

Social Context

New Brunswick's population of 754,741 is 48.8% urban and 51.2% rural. The population distribution, together with a commitment to equal opportunity for all students, places a heavy demand on the Department of Education to provide an equitable level of educational programs and services throughout the province.

Over the past few years, the department 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 disabled 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) and integration (students with special needs).

Organization of the School System

Since 1967, the provincial government has had sole responsibility for financing public schools. The Minister of Education has the authority to prescribe curriculum and assess the degree to which goals are attained by students.

In 1969, New Brunswick became officially bilingual. In 1974, in recognition of its linguistic duality, the province established two parallel but separate education systems. Each linguistic division of the Department of Education is responsible for its own curriculum and assessment. Educational programs and services are delivered in both official languages.

In 1992, New Brunswick amalgamated school districts, reducing the number from 42 to 18 (12 anglophone, 6 francophone). As well, school boards were abolished, to be replaced by a parent-driven structure at the school, district, and provincial levels.

The *Education Act* of 1997 decreed that school attendance be made compulsory to age eighteen, or until graduation from high school. This provision came into effect July 1, 1999.

In the 1998–99 school year, enrolment for kindergarten through grade 12 totalled 129,131. This includes 88,256 in anglophone and 40,875 in francophone districts. The starting age for school is five, and students attend classes for 187 days 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 is in final pilot phase
- 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 for grades 1-6 and 10-12, with current pilots for grades 7-9
- 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 Testing

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 learn.

For the anglophone sector, assessments at the grade 3 and 5 levels are specific to learning outcomes identified in the provincial mathematics, science, and language arts curriculum documents. For science, they constitute an evaluation of the system with a focus both on reporting group data and individual results for some components.

The science component in each of these assessments contains a series of questions to determine students' general knowledge and skill level in science. Reflected in the assessments is a balance between process skills and content as articulated in the science curriculum document. Skills are not restricted to those of the grade 3 or 5 curricula, but also may reflect those taught in earlier grades.

Currently, provincially developed exams are administered in anglophone high schools in grade 12 biology and chemistry.

New Brunswick (English)

Written Assessment

There is no significant difference between the performance of New Brunswick English 13-year-olds and Canadian students overall at levels 1, 2, and 3 in the written assessment. There were significantly fewer New Brunswick students in levels 4 and 5. New Brunswick English 16-year-olds performed as well as the Canadian sample at levels 1, 3, and 4. Significantly fewer New Brunswick English 16-year-olds reached levels 2 and 5.

The performance of New Brunswick English 13-year-olds and 16-year-olds each showed significant improvement between 1996 and 1999 at level 4.

CHART 64

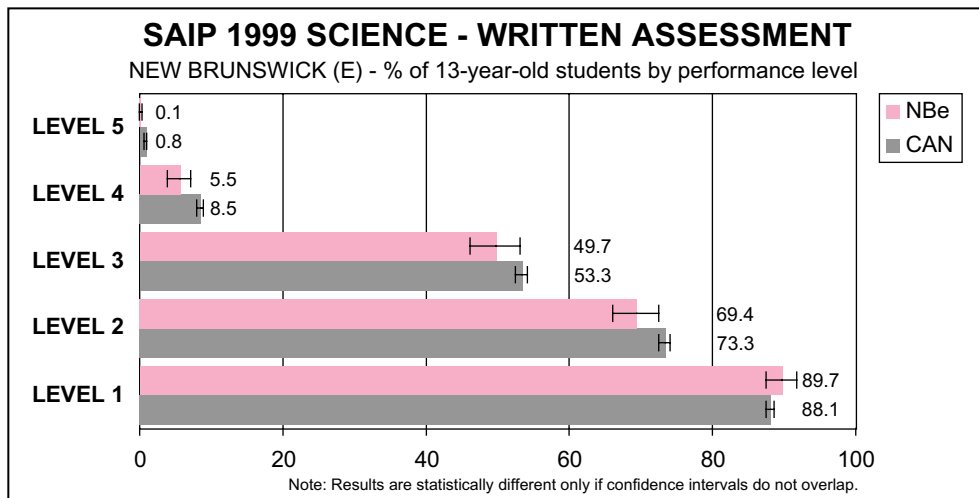
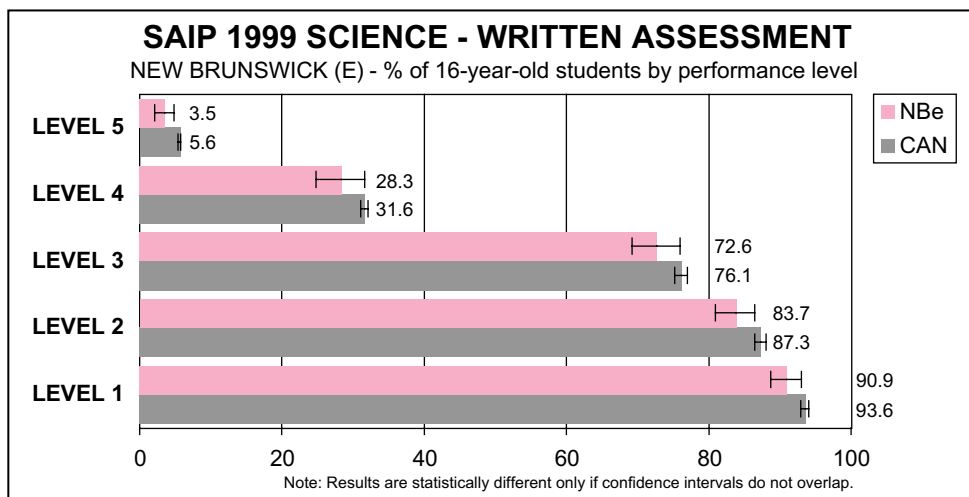


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Social Context

For several years now, New Brunswick has experienced significant socioeconomic growth. Nevertheless, its unemployment rate is still higher than the Canadian average, especially in the francophone regions of the province. As of July 1, 1999, New Brunswick's population was 754,741. The average unemployment rate for 1998 was 12.1%, versus a Canadian rate of 8.3%. Among residents 15 years old and over, the labour force participation rate in 1998 was 60.9%, as was the employment-to-population ratio. Rural residents make up 51.2% of the population and urban residents, 48.8%.

New Brunswick has been officially bilingual since 1969. The native language of more than a third of its population is French. School enrolment is 129,131 students, of whom 30.4% 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.

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 responds to the needs of the francophone population. The province is divided into six francophone school districts (administered by three general administrative units) with 40,875 students and 12 anglophone school districts (administered by five general administrative units) with 88,256 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 is 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. Moreover, early detection programs have been put in place to discourage school-leaving. This has resulted in one of the lowest school dropout rates in Canada: for the 1996-97 school year, francophone schools recorded a dropout rate of 3.2%.

There is no provincial directive covering achievement levels from grades 1 to 8. However, in the majority of school districts, the overall average passing grade is 60% or 65%. 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. In addition, a provincial science assessment program is currently being implemented at the elementary level.

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 the 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 course. The aspects covered in the SAIP assessments are included in the science curriculum, except for the earth sciences dimension, which is covered in social sciences (geography).

Assessment of Science Skills

At the provincial level, the francophone sector of the Department of Education has administered since 1991 a grade 10 physics and grade 11 chemistry examination, i.e. at the end of the required course in these subjects at the secondary level. Results of these examinations, which make up 40% of the students' final mark, are provided to the school within five days following administration. 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.

New Brunswick (French)

Written Assessment

There are significant differences between the performance of both New Brunswick French 13-year-olds and 16-year-olds and Canadian students overall at all levels in the written assessment. Significantly fewer New Brunswick French students of both age groups reached each level.

The performance of New Brunswick French 13-year-olds was not significantly different between 1996 and 1999. The performance of 16-year-olds each showed significant improvement between 1996 and 1999 at levels 3 and 4.

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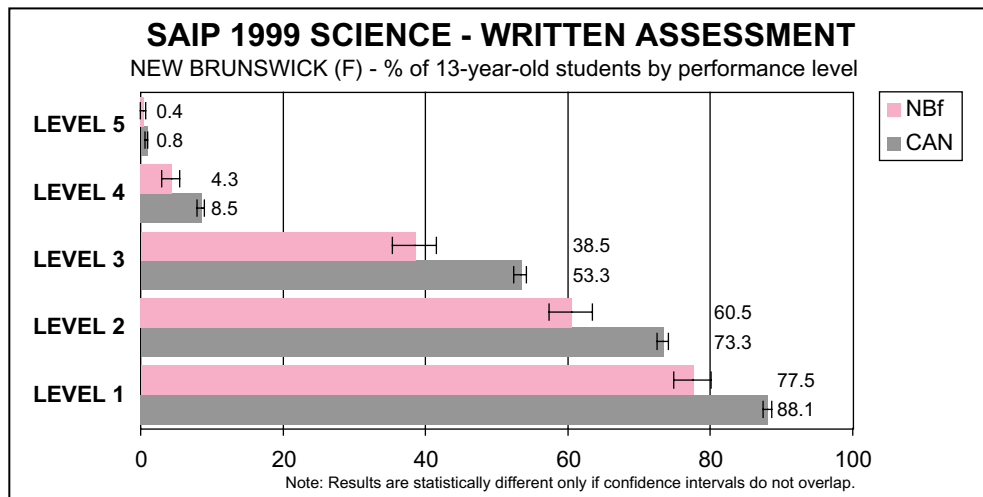


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