



The Common Curriculum Framework

for

GRADES 10–12 MATHEMATICS

Western and Northern Canadian Protocol

January 2008

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BACKGROUND

The Western Canadian Protocol (WCP) for Collaboration in Basic Education Kindergarten to Grade 12 was signed in December 1993 by the Ministers of Education from Alberta, British Columbia, Manitoba, Northwest Territories, Saskatchewan and Yukon Territory. In February 2000, following the addition of Nunavut, the protocol was renamed the Western and Northern Canadian Protocol (WNCP) for Collaboration in Basic Education (Kindergarten to Grade 12).

WNCP jurisdictions:

Alberta

British Columbia

Manitoba

Northwest Territories

Nunavut

Saskatchewan

Yukon Territory

In 2005, the Ministers of Education from all the WNCP jurisdictions unanimously concurred with the rationale of the original partnership because of the importance placed on:

- common educational goals
- the ability to collaborate to achieve common goals
- high standards in education
- planning an array of educational opportunities
- removing obstacles to accessibility for individual learners
- the optimum use of limited educational resources.

The original WCP Common Curriculum Framework for Mathematics was published in two documents: Kindergarten to Grade 9 in 1995 and Grades 10–12 in 1996.

The Common Curriculum Framework for Grades 10–12 Mathematics: Western and Northern Canadian Protocol was developed by the seven ministries of education in collaboration with teachers, administrators, parents, business representatives, post-secondary educators and others.

The framework identifies beliefs about mathematics learning and teaching, general and specific outcomes, and achievement indicators agreed upon by the seven jurisdictions. Each of the provinces and territories will determine when and how the framework will be implemented within its own jurisdiction.

INTRODUCTION

PURPOSE OF THE DOCUMENT

The framework communicates high expectations for students' mathematical learnings.

This document provides sets of outcomes to be used as a common base for defining mathematics curriculum expectations that will be mandated by each province and territory in grades 10, 11 and 12. This common base should result in consistent student outcomes in mathematics across the WNCN jurisdictions and enable easier transfer for students moving from one jurisdiction to another. This document is intended to clearly communicate high expectations for students' mathematical learnings in grades 10, 11 and 12 to all education partners across the jurisdictions, and to facilitate the development of common learning resources.

BELIEFS ABOUT STUDENTS AND MATHEMATICS LEARNING

Mathematical understanding is fostered when students build on their own experiences and prior knowledge.

Students are curious, active learners with individual interests, abilities, needs and career goals. They come to school with varying knowledge, life experiences, expectations and backgrounds. A key component in developing mathematical literacy in students is making connections to these backgrounds, experiences, goals and aspirations.

Students construct their understanding of mathematics by developing meaning based on a variety of learning experiences. This meaning is best developed when learners encounter mathematical experiences that proceed from simple to complex and from the concrete to the abstract. The use of manipulatives, visuals and a variety of pedagogical approaches can address the diversity of learning styles and developmental stages of students. At all levels of understanding, students benefit from working with a variety of materials, tools and contexts when constructing meaning about new mathematical ideas. Meaningful student discussions also provide essential links among concrete, pictorial and symbolic representations of mathematics.

The learning environment should value, respect and address all students' experiences and ways of thinking, so that students are comfortable taking intellectual risks, asking questions and posing conjectures. Students need to explore mathematics through solving problems in order to continue developing personal strategies and mathematical literacy. It is important to realize that it is acceptable to solve problems in different ways and that solutions may vary depending upon how the problem is understood.

FIRST NATIONS, MÉTIS AND INUIT PERSPECTIVES

First Nations, Métis and Inuit students in northern and western Canada come from diverse geographic areas and have varied cultural and linguistic backgrounds. Students attend schools in a variety of settings, including urban, rural and isolated communities. Teachers need to recognize and understand the diversity of cultures within schools and the diverse experiences of students.

First Nations, Métis and Inuit students often have a whole-world view of the environment; as a result, many of these students live and learn best in a holistic way. This means that students look for connections in learning and learn mathematics best when it is contextualized and not taught as discrete content.

First Nations, Métis and Inuit students come from cultures where learning takes place through active participation. Traditionally, little emphasis was placed upon the written word. Oral communication along with practical applications and experiences are important to student learning and understanding. It is also vital that teachers understand and respond to nonverbal cues so that student learning and mathematical understanding are optimized.

A variety of teaching and assessment strategies are required to build upon the diverse knowledge, cultures, communication styles, skills, attitudes, experiences and learning styles of students.

Teachers need to understand the diversity of students' cultures and experiences.

The strategies used must go beyond the incidental inclusion of topics and objects unique to a culture or region and strive to achieve higher levels of multicultural education (Banks and Banks, 1993).

AFFECTIVE DOMAIN

A positive attitude is an important aspect of the affective domain that has a profound effect on learning. Environments that create a sense of belonging, support risk taking and provide opportunities for success help students to develop and maintain positive attitudes and self-confidence. Students with positive attitudes toward learning mathematics are likely to be motivated and prepared to learn, to participate willingly in classroom activities, to persist in challenging situations and to engage in reflective practices.

Teachers, students and parents need to recognize the relationship between the affective and cognitive domains and to nurture those aspects of the affective domain that contribute to positive attitudes. To experience success, students must be taught to set achievable goals and assess themselves as they work toward these goals.

Striving toward success and becoming autonomous and responsible learners are ongoing, reflective processes that involve revisiting the setting and assessing of personal goals.

To experience success, students must be taught to set achievable goals and assess themselves as they work toward these goals.

Curiosity about mathematics is fostered when students are actively engaged in their environment.

GOALS FOR STUDENTS

Mathematics education must prepare students to use mathematics confidently to solve problems.

The main goals of mathematics education are to prepare students to:

- solve problems
- communicate and reason mathematically
- make connections between mathematics and its applications
- become mathematically literate
- appreciate and value mathematics
- make informed decisions as contributors to society.

Students who have met these goals:

- gain an understanding and appreciation of the role of mathematics in society
- exhibit a positive attitude toward mathematics
- engage and persevere in mathematical problem solving
- contribute to mathematical discussions
- take risks in performing mathematical tasks
- exhibit curiosity about mathematics and situations involving mathematics.

In order to assist students in attaining these goals, teachers are encouraged to develop a classroom atmosphere that fosters conceptual understanding through:

- taking risks
- thinking and reflecting independently
- sharing and communicating mathematical understanding
- solving problems in individual and group projects
- pursuing greater understanding of mathematics
- appreciating the value of mathematics throughout history.

