

Social Context

Nova Scotia is a small province with a population of 940,825 and a higher rural population than the Canadian average. Population growth is currently about one-half of one per cent annually. Immigration is low both in absolute numbers and when compared to immigration in Canada as a whole. About nine and one-half per cent of the population speaks both English and French (9.3%), or French only (0.2%). Among the total population, about 2 per cent is African Canadian, 1.4% is Aboriginal, and 1.5% consists of other visible minorities. Unemployment rates in Nova Scotia are typically above the Canadian average.

Organization of School System

Nova Scotia's total school population is 160,011 in grades primary to 12. The province has a teaching force of 9,913 and is divided into seven school boards. About 97% of the students are enrolled in anglophone school boards, and about 3% in the Conseil scolaire acadien provincial. School enrolment is expected to decrease over the next few years.

Children who are five years old before October 1 are admitted to school. Students must attend school until they are 16 years old. For the most part, 13-year-old students are in grades 7 and 8, and 16-year-olds are in grades 10 and 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 developing new science curriculum guidelines for grades entry - 12. The science curriculum is based on an outcomes framework that includes statements of essential graduation learnings, 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*.

Teachers and school boards are in the process of piloting and implementing the new grades 11 and 12 chemistry, physics, and biology curricula. Development and piloting of science curriculum for grades P-10 and grade 12 geology are ongoing. 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.

Scientific 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, analyse, 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.

The curriculum gives students opportunities to construct the important ideas of science and develop these ideas in depth through inquiry and investigation. The curriculum is inclusive and is designed to help all learners reach their potential through a wide variety of learning experiences. The curriculum seeks to provide equally for all learners and to ensure, insofar as possible, equal entitlement to learning opportunities.

Hands-on experiences are integral to student learning. The curriculum emphasizes interactive, resource-based learning that engages students in group work as a basis for the social organization of the classroom.

Assessment

The province continues to work with the other Atlantic provinces to develop regional examinations. In science, Nova Scotia leads in developing instruments for Chemistry 12 and Physics 12. During the 1999–2000 school year, all grade 12 chemistry students write APEF examinations. The exams are written on common dates for all four provinces. Three new forms are available each year. In Nova Scotia, teachers mark their own students' papers based on a scoring key provided by the APEF. A random representative sample of student papers is selected and scored centrally to yield data at provincial and school board levels.

All teachers of Chemistry 12 participated in an information session pertaining to the administration of the chemistry exam. Teachers were also given a workshop on finding, constructing, and scoring STSE questions. Physics 12 and Biology 12 examinations are to be administered in 1999–2000 on a trial basis.

At the classroom level, the assessment program involves a broad range of strategies that help students to monitor their progress in various scientific skills: initiating and planning, performing and recording, analysing and interpreting, communicating, and teamwork. The program incorporates tasks similar to those used on a regular basis during classroom/laboratory activities. The use of journals, projects, performance assessments, and portfolios is encouraged.

Nova Scotia (English)

Written Assessment

There is no significant difference between the performance of Nova Scotia English 13-year-olds and Canadian students overall at levels 1, 2, and 4 in the written assessment. Slightly fewer Nova Scotia students in this category reached levels 3 and 5. Nova Scotia 16-year-olds performed as well as the Canadian sample at levels 1, 2, 3, and 4. Slightly fewer Nova Scotia 16-year-olds reached level 5.

The performance of Nova Scotia English 13-year-olds and 16-year-olds each showed significant improvement between 1996 and 1999 at levels 3 and 4. Sixteen-year-olds also showed significant improvement at level 2.

CHART 68

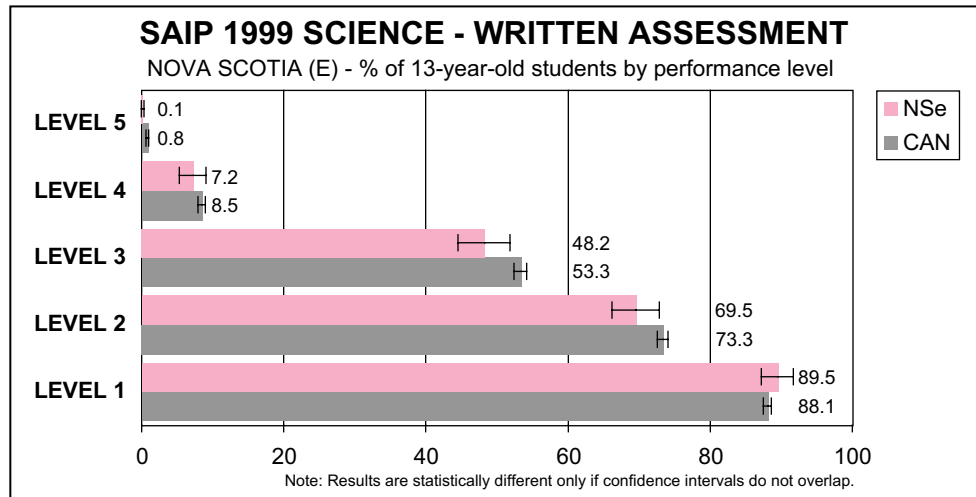
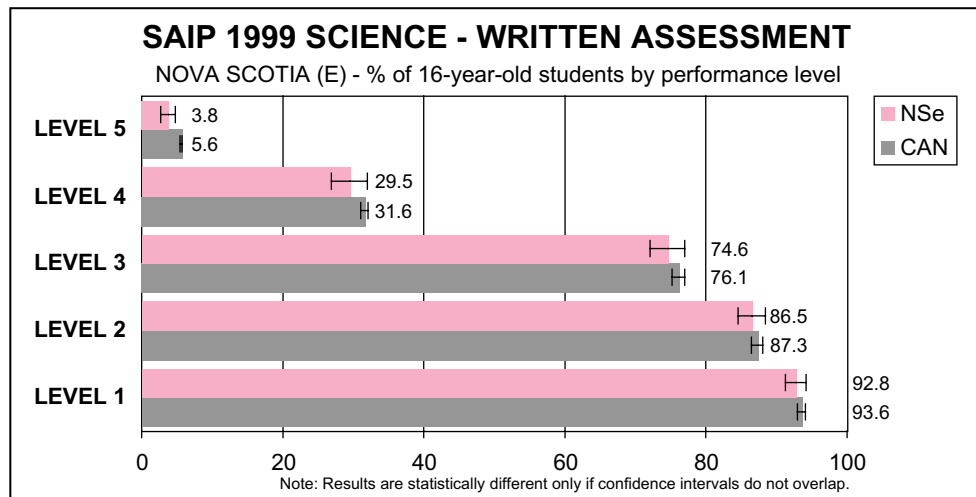


CHART 69



Social Context

Nova Scotia is a small province of 940,825, with a higher rural population than the national average. Population growth is currently about 0.5% annually. Immigration is low both in absolute numbers and when compared to immigration in Canada as a whole. About 9.5% of the population speaks both French and English, or French only. About 2% of the population is African-Canadian, 1.4% is Aboriginal, and 1.5% consists of other visible minorities. The unemployment rate in Nova Scotia is typically above the national average.

Organization of the School System

Nova Scotia's total enrolment from primary to grade 12 is 160,011 students. The province employs 9,913 teachers and is divided into seven school boards. Approximately 97% of students are enrolled in anglophone school boards and 3% in the Conseil scolaire acadien provincial. School enrolment is expected to decrease slightly over the next few years.

In Nova Scotia children who are five years old on or before October 1 are admitted to elementary school. Students must attend school up to the age of 16. Most 13-year-old students are in grades 7 or 8, while 16-year-old students are in grades 10 or 11.

Science Teaching

Science curricula at the elementary level and in junior high school (grades 7, 8, and 9) is being harmonized with the pan-Canadian common framework of learning outcomes. Harmonization of senior high school science curricula will begin in January 2000. These curricula provide for an STSE approach, to allow students to acquire knowledge and to develop skills and attitudes for citizenship and scientific literacy. Nova Scotia seeks to attain this objective based on the following principles:

- 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 in the form 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, problem-solving, informed decision-making, communication, and drawing connections;
- 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;
- language, social, and media skills need to be emphasized;
- 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 learning.

Assessment of Science Skills

In Nova Scotia, assessment of students' science learning is based on a solid foundation supported by continuing teacher education. Teachers apply assessment strategies that match the philosophy of the curriculum and take into account the role students must play at that level.

Nova Scotia (French)

Written Assessment

Significantly fewer Nova Scotia French 13-year-olds reached all levels in the written assessment than Canadian students overall. There were no significant differences between Nova Scotia French 16-year-old students and Canadian students overall at levels 1 to 4.

The performance of Nova Scotia French 13-year-olds showed significant improvement between 1996 and 1999 at level 4.

CHART 70

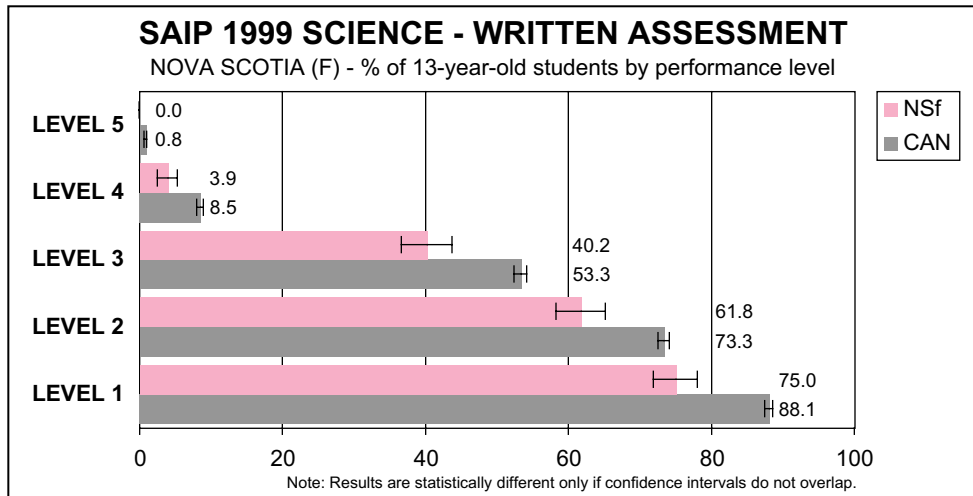


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