Alberta Mathematics Sample Year Plan

Grade 6

The purpose of this document is to provide a possible Year Plan for organizing your units of instruction but more importantly, it provides a possible approach to scaffolding the learning that students will need if they do not have the prerequisite knowledge. Sections highlighted in yellow suggest starting points for addressing the Learner Outcome at a more appropriate entry level. Students will require sufficient time to access prior knowledge so a spiralled approach to the Learner Outcomes will likely be necessary.

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May 31, 2023

This resource has been created by Teachers/Administrators/Directors/Consultants from Zone 4 & 6 with the support and feedback of provincial teachers piloting the course. The purpose is to provide a common starting point for the New Grade 6 Mathematics Curriculum. This guide will be used to offer targeted Professional Learning based on the approximate schedules contained within but is not prescriptive in nature.

What is Mathematics?

Mathematics is a universal language relying on a shared understanding of symbols and procedures to communicate ideas efficiently. It is a powerful tool used every day to solve real-life problems. The beauty of mathematics inspires curiosity about our world and the universe. As a subject, mathematics has historical roots in many cultures and continues to evolve in support of innovations. Mathematics involves learning across various disciplines, including arithmetic, algebra, geometry, statistics, and probability. In all disciplines, procedures may range from counting, calculating, and measuring to analyzing, modelling, and generalizing. Engaging with mathematics allows students to develop logical thinking skills, which contribute to effective decision making and problem solving. Students are able to extend their thinking beyond personal experiences through flexible and collaborative learning opportunities. Experiences with mathematics help students develop appreciation for the patterns and relationships that describe multiple aspects of the world and its future possibilities.Numeracy is a foundational building block of learning and is developed in all subjects in different ways. Central to the development of numeracy, the mathematics curriculum helps students acquire and apply the knowledge and skills necessary to interact with quantitative and spatial information in a variety of situations. Foundational numeracy focuses on counting, comparing, and calculating* with numbers; describing, representing, and measuring shapes and objects; collecting, organizing, and interpreting data; and creating and interpreting diagrams, graphs, and tables. Numeracy skills support real-life pursuits, including telling time, using and managing money, following instructions, finding an address, and reading a schedule. With a focus on numeracy, the mathematics curriculum provides all students with a solid foundation of mathematical knowledge, understanding, and skills to set them up for future success.

Mathematics education is an ongoing process of connecting students' concrete experiences to their comprehension of abstract concepts. A recognition of numbers and their application to counting and comparing form foundational knowledge and skills for students as they encounter a variety of quantitative information in their lives. The development of these skills supports students as they participate in family, community, and cultural activities. As their experiences broaden, students also learn that operations with numbers provide reliable and efficient options to counting and comparing. Students acquire knowledge of basic number facts that can be applied to addition, subtraction, multiplication, and division of larger numbers using commonly recognized algorithms. Students also communicate using conventional mathematical symbols and vocabulary. As students are exposed to more and varied quantitative information, they learn about different number systems and their applications to various situations, such as decimals for money and integers for temperature. In developing algebraic thinking skills, students transfer their understanding of properties of numbers to new or abstract problems.

Although mathematics is often considered the study of numbers, it also provides the tools to interpret spatial information in the world. The earliest mathematical experiences of children involve exploration of the space and objects around them. Mathematics provides the foundations for precisely describing, defining, and measuring spatial information. Students will learn geometric properties that relate to and distinguish shapes. They will also develop an understanding of measurement, progressing from direct comparison, to

Numeracy, Quantitative Information and Spatial Information

the use of non-standard units of measure, to accurately measure with various standard units and tools. Examining shapes through measures and calculations of length, area, volume, and angle will allow students to build a broad understanding of spatial information. Students will extend their application of spatial knowledge and skills from concrete to abstract situations, precisely describing location and movement of shapes in a plane. They will develop knowledge of geometric properties, theorems, and formulas to appreciate complex patterns within traditional cultural designs, to solve immediate real-life problems, and to propose innovations.

Throughout the study of mathematics, students apply their foundational knowledge, understandings, skills, and procedures to solve problems. They visualize and reason to move from what is known to what is sought. Thinking logically about a problem, choosing a strategy, reaching a conclusion, and justifying the solution helps students develop confidence in their mathematical thinking and decision making. These processes are reinforced by both literacy and numeracy skills and continue to develop throughout students' lives to support a wide variety of needs, such as financial literacy.

The foundational knowledge and skills provided by the mathematics curriculum are important contributions to the future success of students. Students will apply abilities in computation, managing information, reasoning, and problem solving in daily life and in future educational pursuits and careers. Mathematics will help students interact in society with confidence and intellectual curiosity. Students will rely on their mathematical knowledge and skills as they continue into adulthood in our interconnected and ever changing world. *Note: Learning outcomes in the Mathematics Kindergarten to Grade 6 Curriculum are intended to be achieved without the support of calculators.

This document has been designed to consider the Bridging Needs for new implementation. Many of the highlighted areas will be removed in subsequent years and Organizing Ideas reordered.

Sample Year at a Glance: Mathematics - Grade 6

September 2023 ---------- November 2023

September	October	November
Number: Quantity is measured with numbers that enable counting, labelling, comparing and operating. (use money as concept/manipulative and consider FL)		
6N1.1 Students investigate magnitude with positive and negative numbers. ● Symmetry of the number line extends infinitely to the left and right of zero or above and below zero. ● Direction relative to zero is indicated symbolically with a positive or negative sign. ● Magnitude with direction distinguishes between positive and negative numbers. * Review of math facts (12 x 12) with different strategies should be ongoing	6N1.2 Students investigate magnitude with positive and negative numbers. ● Any number can be expressed as a sum in infinitely many ways. (begin with positive numbers) 6N1.3 Students investigate magnitude with positive and negative numbers. ● The difference of any two numbers can be interpreted as a sum. 6N2 Students solve problems using standard algorithms for addition and subtraction. (begin with money - review money, values to hundredths - dollars and cents) ● Addition and subtraction of numbers in problem-solving contexts is facilitated by standard algorithms * Review of math facts (12 x 12) with different strategies should be ongoing	6N3.1 Students analyze numbers using prime factorization and exponentiation. ● A productt can be composed in multiple ways. (start with simple factor trees for example) ● The prime factors of a number provide a picture of its divisibility. 6N3.2 Students analyze numbers using prime factorization and exponentiation. ● Different representations of a product can provide new perspectives of its divisibility. (link to area diagrams) ● A power is divisible by its base * Review of math facts (12 x 12) with different strategies should be ongoing
Geometry: Shapes are defined and related by geometric attributes.		
6G1.1 Students analyze shapes through symmetry and congruence . ● Symmetry is a relationship between two shapes that can be mapped exactly onto each other through reflection or rotation. (limit to reflection)	6G1.1 Students analyze shapes through symmetry and congruence . Symmetry is a relationship between two shapes that can be mapped exactly onto each other through reflection or rotation. (include rotation)	

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Sample Year at a Glance: Mathematics - Grade 6

September 2023 ----------		---------- November 2023
September	**October**	**November**
Coordinate Geometry:Location and movement of objects in space can be communicated using a coordinate grid.		
6CG1.1 Students explain location and movement in relation to position in the Cartesian plane. ● Location can be described using the Cartesian plane. ● The Cartesian plane is the two-dimensional equivalent of the number line (may start with a quadrant 1 grid first to review plotting points)	6CG1.2 Students explain location and movement in relation to position in the Cartesian plane. ● Location can change as a result of movement in space. ● Change in location does not imply change in orientation. (students should be able to identify when orientation will be affected but that size does not change)	
Algebra: Equations express relationships between quantities.		
6A1.1 Students analyze expressions and solve algebraic equations.(no exponent - review order of operations) ● The conventional order of operations can be applied to simplify or evaluate expressions (link to review of math facts 12 x 12)	6A1.1 Students analyze expressions and solve algebraic equations.(no exponents - review order of operations) ● The conventional order of operations can be applied to simplify or evaluate expressions (link to review of math facts 12 x 12)	6A1.1 Students analyze expressions and solve algebraic equations.(exponent included) ● The conventional order of operations can be applied to simplify or evaluate expressions.
Patterns: Awareness of patterns supports problem solving in various situations.		

Sample Year at a Glance: Mathematics - Grade 6

December 2023 ---------- January 2024

December	January	February
Number: Quantity is measured with numbers that enable counting, labelling, comparing and operating.		
6N4 Students apply standard algorithmss to multiplication and division of decimal and natural numbers. • Multiplication and division of decimal numbers is facilitated by standard algorithms.(link to money and area models) * Review of math 12 x 12 facts with different strategies should be ongoing	6N4 Students apply standard algorithms to multiplication and division of decimal and natural numbers. • Multiplication and division of decimal numbers is facilitated by standard algorithms. * Review of math 12 x 12 facts with different strategies should be ongoing	6N5 Students relate fractions to quotients.(begin with unit fractions for money, move to equivalent fractions/decimals for money;stay with common denominator initially) • Fractions represent quotients in equal-sharing situations. • All equivalent fractions represent the same quotient 6N6 Students add and subtract fractions with denominators within 100. • Fractions with common denominators have the same units. • Any numbers with the same unit can be compared, added, or subtracted. * Review of math 12 x 12 facts with different strategies should be ongoing.
Algebra: Equations express relationships between quantities.		
		6A1.2 Students analyze expressions and solve algebraic equations. • Algebraic properties ensure equivalence of algebraic expressions.

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Sample Year at a Glance: Mathematics - Grade 6

December 2023 ---------- January 2024

December	January	February
Geometry: Shapes are defined and related by geometric attributes.		
	6G1.2 Students analyze shapes through symmetry and congruence. ● Congruence is a relationship between two shapes of identical size and shape. ● Congruence is not dependent on orientation or location of the shapes	
Coordinate Geometry: Location and movement of objects in space can be communicated using a coordinate grid.		
	6CG1.2 Students explain location and movement in relation to position in the Cartesian plane. ● Location can change as a result of movement in space. ● Change in location does not imply change in orientation. (review of angles)	

Sample Year at a Glance: Mathematics - Grade 6

March 2024 ---------- June 2024

March	April	May	June
Number: Quantity is measured with numbers that enable counting, labelling, comparing and operating.			
6N7 Students interpret the multiplication of natural numbers by fractions.(begin with familiar unit fraction in money;review counting by unit fractions) • Multiplication does not always result in a larger number (model several examples in real life before showing algorithms). • Multiplication of a natural number by a fraction can be interpreted as repeated addition of the fraction. • Multiplication of a fraction by a natural number can be interpreted as taking part of a quantity * Review of math 12 x 12 facts with different strategies should be ongoing	6N8 Students apply equivalence to the interpretation of ratios and rates. • All equivalent ratios express the same proportional relationship (use real world examples upfront). • A rate can be used to extend a given proportional relationship to different quantities. * Review of math facts with different strategies should be ongoing	* Review of math facts with different strategies should be ongoing	• Review of Key Concepts • Deep Dive Connecting Learning • Final Assessment?
Algebra: Equations express relationships between quantities.			
	6A1.3 Students analyze expressions and solve algebraic equations. • Algebraic expressions on each side of an equation can be simplified into equivalent expressions to facilitate equation solving. (starting with manipulatives only)	6A1.3 Students analyze expressions and solve algebraic equations. • Algebraic expressions on each side of an equation can be simplified into equivalent expressions to facilitate equation solving.	

Sample Year at a Glance: Mathematics - Grade 6

March 2024 ---------- June 2024

March	April	May	June
Measurement: Attributes such as length, area, volume and angle are quantified by measure.		Patterns: Awareness of patterns supports problem solving in various situations.	
6M1.1 Students analyze areas of parallelograms and triangles. (link to 6N7) • The area of a parallelogram can be generalized as the product of the perpendicular base and height. • The area of a triangle can be interpreted relative to the area of a parallelogram. 6M1.2 Students analyze areas of parallelograms and triangles. • An area can be decomposed in infinitely many ways. (models and manipulatives first)	6M2 Students interpret and express volume. • Volume is a measurable attribute that describes the amount of three-dimensional space occupied by a three-dimensional shape. • The volume of a prism can be interpreted as the result of perpendicular motion of an area. • Volume remains the same when decomposed or rearranged. • Volume is quantified by measurement. • Volume is measured with congruent units that themselves have volume and do not need to resemble the shape being measured. • The volume of a right rectangular prism can be perceived as cube shaped units structured in a three-dimensional shape. • l array.	6P1 Students investigate functions to enhance understanding of change. • A function is a correspondence between two changing quantities represented by independent and dependent variables. • Each value of the independent variable in a function corresponds to exactly one value of the dependent variable.	6P1 Students investigate functions to enhance understanding of change. • A function is a correspondence between two changing quantities represented by independent and dependent variable • Each value of the independent variable in a function corresponds to exactly one value of the dependent variable.

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March 2024 ---------- June 2024

March	April	May	June
		Statistics: The science of collecting, analyzing, visualizing and interpreting data can inform understanding and decision making.	
		6ST1.1 Students investigate relative frequency using experimental data. ● Relative frequency expresses the frequency of a category of data as a fraction of the total number of data values. 6ST1.2 Students investigate relative frequency using experimental data. ● Frequency can be a count of categorized observations or trials in an experiment. ● Relative frequency of outcomes can be used to estimate the likelihood of an event. ● Relative frequency varies between sets of collected data. ● Relative frequency provides a better estimate of the likelihood of an event with larger amounts of data. Could be addressed throughout the year in Science/Social as well.	6ST1.1 Students investigate relative frequency using experimental data. ● Relative frequency expresses the frequency of a category of data as a fraction of the total number of data values. 6ST1.2 Students investigate relative frequency using experimental data. ● Frequency can be a count of categorized observations or trials in an experiment. ● Relative frequency of outcomes can be used to estimate the likelihood of an event. ● Relative frequency varies between sets of collected data. ● Relative frequency provides a better estimate of the likelihood of an event with larger amounts of data. Could be addressed throughout the year in Science/Social as well.

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