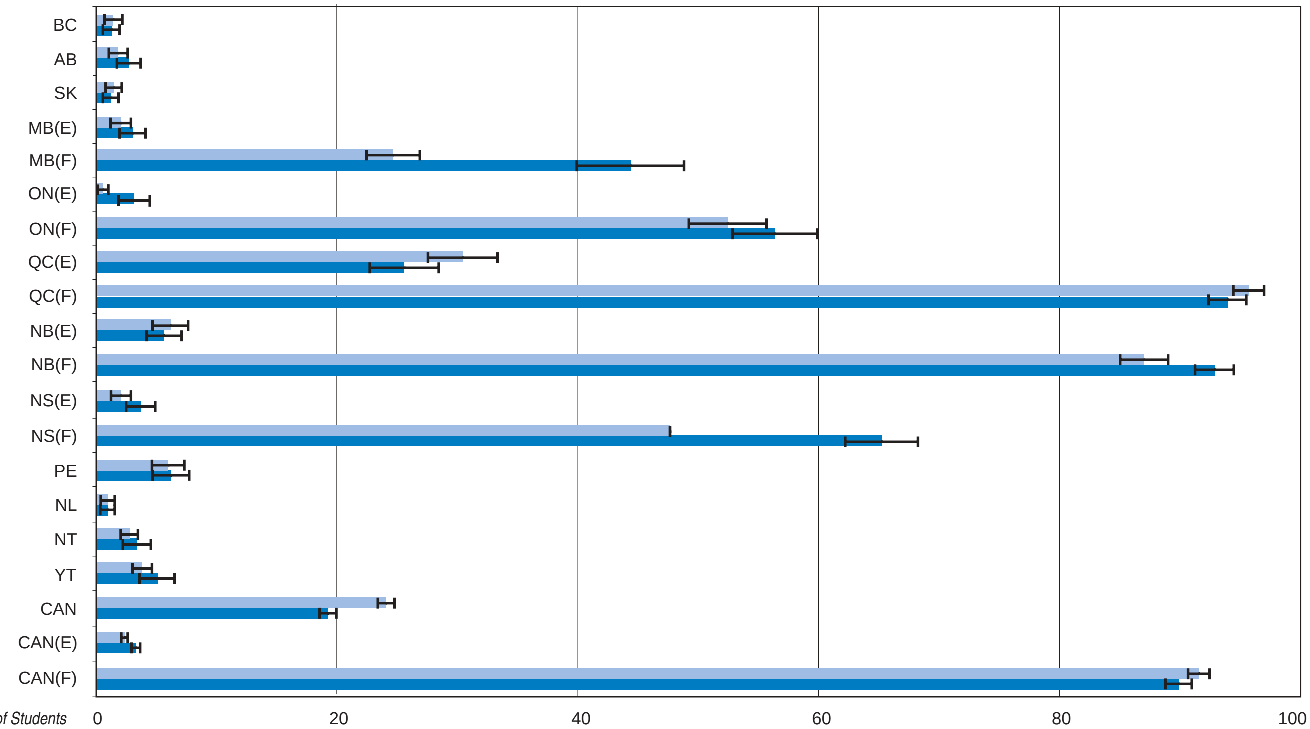
CHART
S-2



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	93	96	99	96	84	92	63	82	10	98	24	99	63	98	99	97	99	74	94	15
16-year-olds	88	96	99	97	78	89	64	85	12	99	21	98	53	97	99	96	96	77	91	17

Percentage of students speaking French often at home

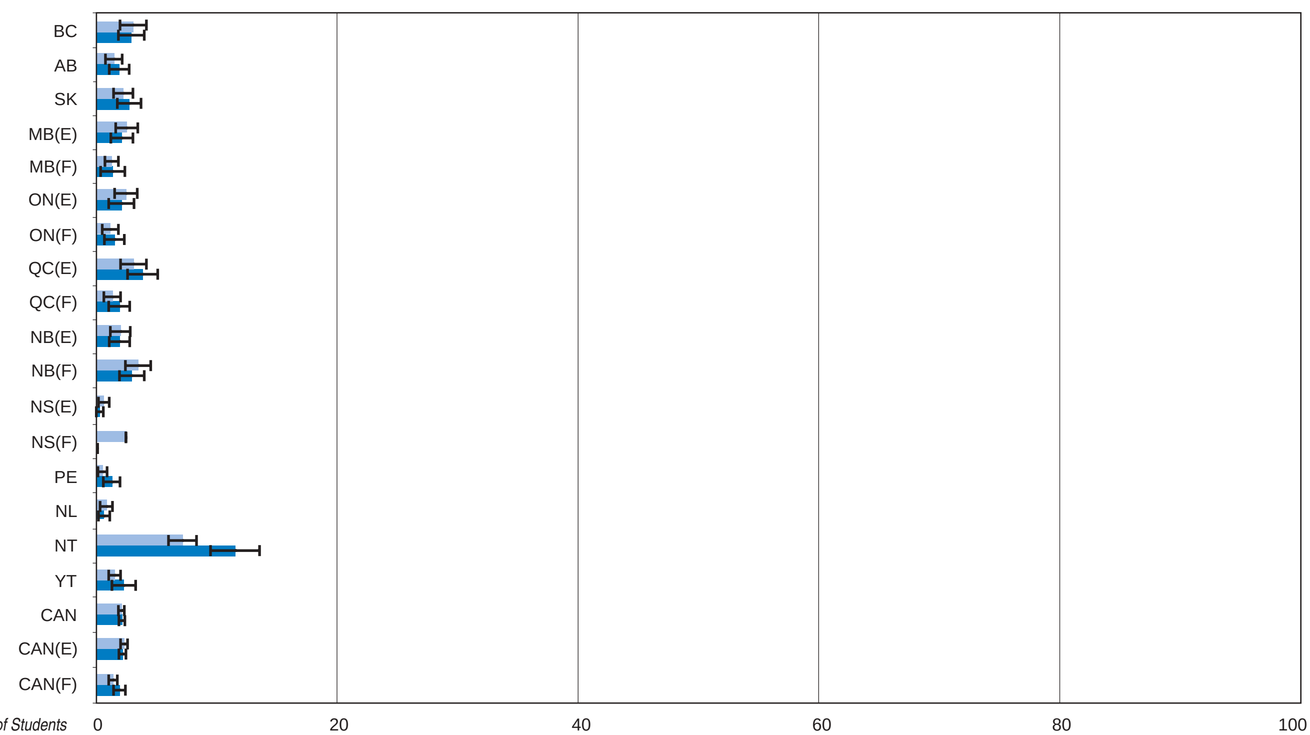
CHART **S-3**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	1	2	1	2	25	0	52	30	96	6	87	2	48	6	1	3	4	24	2	92
16-year-olds	1	3	1	3	44	3	56	26	94	6	93	4	65	6	1	3	5	19	3	90

Percentage of students speaking an Aboriginal language often at home

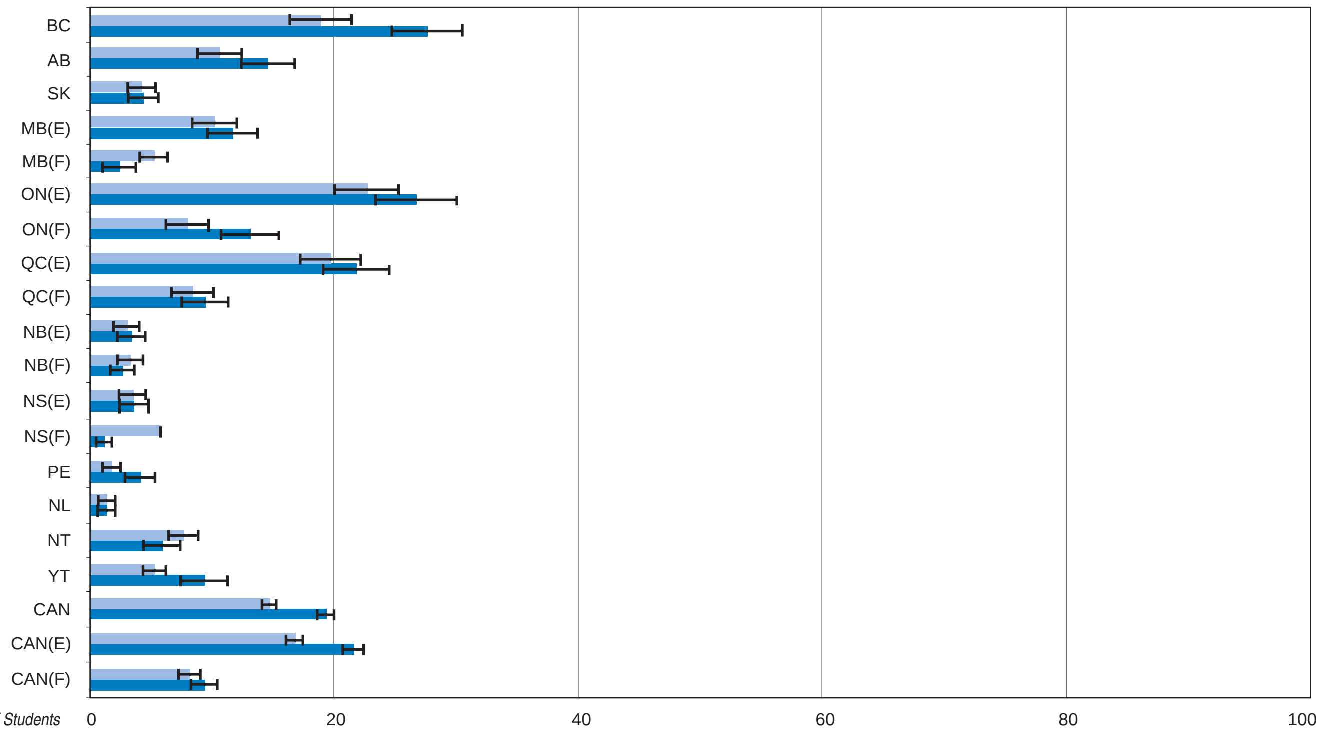
CHART **S-4**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	3	1	2	2	1	2	1	3	1	2	3	1	2	0	1	7	1	2	2	1
16-year-olds	3	2	3	2	1	2	1	4	2	2	3	0	0	1	1	11	2	2	2	2

Percentage of students speaking another language often at home

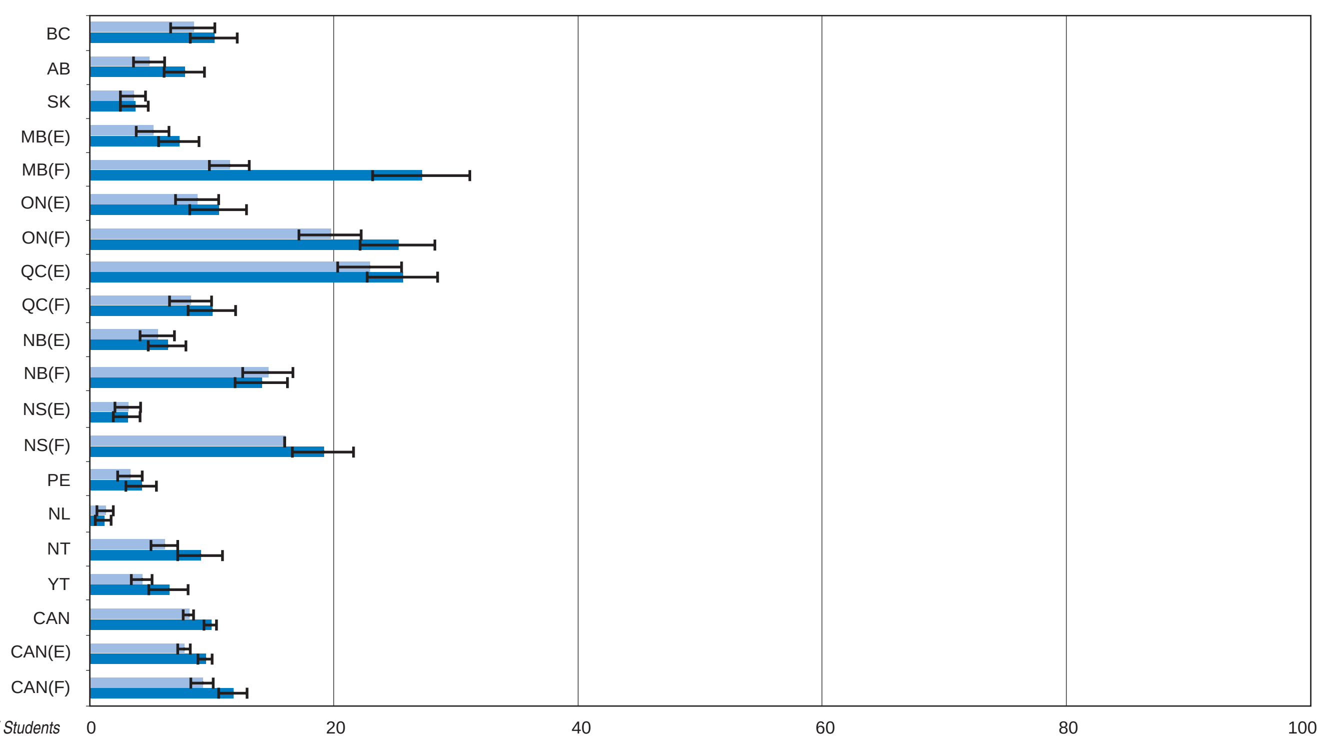
CHART **S-5**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	19	11	4	10	5	23	8	20	8	3	3	3	6	2	1	8	5	15	17	8
16-year-olds	28	15	4	12	2	27	13	22	9	3	3	4	1	4	1	6	9	19	22	9

Percentage of students speaking more than one language often at home

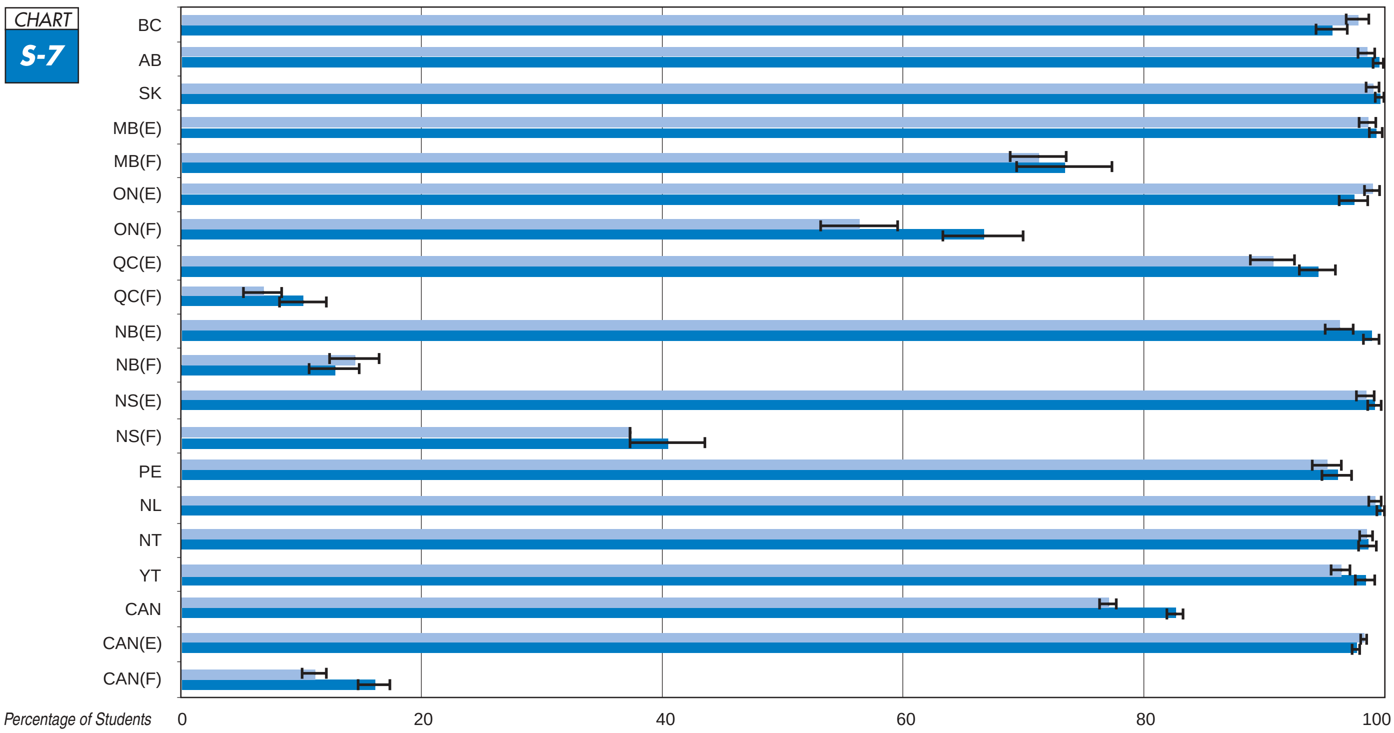
CHART **S-6**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	8	5	3	5	11	9	20	23	8	5	15	3	16	3	1	6	4	8	8	9
16-year-olds	10	8	4	7	27	10	25	26	10	6	14	3	19	4	1	9	6	10	9	12

Percentage of students speaking English often at school

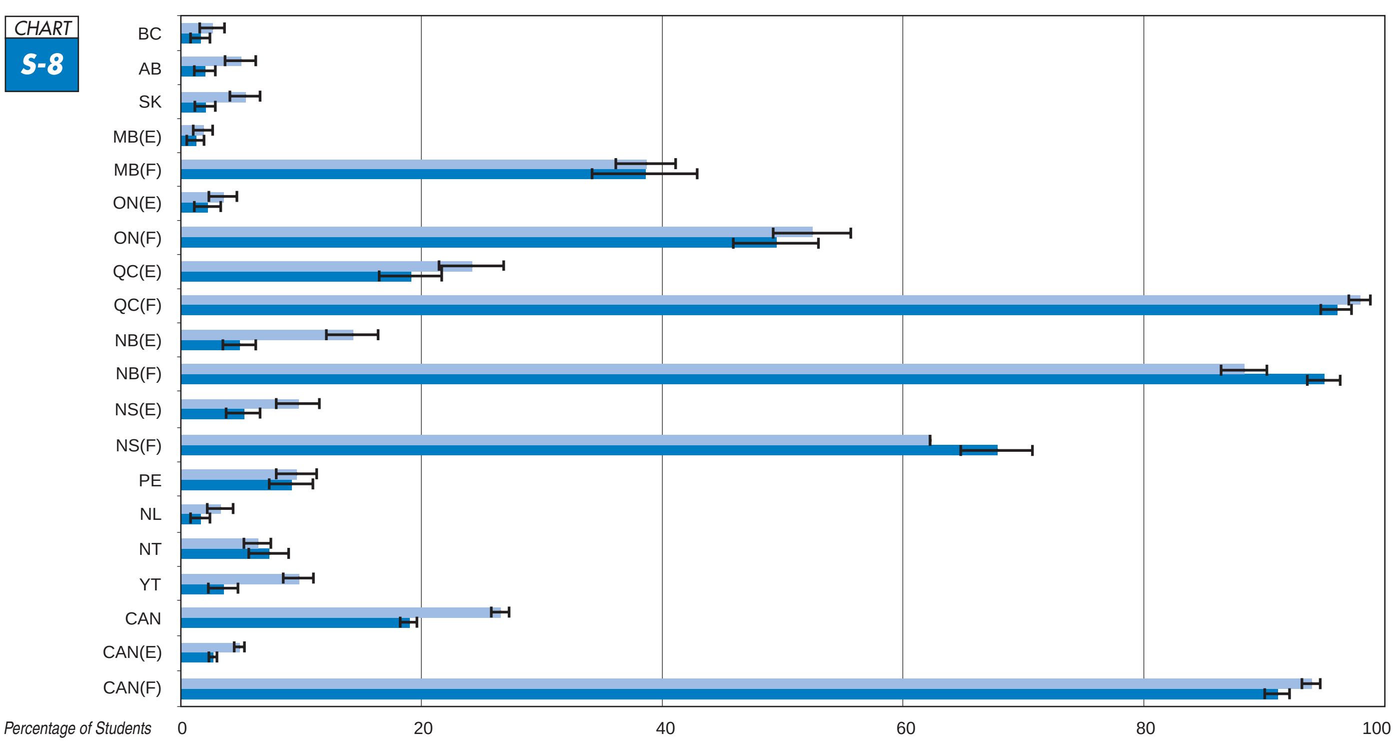
CHART
S-7



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	98	99	99	99	71	99	56	91	7	96	14	98	37	95	99	99	96	77	98	11
16-year-olds	96	100	100	99	73	97	67	94	10	99	13	99	40	96	100	99	98	83	98	16

Percentage of students speaking French often at school

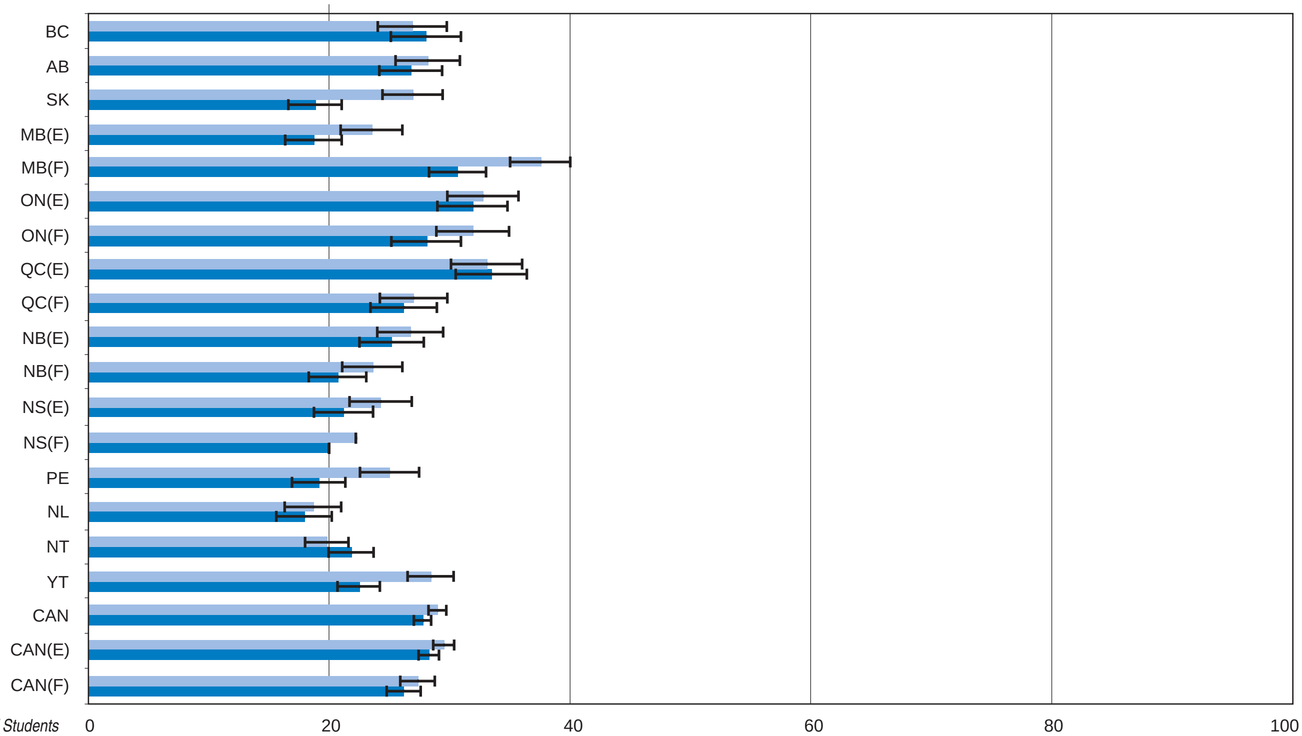
CHART
S-8



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	3	5	5	2	39	3	52	24	98	14	88	10	62	10	3	6	10	27	5	94
16-year-olds	2	2	2	1	39	2	49	19	96	5	95	5	68	9	2	7	4	19	3	91

Percentage of 13-year-old students whose parents have university education

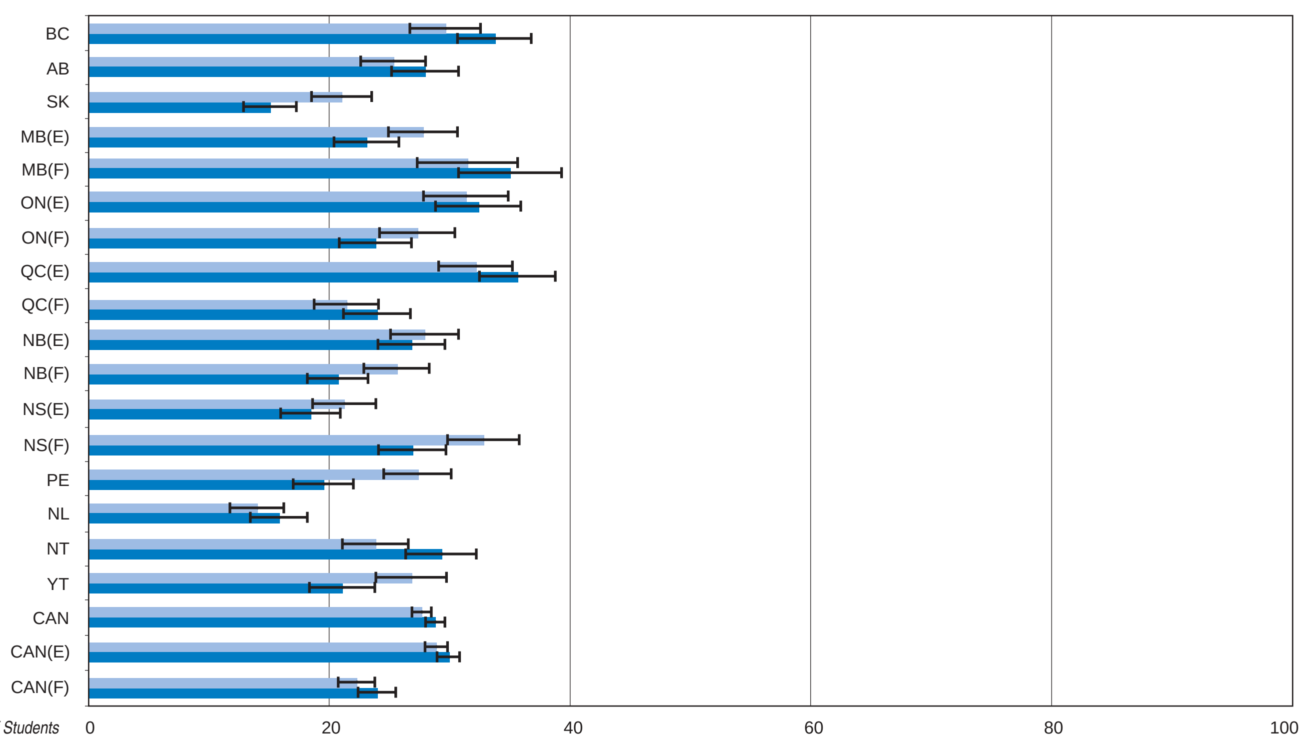
CHART **S-9**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Mother	27	28	27	24	38	33	32	33	27	27	24	24	22	25	19	20	28	29	29	27
Father	28	27	19	19	31	32	28	33	26	25	21	21	20	19	18	22	22	28	28	26

Percentage of 16-year-old students whose parents have university education

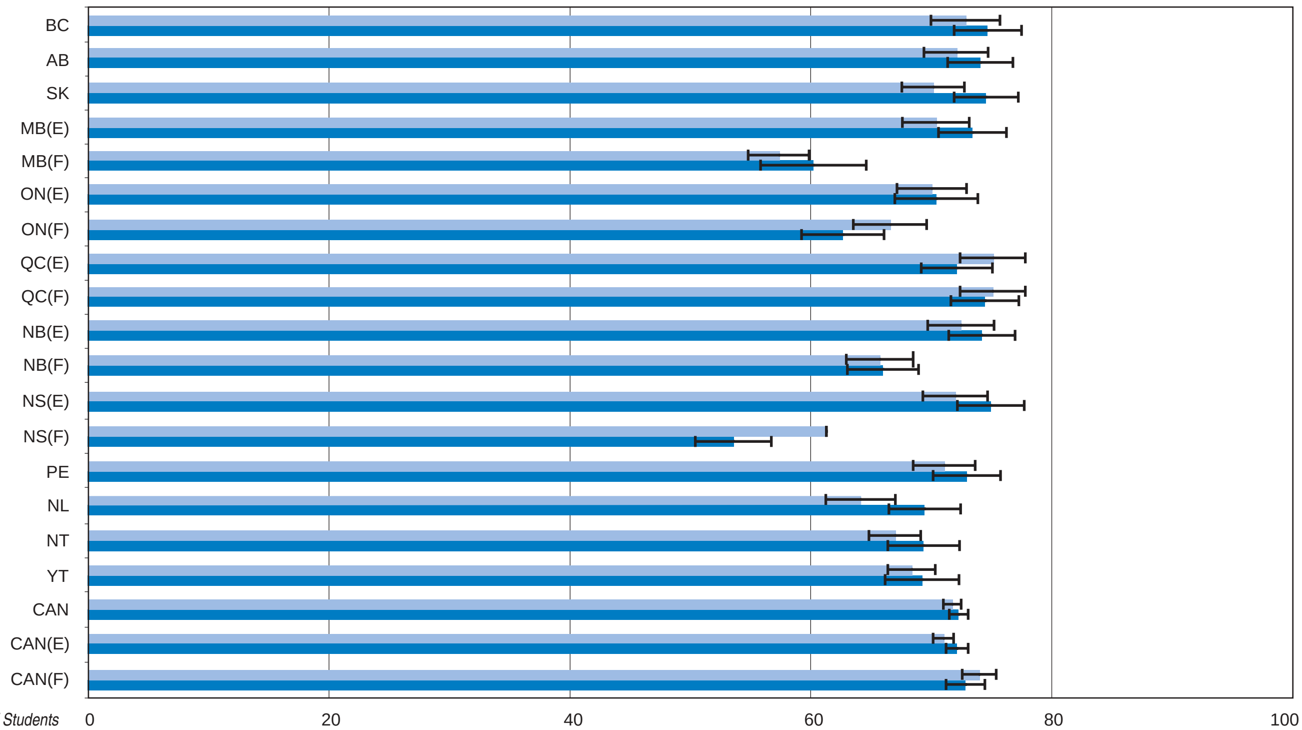
CHART **S-10**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Mother	30	25	21	28	31	31	27	32	21	28	26	21	33	27	14	24	27	28	29	22
Father	34	28	15	23	35	32	24	36	24	27	21	18	27	19	16	29	21	29	30	24

Percentage of students who discuss daily activities with their parent(s) or guardian(s) a few times a week or more

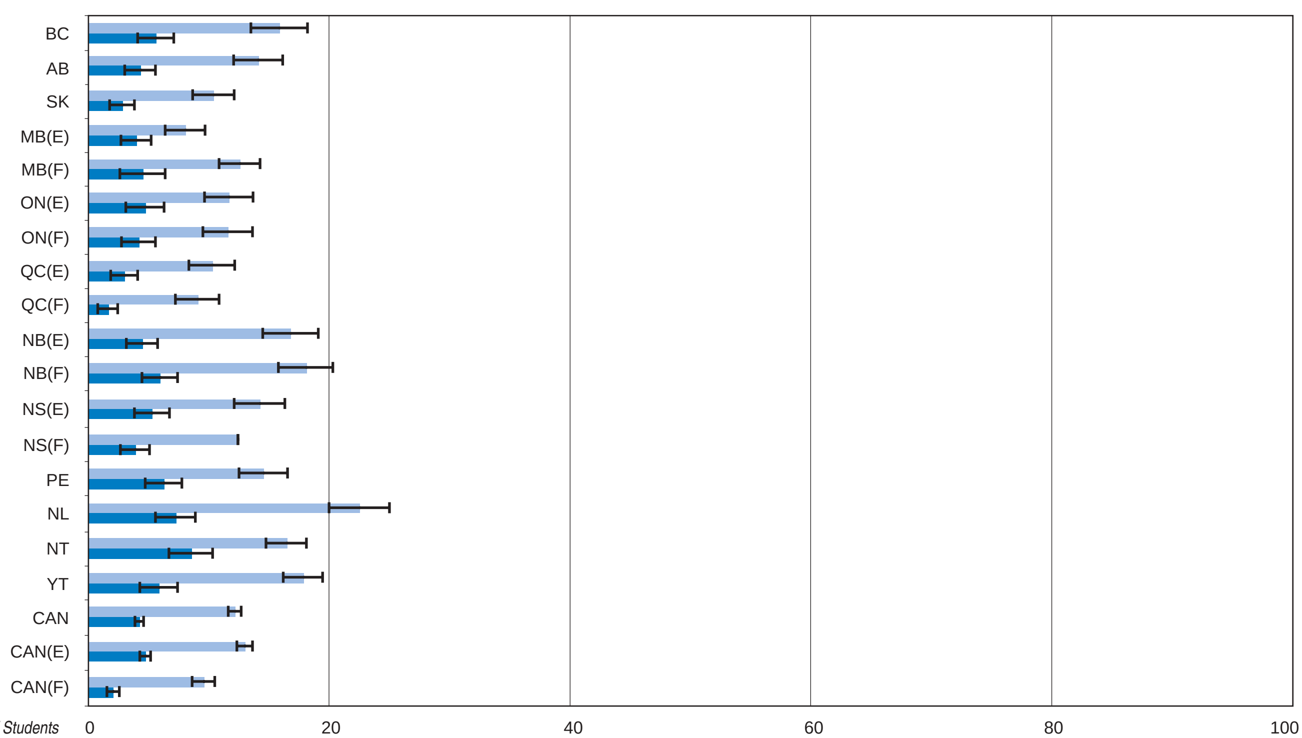
CHART S-11



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	73	72	70	70	57	70	67	75	75	72	66	72	61	71	64	67	68	72	71	74
16-year-olds	75	74	75	73	60	70	63	72	74	74	66	75	54	73	69	69	69	72	72	73

Percentage of students who work together on science homework with their parent(s) or guardian(s) a few times a week or more

CHART S-12

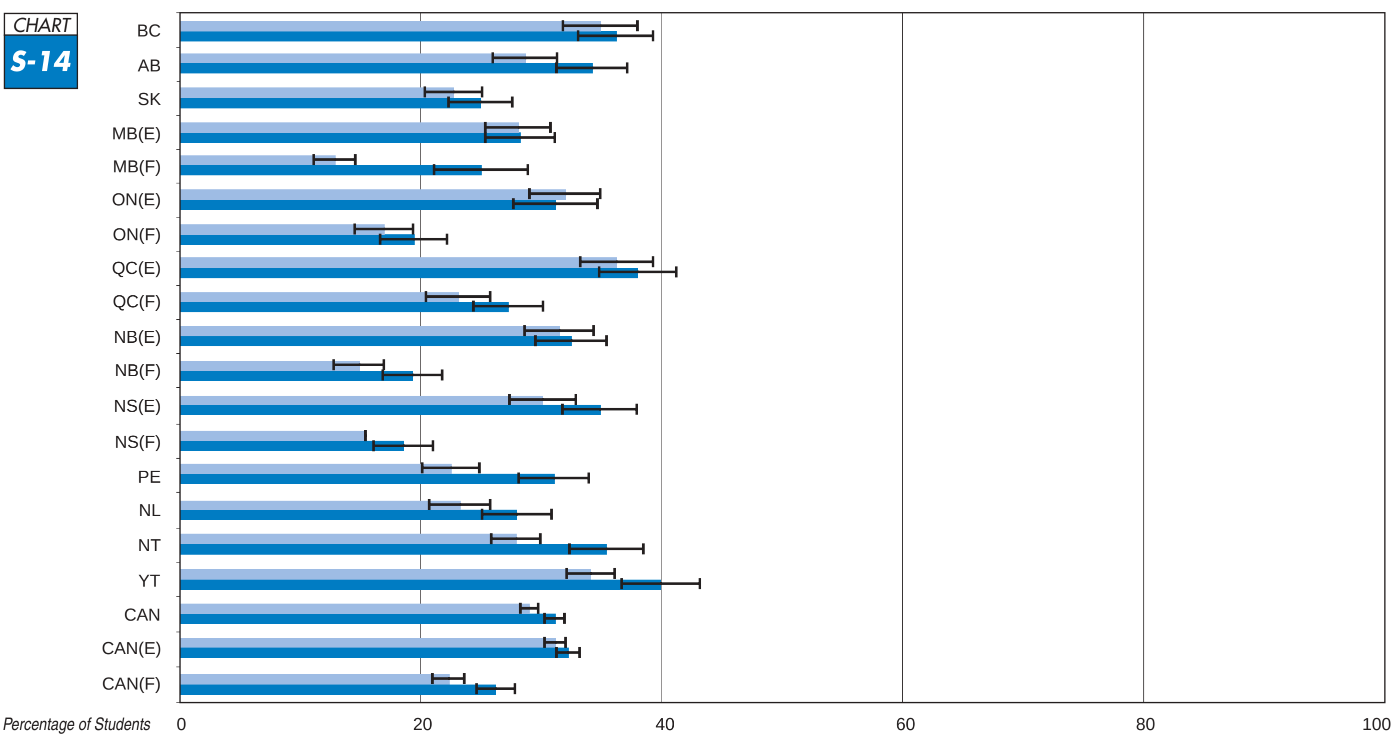


	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	16	14	10	8	13	12	12	10	9	17	18	14	12	15	23	16	18	12	13	10
16-year-olds	6	4	3	4	5	5	4	3	2	4	6	5	4	6	7	9	6	4	5	2

Percentage of students who have a computer or Internet connection at home

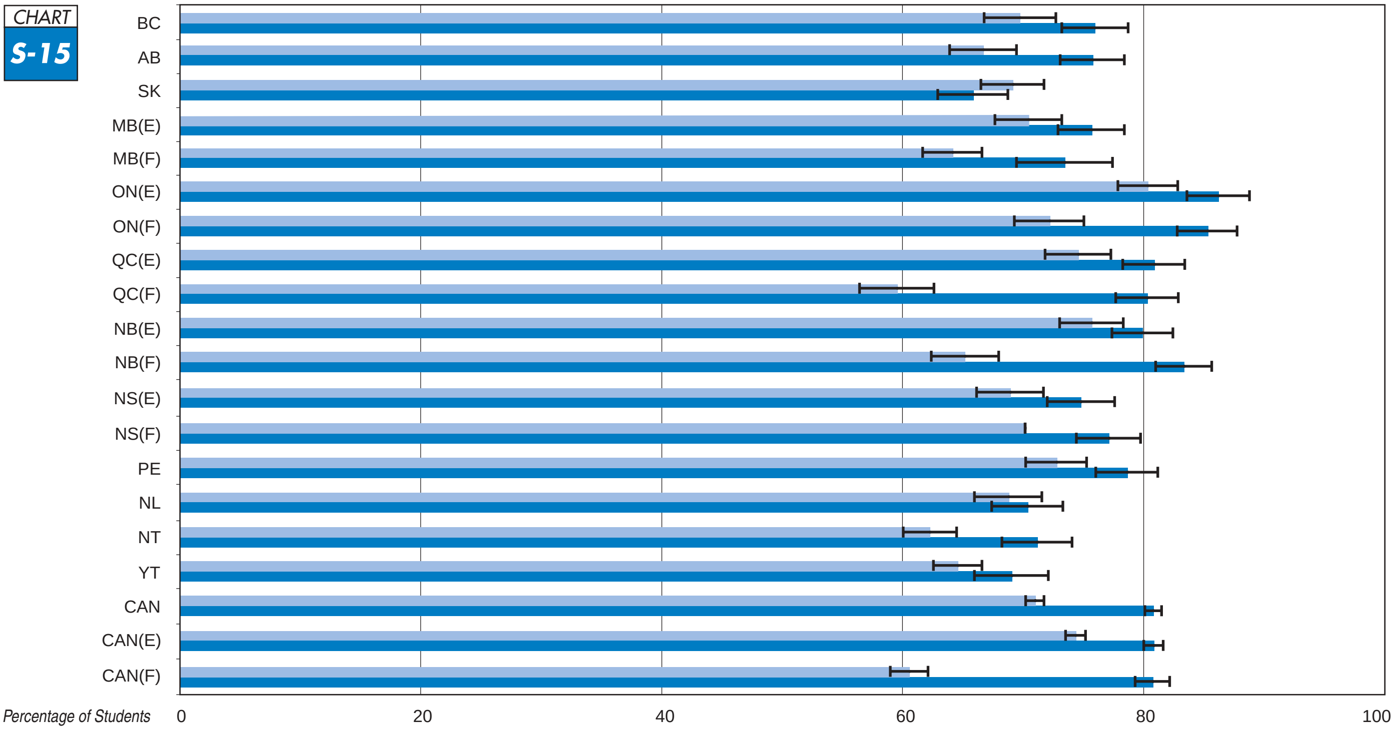
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Computer	96	95	93	93	96	98	96	96	95	93	85	93	96	93	90	87	92	96	96	94
Internet connection	91	88	85	83	90	93	91	91	90	87	77	89	92	86	80	78	85	90	90	89

Percentage of students with more than 200 books in the home



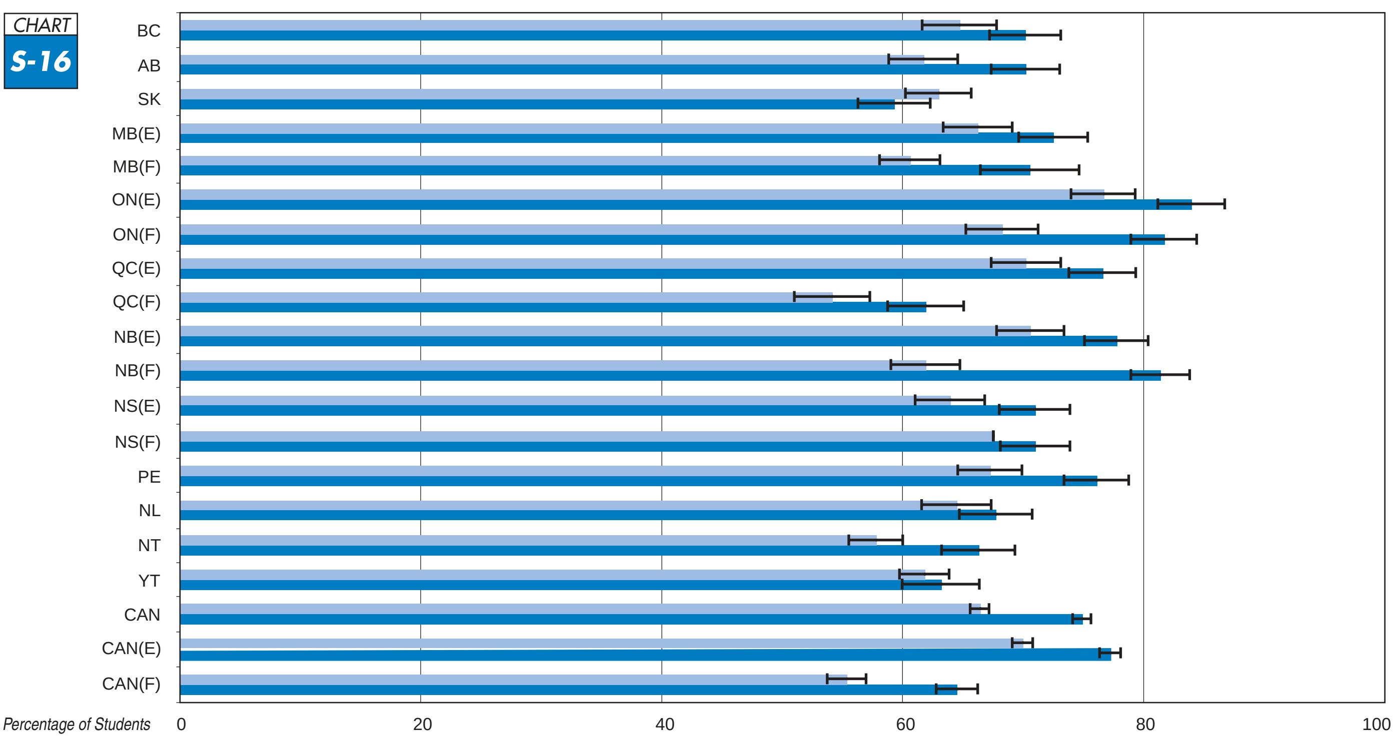
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	35	29	23	28	13	32	17	36	23	31	15	30	15	22	23	28	34	29	31	22
16-year-olds	36	34	25	28	25	31	19	38	27	32	19	35	19	31	28	35	40	31	32	26

Percentage of students intending to take postsecondary education



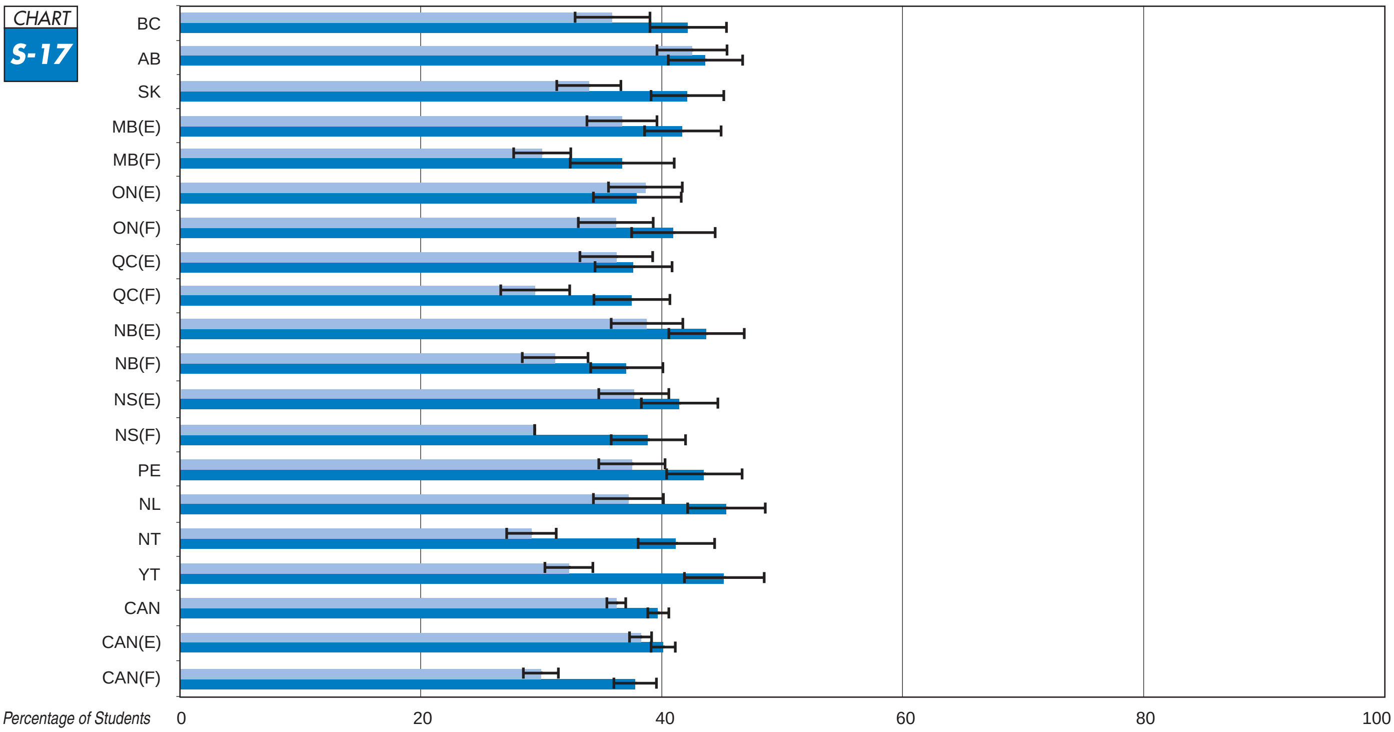
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	70	67	69	70	64	80	72	75	60	76	65	69	70	73	69	62	65	71	74	61
16-year-olds	76	76	66	76	73	86	85	81	80	80	83	75	77	79	70	71	69	81	81	81

Percentage of students reporting that, after they finish high school, they expect to go to college or university



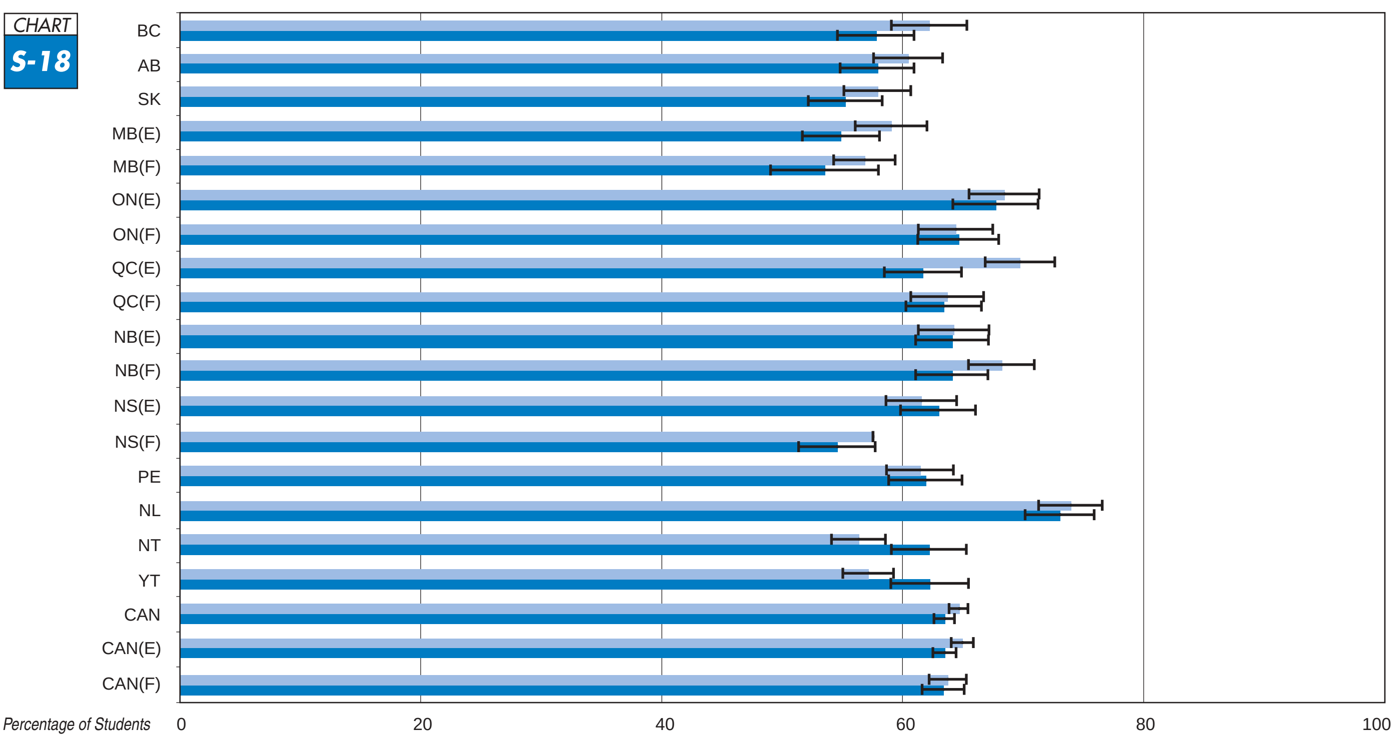
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	65	62	63	66	61	77	68	70	54	71	62	64	68	67	64	58	62	66	70	55
16-year-olds	70	70	59	73	71	84	82	77	62	78	81	71	71	76	68	66	63	75	77	65

Percentage of students reporting that they expect to eventually work in a field that requires education in science or technology



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	36	42	34	37	30	39	36	36	29	39	31	38	29	37	37	29	32	36	38	30
16-year-olds	42	44	42	42	37	38	41	38	37	44	37	41	39	43	45	41	45	40	40	38

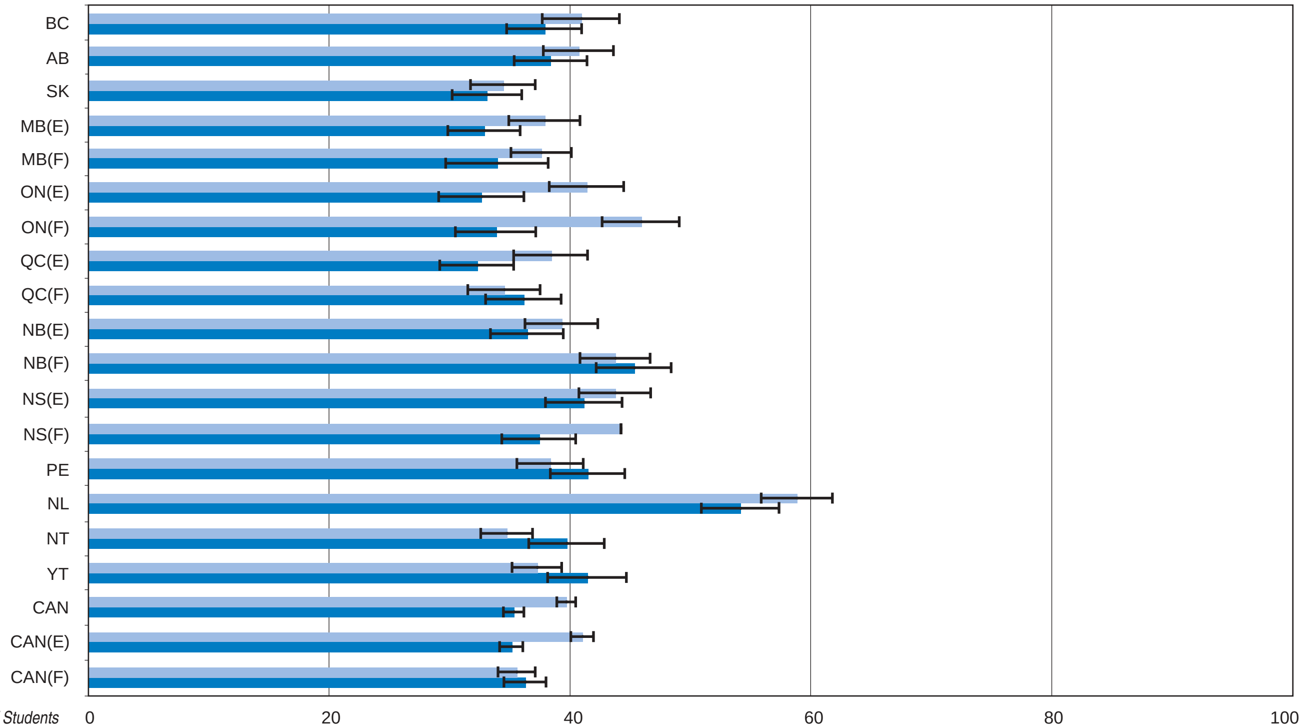
Percentage of students who think it is very important to do well in school



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	62	60	58	59	57	68	64	70	64	64	68	62	58	61	74	56	57	65	65	64
16-year-olds	58	58	55	55	54	68	65	62	63	64	64	63	55	62	73	62	62	63	63	63

Percentage of students who think it is very important to do well in science

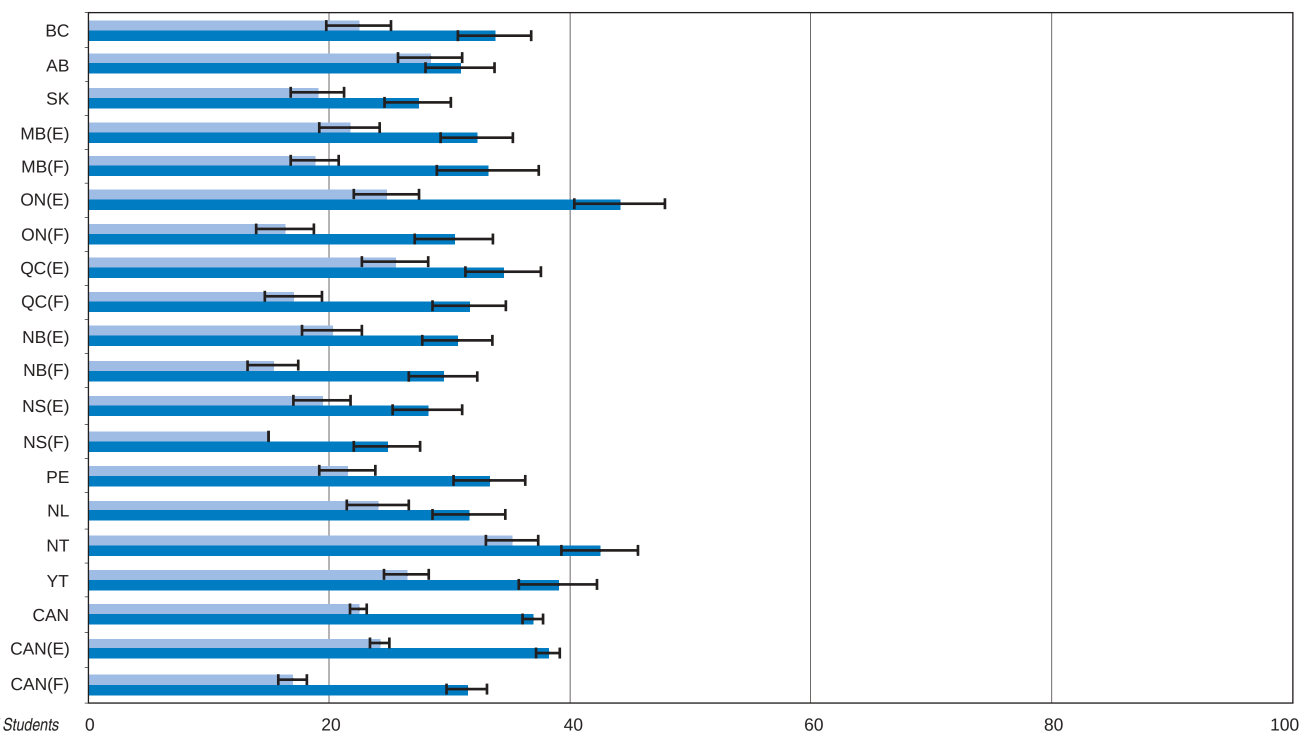
CHART S-19



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	41	41	34	38	38	41	46	38	35	39	44	44	44	38	59	35	37	40	41	36
16-year-olds	38	38	33	33	34	33	34	32	36	36	45	41	37	41	54	40	41	35	35	36

Percentage of students who are dissatisfied or very dissatisfied with how well they are doing in their science courses this year

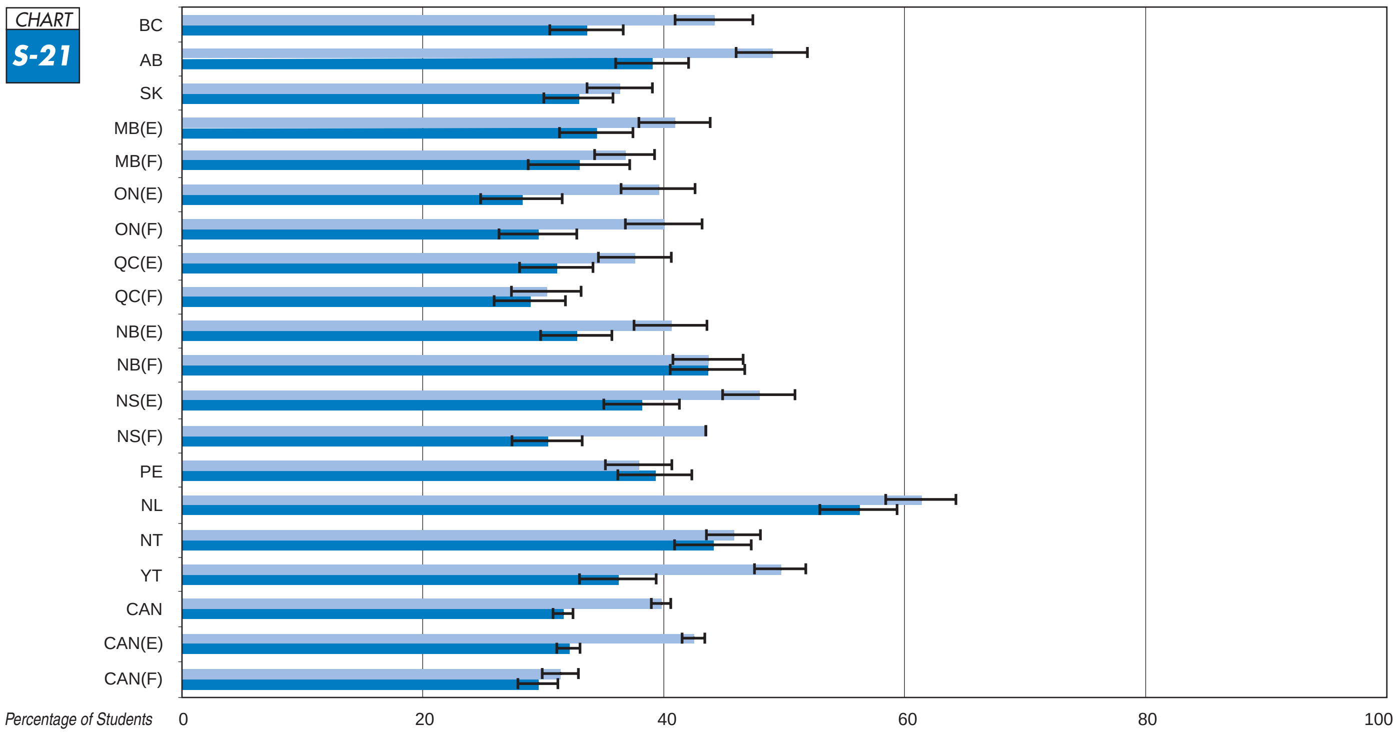
CHART S-20



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	22	28	19	22	19	25	16	26	17	20	15	19	15	22	24	35	26	22	24	17
16-year-olds	34	31	27	32	33	44	30	34	32	31	30	28	25	33	32	43	39	37	38	31

Percentage of students whose parents think it is very important to do well in science

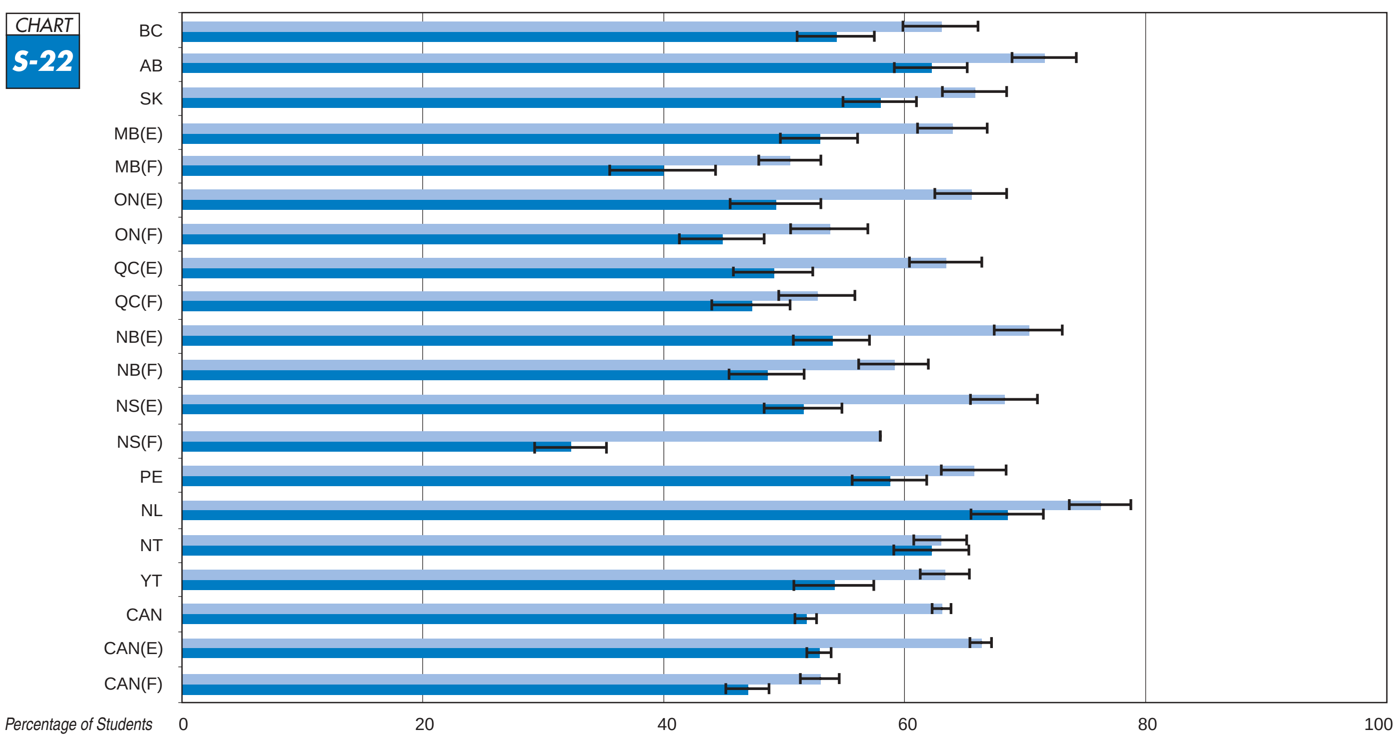
CHART
S-21



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	44	49	36	41	37	40	40	38	30	41	44	48	44	38	61	46	50	40	42	31
16-year-olds	34	39	33	34	33	28	30	31	29	33	44	38	30	39	56	44	36	32	32	30

Percentage of students who have a science teacher who thinks it is very important to do well in science

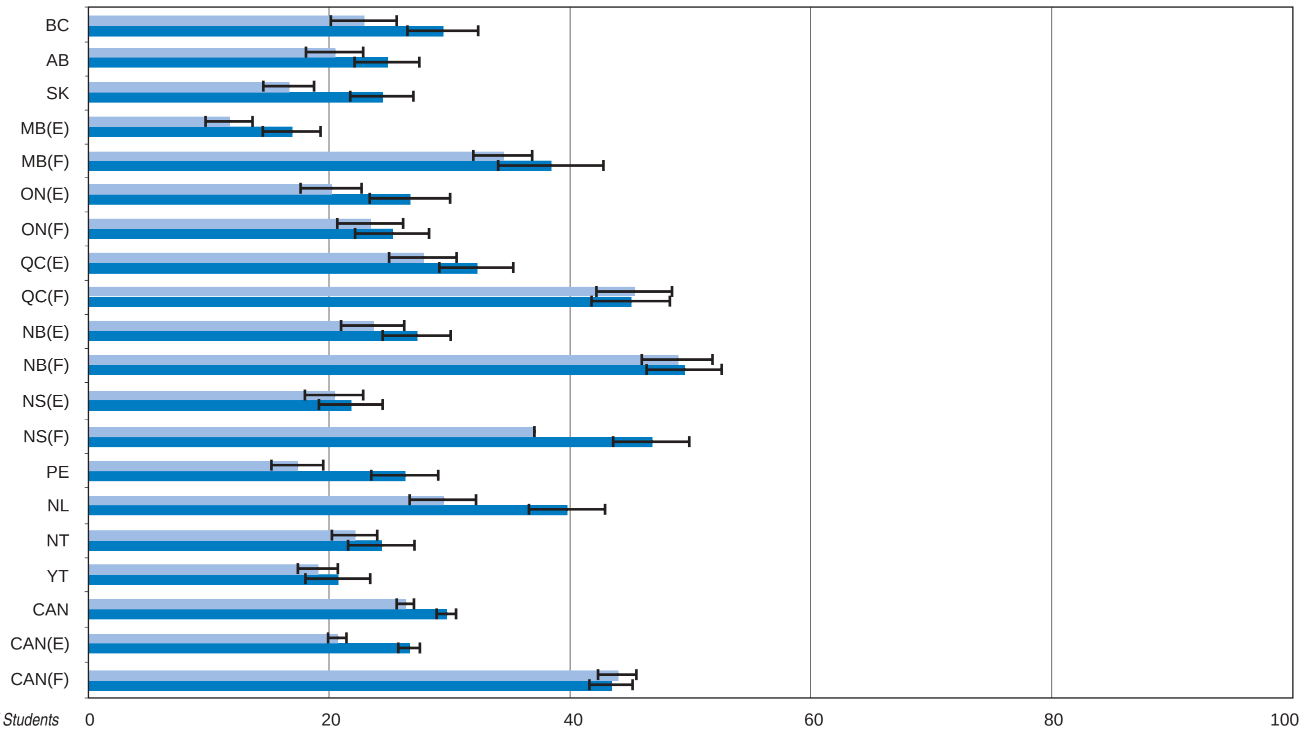
CHART
S-22



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	63	72	66	64	50	66	54	63	53	70	59	68	58	66	76	63	63	63	66	53
16-year-olds	54	62	58	53	40	49	45	49	47	54	49	52	32	59	68	62	54	52	53	47

Percentage of students taking extra school lessons or being tutored outside of school hours

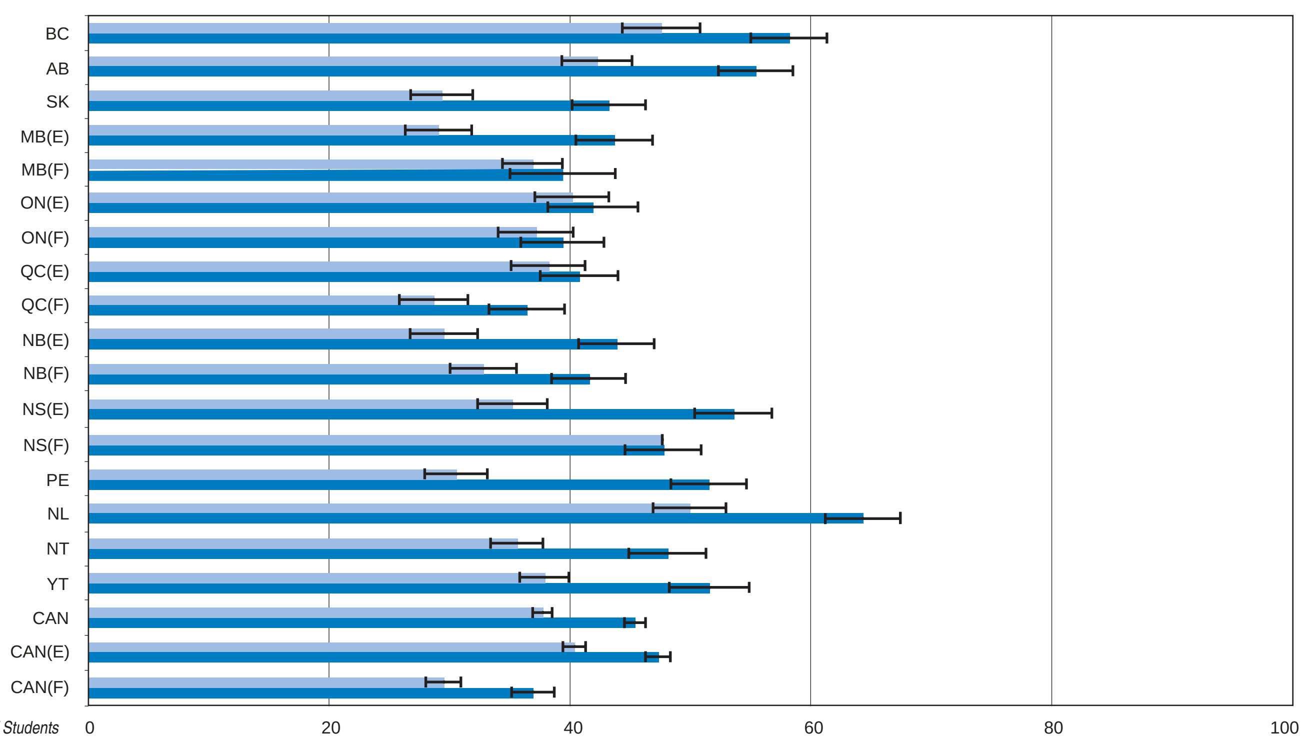
CHART S-23



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	23	20	17	12	34	20	23	28	45	24	49	20	37	17	29	22	19	26	21	44
16-year-olds	29	25	24	17	38	27	25	32	45	27	49	22	47	26	40	24	21	30	27	43

Percentage of students spending one hour or more a week studying or doing homework in science courses outside of school hours

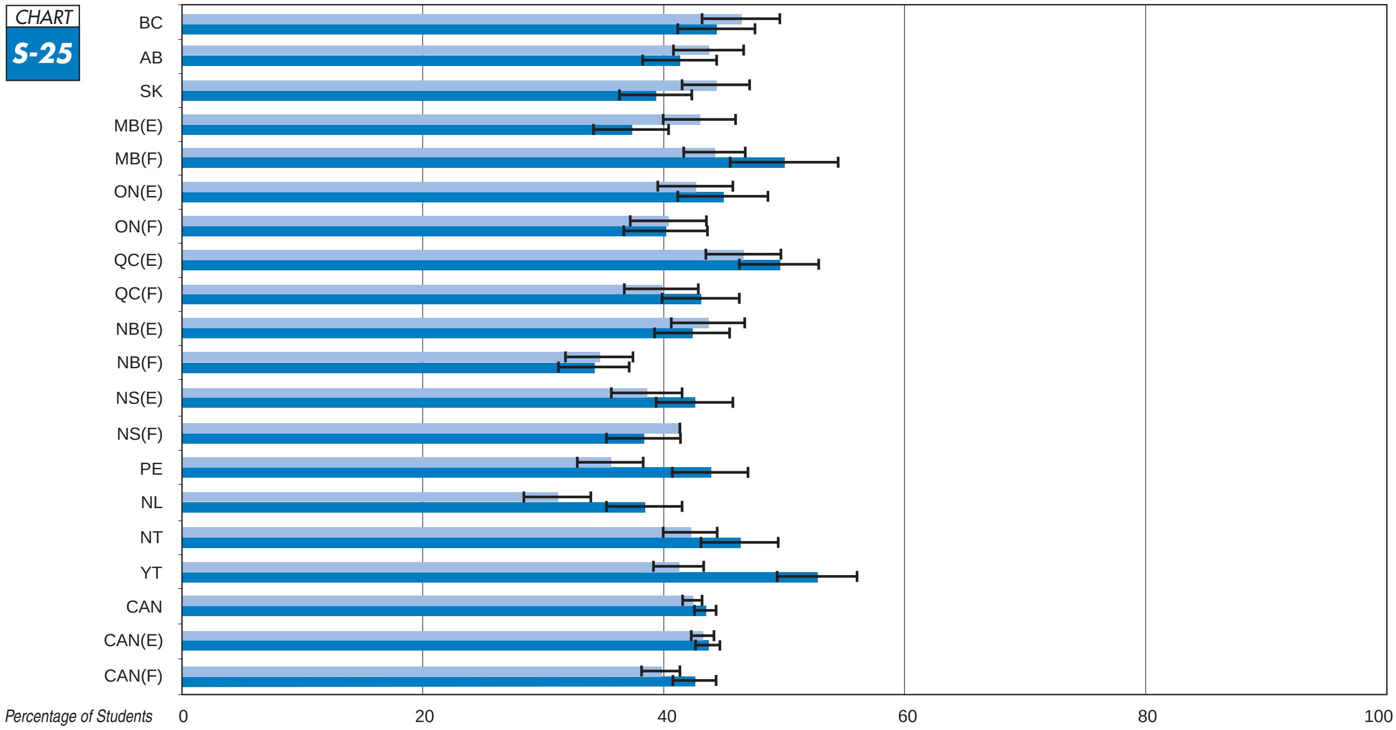
CHART S-24



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	48	42	29	29	37	40	37	38	29	30	33	35	48	31	50	36	38	38	40	29
16-year-olds	58	55	43	44	39	42	39	41	36	44	42	54	48	52	64	48	52	45	47	37

Percentage of students spending one hour or more a week reading for enjoyment outside of school hours

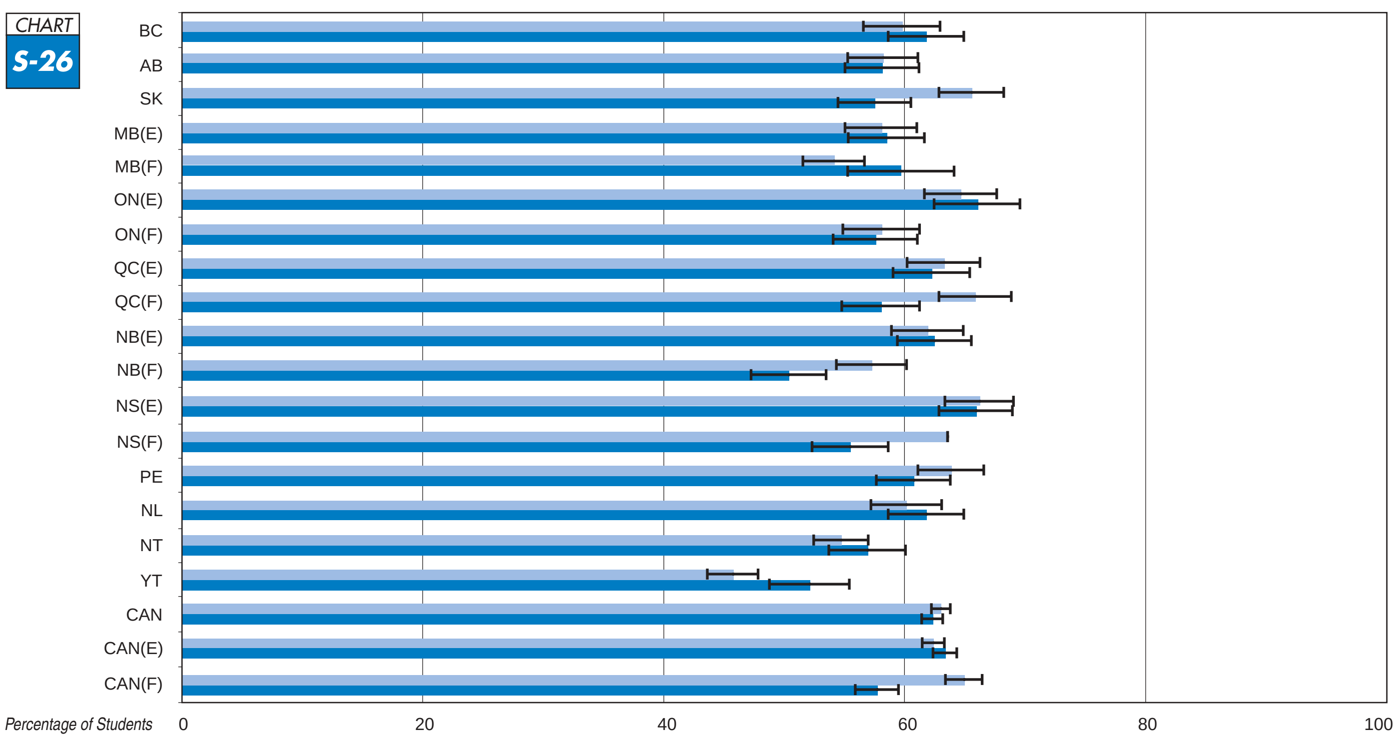
CHART **S-25**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	46	44	44	43	44	43	40	47	40	44	35	39	41	36	31	42	41	42	43	40
16-year-olds	44	41	39	37	50	45	40	50	43	42	34	43	38	44	38	46	53	43	44	43

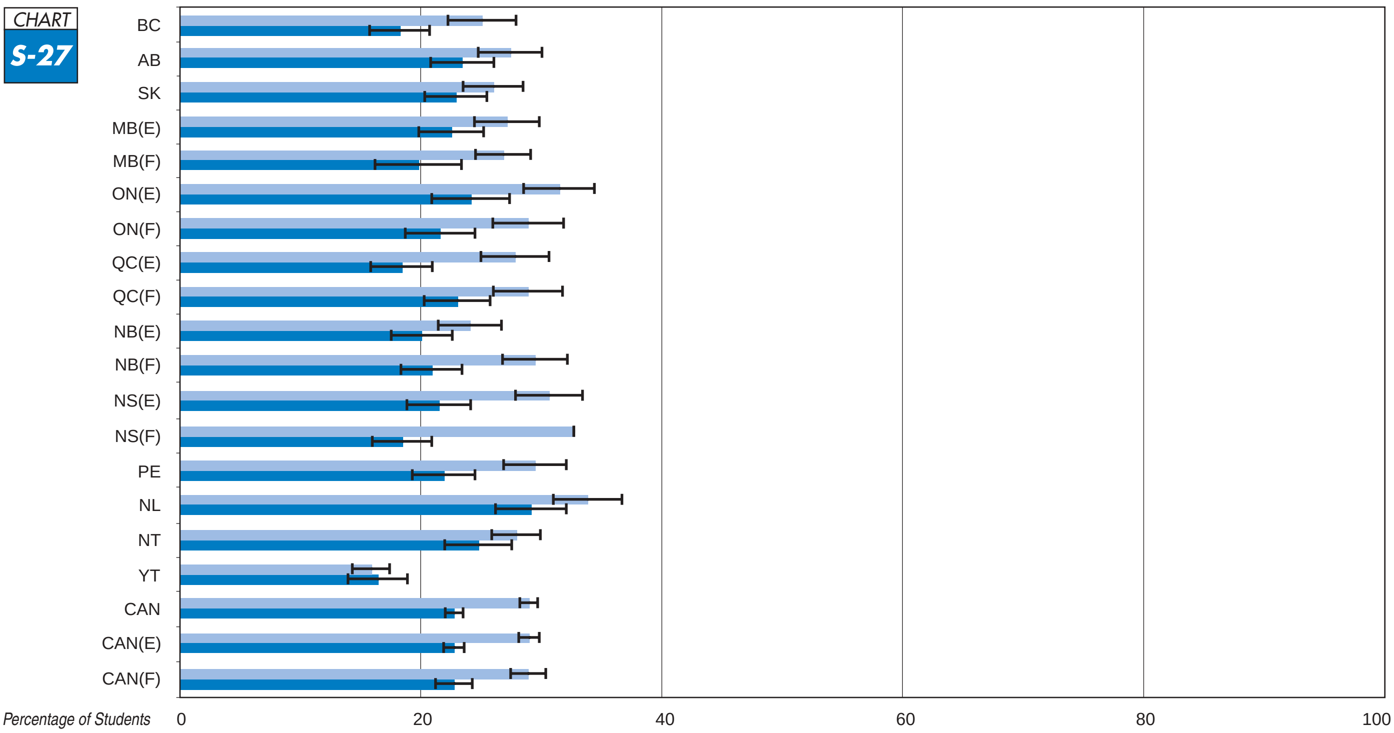
Percentage of students spending three or more hours a week using a computer for entertainment outside of school hours

CHART **S-26**



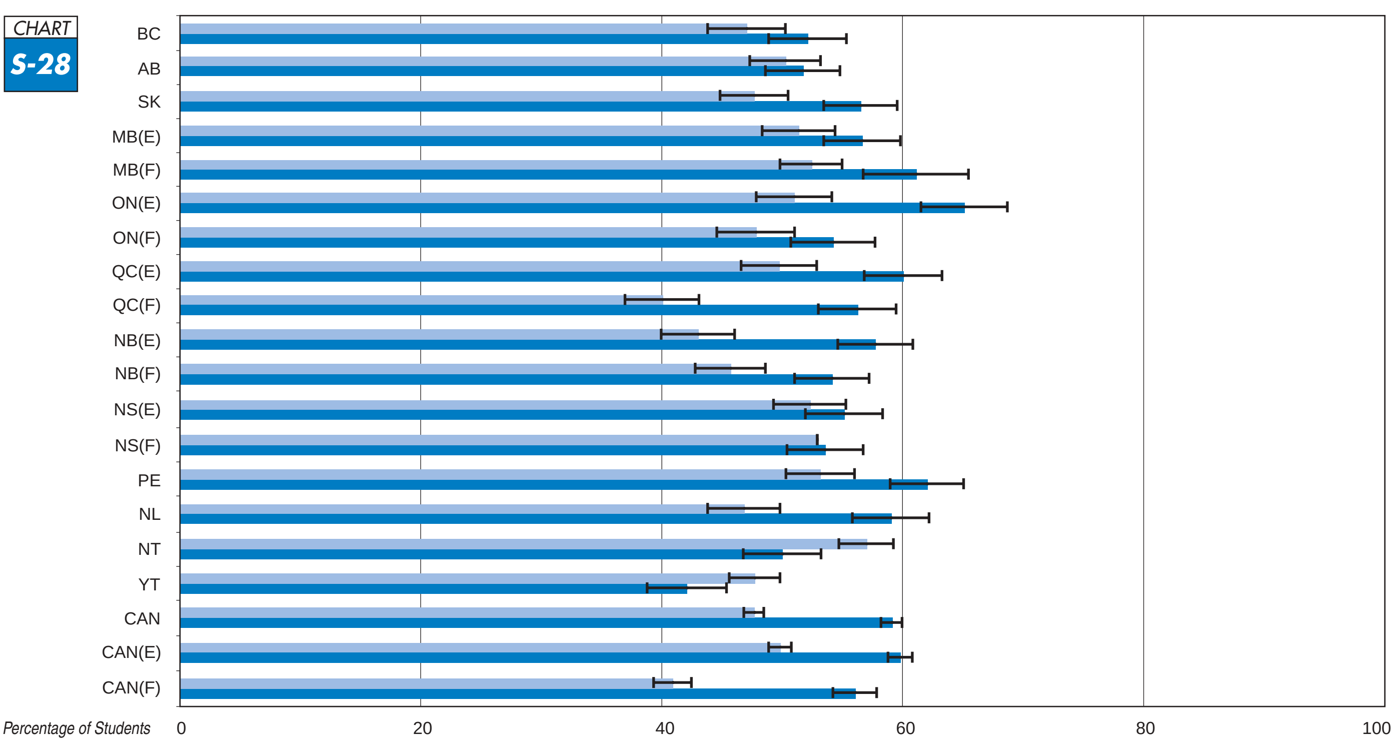
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	60	58	66	58	54	65	58	63	66	62	57	66	64	64	60	55	46	63	62	65
16-year-olds	62	58	58	59	60	66	58	62	58	62	50	66	55	61	62	57	52	62	63	58

Percentage of students spending 15 hours or more a week watching television, movies, and videos



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	25	27	26	27	27	31	29	28	29	24	29	31	33	29	34	28	16	29	29	29
16-year-olds	18	23	23	23	20	24	22	18	23	20	21	21	18	22	29	25	16	23	23	23

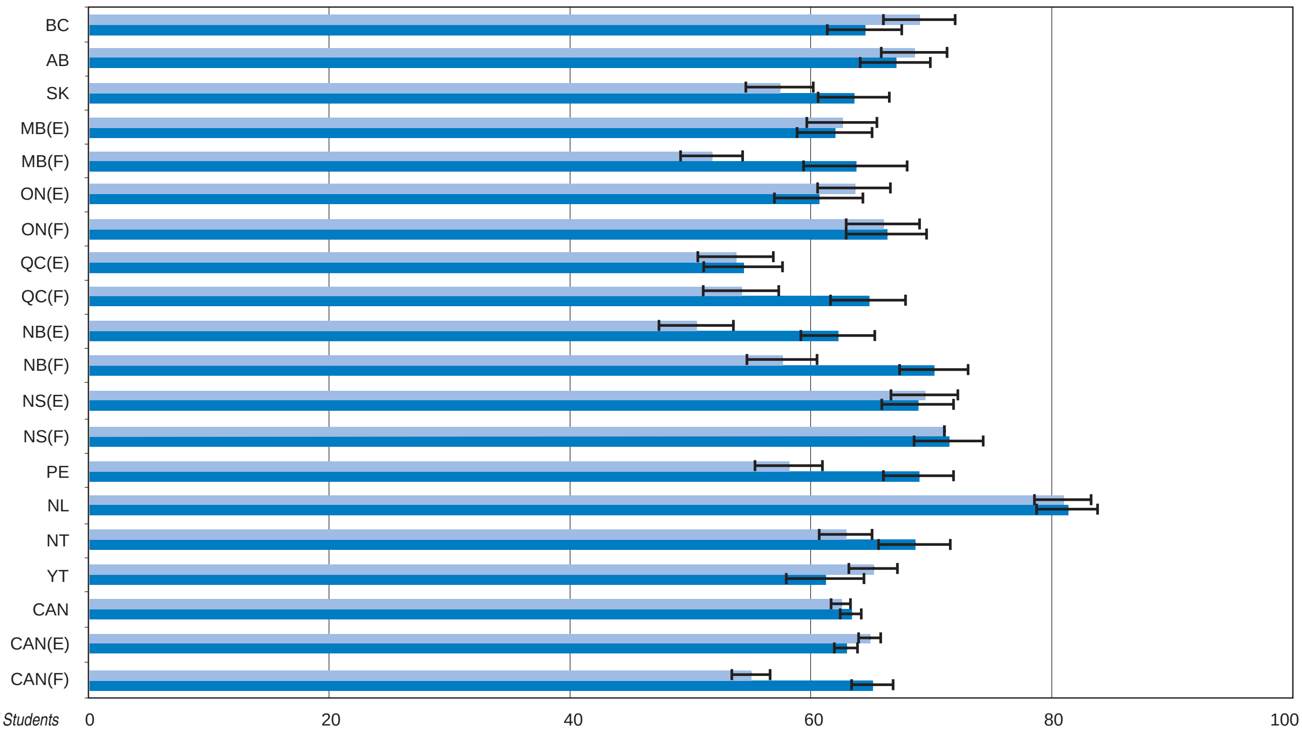
Percentage of students stating that science is more difficult than other subjects



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	47	50	48	51	52	51	48	50	40	43	46	52	53	53	47	57	48	48	50	41
16-year-olds	52	52	57	57	61	65	54	60	56	58	54	55	54	62	59	50	42	59	60	56

Percentage of students stating that science is one of the most important subjects in school

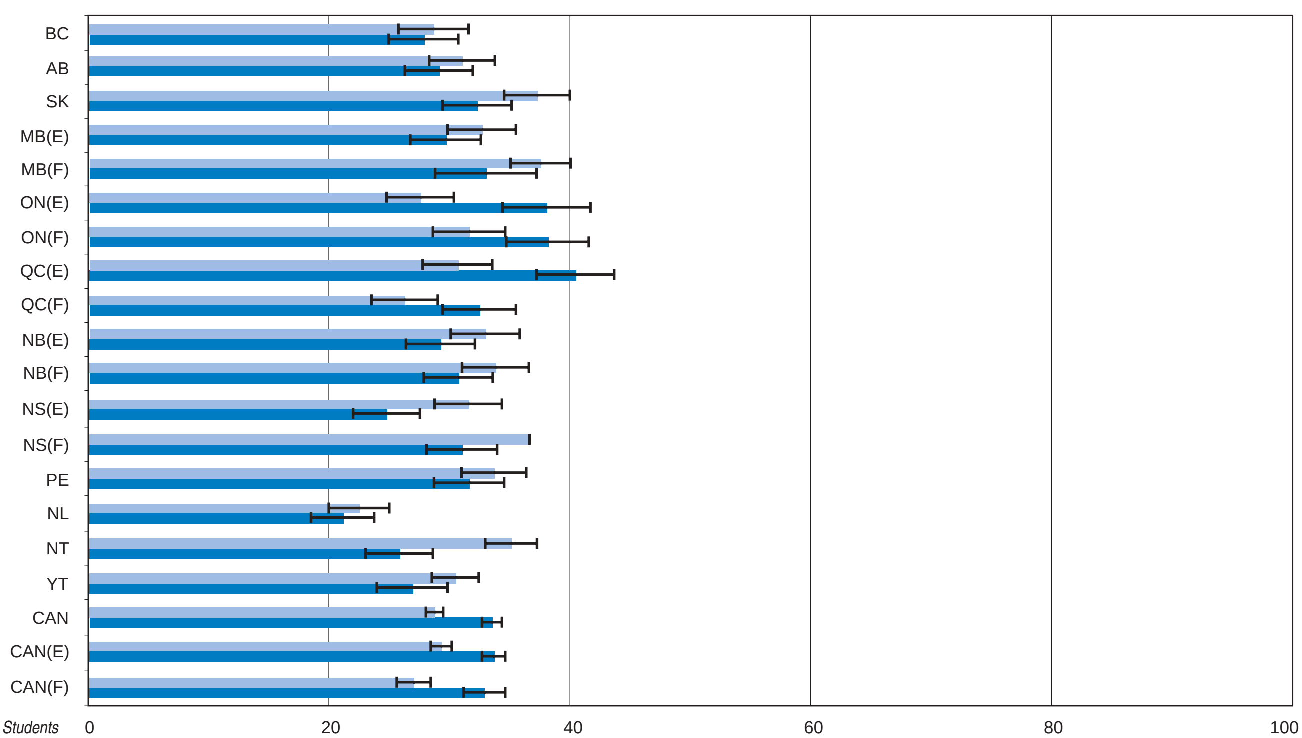
CHART
S-29



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	69	69	57	63	52	64	66	54	54	50	58	69	71	58	81	63	65	62	65	55
16-year-olds	64	67	64	62	64	61	66	54	65	62	70	69	71	69	81	69	61	63	63	65

Percentage of students who are not interested in science subjects

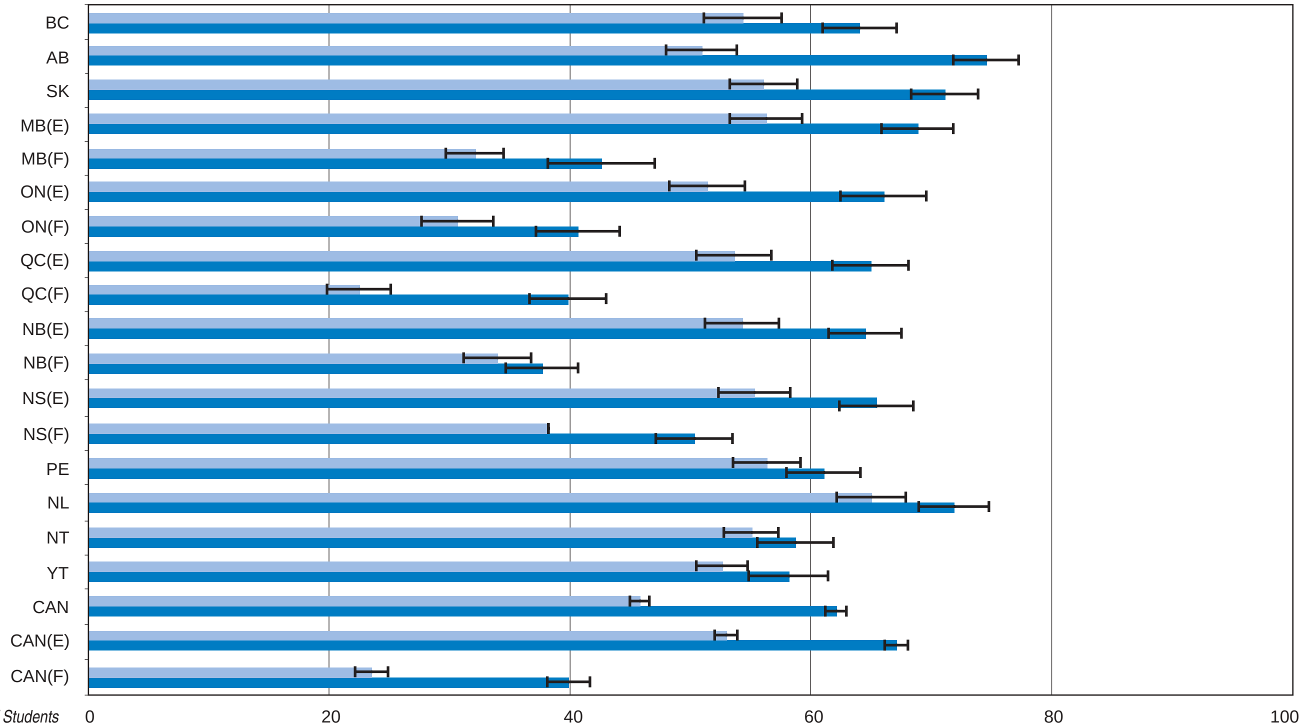
CHART
S-30



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	29	31	37	33	38	28	32	31	26	33	34	32	37	34	22	35	30	29	29	27
16-year-olds	28	29	32	30	33	38	38	40	32	29	31	25	31	32	21	26	27	33	34	33

Percentage of students who believe that to do well in science you need natural ability

CHART
S-31



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	54	51	56	56	32	51	31	54	22	54	34	55	38	56	65	55	53	46	53	24
16-year-olds	64	75	71	69	43	66	41	65	40	65	38	65	50	61	72	59	58	62	67	40

Percentage of students who believe that to do well in science you need hard work

CHART
S-32

	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	96	96	95	95	96	97	97	95	95	95	97	94	96	95	96	94	95	96	96	95
16-year-olds	96	96	95	94	94	96	97	92	95	97	95	96	97	96	96	98	97	96	96	95

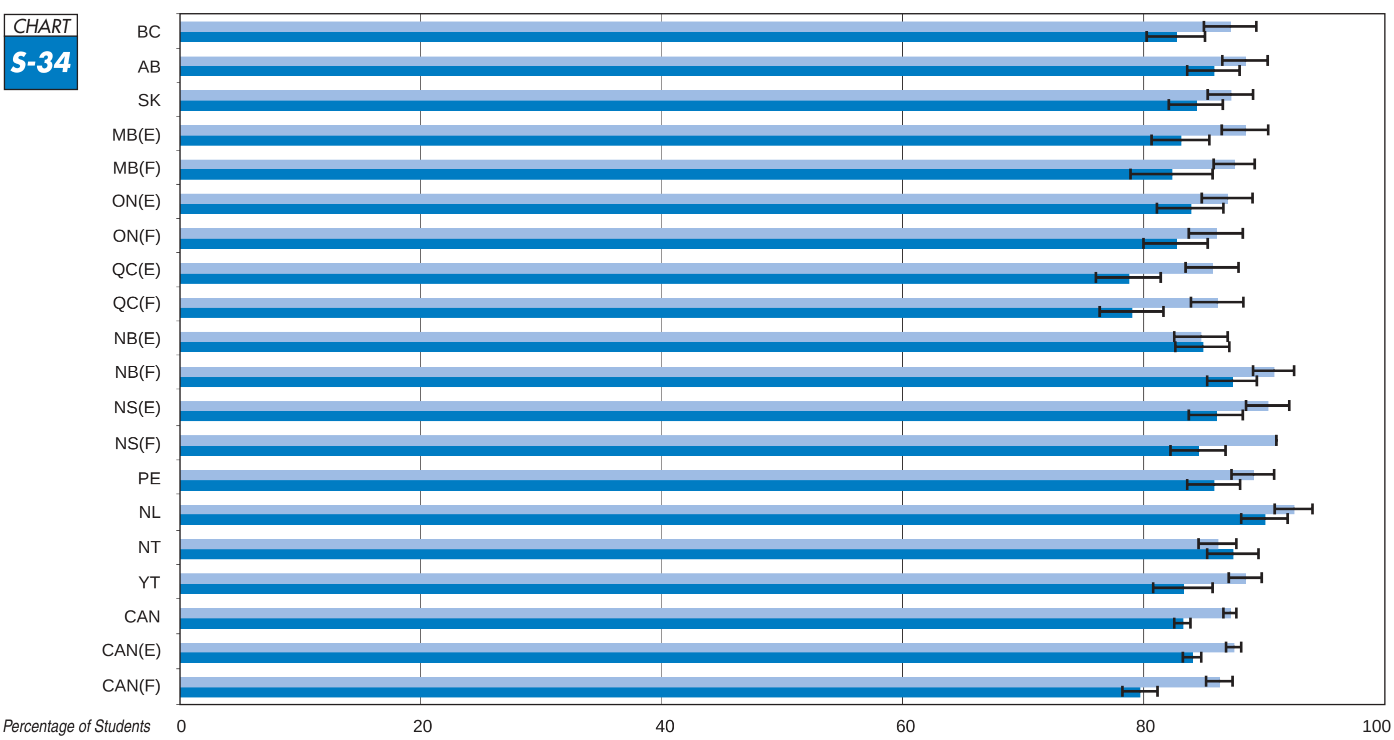
Percentage of students who believe that to do well in science you need encouragement from teachers

CHART
S-33

	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	88	89	89	87	88	89	85	87	86	87	90	91	87	89	93	87	87	88	89	86
16-year-olds	89	89	90	88	90	90	88	85	84	91	89	90	86	89	91	92	88	89	90	85

Percentage of students who believe that to do well in science you need encouragement from parents

CHART
S-34



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	87	88	87	88	88	87	86	86	86	85	91	90	91	89	92	86	88	87	87	86
16-year-olds	83	86	84	83	82	84	83	79	79	85	87	86	85	86	90	87	83	83	84	80

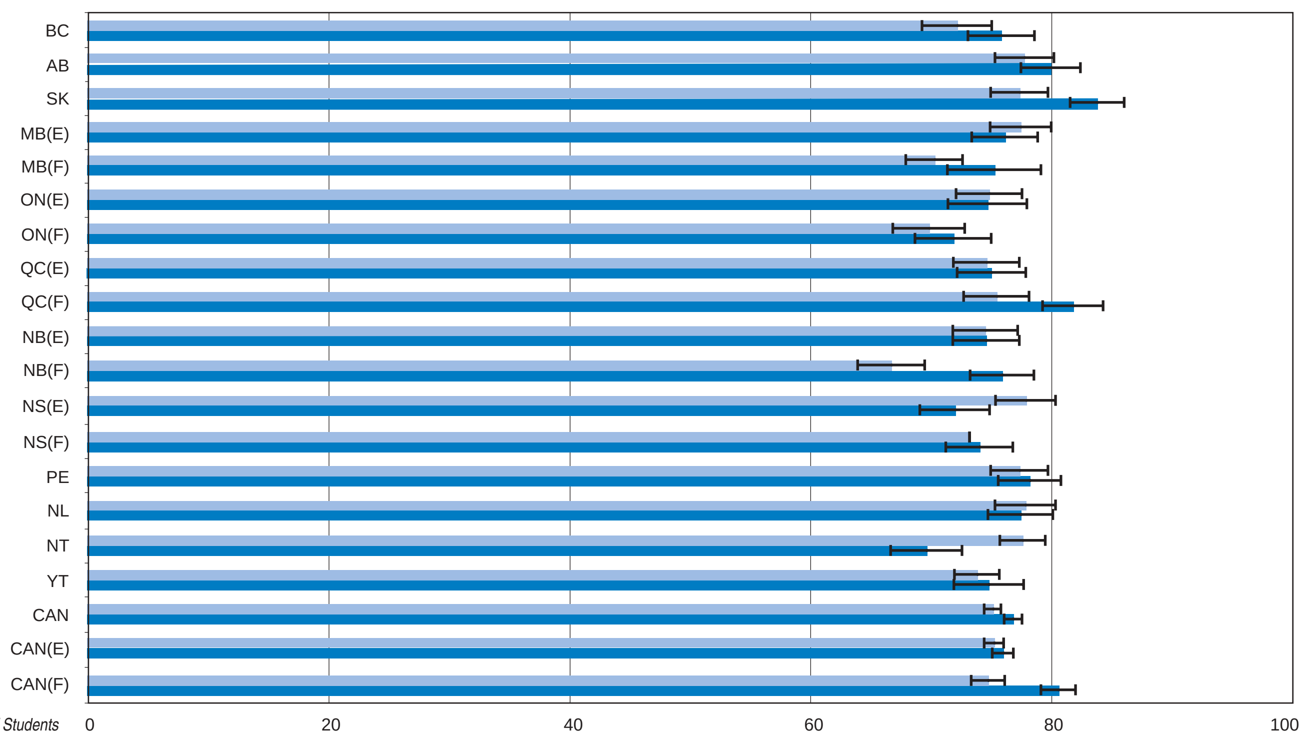
Percentage of students who believe that when they get an unusually low mark on a science assignment, it is most likely because they did not study hard enough

CHART **S-35**

	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	83	82	84	81	76	87	80	81	81	84	80	82	71	85	81	84	84	83	84	81
16-year-olds	86	82	82	84	82	82	77	80	75	85	80	84	75	85	78	88	84	81	83	76

Percentage of students who believe that when they get an unusually low mark on a science assignment, it is most likely because the course was difficult

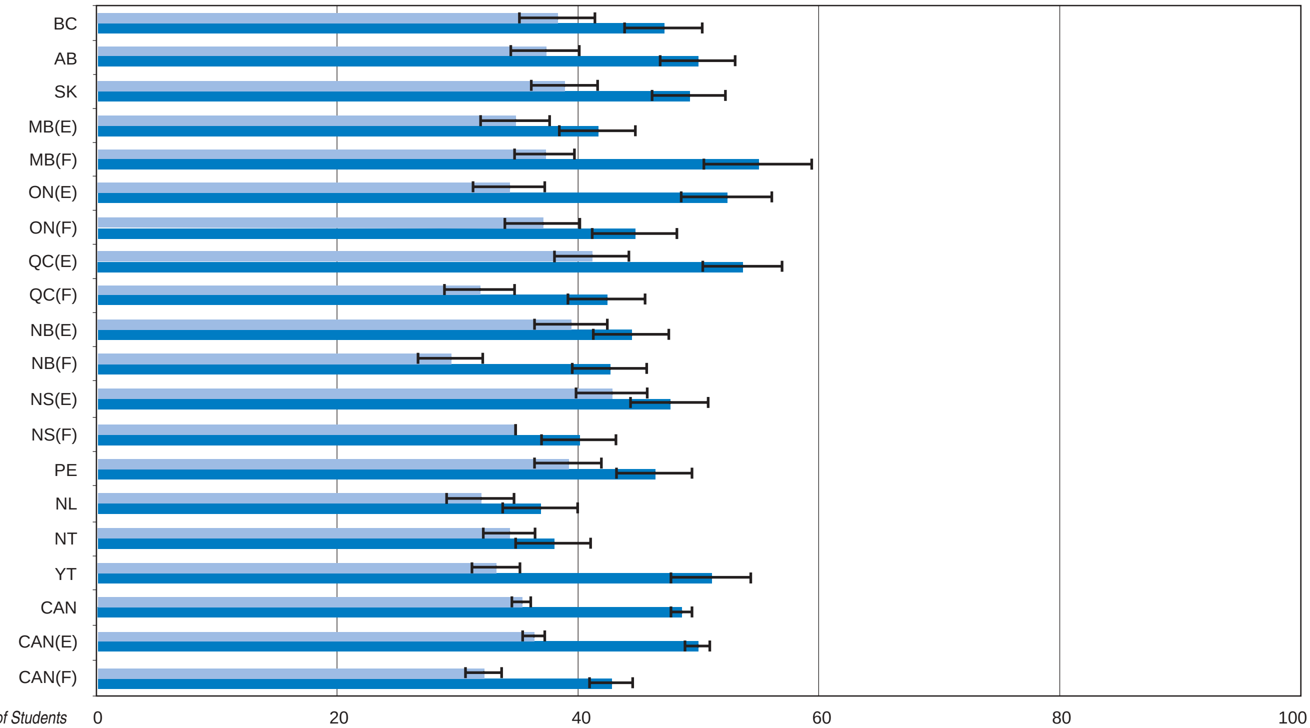
CHART **S-36**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	72	78	77	77	70	75	70	75	75	75	67	78	73	77	78	78	74	75	75	75
16-year-olds	76	80	84	76	75	75	72	75	82	75	76	72	74	78	77	70	75	77	76	81

Percentage of students who believe that when they get an unusually low mark on a science assignment, it is most likely because the course was not well taught

CHART **S-37**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	38	37	39	35	37	34	37	41	32	39	29	43	35	39	32	34	33	35	36	32
16-year-olds	47	50	49	42	55	52	45	54	42	44	43	48	40	46	37	38	51	49	50	43

Percentage of students who believe that when they get an unusually high mark on a science assignment, it is most likely because the course was well taught

CHART **S-38**

	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	91	89	89	90	90	92	92	90	91	87	91	89	89	89	91	85	89	91	91	91
16-year-olds	92	90	90	89	89	89	89	86	91	92	93	91	92	91	92	90	89	90	90	91

Percentage of students who believe that when they get an unusually high mark on a science assignment, it is most likely because they studied a lot

CHART **S-39**

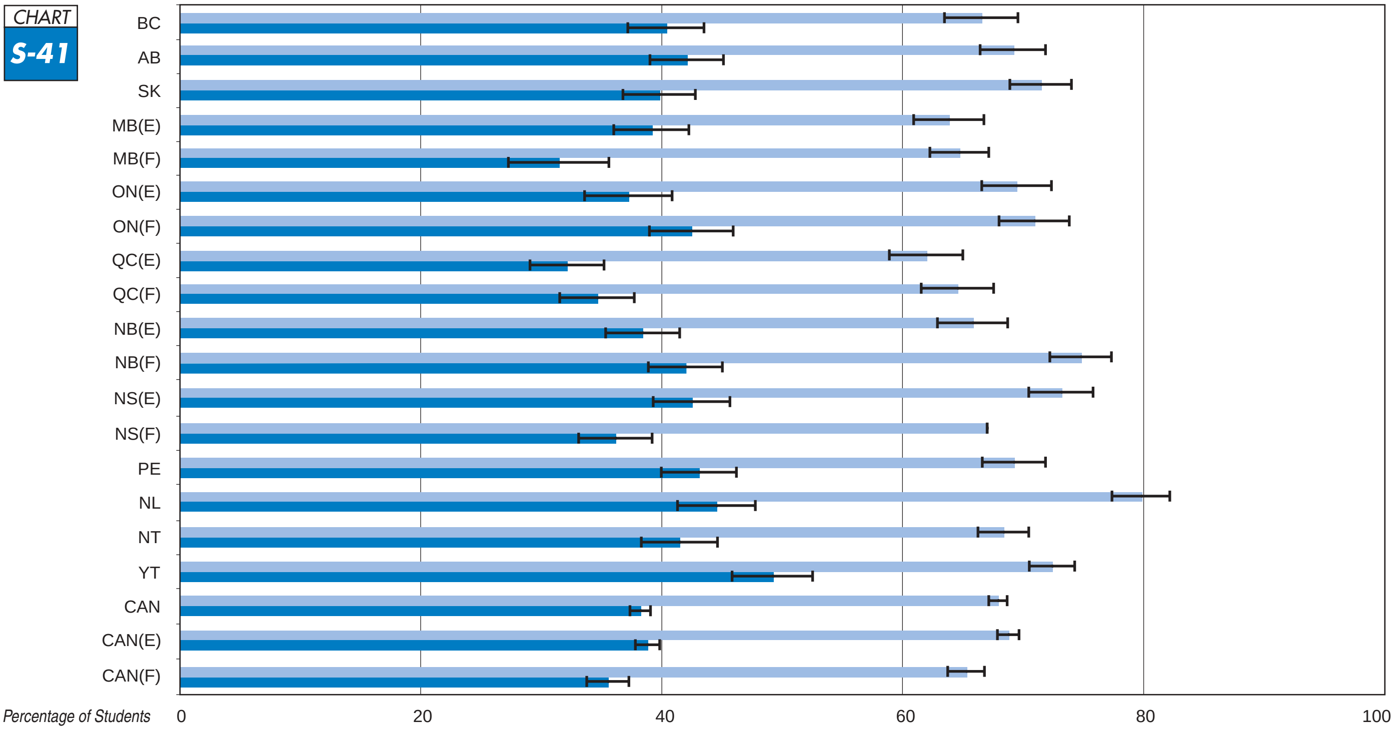
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	84	76	81	79	82	85	84	80	86	79	81	81	84	84	88	77	78	83	82	86
16-year-olds	84	75	80	79	83	85	84	80	84	82	85	82	80	85	86	82	83	83	83	84

Percentage of students who would be likely to ask the teacher for help in science

CHART **S-40**

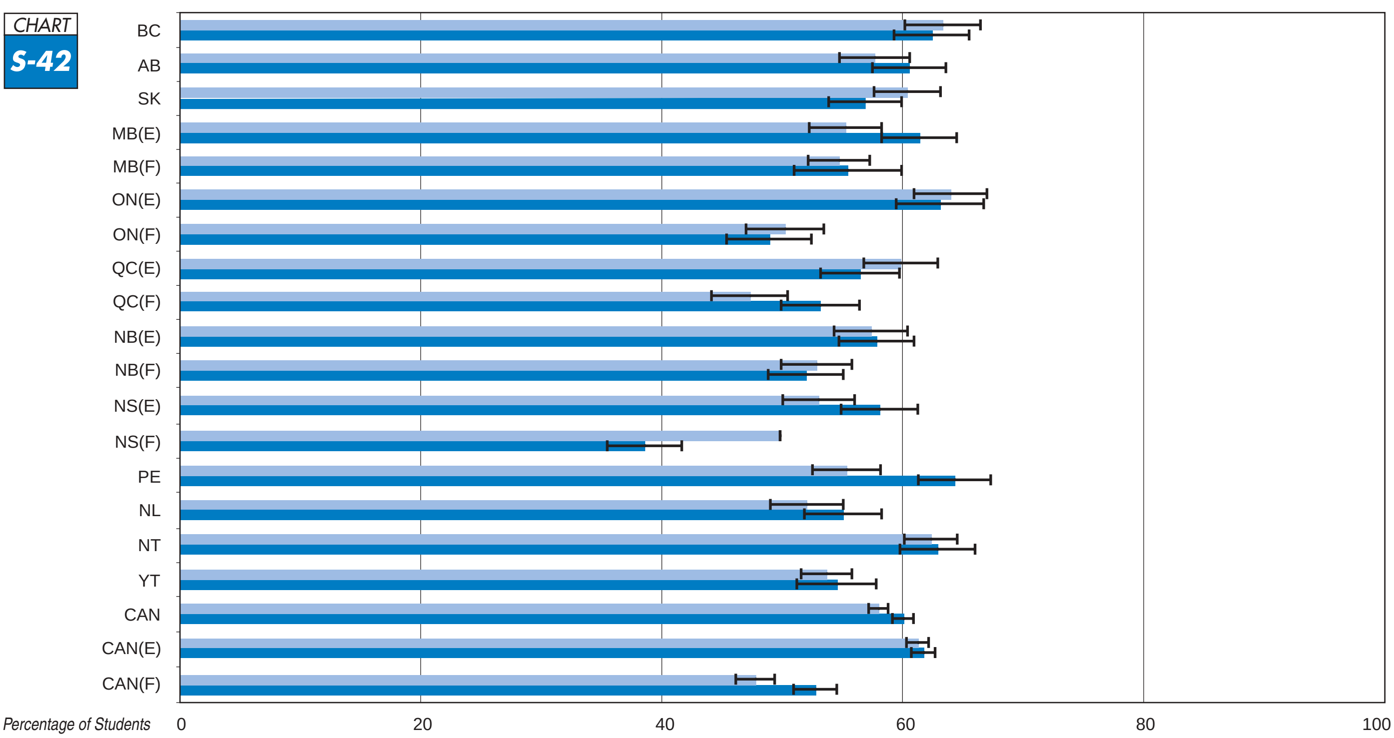
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	83	79	83	83	81	84	88	79	87	77	88	83	80	79	88	78	86	84	83	87
16-year-olds	85	82	82	80	81	81	86	82	89	81	89	82	88	84	87	84	86	83	82	89

Percentage of students who would be likely to ask their parents for help in science



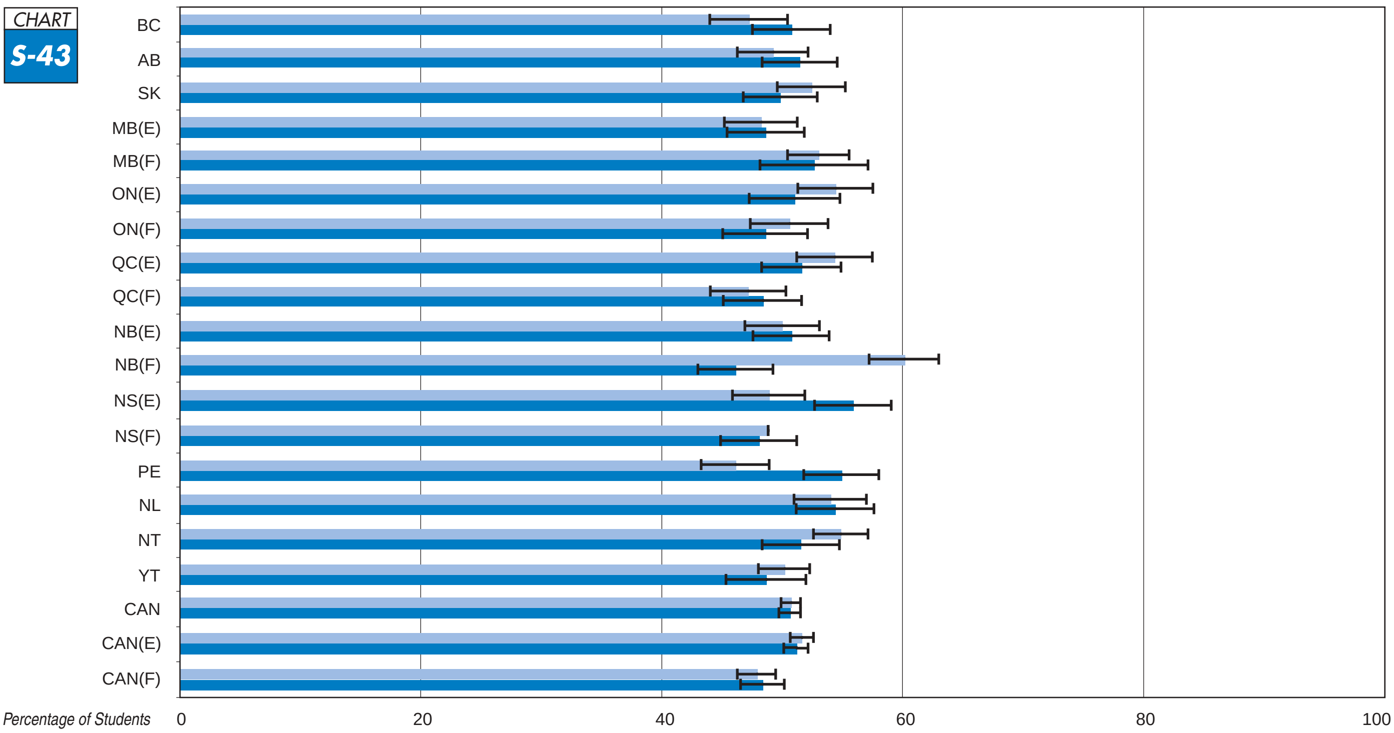
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	67	69	71	64	65	69	71	62	65	66	75	73	67	69	80	68	72	68	69	65
16-year-olds	40	42	40	39	31	37	42	32	35	38	42	42	36	43	45	41	49	38	39	36

Percentage of students who enjoy going to school



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	63	58	60	55	55	64	50	60	47	57	53	53	50	55	52	62	54	58	61	48
16-year-olds	62	61	57	61	55	63	49	56	53	58	52	58	39	64	55	63	55	60	62	53

Percentage of students who are genuinely interested in school work



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	47	49	52	48	53	54	51	54	47	50	60	49	49	46	54	55	50	51	52	48
16-year-olds	51	51	50	49	53	51	49	52	48	51	46	56	48	55	54	52	49	51	51	48

Percentage of students whose teachers treat them fairly

	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	84	85	87	87	77	88	78	86	76	84	73	87	71	88	85	86	86	84	86	76
16-year-olds	89	88	87	87	81	87	80	84	80	89	78	89	78	90	88	87	83	86	87	80

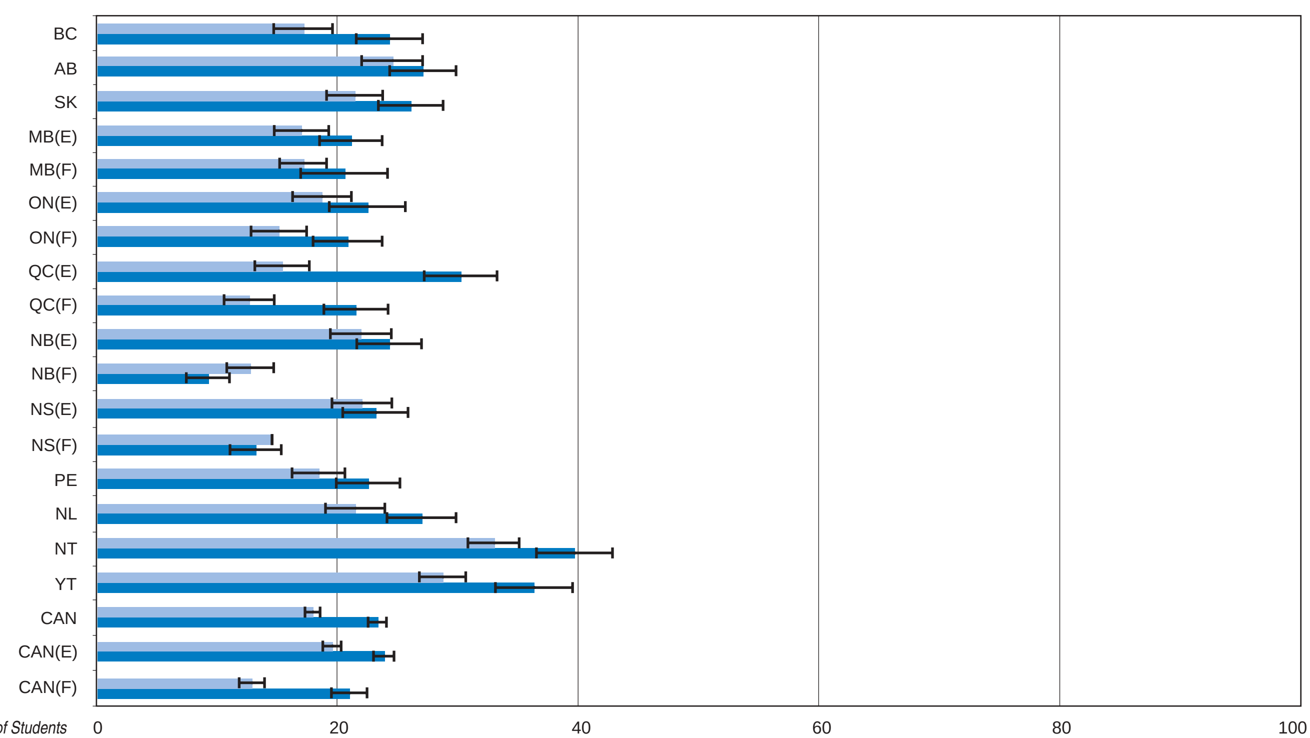
Percentage of students who think that they get the marks they deserve

CHART S-45

	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	84	84	87	86	82	85	86	85	89	85	87	85	82	89	87	82	84	86	85	89
16-year-olds	82	82	84	85	80	79	83	80	88	86	85	86	81	83	87	87	81	82	81	88

Percentage of students reporting that they have been absent from school more than 10 days this year

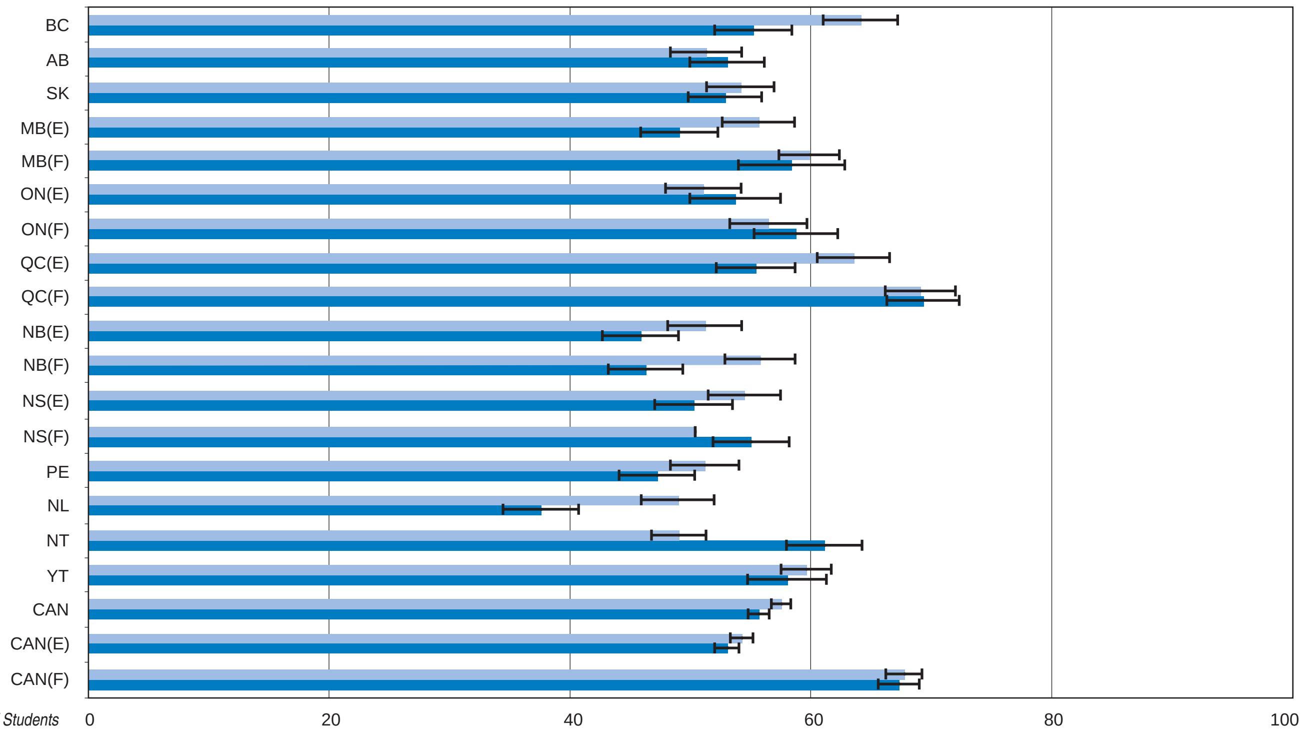
CHART S-46



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	17	25	21	17	17	19	15	15	13	22	13	22	15	18	21	33	29	18	20	13
16-year-olds	24	27	26	21	21	22	21	30	22	24	9	23	13	23	27	40	36	23	24	21

Percentage of students who work in pairs or in small groups a few times a week or more

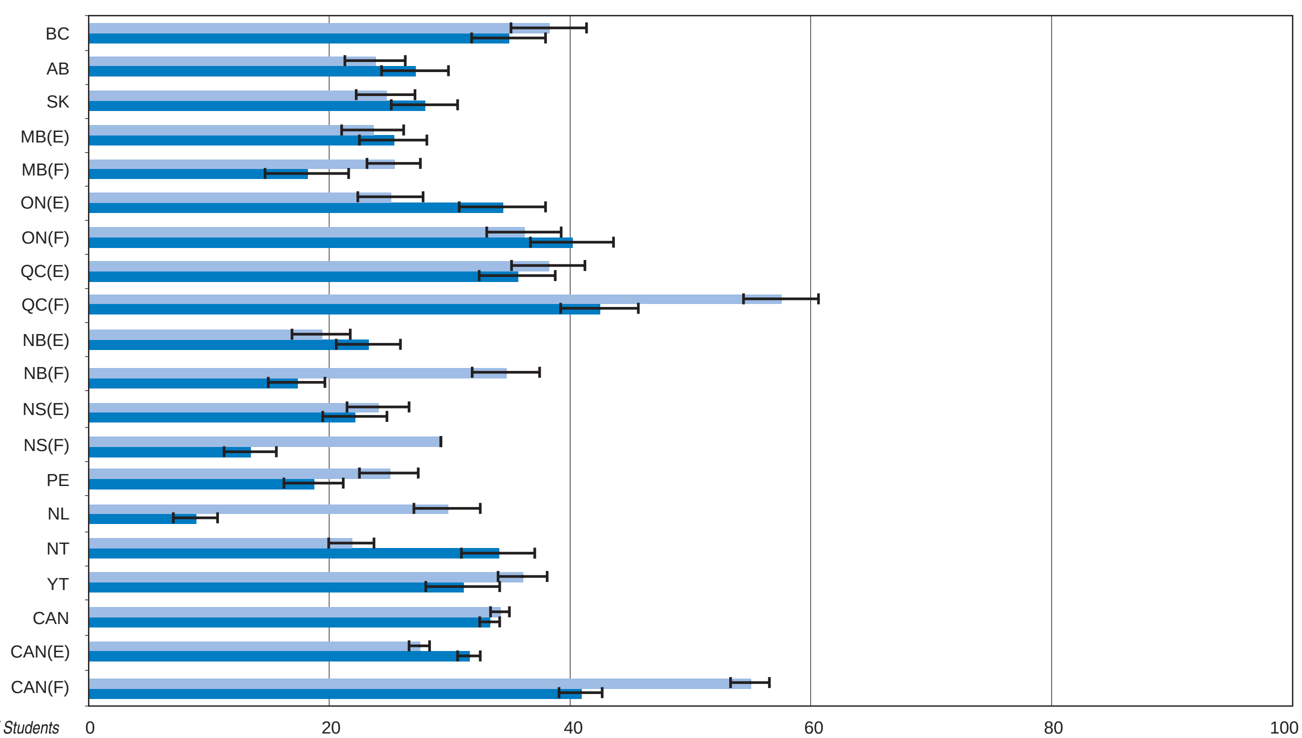
CHART **S-47**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	64	51	54	56	60	51	56	64	69	51	56	54	50	51	49	49	60	58	54	68
16-year-olds	55	53	53	49	58	54	59	55	69	46	46	50	55	47	38	61	58	56	53	67

Percentage of students who do experiments in the laboratory a few times a week or more

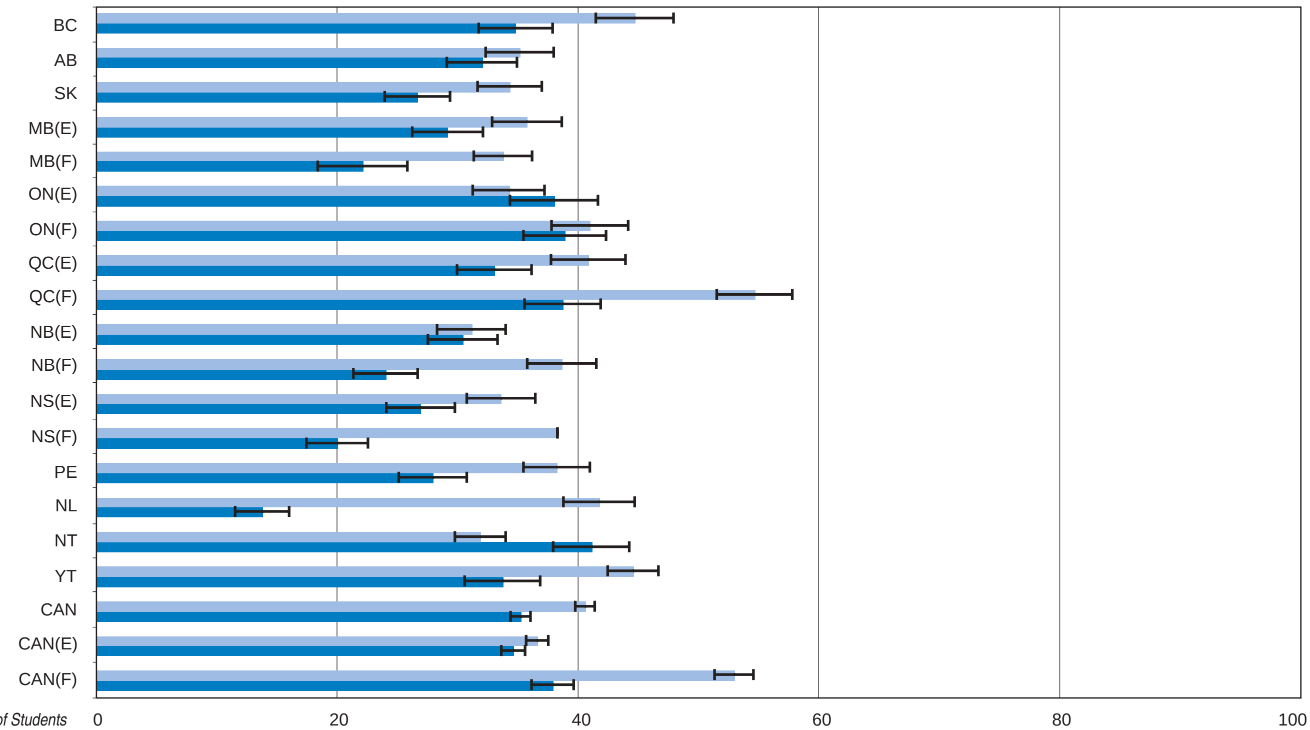
CHART **S-48**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	38	24	25	24	25	25	36	38	58	19	35	24	29	25	30	22	36	34	27	55
16-year-olds	35	27	28	25	18	34	40	36	42	23	17	22	13	19	9	34	31	33	32	41

Percentage of students whose teachers show them experiments a few times a week or more

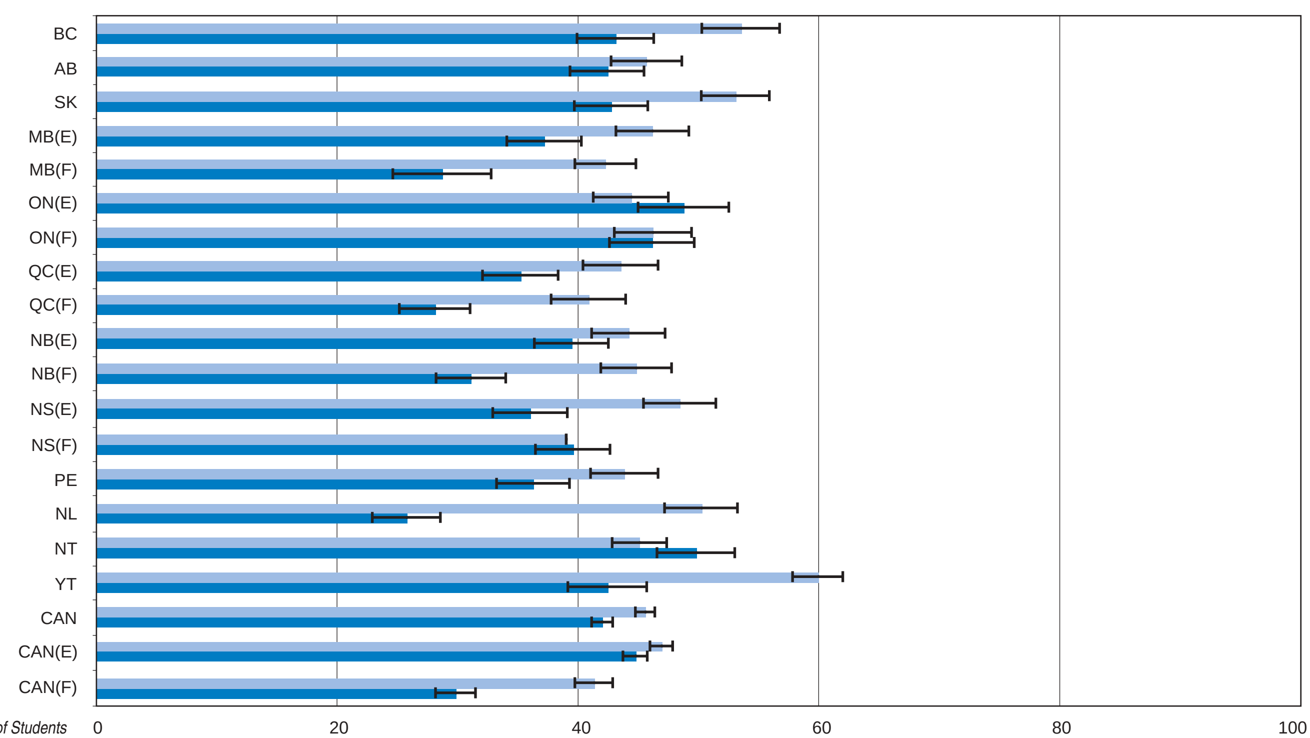
CHART **S-49**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	45	35	34	36	34	34	41	41	55	31	39	34	38	38	42	32	45	41	37	53
16-year-olds	35	32	27	29	22	38	39	33	39	30	24	27	20	28	14	41	34	35	35	38

Percentage of students who participate in scientific projects a few times a week or more

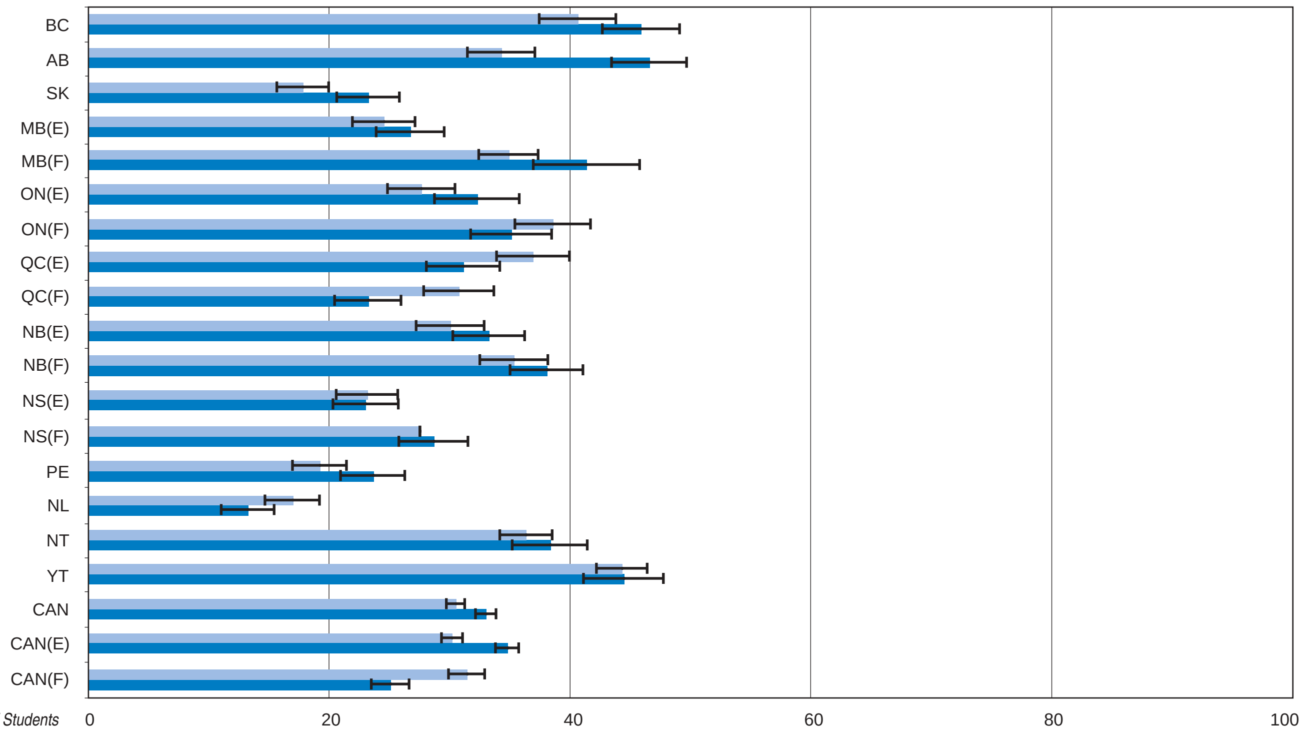
CHART **S-50**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	54	46	53	46	42	44	46	44	41	44	45	48	39	44	50	45	60	46	47	41
16-year-olds	43	42	43	37	29	49	46	35	28	39	31	36	40	36	26	50	42	42	45	30

Percentage of students who have a quiz or a test a few times a week or more

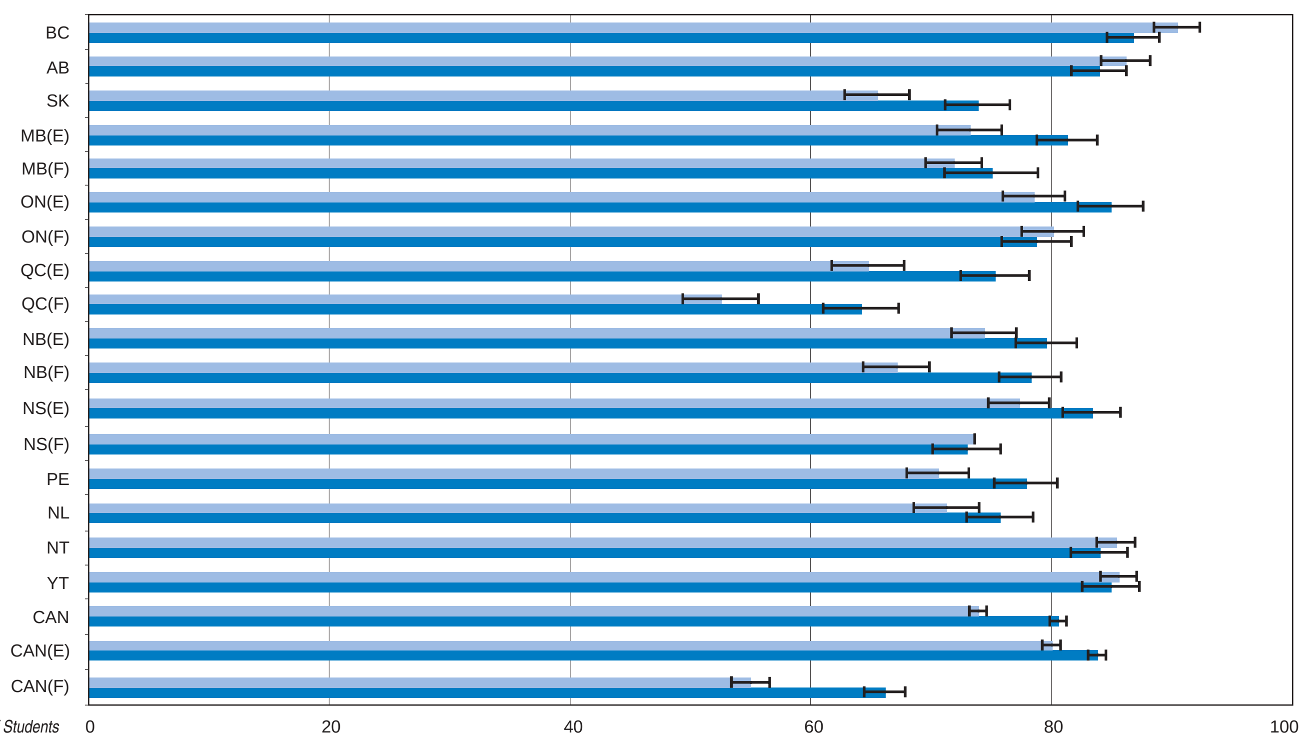
CHART
S-51



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	41	34	18	25	35	28	39	37	31	30	35	23	28	19	17	36	44	30	30	31
16-year-olds	46	47	23	27	41	32	35	31	23	33	38	23	29	24	13	38	44	33	35	25

Percentage of students whose teachers assign them homework a few times a week or more

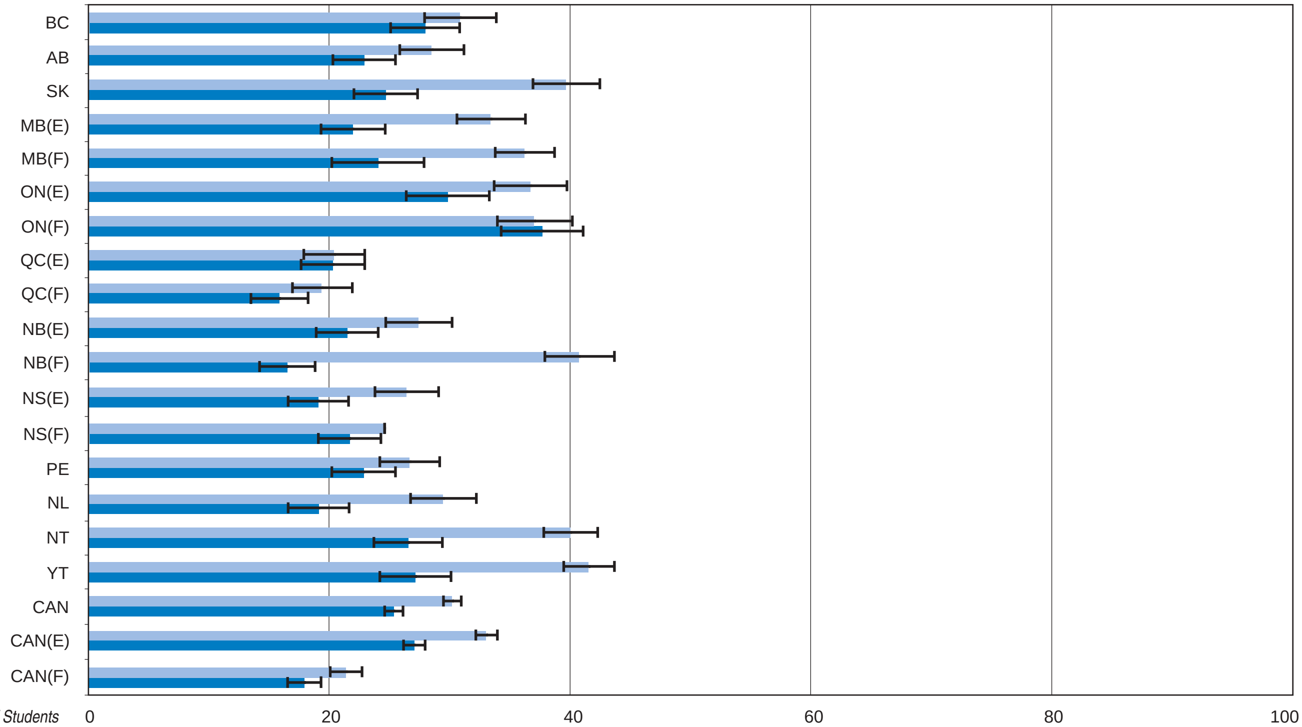
CHART
S-52



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	90	86	66	73	72	79	80	65	53	74	67	77	74	71	71	85	86	74	80	55
16-year-olds	87	84	74	81	75	85	79	75	64	80	78	83	73	78	76	84	85	81	84	66

Percentage of students who go outside or out of the school for an educational outing a few times a month or more

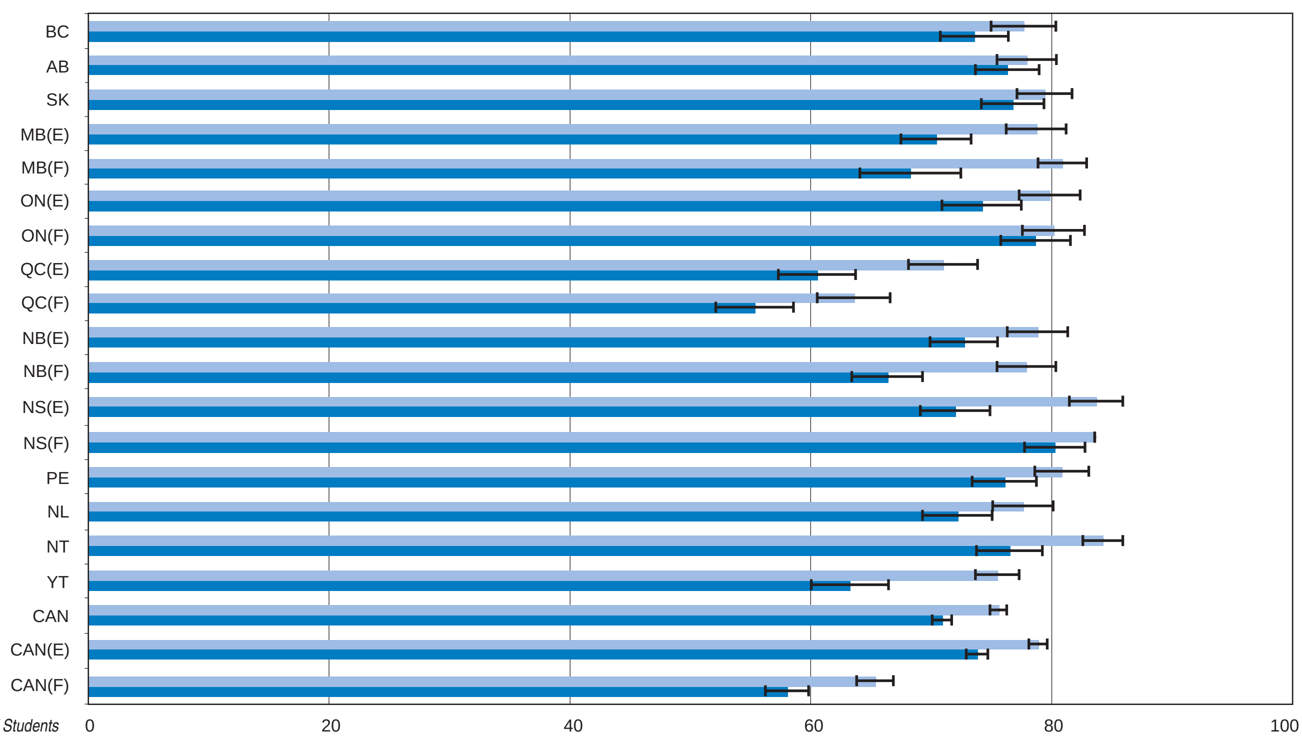
CHART S-53



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	31	28	40	33	36	37	37	20	19	27	41	26	25	27	29	40	42	30	33	21
16-year-olds	28	23	25	22	24	30	38	20	16	21	16	19	22	23	19	26	27	25	27	18

Percentage of students reporting that science books and magazines (other than textbooks) are used in their science course a few times a month or more

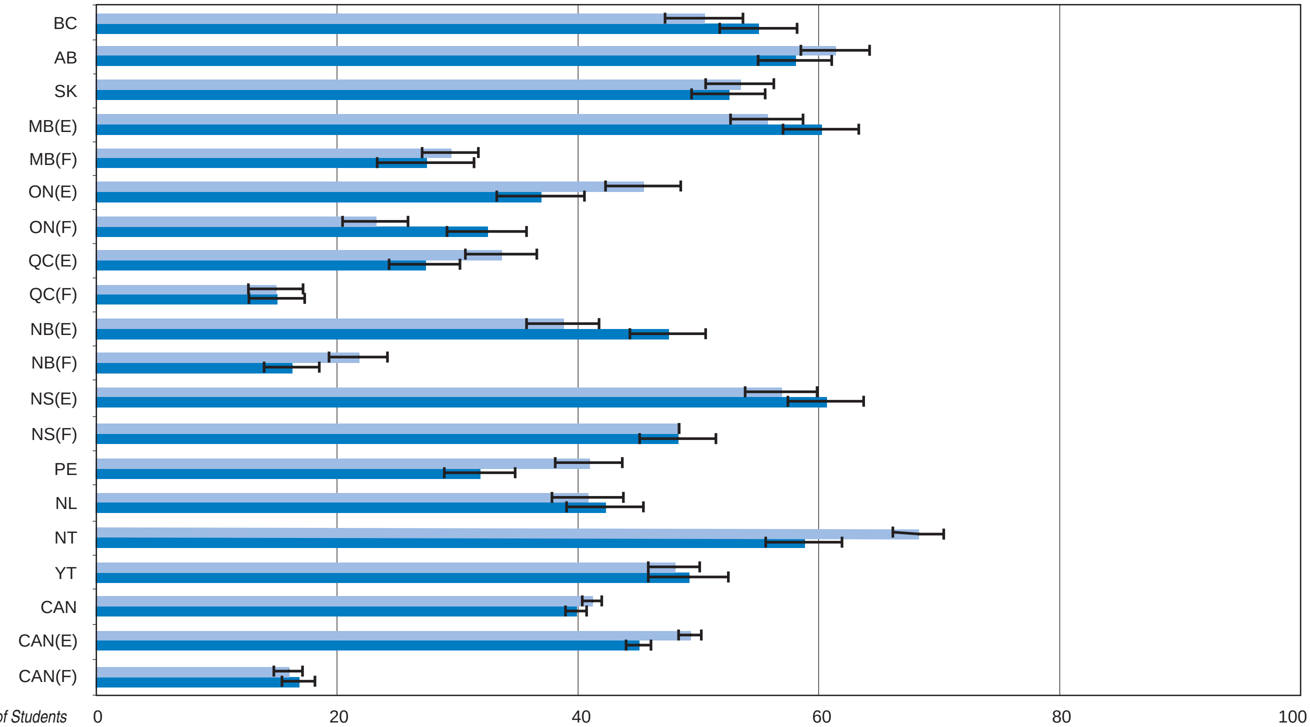
CHART S-54



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	78	78	79	79	81	80	80	71	64	79	78	84	84	81	78	84	75	76	79	65
16-year-olds	74	76	77	70	68	74	79	61	55	73	66	72	80	76	72	76	63	71	74	58

Percentage of students reporting that they use computers in their science course a few times a month or more

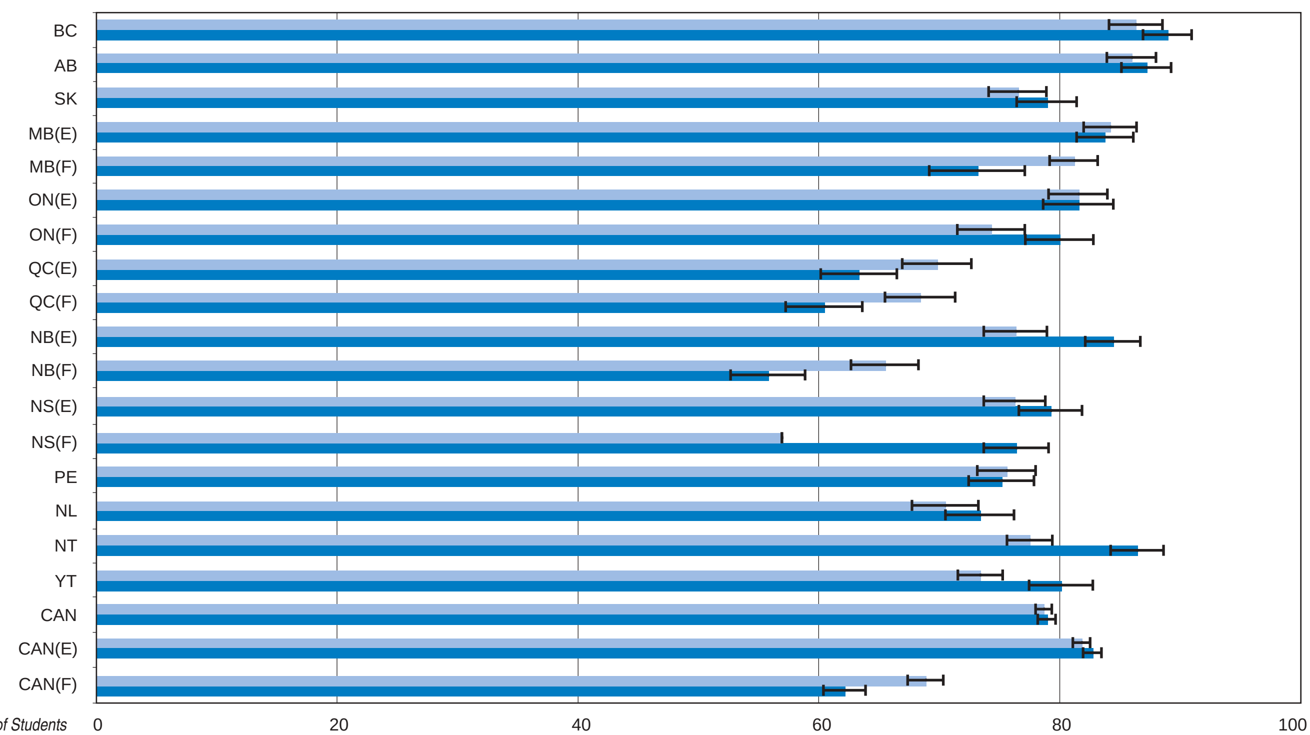
CHART S-55



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	51	61	53	56	29	45	23	34	15	39	22	57	48	41	41	68	48	41	49	16
16-year-olds	55	58	53	60	27	37	32	27	15	47	16	61	48	32	42	59	49	40	45	17

Percentage of students reporting that slides, films, or videos are used in their science course a few times a month or more

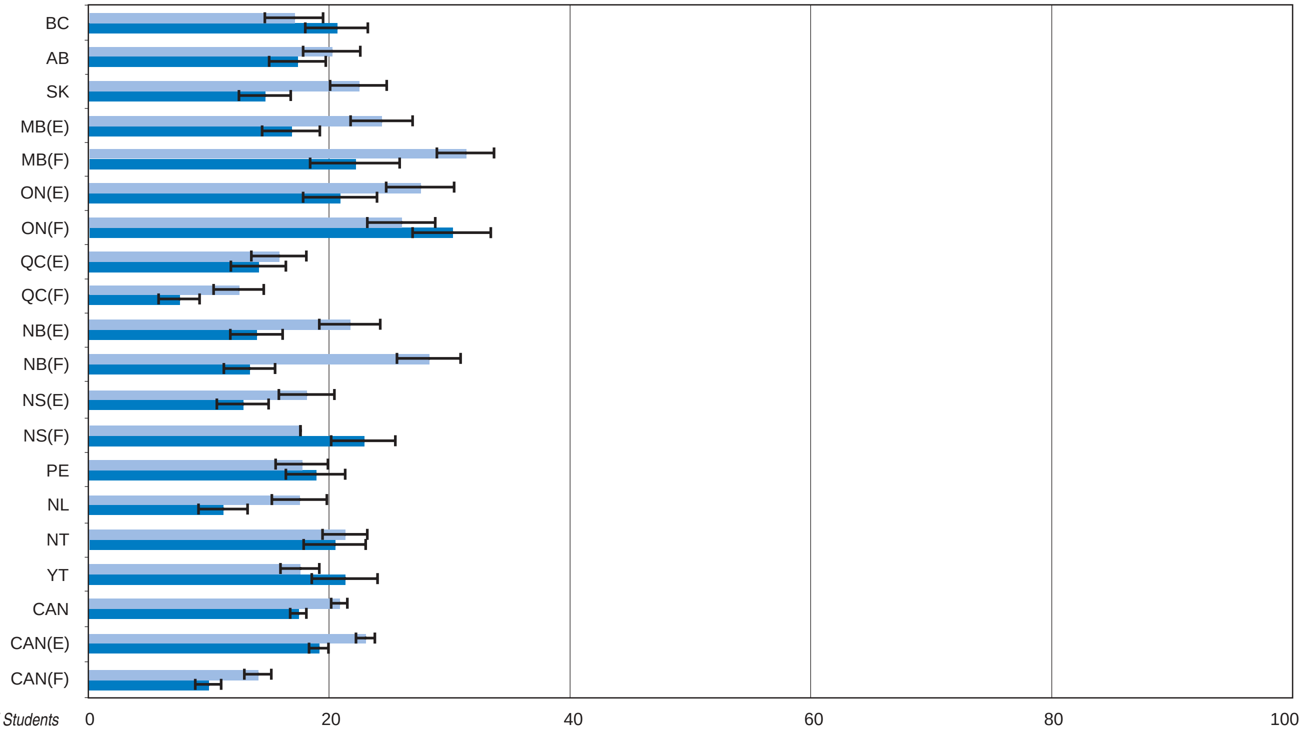
CHART S-56



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	86	86	77	84	81	82	74	70	69	76	66	76	57	76	71	78	74	79	82	69
16-year-olds	89	87	79	84	73	82	80	63	61	85	56	79	77	75	73	87	80	79	83	62

Percentage of students going to museums, zoos, conservation areas, and similar non-school sites in their science course a few times a year or more

CHART
S-57



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	17	20	22	24	31	28	26	16	12	22	28	18	18	18	18	21	18	21	23	14
16-year-olds	21	17	15	17	22	21	30	14	7	14	13	13	23	19	11	20	21	17	19	10

The teacher questionnaire comprised 30 questions. Many of these contained several specific items or scales requiring separate responses, for a total of nearly 200 teacher responses. Responses were received from almost 5,000 teachers.

Questions were asked about teachers' professional background and experience, teaching assignments and duties, class sizes, interaction with parents and other teachers, lesson planning, classroom activities, resource use, constraints on teaching, homework, and student evaluation. Teachers were also asked to indicate their agreement or disagreement with a number of propositions about the nature of science, factors affecting student learning, and streaming for high school students.

Confidence intervals cannot be computed for the teacher data because not enough is known about how representative the teacher sample is of the whole pan-Canadian population of science teachers. In the absence of confidence intervals, comparisons should be interpreted essentially as descriptive of the samples rather than as inferences about the populations. While many of the noted differences are quite large, we cannot estimate the probability that these differences are due to sampling error.

Also because of sampling limitations, weights cannot be computed to adjust for different population sizes in computing results for Canada as a whole. For this reason, Canadian averages and language group averages are not reported. Where regional or language patterns are noted, they are less likely than individual population comparisons to represent chance effects because the effects are replicated over several jurisdictions. Some of the observed differences between populations are quite large, and it is unlikely, even allowing for some sampling bias, that these would be due to chance.

TEACHER BACKGROUND AND EXPERIENCE

Charts T-1 through **T-10** give teachers' responses to questions on their background and experience. As shown in **chart T-1**, generally over 40% of science teachers are female. The lowest proportions of female teachers are found in British Columbia and Newfoundland and Labrador. **Chart T-2** shows that the median years of science teaching experience reflect the fact that so many teachers of long experience have reached retirement age, leaving a younger cadre to carry on.

Teachers reported a wide variety of educational backgrounds. **Chart T-3** shows that a bachelor's degree in science or equivalent is reported by as many as 75% of teachers in some jurisdictions, and as few as 30% in others. **Chart T-4** shows that more than 80% of all teachers in most populations have at least one year of teacher training. Quebec francophone teachers are a notable exception to this pattern, with 66% of teachers reporting this qualification.

Charts T-5 through **T-10** show the variety of subject specializations reported by these teachers. As one might expect, this is quite varied, the highest proportion reporting biological sciences, followed by the physical sciences (i.e., chemistry and physics). Other charts show that many teachers of science also list qualifications in varied areas such as mathematics and earth sciences, as well as related areas such as computer science.

Chart T-11 shows that many teachers consider themselves science specialists and are quite comfortable teaching mainly science. This same chart also shows that nearly half of the teachers in Saskatchewan, Manitoba francophone, and New Brunswick francophone and over half of the teachers reporting from the Northwest Territories do not share this opinion. Similar results are reflected in **chart T-12**, which shows that as many as 25% of teachers reporting, while feeling quite competent, would prefer to teach in other areas. This feeling is lowest for Quebec francophone teachers at 6%, and highest in Saskatchewan, Northwest Territories, New Brunswick anglophone, and Manitoba francophone.

Charts T-13 and **T-14** show that in most jurisdictions teachers agree that their students appreciate their work but are less confident that society in general appreciates it.

FACTORS AFFECTING APPROACHES TO TEACHING

Class Size

Teachers were asked to give the average size of the classes they teach, as well as their largest and smallest class sizes. **Chart T-15** shows median average values by jurisdiction. In most jurisdictions, it is about 25 or fewer, with the highest 28 (Quebec francophone) and the lowest 17 (Nova Scotia francophone). **Chart T-16** shows that data on largest class sizes show similar patterns, with the largest classes reported as between an average of 31 (Quebec francophone) and an average of 20 (Northwest Territories).

Chart T-17 shows how teachers reported the effect of large class sizes on their teaching methods. As one might expect, there often appear to be more difficulties reported with larger class sizes in jurisdictions where teachers report making frequent use of laboratories (see charts T-33 and T-34). In Alberta, British Columbia, Ontario anglophone, Quebec francophone, and New Brunswick francophone classrooms, many teachers report the limitations of larger classrooms (T-17). In **charts T-33** and **T-34**, teachers from the same jurisdictions describe more frequent use of laboratories than many other jurisdictions.

Student Factors

Teachers were asked whether any of several factors restricted how they taught their classes. Several questions were related to the background, abilities, and attitudes of the students. **Charts T-18** through **T-21** show several interesting examples. **Charts T-18**, **T-19**, and **T-20** illustrate the problems many teachers reported with the wide variety of students with a myriad of backgrounds, abilities, and special needs that impact on the classroom. In all three of these charts, a high percentage of Northwest Territories teachers reported problems with the variety of student backgrounds. Ninety per cent of teachers in Nova Scotia francophone schools report problems with the range of differences in backgrounds of their students. It is worth noting **chart T-21**, which suggests that there is a widespread problem with uninterested students, with 80% or more teachers in all jurisdictions reporting that uninterested students limit or restrict how they teach science classes. For this factor, there are a number of possible interpretations (e.g., the lack of understanding about the usefulness of science in daily life or the lack of a stimulating environment for learning science) — all worthy of further study.

Resources and Policy Issues

Chart T-22 indicates that over one-quarter of all teachers responding report a problem with shortage of materials or equipment. **Chart T-23** illustrates the perceived difficulties with curriculum in-service as reported by teachers. Given the relatively few years of experience reported by these teachers (see chart T-2), perhaps the rapid changes experienced in curricula do not impact on these young teachers as they might do on an older population. **Chart T-24** relates to the impact on classroom teaching of external assessments. The variety of responses may well be related to the number of such assessments experienced in each jurisdiction, with approximately 30% or more of the teachers in British Columbia, Yukon, and Alberta reporting such a limitation and 5% or less in Prince Edward Island, New Brunswick anglophone, and Ontario (both anglophone and francophone).

VIEWS ON THE NATURE OF SCIENCE AND ON THE LEARNING OF SCIENCE

A four-point scale (strongly disagree, disagree, agree, strongly agree) was used to examine teacher opinions on a number of propositions about the nature and purposes of science teaching and learning and the role of home environment, talent, and ability in student learning.

The Nature of Science

Charts T-25, **T-26**, and **T-27** illustrate teachers' opinions on the teaching of science and the nature of science itself. The importance of concepts and principles over facts and rules is agreed upon almost universally, with about 80% of teachers in most jurisdictions agreeing that the learning of concepts and principles (T-25) is more important than facts and more than 80% in nearly all jurisdictions seeing science as a process, rather than a body of knowledge (T-26). About half of the teachers reporting, in most jurisdictions, feel that there is a set of basic facts and rules necessary for a true understanding of science (T-27).

Chart T-28 shows that many science teachers believe that science is generally more difficult than other subjects with over half of the teachers in Ontario anglophone and in Newfoundland and Labrador agreeing with this statement. **Charts T-29**, **T-30**, and **T-31** show that teachers generally agree that while talent can be helpful, if students work hard, they can succeed. A rather higher proportion of teachers who responded believe that streaming based on abilities should be implemented. **Chart T-32** shows that more teachers in Alberta, Ontario (anglophone and francophone), New Brunswick (anglophone and francophone), and Newfoundland and Labrador report this opinion than in other jurisdictions.

Classroom Activities

Teachers were asked to report the frequency of use of a fairly lengthy list of science learning and teaching activities that might be found in science classrooms, along with a few more general items of classroom practice.

Again, because of the large number of items, only a selection will be reported in chart form. However, this should be sufficient to reveal distinct jurisdictional and language differences in activities surrounding the teaching of science.

Chart T-33 shows that laboratory use seems to vary widely across jurisdictions. Most frequent reported use is in Yukon, British Columbia, Alberta, Manitoba anglophone and Ontario anglophone. **Chart T-34** shows the use of the laboratory for student experiments, which shows a wide variation, with highs and lows similar to those found in chart T-33. The highest reported use is in Quebec francophone, followed by Quebec anglophone, Ontario anglophone, and British Columbia. The least frequent use is reported by Nova Scotia francophone teachers. **Chart T-35** reports the use of teacher demonstrations, which is more evenly distributed. Differences in these two approaches may well reflect access to laboratory facilities for student enquiry.

Charts T-36 and **T-37** show that the use of field trips — and the use of outside experts — is rarely used in any jurisdiction. Yukon shows rather more use of these resources than most. It may be that the rarity of field trips in particular, a very valuable resource, reflects a combination of factors such as the increased concern for student safety and teacher liability, as well as an increasingly demanding and challenging curriculum.

Student Assessment

Teachers use a variety of different ways of assessing students' work, including tests, homework, and other forms of formal assignments, as well as informal techniques such as observation and student participation. The increased emphasis on the use of assessment as a learning and teaching tool is no doubt reflected in the data reported by this sample of teachers.

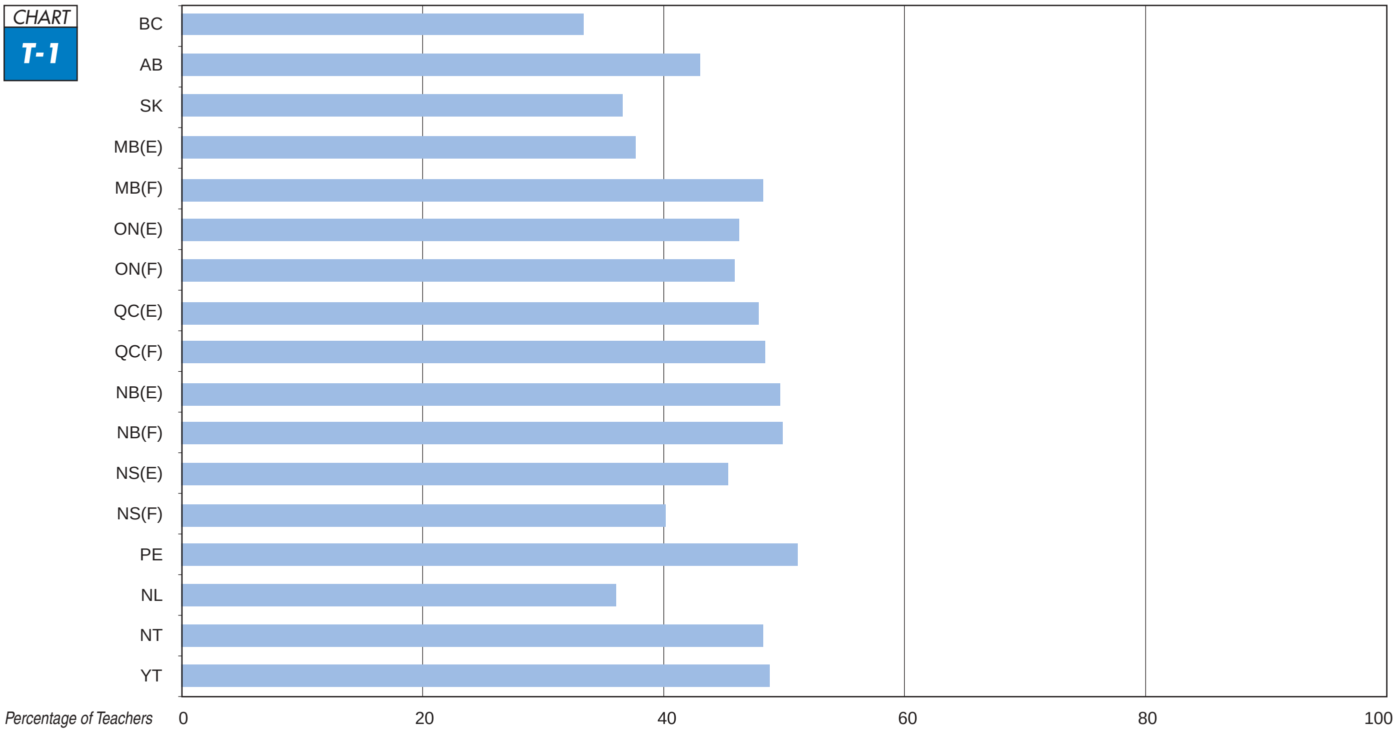
Chart T-38 shows that many teachers use a fairly wide range of scores for computing final marks. Fewer teachers in Quebec francophone, Ontario francophone, and New Brunswick francophone report using ten or more scores. Similar distribution is shown in **chart T-39**, which gives a snapshot of the marking load of teachers. The highest percentages are reported by teachers from Yukon, British Columbia, and Alberta.

The type of summative assessments reported is shown in **chart T-40**. In most cases, teachers report a more frequent use of tests requiring written responses.

Strategies used in other assessment methods show a wide variation. Examples of the data reported by these teachers appear in **charts T-41** to **T-45**. In nearly all jurisdictions, over half of teachers reported giving considerable weight to projects or laboratory work, with a range from 41% in Newfoundland and Labrador to 80% in Ontario anglophone. The contribution of homework to marks varied widely, with no apparent pattern emerging, but was highest in Manitoba francophone, Nova Scotia francophone, and Yukon. However, the use of more affective elements such as self-assessment, improvement, and attendance seemed to indicate that francophone populations favour these factors more than anglophone populations.

Percentage of science teachers who are female

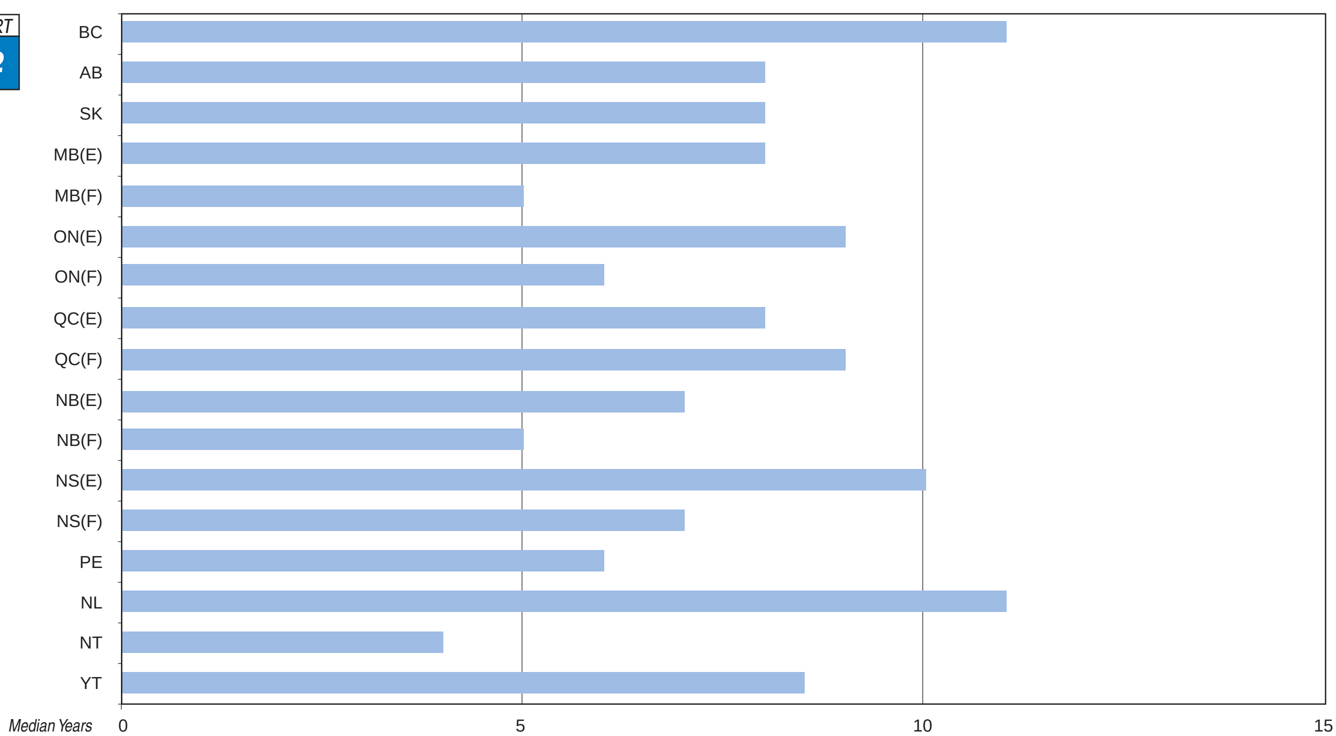
CHART T-1



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Female	33	43	36	37	48	46	46	48	48	50	50	45	40	51	36	48	49

Median number of years of experience teaching science, including this year

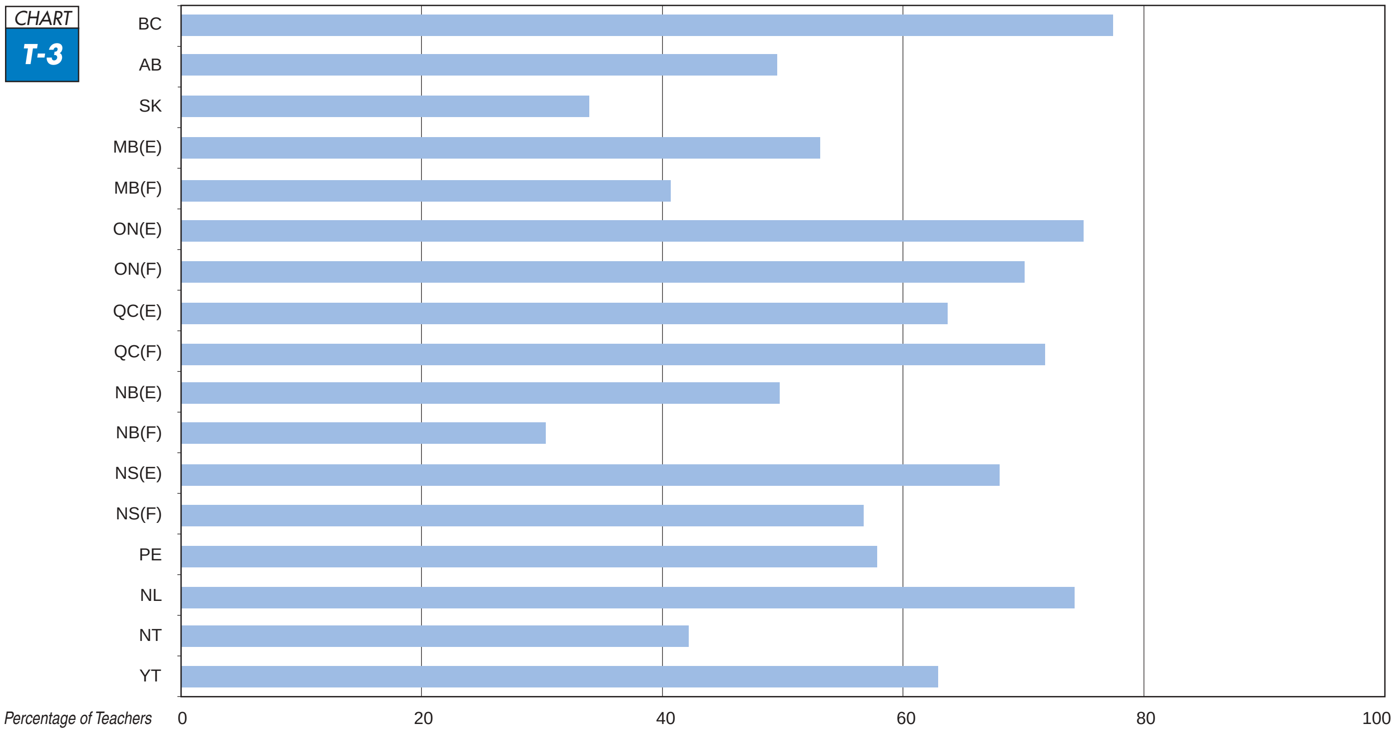
CHART T-2



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Median	11	8	8	8	5	9	6	8	9	7	5	10	7	6	11	4	9

Percentage of teachers holding a BSc or equivalent

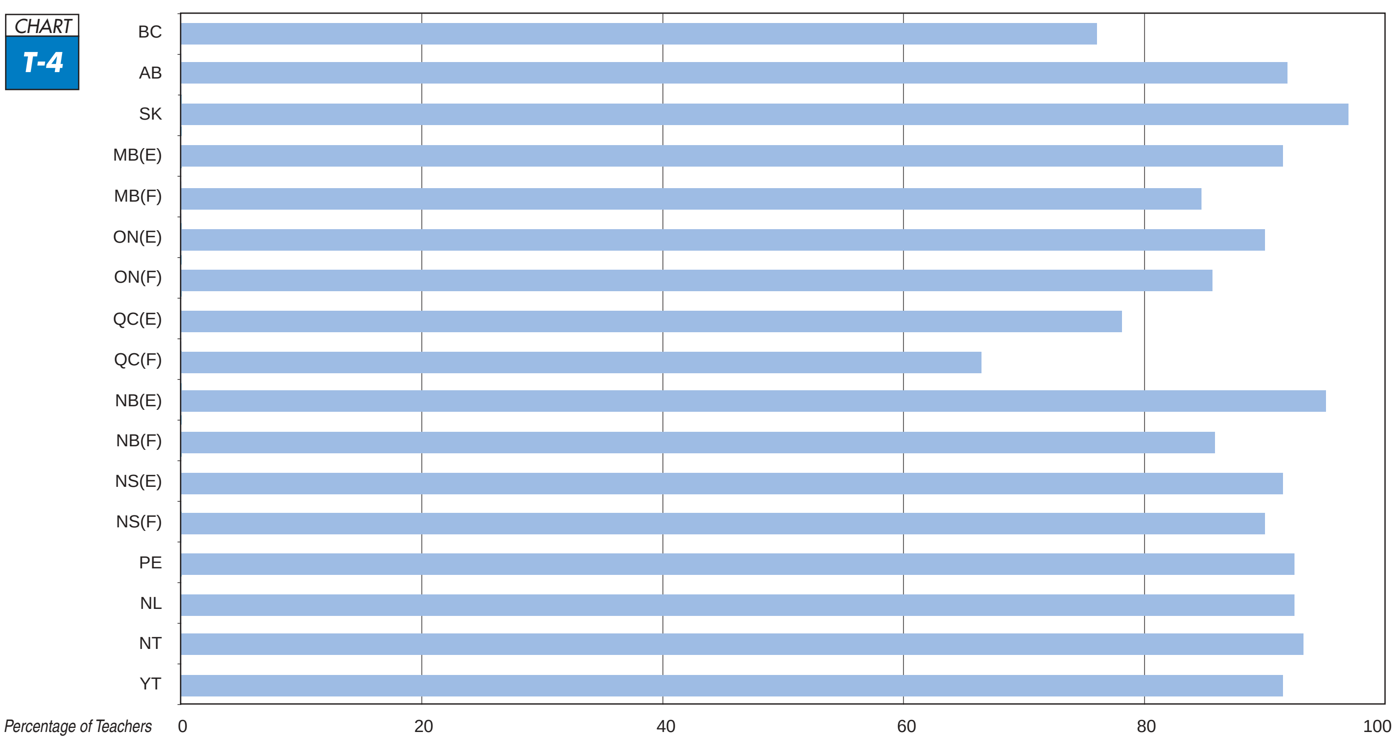
CHART **T-3**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Holding a BSc or equivalent	77	49	34	53	41	75	70	64	72	50	30	68	57	58	74	42	63

Percentage of teachers holding a BEd or equivalent (i.e., at least a year of teacher training)

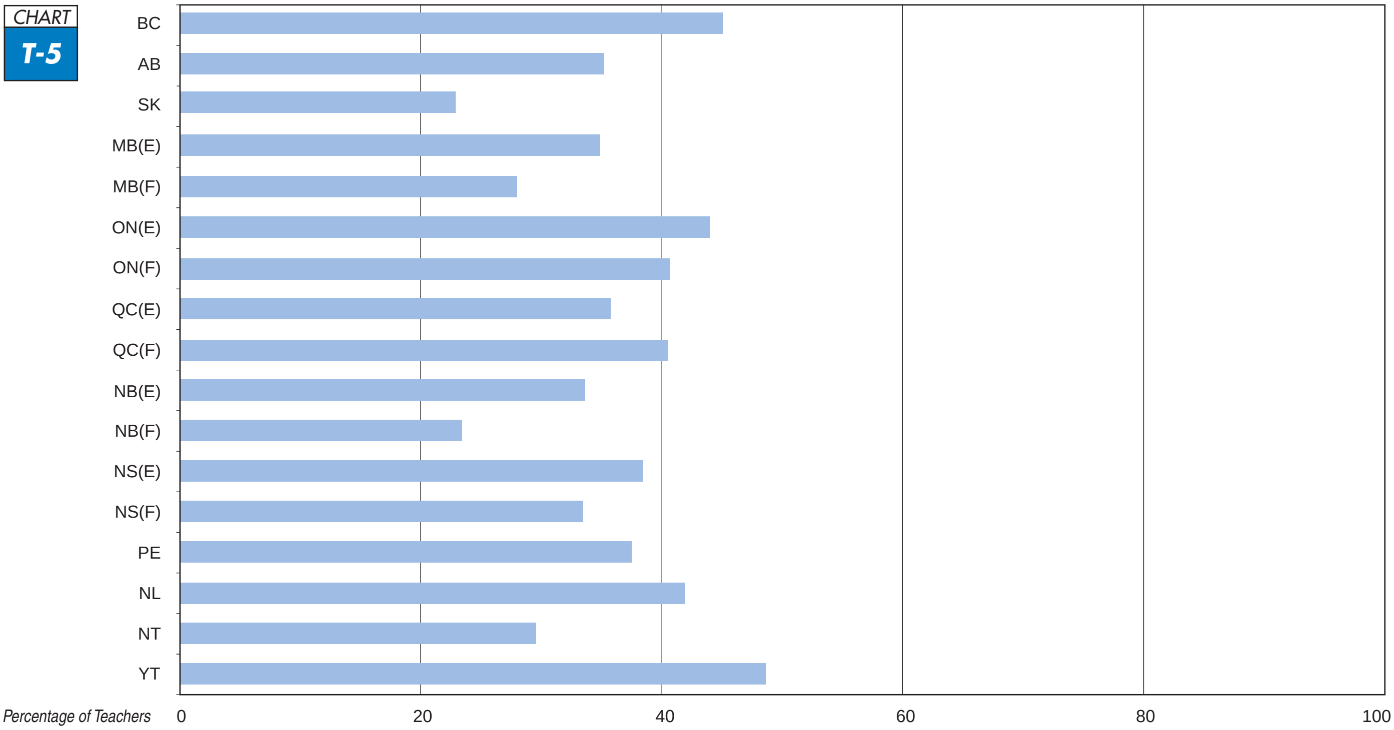
CHART **T-4**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Holding a BEd or equivalent	76	92	97	91	85	90	86	78	66	95	86	92	90	93	92	93	91

Percentage of teachers holding a BSc degree or higher in science with a major or concentration in biology

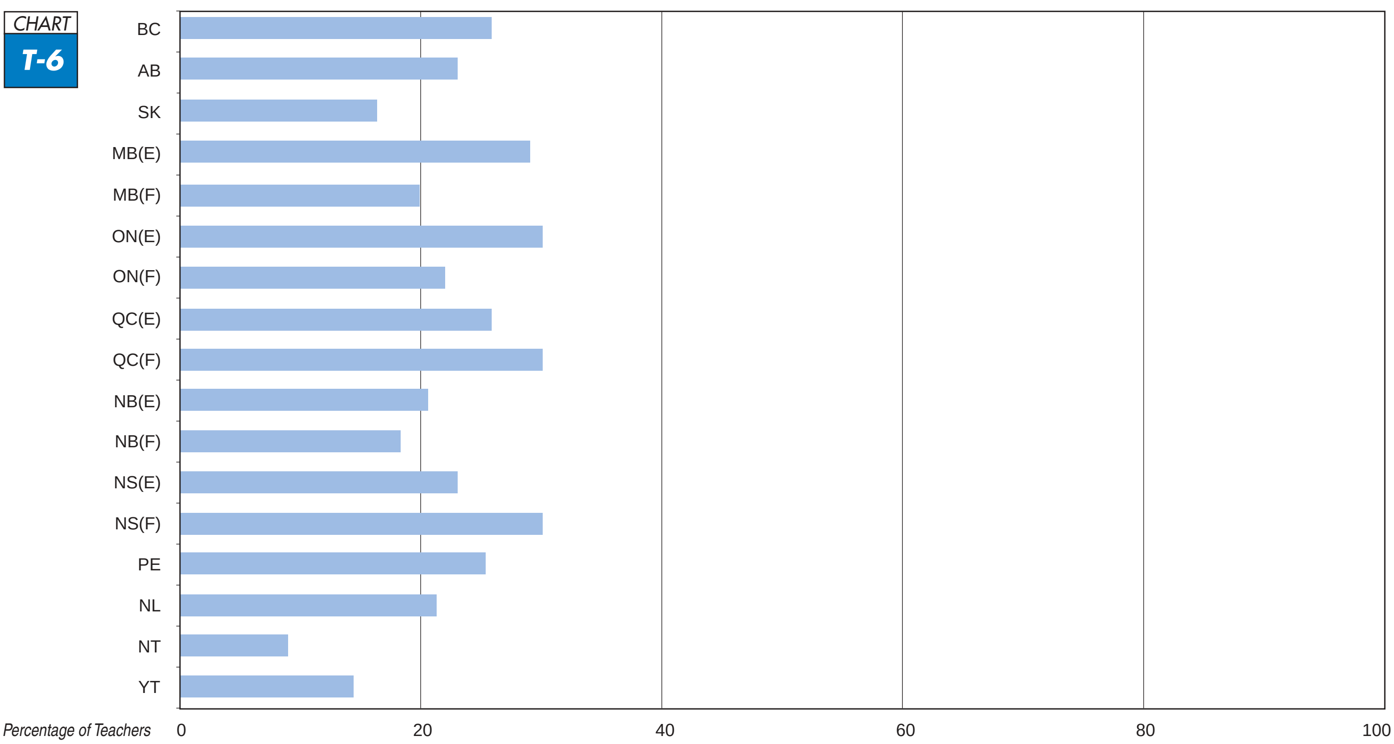
CHART **T-5**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Holds degree	45	35	23	35	28	44	40	36	40	34	23	38	33	37	42	29	49

Percentage of teachers holding a BSc degree or higher in science with a major or concentration in chemistry or biochemistry

CHART **T-6**



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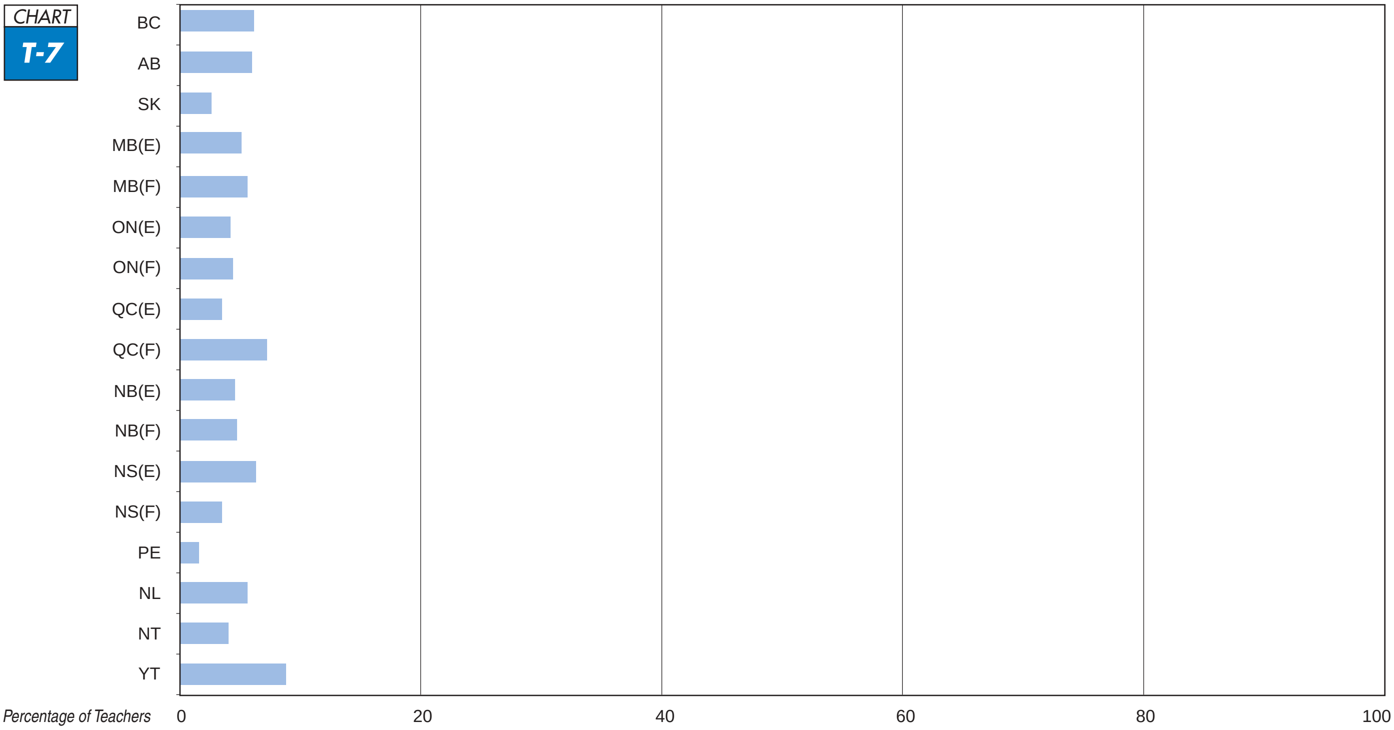
Holds degree	26	23	16	29	20	30	22	26	30	20	18	23	30	25	21	9	14

Percentage of teachers holding a BSc degree or higher in science with a major in earth science

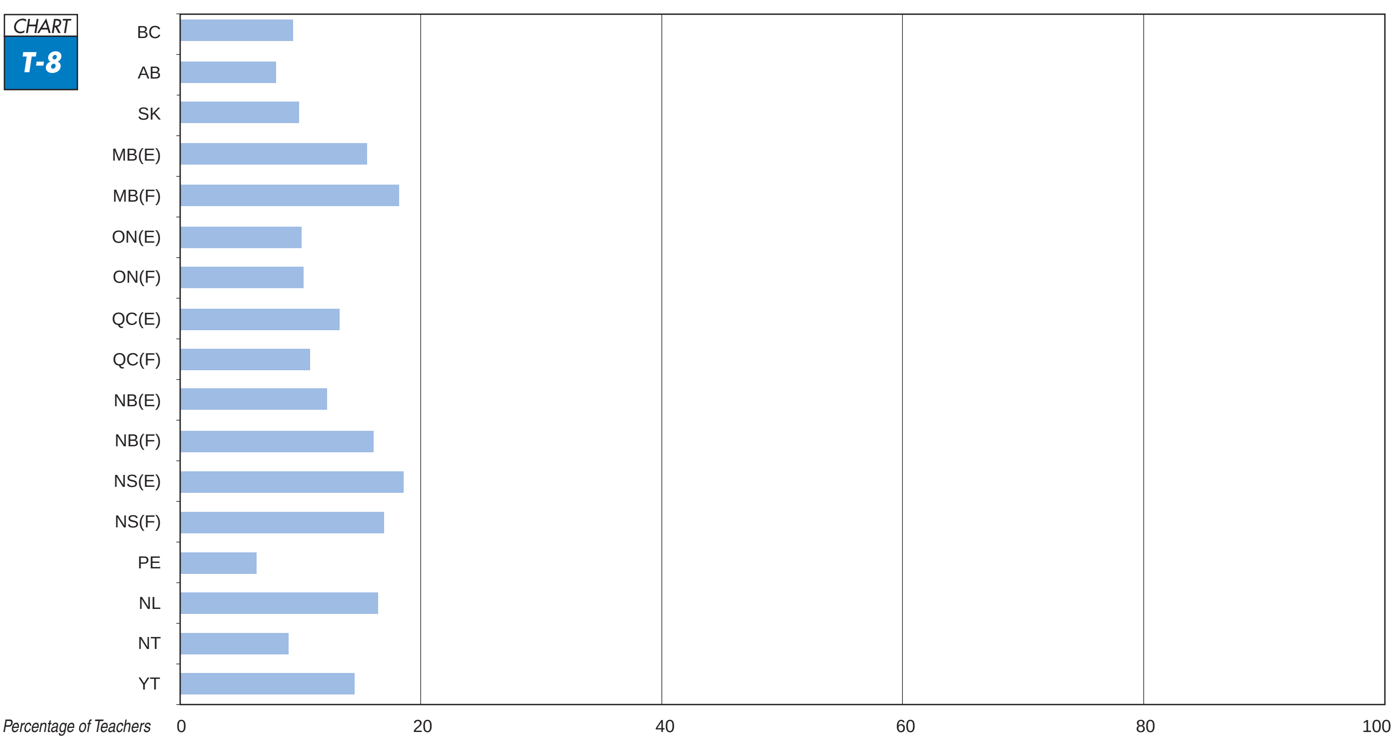
CHART T-7



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Holds degree	6	6	2	5	5	4	4	3	7	4	5	6	3	1	5	4	9

Percentage of teachers holding a BSc degree or higher in science with a major or concentration in mathematics

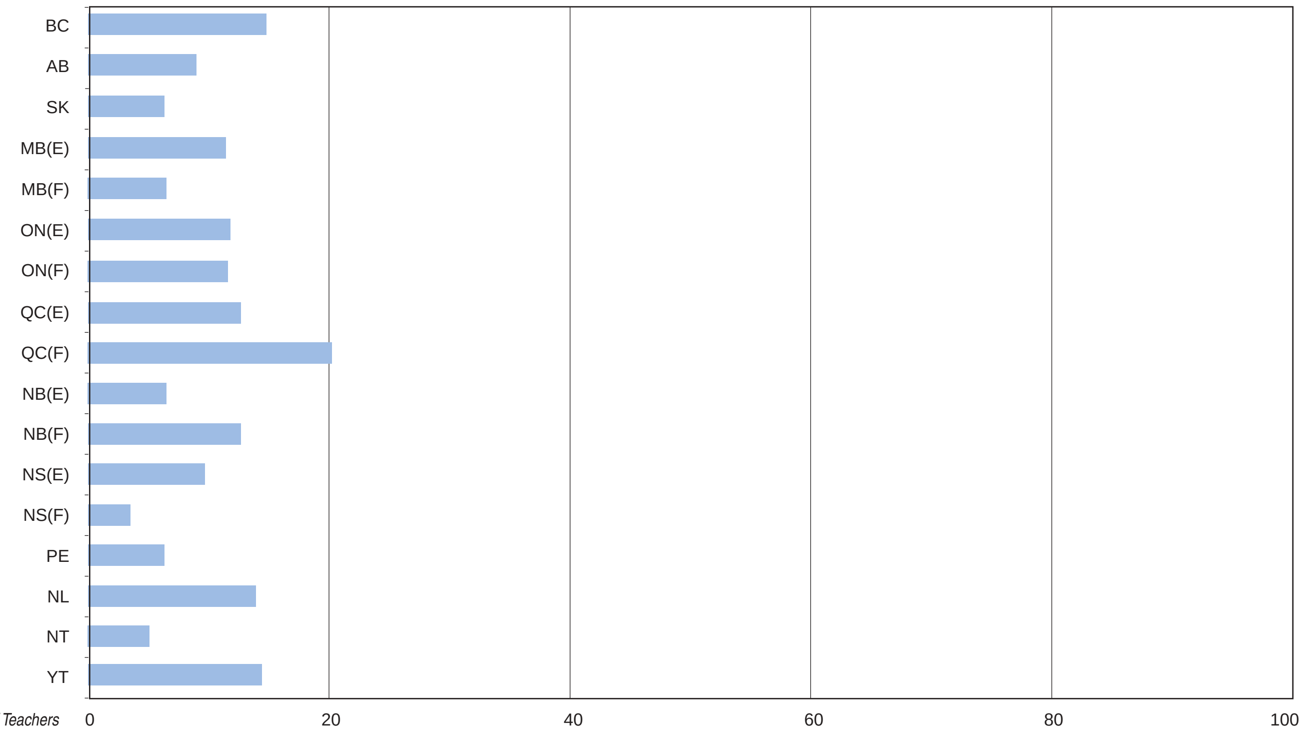
CHART T-8



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Holds degree	9	8	10	15	18	10	10	13	11	12	16	18	17	6	16	9	14

Percentage of teachers holding a BSc degree or higher in science with a major or concentration in physics

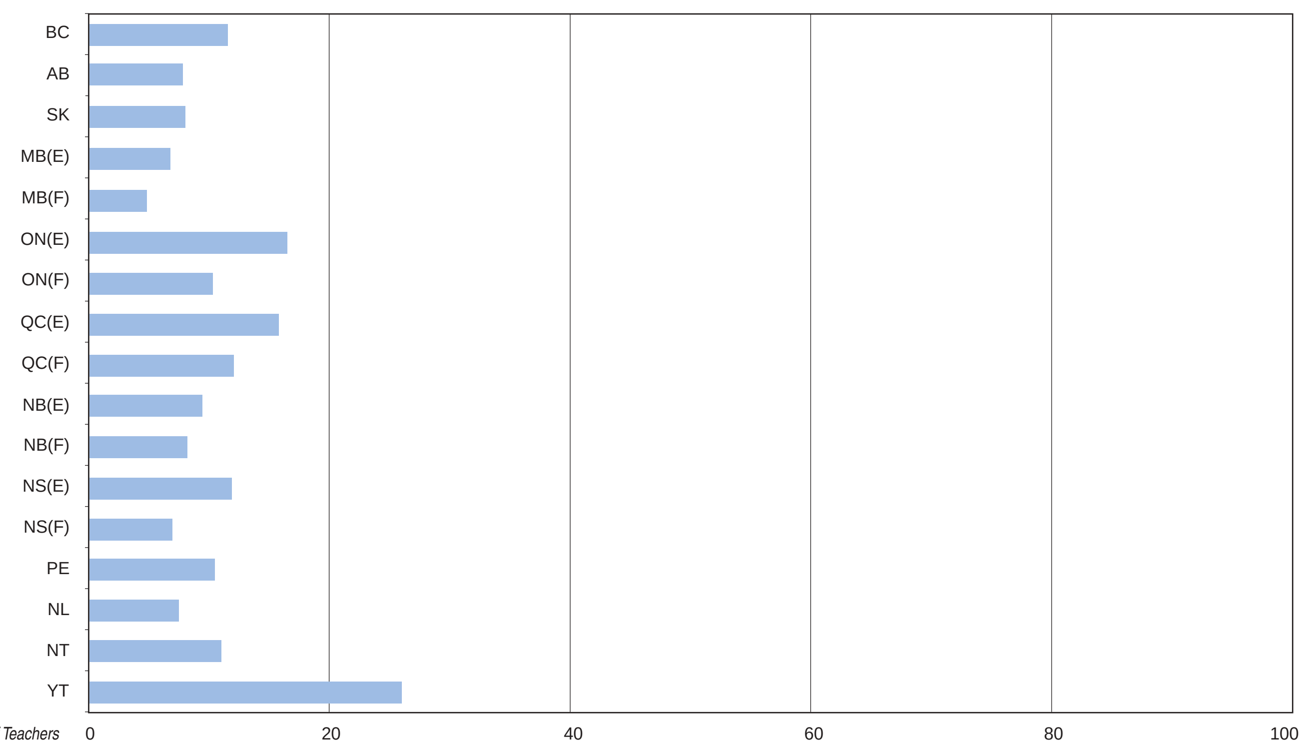
CHART T-9



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Holds degree	15	9	6	11	6	12	11	12	20	6	13	9	3	6	14	5	14

Percentage of teachers holding a BSc degree or higher in science with a major or concentration in computer science or equivalent or other science

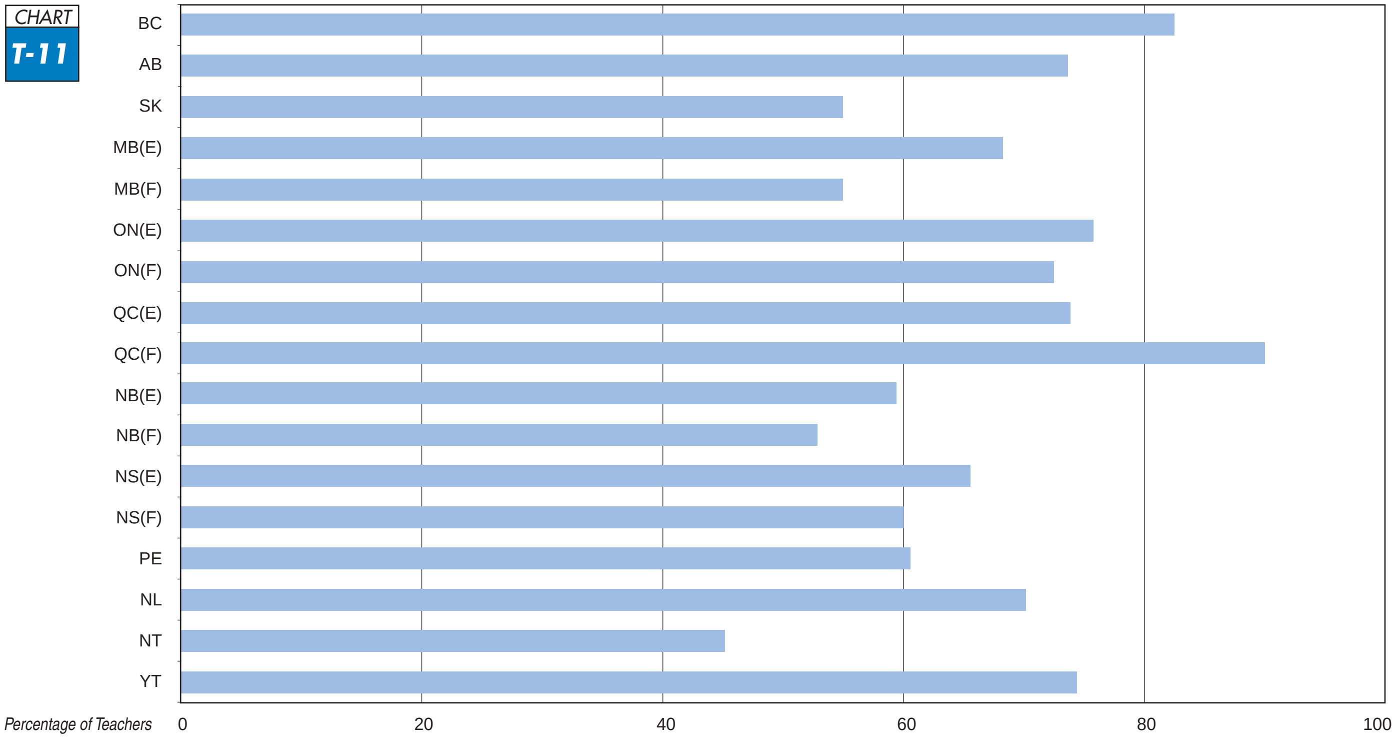
CHART T-10



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Holds degree	11	8	8	7	5	16	10	16	12	9	8	12	7	10	7	11	26

Percentage of teachers reporting that they consider themselves specialists in science and prefer to teach mainly in this area

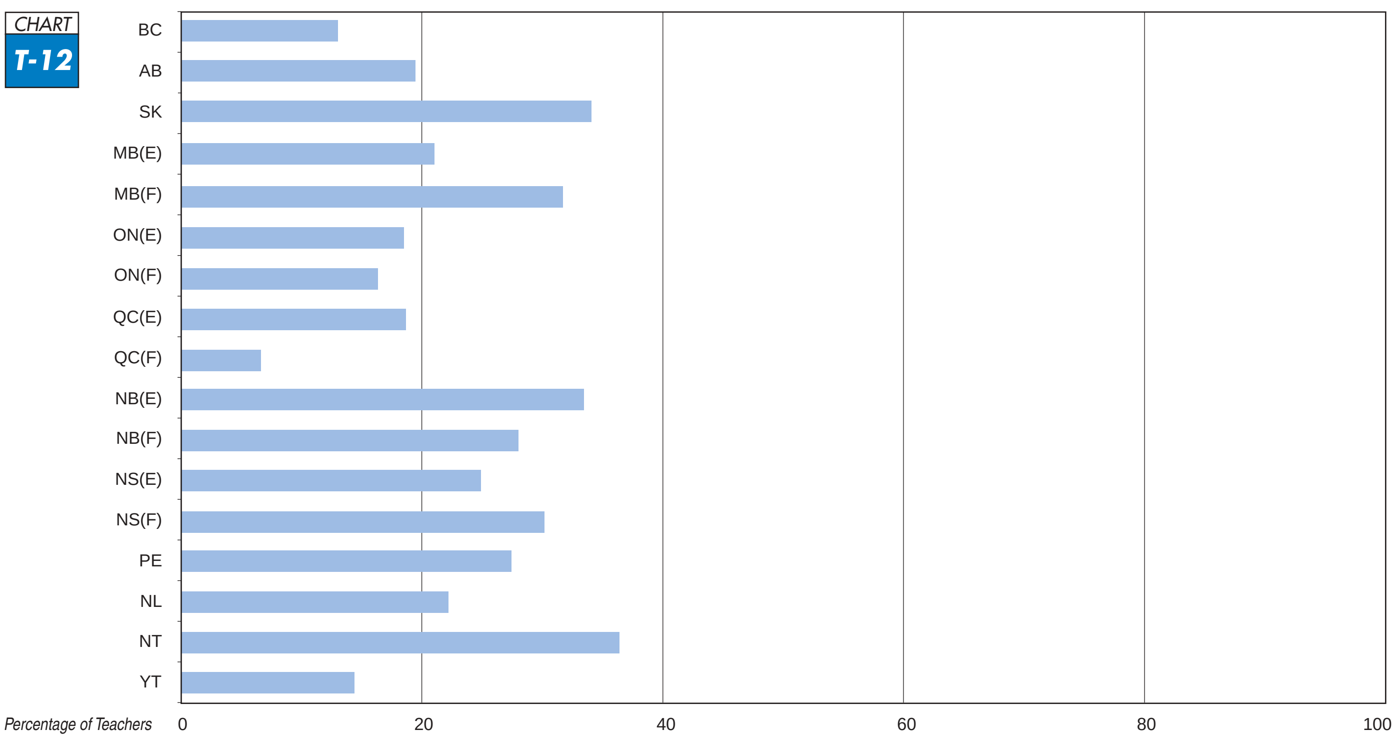
CHART
T-11



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Consider themselves specialists	82	74	55	68	55	76	72	74	90	59	53	66	60	61	70	45	74

Percentage of teachers reporting that they consider themselves quite capable of teaching science but would prefer to teach other subjects

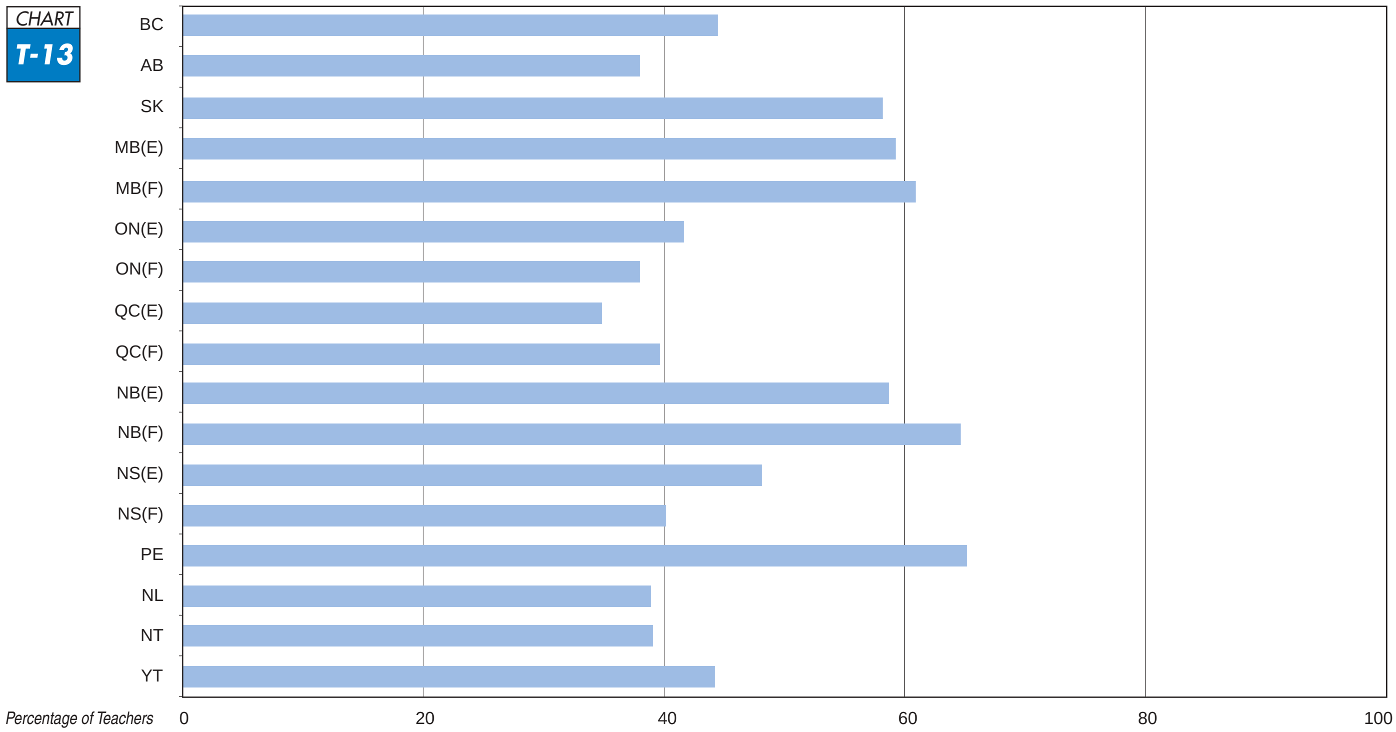
CHART
T-12



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite capable of teaching science	13	19	34	21	32	18	16	19	6	33	28	25	30	27	22	36	14

Percentage of teachers who agree or strongly agree that society generally appreciates the work of teachers

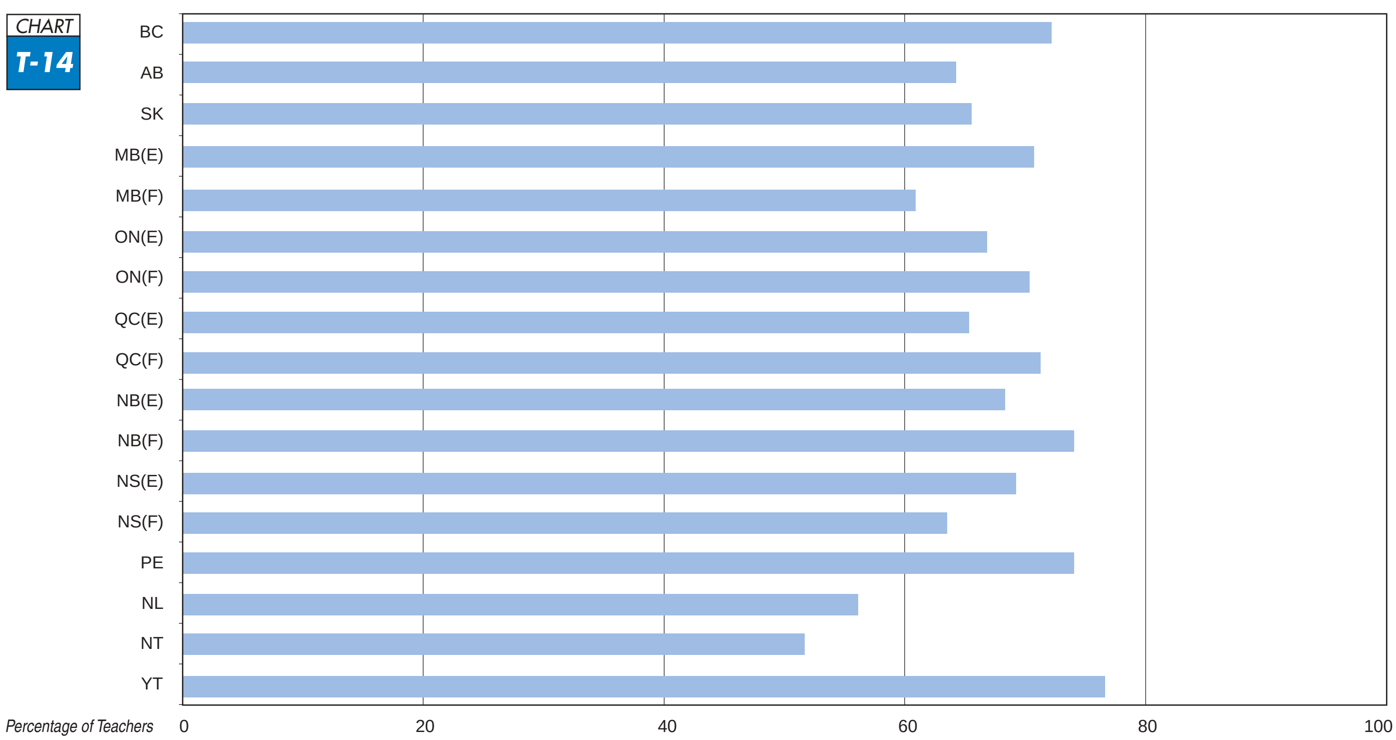
CHART **T-13**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	44	38	58	59	61	42	38	35	40	59	65	48	40	65	39	39	44

Percentage of teachers who agree or strongly agree that students generally appreciate the work of teachers

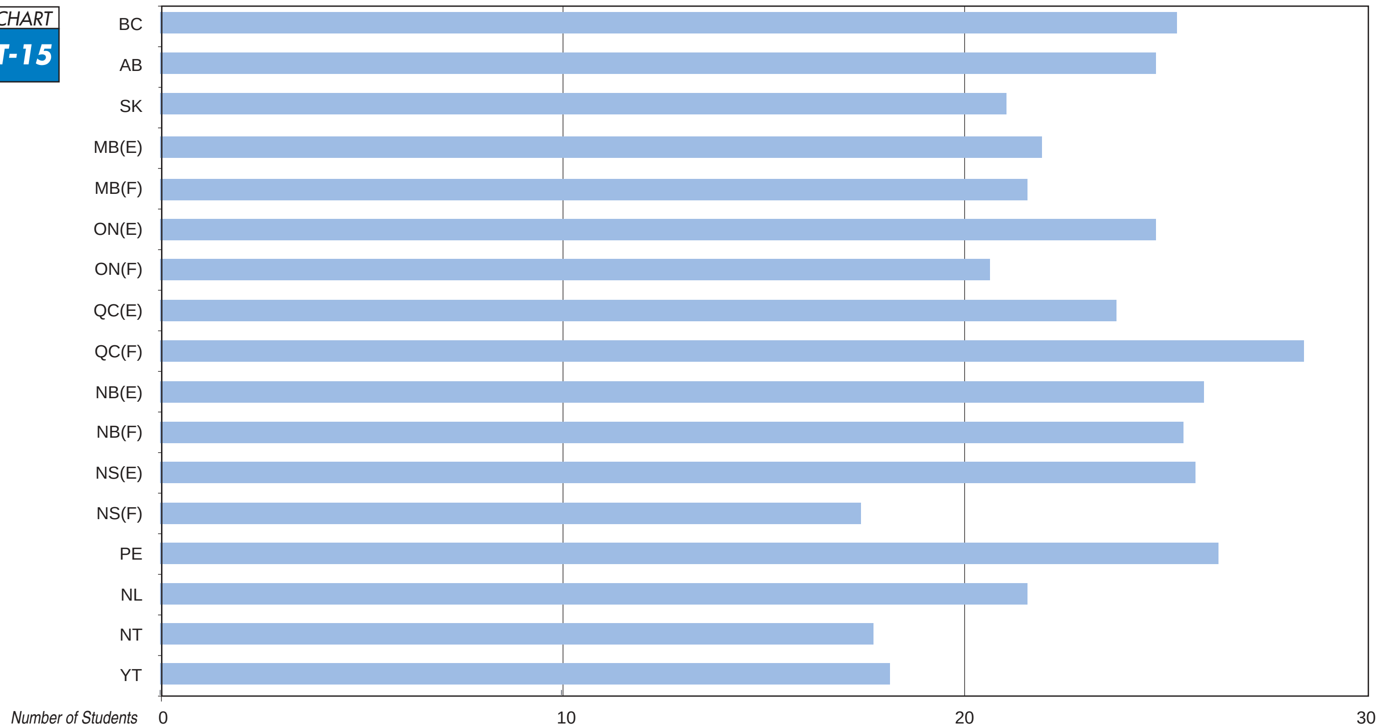
CHART **T-14**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	72	64	65	71	61	67	70	65	71	68	74	69	63	74	56	52	76

Average number of students in the science classes this year

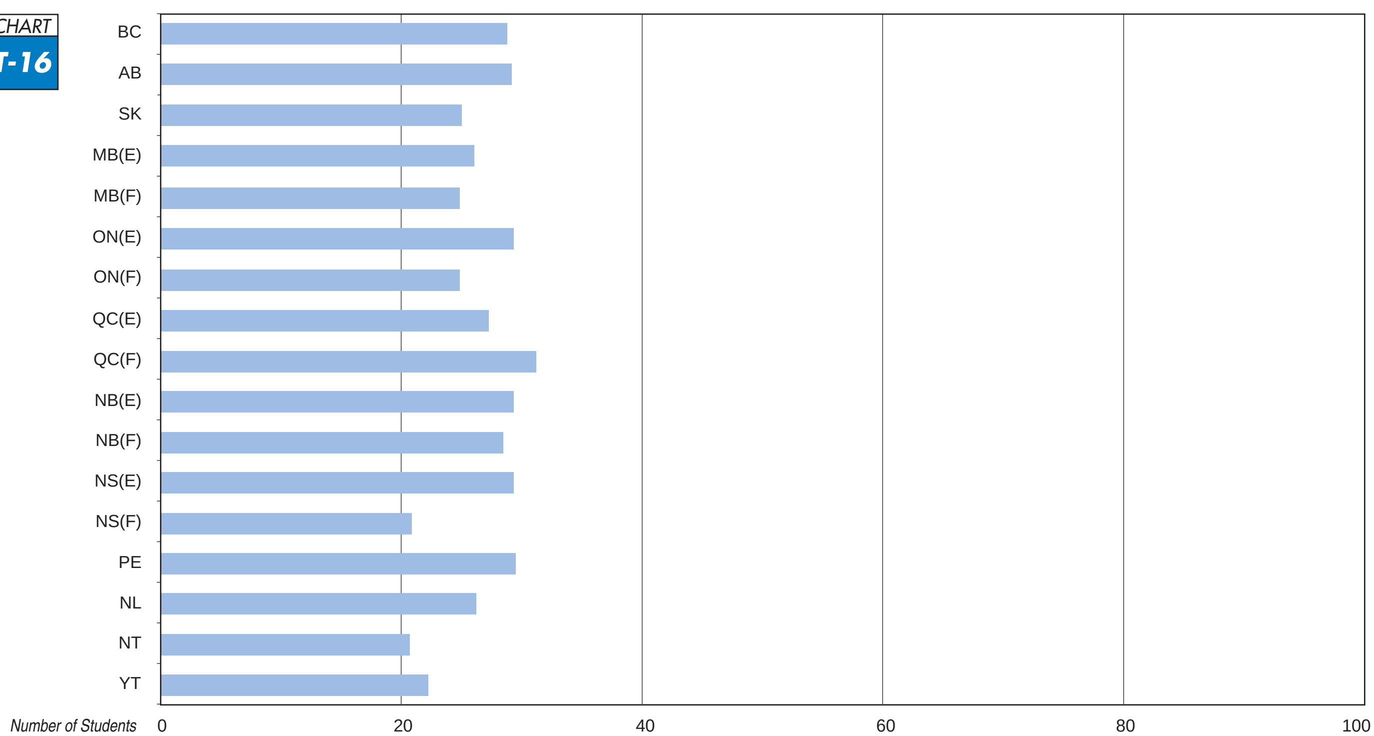
CHART T-15



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Average	25	25	21	22	22	25	21	24	28	26	25	26	17	26	22	18	18

Average largest number of students in any science class

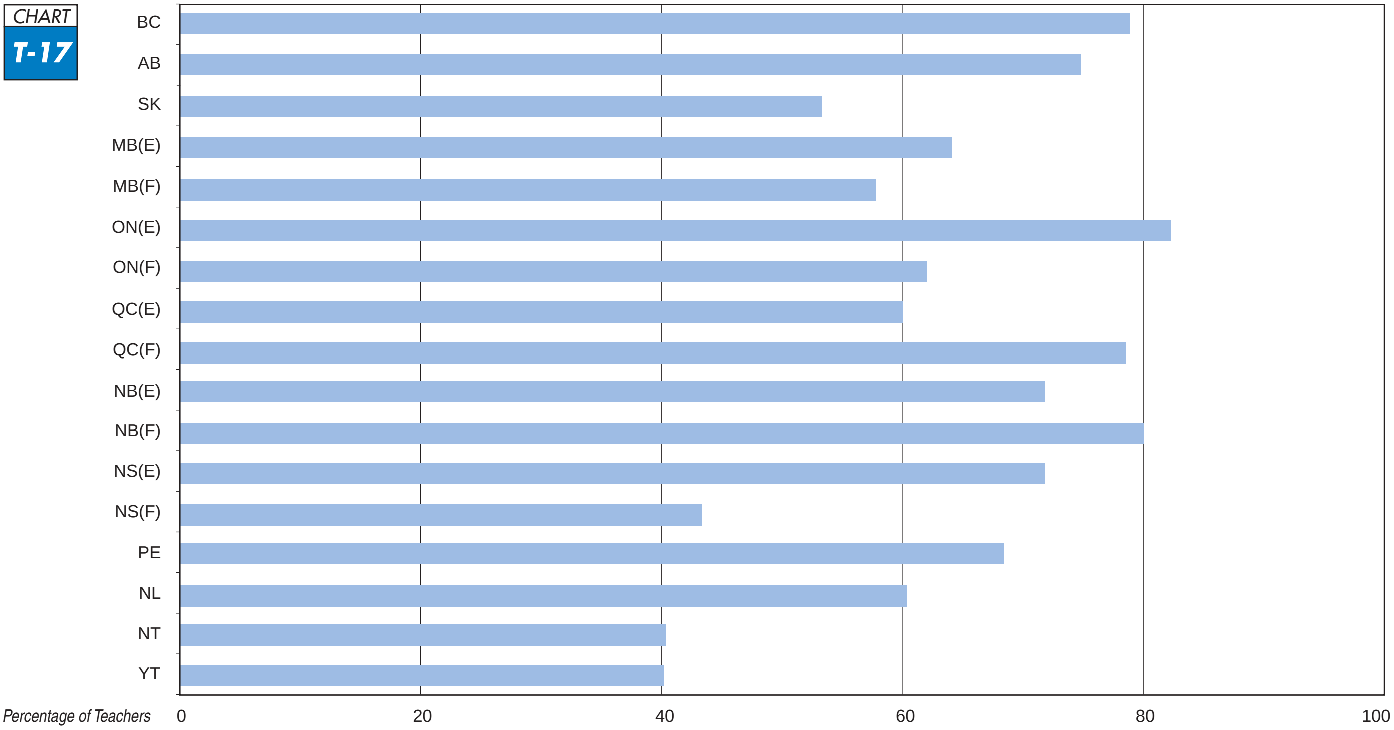
CHART T-16



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Average	29	29	25	26	25	29	25	27	31	29	28	29	21	29	26	20	22

Percentage of teachers reporting that large class sizes limit or restrict how they teach science classes

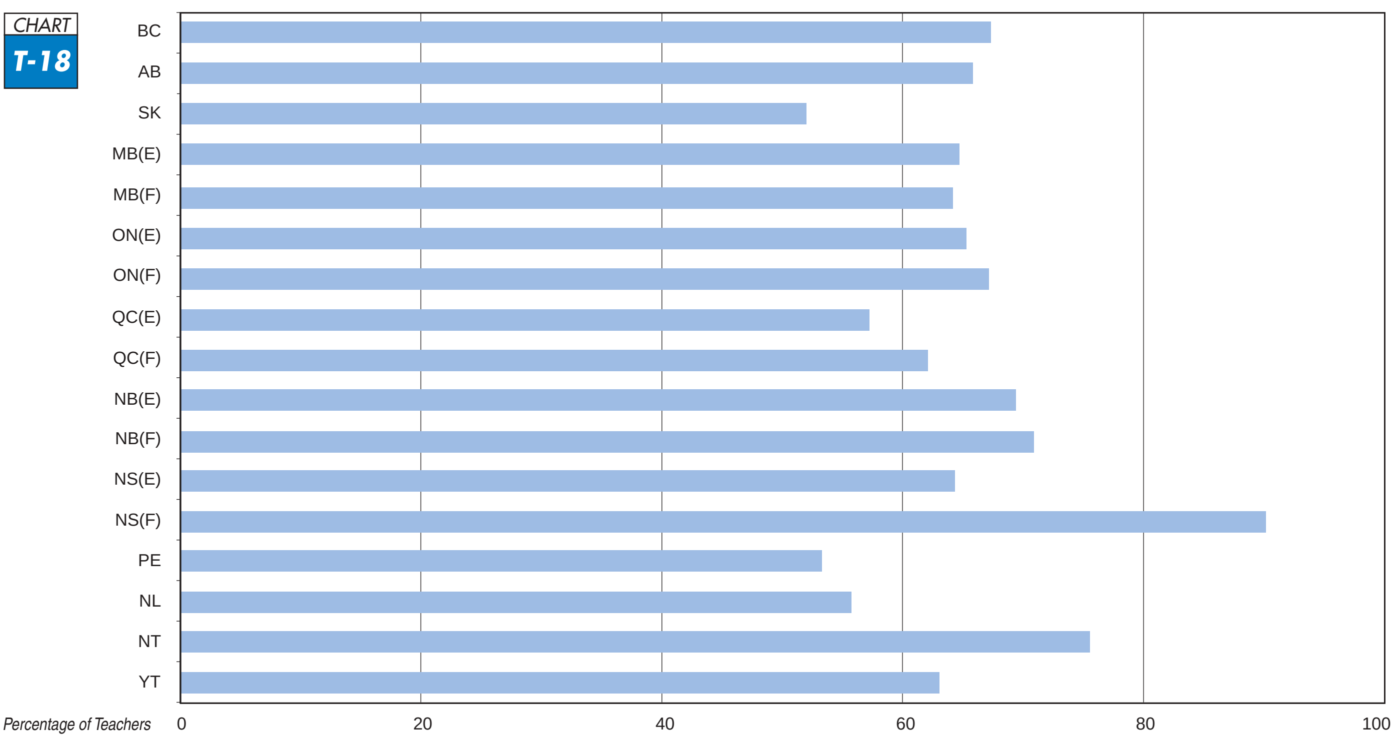
CHART T-17



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	79	75	53	64	58	82	62	60	78	72	80	72	43	68	60	40	40

Percentage of teachers reporting that the range of differences in students' backgrounds limits or restricts how they teach science classes

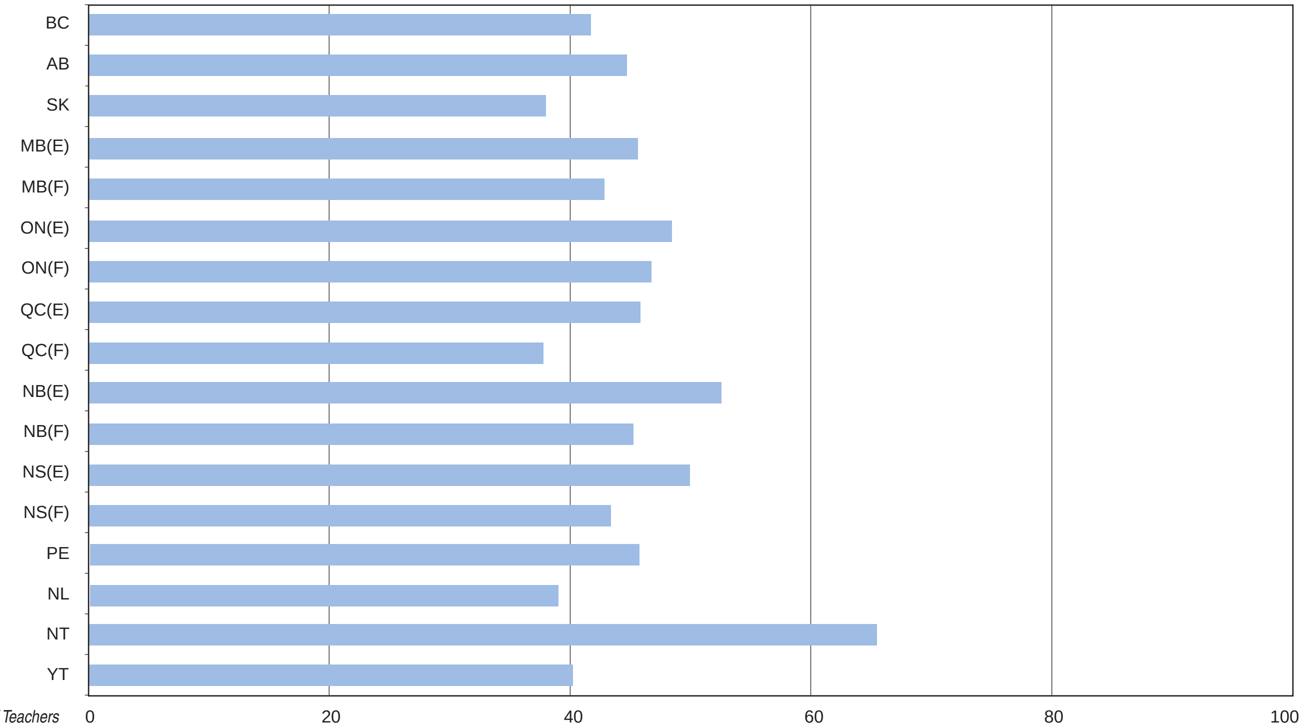
CHART T-18



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	67	66	52	65	64	65	67	57	62	69	71	64	90	53	56	75	63

Percentage of teachers reporting that the range of student abilities in the class limits or restricts how they teach science classes

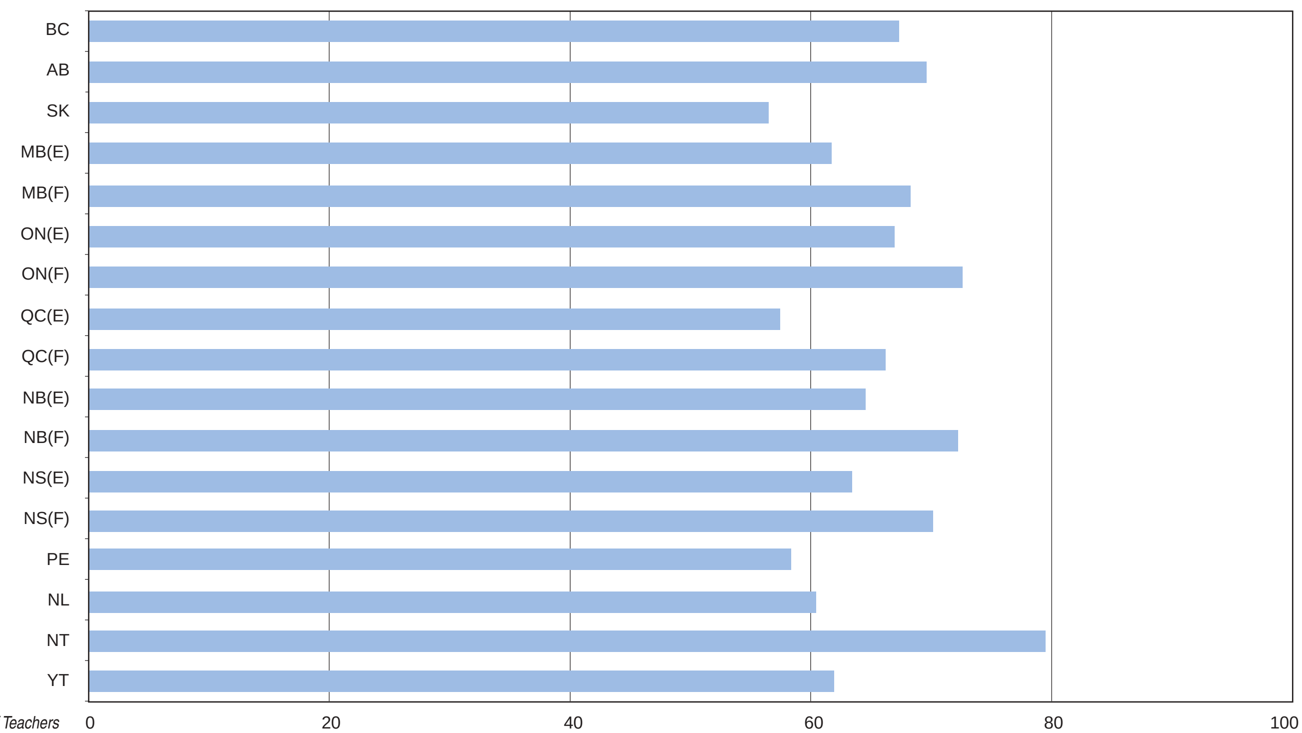
CHART
T-19



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	42	45	38	45	43	48	47	46	38	52	45	50	43	46	39	65	40

Percentage of teachers reporting that the presence of students with special needs limits or restricts how they teach science classes

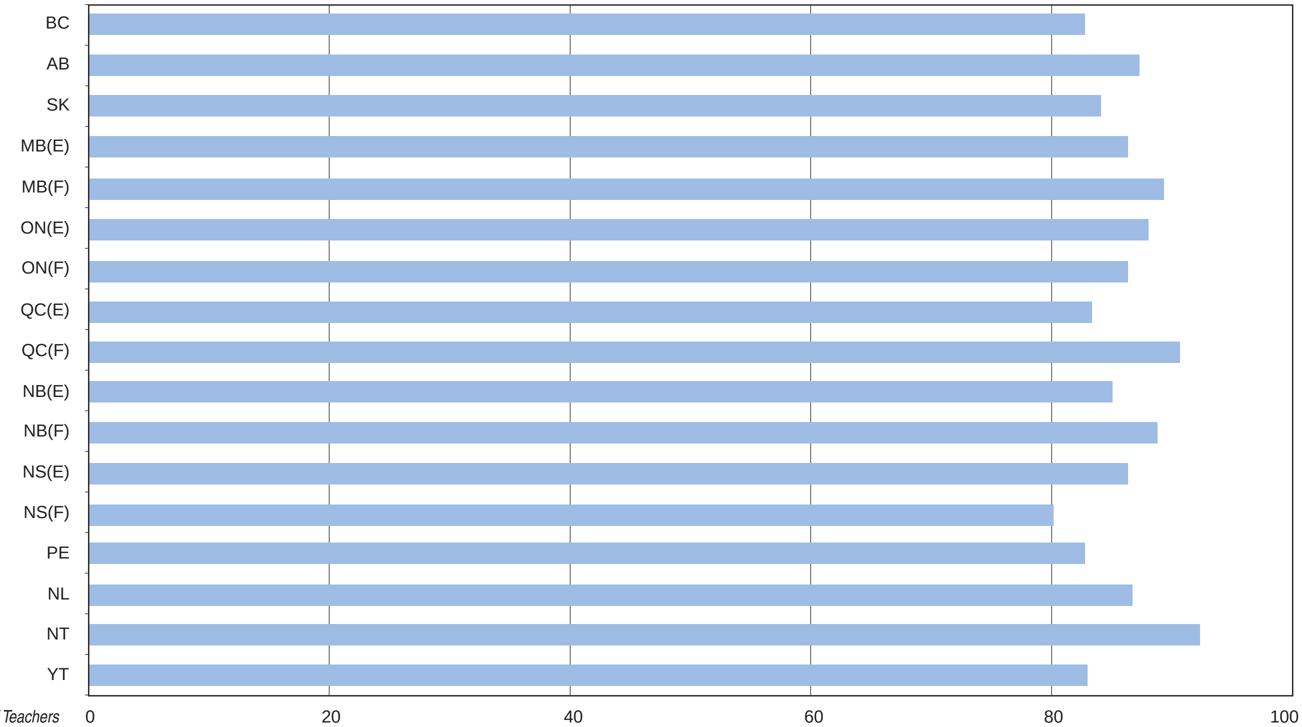
CHART
T-20



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	67	70	56	62	68	67	72	57	66	64	72	63	70	58	60	79	62

Percentage of teachers reporting that uninterested students limit or restrict how they teach science classes

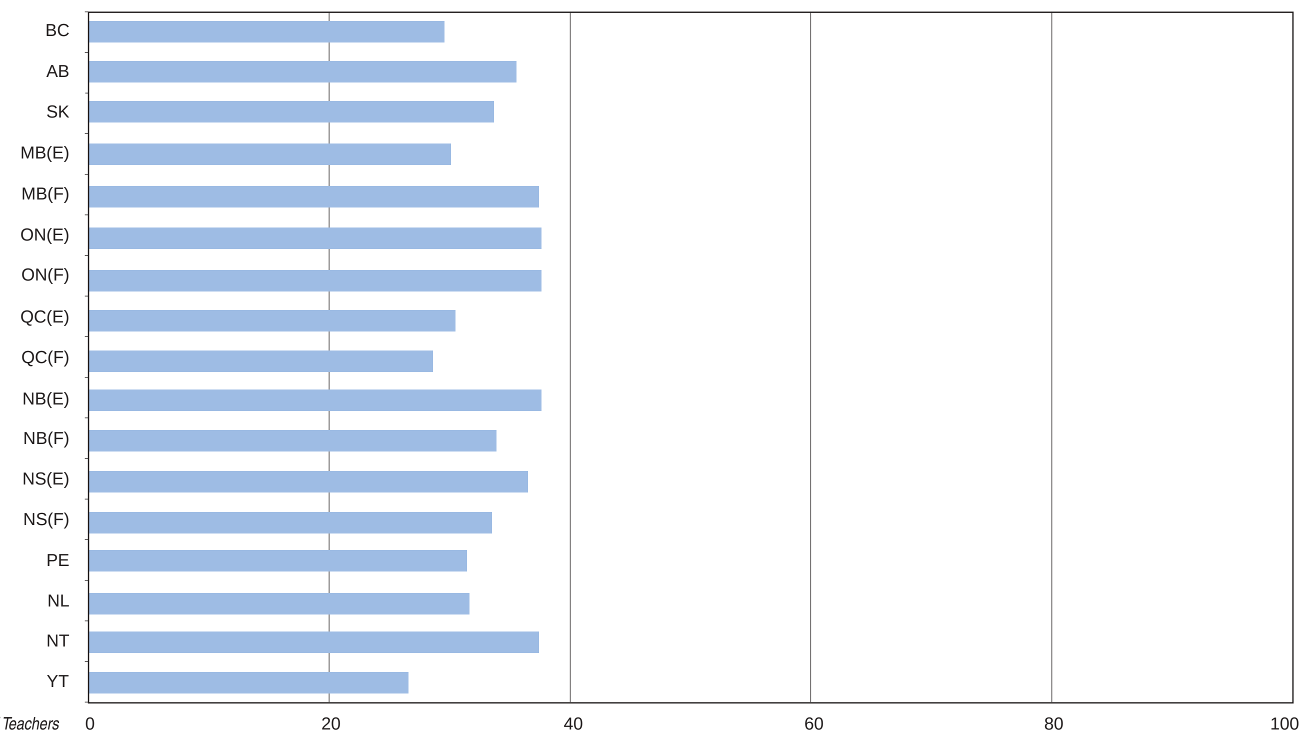
CHART **T-21**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	83	87	84	86	89	88	86	83	90	85	89	86	80	83	86	92	83

Percentage of teachers reporting that shortage of materials or equipment limits or restricts how they teach science classes

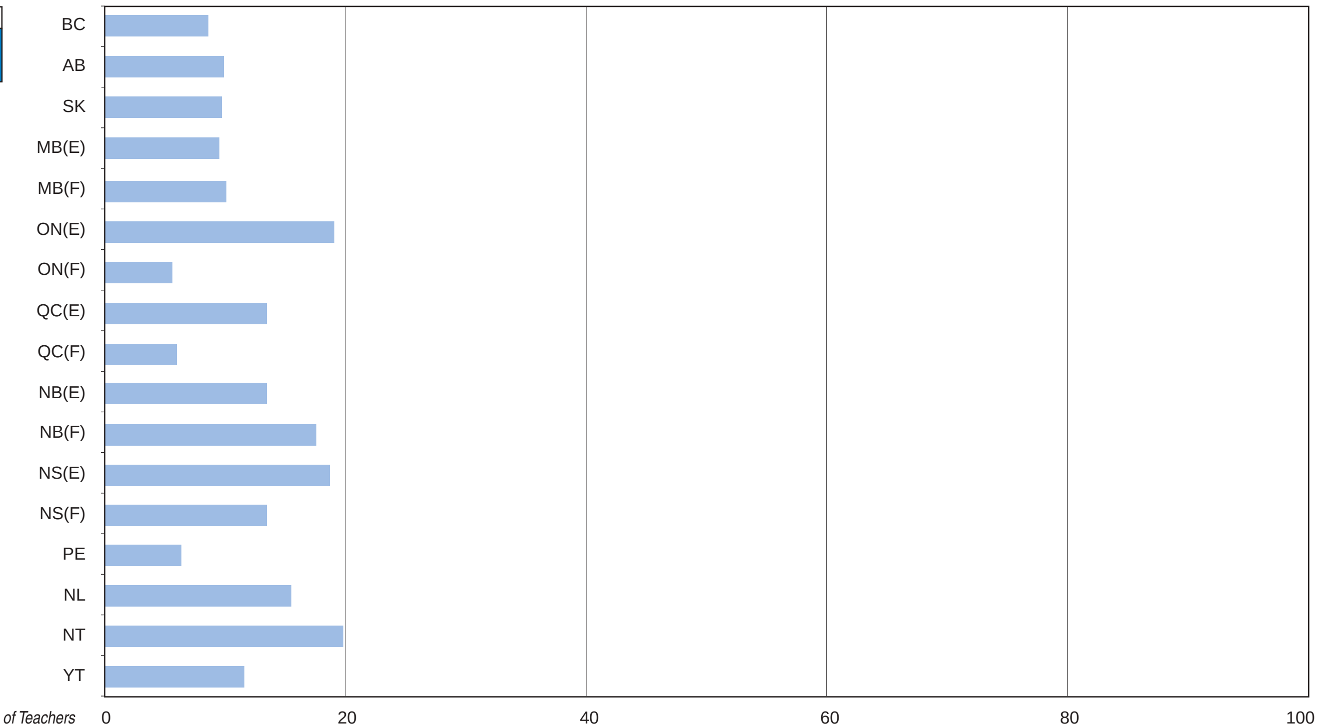
CHART **T-22**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	29	35	34	30	37	38	37	30	28	38	34	36	33	31	31	37	26

Percentage of teachers reporting that the lack of in-service with respect to the curriculum limits or restricts how they teach science classes

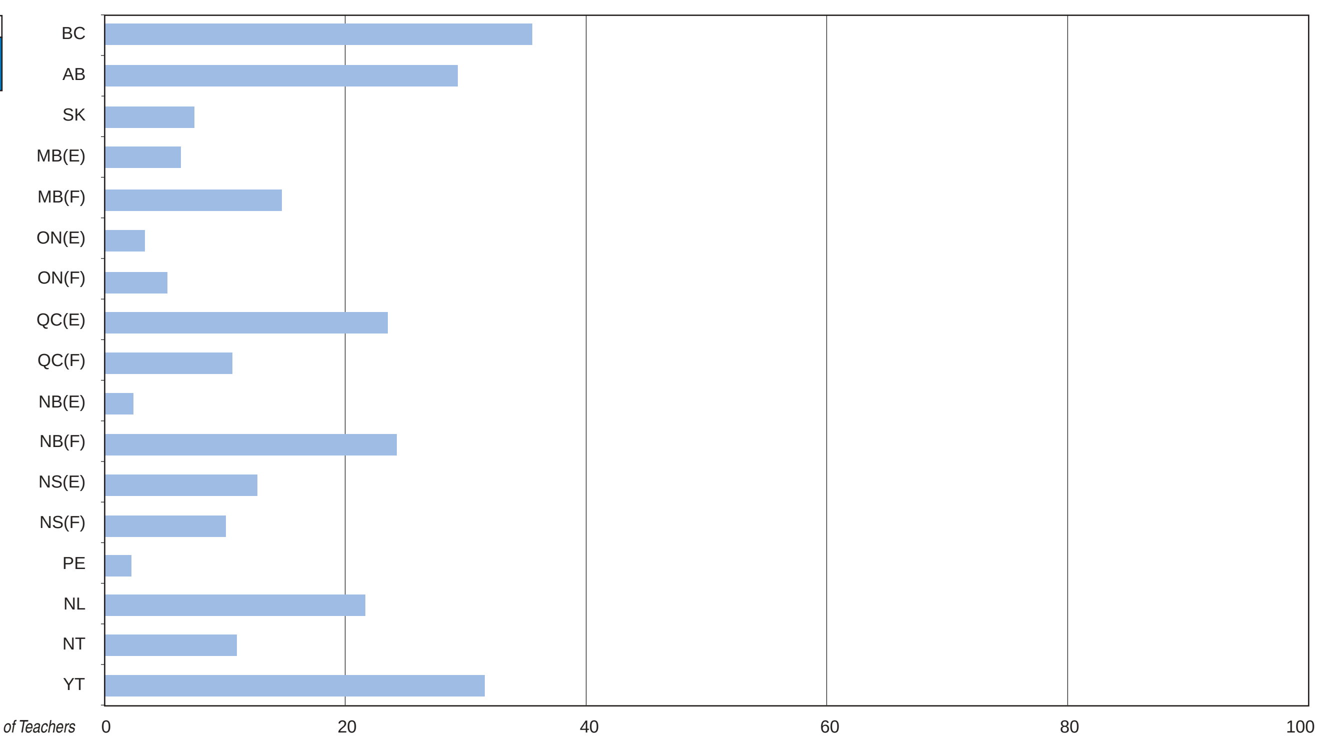
CHART
T-23



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	8	10	9	9	10	19	5	13	6	13	17	18	13	6	15	20	11

Percentage of teachers reporting that external examinations or standardized tests limit or restrict how they teach their science classes

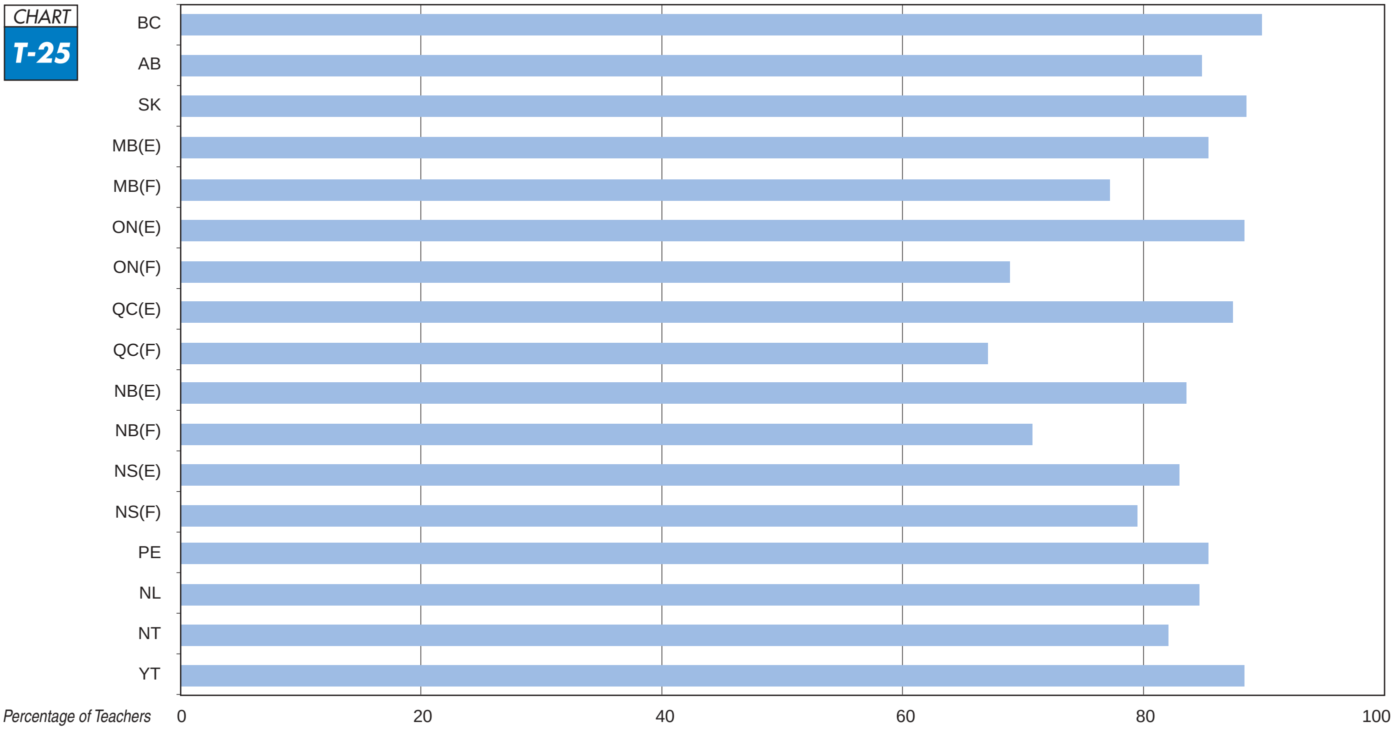
CHART
T-24



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	35	29	7	6	15	3	5	23	11	2	24	13	10	2	22	11	31

Percentage of teachers who agree or strongly agree that learning scientific concepts and principles is more important than learning facts and rules

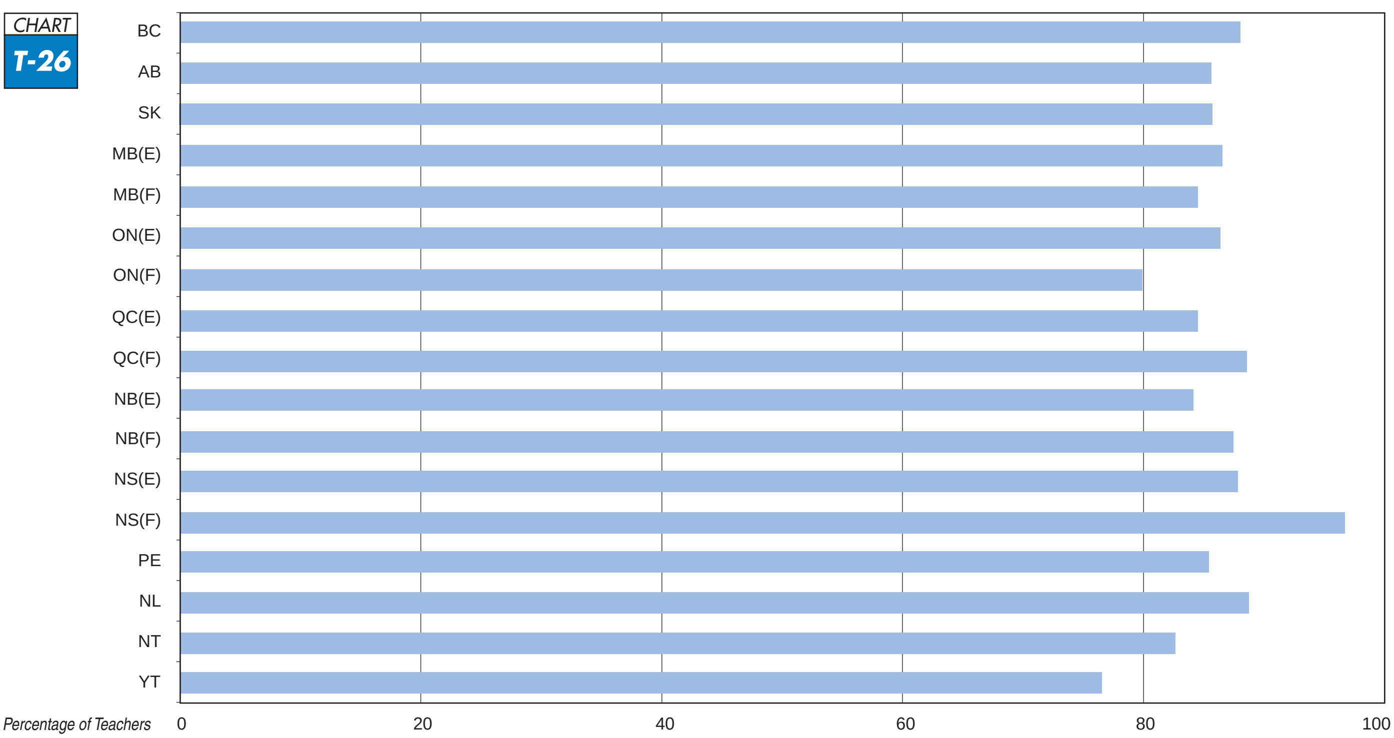
CHART T-25



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	90	85	88	85	77	88	69	87	67	83	71	83	79	85	84	82	88

Percentage of teachers who agree or strongly agree that science is better thought of as a process than as a body of knowledge and concepts

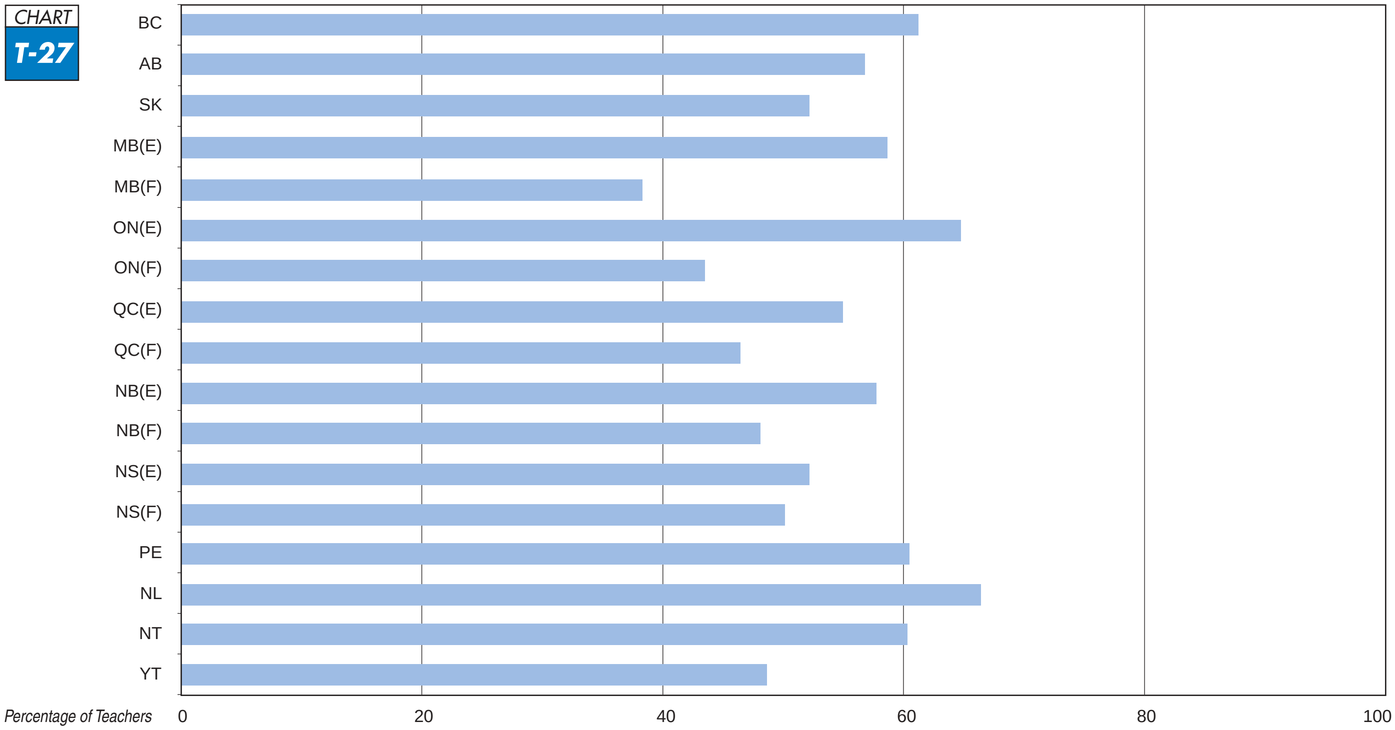
CHART T-26



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	88	86	86	87	84	86	80	84	89	84	87	88	97	85	89	83	76

Percentage of teachers who agree or strongly agree that a true understanding of science takes place only after students learn basic facts and rules

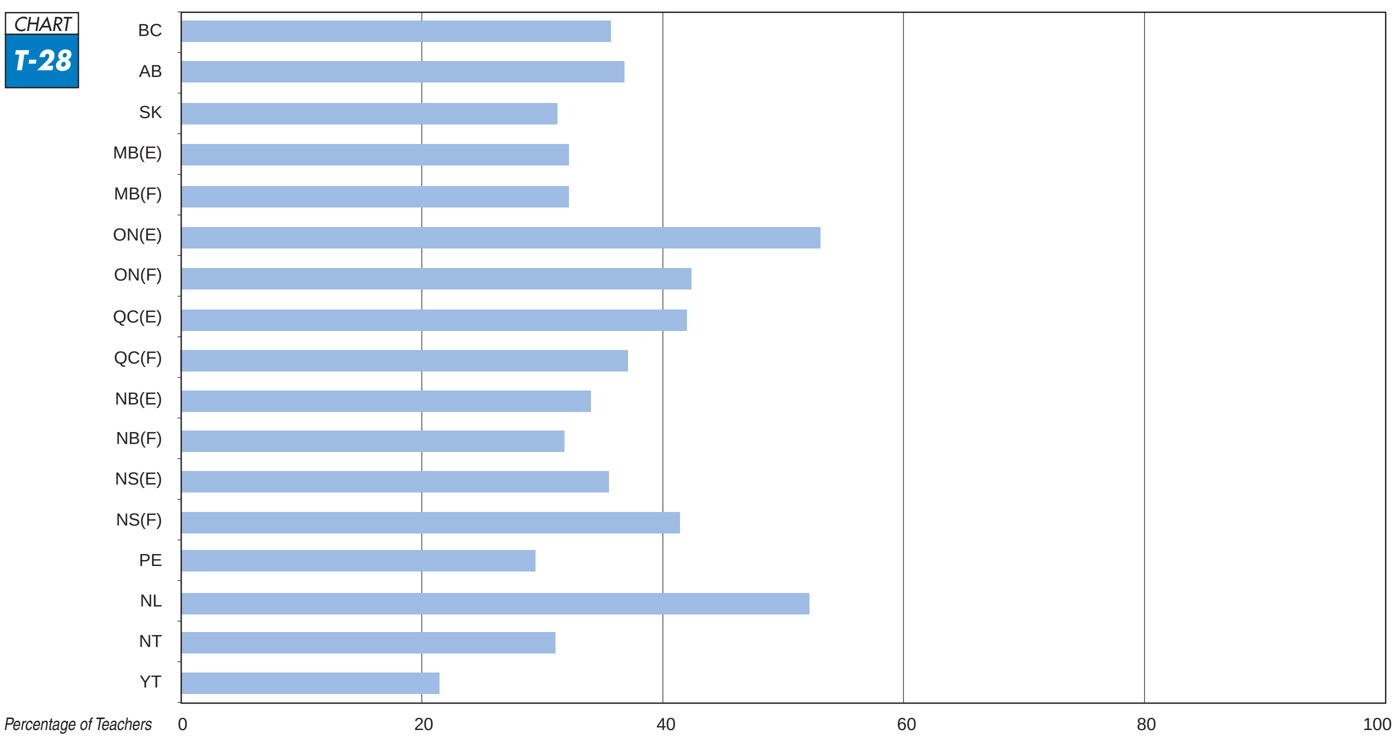
CHART
T-27



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	61	57	52	59	38	65	43	55	46	58	48	52	50	60	66	60	48

Percentage of teachers who agree or strongly agree that science is generally more difficult than other school subjects

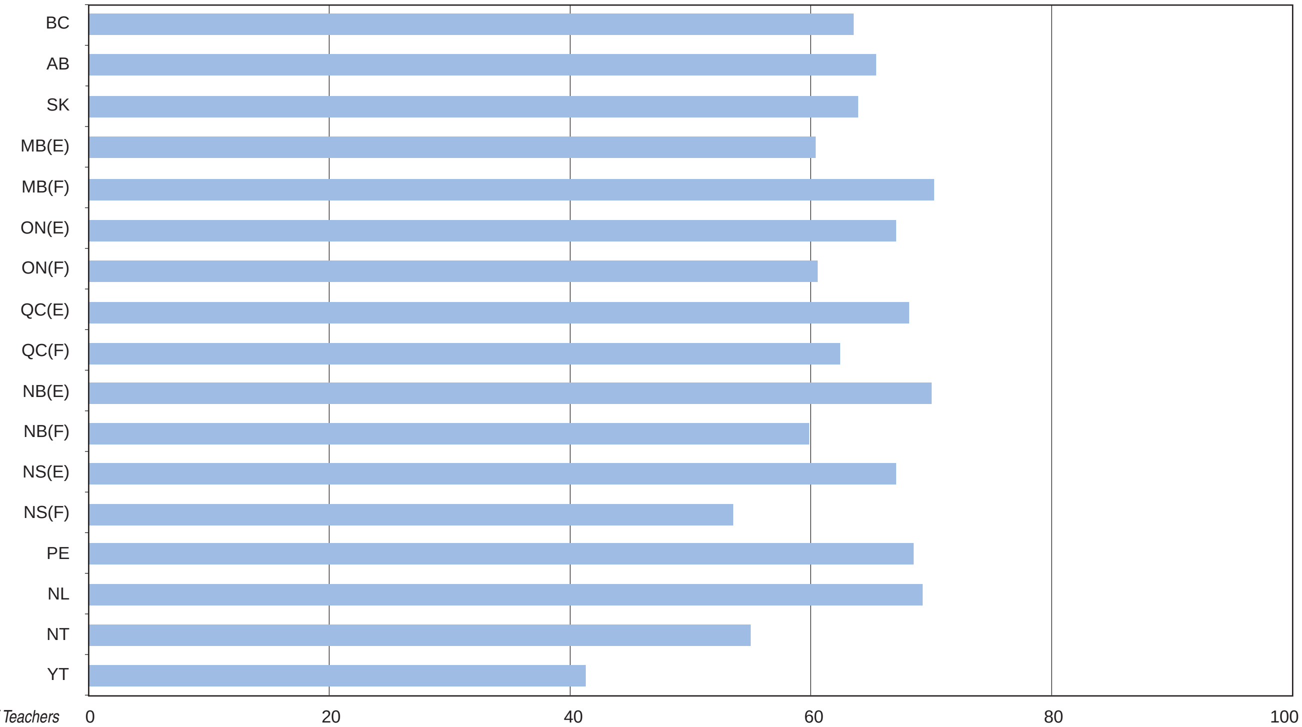
CHART
T-28



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	36	37	31	32	32	53	42	42	37	34	32	35	41	29	52	31	21

Percentage of teachers who agree or strongly agree that some students have a natural talent for science and some do not

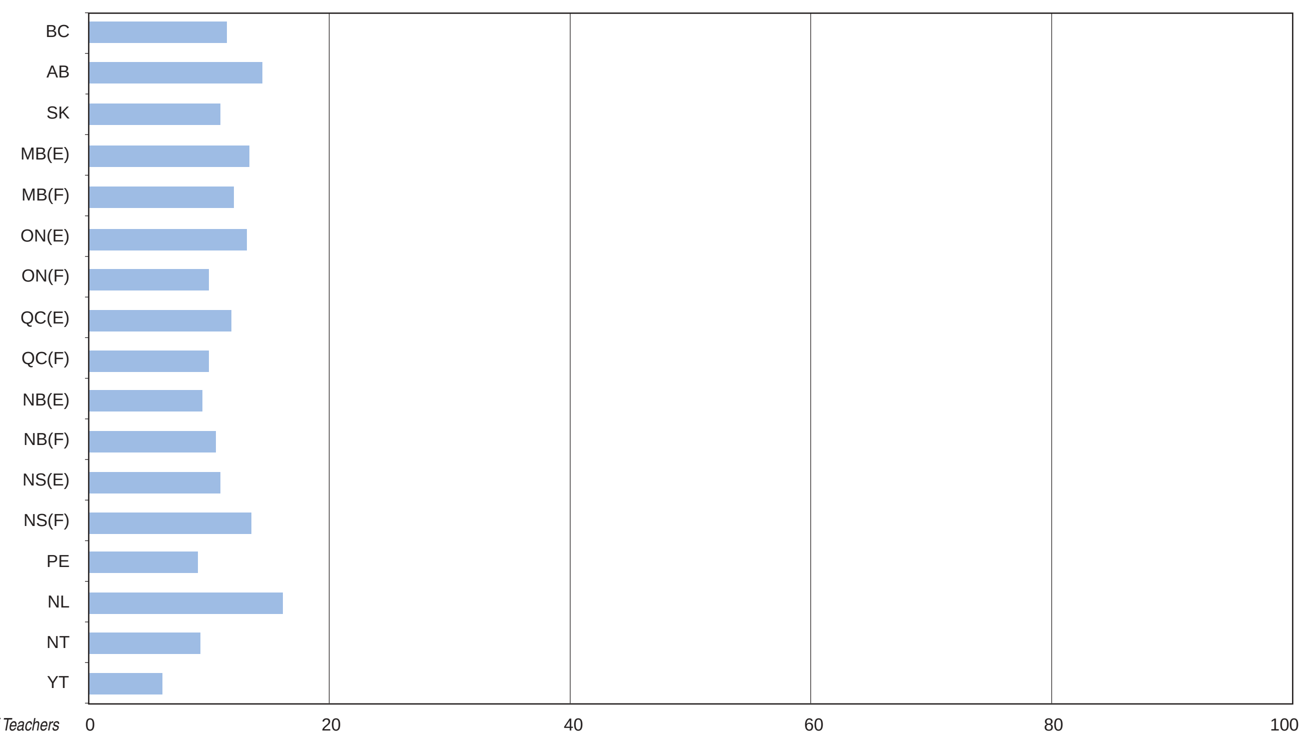
CHART T-29



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	63	65	64	60	70	67	60	68	62	70	60	67	53	68	69	55	41

Percentage of teachers who agree or strongly agree that students need natural talent to do well in science courses

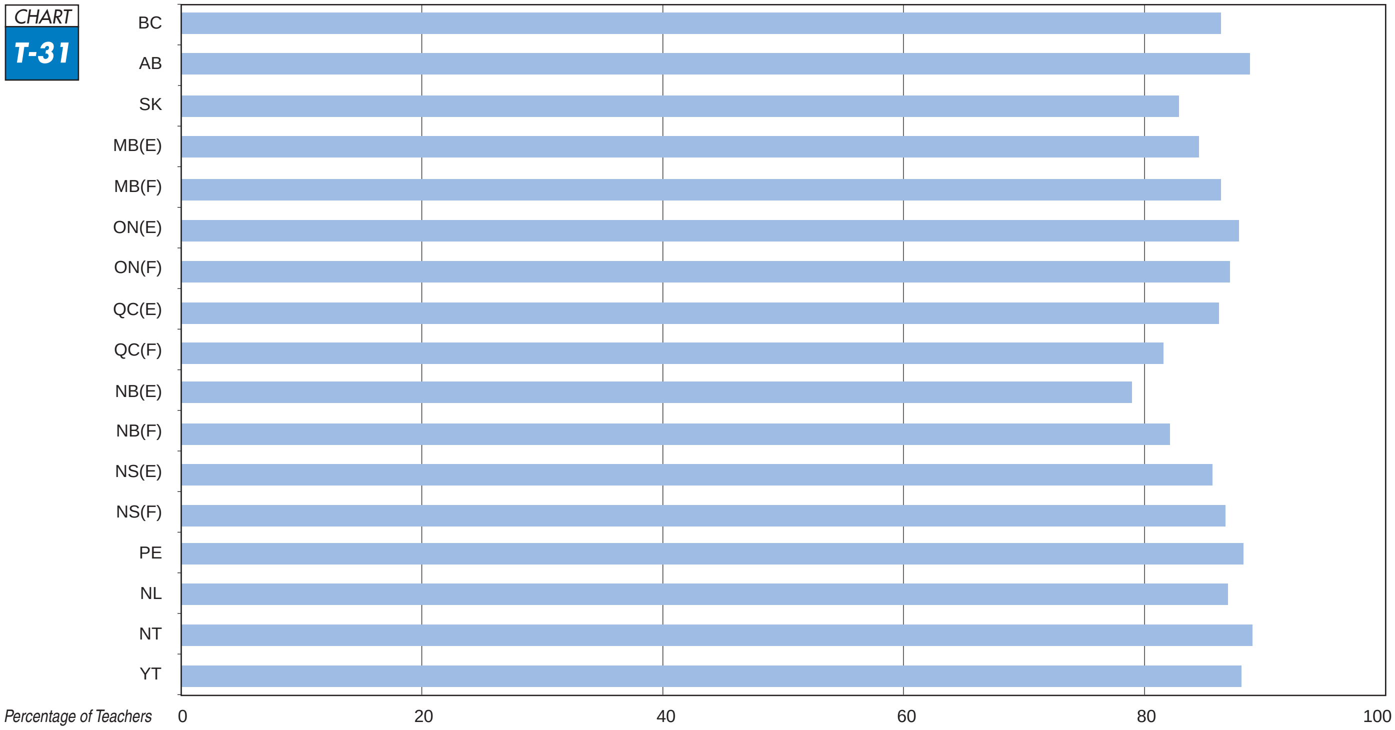
CHART T-30



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	11	14	11	13	12	13	10	12	10	9	10	11	13	9	16	9	6

Percentage of teachers who agree or strongly agree that students need to work hard to do well in science courses

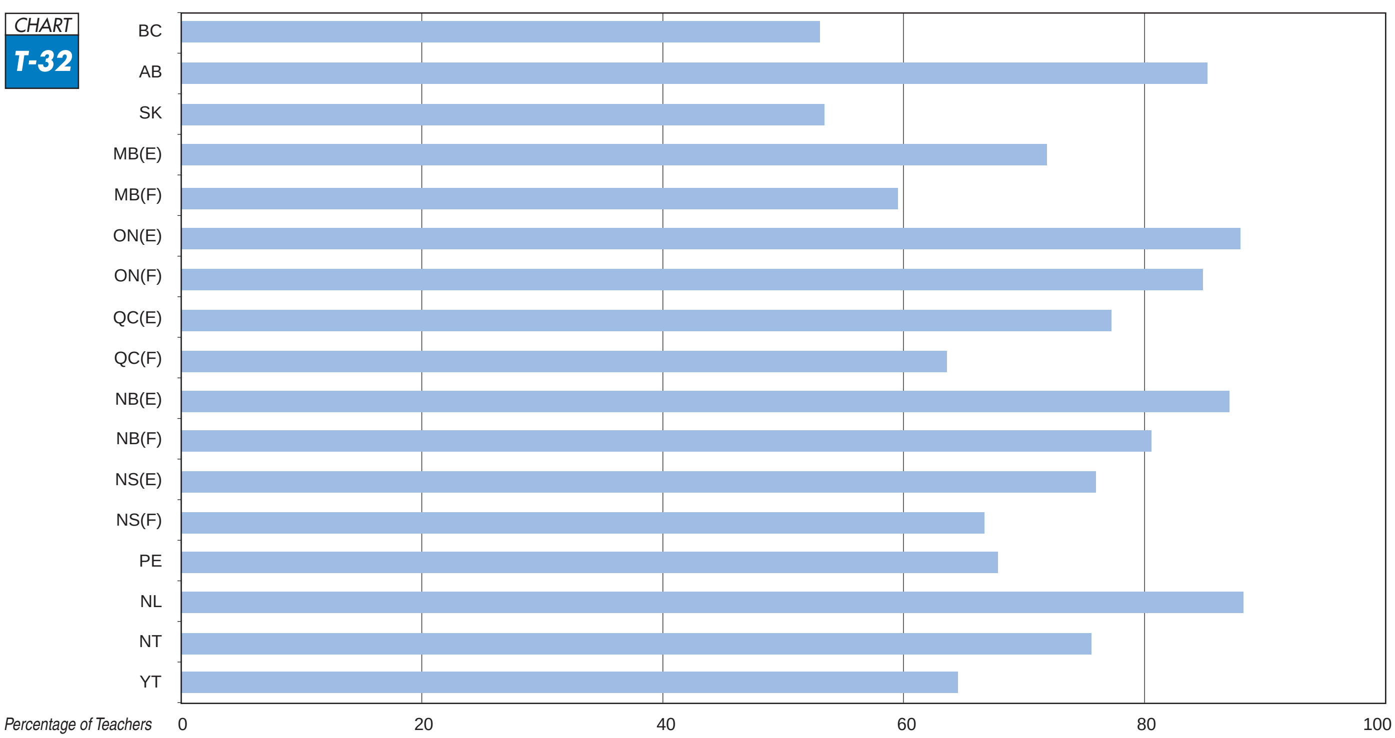
CHART T-31



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	86	89	83	84	86	88	87	86	82	79	82	86	87	88	87	89	88

Percentage of teachers agreeing that high school students should be streamed into different programs based on their abilities

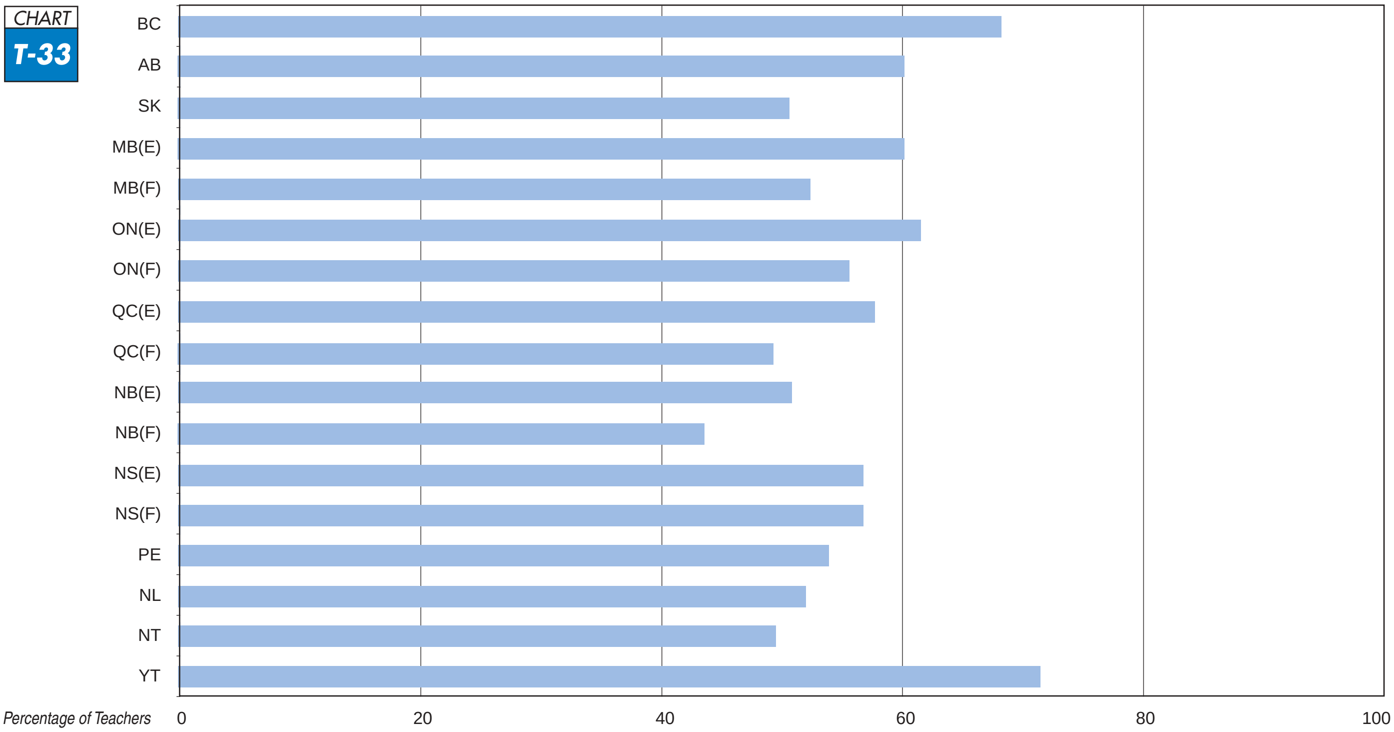
CHART T-32



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Agree or strongly agree	53	85	53	72	59	88	85	77	64	87	81	76	67	68	88	76	65

Percentage of teachers who use a laboratory a few times a month or more

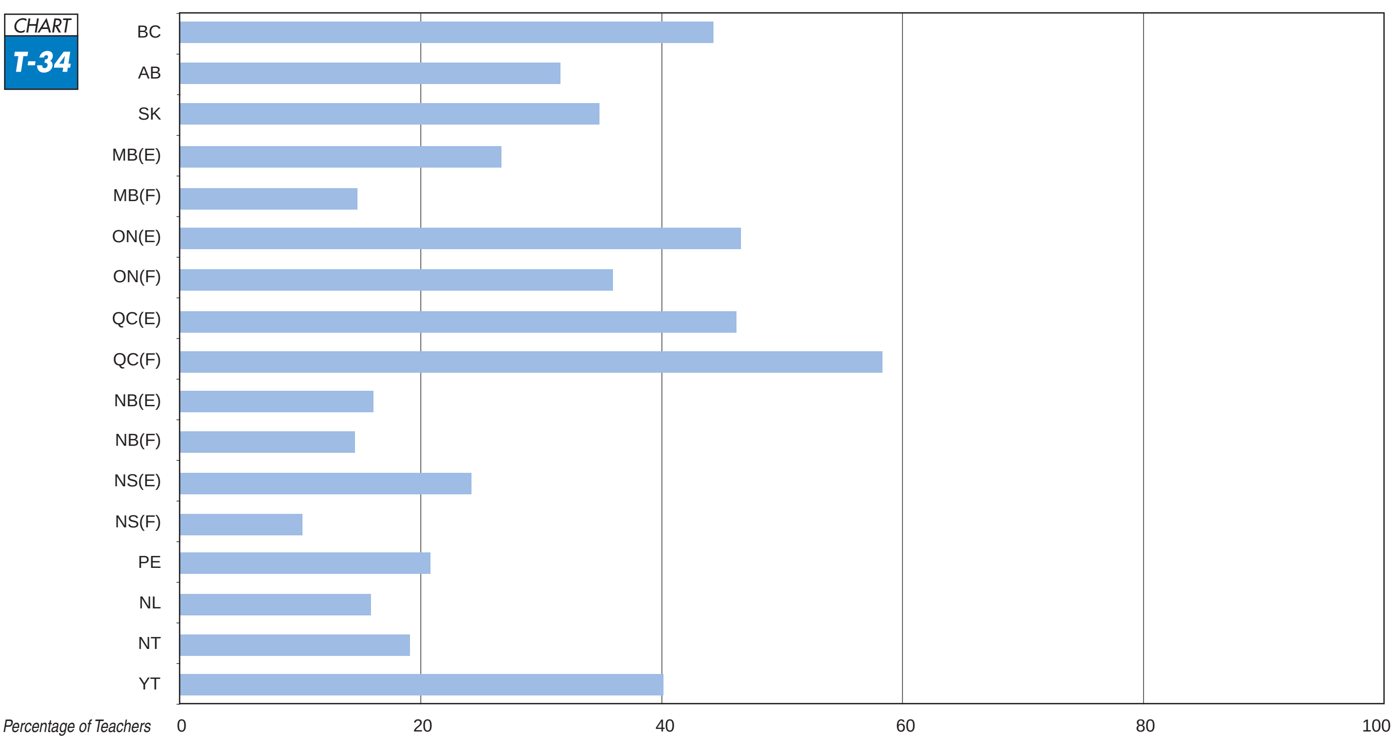
CHART T-33



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
A few times a month or more	68	60	51	60	52	61	56	58	49	51	43	57	57	54	52	50	71

Percentage of teachers who have students do laboratory experiments a few times a week or more

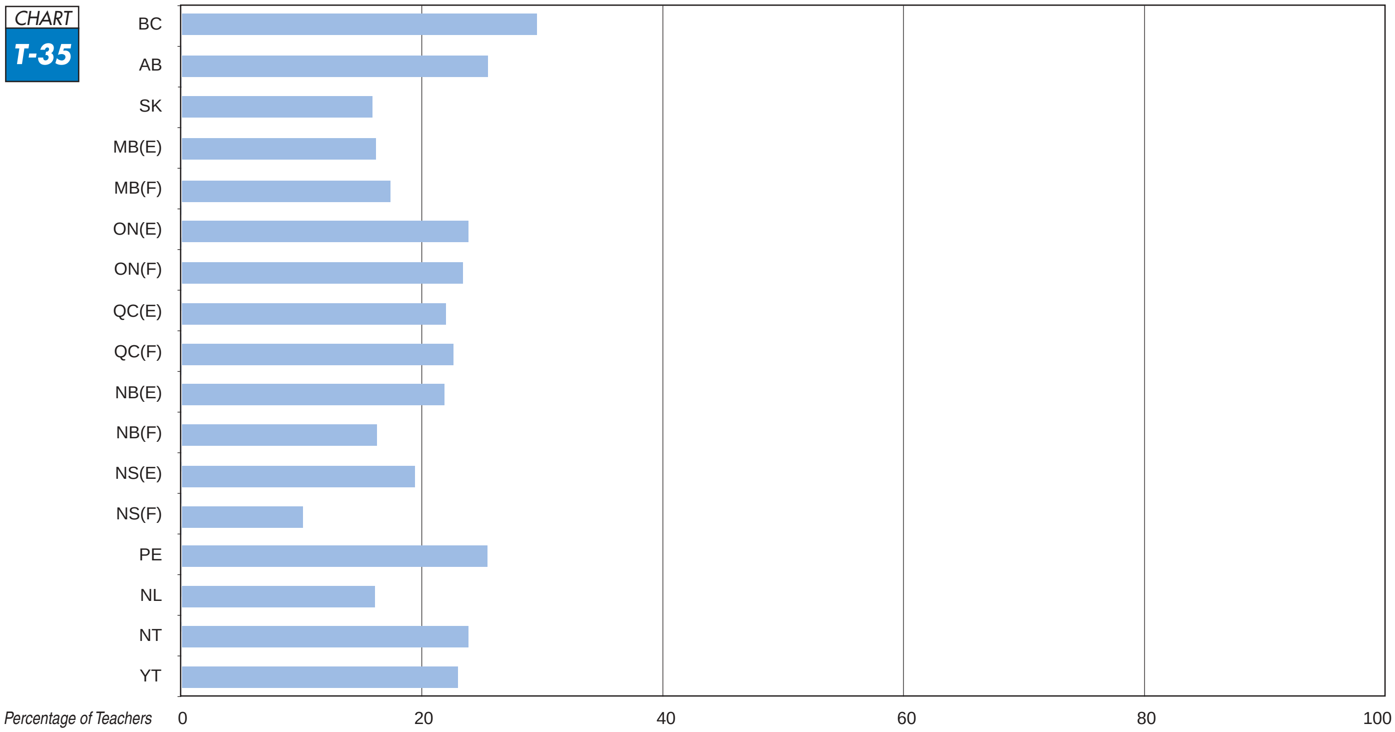
CHART T-34



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
A few times a week or more	44	32	35	27	15	46	36	46	58	16	14	24	10	21	16	19	40

Percentage of teachers who demonstrate an experiment a few times a week or more

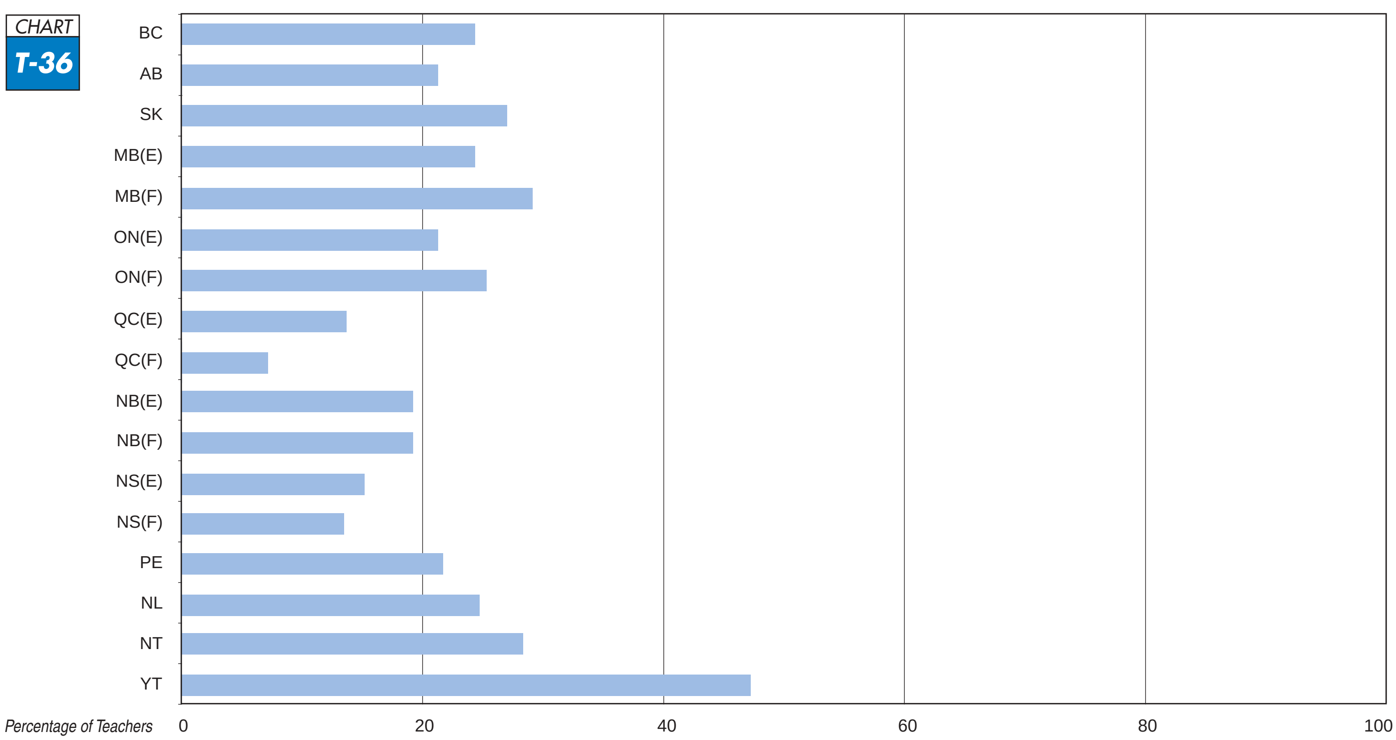
CHART
T-35



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
A few times a week or more	29	25	16	16	17	24	23	22	22	22	16	19	10	25	16	24	23

Percentage of teachers who take students outdoors or on a field trip a few times a month or more

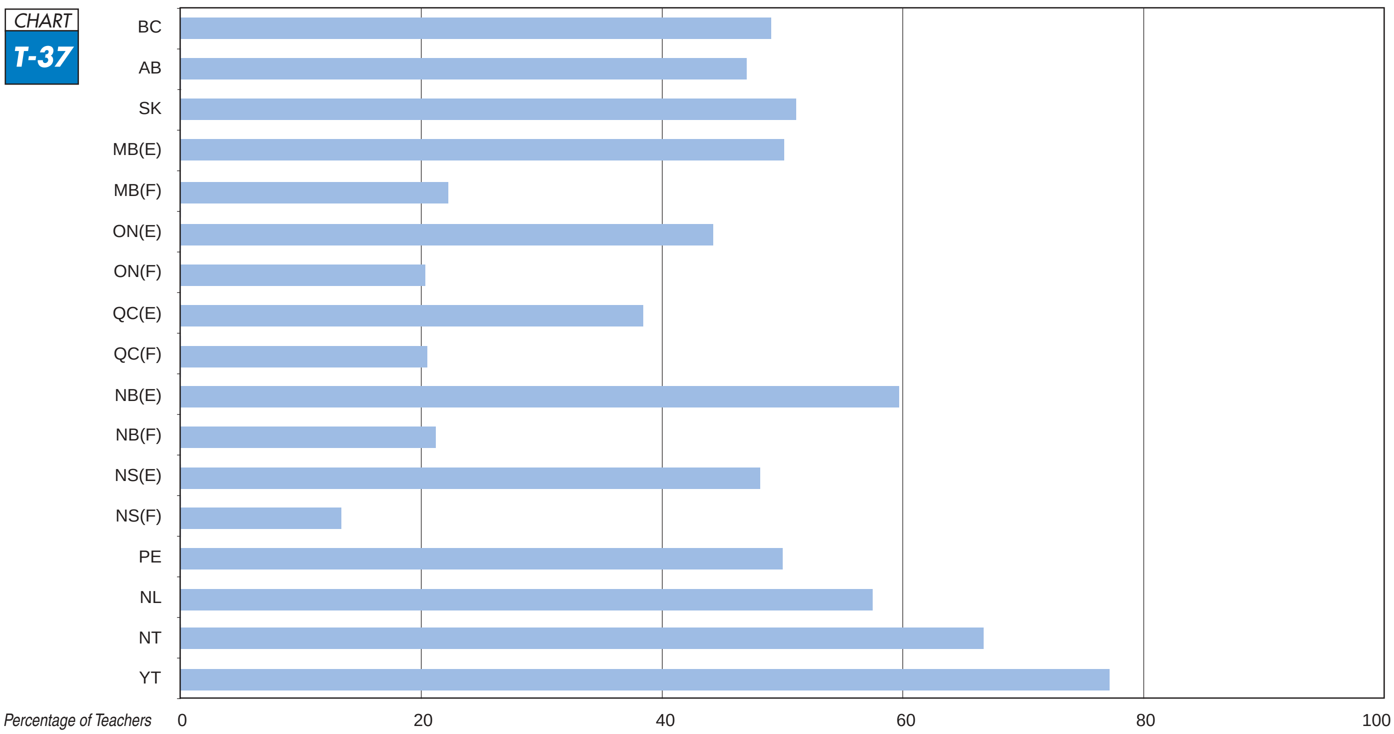
CHART
T-36



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
A few times a month or more	24	21	27	24	29	21	25	13	7	19	19	15	13	22	25	28	47

Percentage of teachers who use experts within the community few times a year or more

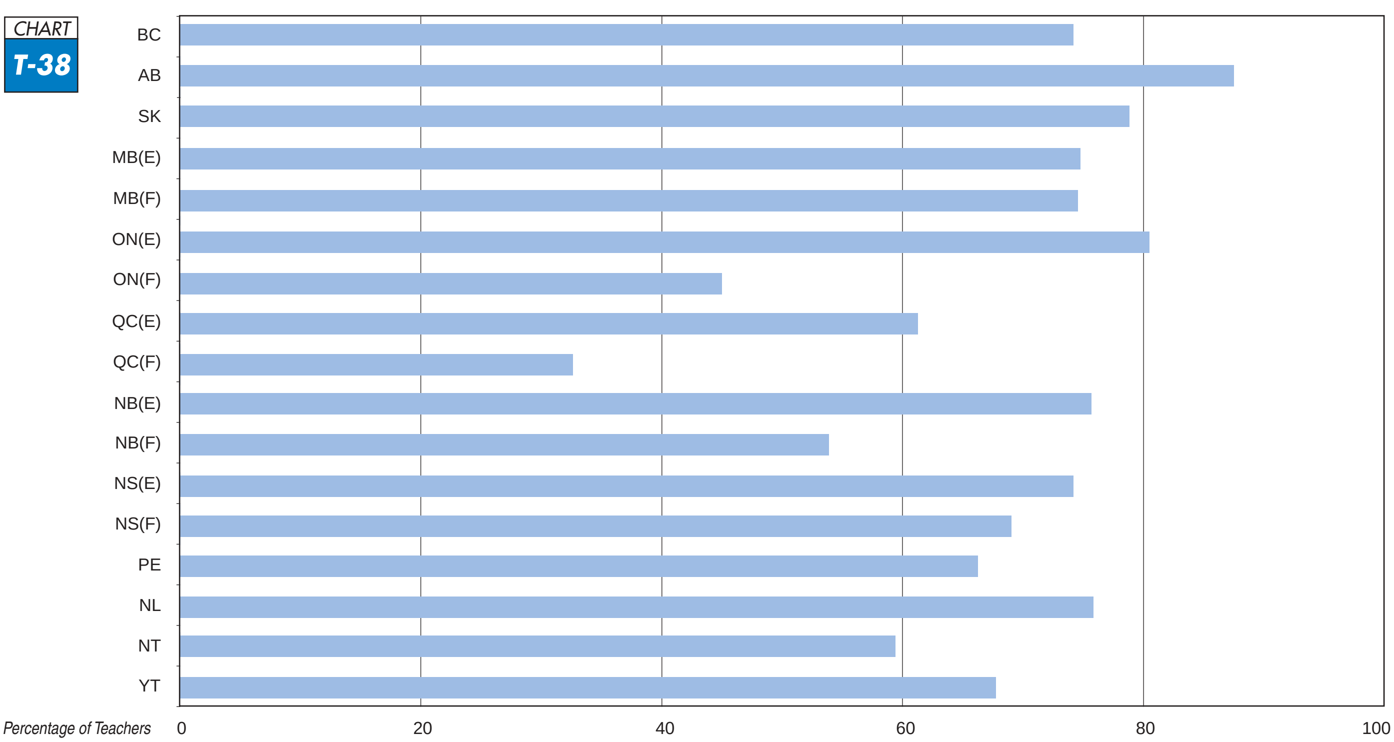
CHART
T-37



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
A few times a year or more	49	47	51	50	22	44	20	38	20	60	21	48	13	50	57	67	77

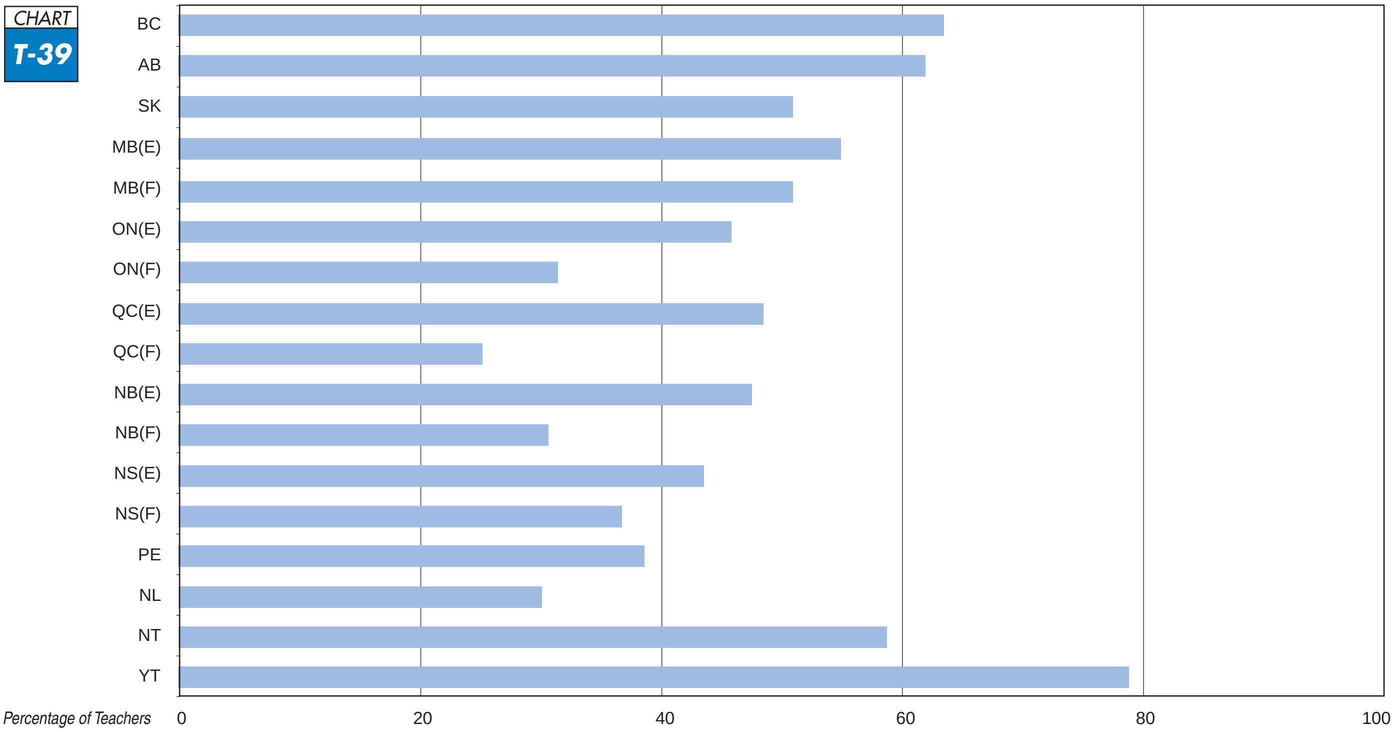
Percentage of teachers using ten or more different scores or grades in computing final marks

CHART
T-38



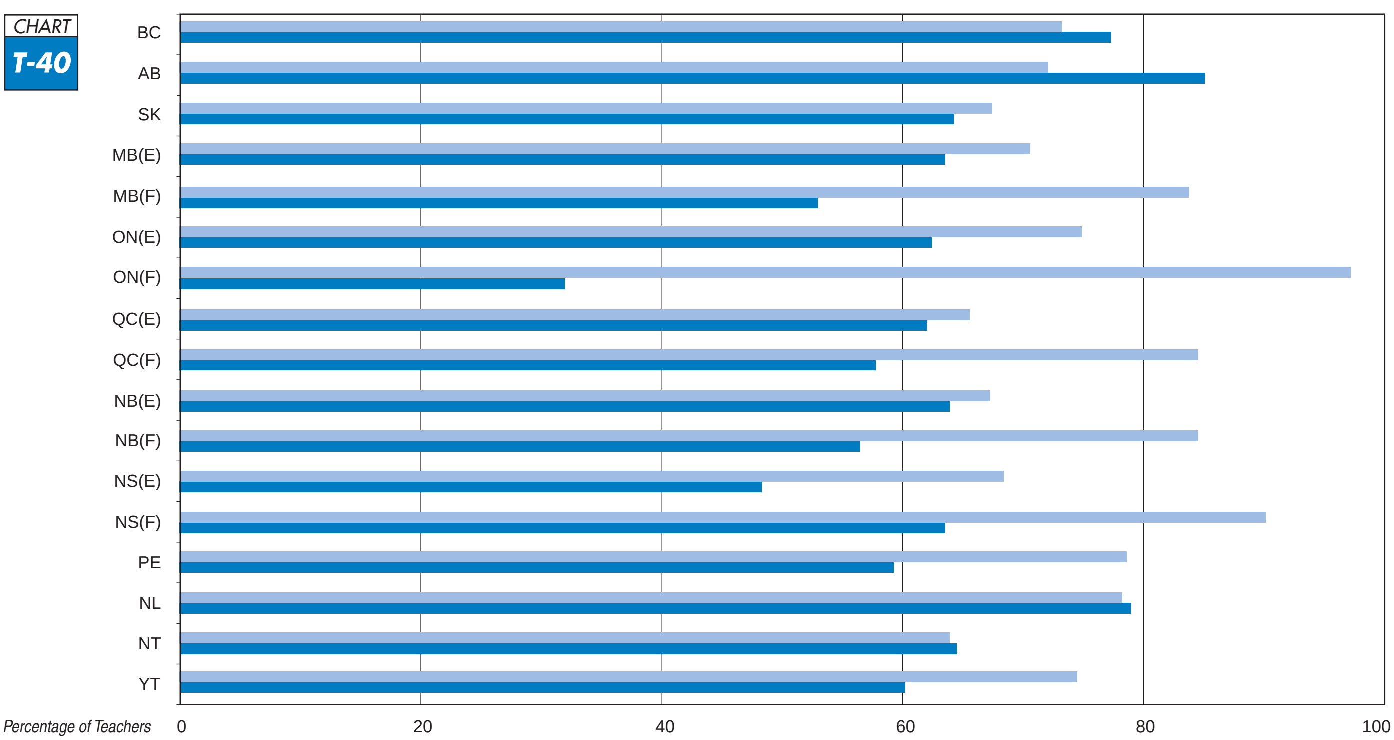
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Use 10 or more scores	74	87	79	75	75	80	45	61	32	76	54	74	69	66	76	59	68

Percentage of teachers who collect, correct, and return assignments to students a few times a week or more



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
A few times a week or more	63	62	51	55	51	46	31	48	25	47	31	43	37	38	30	59	79

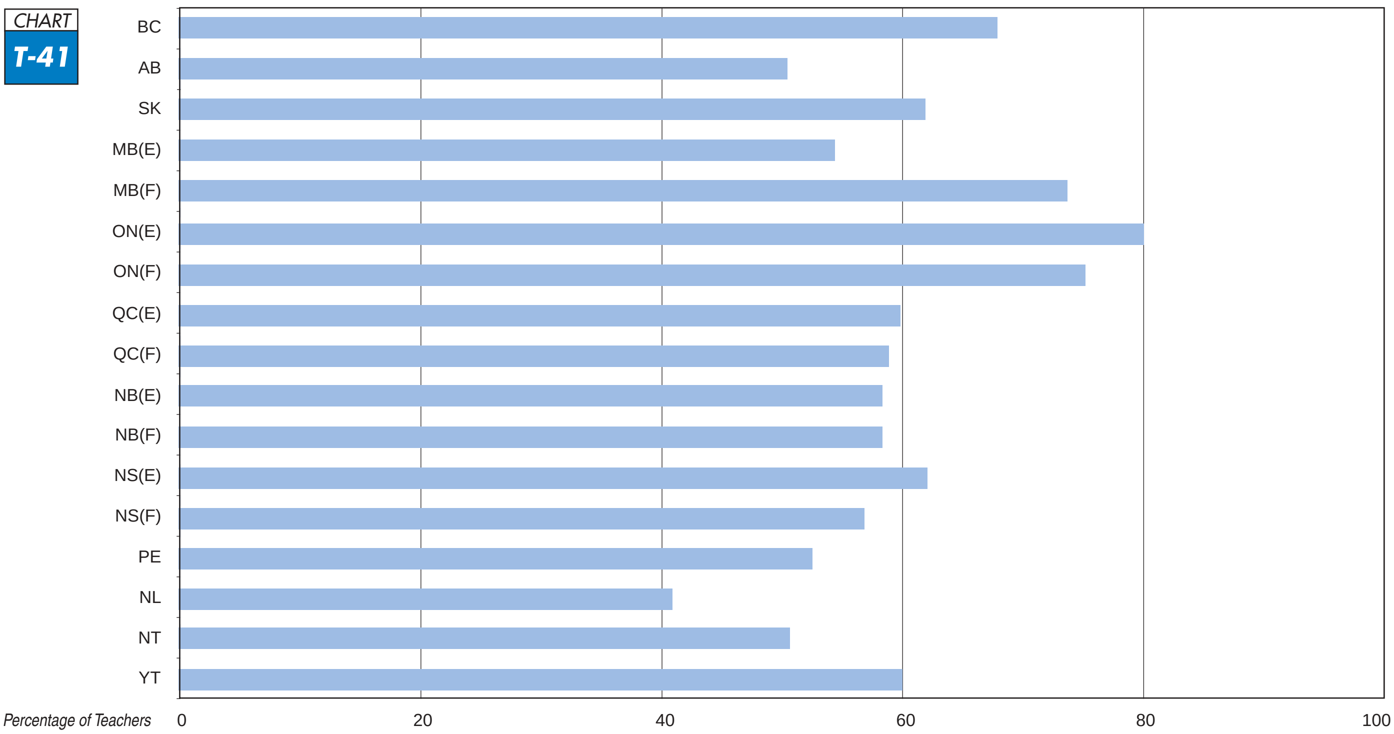
Percentage of teachers giving quite a lot or a great deal of weight to teacher-made short-answer or essay tests and multiple-choice or similar



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Short-answer or essay	73	72	67	71	84	75	97	65	84	67	84	68	90	78	78	64	74
Multiple-choice or similar	77	85	64	63	53	62	32	62	58	64	56	48	63	59	79	64	60

Percentage of teachers giving quite a lot or a great deal of weight to projects or laboratory experiments

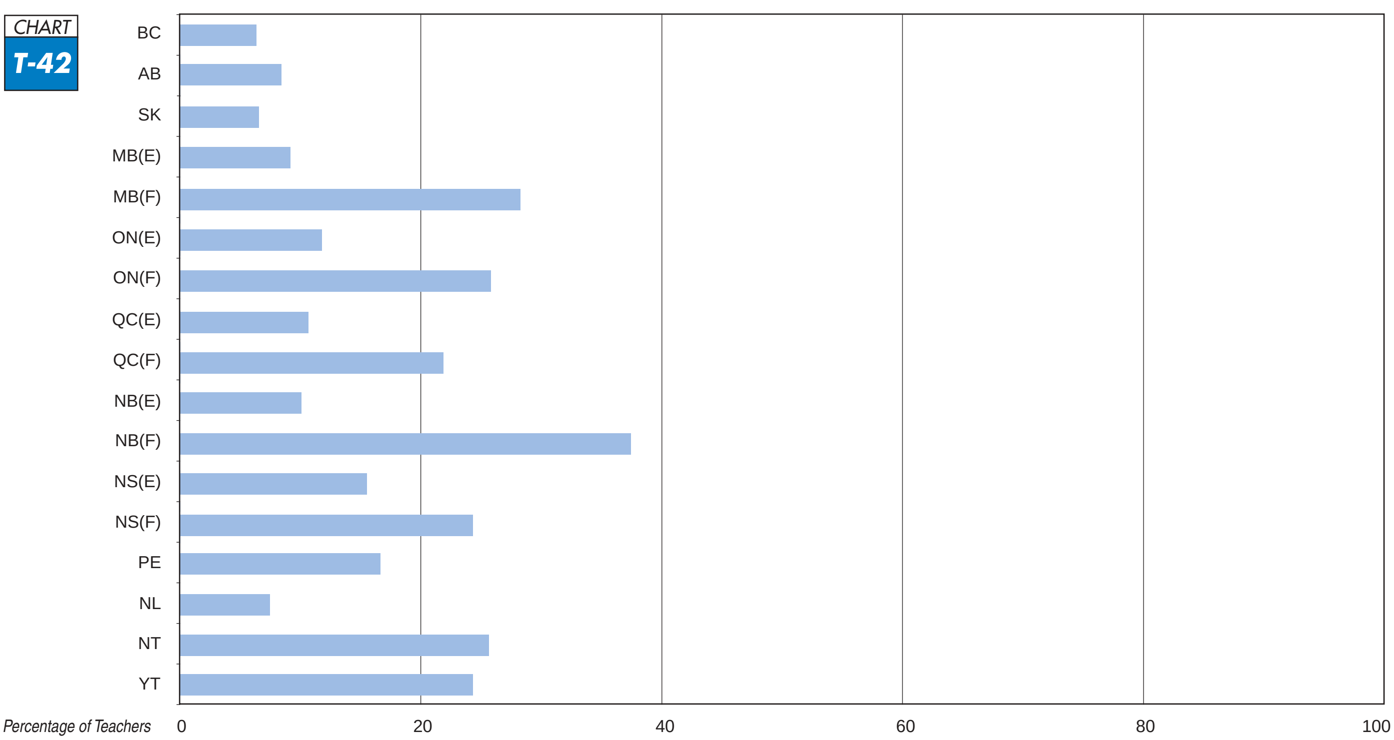
CHART **T-41**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	68	50	62	54	74	80	75	60	59	58	58	62	57	52	41	50	60

Percentage of teachers reporting that they give quite a lot or a great deal of weight to observations of or interviews with students

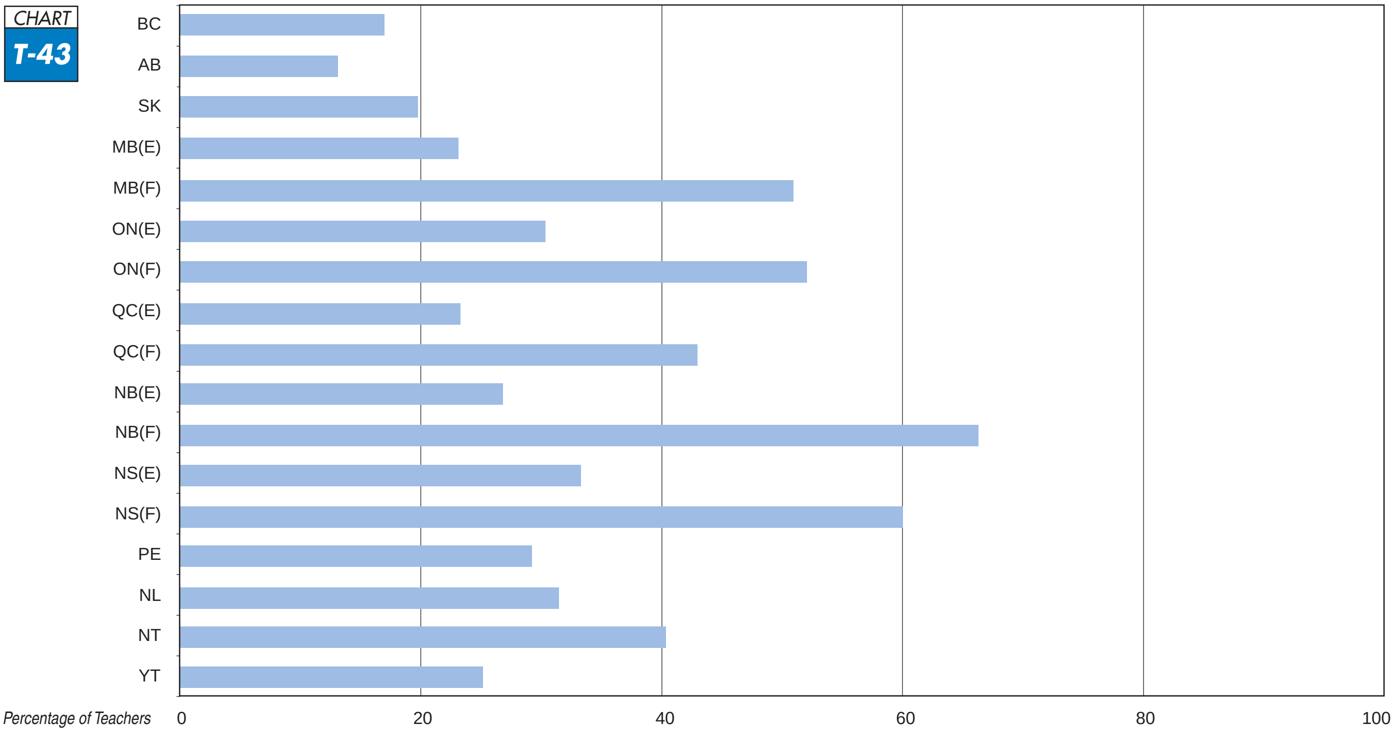
CHART **T-42**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	6	8	6	9	28	12	26	10	22	10	37	15	24	17	7	25	24

Percentage of teachers giving quite a lot or a great deal of weight to improvement over the year or term

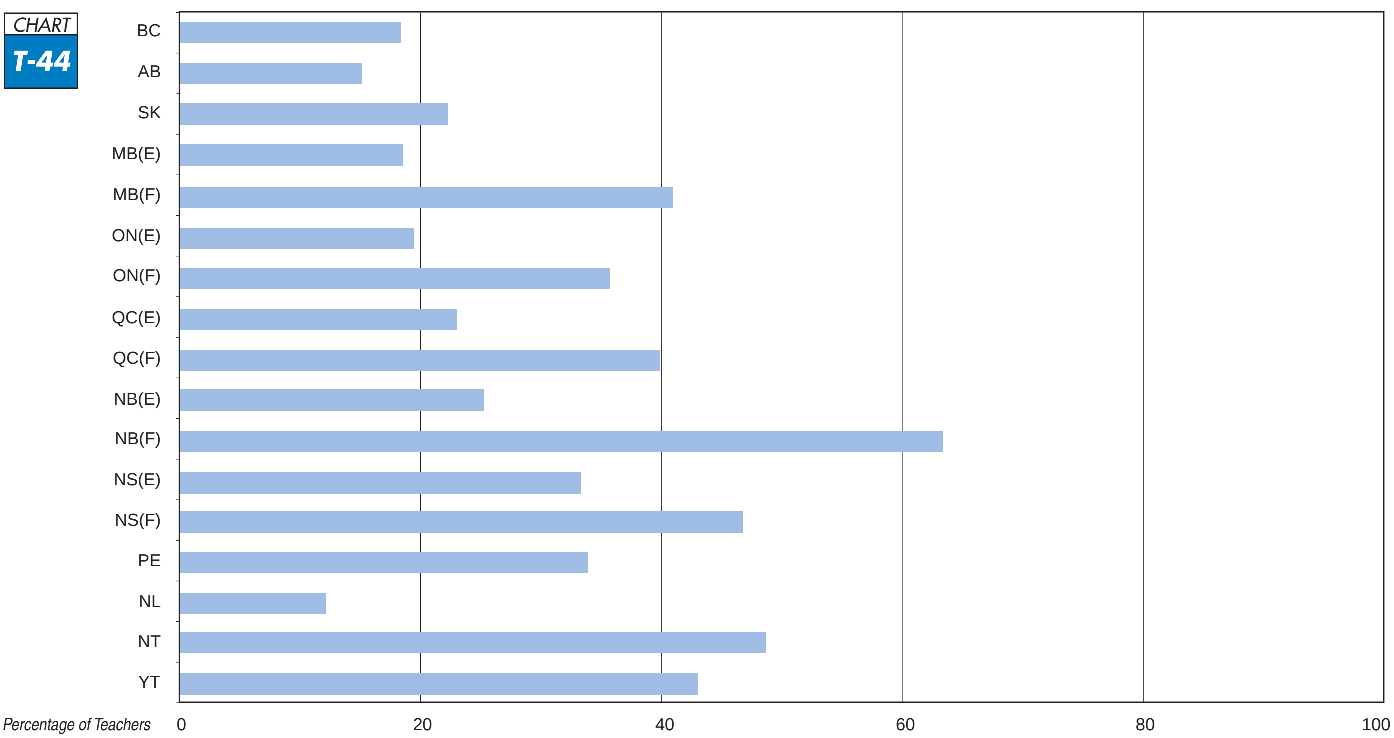
CHART **T-43**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great dal	17	13	20	23	51	30	52	23	43	27	66	33	60	29	31	40	25

Percentage of teachers reporting that they give quite a lot or a great deal of weight to participation of students in class activities

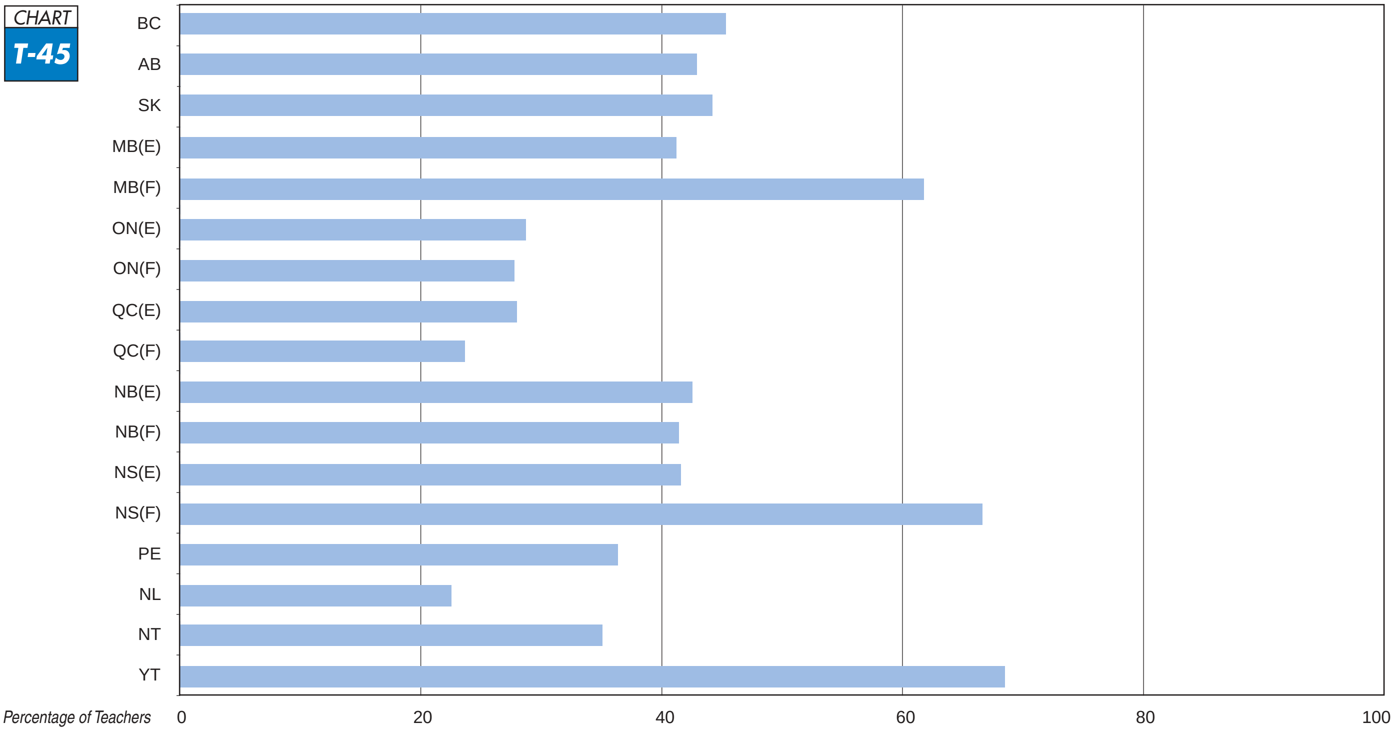
CHART **T-44**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	18	15	22	18	41	19	36	23	40	25	63	33	47	34	12	49	43

Percentage of teachers reporting that they give quite a lot or a great deal of weight to homework assignments

CHART **T-45**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Quite a lot or a great deal	45	43	44	41	62	29	28	28	24	42	41	42	67	36	23	35	69

The principal was responsible for completing the school questionnaire. The questionnaire contained 30 questions, involving over 100 items covering school demographics and student characteristics, matters such as factors limiting the school's capacity to provide instruction, computers and their use, course organization, streaming, remediation, and enrichment. The questionnaire also asked principals for their opinions on a range of issues related to factors affecting student learning, school spirit and morale, and support for the school.

Once again, a selection of data is included in this report, with a complete set of data to be found in the technical report to follow.

SCHOOL CHARACTERISTICS

School Community

Principals were asked to describe the type of community in which their school was located by selecting from one of six categories. **Chart P-1** shows the results for two groups of the categories, the smaller municipalities (rural, small town) and the two largest types (medium or large city). As can be seen, a general East–Central–West division is apparent, with many more schools in the East (and North) located in rural or small-town areas than in the Central or Western jurisdictions, while in Ontario and Quebec (as well as British Columbia), there are fewer rural/small town schools than in other provinces, either Eastern or Western.

Chart P-2 shows the percentage of schools with fewer than 100 or more than 500 students. Generally speaking, school size tends to follow population size and the urban/rural distribution. However, Nova Scotia and New Brunswick anglophone populations appear to have a relatively larger proportion of 500+ schools than their overall population would indicate.

Box 9

Note on Confidence Intervals

The confidence intervals given in these charts are based on a "finite population adjustment" used when the samples are selected from relatively small populations. These result in narrower confidence intervals than would be found for the same sample sizes selected from large populations. The width of the confidence interval thus reflects both sample and population size. Confidence intervals for the school data are much wider than those for student data because both sample and population sizes are smaller and are based on the number of schools with 13- and 16-year olds in each jurisdiction. School data within jurisdictions are not weighted, as the size of each school could not be reliably reported on. The confidence interval is zero for Manitoba (F) because all schools in this population were sampled. Confidence intervals are also not given for charts with medians or modes as values.

Chart P-3 illustrates the proportion of separate, public, and private schools found within the school district. While public schools dominate, the proportion of separate schools is highest in Ontario francophone and anglophone, and private schools highest in Quebec and British Columbia.

Chart P-4 gives an indication of the involvement of parents in school decision making. The highest proportions reported are found in Yukon, Quebec anglophone and francophone, and British Columbia, with 40% of schools reporting "some or a lot" of parent involvement.

Student Characteristics

Chart P-5 shows the percentage of schools with 10% or more of their students having a first language other than the language of the school. A feature is the relatively high proportion in Quebec anglophone, Ontario anglophone and francophone, Manitoba francophone, and Nova Scotia francophone. This suggests that a difference between school and home language may be more prevalent among newly arrived immigrant families in Ontario and in British Columbia. In the francophone populations, it is a possibility that minority official-language schools may be attracting students from the majority language group. It is also possible that many students with official minority-language status may actually speak the majority language at home. This is suggested by the student data on language spoken at home (see student charts S-2 through S-6).

The percentage of schools with 25% or more of their students reported as having learning problems requiring special attention is given in **chart P-6**. Here, the Northwest Territories at 60% is distinguished by having much higher proportions of such schools than others. The Canadian average is 17% of all schools with this proportion of students with special needs.

Studies have shown that children from single-parent families tend to have greater learning problems than others (although it is debatable whether family status or poverty is the underlying problem).[11] **Chart P-7** shows the percentage of schools with 25% or more of their students from single-parent families. The results here show wide variations across populations. Reporting 60% or more are Quebec anglophone and francophone, Yukon, and the Northwest Territories.

Chart P-8 gives an indication of the impact of health and nutrition on student learning. In most jurisdictions, 40%, or nearly so, of schools report that 10% or more of their students have health or nutrition problems. This serious problem is most often reported in the Northwest Territories, with 75% of schools reporting this, and least often in smaller francophone populations.

CLASS SIZE AND ARRANGEMENTS FOR TEACHING SCIENCE

Principals were asked to estimate average class sizes in their school as a whole and in science classes at the two SAIP age levels. **Chart P-9** gives the percentage of schools with a science class size average of 25 or more students. The differences between jurisdictions are substantial, with no apparent pattern emerging. The highest is Quebec francophone, for both age groups, with nearly 80% showing this class size. With only three exceptions, jurisdictions report fewer 16-year-old classes with 25 or more students than 13-year-old classes.

Chart P-10 shows that a majority of schools have their science courses for 16-year-olds semestered. As one might expect, semestered courses are much less prevalent for 13-year-olds. The proportion of schools using semestered courses varies substantially by jurisdiction. Quebec and Newfoundland and Labrador stand out as making little use of semestered programs at either level.

Chart P-11 indicates that all classes for 16-year-olds are taught primarily by teachers responsible for specific subjects in almost all jurisdictions. However, as seen in **chart P-12**, the pattern is much more variable for 13-year-olds, where there tends to be less specialization in smaller than in larger jurisdictions and in minority-language relative to majority-language groups within jurisdictions. These patterns no doubt reflect broader differences in the organization of schools in different jurisdictions and the structure of senior secondary school grades, where 16-year-olds are found, compared to middle or intermediate grades, which include most 13-year-olds.

[11] For example, see OECD. 2004. *Learning for Tomorrow's World — First Results from PISA 2003*. Paris: OECD. pp. 166–7.

Similar trends are found in **chart P-13**, which shows that specialized science teachers teach most 16-year-old students, and rather less so for younger students. However, notable exceptions to this rule are British Columbia, Quebec anglophone and francophone, and Newfoundland and Labrador, where a significant proportion of teachers of 13-year-olds are subject specialists. New Brunswick francophone schools report the lowest proportion of specialists by far for 13-year-olds with 17% compared to a Canadian average of 65%.

FACTORS LIMITING ABILITY TO PROVIDE INSTRUCTION

Principals were asked a number of questions related to this topic, including such issues as community support and student backgrounds. **Chart P-14** shows the percentage of principals reporting that community conditions are limiting factors. Nova Scotia francophone, Yukon, Northwest Territories, and Ontario francophone schools show the greatest concern in this area. **Chart P-15** reports concerns about lack of parental support. Schools in Yukon and the Northwest Territories, as well as Quebec francophone populations, also show relatively high levels of concern with this issue.

Chart P-16 shows the percentage of principals indicating that instruction in their schools is limited by a shortage or inadequacy of teachers specialized in science. More than 40% of schools in most jurisdictions report this as a limiting factor. Over 80% of schools in New Brunswick francophone and the Northwest Territories show a high level of concern with shortage of science specialists.

Responses to other items in this set may be summarized as follows:

- **Chart P-17** indicates that in nearly all cases, less than 40% of schools report a problem with "special-purpose space," which would include laboratories. A notable exception is the Northwest Territories at 45%.
- **Chart P-18** reports problems with lack of instructional materials. The most frequent incidences are in Nova Scotia francophone at 56% and Ontario francophone with 44%.
- **Chart P-19** shows that supply budget shortages are reported to limit instruction to a varying degree across Canada. The most frequent reports are from Nova Scotia francophone (56%) and New Brunswick francophone (49%), and the least frequent in Manitoba anglophone (21%).

The importance to science education of qualified teachers, appropriate, safe laboratories, sufficient current instructional equipment, and a budget for laboratory supplies cannot be overstated.

STREAMING AND COURSE CHOICE

Chart P-20 shows the percentage reporting that they have two or more distinct streams or ability groups for science. It is clear that streaming is much more prevalent for 16-year-olds than for 13-year-olds. Beyond these patterns, there is considerable jurisdictional variation. The lowest level of streaming for 16-year-olds is found in Manitoba francophone schools and in Saskatchewan schools. The highest level of streaming reported for 13-year-olds is found in Ontario anglophone and francophone and in New Brunswick francophone schools.

Chart P-21 reports on the variety of science courses available for both populations. As one might expect, 13-year-olds have much less choice, as in elementary and middle years, a general science program is common. For 16-year-olds, more than three different courses are common, such as chemistry, biology, physics, and earth science, among other possibilities. Exceptions are Quebec anglophone and francophone, as well as the two territories.

ARRANGEMENTS FOR STUDENT ASSISTANCE AND SUPPORT

A number of questions were asked about whether schools provide remedial teaching in science. **Chart P-22** shows that most schools have remedial programs. However, Ontario francophone, Manitoba francophone, New Brunswick francophone, the Northwest Territories, and Yukon report that remedial programs are less frequent in their schools than elsewhere. **Charts P-23** and **P-24** show that the most frequent methods of providing remedial support are extra help outside of regular school hours and peer tutoring.

Chart P-25 represents those schools that do not provide enrichment programs. The pattern is much more varied than with remedial programs (chart P-22). It would appear that the fewest enrichment programs are to be found in Yukon, Northwest Territories, Newfoundland and Labrador, and New Brunswick francophone.

Large differences occur between the two areas, with remedial support being provided much more frequently than enrichment in almost all jurisdictions.

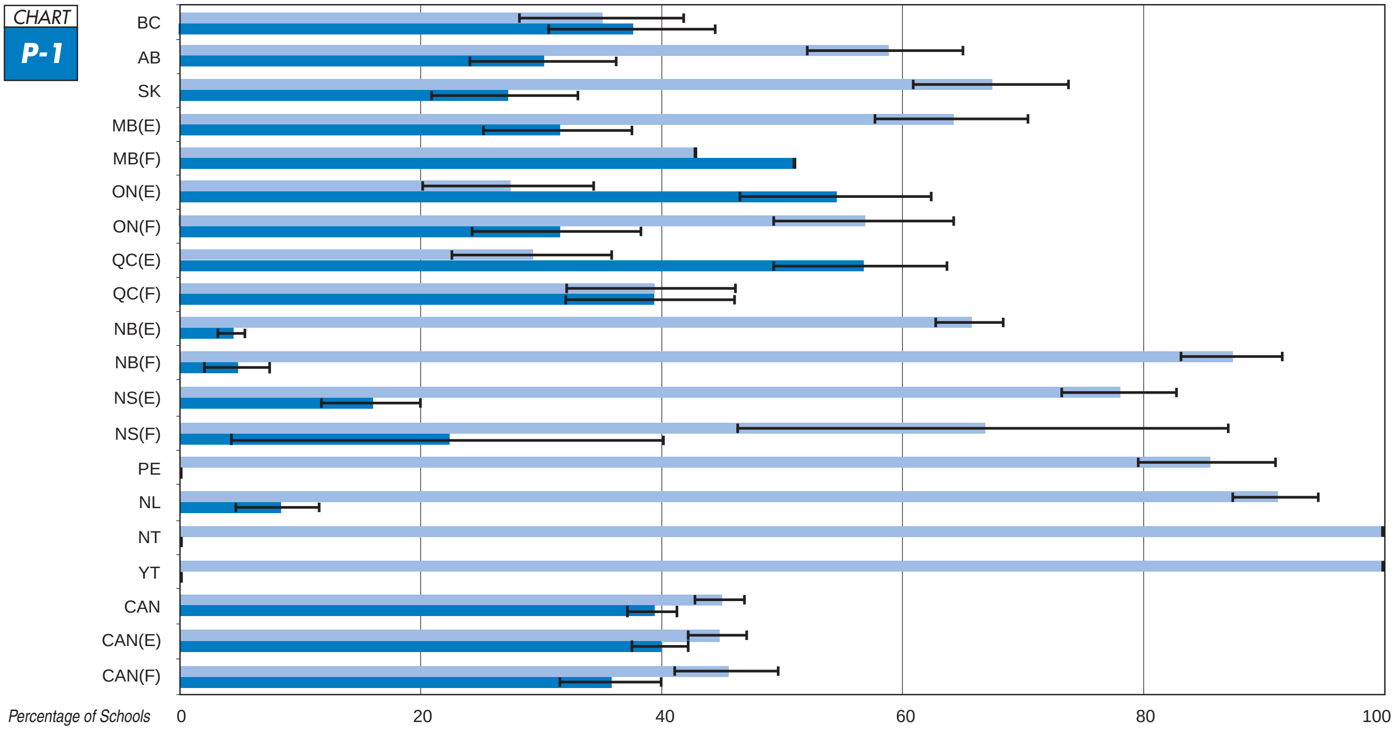
VIEWS ON SCHOOL LEARNING AND SUPPORT FOR THE SCHOOL

Principals were asked a number of questions about their views on factors influencing student learning, the state of staff morale, and support for the school. **Chart P-26** shows that more than 60% of schools in most jurisdictions agree that a student's home environment has a major influence on achievement.

The range of student abilities is reported as a limit on capacity to provide instruction in **chart P-27**. About half of the schools in most jurisdictions agreed with this, with 93% of Northwest Territories schools reporting significantly higher incidence than others.

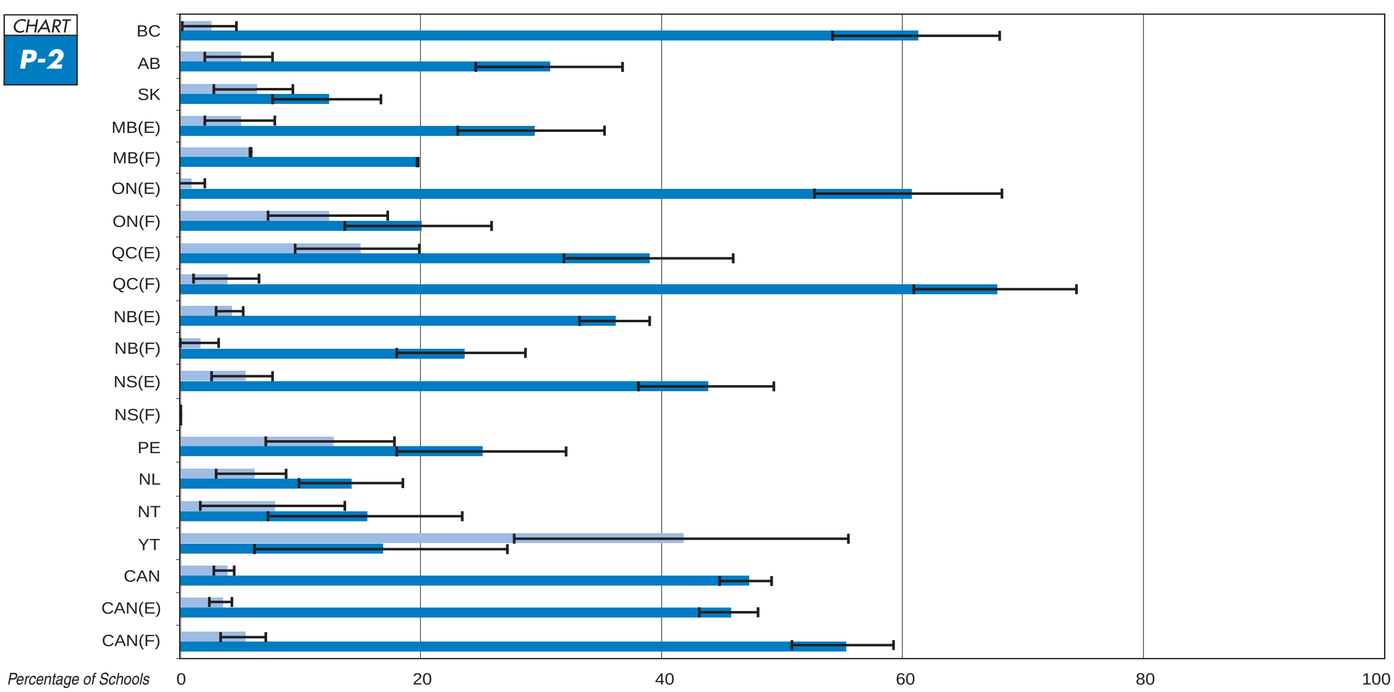
Support both within and without the school is reported in **charts P-28** to **P-30**. More than 90% of all schools report high staff morale. Strong school spirit is also reported in more than 70% of schools in all jurisdictions except Nova Scotia francophone. The vital element of community support is reported by about 90% of schools except Quebec francophone, where 58% of these schools agree that the school is supported in the community.

Percentage located in rural/small town or medium/large city



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Rural/small	35	59	67	64	43	27	57	29	39	66	87	78	67	85	91	100	100	45	45	45
Medium/large	38	30	27	31	51	54	31	57	39	4	5	16	22	0	8	0	0	39	40	36

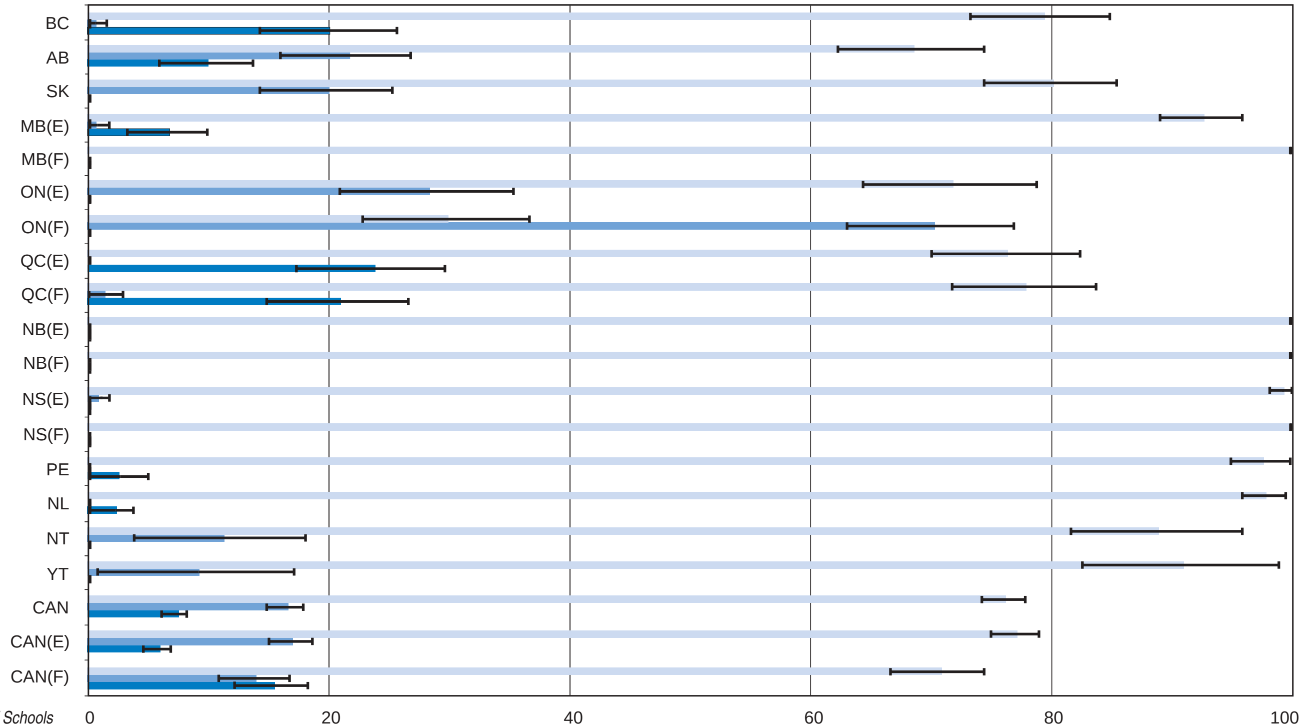
Percentage of schools with more than 500 or fewer than 100 students



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Less than 100	2	5	6	5	6	1	12	15	4	4	2	5	0	13	6	8	42	4	3	5
More than 500	61	31	12	29	20	61	20	39	68	36	23	44	0	25	14	15	17	47	46	55

Percentage of public, separate, and private schools within a school board or district

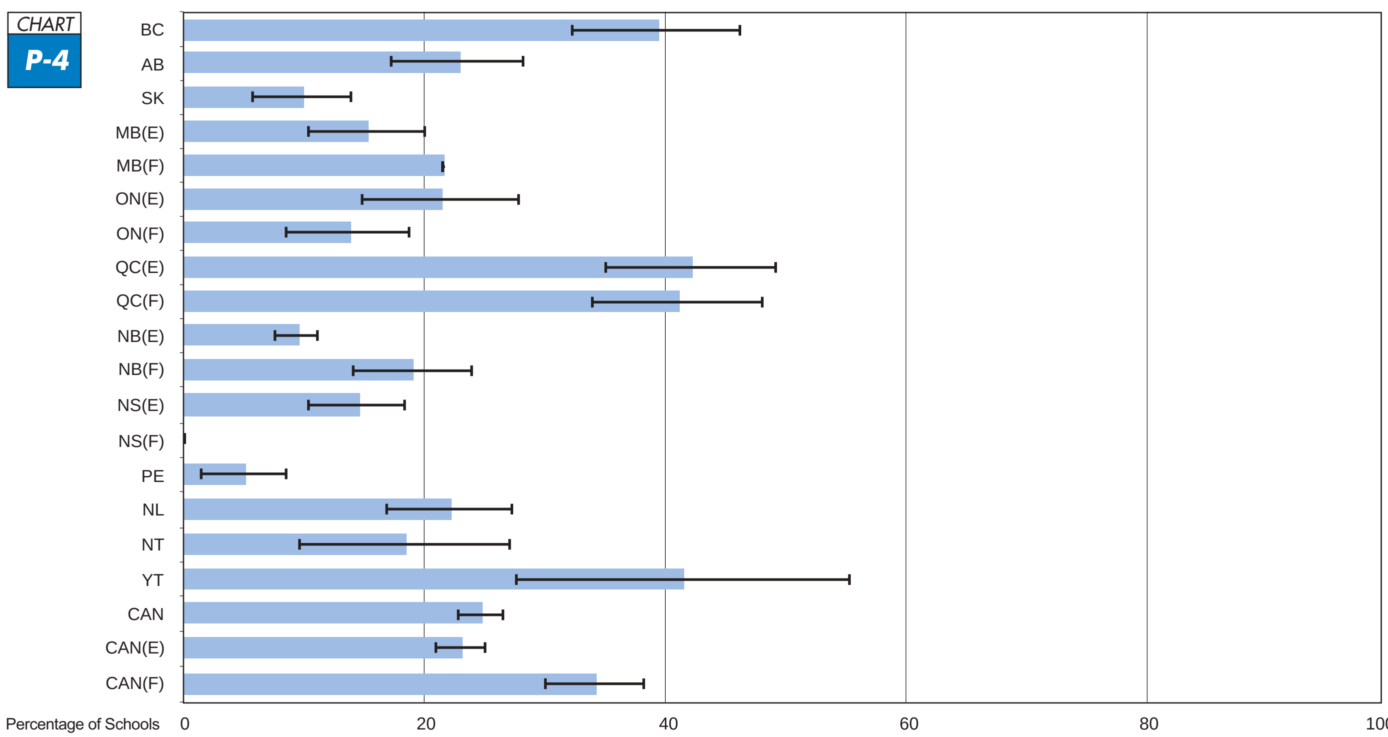
CHART **P-3**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Public schools	79	69	80	93	100	72	30	76	78	100	100	99	100	98	98	89	91	76	77	71
Separate schools	1	22	20	1	0	28	70	0	1	0	0	1	0	0	0	11	9	16	17	14
Private schools	20	10	0	7	0	0	0	24	21	0	0	0	0	2	2	0	0	7	6	15

Percentage reporting that parents serve on committees on matters of finance and administration

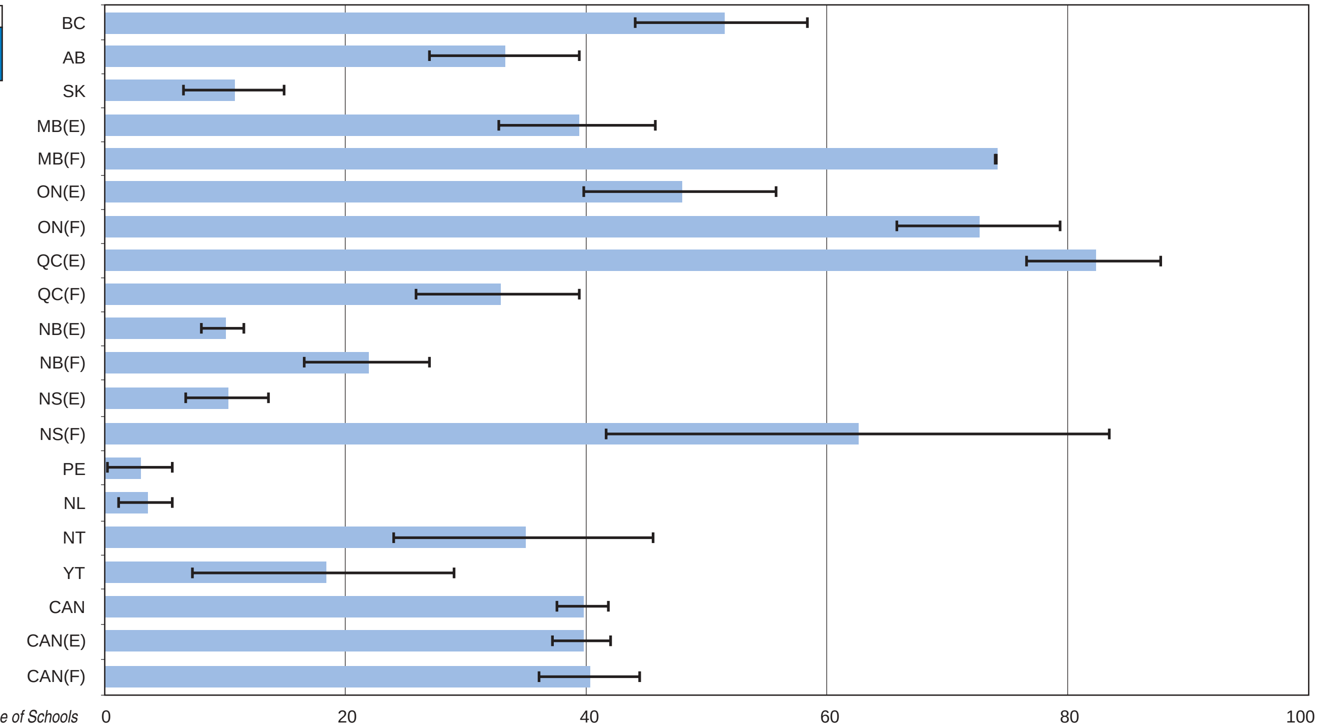
CHART **P-4**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Some or a lot	40	23	10	15	22	21	14	42	41	9	19	14	0	5	22	19	42	25	23	34

Percentage with 10% or more of students with first language other than the language of the school

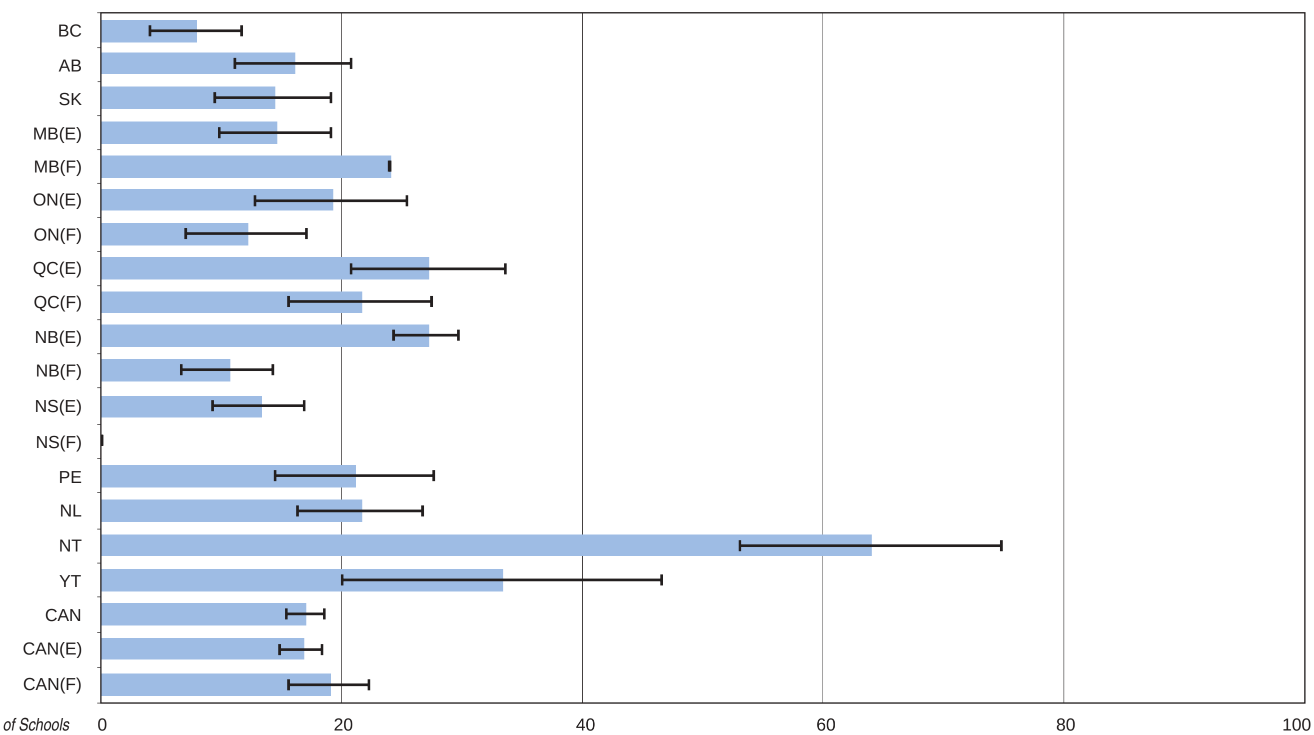
CHART P-5



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
10% or more	51	33	11	39	74	48	73	82	33	10	22	10	63	3	3	35	18	40	40	40

Percentage with 25% or more of students with learning problems needing special attention

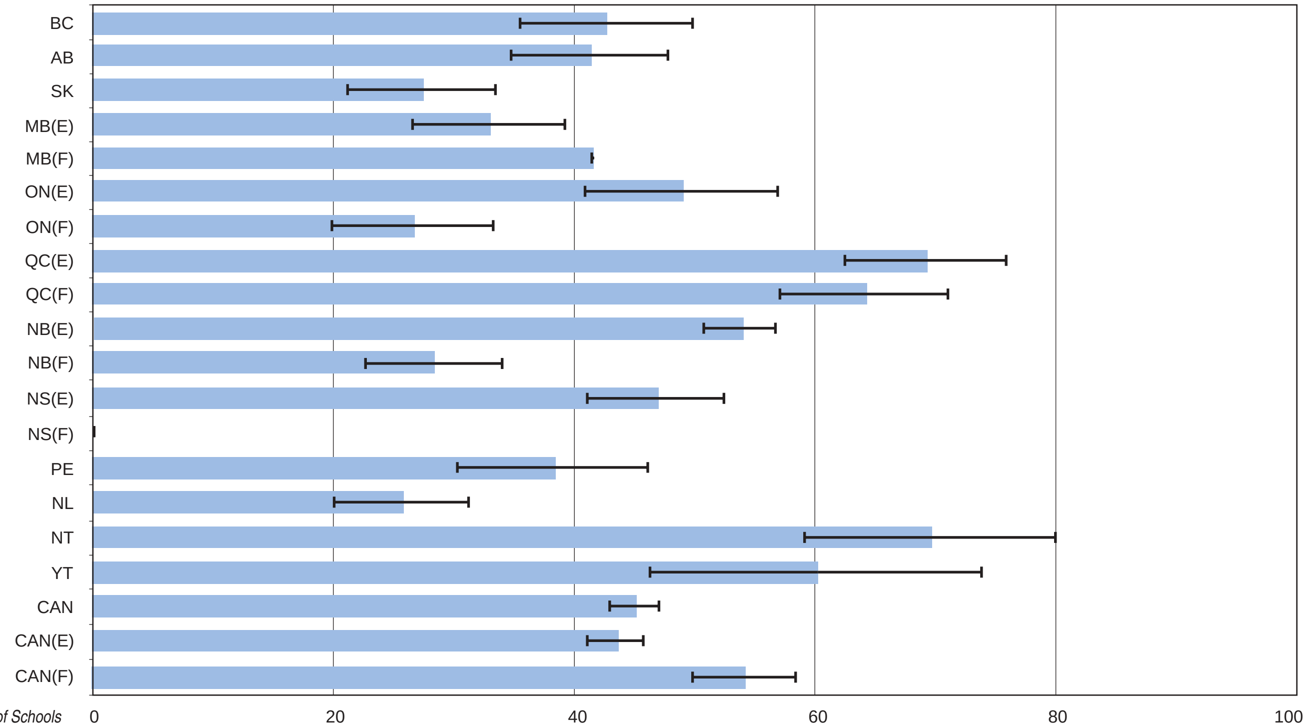
CHART P-6



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
25% or more	8	16	14	14	24	19	12	27	22	27	11	13	0	21	22	64	33	17	17	19

Percentage with 25% or more of students from single-parent families

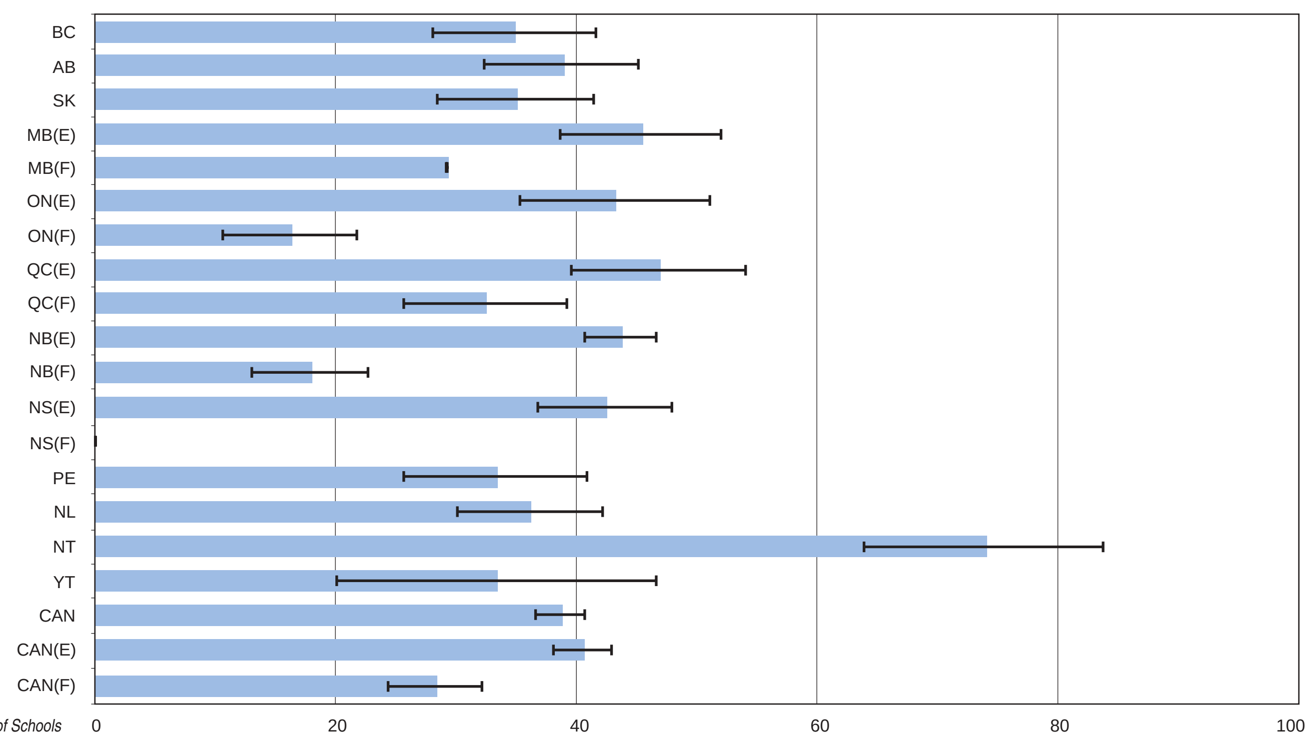
CHART P-7



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
25% or more	43	41	27	33	41	49	27	69	64	54	28	47	0	38	26	70	60	45	43	54

Percentage with 10% or more of students who have health or nutrition problems that inhibit learning

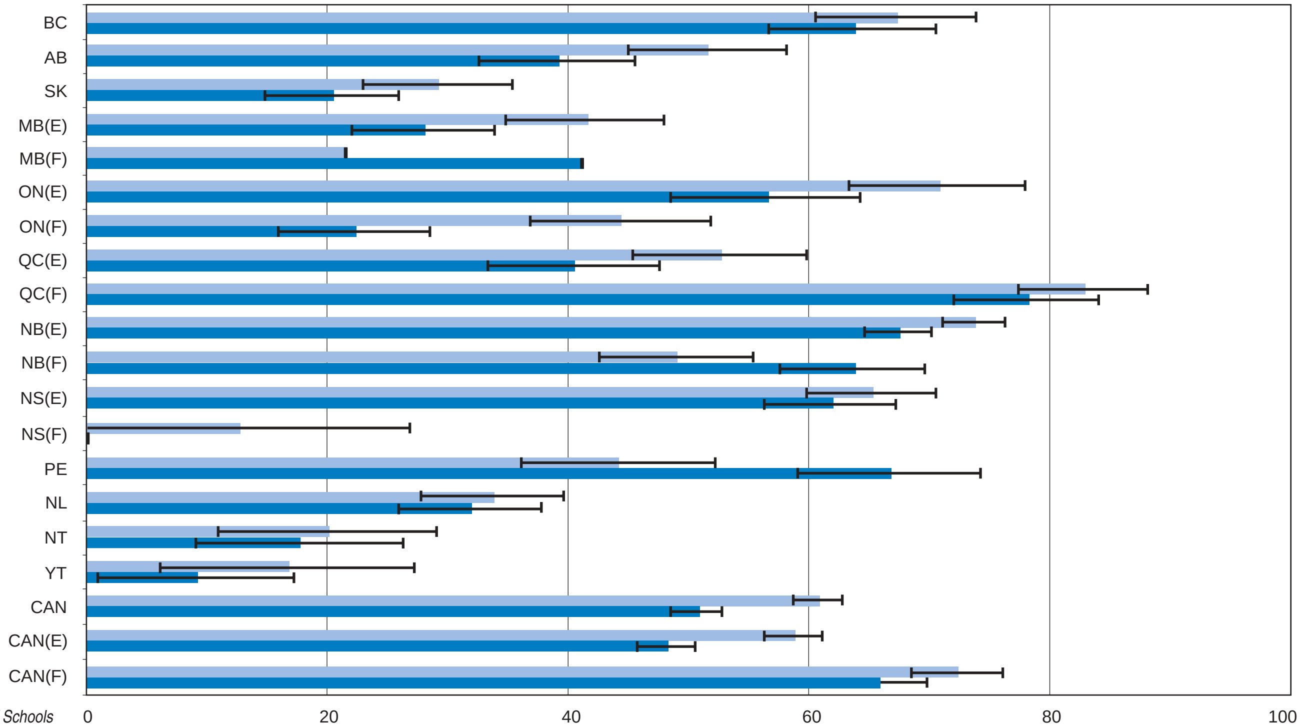
CHART P-8



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
10% or more	35	39	35	45	29	43	16	47	32	44	18	42	0	33	36	74	33	39	41	28

Percentage with an average class size of 25 students or more

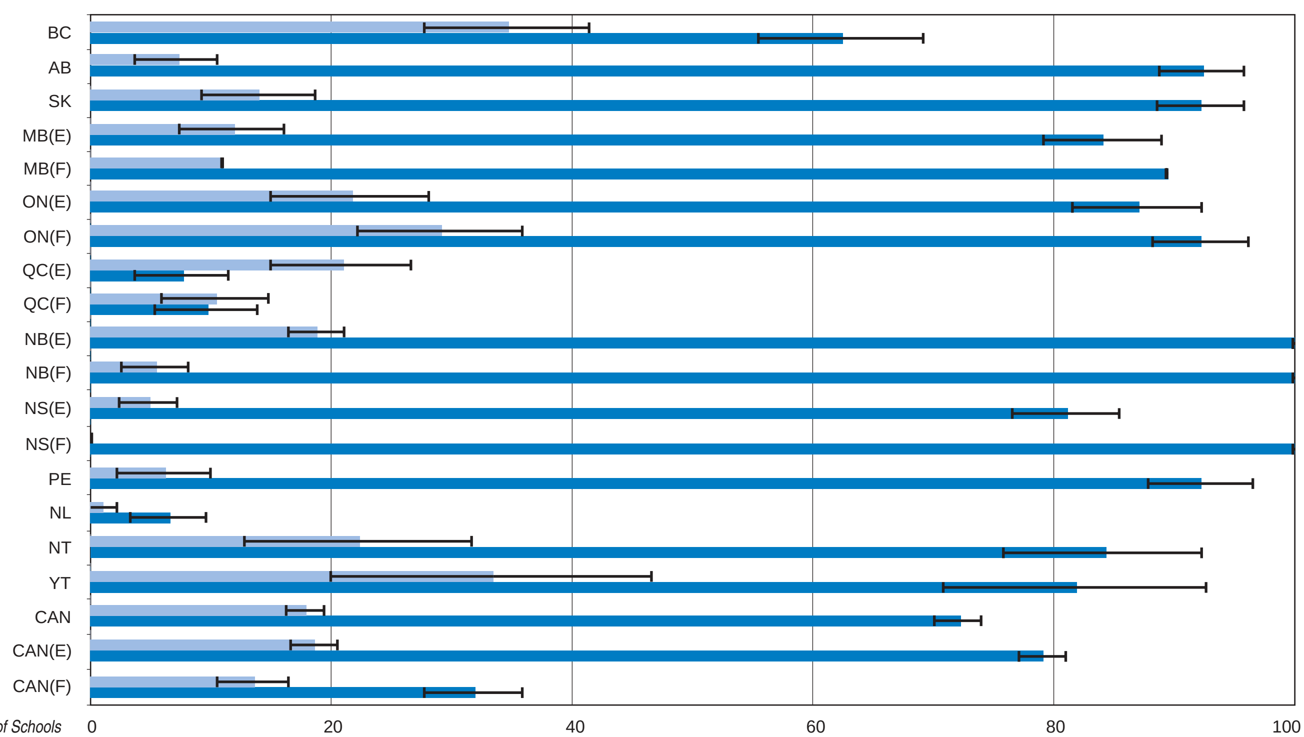
CHART
P-9



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	67	52	29	41	21	71	44	53	83	74	49	65	13	44	34	20	17	61	59	72
16-year-olds	64	39	20	28	41	56	22	40	78	67	64	62	0	67	32	18	9	51	48	66

Percentage reporting that science courses for 13-year-olds and 16-year-olds are organized on a semester basis

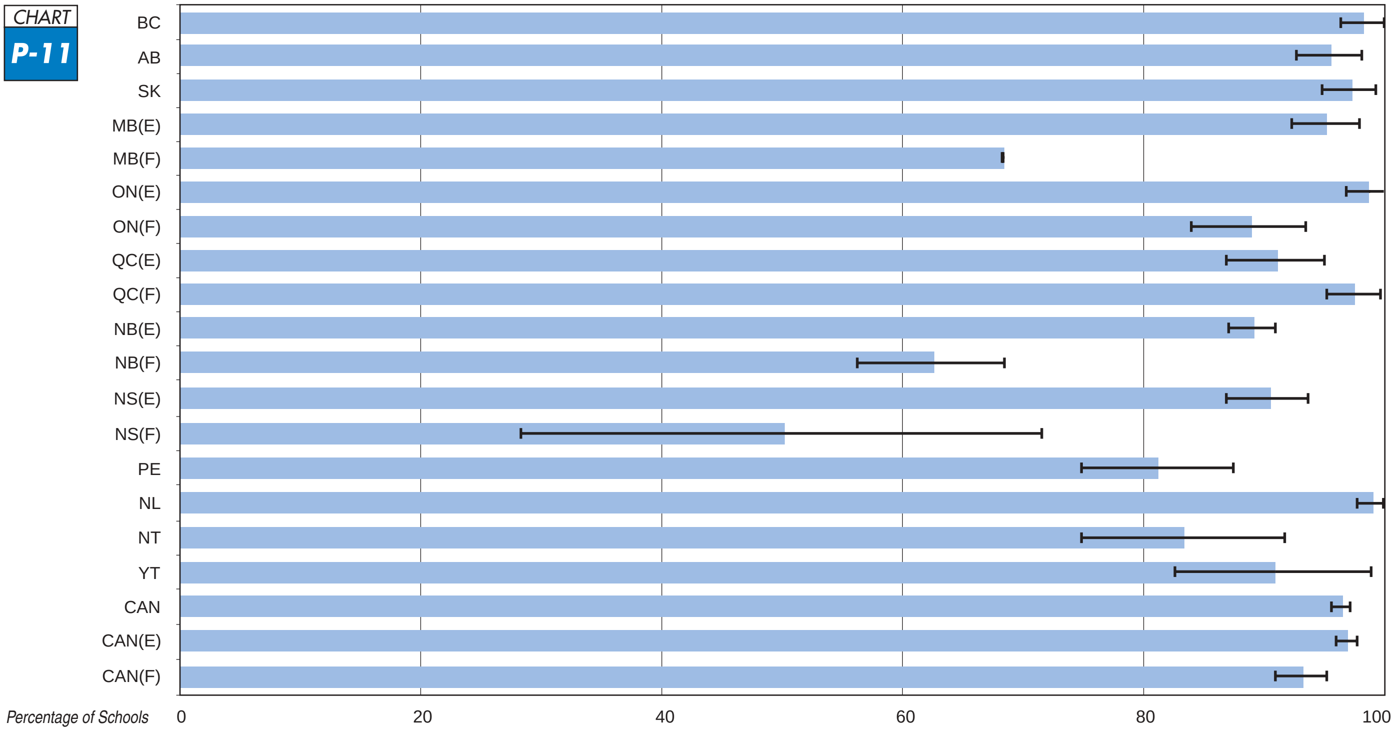
CHART
P-10



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	35	7	14	12	11	22	29	21	10	19	5	5	0	6	1	22	33	18	19	13
16-year-olds	62	92	92	84	89	87	92	8	10	100	100	81	100	92	6	84	82	72	79	32

Percentage reporting teachers responsible for specific subjects as the most common pattern of teaching assignment for teaching 16-year-olds

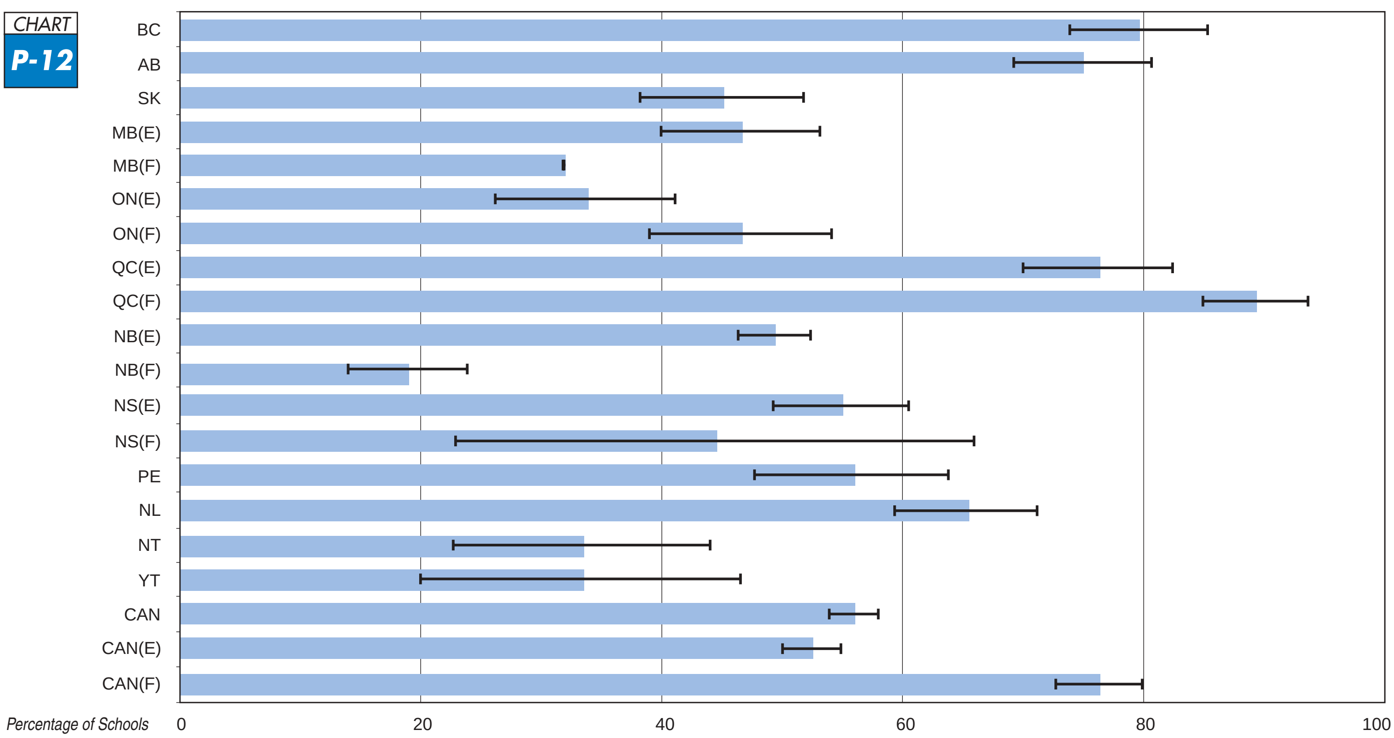
CHART **P-11**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Teachers responsible for specific subjects	98	96	97	95	68	99	89	91	98	89	63	90	50	81	99	83	91	96	97	93

Percentage reporting teachers responsible for specific subjects as the most common pattern of teaching assignment for teaching 13-year-olds

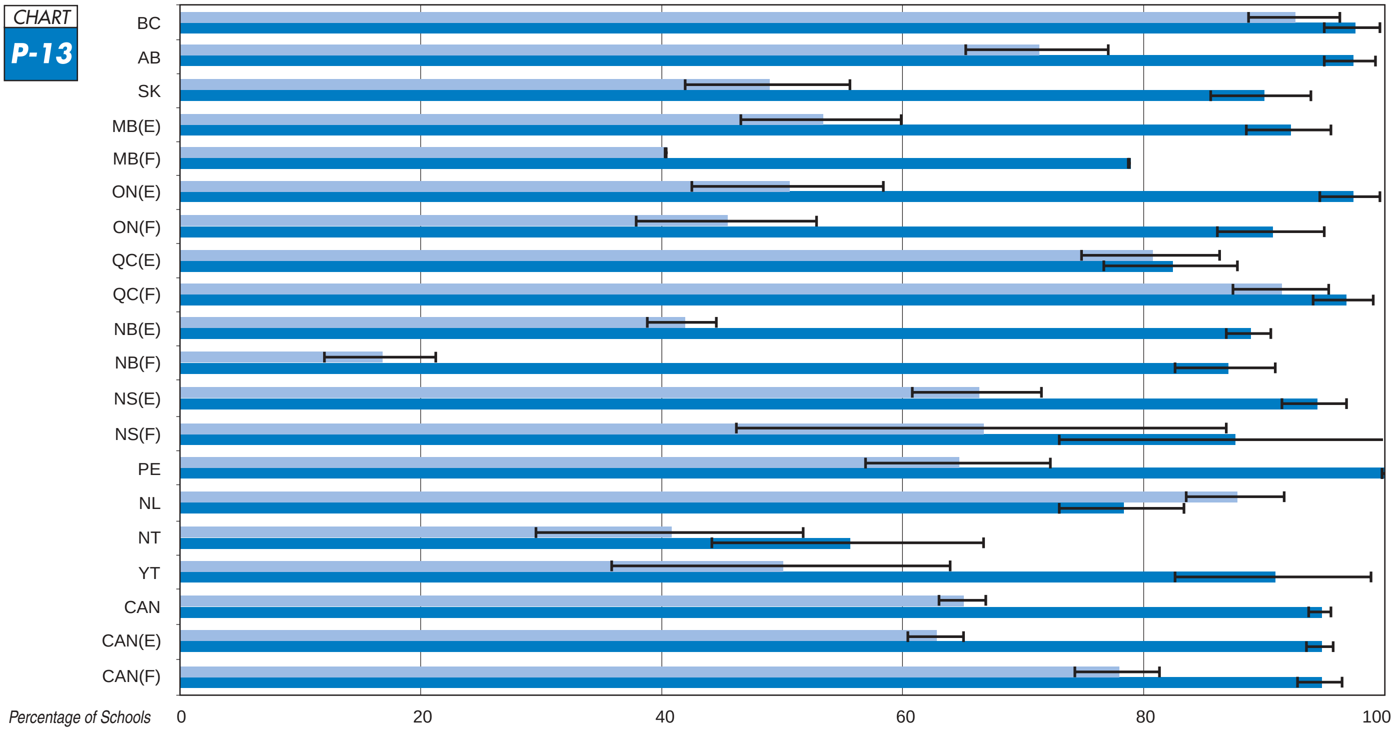
CHART **P-12**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Teachers responsible for specific subjects	80	75	45	47	32	34	47	76	89	49	19	55	44	56	65	33	33	56	52	76

Percentage in which science is taught mainly by specialized subject teachers

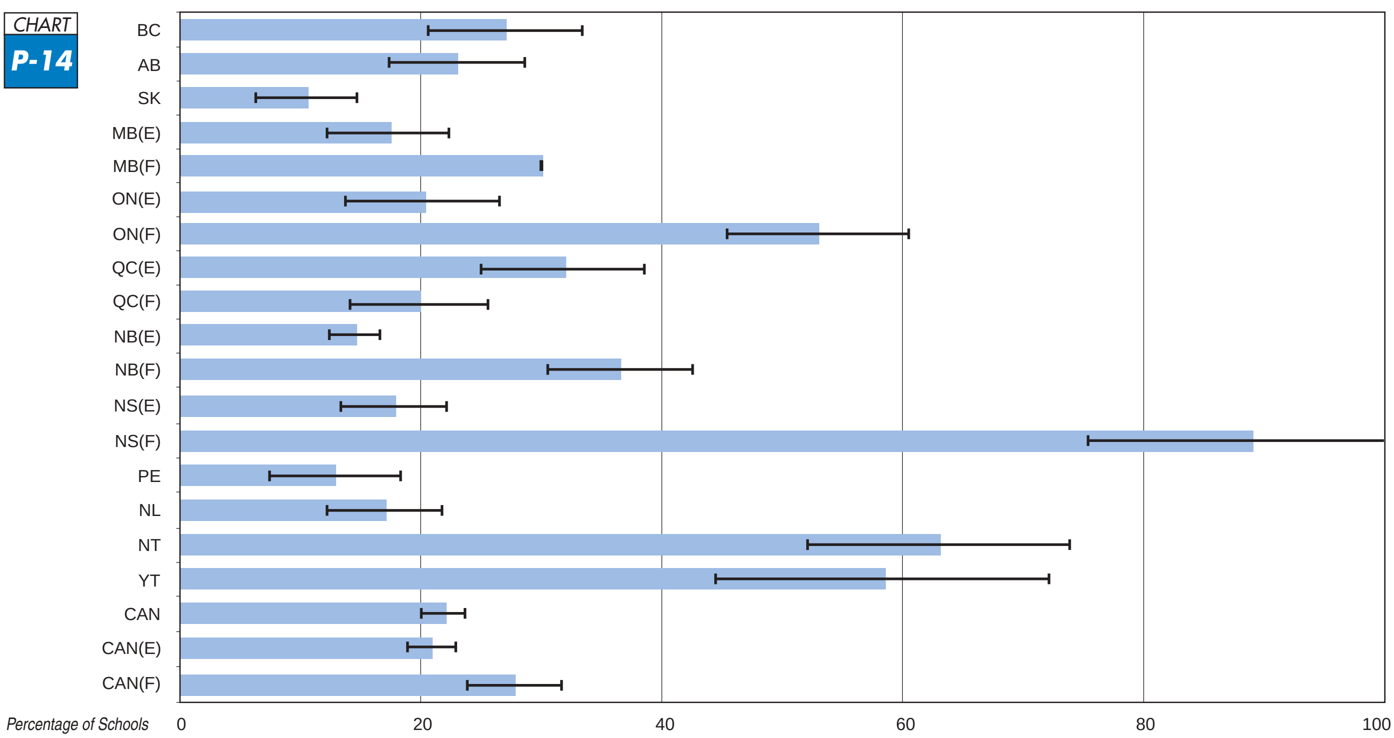
CHART P-13



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	93	71	49	53	40	51	45	81	92	42	17	66	67	65	88	41	50	65	63	78
16-year-olds	98	97	90	92	79	97	91	82	97	89	87	94	88	100	78	56	91	95	95	95

Percentage of schools reporting that their school's instruction is limited by the community conditions

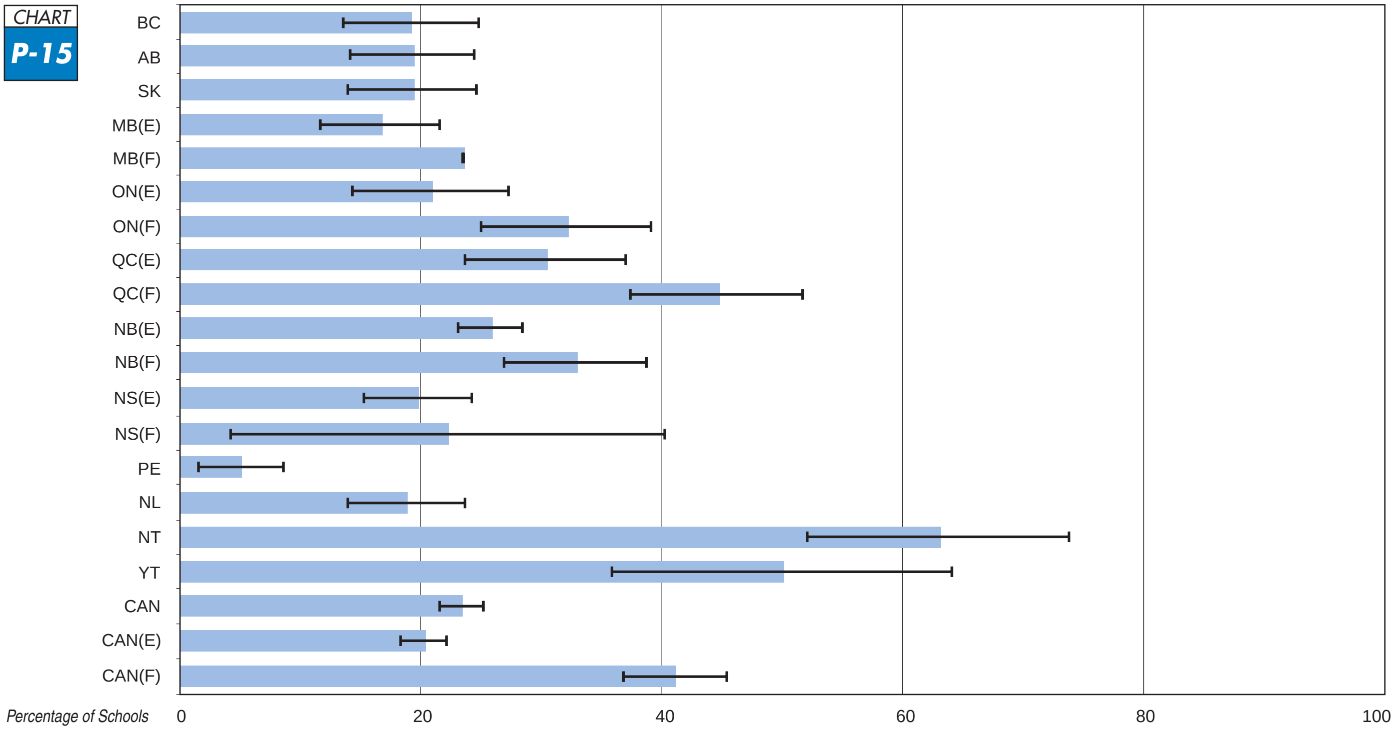
CHART P-14



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Somewhat or a lot	27	23	10	17	30	20	53	32	20	14	37	18	89	13	17	63	58	22	21	28

Percentage reporting that their school's capacity to provide instruction is limited by the lack of parental support for the school

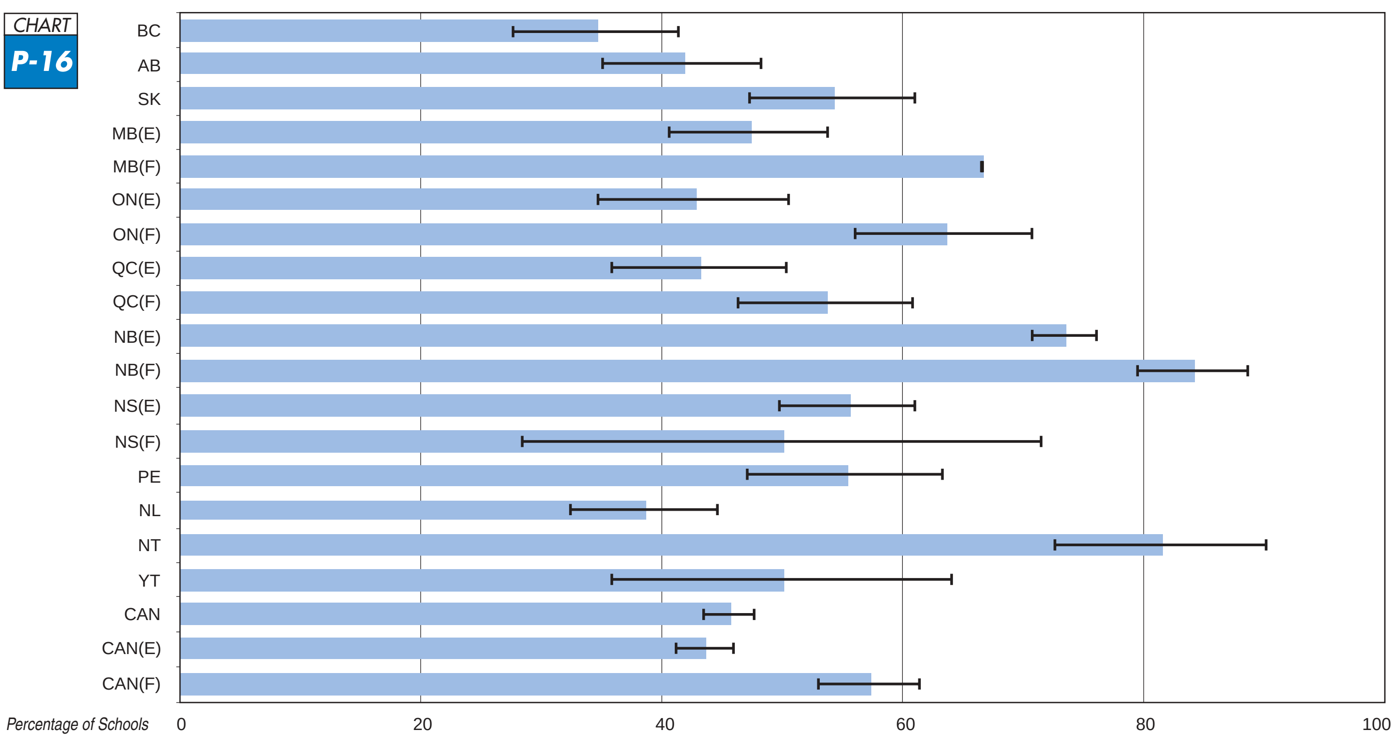
CHART **P-15**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Somewhat or a lot	19	19	19	17	24	21	32	30	45	26	33	20	22	5	19	63	50	23	20	41

Percentage reporting that a shortage or an inadequacy of teachers specialized in science affects the school's capacity to provide instruction

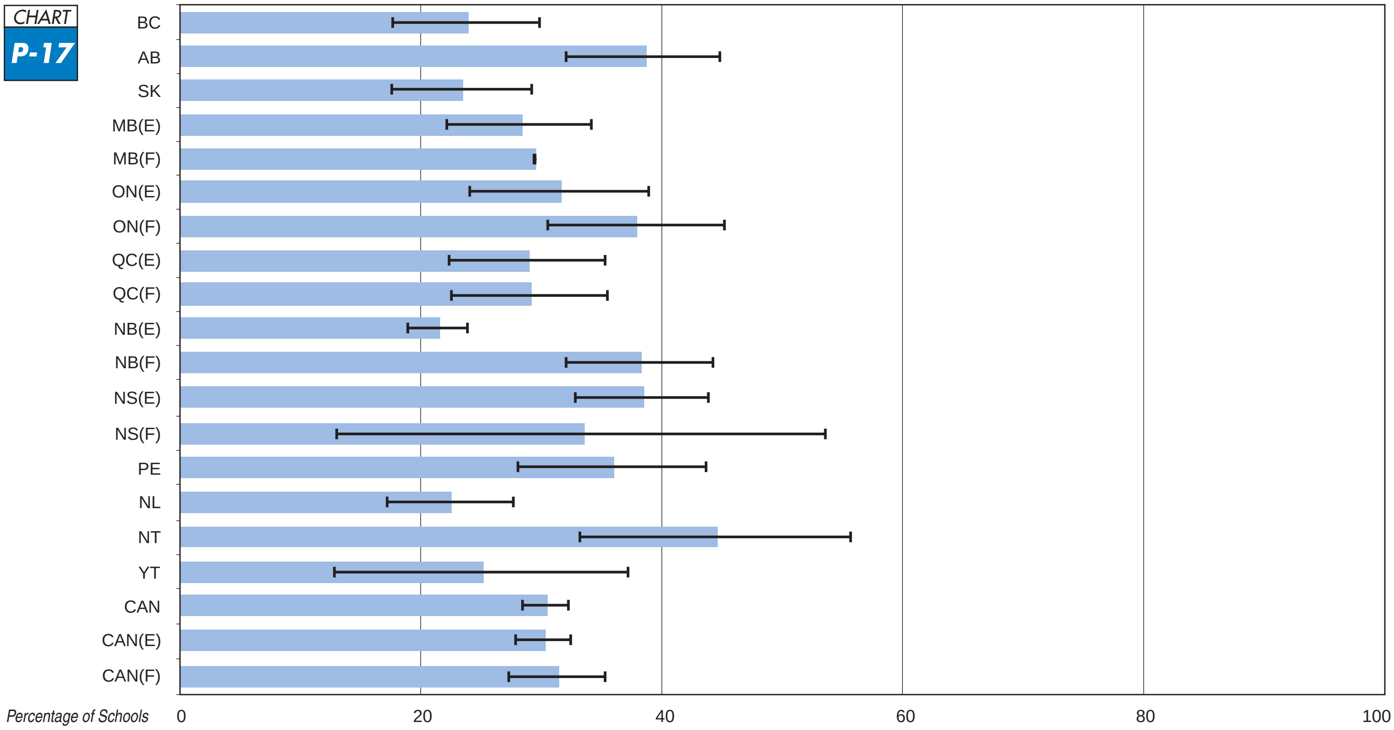
CHART **P-16**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Somewhat or a lot	35	42	54	47	67	43	63	43	54	73	84	55	50	55	39	81	50	46	44	57

Percentage reporting that their school's instruction is limited by shortage or inadequacy of special-purpose space

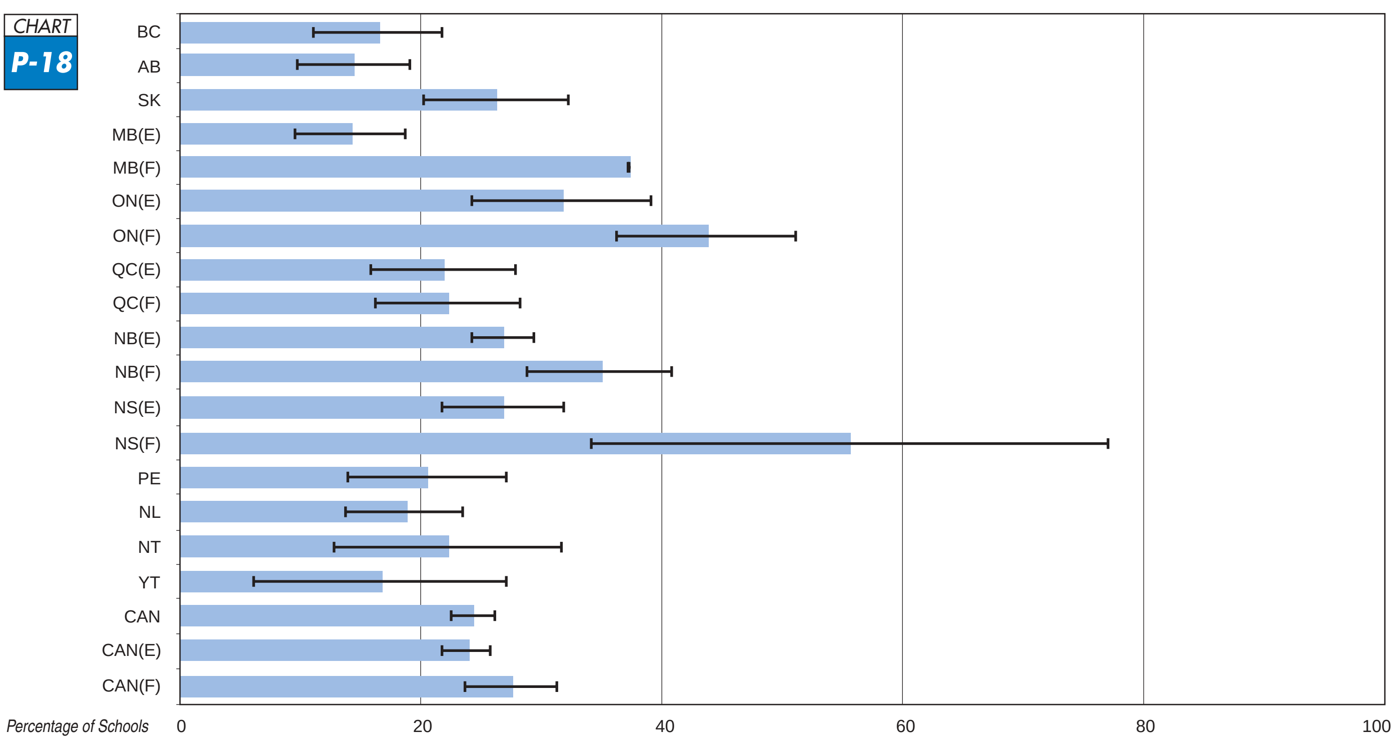
CHART **P-17**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Somewhat or a lot	24	39	23	28	29	31	38	29	29	21	38	38	33	36	22	44	25	30	30	31

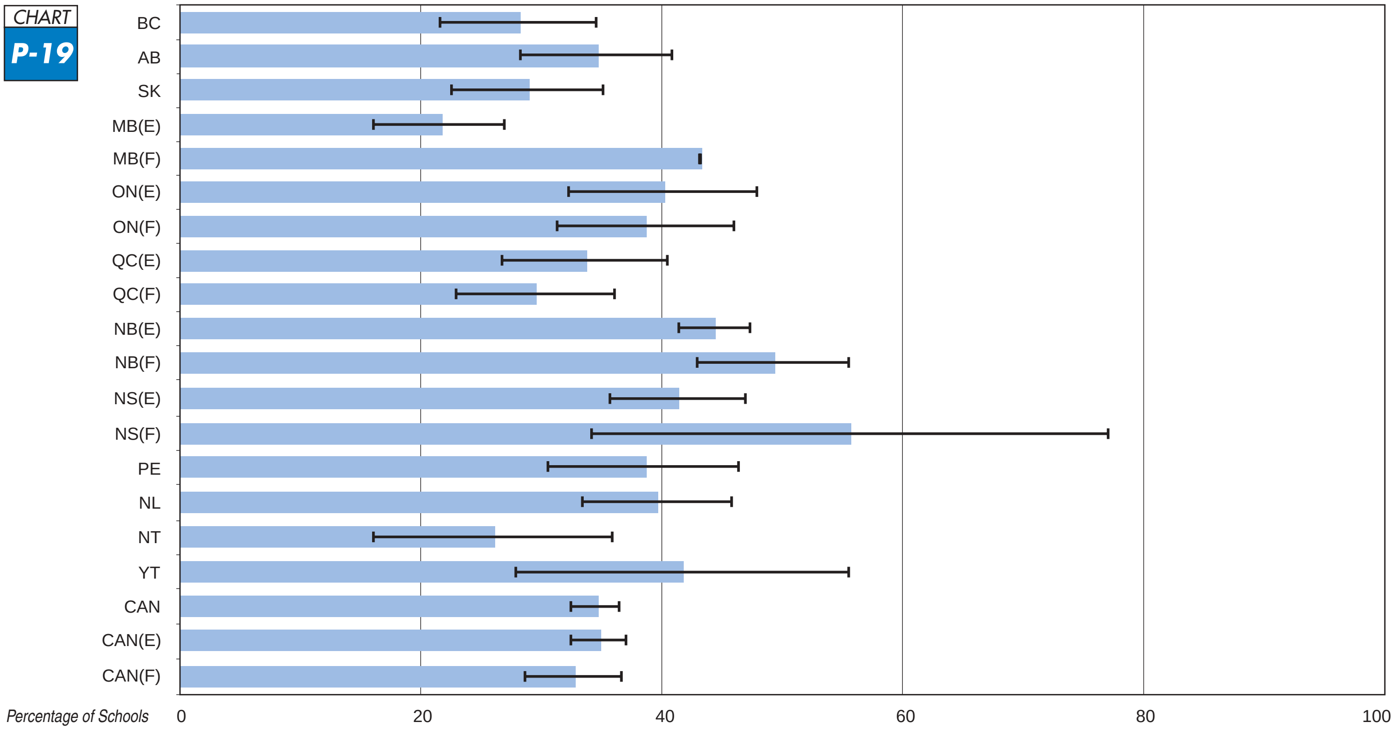
Percentage reporting that their school's instruction is limited by shortage or inadequacy of instructional materials

CHART **P-18**



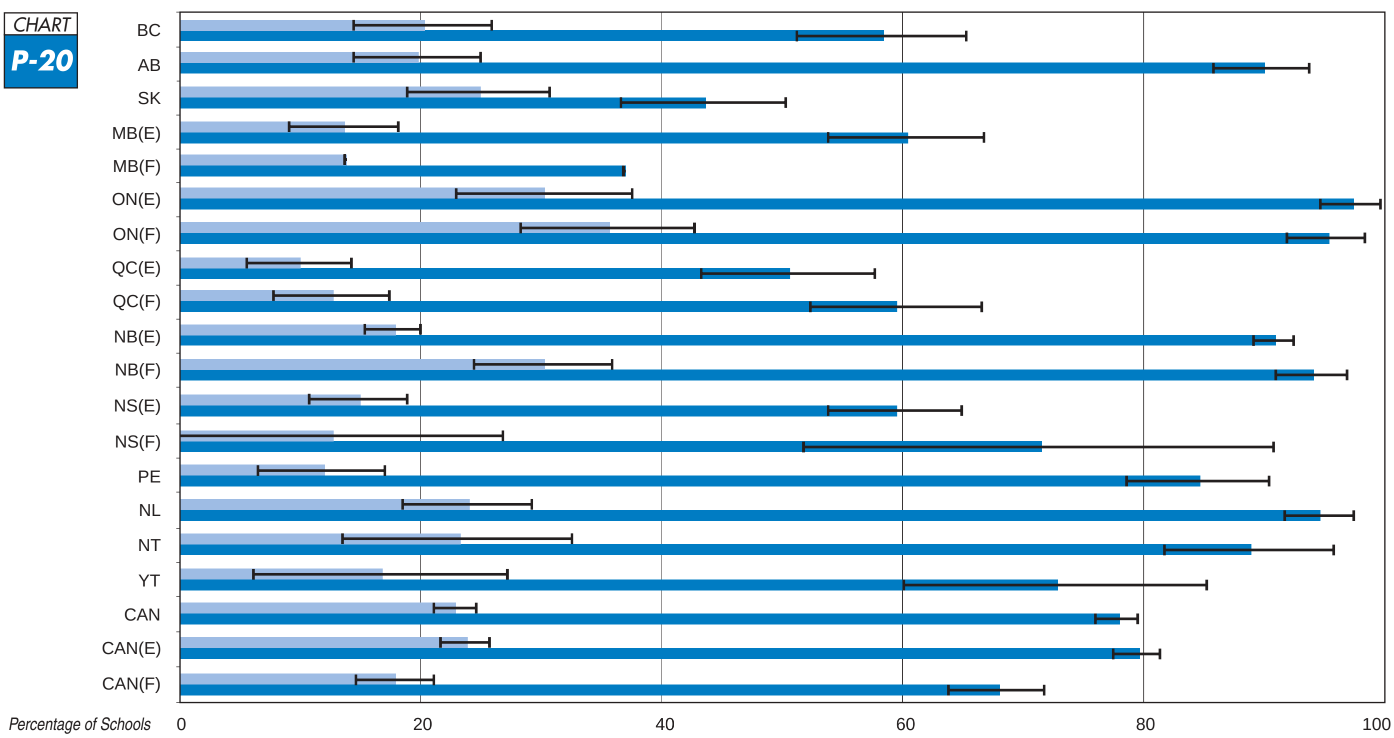
	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Somewhat or a lot	16	14	26	14	37	32	44	22	22	27	35	27	56	21	19	22	17	24	24	27

Percentage reporting that their school's instruction is limited by shortage or inadequacy of budget for supplies



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Somewhat or a lot	28	35	29	21	43	40	39	34	29	44	49	41	56	38	40	26	42	34	35	33

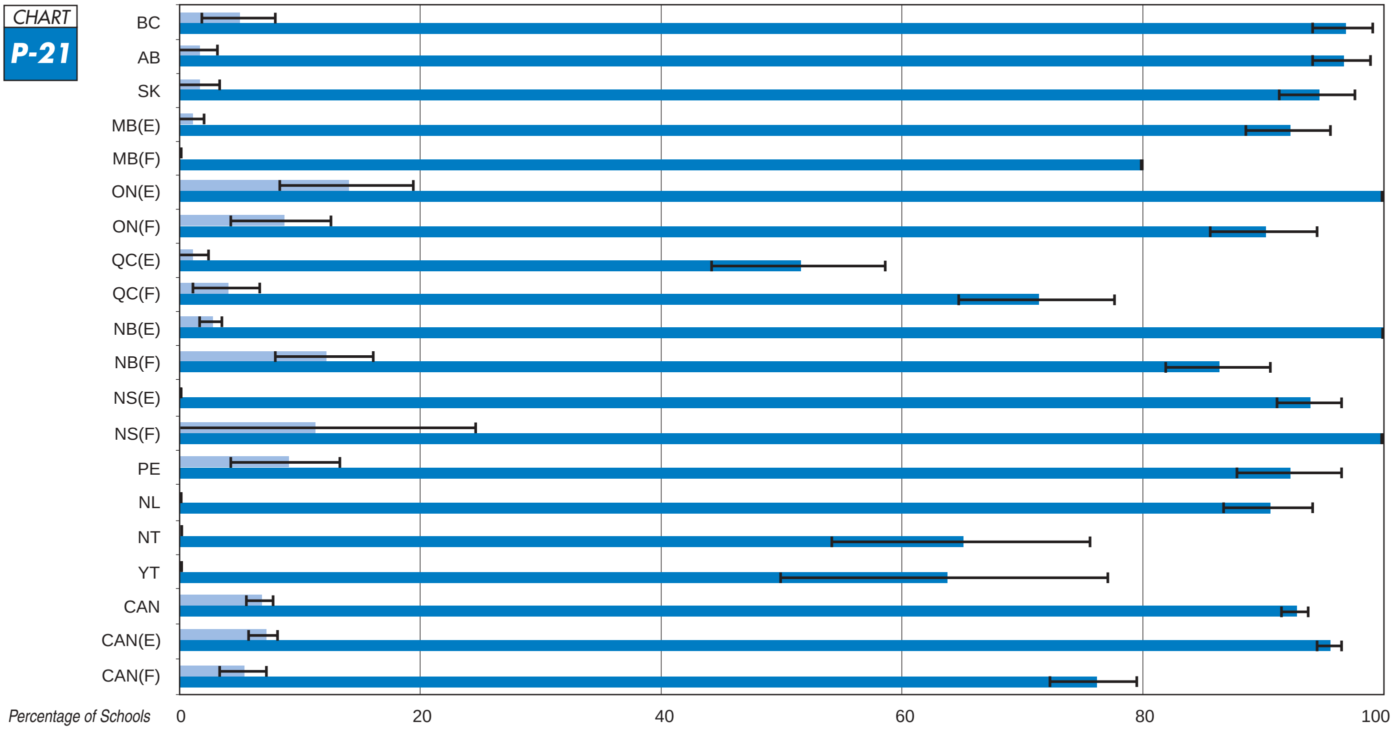
Percentage reporting two or more distinct streams or ability groupings for science students



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	20	20	25	14	14	30	36	10	13	18	30	15	13	12	24	23	17	23	24	18
16-year-olds	58	90	44	60	37	97	95	51	60	91	94	59	71	85	95	89	73	78	80	68

Percentage reporting three or more different science courses available to 13-year-olds and 16-year-olds

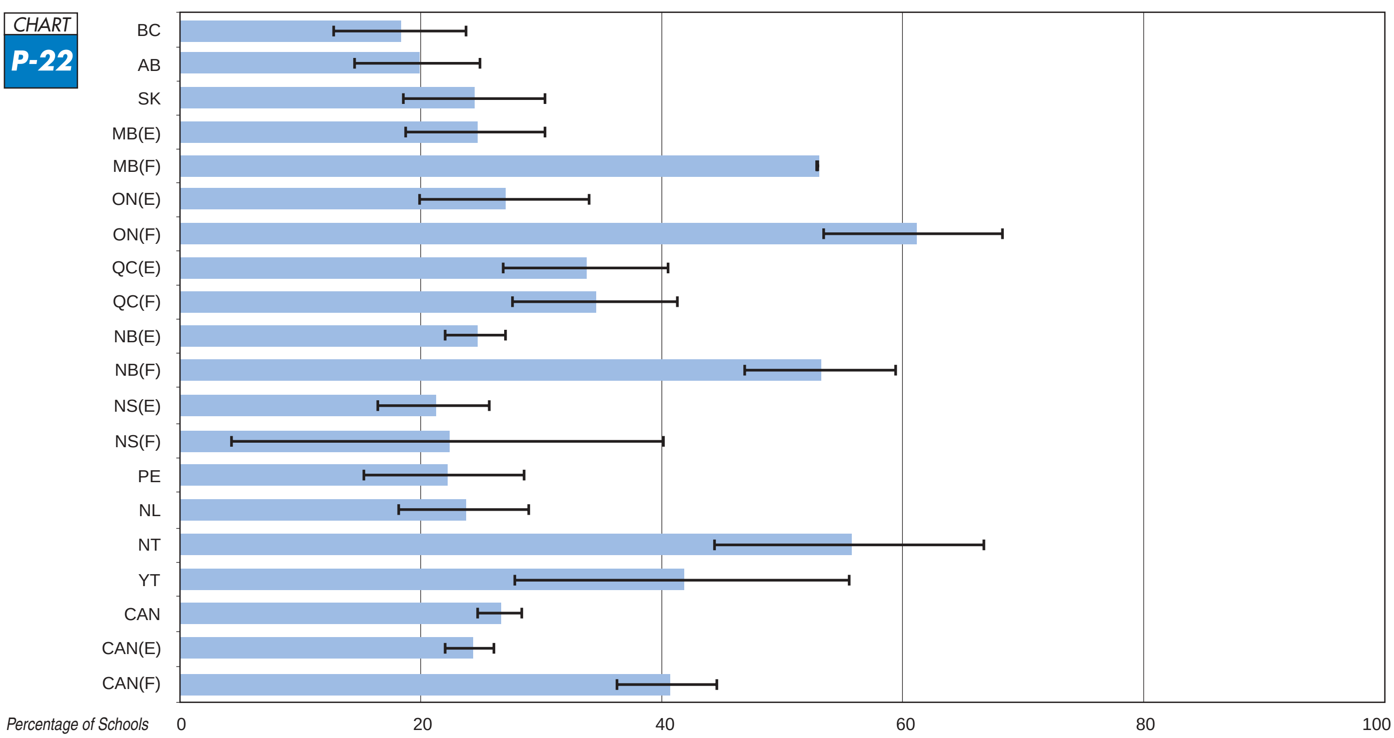
CHART **P-21**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
13-year-olds	5	2	2	1	0	14	8	1	4	3	12	0	11	9	0	0	0	7	7	5
16-year-olds	97	97	95	92	80	100	90	52	71	100	86	94	100	92	91	65	64	93	96	76

Percentage reporting that their school does NOT provide remedial teaching in science

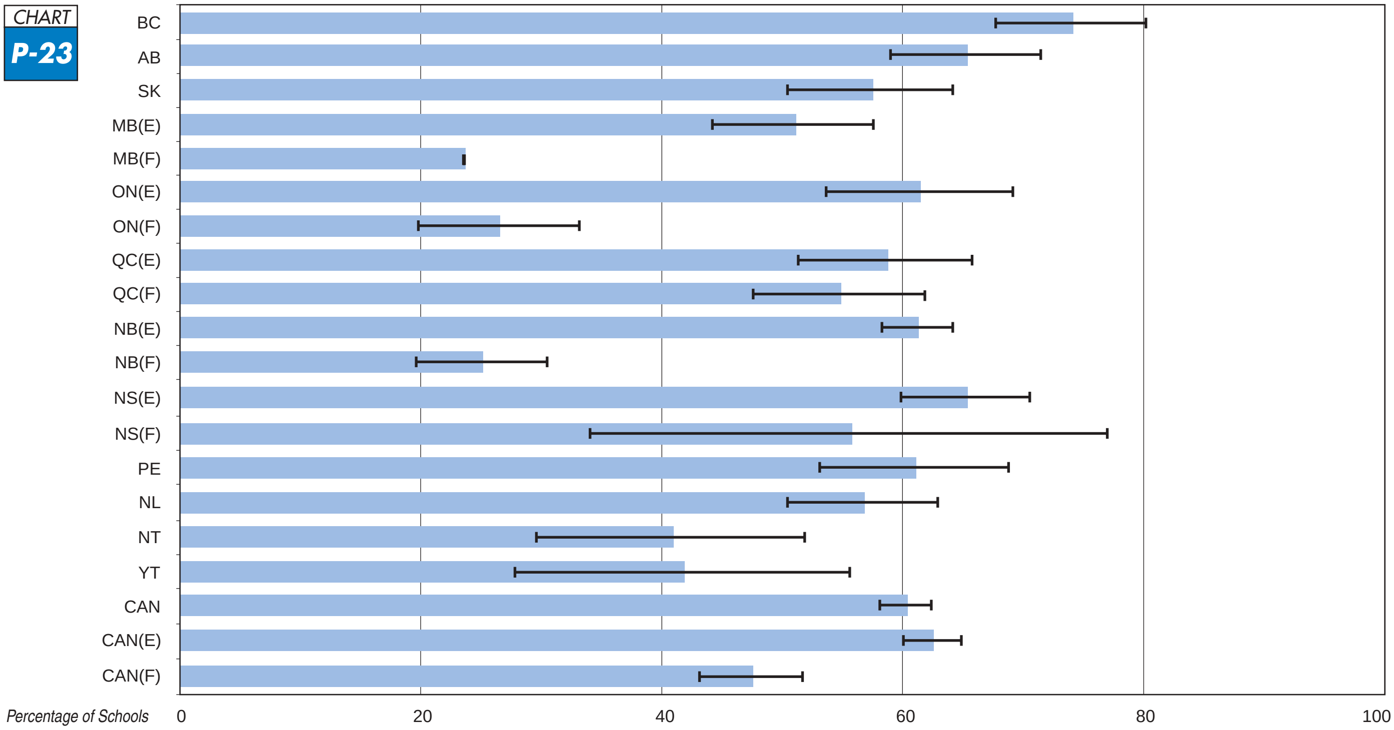
CHART **P-22**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
No remedial teaching	18	20	24	25	53	27	61	34	34	24	53	21	22	22	24	56	42	26	24	40

Percentage reporting that their school provides remedial teaching in science, such as students given extra help outside of regular school hours

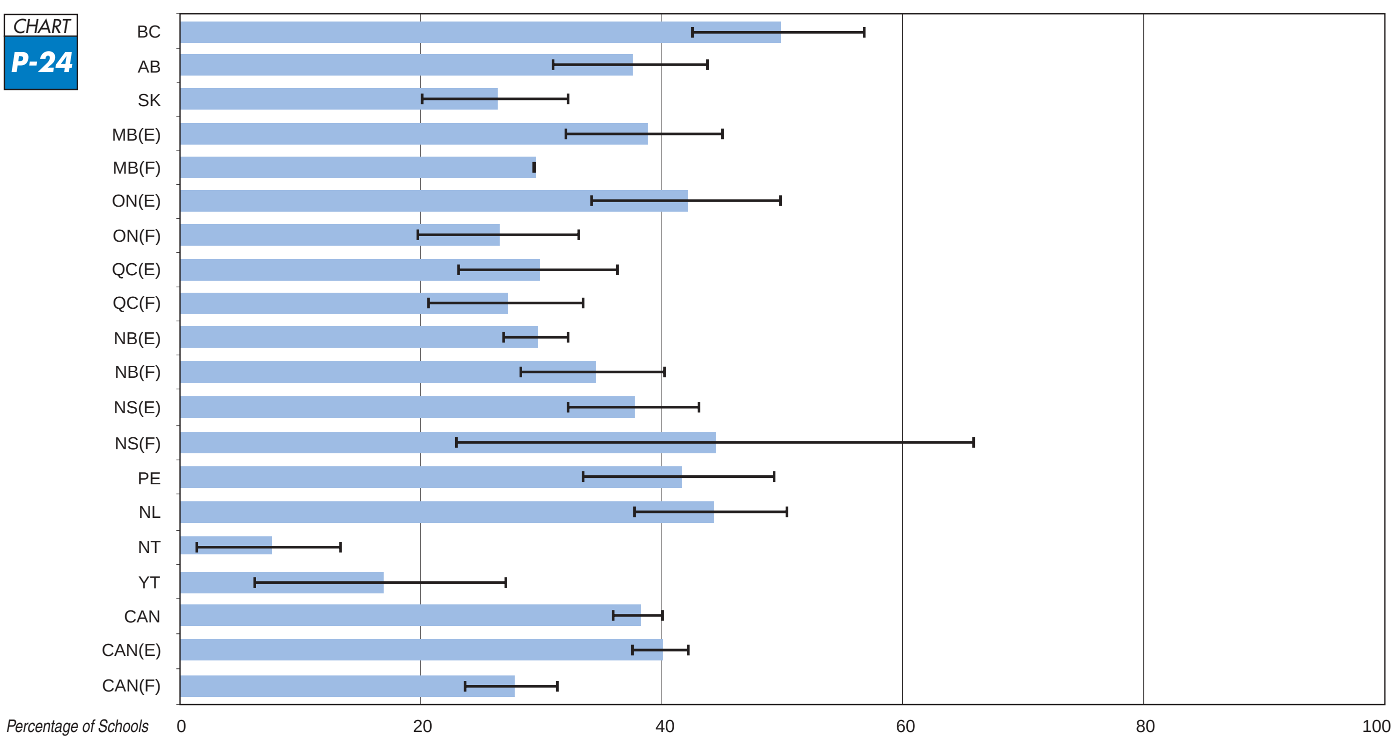
CHART
P-23



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Yes	74	65	57	51	24	61	26	59	55	61	25	65	56	61	57	41	42	60	62	47

Percentage reporting their school provides remedial teaching in science, such as peer tutoring during regular science classes or after school

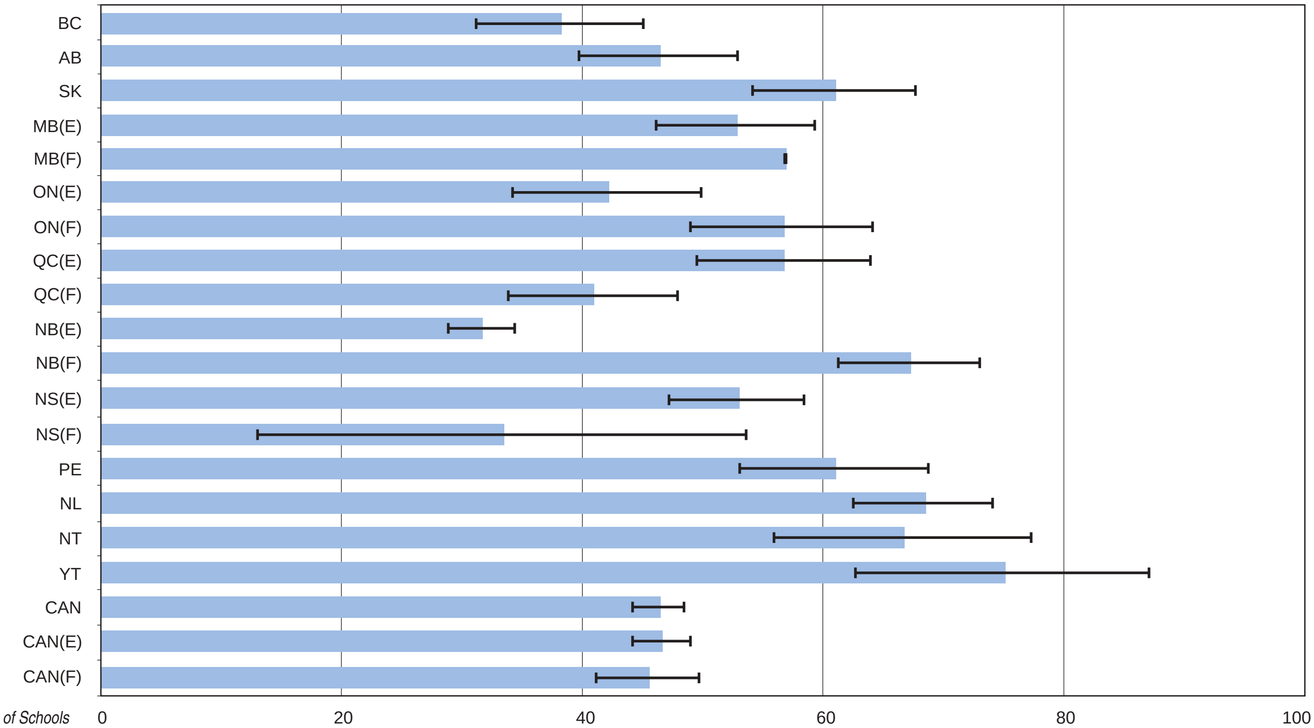
CHART
P-24



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Yes	50	37	26	39	29	42	26	30	27	30	34	38	44	41	44	7	17	38	40	28

Percentage reporting that their school does NOT provide enrichment programs in science for gifted students

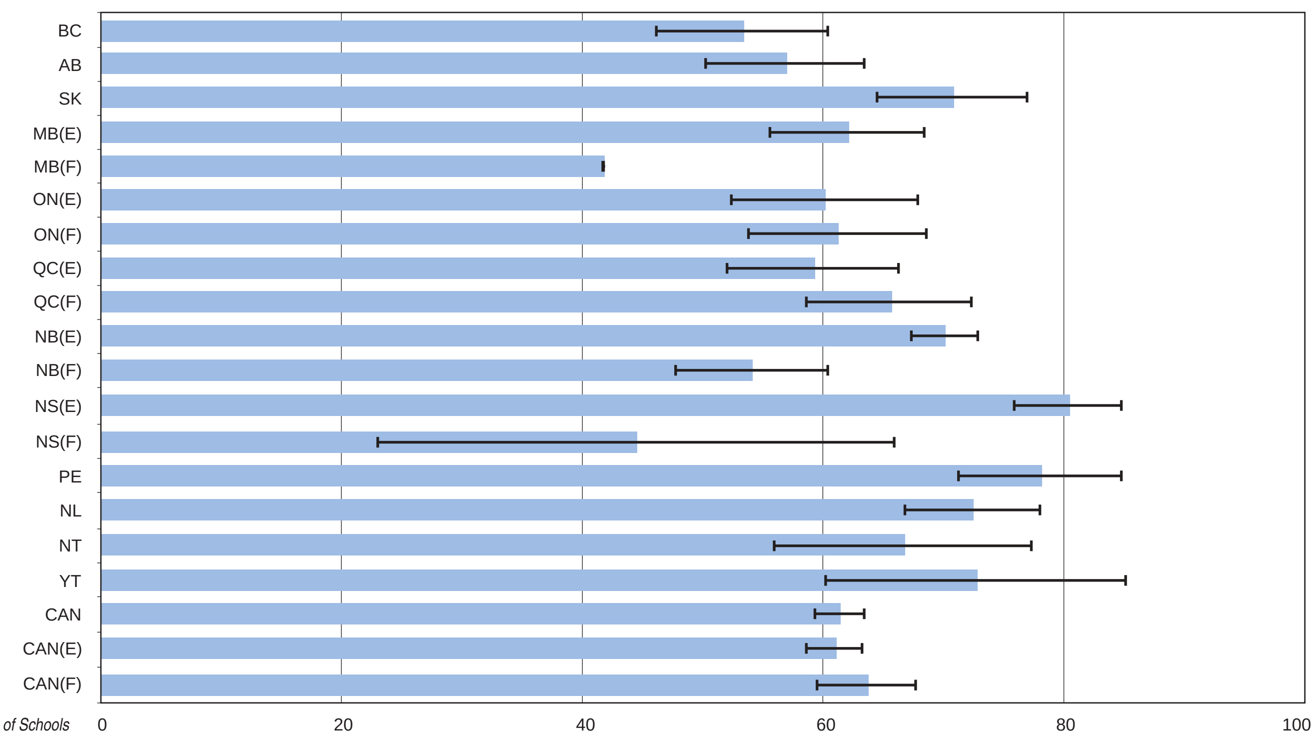
CHART **P-25**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
No	38	46	61	53	57	42	57	57	41	32	67	53	33	61	68	67	75	46	47	45

Percentage reporting that there are limits to what a school can accomplish because a student's home environment has a major influence on achievement

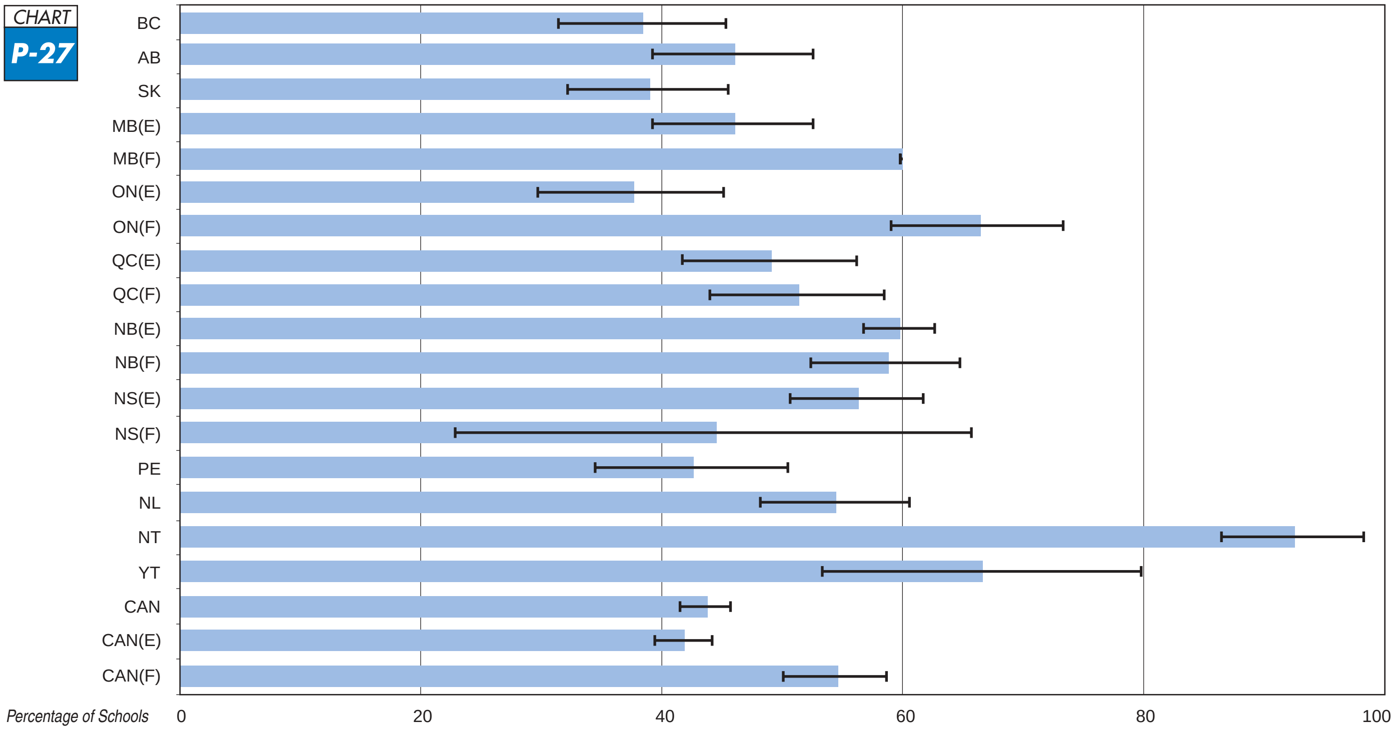
CHART **P-26**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Yes	53	57	71	62	42	60	61	59	66	70	54	80	44	78	72	67	73	61	61	64

Percentage reporting that their school's capacity to provide instruction is limited by the range of student abilities

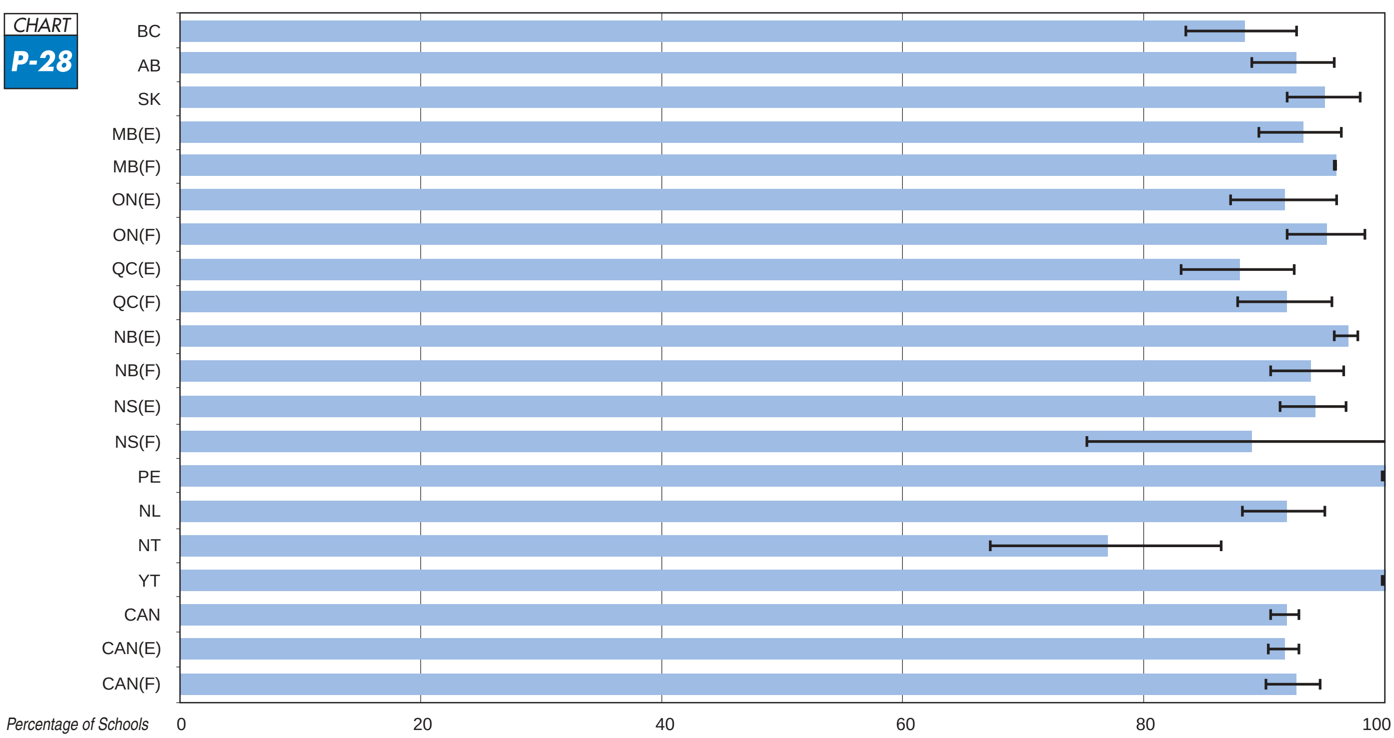
CHART **P-27**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Somewhat or a lot	38	46	39	46	60	38	66	49	51	60	59	56	44	43	54	93	67	44	42	55

Percentage of schools that agree or strongly agree that staff morale is high in their school

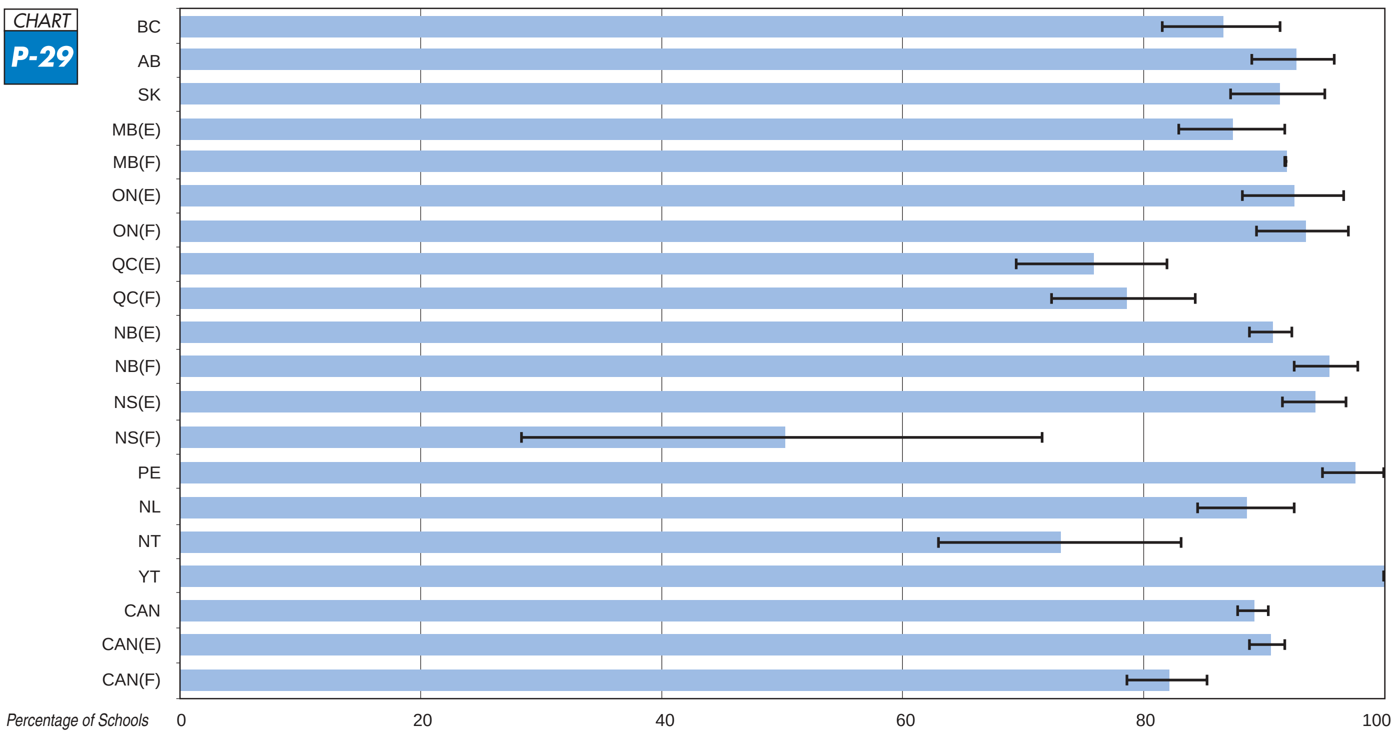
CHART **P-28**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Agree or strongly agree	88	92	95	93	96	92	95	88	92	97	94	94	89	100	92	77	100	92	92	93

Percentage of schools that agree or strongly agree that there is a strong school spirit in their school

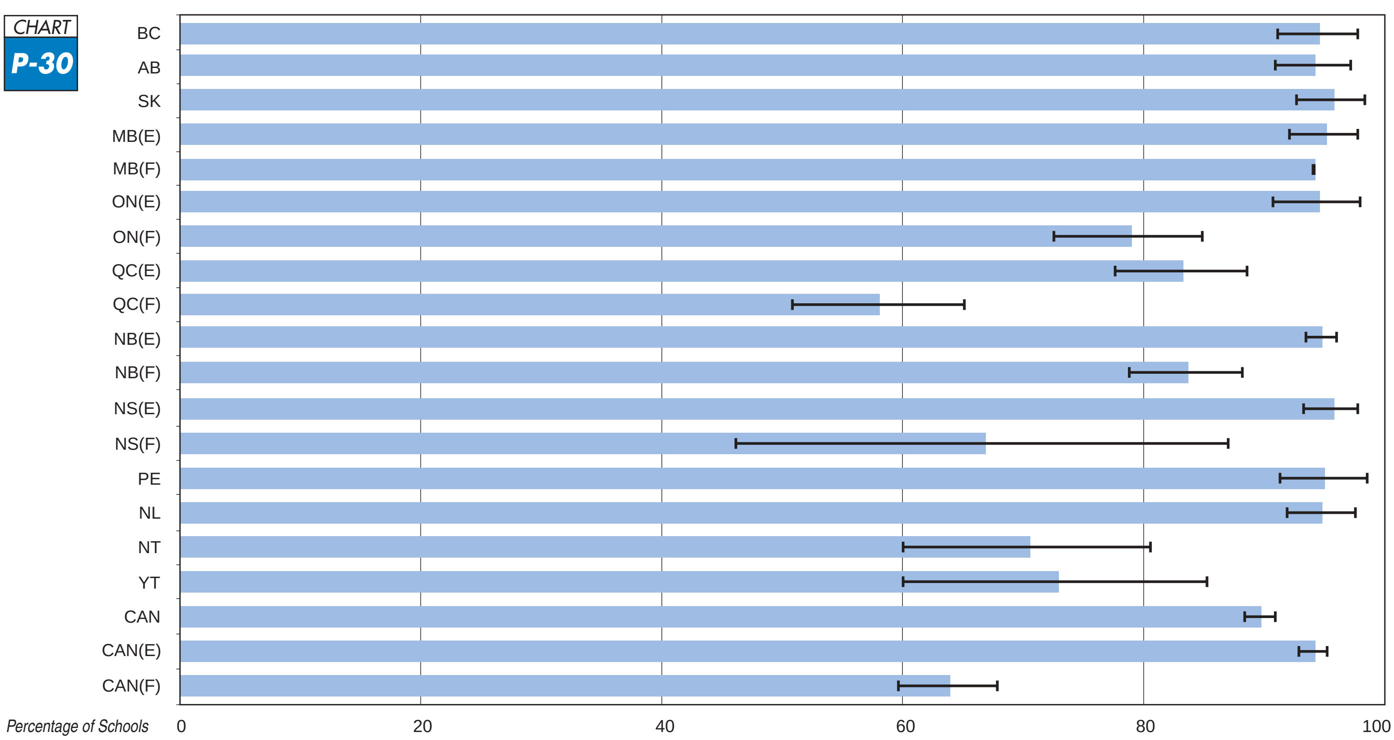
CHART **P-29**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Agree or strongly agree	87	92	91	87	92	92	93	76	78	91	95	94	50	98	89	73	100	89	90	82

Percentage of schools that agree or strongly agree that their school is supported by the community

CHART **P-30**



	BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN	CAN(E)	CAN(F)
Agree or strongly agree	95	94	96	95	94	94	79	83	58	95	84	96	67	95	95	70	73	90	94	64

Student achievement is influenced by an enormous number of variables. Some of these, such as student ability and socioeconomic status, have been extensively studied. Others, especially macro-level policy variables and school and classroom practices, are less well documented. One of the functions of large-scale assessments is to add to our understanding of the factors influencing achievement. The addition of comprehensive questionnaires to the SAIP assessments was intended to allow some progress to be made toward this goal.

This section presents an exploratory analysis based on simple bivariate relationships between selected questionnaire variables and science achievement. Following the pattern established in past SAIP reports, the results are given for each jurisdiction. However, the emphasis here shifts from jurisdictional comparisons to finding stable relationships. Results by jurisdiction should therefore be thought of as "replications" rather than as comparisons across jurisdictions. While it is possible that some of the factors influencing achievement will operate differently in different settings (e.g., correlate positively with achievement in some jurisdictions and negatively in others), the analysis is not focused directly on such differences.

It is also important to recognize that, because students learn in complex ways, no single variable can be expected to stand out as having a large influence on achievement. Most of the actual correlations reported are small. Their occurrence in consistent patterns is evidence of their stability across settings and not of their strength or educational significance.

Results of the type presented here cannot be interpreted as establishing causal directions. For example, the results show that students who reported spending one hour or more per week reading for enjoyment outside of school hours tended to perform better on the SAIP Science III Assessment. However, we cannot tell from these results if the time spent reading is one of the causes of higher SAIP science achievement. Nevertheless, the conceptual model being used assumes that input and process variables affect achievement and not the other way around.

A comprehensive analysis of the SAIP data would require efforts to model achievement using particular combinations of variables and to test such models statistically. It is hoped that the results presented here will stimulate further research on ways of modelling science achievement. These relationships are intended to point to some possible directions for such research using multivariate models. Analyses of this kind may allow researchers to discern which variables have the strongest relationships with science achievement.

For the student data, a direct relationship can be established between individual achievement and individual questionnaire responses. For the teacher questionnaire, each science teacher in a school was assigned an identification number, and student achievement was linked to the teacher questionnaire using this identification number. For the school questionnaires, the student achievement results were first aggregated to the school level and reported as the proportion of students in the school at or above the criterion (level 2 for 13-year-olds and level 3 for 16-year-olds).

Tables describing significant correlations of student, teacher, and school context questionnaires with student achievement may be found in the appendix to this report.

A selection of questionnaire variables was chosen for detailed analysis, based upon preliminary screening using the overall results for Canada. Results for all student questionnaire variables and the detailed cross-tabulations will appear in the technical report.

The correlation of many of these factors with achievement varies widely across the jurisdictions, making it very difficult to provide general comments in this report.

In this public report, nine variables have been selected for comment, all of which show consistent patterns across most jurisdictions and have particular relevance to science education. For the remaining variables, a detailed presentation is left for the technical report.

Student Background and Aspirations

Not surprisingly, students from both age groups and in almost all jurisdictions who report that they are not interested in science, as well as those who find science one of the most difficult subjects, did not perform well on the SAIP Science Assessment.

Conversely, 16-year-old students reporting that they are genuinely interested in school work, as well as those who believe that science is one of the most important subjects they study, tended to perform better on the SAIP Science Assessment.

It is interesting to note that the Trends in International Mathematics and Science Study 2003 (TIMSS 2003)[12] confirmed this correlation. In almost all countries surveyed at the grade 8 level, there was a positive association between valuing science and average science achievement.

Box 10

Statistical Note

Student results are based on cross-tabulations of levels of achievement with categories from the questionnaire items. This type of data is ordinal (rank order) in nature. A statistic known as Kendall's tau-b is used as the measure of relationship for this type of data. The relationship is considered statistically significant if the probability that a value of tau-b as large as that observed can occur by chance is 0.05 or less.

When reporting a large number of statistical tests, each at the 0.05 level of significance, one in twenty such tests can be considered a "false positive." For this reason, the emphasis here is on results that show consistent patterns across jurisdictions. The results should not be used to compare jurisdictions. It was actually rare to find results in opposite directions from one jurisdiction to another. Differences that were not statistically significant were virtually all in the same direction as those labelled significant.

For brevity in reporting, only the indicator of significance and the direction of the relationship (s+ and s-) are presented in the appendix. More detailed cross-tabulations will be found in the technical report. A positive relationship (s+) should be interpreted as meaning that positive values of the questionnaire indicator are associated with higher performance. Some questionnaire items were reverse-scaled to maintain this interpretation.

A two-step procedure was used to select variables for discussion. At the first step, the correlation for Canada as a whole was computed. If this correlation was statistically significant at the 0.05 level, the second step was invoked. This step involved a "sign test" based on the number of positive and negative correlations across the 17 SAIP populations (excluding CAN(E), CAN(F), and CAN). The sign test gives a measure of the consistency of the correlations across populations but not of their magnitude. A variable was selected for discussion if 12 or more correlations were in the same direction.

[12] Martin, M.O. et al. 2004. *TIMSS 2003 International Science Report*, Chestnut Hill: TIMSS & PIRLS International Study Center: **http://timss.bc.edu/PDF/t03_download/T03_S_Chap4.pdf**, p. 165.

The School Experience

There were only three variables in this category that have consistent correlations across most jurisdictions.

With respect to assessment factors, 13-year-olds who think that they get the marks they deserve tend to enjoy higher achievement in science.

Both 13-year-olds and 16-year-olds who report having a quiz or test a few times a week or more are more likely to have lower science achievement. As educators have learned more and more about the importance of assessment and evaluation in the classroom as learning tools, rather than as strictly measures of success or failure, perhaps the frequency of tests and quizzes will become less important than other strategies for student assessment. The purposes of assessment (formative, summative, and diagnostic) need to be carefully considered as do the strategies for gathering the information (tests, quizzes, laboratory assignments, classroom work, formal examinations).

One more variable that is consistently correlated negatively with science achievement is that in which students report being outside the school for educational outings a few times a month or more. Perhaps the concern of some teachers that a "crowded curriculum" precludes taking time for such opportunities might have some validity. If taking time for such activities has a negative effect on achievement, an examination of the causes for this linkage would be worth considering. Many science educators would agree that linking science knowledge and skills with the real world of the student is vital in fostering a scientifically literate population.

Out-of-School Activities

Students can do a number of things outside of school to enhance their scholastic achievement. One of these that consistently shows positive correlation across jurisdictions for students from both age-groups is spending one hour or more per week reading for pleasure outside school hours.

A more complete table of correlations of student questionnaire variables with student achievement will be found in the appendix to this report.

TEACHER QUESTIONNAIRE

It is more difficult to establish a relationship between teacher responses to context questions and the achievement of their students. This report is the first instance for a SAIP assessment in which the complex connections between student data, teacher responses, and school data were tracked in such a way that would allow an attempt to make this connection.

An examination of the results of this analysis has shown that there is no consistent pan-Canadian trend relating teacher responses to student achievement. In only two instances were as many as 10 out of the 17 jurisdictions yielding similar correlations.

- *Median number of years of experience teaching science:* For 16-year-olds only, in 11 jurisdictions, more experienced teachers were positively correlated to student achievement.
- *Percentage of teachers reporting that they considered themselves specialists in science and prefer to teach mainly in this area:* Again, for 16-year-olds only, in 10 of the 17 jurisdictions, there was a positive correlation between the percentage of teachers thus reporting and the achievement of their students.

Neither of these is a surprising result, but it is important to realize that such intuitive correlations can be supported with data.

A table of correlations of teacher questionnaire variables with student achievement will be found in the appendix to this report.

Box 11

Statistical Note

It should also be noted that to determine statistical significance for the teacher and school variables in each jurisdiction, a less stringent statistical level ($p < 0.10$) was used. Although most school variables were statistically associated with achievement at the Canada level, this was not the case for individual jurisdictions, which had much smaller sample sizes. The chosen level of significance allows the identification of jurisdictions where associations are likely to be present. Detailed correlations by jurisdiction [including CAN(E) and CAN(F)] can be found in the appendix.

The same two-step procedure as above was used to select variables for discussion. However, as can be expected, very few school or teacher variables showed significant correlations across many jurisdictions (tables 21 and 22).

SCHOOL QUESTIONNAIRE

As can be seen by examining the table of correlations (see table 25 in the appendix), there appears to be little consistency across the 17 jurisdictions. While educators and policy makers in individual jurisdictions may find some suggestive data, no statistically significant pan-Canadian trends can be found in this analysis.

A table of correlations of school questionnaire variables with student achievement will be found in the appendix to this report.

CONCLUSION

This report describes the performance of 25,700 English- and French-speaking 13-year-old and 16-year-old Canadian students from 17 jurisdictions[13] across Canada in the SAIP Science III Assessment (2004). This pan-Canadian science assessment was administered for the third time using essentially the same criteria. In this third iteration, only the written portion of the assessment was administered, unlike the previous two administrations, which included a hands-on practical task component as well.

The SAIP *Science Assessment Framework and Criteria* reflects the intent of several recent science curriculum initiatives, both within Canada and at the international level. While the understanding of the process of teaching and learning about science is continually being refined, the framework and criteria used in 2004 are essentially the same as those used in 1996 and 1999. This is to facilitate the comparison of results among the three assessments — an important feature of SAIP.

The assessment instruments were designed, developed, and reviewed by representatives of the jurisdictions, working together under the leadership of the development team. This assessment was also made possible by the cooperation extended to the development team by students, teachers, parents, and stakeholder representatives.

In spite of the diversity of student circumstances and educational experiences in the jurisdictions, this challenging exercise produced a comprehensive assessment of student science knowledge and skills, composed for a specific purpose in a specific context. In addition, a snapshot of the context in which students learn science was taken, through a survey of students, their teachers, and their schools.

GENERAL RESULTS FOR THE TWO AGE GROUPS

Given that 13-year-olds and 16-year-olds write the same assessment, the SAIP designers worked under the assumption that the largest proportion of the younger group would achieve at least level 2 and the largest proportion of the older group would achieve at least level 3 of the five-point scale. Over 70% of 13-year-olds did reach level 2 or above, while almost two-thirds of 16-year-olds reached level 3 or above. Notably, more than 40% of the younger students also reached level 3 or above, while more than 20% of older students performed at levels 4 or 5.

Results from the 2004 assessment suggest that the relative proportions of students attaining each level were relatively consistent with results from the 1996 and 1999 SAIP assessments. However, fewer 16-year-old students achieved level 2 or above in 2004 compared to 1996 and 1999.

To be assigned a level 3, the student can typically

- use chemical properties to compare and classify substances
- know that some life forms are unicellular and others are multicellular, and that life forms are involved in the transfer of energy
- compare gravitational and electrical forces
- compare distances from Earth to the Moon, Sun, and other stars
- analyze experiments and judge their validity
- identify areas where science knowledge and technologies address societal problems

At this level, the student is beginning to integrate principles learned in a variety of earlier science experiences and apply this understanding to a wide variety of real-world situations.

[13] This comprises all ten provinces, including five with both anglophone and francophone populations, as well as two of the territories (Yukon and Northwest Territories).

BELOW LEVEL 1 ACHIEVEMENT

The proportion of students not achieving level 1 is about 30% in several jurisdictions. This is a serious concern that needs to be looked into further as it suggests that a significant number of students may not possess a very basic level of scientific knowledge and skills. There are a number of possible reasons for this that might be considered.

A recent report released by CMEC, *Pan-Canadian results of francophone students in a minority language setting in the School Achievement Indicators Program (SAIP)*,[14] discusses this situation with respect to minority-language students:

> Research on science education confirms that students in minority-language settings may experience difficulties with vocabulary that interfere with their understanding of scientific concepts. Reading difficulties among these students likely are closely associated with difficulties on the written assessment. (p. 35)

The report also recommends that teachers be particularly vigilant in their use of scientific terminology and encourage approaches such as experimentation, hand-on use of objects, and discussion to cultivate students' natural motivation for science.

Another factor that would be worth examining might be called "assessment fatigue." Students in an increasingly competitive and challenging academic environment are less likely to be highly motivated to do their best on a "low-stakes" assessment that has no effect on their personal success. Teachers who report increasing demands on their time may also find it more difficult administering these assessments in a manner that encourages and motivates students.

These are just two factors worth examining for future assessments.

COMPARISON WITH INTERNATIONAL ASSESSMENTS

It is interesting to note the consistency of SAIP science results for those jurisdictions where students completed this SAIP Science III Assessment in 2004 and the most recent Programme for International Student Assessment (PISA) Science in 2003. More specifically, when we compare the proportion of 16-year-old students achieving at least level 3 in SAIP in each jurisdiction with their overall mean in science for 15-year-olds in PISA, the pattern of relative stronger and weaker performance is very similar.

Also, the low performance of students in French-as-a-minority setting in SAIP, as exemplified by the high proportion of students achieving level 1 or below, is very consistent with the overall pattern noted in PISA 2003 science results, where results from students in the French-language school system were statistically lower than results from the English-language-school-system students in the same provinces with French-minority-language students.

PUBLIC EXPECTATIONS

In 2004, a pan-Canadian panel of representatives of various sectors of society determined a set of expectations to help interpret the results actually achieved by the students.

The 13-year-old students met the expectations of the panel at levels 1, 2, and 3, while the panel expected significantly more students to reach levels 4 and 5. Panellists were satisfied with the performance of 16-year-old students at levels 2, 3, 4, and 5. At level 1, there was a small but significant difference that indicates that expectations only slightly exceeded performance.

[14] The full text of this report may be found at **http://www.cmec.ca/else/francophone/analysis.en.pdf**.

AGE AND GENDER DIFFERENCES

As expected, the older students performed better than the younger students. This does suggest that the curriculum and classroom practices with regard to science education do foster improved levels of knowledge and skill between the ages of 13 and 16.

Happily, the gender differences in achievement that had caused such understandable concern in science education for many years have almost disappeared. The professional conferences and curriculum reviews at the jurisdictional level that have been organized specifically to address the issue would seem to have had significant impact.

Results for this assessment show that there is no significant difference in achievement between males and females at most levels. There are slightly more 13-year-old males at level 1 and above and more females at level 3. For 16-year-olds, there are slightly more females at level 1 and more males at level 3. The overall message given by these data suggests that the efforts to make science education more relevant to, and more inclusive of, young women continue to have a positive influence on science achievement. Again, the same trend is reported on an international level in the report of PISA 2003 (Programme for International Student Assessment).[15]

LANGUAGE DIFFERENCES

As has been observed in past SAIP assessments, while francophone students within Quebec achieve very well when compared to pan-Canadian results, this is not generally true for francophone students in minority populations. The difficulties encountered by students studying and responding in a language different from that in which they live, work, and play can also be seen in those jurisdictions with a high proportion of students whose first language may be an Aboriginal tongue.

JURISDICTIONAL RESULTS

This report provides a useful picture of Canada as a whole, as well as how students achieved in each participating jurisdiction. While it is not the purpose of this report to comment on individual jurisdictional trends, it is worth noting that, in general, the achievement trends among jurisdictions have remained consistent from one SAIP assessment to the next. Individual jurisdictions may release reports describing and discussing more fully their own results of this assessment.

THE CONTEXT IN WHICH SCIENCE IS LEARNED

Once again, SAIP has attempted to describe the context in which science is learned. Extensive questionnaires were completed by students, their teachers, and their school principals. Data from these allowed a picture to be developed of the environment in which students learn in all 17 jurisdictions.

While the qualitative descriptions of the learning context as provided by students, their teachers, and their principals are indeed interesting, actual statistical correlations between these factors and student achievement were more difficult to attain. The complex relationship between student achievement and the many variables that impact on teaching and learning was considered by describing a few correlations between student achievement and context that were found to be generally consistent across most jurisdictions.

While a total of nine variables related to student questionnaire responses were found to have consistent correlation across most jurisdictions, such consistency was not found in teacher and school data. Although some useful inferences may be drawn by individual jurisdictions, it was not possible to make pan-Canadian inferences in a meaningful way.

[15] See **http://www.cmec.ca/pisa/indexe.stm.**

FINAL COMMENTS

In these early years of the 21st century, there are few who would question the importance of ensuring that students acquire a level of scientific literacy and understanding to enable them to function with comfort and competence in the world in which they live, work, and play. Once again, the SAIP Science Assessment has provided a valuable snapshot of the degree to which this has taken place in Canada and within its provinces and territories. Jurisdictions will be able to use the data from this report and its predecessors to help them make important decisions about curriculum and resources to ensure that their students have the best opportunities possible to acquire this necessary level of scientific knowledge and skills.

TABLE 1: SAIP SCIENCE 2004
PERCENTAGE OF STUDENTS BY PERFORMANCE LEVEL AND BY AGE

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
13-year-olds	13.7 (0.6)	15.3 (0.6)	30.9 (0.8)	37.2 (0.8)	2.4 (0.3)	0.5 (0.1)
		86.3 (0.6)	71.0 (0.8)	40.1 (0.8)	2.9 (0.3)	0.5 (0.1)
16-year-olds	7.3 (0.5)	6.0 (0.4)	22.7 (0.8)	41.4 (0.9)	16.0 (0.7)	6.5 (0.4)
		92.7 (0.5)	86.7 (0.6)	64.0 (0.9)	22.6 (0.8)	6.5 (0.4)

Note: For each age group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 2: SAIP SCIENCE 2004
PERCENTAGE OF 13-YEAR-OLDS BY PERFORMANCE LEVEL AND BY GENDER

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
Females	13.3 (0.8)	16.3 (0.9)	32.0 (1.1)	35.2 (1.1)	2.5 (0.4)	0.6 (0.2)
		86.7 (0.8)	70.4 (1.1)	38.3 (1.1)	3.1 (0.4)	0.6 (0.2)
Males	14.0 (0.8)	14.4 (0.8)	29.7 (1.1)	39.3 (1.1)	2.3 (0.4)	0.4 (0.1)
		86.0 (0.8)	71.7 (1.1)	42.0 (1.2)	2.7 (0.4)	0.4 (0.1)
Total	13.7 (0.6)	15.3 (0.6)	30.9 (0.8)	37.2 (0.8)	2.4 (0.3)	0.5 (0.1)
		86.3 (0.6)	71.0 (0.8)	40.1 (0.8)	2.9 (0.3)	0.5 (0.1)

Note: For each gender group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 3: SAIP SCIENCE 2004
PERCENTAGE OF 16-YEAR-OLDS BY PERFORMANCE LEVEL AND BY GENDER

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
Females	6.5 (0.6)	6.2 (0.6)	25.2 (1.1)	40.3 (1.2)	15.3 (0.9)	6.5 (0.6)
		93.5 (0.6)	87.3 (0.8)	62.1 (1.2)	21.8 (1.1)	6.5 (0.6)
Males	8.1 (0.7)	5.8 (0.6)	20.2 (1.0)	42.6 (1.3)	16.7 (1.0)	6.6 (0.6)
		91.9 (0.7)	86.1 (0.9)	65.8 (1.2)	23.2 (1.1)	6.6 (0.6)
Total	7.3 (0.5)	6.0 (0.4)	22.7 (0.8)	41.4 (0.9)	16.0 (0.7)	6.5 (0.4)
		92.7 (0.5)	86.7 (0.6)	64.0 (0.9)	22.6 (0.8)	6.5 (0.4)

Note: For each gender group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 4: SAIP SCIENCE 2004
PERCENTAGE OF 13-YEAR-OLDS BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
British Columbia	16.0 (2.4)	14.3 (2.3)	31.1 (3.0)	35.6 (3.1)	2.2 (1.0)	0.7 (0.5)
		84.0 (2.4)	69.6 (3.0)	38.5 (3.2)	2.9 (1.1)	0.7 (0.5)
Alberta	11.8 (1.9)	10.3 (1.8)	24.4 (2.6)	47.1 (3.0)	5.4 (1.3)	1.0 (0.6)
		88.2 (1.9)	77.9 (2.5)	53.5 (3.0)	6.4 (1.5)	1.0 (0.6)
Saskatchewan	17.3 (2.2)	16.8 (2.2)	35.3 (2.8)	29.5 (2.7)	0.8 (0.5)	0.2 (0.3)
		82.7 (2.2)	65.9 (2.8)	30.5 (2.7)	1.0 (0.6)	0.2 (0.3)
Manitoba (E)	17.7 (2.4)	14.7 (2.2)	30.3 (2.9)	35.0 (3.0)	1.8 (0.8)	0.4 (0.4)
		82.3 (2.4)	67.6 (2.9)	37.3 (3.0)	2.3 (0.9)	0.4 (0.4)
Manitoba (F)	29.5 (2.4)	12.2 (1.7)	25.8 (2.3)	30.9 (2.4)	1.1 (0.5)	0.5 (0.4)
		70.5 (2.4)	58.4 (2.6)	32.6 (2.4)	1.6 (0.7)	0.5 (0.4)
Ontario (E)	11.5 (2.0)	16.7 (2.4)	32.5 (3.0)	36.8 (3.0)	2.2 (0.9)	0.3 (0.4)
		88.5 (2.0)	71.8 (2.8)	39.3 (3.1)	2.5 (1.0)	0.3 (0.4)
Ontario (F)	23.3 (2.7)	13.5 (2.2)	32.4 (3.0)	29.8 (3.0)	1.0 (0.6)	0.0 (0.0)
		76.7 (2.7)	63.2 (3.1)	30.9 (3.0)	1.0 (0.6)	0.0 (0.0)
Quebec (E)	17.2 (2.5)	14.9 (2.3)	31.5 (3.0)	34.1 (3.1)	1.9 (0.9)	0.3 (0.4)
		82.8 (2.5)	67.9 (3.1)	36.4 (3.2)	2.2 (1.0)	0.3 (0.4)
Quebec (F)	11.2 (2.0)	15.9 (2.3)	30.3 (2.9)	39.7 (3.1)	2.5 (1.0)	0.5 (0.5)
		88.8 (2.0)	73.0 (2.8)	42.7 (3.1)	3.0 (1.1)	0.5 (0.5)
New Brunswick (E)	18.7 (2.4)	19.5 (2.4)	30.3 (2.8)	31.0 (2.8)	0.3 (0.4)	0.1 (0.2)
		81.3 (2.4)	61.7 (3.0)	31.4 (2.9)	0.5 (0.4)	0.1 (0.2)
New Brunswick (F)	34.8 (2.8)	16.5 (2.2)	25.4 (2.6)	23.0 (2.5)	0.1 (0.2)	0.1 (0.2)
		65.2 (2.8)	48.6 (2.9)	23.2 (2.5)	0.2 (0.3)	0.1 (0.2)
Nova Scotia (E)	18.9 (2.5)	18.0 (2.4)	31.2 (2.9)	30.4 (2.9)	1.2 (0.7)	0.2 (0.3)
		81.1 (2.5)	63.1 (3.0)	31.9 (2.9)	1.4 (0.7)	0.2 (0.3)
Nova Scotia (F)	31.0 (5.4)	10.2 (0.0)	26.1 (0.0)	32.4 (0.0)	0.4 (0.0)	0.0 (0.0)
		69.0 (0.0)	58.8 (0.0)	32.7 (0.0)	0.4 (0.0)	0.0 (0.0)
Prince Edward Island	18.9 (2.8)	15.3 (2.0)	34.7 (2.7)	30.4 (2.6)	0.5 (0.4)	0.1 (0.2)
		81.1 (2.2)	65.8 (2.7)	31.1 (2.6)	0.7 (0.5)	0.1 (0.2)
Newfoundland and Labrador	20.2 (2.6)	14.2 (2.1)	36.9 (2.9)	26.6 (2.7)	1.8 (0.8)	0.3 (0.3)
		79.8 (2.4)	65.6 (2.9)	28.7 (2.7)	2.2 (0.9)	0.3 (0.3)
Yukon	24.2 (4.4)	14.3 (1.5)	29.5 (1.9)	30.9 (2.0)	1.1 (0.4)	0.0 (0.0)
		75.8 (1.8)	61.5 (2.1)	32.0 (2.0)	1.1 (0.4)	0.0 (0.0)
Northwest Territories	35.2 (4.1)	16.1 (1.7)	22.8 (1.9)	23.2 (1.9)	2.6 (0.7)	0.0 (0.0)
		64.8 (2.2)	48.7 (2.3)	25.8 (2.0)	2.6 (0.7)	0.0 (0.0)
Canada (E)	13.8 (0.7)	15.4 (0.7)	31.3 (0.9)	36.6 (0.9)	2.4 (0.3)	0.5 (0.1)
		86.2 (0.7)	70.8 (0.9)	39.5 (0.9)	2.9 (0.3)	0.5 (0.1)
Canada (F)	13.2 (1.1)	15.2 (1.2)	29.7 (1.5)	39.0 (1.6)	2.4 (0.5)	0.5 (0.2)
		86.8 (1.1)	71.6 (1.5)	41.9 (1.6)	2.9 (0.5)	0.5 (0.2)
Canada	13.7 (0.6)	15.3 (0.6)	30.9 (0.8)	37.2 (0.8)	2.4 (0.3)	0.5 (0.1)
		86.3 (0.6)	71.0 (0.8)	40.1 (0.8)	2.9 (0.3)	0.5 (0.1)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 5: SAIP SCIENCE 2004
PERCENTAGE OF 16-YEAR-OLDS BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	*Level 1*	*Level 2*	*Level 3*	*Level 4*	*Level 5*
British Columbia	10.9 (2.0)	5.8 (1.5)	19.7 (2.6)	42.0 (3.2)	15.9 (2.4)	5.7 (1.5)
		89.1 (2.0)	83.3 (2.4)	63.6 (3.1)	21.6 (2.7)	5.7 (1.5)
Alberta	4.9 (1.4)	4.6 (1.3)	18.0 (2.4)	40.4 (3.1)	23.3 (2.7)	8.7 (1.8)
		95.1 (1.4)	90.4 (1.8)	72.4 (2.8)	32.0 (2.9)	8.7 (1.8)
Saskatchewan	8.0 (1.7)	9.3 (1.8)	23.4 (2.7)	43.1 (3.1)	12.4 (2.1)	3.9 (1.2)
		92.0 (1.7)	82.7 (2.4)	59.3 (3.1)	16.2 (2.3)	3.9 (1.2)
Manitoba (E)	11.9 (2.1)	5.6 (1.5)	23.1 (2.8)	40.9 (3.3)	14.7 (2.3)	3.8 (1.3)
		88.1 (2.1)	82.5 (2.5)	59.3 (3.3)	18.4 (2.6)	3.8 (1.3)
Manitoba (F)	13.0 (2.9)	4.3 (1.8)	24.5 (3.7)	45.8 (4.3)	10.5 (2.7)	1.9 (1.2)
		87.0 (2.9)	82.7 (3.3)	58.2 (4.3)	12.4 (2.8)	1.9 (1.2)
Ontario (E)	5.8 (1.8)	5.8 (1.8)	24.4 (3.2)	41.1 (3.7)	14.6 (2.7)	8.3 (2.1)
		94.2 (1.8)	88.4 (2.4)	64.0 (3.6)	22.9 (3.2)	8.3 (2.1)
Ontario (F)	17.1 (2.7)	9.3 (2.0)	25.4 (3.1)	34.5 (3.4)	11.0 (2.2)	2.6 (1.1)
		82.9 (2.7)	73.6 (3.1)	48.2 (3.5)	13.6 (2.4)	2.6 (1.1)
Quebec (E)	9.1 (2.0)	7.9 (1.9)	25.3 (3.0)	37.9 (3.4)	15.9 (2.5)	3.9 (1.3)
		90.9 (2.0)	83.0 (2.6)	57.7 (3.4)	19.8 (2.8)	3.9 (1.3)
Quebec (F)	5.3 (1.5)	5.9 (1.5)	23.0 (2.8)	43.4 (3.3)	18.6 (2.6)	3.8 (1.3)
		94.7 (1.5)	88.8 (2.1)	65.8 (3.1)	22.4 (2.7)	3.8 (1.3)
New Brunswick (E)	11.5 (2.0)	6.8 (1.6)	24.1 (2.7)	42.5 (3.1)	11.8 (2.0)	3.3 (1.1)
		88.5 (2.0)	81.7 (2.4)	57.6 (3.1)	15.1 (2.3)	3.3 (1.1)
New Brunswick (F)	16.6 (2.3)	6.8 (1.6)	19.4 (2.5)	40.4 (3.1)	14.3 (2.2)	2.6 (1.0)
		83.4 (2.3)	76.6 (2.6)	57.2 (3.1)	16.8 (2.3)	2.6 (1.0)
Nova Scotia (E)	10.1 (2.0)	7.0 (1.7)	23.2 (2.8)	41.6 (3.3)	13.3 (2.3)	4.8 (1.4)
		89.9 (2.0)	82.9 (2.5)	59.7 (3.3)	18.1 (2.6)	4.8 (1.4)
Nova Scotia (F)	15.1 (2.3)	6.9 (1.6)	19.5 (2.5)	46.5 (3.2)	10.1 (1.9)	1.9 (0.9)
		84.9 (2.3)	78.0 (2.6)	58.5 (3.1)	11.9 (2.1)	1.9 (0.9)
Prince Edward Island	11.7 (2.0)	6.2 (1.5)	24.0 (2.7)	43.5 (3.1)	11.0 (2.0)	3.5 (1.2)
		88.3 (2.0)	82.0 (2.4)	58.0 (3.1)	14.5 (2.2)	3.5 (1.2)
Newfoundland and Labrador	9.1 (1.9)	6.5 (1.6)	22.1 (2.7)	39.2 (3.2)	14.5 (2.3)	8.6 (1.8)
		90.9 (1.9)	84.4 (2.3)	62.3 (3.1)	23.1 (2.7)	8.6 (1.8)
Yukon	14.5 (2.3)	6.9 (1.7)	17.9 (2.6)	46.2 (3.3)	9.3 (1.9)	5.2 (1.5)
		85.5 (2.3)	78.6 (2.7)	60.7 (3.2)	14.5 (2.3)	5.2 (1.5)
Northwest Territories	20.4 (2.6)	10.2 (1.9)	20.4 (2.6)	34.2 (3.1)	9.9 (1.9)	5.0 (1.4)
		79.6 (2.6)	69.5 (3.0)	49.1 (3.2)	14.9 (2.3)	5.0 (1.4)
Canada (E)	7.4 (0.5)	6.0 (0.5)	22.6 (0.8)	41.1 (1.0)	15.6 (0.7)	7.2 (0.5)
		92.6 (0.5)	86.6 (0.7)	64.0 (1.0)	22.9 (0.8)	7.2 (0.5)
Canada (F)	6.8 (1.0)	6.1 (1.0)	23.2 (1.8)	42.6 (2.1)	17.7 (1.6)	3.6 (0.8)
		93.2 (1.0)	87.1 (1.4)	63.9 (2.0)	21.3 (1.7)	3.6 (0.8)
Canada	7.3 (0.5)	6.0 (0.4)	22.7 (0.8)	41.4 (0.9)	16.0 (0.7)	6.5 (0.4)
		92.7 (0.5)	86.7 (0.6)	64.0 (0.9)	22.6 (0.8)	6.5 (0.4)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 6: SAIP SCIENCE 2004
PERCENTAGE OF 13-YEAR-OLD FEMALES BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
British Columbia	17.2 (3.6)	16.3 (3.5)	32.3 (4.5)	31.6 (4.4)	1.9 (1.3)	0.7 (0.8)
		82.8 (3.6)	66.5 (4.5)	34.2 (4.5)	2.6 (1.5)	0.7 (0.8)
Alberta	11.9 (2.7)	10.3 (2.6)	24.4 (3.6)	47.0 (4.2)	4.9 (1.8)	1.5 (1.0)
		88.1 (2.7)	77.8 (3.5)	53.4 (4.2)	6.3 (2.1)	1.5 (1.0)
Saskatchewan	14.8 (3.1)	20.0 (3.4)	35.8 (4.1)	28.3 (3.9)	0.8 (0.8)	0.2 (0.4)
		85.2 (3.1)	65.1 (4.1)	29.3 (3.9)	1.0 (0.8)	0.2 (0.4)
Manitoba (E)	16.6 (3.3)	15.0 (3.1)	32.7 (4.1)	33.9 (4.1)	1.6 (1.1)	0.2 (0.4)
		83.4 (3.3)	68.5 (4.1)	35.7 (4.2)	1.8 (1.2)	0.2 (0.4)
Manitoba (F)	28.0 (3.2)	14.4 (2.5)	24.8 (3.1)	32.3 (3.3)	0.5 (0.5)	0.0 (0.0)
		72.0 (3.2)	57.6 (3.5)	32.8 (3.3)	0.5 (0.5)	0.0 (0.0)
Ontario (E)	11.3 (2.9)	17.7 (3.5)	32.9 (4.3)	35.3 (4.3)	2.4 (1.4)	0.4 (0.6)
		88.7 (2.9)	70.9 (4.1)	38.0 (4.4)	2.8 (1.5)	0.4 (0.6)
Ontario (F)	23.3 (3.9)	13.9 (3.2)	31.6 (4.3)	30.4 (4.2)	0.8 (0.8)	0.0 (0.0)
		76.7 (3.9)	62.8 (4.4)	31.1 (4.2)	0.8 (0.8)	0.0 (0.0)
Quebec (E)	16.7 (3.4)	16.7 (3.4)	35.0 (4.4)	29.5 (4.2)	1.8 (1.2)	0.2 (0.4)
		83.3 (3.4)	66.5 (4.3)	31.5 (4.3)	2.0 (1.3)	0.2 (0.4)
Quebec (F)	10.7 (2.7)	16.8 (3.3)	32.3 (4.1)	36.5 (4.2)	3.2 (1.5)	0.6 (0.7)
		89.3 (2.7)	72.6 (3.9)	40.2 (4.3)	3.7 (1.7)	0.6 (0.7)
New Brunswick (E)	16.1 (3.1)	19.8 (3.4)	31.8 (4.0)	31.4 (4.0)	0.7 (0.7)	0.2 (0.4)
		83.9 (3.1)	64.1 (4.1)	32.2 (4.0)	0.9 (0.8)	0.2 (0.4)
New Brunswick (F)	27.1 (3.8)	17.8 (3.3)	32.0 (4.0)	22.7 (3.6)	0.3 (0.4)	0.3 (0.4)
		72.9 (3.8)	55.2 (4.2)	23.2 (3.6)	0.5 (0.6)	0.3 (0.4)
Nova Scotia (E)	19.1 (3.4)	18.1 (3.4)	34.0 (4.1)	27.2 (3.9)	1.4 (1.0)	0.2 (0.4)
		80.9 (3.4)	62.8 (4.2)	28.8 (4.0)	1.6 (1.1)	0.2 (0.4)
Nova Scotia (F)	31.4 (7.3)	12.2 (0.0)	23.1 (0.0)	32.7 (0.0)	0.6 (0.0)	0.0 (0.0)
		68.6 (0.0)	56.4 (0.0)	33.3 (0.0)	0.6 (0.0)	0.0 (0.0)
Prince Edward Island	15.5 (3.8)	15.8 (3.0)	39.3 (4.1)	28.7 (3.8)	0.6 (0.6)	0.0 (0.0)
		84.5 (3.0)	68.6 (3.9)	29.3 (3.8)	0.6 (0.6)	0.0 (0.0)
Newfoundland and Labrador	15.2 (3.3)	14.1 (3.0)	42.2 (4.2)	26.7 (3.8)	1.5 (1.0)	0.2 (0.4)
		84.8 (3.1)	70.7 (3.9)	28.5 (3.8)	1.7 (1.1)	0.2 (0.4)
Yukon	20.6 (6.4)	12.9 (2.2)	37.4 (3.1)	27.7 (2.9)	1.3 (0.7)	0.0 (0.0)
		79.4 (2.6)	66.5 (3.0)	29.0 (2.9)	1.3 (0.7)	0.0 (0.0)
Northwest Territories	32.5 (5.6)	16.6 (2.4)	25.3 (2.8)	22.3 (2.7)	3.4 (1.2)	0.0 (0.0)
		67.5 (3.0)	50.9 (3.2)	25.7 (2.8)	3.4 (1.2)	0.0 (0.0)
Canada (E)	13.6 (0.9)	16.5 (1.0)	32.2 (1.3)	34.8 (1.3)	2.4 (0.4)	0.6 (0.2)
		86.4 (0.9)	69.9 (1.3)	37.8 (1.3)	3.0 (0.5)	0.6 (0.2)
Canada (F)	12.5 (1.5)	16.0 (1.7)	31.6 (2.1)	36.5 (2.2)	2.9 (0.8)	0.5 (0.3)
		87.5 (1.5)	71.5 (2.0)	39.9 (2.2)	3.4 (0.8)	0.5 (0.3)
Canada	13.3 (0.8)	16.3 (0.9)	32.0 (1.1)	35.2 (1.1)	2.5 (0.4)	0.6 (0.2)
		86.7 (0.8)	70.4 (1.1)	38.3 (1.1)	3.1 (0.4)	0.6 (0.2)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 7: SAIP SCIENCE 2004
PERCENTAGE OF 13-YEAR-OLD MALES BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
British Columbia	14.8 (3.2)	12.7 (3.0)	30.0 (4.1)	39.3 (4.4)	2.5 (1.4)	0.6 (0.7)
		85.2 (3.2)	72.5 (4.0)	42.5 (4.5)	3.2 (1.6)	0.6 (0.7)
Alberta	11.5 (2.7)	10.4 (2.6)	24.3 (3.6)	47.4 (4.2)	5.9 (2.0)	0.6 (0.6)
		88.5 (2.7)	78.1 (3.5)	53.9 (4.2)	6.5 (2.1)	0.6 (0.6)
Saskatchewan	19.6 (3.2)	13.8 (2.8)	34.9 (3.9)	30.7 (3.7)	0.9 (0.7)	0.2 (0.3)
		80.4 (3.2)	66.6 (3.8)	31.7 (3.8)	1.0 (0.8)	0.2 (0.3)
Manitoba (E)	18.9 (3.5)	14.3 (3.1)	27.8 (4.0)	36.2 (4.3)	2.1 (1.3)	0.6 (0.7)
		81.1 (3.5)	66.7 (4.2)	38.9 (4.4)	2.7 (1.5)	0.6 (0.7)
Manitoba (F)	31.2 (3.6)	9.5 (2.3)	27.0 (3.4)	29.4 (3.5)	1.8 (1.0)	1.2 (0.8)
		68.8 (3.6)	59.3 (3.8)	32.3 (3.6)	3.0 (1.3)	1.2 (0.8)
Ontario (E)	11.7 (2.8)	15.7 (3.2)	32.2 (4.1)	38.2 (4.3)	2.0 (1.2)	0.2 (0.4)
		88.3 (2.8)	72.6 (3.9)	40.4 (4.3)	2.2 (1.3)	0.2 (0.4)
Ontario (F)	23.4 (3.9)	13.1 (3.1)	33.2 (4.3)	29.1 (4.1)	1.3 (1.0)	0.0 (0.0)
		76.6 (3.9)	63.6 (4.4)	30.4 (4.2)	1.3 (1.0)	0.0 (0.0)
Quebec (E)	17.8 (3.6)	13.0 (3.1)	28.0 (4.2)	38.7 (4.6)	2.1 (1.3)	0.5 (0.6)
		82.2 (3.6)	69.2 (4.3)	41.2 (4.6)	2.5 (1.5)	0.5 (0.6)
Quebec (F)	11.6 (3.0)	14.9 (3.3)	28.0 (4.1)	43.3 (4.6)	1.8 (1.2)	0.4 (0.6)
		88.4 (3.0)	73.6 (4.1)	45.6 (4.6)	2.2 (1.4)	0.4 (0.6)
New Brunswick (E)	21.6 (3.7)	19.2 (3.5)	28.7 (4.0)	30.4 (4.1)	0.0 (0.0)	0.0 (0.0)
		78.4 (3.7)	59.1 (4.4)	30.4 (4.1)	0.0 (0.0)	0.0 (0.0)
New Brunswick (F)	41.8 (4.0)	15.4 (2.9)	19.5 (3.2)	23.3 (3.4)	0.0 (0.0)	0.0 (0.0)
		58.2 (4.0)	42.8 (4.0)	23.3 (3.4)	0.0 (0.0)	0.0 (0.0)
Nova Scotia (E)	18.7 (3.5)	17.9 (3.5)	28.3 (4.1)	33.8 (4.3)	1.1 (0.9)	0.2 (0.4)
		81.3 (3.5)	63.4 (4.4)	35.1 (4.3)	1.3 (1.0)	0.2 (0.4)
Nova Scotia (F)	30.5 (8.0)	7.8 (0.0)	29.7 (0.0)	32.0 (0.0)	0.0 (0.0)	0.0 (0.0)
		69.5 (0.0)	61.7 (0.0)	32.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Prince Edward Island	21.9 (4.1)	14.8 (2.8)	30.8 (3.6)	31.8 (3.6)	0.5 (0.6)	0.3 (0.4)
		78.1 (3.2)	63.4 (3.7)	32.6 (3.6)	0.8 (0.7)	0.3 (0.4)
Newfoundland and Labrador	24.9 (3.9)	14.3 (3.0)	31.7 (4.0)	26.5 (3.8)	2.2 (1.2)	0.4 (0.6)
		75.1 (3.7)	60.7 (4.2)	29.1 (3.9)	2.6 (1.4)	0.4 (0.6)
Yukon	26.9 (6.1)	15.4 (2.0)	23.4 (2.4)	33.3 (2.7)	1.0 (0.6)	0.0 (0.0)
		73.1 (2.5)	57.7 (2.8)	34.3 (2.7)	1.0 (0.6)	0.0 (0.0)
Northwest Territories	37.7 (5.8)	15.7 (2.3)	20.5 (2.6)	24.3 (2.7)	1.9 (0.9)	0.0 (0.0)
		62.3 (3.1)	46.6 (3.2)	26.1 (2.8)	1.9 (0.9)	0.0 (0.0)
Canada (E)	14.0 (0.9)	14.4 (0.9)	30.4 (1.2)	38.5 (1.3)	2.5 (0.4)	0.4 (0.2)
		86.0 (0.9)	71.7 (1.2)	41.3 (1.3)	2.8 (0.4)	0.4 (0.2)
Canada (F)	13.9 (1.7)	14.4 (1.7)	27.5 (2.1)	41.9 (2.4)	1.9 (0.7)	0.4 (0.3)
		86.1 (1.7)	71.7 (2.2)	44.2 (2.4)	2.3 (0.7)	0.4 (0.3)
Canada	14.0 (0.8)	14.4 (0.8)	29.7 (1.1)	39.3 (1.1)	2.3 (0.4)	0.4 (0.1)
		86.0 (0.8)	71.7 (1.1)	42.0 (1.2)	2.7 (0.4)	0.4 (0.1)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 8: SAIP SCIENCE 2004
PERCENTAGE OF 16-YEAR-OLD FEMALES BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
British Columbia	8.9 (2.7)	6.5 (2.4)	21.6 (3.9)	40.8 (4.7)	14.9 (3.4)	7.4 (2.5)
		91.1 (2.7)	84.7 (3.5)	63.1 (4.6)	22.3 (4.0)	7.4 (2.5)
Alberta	3.6 (1.7)	4.9 (1.9)	21.9 (3.7)	37.6 (4.4)	24.7 (3.9)	7.4 (2.4)
		96.4 (1.7)	91.6 (2.5)	69.6 (4.1)	32.1 (4.2)	7.4 (2.4)
Saskatchewan	4.9 (1.9)	9.9 (2.7)	24.9 (3.9)	42.8 (4.5)	12.9 (3.0)	4.6 (1.9)
		95.1 (1.9)	85.2 (3.2)	60.3 (4.4)	17.5 (3.4)	4.6 (1.9)
Manitoba (E)	11.8 (3.0)	5.3 (2.1)	24.8 (4.1)	39.2 (4.6)	15.3 (3.4)	3.5 (1.7)
		88.2 (3.0)	82.8 (3.6)	58.0 (4.7)	18.8 (3.7)	3.5 (1.7)
Manitoba (F)	12.9 (4.0)	4.7 (2.5)	24.7 (5.1)	45.9 (5.9)	10.0 (3.6)	1.8 (1.6)
		87.1 (4.0)	82.4 (4.5)	57.6 (5.9)	11.8 (3.8)	1.8 (1.6)
Ontario (E)	5.7 (2.5)	5.7 (2.5)	26.8 (4.8)	40.4 (5.3)	13.3 (3.6)	8.1 (2.9)
		94.3 (2.5)	88.6 (3.4)	61.7 (5.2)	21.4 (4.4)	8.1 (2.9)
Ontario (F)	14.6 (3.4)	10.3 (2.9)	26.8 (4.3)	33.6 (4.6)	11.9 (3.1)	2.7 (1.6)
		85.4 (3.4)	75.1 (4.2)	48.2 (4.8)	14.6 (3.4)	2.7 (1.6)
Quebec (E)	7.3 (2.5)	8.7 (2.7)	30.8 (4.4)	35.0 (4.5)	16.2 (3.5)	2.1 (1.4)
		92.7 (2.5)	84.0 (3.5)	53.3 (4.7)	18.3 (3.7)	2.1 (1.4)
Quebec (F)	4.9 (1.9)	6.3 (2.2)	25.3 (3.8)	42.0 (4.4)	17.3 (3.3)	4.3 (1.8)
		95.1 (1.9)	88.8 (2.8)	63.5 (4.3)	21.6 (3.6)	4.3 (1.8)
New Brunswick (E)	10.6 (2.8)	6.2 (2.2)	27.9 (4.1)	41.2 (4.5)	10.4 (2.8)	3.7 (1.7)
		89.4 (2.8)	83.2 (3.4)	55.3 (4.5)	14.1 (3.2)	3.7 (1.7)
New Brunswick (F)	14.7 (3.1)	7.9 (2.3)	19.7 (3.4)	39.6 (4.2)	15.0 (3.1)	3.1 (1.5)
		85.3 (3.1)	77.4 (3.6)	57.7 (4.3)	18.1 (3.3)	3.1 (1.5)
Nova Scotia (E)	8.9 (2.6)	6.2 (2.2)	26.4 (4.1)	40.8 (4.5)	13.1 (3.1)	4.7 (1.9)
		91.1 (2.6)	84.9 (3.3)	58.5 (4.5)	17.7 (3.5)	4.7 (1.9)
Nova Scotia (F)	10.2 (2.6)	6.8 (2.2)	20.5 (3.5)	50.0 (4.3)	10.2 (2.6)	2.3 (1.3)
		89.8 (2.6)	83.0 (3.2)	62.5 (4.2)	12.5 (2.8)	2.3 (1.3)
Prince Edward Island	9.8 (2.6)	6.4 (2.1)	25.4 (3.8)	45.7 (4.3)	9.2 (2.5)	3.5 (1.6)
		90.2 (2.6)	83.8 (3.2)	58.4 (4.3)	12.7 (2.9)	3.5 (1.6)
Newfoundland and Labrador	9.4 (2.6)	6.9 (2.2)	22.9 (3.7)	40.7 (4.3)	12.6 (2.9)	7.6 (2.3)
		90.6 (2.6)	83.8 (3.3)	60.9 (4.3)	20.1 (3.5)	7.6 (2.3)
Yukon	10.1 (2.8)	9.5 (2.7)	17.6 (3.5)	45.9 (4.6)	10.8 (2.9)	6.1 (2.2)
		89.9 (2.8)	80.4 (3.7)	62.8 (4.5)	16.9 (3.5)	6.1 (2.2)
Northwest Territories	17.0 (3.6)	11.4 (3.0)	21.0 (3.9)	33.0 (4.5)	13.1 (3.2)	4.5 (2.0)
		83.0 (3.6)	71.6 (4.3)	50.6 (4.7)	17.6 (3.6)	4.5 (2.0)
Canada (E)	6.6 (0.7)	6.1 (0.7)	25.2 (1.2)	40.0 (1.4)	14.9 (1.0)	7.2 (0.7)
		93.4 (0.7)	87.3 (0.9)	62.1 (1.4)	22.1 (1.2)	7.2 (0.7)
Canada (F)	6.2 (1.4)	6.6 (1.4)	25.3 (2.5)	41.3 (2.8)	16.6 (2.1)	4.0 (1.1)
		93.8 (1.4)	87.2 (1.9)	61.9 (2.7)	20.6 (2.3)	4.0 (1.1)
Canada	6.5 (0.6)	6.2 (0.6)	25.2 (1.1)	40.3 (1.2)	15.3 (0.9)	6.5 (0.6)
		93.5 (0.6)	87.3 (0.8)	62.1 (1.2)	21.8 (1.1)	6.5 (0.6)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 9: SAIP SCIENCE 2004
PERCENTAGE OF 16-YEAR-OLD MALES BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	*Level 1*	*Level 2*	*Level 3*	*Level 4*	*Level 5*
British Columbia	12.6 (2.9)	5.3 (2.0)	18.1 (3.4)	43.0 (4.4)	16.8 (3.3)	4.3 (1.8)
		87.4 (2.9)	82.2 (3.4)	64.1 (4.2)	21.1 (3.6)	4.3 (1.8)
Alberta	6.2 (2.1)	4.4 (1.8)	14.3 (3.1)	43.2 (4.4)	21.9 (3.6)	10.0 (2.6)
		93.8 (2.1)	89.4 (2.7)	75.1 (3.8)	31.9 (4.1)	10.0 (2.6)
Saskatchewan	11.0 (2.8)	8.8 (2.5)	21.9 (3.7)	43.3 (4.4)	11.9 (2.9)	3.1 (1.6)
		89.0 (2.8)	80.2 (3.6)	58.3 (4.4)	15.0 (3.2)	3.1 (1.6)
Manitoba (E)	12.0 (3.0)	5.9 (2.2)	21.5 (3.8)	42.5 (4.6)	14.0 (3.2)	4.1 (1.8)
		88.0 (3.0)	82.1 (3.6)	60.6 (4.6)	18.1 (3.6)	4.1 (1.8)
Manitoba (F)	13.1 (4.2)	3.9 (2.4)	24.2 (5.4)	45.8 (6.3)	11.1 (3.9)	2.0 (1.7)
		86.9 (4.2)	83.0 (4.7)	58.8 (6.2)	13.1 (4.2)	2.0 (1.7)
Ontario (E)	5.9 (2.5)	5.9 (2.5)	22.1 (4.4)	41.9 (5.3)	15.6 (3.9)	8.6 (3.0)
		94.1 (2.5)	88.2 (3.4)	66.1 (5.0)	24.2 (4.6)	8.6 (3.0)
Ontario (F)	20.0 (4.1)	8.1 (2.8)	23.8 (4.4)	35.6 (5.0)	10.0 (3.1)	2.5 (1.6)
		80.0 (4.1)	71.9 (4.7)	48.1 (5.2)	12.5 (3.4)	2.5 (1.6)
Quebec (E)	11.3 (3.2)	7.0 (2.6)	19.1 (4.0)	41.1 (5.0)	15.6 (3.7)	5.9 (2.4)
		88.7 (3.2)	81.7 (3.9)	62.6 (4.9)	21.5 (4.2)	5.9 (2.4)
Quebec (F)	5.7 (2.3)	5.5 (2.2)	20.0 (3.9)	45.4 (4.9)	20.2 (3.9)	3.2 (1.7)
		94.3 (2.3)	88.8 (3.1)	68.8 (4.5)	23.4 (4.1)	3.2 (1.7)
New Brunswick (E)	12.4 (2.9)	7.3 (2.3)	20.6 (3.5)	43.7 (4.3)	13.0 (3.0)	3.0 (1.5)
		87.6 (2.9)	80.3 (3.5)	59.7 (4.3)	16.0 (3.2)	3.0 (1.5)
New Brunswick (F)	18.6 (3.5)	5.6 (2.1)	19.2 (3.5)	41.1 (4.4)	13.5 (3.1)	2.0 (1.2)
		81.4 (3.5)	75.8 (3.8)	56.6 (4.4)	15.5 (3.2)	2.0 (1.2)
Nova Scotia (E)	11.5 (3.1)	7.9 (2.6)	19.7 (3.9)	42.5 (4.8)	13.5 (3.3)	4.9 (2.1)
		88.5 (3.1)	80.6 (3.8)	60.9 (4.7)	18.4 (3.8)	4.9 (2.1)
Nova Scotia (F)	21.1 (3.9)	7.0 (2.4)	18.3 (3.7)	42.3 (4.7)	9.9 (2.8)	1.4 (1.1)
		78.9 (3.9)	71.8 (4.3)	53.5 (4.8)	11.3 (3.0)	1.4 (1.1)
Prince Edward Island	13.8 (3.2)	6.1 (2.2)	22.5 (3.8)	41.2 (4.5)	12.9 (3.1)	3.5 (1.7)
		86.2 (3.2)	80.1 (3.7)	57.6 (4.5)	16.4 (3.4)	3.5 (1.7)
Newfoundland and Labrador	8.8 (2.7)	6.1 (2.3)	21.2 (3.9)	37.4 (4.6)	16.7 (3.5)	9.8 (2.8)
		91.2 (2.7)	85.1 (3.4)	63.9 (4.6)	26.5 (4.2)	9.8 (2.8)
Yukon	19.0 (3.7)	4.2 (1.9)	18.3 (3.7)	46.5 (4.7)	7.7 (2.5)	4.2 (1.9)
		81.0 (3.7)	76.8 (4.0)	58.5 (4.7)	12.0 (3.1)	4.2 (1.9)
Northwest Territories	23.2 (3.7)	9.2 (2.5)	19.8 (3.5)	35.3 (4.2)	7.2 (2.3)	5.3 (2.0)
		76.8 (3.7)	67.6 (4.1)	47.8 (4.4)	12.6 (2.9)	5.3 (2.0)
Canada (E)	8.2 (0.8)	5.9 (0.7)	20.2 (1.1)	42.2 (1.4)	16.2 (1.0)	7.3 (0.7)
		91.8 (0.8)	85.9 (1.0)	65.7 (1.3)	23.5 (1.2)	7.3 (0.7)
Canada (F)	7.6 (1.6)	5.6 (1.4)	20.4 (2.5)	44.3 (3.1)	19.1 (2.4)	3.1 (1.1)
		92.4 (1.6)	86.8 (2.1)	66.5 (2.9)	22.2 (2.6)	3.1 (1.1)
Canada	8.1 (0.7)	5.8 (0.6)	20.2 (1.0)	42.6 (1.3)	16.7 (1.0)	6.6 (0.6)
		91.9 (0.7)	86.1 (0.9)	65.8 (1.2)	23.2 (1.1)	6.6 (0.6)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 10: SAIP SCIENCE 1999
PERCENTAGE OF STUDENTS BY PERFORMANCE LEVEL AND BY AGE

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
13-year-olds	11.9 (0.6)	14.7 (0.6)	20.0 (0.7)	44.9 (0.9)	7.7 (0.5)	0.8 (0.2)
		88.1 (0.6)	73.3 (0.8)	53.3 (0.9)	8.5 (0.5)	0.8 (0.2)
16-year-olds	6.4 (0.4)	6.3 (0.4)	11.2 (0.6)	44.5 (0.9)	26.0 (0.8)	5.6 (0.4)
		93.6 (0.4)	87.3 (0.6)	76.1 (0.8)	31.6 (0.8)	5.6 (0.4)

Note: For each age group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 11: SAIP SCIENCE 1999
PERCENTAGE OF 13-YEAR-OLDS BY PERFORMANCE LEVEL AND BY GENDER

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
Females	10.3 (0.8)	16.0 (0.9)	20.5 (1.0)	44.7 (1.3)	7.7 (0.7)	0.8 (0.2)
		89.7 (0.8)	73.8 (1.1)	53.2 (1.3)	8.5 (0.7)	0.8 (0.2)
Males	13.0 (0.8)	13.4 (0.8)	19.0 (1.0)	45.5 (1.2)	8.2 (0.7)	0.9 (0.2)
		87.0 (0.8)	73.6 (1.1)	54.6 (1.2)	9.1 (0.7)	0.9 (0.2)
Total	11.9 (0.6)	14.7 (0.6)	20.0 (0.7)	44.9 (0.9)	7.7 (0.5)	0.8 (0.2)
		88.1 (0.6)	73.3 (0.8)	53.3 (0.9)	8.5 (0.5)	0.8 (0.2)

Note: For each gender group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 12: SAIP SCIENCE 1999
PERCENTAGE OF 16-YEAR-OLDS BY PERFORMANCE LEVEL AND BY GENDER

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
Females	4.9 (0.6)	7.2 (0.7)	11.4 (0.8)	46.7 (1.3)	24.3 (1.1)	5.6 (0.6)
		95.1 (0.8)	87.9 (0.8)	76.5 (1.1)	29.8 (1.2)	5.6 (0.6)
Males	6.8 (0.7)	5.5 (0.6)	10.1 (0.8)	43.4 (1.3)	28.4 (1.2)	5.7 (0.6)
		93.2 (0.9)	87.6 (0.9)	77.5 (1.1)	34.1 (1.3)	5.7 (0.6)
Total	6.4 (0.4)	6.3 (0.4)	11.2 (0.6)	44.5 (0.9)	26.0 (0.8)	5.6 (0.4)
		93.6 (0.6)	87.3 (0.6)	76.1 (0.8)	31.6 (0.8)	5.6 (0.4)

Note: For each gender group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 13: SAIP SCIENCE 1999
PERCENTAGE OF 13-YEAR-OLDS BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
British Columbia	8.9 (2.0)	14.9 (2.4)	18.2 (2.6)	47.5 (3.4)	9.1 (2.0)	1.3 (0.8)
		91.1 (2.0)	76.1 (2.9)	57.9 (3.4)	10.4 (2.1)	1.3 (0.8)
Alberta	9.3 (1.8)	8.2 (1.7)	17.6 (2.4)	50.2 (3.2)	12.0 (2.1)	2.7 (1.0)
		90.7 (1.8)	82.5 (2.4)	64.9 (3.0)	14.7 (2.3)	2.7 (1.0)
Saskatchewan	9.2 (1.9)	15.3 (2.4)	23.4 (2.8)	44.3 (3.3)	6.7 (1.7)	1.2 (0.7)
		90.8 (1.9)	75.5 (2.9)	52.1 (3.3)	7.8 (1.8)	1.2 (0.7)
Manitoba (E)	13.4 (2.3)	13.9 (2.4)	19.1 (2.7)	45.2 (3.4)	8.0 (1.9)	0.5 (0.5)
		86.6 (2.3)	72.8 (3.0)	53.7 (3.4)	8.5 (1.9)	0.5 (0.5)
Manitoba (F)	29.3 (3.5)	9.5 (2.2)	20.9 (3.1)	37.7 (3.7)	2.4 (1.2)	0.2 (0.4)
		70.7 (3.5)	61.2 (3.7)	40.3 (3.7)	2.6 (1.2)	0.2 (0.4)
Ontario (E)	11.6 (2.2)	16.3 (2.6)	23.7 (3.0)	41.1 (3.5)	6.8 (1.8)	0.5 (0.5)
		88.4 (2.2)	72.1 (3.1)	48.4 (3.5)	7.3 (1.8)	0.5 (0.5)
Ontario (F)	25.3 (2.9)	17.5 (2.5)	21.8 (2.7)	32.0 (3.1)	3.4 (1.2)	0.0 (0.0)
		74.7 (2.9)	57.2 (3.3)	35.4 (3.2)	3.4 (1.2)	0.0 (0.0)
Quebec (E)	14.1 (2.3)	16.2 (2.4)	19.1 (2.6)	42.4 (3.2)	7.3 (1.7)	0.8 (0.6)
		85.9 (2.3)	69.6 (3.0)	50.5 (3.3)	8.1 (1.8)	0.8 (0.6)
Quebec (F)	13.5 (2.1)	13.7 (2.1)	15.4 (2.3)	49.7 (3.1)	7.3 (1.6)	0.3 (0.3)
		86.5 (2.1)	72.8 (2.8)	57.3 (3.1)	7.6 (1.7)	0.3 (0.3)
New Brunswick (E)	10.3 (2.1)	20.3 (2.8)	19.7 (2.8)	44.1 (3.5)	5.4 (1.6)	0.1 (0.2)
		89.7 (2.1)	69.4 (3.2)	49.7 (3.5)	5.5 (1.6)	0.1 (0.2)
New Brunswick (F)	22.5 (2.6)	17.0 (2.4)	22.0 (2.6)	34.2 (3.0)	3.9 (1.2)	0.4 (0.4)
		77.5 (2.6)	60.5 (3.1)	38.5 (3.1)	4.3 (1.3)	0.4 (0.4)
Nova Scotia (E)	10.5 (2.2)	19.9 (2.9)	21.3 (3.0)	41.0 (3.6)	7.1 (1.9)	0.1 (0.3)
		89.5 (2.2)	69.5 (3.3)	48.2 (3.6)	7.2 (1.9)	0.1 (0.3)
Nova Scotia (F)	25.0 (3.1)	13.2 (2.4)	21.6 (2.9)	36.3 (3.4)	3.9 (1.4)	0.0 (0.0)
		75.0 (3.1)	61.8 (3.5)	40.2 (3.5)	3.9 (1.4)	0.0 (0.0)
Prince Edward Island	9.8 (2.0)	15.9 (2.4)	21.4 (2.7)	45.6 (3.3)	7.2 (1.7)	0.2 (0.3)
		90.2 (2.0)	74.3 (2.9)	52.9 (3.3)	7.3 (1.7)	0.2 (0.3)
Newfoundland and Labrador	16.4 (2.1)	15.5 (2.0)	21.1 (2.3)	41.7 (2.7)	4.5 (1.2)	0.7 (0.5)
		83.6 (2.1)	68.0 (2.6)	46.9 (2.8)	5.2 (1.2)	0.7 (0.5)
Yukon	17.1 (2.2)	11.6 (1.9)	16.2 (2.2)	45.3 (2.9)	8.3 (1.6)	1.5 (0.7)
		82.9 (2.2)	71.3 (2.6)	55.0 (2.9)	9.8 (1.7)	1.5 (0.7)
Northwest Territories	32.6 (2.2)	15.2 (1.7)	16.2 (1.7)	32.4 (2.2)	3.2 (0.8)	0.4 (0.3)
		67.4 (2.2)	52.2 (2.3)	36.0 (2.2)	3.6 (0.9)	0.4 (0.3)
Nunavut	71.0 (2.9)	11.5 (2.1)	5.4 (1.5)	10.3 (2.0)	0.9 (0.6)	0.9 (0.6)
		29.0 (2.9)	17.5 (2.5)	12.1 (2.1)	1.8 (0.9)	0.9 (0.6)
Canada	11.9 (0.6)	14.7 (0.6)	20.0 (0.7)	44.9 (0.9)	7.7 (0.5)	0.8 (0.2)
		88.1 (0.6)	73.3 (0.8)	53.3 (0.9)	8.5 (0.5)	0.8 (0.2)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 14: SAIP SCIENCE 1999
PERCENTAGE OF 16-YEAR-OLDS BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
British Columbia	6.8 (1.9)	5.6 (1.7)	11.7 (2.4)	46.3 (3.7)	25.6 (3.3)	3.9 (1.4)
		93.2 (1.9)	87.6 (2.5)	75.8 (3.2)	29.5 (3.4)	3.9 (1.4)
Alberta	3.1 (1.1)	3.6 (1.2)	7.5 (1.7)	36.0 (3.1)	38.0 (3.1)	11.8 (2.1)
		96.9 (1.1)	93.3 (1.6)	85.8 (2.3)	49.8 (3.2)	11.8 (2.1)
Saskatchewan	5.7 (1.6)	6.5 (1.7)	10.4 (2.1)	48.7 (3.4)	23.9 (2.9)	4.9 (1.5)
		94.3 (1.6)	87.8 (2.2)	77.4 (2.9)	28.8 (3.1)	4.9 (1.5)
Manitoba (E)	4.8 (1.4)	4.9 (1.4)	10.4 (2.0)	44.3 (3.3)	29.1 (3.0)	6.4 (1.6)
		95.2 (1.4)	90.2 (1.9)	79.8 (2.6)	35.5 (3.1)	6.4 (1.6)
Manitoba (F)	7.5 (2.0)	3.1 (1.3)	13.2 (2.6)	54.3 (3.8)	19.2 (3.0)	2.6 (1.2)
		92.5 (2.0)	89.4 (2.4)	76.2 (3.3)	21.9 (3.2)	2.6 (1.2)
Ontario (E)	7.5 (2.0)	7.7 (2.0)	12.6 (2.6)	44.2 (3.8)	23.1 (3.2)	4.9 (1.7)
		92.5 (2.0)	84.8 (2.8)	72.2 (3.4)	28.0 (3.5)	4.9 (1.7)
Ontario (F)	13.4 (2.8)	10.6 (2.5)	15.9 (3.0)	42.0 (4.0)	15.5 (2.9)	2.6 (1.3)
		86.6 (2.8)	76.0 (3.5)	60.1 (4.0)	18.1 (3.1)	2.6 (1.3)
Quebec (E)	7.3 (1.7)	6.4 (1.6)	9.6 (1.9)	44.3 (3.2)	25.4 (2.8)	7.0 (1.6)
		92.7 (1.7)	86.3 (2.2)	76.7 (2.7)	32.4 (3.0)	7.0 (1.6)
Quebec (F)	4.4 (1.3)	4.9 (1.3)	10.1 (1.9)	47.7 (3.1)	27.1 (2.7)	5.7 (1.4)
		95.6 (1.3)	90.6 (1.8)	80.5 (2.4)	32.8 (2.9)	5.7 (1.4)
New Brunswick (E)	9.1 (2.2)	7.2 (1.9)	11.1 (2.4)	44.4 (3.7)	24.7 (3.2)	3.5 (1.4)
		90.9 (2.2)	83.7 (2.8)	72.6 (3.3)	28.3 (3.4)	3.5 (1.4)
New Brunswick (F)	10.3 (2.0)	9.1 (1.9)	11.3 (2.1)	50.0 (3.3)	16.8 (2.5)	2.6 (1.1)
		89.7 (2.0)	80.6 (2.6)	69.4 (3.1)	19.4 (2.6)	2.6 (1.1)
Nova Scotia (E)	7.2 (1.5)	6.2 (1.4)	12.0 (1.8)	45.1 (2.8)	25.7 (2.5)	3.8 (1.1)
		92.8 (1.5)	86.5 (1.9)	74.6 (2.4)	29.5 (2.6)	3.8 (1.1)
Nova Scotia (F)	10.7 (5.3)	6.0 (4.1)	9.5 (5.1)	35.7 (8.3)	35.7 (8.3)	2.4 (2.6)
		89.3 (5.3)	83.3 (6.4)	73.8 (7.6)	38.1 (8.4)	2.4 (2.6)
Prince Edward Island	4.1 (1.6)	3.9 (1.5)	10.8 (2.4)	45.4 (3.9)	29.2 (3.6)	6.7 (2.0)
		95.9 (1.6)	92.0 (2.1)	81.3 (3.1)	35.9 (3.8)	6.7 (2.0)
Newfoundland and Labrador	10.6 (1.9)	7.3 (1.6)	9.4 (1.8)	42.3 (3.1)	24.7 (2.7)	5.6 (1.4)
		89.4 (1.9)	82.0 (2.4)	72.7 (2.8)	30.4 (2.9)	5.6 (1.4)
Yukon	9.1 (2.2)	4.7 (1.7)	12.2 (2.6)	35.8 (3.7)	30.7 (3.6)	7.5 (2.1)
		90.9 (2.2)	86.2 (2.7)	74.0 (3.4)	38.2 (3.8)	7.5 (2.1)
Northwest Territories	11.5 (2.5)	8.7 (2.2)	12.1 (2.6)	38.4 (3.8)	25.4 (3.4)	4.0 (1.5)
		88.5 (2.5)	79.9 (3.1)	67.8 (3.7)	29.4 (3.6)	4.0 (1.5)
Nunavut	48.4 (7.2)	18.3 (5.6)	9.5 (4.2)	16.7 (5.4)	5.6 (3.3)	1.6 (1.8)
		51.6 (7.2)	33.3 (6.8)	23.8 (6.2)	7.1 (3.7)	1.6 (1.8)
Canada	6.4 (0.4)	6.3 (0.4)	11.2 (0.6)	44.5 (0.9)	26.0 (0.8)	5.6 (0.4)
		93.6 (0.4)	87.3 (0.6)	76.1 (0.8)	31.6 (0.8)	5.6 (0.4)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 15: SAIP SCIENCE 1996
PERCENTAGE OF STUDENTS BY PERFORMANCE LEVEL AND BY AGE

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
13-year-olds	11.2 (0.5)	16.8 (0.6)	28.9 (0.8)	37.6 (0.8)	5.2 (0.4)	0.3 (0.1)
		88.8 (0.5)	71.9 (0.8)	43.0 (0.8)	5.5 (0.4)	0.3 (0.1)
16-year-olds	5.0 (0.4)	7.4 (0.5)	18.7 (0.7)	42.8 (0.9)	22.7 (0.7)	3.4 (0.3)
		95.0 (0.4)	87.6 (0.6)	69.0 (0.8)	26.1 (0.8)	3.4 (0.3)

Note: For each age group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 16: SAIP SCIENCE 1996
PERCENTAGE OF 13-YEAR-OLDS BY PERFORMANCE LEVEL AND BY GENDER

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
Females	10.7 (0.7)	16.0 (0.9)	29.3 (1.1)	38.8 (1.2)	5.0 (0.5)	0.2 (0.1)
		89.3 (0.7)	73.3 (1.1)	43.9 (1.2)	5.2 (0.5)	0.2 (0.1)
Males	11.5 (0.8)	17.7 (0.9)	28.6 (1.1)	36.5 (1.1)	5.3 (0.5)	0.5 (0.2)
		88.5 (0.8)	70.9 (1.1)	42.3 (1.2)	5.8 (0.6)	0.5 (0.2)
Total	11.2 (0.5)	16.8 (0.6)	28.9 (0.8)	37.6 (0.8)	5.2 (0.4)	0.3 (0.1)
		88.8 (0.5)	71.9 (0.8)	43.0 (0.8)	5.5 (0.4)	0.3 (0.1)

Note: For each gender group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 17: SAIP SCIENCE 1996
PERCENTAGE OF 16-YEAR-OLDS BY PERFORMANCE LEVEL AND BY GENDER

	Below 1	Level 1	Level 2	Level 3	Level 4	Level 5
Females	4.1 (0.5)	8.4 (0.7)	19.6 (1.0)	44.0 (1.2)	21.1 (1.0)	2.9 (0.4)
		95.9 (0.5)	87.5 (0.8)	68.0 (1.2)	23.9 (1.1)	2.9 (0.4)
Males	5.2 (0.6)	6.4 (0.6)	17.9 (1.0)	41.9 (1.2)	24.5 (1.1)	4.0 (0.5)
		94.8 (0.6)	88.4 (0.8)	70.5 (1.1)	28.6 (1.1)	4.0 (0.5)
Total	5.0 (0.4)	7.4 (0.5)	18.7 (0.7)	42.8 (0.9)	22.7 (0.7)	3.4 (0.3)
		95.0 (0.4)	87.6 (0.6)	69.0 (0.8)	26.1 (0.8)	3.4 (0.3)

Note: For each gender group, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 18: SAIP SCIENCE 1996
PERCENTAGE OF 13-YEAR-OLDS BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1		Level 1		Level 2		Level 3		Level 4		Level 5	
British Columbia	10.9	(1.9)	14.2	(2.1)	29.4	(2.8)	42.5	(3.0)	2.4	(0.9)	0.6	(0.5)
			89.1	(1.9)	74.9	(2.6)	45.5	(3.0)	3.0	(1.0)	0.6	(0.5)
Alberta	8.5	(1.6)	8.5	(1.6)	27.3	(2.6)	44.4	(2.9)	10.1	(1.8)	1.2	(0.7)
			91.5	(1.6)	83.0	(2.2)	55.7	(2.9)	11.3	(1.9)	1.2	(0.7)
Saskatchewan	7.6	(1.7)	16.3	(2.3)	31.2	(2.9)	40.6	(3.1)	4.3	(1.3)	0.0	(0.0)
			92.4	(1.7)	76.1	(2.7)	44.9	(3.1)	4.3	(1.3)	0.0	(0.0)
Manitoba (E)	9.1	(1.8)	18.0	(2.4)	30.5	(2.9)	36.5	(3.0)	5.2	(1.4)	0.7	(0.5)
			90.9	(1.8)	72.9	(2.8)	42.4	(3.1)	5.9	(1.5)	0.7	(0.5)
Manitoba (F)	23.3	(2.9)	16.9	(2.6)	30.4	(3.2)	26.6	(3.1)	2.7	(1.1)	0.1	(0.2)
			76.7	(2.9)	59.8	(3.4)	29.4	(3.2)	2.8	(1.1)	0.1	(0.2)
Ontario (E)	13.7	(2.0)	18.9	(2.3)	30.9	(2.7)	31.0	(2.7)	5.3	(1.3)	0.2	(0.3)
			86.3	(2.0)	67.4	(2.8)	36.6	(2.8)	5.5	(1.4)	0.2	(0.3)
Ontario (F)	21.7	(2.6)	21.1	(2.6)	30.2	(2.9)	24.7	(2.7)	2.2	(0.9)	0.0	(0.0)
			78.3	(2.6)	57.1	(3.1)	26.9	(2.8)	2.2	(0.9)	0.0	(0.0)
Quebec (E)	9.5	(1.8)	17.9	(2.4)	29.6	(2.8)	38.0	(3.0)	4.8	(1.3)	0.2	(0.3)
			90.5	(1.8)	72.6	(2.8)	43.0	(3.1)	5.0	(1.4)	0.2	(0.3)
Quebec (F)	8.9	(1.7)	17.9	(2.3)	24.9	(2.6)	43.2	(2.9)	5.2	(1.3)	0.0	(0.0)
			91.1	(1.7)	73.3	(2.6)	48.4	(3.0)	5.2	(1.3)	0.0	(0.0)
New Brunswick (E)	9.0	(1.8)	20.4	(2.6)	26.9	(2.8)	40.5	(3.1)	3.2	(1.1)	0.0	(0.0)
			91.0	(1.8)	70.6	(2.9)	43.7	(3.2)	3.2	(1.1)	0.0	(0.0)
New Brunswick (F)	18.3	(2.3)	21.3	(2.4)	25.6	(2.6)	32.3	(2.8)	2.5	(0.9)	0.0	(0.0)
			81.7	(2.3)	60.4	(2.9)	34.8	(2.8)	2.5	(0.9)	0.0	(0.0)
Nova Scotia (E)	8.7	(1.9)	18.0	(2.6)	33.9	(3.2)	34.7	(3.2)	4.5	(1.4)	0.2	(0.3)
			91.3	(1.9)	73.3	(2.9)	39.3	(3.3)	4.6	(1.4)	0.2	(0.3)
Nova Scotia (F)	17.6	(—)	8.8	(—)	35.1	(—)	38.5	(—)	0.0	(—)	0.0	(—)
			82.4	(—)	73.7	(—)	38.5	(—)	0.0	(—)	0.0	(—)
Prince Edward Island	8.0	(1.7)	15.6	(2.3)	30.6	(2.9)	42.4	(3.1)	3.4	(1.1)	0.0	(0.0)
			92.0	(1.7)	76.4	(2.7)	45.8	(3.1)	3.4	(1.1)	0.0	(0.0)
Newfoundland and Labrador	11.1	(2.1)	17.5	(2.5)	33.2	(3.1)	33.8	(3.1)	4.5	(1.4)	0.0	(0.0)
			88.9	(2.1)	71.4	(3.0)	38.2	(3.2)	4.5	(1.4)	0.0	(0.0)
Yukon	7.0	(2.2)	16.8	(3.3)	27.6	(3.9)	40.6	(4.3)	7.8	(2.3)	0.3	(0.4)
			93.0	(2.2)	76.2	(3.7)	48.6	(4.4)	8.0	(2.4)	0.3	(0.4)
Northwest Territories	44.4	(5.0)	14.9	(3.6)	20.0	(4.0)	19.2	(4.0)	1.1	(1.1)	0.2	(0.5)
			55.6	(5.0)	40.6	(5.0)	20.6	(4.1)	1.4	(1.2)	0.2	(0.5)
Canada	11.2	(0.5)	16.8	(0.6)	28.9	(0.8)	37.6	(0.8)	5.2	(0.4)	0.3	(0.1)
			88.8	(0.5)	71.9	(0.8)	43.0	(0.8)	5.5	(0.4)	0.3	(0.1)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 19: SAIP SCIENCE 1996
PERCENTAGE OF 16-YEAR-OLDS BY PERFORMANCE LEVEL AND BY JURISDICTION

	Below 1	*Level 1*	*Level 2*	*Level 3*	*Level 4*	*Level 5*
British Columbia	4.7 (1.4)	7.7 (1.7)	18.3 (2.5)	45.6 (3.2)	18.2 (2.5)	5.4 (1.4)
		95.3 (1.4)	87.6 (2.1)	69.2 (2.9)	23.6 (2.7)	5.4 (1.4)
Alberta	5.7 (1.4)	3.4 (1.1)	12.2 (1.9)	36.5 (2.8)	34.1 (2.8)	8.1 (1.6)
		94.3 (1.4)	90.8 (1.7)	78.6 (2.4)	42.1 (2.9)	8.1 (1.6)
Saskatchewan	3.0 (1.1)	7.2 (1.7)	18.9 (2.6)	44.2 (3.4)	22.2 (2.8)	4.6 (1.4)
		97.0 (1.1)	89.9 (2.0)	71.0 (3.1)	26.7 (3.0)	4.6 (1.4)
Manitoba (E)	3.9 (1.3)	7.3 (1.7)	21.1 (2.7)	38.2 (3.2)	25.6 (2.8)	4.0 (1.3)
		96.1 (1.3)	88.8 (2.1)	67.8 (3.0)	29.6 (3.0)	4.0 (1.3)
Manitoba (F)	6.6 (2.4)	7.4 (2.5)	18.3 (3.7)	37.6 (4.6)	29.1 (4.3)	1.1 (1.0)
		93.4 (2.4)	86.0 (3.3)	67.8 (4.4)	30.2 (4.3)	1.1 (1.0)
Ontario (E)	6.2 (1.5)	8.7 (1.7)	20.3 (2.5)	42.3 (3.1)	20.1 (2.5)	2.5 (1.0)
		93.8 (1.5)	85.2 (2.2)	64.9 (3.0)	22.6 (2.6)	2.5 (1.0)
Ontario (F)	9.9 (2.0)	12.1 (2.1)	26.6 (2.9)	36.5 (3.2)	14.1 (2.3)	0.8 (0.6)
		90.1 (2.0)	78.0 (2.7)	51.4 (3.3)	14.9 (2.3)	0.8 (0.6)
Quebec (E)	4.6 (1.3)	10.2 (1.9)	19.6 (2.5)	44.4 (3.1)	17.8 (2.4)	3.5 (1.2)
		95.4 (1.3)	85.2 (2.2)	65.6 (3.0)	21.2 (2.6)	3.5 (1.2)
Quebec (F)	3.8 (1.1)	5.8 (1.4)	16.9 (2.2)	44.8 (2.9)	26.9 (2.6)	1.7 (0.7)
		96.2 (1.1)	90.3 (1.7)	73.4 (2.6)	28.6 (2.6)	1.7 (0.7)
New Brunswick (E)	3.5 (1.2)	9.3 (2.0)	17.5 (2.5)	49.9 (3.4)	16.7 (2.5)	3.2 (1.2)
		96.5 (1.2)	87.2 (2.2)	69.8 (3.1)	19.9 (2.7)	3.2 (1.2)
New Brunswick (F)	7.6 (1.6)	12.7 (2.1)	21.8 (2.6)	44.1 (3.1)	12.8 (2.1)	1.1 (0.6)
		92.4 (1.6)	79.7 (2.5)	58.0 (3.1)	13.9 (2.1)	1.1 (0.6)
Nova Scotia (E)	1.4 (0.9)	7.4 (1.9)	22.7 (3.0)	49.1 (3.6)	16.9 (2.7)	2.5 (1.1)
		98.6 (0.9)	91.2 (2.1)	68.5 (3.4)	19.4 (2.9)	2.5 (1.1)
Nova Scotia (F)	2.5 (—)	3.8 (—)	13.4 (—)	46.5 (—)	32.5 (—)	1.3 (—)
		97.5 (—)	93.6 (—)	80.3 (—)	33.8 (—)	1.3 (—)
Prince Edward Island	4.4 (1.5)	6.7 (1.8)	20.3 (2.9)	46.0 (3.6)	19.8 (2.8)	2.8 (1.2)
		95.6 (1.5)	88.8 (2.3)	68.6 (3.3)	22.5 (3.0)	2.8 (1.2)
Newfoundland and Labrador	3.2 (1.2)	8.8 (1.9)	23.6 (2.8)	39.4 (3.3)	20.2 (2.7)	4.8 (1.4)
		96.8 (1.2)	88.0 (2.2)	64.4 (3.2)	25.0 (2.9)	4.8 (1.4)
Yukon	5.6 (3.3)	7.5 (3.8)	13.1 (4.8)	41.5 (7.0)	26.5 (6.3)	5.9 (3.4)
		94.4 (3.3)	86.9 (4.8)	73.9 (6.3)	32.4 (6.7)	5.9 (3.4)
Northwest Territories	21.8 (5.9)	12.6 (4.8)	21.2 (5.9)	16.6 (5.4)	23.9 (6.1)	3.9 (2.8)
		78.2 (5.9)	65.6 (6.8)	44.4 (7.1)	27.8 (6.4)	3.9 (2.8)
Canada	5.0 (0.4)	7.4 (0.5)	18.7 (0.7)	42.8 (0.9)	22.7 (0.7)	3.4 (0.3)
		95.0 (0.4)	87.6 (0.6)	69.0 (0.8)	26.1 (0.8)	3.4 (0.3)

Note: For each population, the first line shows the percentages of students by highest level achieved; the second line shows the cumulative percentages of students at or above each level. The confidence intervals (± 1.96 times the standard errors) for the percentages are shown between parentheses. Results are weighted so as to correctly represent each population.

TABLE 20: SAIP SCIENCE 2004
CORRELATIONS BETWEEN STUDENT QUESTIONNAIRE VARIABLES AND ACHIEVEMENT

Correl: Kendall's tau-b correlation
p: Probabilty for test of hypothesis that tau-b is zero (two tail) for Canada
sign: number of populations with correlation in the same direction (+ or –)
Results printed in bold: p< 0.05 and correlation is in the same direction as the Canada correlation for 12 or more populations

	13-year-olds			16-year-olds		
Variable	*Correl*	*p*	*sign*	*Correl*	*p*	*sign*
Number of hours reading for enjoyment	**0.200**	**0.000**	**17**	**0.152**	**0.000**	**15**
Number of hours using a computer for entertainment	0.065	0.000	7	0.059	0.000	8
Science is more difficult than other subjects	**–0.124**	**0.000**	**14**	**–0.107**	**0.000**	**16**
Not interested in science subjects	**–0.152**	**0.000**	**14**	**–0.225**	**0.000**	**17**
Science is one of the most important subjects in school	0.109	0.000	10	**0.179**	**0.000**	**16**
To do well in science, I need natural ability	–0.017	0.079	5	0.077	0.000	5
To do well in science, I need hard work	0.002	0.836	3	–0.010	0.368	0
To do well in science, I need encouragement from teachers	–0.030	0.002	1	–0.041	0.000	1
To do well in science, I need encouragement from parents	–0.029	0.003	1	–0.061	0.000	3
Unusually low marks on a science assignment are because I did not study hard enough	–0.024	0.015	0	0.000	0.979	3
Unusually low marks on a science assignment are because the course was difficult	–0.031	0.002	2	–0.061	0.000	6
Unusually low marks on a science assignment are because the course was not well taught	0.052	0.000	3	–0.014	0.199	2
Unusually high marks on a science assignment are because I studied a lot	–0.041	0.000	1	–0.020	0.060	1
Unusually high marks on a science assignment are because the course was well taught	0.015	0.121	1	0.085	0.000	5
Ask the teacher for help in science	–0.023	0.019	0	0.055	0.000	4
Ask my parents for help in science	–0.043	0.000	2	–0.038	0.000	3
Interested in school work	0.042	0.000	2	**0.123**	**0.000**	**12**
Teachers treat me fairly	0.027	0.006	6	**0.067**	**0.000**	**13**
Enjoy going to school	0.034	0.001	1	0.034	0.002	10
I get the marks I deserve	**0.106**	**0.000**	**12**	0.057	0.000	10
Absent from school more than 10 days this year	–0.021	0.035	1	–0.111	0.000	5
Spend 15 hours or more watching television, movies, and videos	0.027	0.006	0	–0.051	0.000	4
Participate in scientific projects	–0.087	0.000	11	–0.103	0.000	10
Work in pairs or in small groups	–0.040	0.000	6	–0.043	0.000	3
Do experiments in the laboratory	–0.046	0.000	6	–0.077	0.000	5
Teachers show me experiments	–0.097	0.000	10	–0.073	0.000	9
Have quizzes or tests	**–0.121**	**0.000**	**15**	**–0.119**	**0.000**	**12**
Teachers assign homework	0.004	0.711	1	0.100	0.000	8
Go outside or out of the school for an educational outing	**–0.124**	**0.000**	**13**	**–0.142**	**0.000**	**14**
Use science books and magazines in science	–0.057	0.000	4	–0.027	0.023	6
Use computers in science	–0.037	0.000	1	0.002	0.843	3
Use slides, films, or videos in science	0.038	0.000	3	–0.002	0.864	2
Visit museums, zoos, conservation areas, and similar non-school sites in science	–0.082	0.000	9	–0.055	0.000	6

TABLE 21: SAIP SCIENCE 2004
CORRELATIONS BETWEEN TEACHER QUESTIONNAIRE VARIABLES AND ACHIEVEMENT

Correl: Kendall's tau-b correlation
p: Probabilty for test of hypothesis that tau-b is zero (two tail) for Canada
sign: number of populations with correlation in the same direction (+ or –)
Results printed in bold: p< 0.10 and correlation is in the same direction as the Canada correlation for 12 or more populations

	13-year-olds			16-year-olds		
Variable	*Correl*	*p*	*sign*	*Correl*	*p*	*sign*
Average number of students in the science classes this year	0.042	0.000	5	0.040	0.000	7
Average largest number of students in any science class	0.053	0.000	7	0.037	0.000	7
Learning scientific concepts and principles is more important than learning facts and rules	0.024	0.008	2	0.010	0.354	1
Science is better thought of as a process than as a body of knowledge and concepts	0.011	0.246	2	0.044	0.000	5
True understanding of science takes place only after students learn basic facts and rules	0.010	0.292	4	0.019	0.084	3
Some students have a natural talent for science and some do not	0.023	0.011	1	0.028	0.011	3
Students need natural talent to do well in science courses	0.007	0.433	2	0.022	0.041	3
Students need to work hard to do well in science courses	0.003	0.714	1	0.001	0.909	2
Science is generally more difficult than other school subjects	0.003	0.774	2	0.034	0.002	4
Society generally appreciates the work of teachers	–0.019	0.039	3	–0.032	0.004	2
Students generally appreciate the work of teachers	0.020	0.030	4	0.028	0.009	5
High school students should be streamed into different programs based on their abilities	–0.003	0.783	1	0.012	0.292	2
Students do laboratory experiments	0.035	0.000	3	0.030	0.006	4
Demonstrate experiments	0.015	0.095	2	0.031	0.004	5
Take students outdoors or on a field trip	–0.014	0.140	4	–0.018	0.105	4
Use a laboratory	0.064	0.000	6	0.044	0.000	5
Use experts within the community	0.008	0.395	2	–0.028	0.012	4
Teaching is limited or restricted by the range of student abilities in the class	–0.053	0.000	8	–0.037	0.001	5
Teaching is limited or restricted by the range of differences in students' backgrounds	–0.038	0.000	3	–0.020	0.071	4
Teaching is limited or restricted by the presence of students with special-needs limits	–0.032	0.000	5	–0.021	0.059	3
Teaching is limited or restricted by uninterested students	–0.032	0.000	4	–0.026	0.015	2
Teaching is limited or restricted by shortage of materials or equipment	–0.011	0.219	2	–0.011	0.295	4
Teaching is limited or restricted by large class sizes	0.026	0.004	5	0.011	0.324	3
Teaching is limited or restricted by external examinations or standardized tests	0.020	0.028	1	0.012	0.262	3
Teaching is limited or restricted by lack of in-service with respect to the curriculum	–0.002	0.807	2	0.007	0.537	2
Collect, correct, and return assignments to students	0.004	0.661	0	–0.028	0.010	5
Give weight to teacher-made short-answer or essay tests that require students to explain their reasoning	0.012	0.187	5	0.006	0.570	3
Give weight to teacher-made multiple-choice, true-false or matching tests	0.016	0.086	2	0.000	0.975	4
Give weight to homework assignments	0.001	0.948	1	–0.053	0.000	5
Give weight to projects or laboratory experiments	0.023	0.011	2	0.004	0.736	1
Give weight to observations of, or interviews with, students	–0.014	0.133	1	–0.009	0.424	1
Give weight to participation of students in class activities	–0.042	0.000	2	–0.040	0.000	3
Give weight to improvement over the year or term	–0.049	0.000	5	–0.041	0.000	3
Use many scores or grades in computing final marks	0.055	0.000	6	0.008	0.473	2
Female science teachers	–0.008	0.406	2	–0.035	0.001	5
Number of years of experience teaching science	0.036	0.000	6	0.078	0.000	11
Hold a BSc degree or equivalent	0.050	0.000	6	0.033	0.002	3
Hold a BEd or equivalent (e.g., at least a year of teacher training)	–0.017	0.057	2	–0.007	0.536	1
Hold a BSc degree or higher in science with a major or concentration in biology	0.030	0.001	4	–0.033	0.002	4
Hold a BSc degree or higher in science with a major or concentration in chemistry or biochemistry	0.052	0.000	5	0.044	0.000	6
Hold a BSc degree or higher in science with a major or concentration in earth science	–0.007	0.454	1	0.000	0.982	3
Hold a BSc degree or higher in science with a major or concentration in mathematics	0.014	0.126	2	0.009	0.404	4
Hold a BSc degree or higher in science with a major or concentration in physics	0.030	0.001	4	0.064	0.000	5
Hold a BSc degree or higher in science with a major or concentration in computer science or equivalent or other science	–0.001	0.945	0	–0.027	0.013	2
Specialists in science and prefer to teach mainly in this area	0.069	0.000	7	0.078	0.000	10
Capable of teaching science but would prefer to teach other subjects	–0.039	0.000	4	–0.067	0.000	7

TABLE 22: SAIP SCIENCE 2004
CORRELATIONS BETWEEN SCHOOL QUESTIONNAIRE VARIABLES AND ACHIEVEMENT

Correl: Kendall’s tau-b correlation
p: Probabilty for test of hypothesis that tau-b is zero (two tail) for Canada
sign: number of populations with correlation in the same direction (+ or –)
Results printed in bold: p< 0.10 and correlation is in the same direction as the Canada correlation for 12 or more populations

	13-year-olds			*16-year-olds*		
Variable	*Correl*	*p*	*sign*	*Correl*	*p*	*sign*
Size of school community	0.041	0.106	2	0.090	0.002	1
School enrolment	0.080	0.002	2	0.209	0.000	6
Public school within a school board or district	0.052	0.052	4	0.015	0.605	4
Separate school publicly funded (e.g., denominational)	–0.077	0.004	2	–0.054	0.065	1
Private or independent school with its own board of governors	0.063	0.018	3	0.080	0.006	3
Parents serve on committees on matters of finance and administration some or a lot	0.082	0.002	1	0.091	0.002	3
Percentage of students with first language other than the language of the school	–0.146	0.000	3	0.018	0.558	1
Percentage of students with learning problems needing special attention	–0.042	0.125	3	–0.137	0.000	3
Percentage of students from single-parent families	–0.116	0.000	5	–0.037	0.247	1
Percentage of students who have health or nutrition problems that inhibit learning	–0.030	0.294	5	–0.076	0.018	2
Average science class size	0.016	0.560	3	0.130	0.000	6
Science courses are organized on a semester basis	–0.018	0.511	1	–0.041	0.165	1
Teachers are mainly responsible for specific subjects	0.092	0.001	2	0.135	0.000	3
Science is taught mainly by specialized subject teachers	0.063	0.019	2	0.032	0.274	0
Capacity to provide instruction is limited by the community conditions	–0.051	0.057	7	–0.115	0.000	3
Capacity to provide instruction is limited by the lack of parental support for the school	–0.031	0.237	4	–0.220	0.000	8
Capacity to provide instruction is limited by a shortage or an inadequacy of teachers specialized in science	–0.038	0.154	2	–0.035	0.225	2
Capacity to provide instruction is limited by shortage or inadequacy of special-purpose space	0.009	0.734	2	–0.044	0.131	1
Capacity to provide instruction is limited by shortage or inadequacy of instructional materials	–0.057	0.033	3	–0.074	0.011	0
Capacity to provide instruction is limited by shortage or inadequacy of budget for supplies	–0.035	0.195	2	–0.038	0.194	2
Streams or ability groupings for science students	0.015	0.579	3	–0.001	0.966	1
Number of different science courses available	0.058	0.037	1	0.111	0.000	4
Provide remedial teaching in science	–0.102	0.000	3	–0.147	0.000	3
Students given extra help outside of regular school hours	0.127	0.000	2	0.066	0.022	1
Peers tutoring other students during regular science classes or after school	0.069	0.009	3	0.129	0.000	2
School provides enrichment programs in science for gifted students	0.093	0.000	4	0.128	0.000	4
Believe that there are limits to what a school can accomplish because a student’s home environment has a major influence on achievement	0.039	0.146	1	–0.061	0.037	1
Capacity to provide instruction is limited by the range of student abilities in the school	0.092	0.001	5	0.222	0.000	5
Staff morale is high in the school	–0.043	0.109	1	0.096	0.001	2
Strong school spirit in the school	0.034	0.197	2	0.071	0.015	1
School is supported by the community	0.124	0.000	3	0.136	0.000	4

TABLE 23: SAIP SCIENCE 2004
CORRELATIONS BETWEEN STUDENT QUESTIONNAIRE VARIABLES AND ACHIEVEMENT

s+ significant positive correlation
s– significant negative correlation
Level of significance 0.05

Shaded areas: insufficient or no data
Blank areas (—): no significant correlation

		BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN(E)	CAN(F)	CAN
Number of hours reading for enjoyment	13-year-olds	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+
	16-year-olds	s+	s+	s+	s+	—	s+	s+	s+	s+	s+	s+	s+	—	s+	s+	s+	s+	s+	s+	s+
Number of hours using a computer for entertainment	13-year-olds	—	s+	s+	—	s+	s+	s+	s+	—	—	—	—	—	—	—	s+	—	s+	—	s+
	16-year-olds	s+	—	—	—	s+	—	—	s+	—	s+	—	—	s+	—	s+	s+	s+	s+	s+	s+
Science is more difficult than other subjects	13-year-olds	s–	s–	—	s–	s–	s–	s–	s–	s–	s–	s–	s–	—	s–	s–	—	s–	s–	s–	s–
	16-year-olds	s–	s–	s–	s–	s–	s–	s–	s–	—	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–
Not interested in science subjects	13-year-olds	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	—	s–	s–	—	—	s–	s–	s–
	16-year-olds	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–	s–
Science is one of the most important subjects in school	13-year-olds	s+	s+	s+	s+	s+	s+	s+	s+	s+	—	—	—	s+	—	—	—	—	s+	s+	s+
	16-year-olds	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	s+	—	s+	s+	s+	s+	s+	s+	s+
To do well in science, I need natural ability	13-year-olds	—	—	—	—	—	—	s–	—	—	—	s–	s–	—	—	s–	—	s–	—	—	—
	16-year-olds	s+	s+	—	—	—	—	—	s+	s+	—	—	—	—	s+	—	—	—	s+	s+	s+
To do well in science, I need hard work	13-year-olds	—	s+	s+	—	—	—	—	—	s–	—	—	s+	—	—	—	—	—	s+	s–	—
	16-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
To do well in science, I need encouragement from teachers	13-year-olds	—	—	—	s–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	s–
	16-year-olds	s–	—	—	—	—	—	s+	—	—	—	—	—	—	—	—	—	—	s–	—	s–
To do well in science, I need encouragement from parents	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s+	—	s–	s–	s–
	16-year-olds	s–	—	—	—	—	s–	—	—	—	s–	—	—	—	—	—	—	—	s–	—	s–
Unusually low marks on a science assignment are because I did not study hard enough	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	—	s–
	16-year-olds	—	—	—	—	s+	—	—	—	s+	—	—	—	s+	—	—	—	—	s–	s+	—
Unusually low marks on a science assignment are because the course was difficult	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	s–	—	—	s–	—	—	s–	—	s–
	16-year-olds	—	s–	—	—	—	—	—	s–	—	s–	—	s–	s–	s–	—	—	—	s–	s–	s–
Unusually low marks on a science assignment are because the course was not well taught	13-year-olds	—	s+	—	—	—	s+	—	—	s+	—	—	—	—	—	—	—	—	s+	s+	s+
	16-year-olds	—	—	—	s–	—	—	—	—	—	s–	—	—	—	—	—	—	—	—	—	—
Unusually high marks on a science assignment are because I studied a lot	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	—	—	—	s–	s–	s–
	16-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	—	—	s–	—	—
Unusually high marks on a science assignment are because the course was well taught	13-year-olds	—	—	—	—	—	—	—	—	s+	—	—	—	—	—	—	—	—	—	s+	—
	16-year-olds	—	—	—	—	s+	s+	s+	—	s+	—	—	—	—	—	s+	—	—	s+	s+	s+
Ask the teacher for help in science	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	—	s–
	16-year-olds	s+	s+	s+	—	—	—	—	—	—	—	—	—	—	s+	—	—	—	s+	—	s+
Ask my parents for help in science	13-year-olds	—	—	—	—	—	s–	—	—	—	—	s–	—	—	—	—	—	—	s–	s–	s–
	16-year-olds	—	s–	—	—	—	—	—	—	—	—	s–	—	—	—	s–	—	—	s–	—	s–
Interested in school work	13-year-olds	—	—	s+	s+	—	—	—	—	—	—	—	—	—	—	—	—	—	s+	—	s+
	16-year-olds	s+	s+	s+	s+	—	s+	s+	—	—	s+	s+	s+	s+	s+	s+	—	—	s+	s+	s+

		BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN(E)	CAN(F)	CAN
Teachers treat me fairly	13-year-olds	—	S+	—	S+	S+	—	—	—	—	—	S+	—	S+	S+	—	—	—	—	S+	S+
	16-year-olds	S+	S+	S+	S+	S+	—	S+	S+	S+	S+	S+	S+	—	S+	S+	—	—	S+	S+	S+
Enjoy going to school	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	S+	—	—	—	—	S+	S+	S+
	16-year-olds	—	S+	S+	S+	S+	—	S+	—	S+	S+	S+	S+	—	—	S+	—	—	—	S+	S+
I get the marks I deserve	13-year-olds	S+	S+	S+	S+	S+	S+	S+	S+	—	—	S+	—	S+	S+	S+	—	—	S+	S+	S+
	16-year-olds	S+	S+	S+	S+	S+	—	S+	S+	S+	—	—	—	—	S+	S+	—	—	S+	S+	S+
Absent from school more than 10 days this year	13-year-olds	—	S–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	S–	S–
	16-year-olds	—	S–	—	—	S–	S–	—	—	S–	—	—	—	—	—	S–	—	—	S–	S–	S–
Spend 15 hours or more watching television, movies, and videos	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	S+	—	S+
	16-year-olds	—	—	—	—	—	—	—	—	S–	S–	S–	—	S–	—	—	—	—	S–	S–	S–
Participate in scientific projects	13-year-olds	S–	S–	S–	—	S–	S–	—	—	—	—	S–	S–	S–	S–	S–	S–	—	S–	S–	S–
	16-year-olds	S–	S–	—	S–	S–	S–	—	—	S–	—	S–	—	—	S–	S–	S–	—	S–	S–	S–
Work in pairs or in small groups	13-year-olds	S–	S–	S–	—	—	—	S–	—	—	—	—	—	S–	—	S–	—	—	S–	—	S–
	16-year-olds	S–	S–	—	—	—	—	—	—	—	—	—	—	—	S–	—	—	—	S–	—	S–
Do experiments in the laboratory	13-year-olds	—	—	—	S–	S–	—	—	—	—	—	S–	S–	S–	—	S–	—	—	S–	—	S–
	16-year-olds	—	S–	—	S–	—	—	—	—	—	—	S–	—	—	S–	S–	—	—	S–	S–	S–
Teachers show me experiments	13-year-olds	S–	—	S–	S–	—	S–	S–	—	S–	—	S–	—	S–	S–	S–	—	—	S–	S–	S–
	16-year-olds	—	S–	—	S–	S–	S–	S–	—	—	—	S–	S–	—	—	S–	S–	—	S–	—	S–
Have quizzes or tests	13-year-olds	S–	S–	S–	S–	S–	S–	S–	S–	S–	S–	—	S–	S–	S–	S–	S–	—	S–	S–	S–
	16-year-olds	S–	S–	S–	S–	—	S–	S–	S–	S–	—	S–	—	—	—	S–	S–	S–	S–	S–	S–
Teachers assign homework	13-year-olds	—	—	S–	—	—	—	—	—	—	—	—	—	—	—	—	S+	—	—	—	—
	16-year-olds	—	S+	—	S+	S+	S+	S+	—	—	—	—	S+	—	S+	S+	—	—	S+	S+	S+
Go outside or out of the school for an educational outing	13-year-olds	—	S–	S–	S–	S–	S–	S–	S–	S–	S–	—	S–	S–	S–	—	S–	—	S–	S–	S–
	16-year-olds	S–	S–	S–	S–	S–	S–	S–	—	S–	S–	—	S–	—	S–	S–	S–	S–	S–	S–	S–
Use science books and magazines in science	13-year-olds	—	—	—	—	—	—	S–	—	S–	—	—	S–	S–	—	—	—	—	S–	S–	S–
	16-year-olds	—	—	S–	—	—	—	—	—	S–	S–	S–	S–	—	—	—	—	S–	—	S–	S–
Use computers in science	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	S–	—	—	S–	—	S–
	16-year-olds	—	S–	—	—	S–	—	—	—	S+	—	—	—	—	—	—	—	S–	—	S+	—
Use slides, films, or videos in science	13-year-olds	—	S+	—	—	—	—	—	S+	—	—	—	—	S–	—	—	—	S+	S+	—	S+
	16-year-olds	—	S+	—	S+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Visit museums, zoos, conservation areas, and similar non-school sites in science	13-year-olds	—	—	S–	—	S–	S–	—	—	—	—	S–	S–	S–	S–	S–	S–	—	S–	S–	S–
	16-year-olds	—	—	—	—	S–	—	—	—	S–	S–	—	S–	—	S–	S–	—	—	S–	S–	S–

TABLE 24: SAIP SCIENCE 2004
CORRELATIONS BETWEEN TEACHER QUESTIONNAIRE VARIABLES AND ACHIEVEMENT

s+ significant positive correlation
s– significant negative correlation
Level of significance 0.10

Shaded areas: insufficient or no data
Blank areas (—): no significant correlation

		BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Average number of students in the science classes this year	13-year-olds	s–	—	—	—	—	—	—	—	s+	s+	—	—	—	—	s+	s+	s+
	16-year-olds	s–	s+	s+	s+	—	—	—	s+	s+	—	—	—	s+	—	—	s+	s–
Average largest number of students in any science class	13-year-olds	—	s+	—	—	s+	—	—	—	s+	s+	—	—	—	—	s+	s+	s+
	16-year-olds	—	s+	s+	s+	—	—	s+	s+	s+	—	—	—	—	s+	—	—	—
Learning scientific concepts and principles is more important than learning facts and rules	13-year-olds	s+	—	—	—	—	s+	—	—	—	—	—	—	—	—	—	—	—
	16-year-olds	s+	—	—	—	—	—	—	—	—	—	—	—	s–	—	—	—	—
Science is better thought of as a process than as a body of knowledge and concepts	13-year-olds	—	—	s+	—	s–	—	—	s+	—	—	—	—	—	—	—	—	—
	16-year-olds	s+	—	—	—	—	—	—	s+	s+	—	—	s+		—	—	s+	—
True understanding of science takes place only after students learn basic facts and rules	13-year-olds	s+	—	—	s+	s+	—	s+	—	—	—	—	—	—	—	—	—	—
	16-year-olds	—	s+	—	—	s–	—	s–	—	—	—	—	—	—	—	s+	—	s+
Some students have a natural talent for science and some do not	13-year-olds	—	—	—	—	—	—	s+	—	—	—	—	—	—	—	—	—	—
	16-year-olds	s+	—	—	—	—	s+	—	—	—	—	—	s+	—	—	—	—	—
Students need natural talent to do well in science courses	13-year-olds	—	—	—	—	s+	—	—	—	—	—	—	s+	s–	—	—	—	—
	16-year-olds	—	—	—	—	—	s+	—	s+	—	—	s–	—	—	s+	—	—	—
Students need to work hard to do well in science courses	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s+	—
	16-year-olds	—	—	—	—	s–	—	—	—	—	—	—	—	—	—	—	s–	—
Science is generally more difficult than other school subjects	13-year-olds	s+	—	—	—	—	—	—	—	—	—	s–	—	—	—	—	s–	—
	16-year-olds	—	—	—	—	—	—	s+	s+	—	—	s+	—	s–	—	s+	—	—
Society generally appreciates the work of teachers	13-year-olds	s+	—	—	—	s–	—	—	s–	—	s–	—	—	—	s+	—	s+	—
	16-year-olds	—	—	—	—	—	—	—	—	—	—	—	s–	s–	—	—	s+	—
Students generally appreciate the work of teachers	13-year-olds	—	—	—	—	—	—	s–	s+	s+	—	—	—	—	—	—	s+	s+
	16-year-olds	s+	—	—	—	—	—	s+	—	—	—	—	—	—	—	s+	s+	s+
High school students should be streamed into different programs based on their abilities	13-year-olds	—	—	—	—	—	—	—	s–	—	s+	—	—	—	—	—	—	—
	16-year-olds	—	s–	s+	—	s–	—	—	—	—	—	s+	—	—	—	—	—	—
Students do laboratory experiments	13-year-olds	—	s+	—	—	—	s+	—	—	—	—	—	—	—	—	—	s+	—
	16-year-olds	—	—	s+	s–	—	—	—	—	—	s+	—	—	s–	—	s–	s–	—
Demonstrate experiments	13-year-olds	—	—	—	—	—	—	s+	—	—	—	s–	—	—	—	—	s+	—
	16-year-olds	—	—	s+	s–	—	—	—	—	—	s+	s+	s+	—	—	—	—	s+
Take students outdoors or on a field trip	13-year-olds	s–	—	—	s–	s–	—	—	—	—	s+	—	—	s–	—	—	s+	—
	16-year-olds	—	—	—	—	—	—	—	—	s–	—	s+	—	s–	s–	—	—	s–
Use a laboratory	13-year-olds	—	s+	s+	s+	—	—	—	—	—	—	—	—	—	s+	s+	s+	—
	16-year-olds	s+	s+	s+	—	—	—	—	—	s+	—	—	—	—	—	—	s+	—
Use experts within the community	13-year-olds	s–	—	—	—	—	—	—	s+	—	—	—	—	s–	—	—	s+	—
	16-year-olds	—	s–	—	s–	—	—	—	—	—	—	—	—	s–	—	—	—	s–
Teaching is limited or restricted by the range of student abilities in the class	13-year-olds	s–	s–	—	—	—	—	—	s–	s–	s–	s–	—	—	—	—	s–	s–
	16-year-olds	s–	—	s+	s–	s–	—	—	—	—	—	—	—	s–	—	—	s–	—
Teaching is limited or restricted by the range of differences in students' backgrounds	13-year-olds	s–	—	—	s–	—	—	—	—	—	—	—	s–	—	—	—	—	—
	16-year-olds	—	—	—	s–	s+	—	—	s–	s–	—	—	—	—	s–	—	—	—
Teaching is limited or restricted by the presence of students with special-needs limits	13-year-olds	s–	—	—	s–	s–	—	—	s–	s–	—	—	—	s+	—	—	—	—
	16-year-olds	s–	—	s+	—	—	s–	—	s–	—	—	—	—	—	—	—	—	—
Teaching is limited or restricted by uninterested students	13-year-olds	—	s–	s–	—	—	—	—	—	—	s–	—	—	—	—	—	s–	—
	16-year-olds	—	s–	—	—	s+	—	—	s–	—	—	—	—	—	—	—	—	—
Teaching is limited or restricted by shortage of materials or equipment	13-year-olds	—	—	s–	—	—	—	—	—	s–	—	—	—	—	—	—	—	—
	16-year-olds	s–	—	—	—	s–	—	—	—	—	—	—	—	—	—	s–	s–	—

		BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT
Teaching is limited or restricted by large class sizes	13-year-olds	—	—	—	—	—	s+	—	—	—	s+	s–	—	—	—	s+	s+	s+
	16-year-olds	s–	s+	—	—	s–	—	—	—	—	—	s–	—	—	—	—	—	—
Teaching is limited or restricted by external examinations or standardized tests	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	s–	—	—	—	—
	16-year-olds	—	—	—	—	s+	—	—	—	—	—	—	s+	—	s+	—	—	—
Teaching is limited or restricted by lack of in-service with respect to the curriculum	13-year-olds	—	—	—	—	—	—	—	—	—	—	s–	—	—	—	—	—	s–
	16-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	s+	—	—	s–	s+
Collect, correct, and return assignments to students	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	16-year-olds	s–	—	—	s–	—	s–	—	—	—	—	—	—	s–	—	—	s–	—
Give weight to teacher-made short-answer or essay tests that require students to explain their reasoning	13-year-olds	—	s+	—	—	—	—	—	s+	—	—	s+	—	—	—	—	s+	s+
	16-year-olds	—	s–	—	s+	—	—	—	—	—	—	s–	—	s–	—	—	s+	—
Give weight to teacher-made multiple-choice, true-false, or matching tests	13-year-olds	s–	—	s–	—	—	—	s+	—	—	—	—	—	—	—	—	—	—
	16-year-olds	—	—	—	—	—	—	—	s–	s–	—	—	—	s–	—	—	—	s–
Give weight to homework assignments	13-year-olds	—	—	—	—	—	—	—	—	—	—	s+	—	—	—	—	—	—
	16-year-olds	—	—	s–	s–	—	—	—	s–	s+	—	—	—	—	—	s–	s–	—
Give weight to projects or laboratory experiments	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s+	s+	—
	16-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	—
Give weight to observations of or interviews with students	13-year-olds	s–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	16-year-olds	—	—	s–	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Give weight to participation of students in class activities	13-year-olds	—	—	—	s+	—	—	—	—	s–	s–	—	—	—	—	—	—	—
	16-year-olds	s+	—	—	s–	—	—	—	s–	—	—	—	—	—	—	s–	—	—
Give weight to improvement over the year or term	13-year-olds	s–	—	—	—	—	—	—	—	s–	—	—	—	—	s–	s–	s–	—
	16-year-olds	—	—	—	s–	—	—	s–	—	—	—	s–	—	—	—	—	—	—
Use many scores or grades in computing final marks	13-year-olds	—	—	—	—	s+	s+	—	s+	—	—	—	—	—	—	s+	s+	s+
	16-year-olds	—	—	s–	—	—	—	—	s+	—	—	—	—	—	—	—	s+	—
Female science teachers	13-year-olds	—	—	—	—	—	—	s–	—	s+	s+	—	—	—	s–	—	—	—
	16-year-olds	—	—	—	s–	—	s–	—	—	s–	—	—	—	—	s–	—	s–	s+
Number of years of experience teaching science	13-year-olds	—	s+	—	—	—	—	—	s+	s+	—	s+	—	—	s+	—	s+	—
	16-year-olds	—	s+	s+	s+	s+	s+	s+	s+	s+	—	s+	—	—	—	s+	s+	—
Hold a BSc degree or equivalent	13-year-olds	—	—	—	—	—	s+	—	—	s+	—	—	—	s+	—	s+	s+	s+
	16-year-olds	s+	—	—	s+	—	—	—	—	—	—	s+	—	—	—	—	—	—
Hold a BEd degree or equivalent (e.g., at least a year of teacher training)	13-year-olds	—	—	—	—	s–	—	—	—	s–	s+	—	—	—	—	—	—	—
	16-year-olds	—	—	—	s+	—	—	—	—	—	—	—	—	—	—	—	—	—
Hold a BSc degree or higher in science with a major or concentration in Biology	13-year-olds	—	—	—	s+	—	—	—	—	—	—	—	—	s+	—	—	s+	s+
	16-year-olds	s–	—	s+	—	—	—	s–	s–	—	—	s–	—	—	—	—	—	—
Hold a BSc degree or higher in science with a major or concentration in Chemistry or Biochemistry	13-year-olds	—	—	—	—	—	s+	—	s+	—	—	—	—	s+	—	s+	s+	—
	16-year-olds	s+	s+	—	—	s+	—	s+	—	—	s+	—	—	—	—	—	s+	—
Hold a BSc degree or higher in science with a major or concentration in Earth Science	13-year-olds	—	—	—	s–	—	—	—	—	—	—	—	—			—	—	s+
	16-year-olds	—	—	s+	s+	—	s–	s+	—	—	—	—	—		—	—	s–	—
Hold a BSc degree or higher in science with a major or concentration in Mathematics	13-year-olds	—	—	—	s–	—	—	—	s–	—	—	—	—	—		—	—	
	16-year-olds	—	s+	—	—	—	—	—	—	—	—	—	—	—	s+	—	s+	s+
Hold a BSc degree or higher in science with a major or concentration in Physics	13-year-olds	—	—	—	—	—	s+	s+	s–	s+	s+	—	—			—	s–	—
	16-year-olds	s+	—	—	—	—	—	—	—	—	—	—	—		s+	s+	s+	s+
Hold a BSc degree or higher in science with a major or concentration in Computer science or equivalent or other science	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	16-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	s–	—
Specialists in science and prefer to teach mainly in this area	13-year-olds	—	s+	—	s+	—	s+	s–	s+	s+	—	—	—	s+	—	—	—	s+
	16-year-olds	s+	s+	s+	—	s+	—	s+	s+	s+	s+	s+	—	—	—	s+	—	—
Capable of teaching science but would prefer to teach other subjects	13-year-olds	—	s–	—	—	—	s–	s+	—	s–	—	—	—	s–	—	—	—	—
	16-year-olds	s–	s–	s–	—	—	—	s–	s–	—	s–	—	—	—	—	s–	—	—

TABLE 25: SAIP SCIENCE 2004
CORRELATIONS BETWEEN SCHOOL QUESTIONNAIRE VARIABLES AND ACHIEVEMENT

s+ significant positive correlation
s– significant negative correlation
Level of significance 0.10

Shaded areas: insufficient or no data
Blank areas (—): no significant correlation

		BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN(E)	CAN(F)	CAN
Size of school community	13-year-olds	—	—	—	—	s+	—	—	—	—	—	—	—	—	—	s+			—	s+	—
	16-year-olds	—	—	—	—	s+	—	—	—	—	—	—	—	—	—	—			—	s+	s+
School enrolment	13-year-olds	—	—	—	—	s+	—	—	—	—	—	—	—		—	—	s+	—	s+	—	s+
	16-year-olds	s+	s+	—	s+	s+	—	s+	—	—	—	—	—		—	—	—	s+	s+	s+	s+
Public school within a school board or district	13-year-olds	—	—	—	—		—	—	s–	s–					—	s–	s–	—	—	—	s+
	16-year-olds	—	—	—	s–		—	—	s–	s–			—		—	—	s–	—	—	—	—
Separate school publicly funded (e.g., denominational)	13-year-olds		s+	—	—		—	—		—							s+	—	—	—	s–
	16-year-olds	—	—	—	—		—	—					—				s+	—	—	—	s–
Private or independent school with its own board of governors	13-year-olds	—	—		—				s+	s+					—	s+			s+		s+
	16-year-olds	—	—		s+				s+	s+					—	—			s+		s+
Parents serve on committees on matters of finance and administration some or a lot	13-year-olds	—	—	—	—	—	—	—	—	—	—	—	—		—	s+	—	—	—	s+	s+
	16-year-olds	—	—	—	—	—	s+	—	s+	—	s–	—	—		s+	—	—	—	s+	—	s+
Percentage of students with first language other than the language of the school	13-year-olds	—	—	—	—	—	s–	—	—	s–	—	—	—	—	—	—	—	s–	s–	—	s–
	16-year-olds	s+	—	s–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s+	—	—
Percentage of students with learning problems needing special attention	13-year-olds	—	s–	—	s–	—	—	—	—	s–	—	—	—		—	—	—	—	s–	—	—
	16-year-olds	—	—	—	—	—	s–	—	—	s–	—	—	—		—	s+	—	s–	s–	—	s–
Percentage of students from single-parent families	13-year-olds	s–	s–	s–	—	—	—	—	—	s–	s–	—	—		—	—	—	—	s–	s–	s–
	16-year-olds	—	—	s–	—	s+	—	—	—	—	—	—	—		—	—	—	—	s–	—	—
Percentage of students who have health or nutrition problems that inhibit learning	13-year-olds	—	s–	s–	s–	—	—	—	s–	—	—	—	—		—	—	—	s–	s–	—	—
	16-year-olds	—	—	s–	s–		—	—	—	—	—	—	—		—	—	—	—	s–	—	s–
Average science class size	13-year-olds	s–	—	s+	—	—	—	—	—	—	s+	—	—	—	—	—	s+	—	—	—	—
	16-year-olds	—	s+	—	s+	—	—	s+	s–	s+	—	—	—		—	s+	—	s+	s+	s+	s+
Science courses are organized on a semester basis	13-year-olds	s–	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—
	16-year-olds	s–	—	s+	—	—	—	—	—	—			—		—	—	—	—	—	—	—
Teachers are mainly responsible for specific subjects	13-year-olds	—	—	—	—	—	s+	—	—	—	—	—	—	—	—	—	s+	—	s+	—	s+
	16-year-olds		s+	—	—	s+	—	s+	—	—	—	—	—	—	—		—	—	—	s+	s+
Science is taught mainly by specialized subject teachers	13-year-olds	—	—	—	—	s+	—	—	s+	—	—	—	—	—	—	—	—	—	s+	—	s+
	16-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Capacity to provide instruction is limited by the community conditions	13-year-olds	—	—	s–	s–	—	—	—	—	s–	s–	s–	s–	—	—	—	—	s–	s–	s+	s–
	16-year-olds	—	s–	—	—	—	s–	—	—	—	—	—	—		—	—	—	s–	s–	s+	s–
Capacity to provide instruction is limited by the lack of parental support for the school	13-year-olds	—	—	—	s–	—	—	s+	—	s–	s–	—	—	—	s–	—	—	—	s–	s+	—
	16-year-olds	—	s–	s–	s–	—	s–	—	—	s–	—	—	—	s–	—	s–	—	s–	s–	—	s–

		BC	AB	SK	MB(E)	MB(F)	ON(E)	ON(F)	QC(E)	QC(F)	NB(E)	NB(F)	NS(E)	NS(F)	PE	NL	NT	YT	CAN(E)	CAN(F)	CAN
Capacity to provide instruction is limited by a shortage or an inadequacy of teachers specialized in science	13-year-olds	—	—	s–	s–	—	—	—	—	—	—	s+	—	—	—	—	—	—	—	—	—
	16-year-olds	—	—	—	—	—	—	—	—	—	s–	—	—	—	—	—	—	s–	—	—	—
Capacity to provide instruction is limited by shortage or inadequacy of special-purpose space	13-year-olds	—	s–	—	—	s–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	16-year-olds	—	—	—	—	—	—	—	—	s–	—	—	—	—	—	—	—	—	—	—	—
Capacity to provide instruction is limited by shortage or inadequacy of instructional materials	13-year-olds	s–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	s–	—	—	s–
	16-year-olds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	—	s–
Capacity to provide instruction is limited by shortage or inadequacy of budget for supplies	13-year-olds	—	—	—	—	—	—	—	s–	—	—	s+	s–	—	—	—	—	—	—	—	—
	16-year-olds	s+	—	—	s–	—	—	—	—	—	—	—	—	—	s+	—	—	—	—	—	—
Streams or ability groupings for science students	13-year-olds	—	—	—	s–	—	—	—	—	—	—	s–	—	—	—	—	—	s–	—	—	—
	16-year-olds	—	—	—	—	—	—	s–	—	—	—	—	—	—	—	—	—	s+	—	s–	—
Number of different science courses are available	13-year-olds	—	—	—	—		—	s+	—	—	—	s–		—	—				—	s+	s+
	16-year-olds	s+	—	s+	s+	—		—	s–	s–		—	—		—	—	—	s+	s+	—	s+
Provide remedial teaching in science	13-year-olds	—	s+	—	s–	s–	—	—	—	—	—	—	—	—	—	—	s–	—	s–	—	s–
	16-year-olds	—	—	s–	s–	—	—	—	—	s–	—	—	—	—	—	—	—	—	s–	s–	s–
Students given extra help outside of regular school hours	13-year-olds	—	—	—	s+	—	s+	—	—	—	—	—	—	—	—	—	—	—	s+	—	s+
	16-year-olds	s–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s+	s+
Peers tutoring other students during regular science classes or after school	13-year-olds	—	—	—	s+	—	—	—	—	—	—	—	—	—	—	—	s+	s+	s+	—	s+
	16-year-olds	—	—	—	s+	—	—	—	—	—	—	—	—	—	s–	—	s+	—	s+	s+	s+
School provides enrichment programs in science for gifted students	13-year-olds	—	—	—	s+	—	s+	—	—	—	—	—	—	—	s+	—	s+	—	s+	—	s+
	16-year-olds	—	s+	—	s+	s+	—	—	—	—	—	—	—	—	—	—	s+	—	s+	—	s+
Believe that there are limits to what a school can accomplish because a student's home environment has a major influence on achievement	13-year-olds	s+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s–	—	—	—	—
	16-year-olds	—	—	—	—	—	—	s–	—	—	—	—	—	s+	—	—	—	—	—	s–	s–
Capacity to provide instruction is limited by the range of student abilities in the school	13-year-olds	s+	—	s+	s+	—	—	—	s+	—	—	—	—	—	—	—	s+	—	s+	—	s+
	16-year-olds	—	—	—	s+	s+	s+	—	—	—	—	—	—	—	—	s+	s+	—	s+	s+	s+
Staff morale is high in the school	13-year-olds	—	—	s–	—	—	—	—	—	—	—	—	—	—		—	—		—	—	—
	16-year-olds	—	—	—	s+	—	—	s+	—	—		—	—	—		s–	—		s+	s+	s+
Strong school spirit in the school	13-year-olds	—	s+	—	—	—	—	—	—	—	—	—	—	s–	s+	—	—		s+	—	—
	16-year-olds	—	—	—	—	—	—	—	—	s+	—	—	—	—		—	—		s+	s+	s+
School is supported by the community	13-year-olds	—	—	—	—	—	s+	—	s+	—	—	—	—	—	—	—	s+	—	s+	s+	s+
	16-year-olds	—	s+	—	s+	—	s+	—	s+	—	—	—	—	—	—	—	—	—	s+	—	s+

TABLE 26: SAIP SCIENCE 2004
NUMBER OF STUDENTS BY JURISDICTION

	13-year-olds		16-year-olds	
	Sample	*Population*	*Sample*	*Population*
British Columbia	899	51,153	910	52,962
Alberta	1,078	44,414	972	40,144
Saskatchewan	1,107	14,059	954	14,787
Manitoba (E)	976	13,960	873	14,262
Manitoba (F)[16]	740	1,560	323	866
Ontario (E)	965	135,004	672	170,352
Ontario (F)	794	5,717	689	6,408
Quebec (E)	894	10,907	799	8,230
Quebec (F)	958	85,454	893	63,760
New Brunswick (E)	881	6,696	842	6,652
New Brunswick (F)	810	2,997	736	2,870
Nova Scotia (E)	973	11,676	858	11,669
Nova Scotia (F)	284	284	159	191
Prince Edward Island	734	1,908	657	2,037
Newfoundland and Labrador	922	7,099	814	7,163
Northwest Territories	535	749	383	651
Yukon	356	427	290	435
Total	**13,906**	**394,064**	**11,824**	**403,439**

[16] In Manitoba, students in the French immersion program and in the Français program were oversampled, and most of them wrote the assessment in French according to the language of instruction in science.