

## Correlation of Ontario Program of Studies with Mathology Grade 4

Curriculum Expectations	Grade 4 Mathology.ca	Pearson Canada Grades 4-6 Mathematics Learning Progression
<b>B. Number</b>		
<b>B1. Number Sense</b> demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life		
<b>Whole Numbers</b>		
B1.1 read, represent, compose, and decompose whole numbers up to and including 10 000, using appropriate tools and strategies, and describe various ways they are used in everyday life	<p><b>Number Unit 1: Number Relationships and Place Value</b> 1: Representing Numbers to 10 000 2: Composing and Decomposing Larger Numbers 6: Consolidation of Number Relationships and Place Value</p> <p><b>Number Unit 2: Fluency with Addition and Subtraction</b> 7: Estimating Sums and Differences</p>	<p><b>Big Idea: Numbers are related in many ways. Decomposing and composing numbers to investigate equivalencies</b> - Composes and decomposes whole numbers using standard and non-standard partitioning (e.g., 1000 is 10 hundreds or 100 tens). <b>Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units.</b> <b>Unitizing quantities into base-ten units</b> - Writes and reads whole numbers in multiple forms (e.g., 1358; one thousand three hundred fifty-eight; <math>1000 + 300 + 50 + 8</math>). - Understands that the value of a digit is ten times the value of the same digit one place to the right.</p>
B1.2 compare and order whole numbers up to and including 10 000, in various contexts.	<p><b>Number Unit 1: Number Relationships and Place Value</b> 4: Comparing and Ordering Numbers 6. Consolidation of Number Relationships and Place Value</p>	<p><b>Big Idea: Numbers are related in many ways. Comparing and ordering quantities (multitude or magnitude)</b> - Compares, orders, and locates whole numbers based on place-value understanding and records using <math>&lt;</math>, <math>=</math>, <math>&gt;</math> symbols.</p>

<p>B1.3 round whole numbers to the nearest ten, hundred, or thousand, in various contexts</p>	<p><b>Number Unit 1: Number Relationships and Place Value</b>  3: Estimating and Rounding Numbers  5: Estimating to Solve Problems  6: Consolidation of Number Relationships and Place Value</p> <p><b>Number Unit 2: Fluency with Addition and Subtraction</b>  7: Estimating Sums and Differences</p>	<p><b>Big Idea: The set of real numbers is infinite. Estimating quantities and numbers</b>  - Rounds whole numbers using place-value understanding (e.g., 4736 can be rounded to 5000, 4700, 4740).</p>
<p><b>Fractions and Decimals</b></p>		
<p>B1.4 represent fractions from halves to tenths using drawings, tools, and standard fractional notation, and explain the meaning of the denominator and the numerator</p>	<p><b>Number Unit 3: Fractions</b>  13: What Are Fractions?  15: Exploring Different Representations of Fractions  19: Consolidation of Fractions</p>	<p><b>Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units.</b>  <b>Partitioning quantities to form fractions</b>  - Partitions fractional parts into smaller fractional parts (e.g., partitions halves into thirds to create sixths).</p>
<p>B1.5 use drawings and models to represent, compare, and order fractions representing the individual portions that result from two different fair-share scenarios involving any combination of 2, 3, 4, 5, 6, 8, and 10 sharers</p>	<p><b>Number Unit 3: Fractions</b>  16: Sharing Equally  17: Exploring Equivalence in Fractions  18: Comparing and Ordering Fractions  19: Consolidation of Fractions</p>	<p><b>Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units.</b>  <b>Partitioning quantities to form fractions</b>  - Partitions fractional parts into smaller fractional parts (e.g., partitions halves into thirds to create sixths).  <b>Big Idea: Numbers are related in many ways. Comparing and ordering quantities (multitude or magnitude)</b>  - Compares, orders, and locates fractions with the same numerator or denominator using reasoning (e.g., <math>\frac{3}{5} &gt; \frac{3}{6}</math> because fifths are larger parts).  - Compares, orders, and locates fractions using flexible strategies (e.g., comparing models,</p>

		<p>creating common denominators or numerators).</p> <p><b>Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units</b></p> <p><b>Partitioning quantities to form fractions</b></p> <ul style="list-style-type: none"> <li>- Partitions fractional parts into smaller fractional parts (e.g., partitions halves into thirds to create sixths).</li> <li>- Explains that two equivalent fractions represent the same part of a whole, but not necessarily equal quantities (e.g., <math>\frac{1}{2}</math> of a set of 12 and <math>\frac{1}{2}</math> of a set of 6 are equal fractions, but unequal quantities).</li> <li>- Continues to extend fraction understanding to multiple contexts (e.g., sharing, division, ratios).</li> </ul>
B1.6 count to 10 by halves, thirds, fourths, sixths, eighths, and tenths, with and without the use of tools	<p><b>Number Unit 3: Fractions</b></p> <p>14: Counting by Unit Fractions</p> <p>19: Consolidation of Fractions</p>	<p><b>Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units.</b></p> <p><b>Partitioning quantities to form fractions</b></p> <ul style="list-style-type: none"> <li>- Uses models to describe, name, and count forward and backward by unit fractions.</li> </ul>
B1.7 read, represent, and order decimal tenths, in various contexts	<p><b>Number Unit 4: Decimals</b></p> <p>20: Exploring Tenths</p> <p>22: Comparing and Ordering Decimals</p> <p>23: Consolidation of Decimals</p>	<p><b>Big Idea: The set of real numbers is infinite. Extending whole number understanding to the set of real numbers</b></p> <ul style="list-style-type: none"> <li>- Explores decimal fractions to tenths (e.g., 0.1, 0.5, 0.8) and hundredths (e.g., 0.42, 0.05, 0.90).</li> </ul> <p><b>Big Idea: Numbers are related in many ways. Comparing and ordering quantities (multitude or magnitude)</b></p> <ul style="list-style-type: none"> <li>- Compares, orders, and locates decimal numbers using place-value understanding.</li> </ul> <p><b>Estimating quantities and numbers</b></p> <ul style="list-style-type: none"> <li>- Estimates the location of decimals and fractions on a number line.</li> </ul> <p><b>Decomposing and composing numbers to investigate equivalencies</b></p> <ul style="list-style-type: none"> <li>- Composes and decomposes decimal numbers</li> </ul>

		<p>using standard and non-standard partitioning (e.g., 1.6 is 16 tenths or 0.16 tens).</p> <p><b>Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units.</b></p> <p><b>Unitizing quantities into base-ten units</b></p> <ul style="list-style-type: none"> <li>- Uses fractions with denominators of 10 to develop decimal fraction understanding and notation (e.g., five-tenths is <math>\frac{5}{10}</math> or 0.5).</li> <li>- Counts forward and backward by decimal units (e.g., 0.1, 0.2, ... 0.9, 1.0).</li> <li>- Understands that the value of a digit is ten times the value of the same digit one place to the right.</li> <li>- Understands that the value of a digit is one-tenth the value of the same digit one place to the left.</li> <li>- Writes and reads decimal numbers in multiple forms (e.g., numerals, number names, expanded form).</li> </ul>
B1.8 round decimal numbers to the nearest whole number, in various contexts	<p><b>Number Unit 4: Decimals</b></p> <p>20: Exploring Tenths</p> <p>23: Consolidation of Decimals</p>	<p><b>Big Idea: Numbers are related in many ways</b></p> <p><b>Estimating quantities and numbers</b></p> <ul style="list-style-type: none"> <li>- Provides approximate decimal values using multiple strategies (e.g., estimation, rounding, truncating).</li> </ul>
B1.9 describe relationships and show equivalences among fractions and decimal tenths, in various contexts	<p><b>Number Unit 4: Decimals</b></p> <p>20: Exploring Tenths</p> <p>23: Consolidation of Decimals</p>	<p><b>Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units.</b></p> <p><b>Unitizing quantities into base-ten units</b></p> <ul style="list-style-type: none"> <li>- Uses fractions with denominators of 10 to develop decimal fraction understanding and notation (e.g., five-tenths is <math>\frac{5}{10}</math> or 0.5).</li> <li>- Understands that the value of a digit is ten times the value of the same digit one place to the right.</li> <li>- Understands that the value of a digit is one-tenth the value of the same digit one place to the left.</li> </ul>

<b>B2. Operations</b>		
use knowledge of numbers and operations to solve mathematical problems encountered in everyday life		
<b>Properties and Relationships</b>		
B2.1 use the properties of operations, and the relationships between addition, subtraction, multiplication, and division, to solve problems involving whole numbers, including those requiring more than one operation, and check calculations	<p><b>Number Unit 2: Fluency with Addition and Subtraction</b></p> <p>9: Adding and Subtracting Larger Numbers</p> <p>10: Using Mental Math to Add and Subtract</p> <p>11: Creating and Solving Problems</p> <p>12: Consolidation of Fluency with Addition and Subtraction</p> <p><b>Number Unit 5: Fluency with Multiplication and Division Facts</b></p> <p>24: Strategies for Multiplication</p> <p>25: Solving Multiplication Problems</p> <p>26: Relating Multiplication and Division</p> <p>27: Strategies for Division</p> <p>29: Consolidation of Fluency with Multiplication and Division</p> <p><b>Number Unit 6: Multiplying and Dividing Larger Numbers</b></p> <p>30: Exploring Strategies for Multiplying</p> <p>31: Estimating Products</p> <p>32: Exploring Strategies for Dividing</p>	<p><b>Big Idea: Numbers are related in many ways. Estimating quantities and numbers</b></p> <ul style="list-style-type: none"> <li>- Rounds whole numbers using place-value understanding (e.g., 4736 can be rounded to 5000, 4700, 4740).</li> </ul> <p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b></p> <p><b>Investigating number and arithmetic properties</b></p> <ul style="list-style-type: none"> <li>- Recognizes and generates equivalent numerical expressions using commutative and associative properties.</li> <li>- Understands operational relationships (e.g., inverse relationship between multiplication/division, addition/subtraction).</li> <li>- Understands the identity of operations (e.g., <math>5 + 0 = 5</math>; <math>7 \times 1 = 7</math>).</li> </ul> <p><b>Developing conceptual meaning of operations</b></p> <ul style="list-style-type: none"> <li>- Models and develops meaning for whole number computation to four digits.</li> </ul> <p><b>Developing fluency of operations</b></p> <ul style="list-style-type: none"> <li>- Estimates the result of whole number operations using contextually relevant strategies (e.g., How many buses are needed to take the Grade 8 classes to the museum?).</li> <li>- Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase).</li> </ul>

	33: Estimating Quotients 34: Dividing with Remainders 35. Consolidation of Multiplying and Dividing Larger Numbers	
<b>Math Facts</b>		
B2.2 recall and demonstrate multiplication facts for $1 \times 1$ to $10 \times 10$ , and related division facts	<b>Number Unit 5: Fluency with Multiplication and Division Facts</b> 24: Strategies for Multiplication 25: Solving Multiplication Problems 26: Relating Multiplication and Division 27: Strategies for Division 29: Consolidation of Fluency with Multiplication and Division	<b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b> <b>Developing fluency of operations</b> - Fluently recalls multiplication and division facts to 100.
<b>Mental Math</b>		
B2.3 use mental math strategies to multiply whole numbers by 10, 100, and 1000, divide whole numbers by 10, and add and subtract decimal tenths, and explain the strategies used	<b>Number Unit 6: Multiplying and Dividing Larger Numbers</b> 30: Exploring Strategies for Multiplying 32: Exploring Strategies for Dividing 35: Consolidation of Multiplying and Dividing Larger Numbers  <b>Number Unit 7: Operations with Fractions and Decimals</b> 37: Adding and Subtracting Decimals	<b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b> <b>Developing conceptual meaning of operations</b> - Understands the effect of multiplying and dividing whole numbers by powers of 10. <b>Developing fluency of operations</b> - Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase). - Solves decimal number computation using efficient strategies.

	<p>38: Using Mental Math to Add and Subtract Decimals</p> <p>40: Consolidation of Operations with Fractions and Decimals</p>	
<b>Addition and Subtraction</b>		
<p>B2.4 represent and solve problems involving the addition and subtraction of whole numbers that add up to no more than 10 000 and of decimal tenths, using appropriate tools and strategies, including algorithms</p>	<p><b>Number Unit 2: Fluency with Addition and Subtraction</b></p> <p>7: Estimating Sums and Differences</p> <p>8: Modelling Addition and Subtraction</p> <p>9: Adding and Subtracting Larger Numbers</p> <p>10: Using Mental Math to Add and Subtract</p> <p>11: Creating and Solving Problems</p> <p>12: Consolidation of Fluency with Addition and Subtraction</p> <p><b>Number Unit 7: Operations with Fractions and Decimals</b></p> <p>36: Estimating Sums and Differences with Decimals</p> <p>37: Adding and Subtracting Decimals</p> <p>38: Using Mental Math to Add and Subtract Decimals</p> <p>40: Consolidation of Operations with Fractions and Decimals</p>	<p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b></p> <p><b>Investigating number and arithmetic properties</b></p> <ul style="list-style-type: none"> <li>- Recognizes and generates equivalent numerical expressions using commutative and associative properties.</li> <li>- Understands operation relationships (e.g., inverse relationship between multiplication/division, addition/subtraction).</li> <li>- Understands the identity of operations (e.g., <math>5 + 0 = 5</math>; <math>7 \times 1 = 7</math>).</li> </ul> <p><b>Developing conceptual meaning of operations</b></p> <ul style="list-style-type: none"> <li>- Models and develops meaning for whole number computation to four digits.</li> <li>- Demonstrates an understanding of decimal number computation through modelling and flexible strategies.</li> </ul> <p><b>Developing fluency of operations</b></p> <ul style="list-style-type: none"> <li>- Estimates the result of whole number operations using contextually relevant strategies (e.g., How many buses are needed to take the Grade 8 classes to the museum?).</li> <li>- Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase).</li> <li>- Estimates sums and differences of decimal numbers (e.g., calculating cost of transactions involving dollars and cents).</li> </ul>

	<p><b>Number Unit 8: Financial Literacy</b></p> <p>41: Purchasing and Making Change (Whole-Dollar Amounts)</p> <p>43: Making Financial Decisions</p> <p>45: Consolidation of Financial Literacy</p>	<p>- Solves decimal number computation using efficient strategies.</p>
<b>Multiplication and Division</b>		
<p>B2.5 represent and solve problems involving the multiplication of two- or three-digit whole numbers by one-digit whole numbers and by 10, 100, and 1000, using appropriate tools, including arrays</p>	<p><b>Number Unit 6: Multiplying and Dividing Larger Numbers</b></p> <p>30: Exploring Strategies for Multiplying</p> <p>31: Estimating Products</p> <p>35: Consolidation of Multiplying and Dividing Larger Numbers</p>	<p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b></p> <p><b>Developing conceptual meaning of operations</b></p> <ul style="list-style-type: none"> <li>- Models and develops meaning for whole number computation to four digits.</li> <li>- Understands the effect of multiplying and dividing whole numbers by powers of 10.</li> </ul> <p><b>Developing fluency of operations</b></p> <ul style="list-style-type: none"> <li>- Estimates the result of whole number operations using contextually relevant strategies (e.g., How many buses are needed to take the Grade 8 classes to the museum?).</li> <li>- Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase).</li> </ul>
<p>B2.6 represent and solve problems involving the division of two- or three-digit whole numbers by one-digit whole numbers, expressing any remainder as a fraction when appropriate, using appropriate tools, including arrays</p>	<p><b>Number Unit 6: Multiplying and Dividing Larger Numbers</b></p> <p>32: Exploring Strategies for Dividing</p> <p>33: Estimating Quotients</p> <p>34: Dividing with Remainders</p> <p>35: Consolidation of Multiplying and Dividing Larger Numbers</p>	<p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b></p> <p><b>Partitioning quantities to form fractions</b></p> <ul style="list-style-type: none"> <li>- Understands the fraction <math>\frac{a}{b}</math> as <math>a \div b</math>.</li> </ul> <p><b>Developing conceptual meaning of operations</b></p> <ul style="list-style-type: none"> <li>- Models and develops meaning for whole number computation to four digits.</li> <li>- Understands the effect of multiplying and</li> </ul>

		<p>dividing whole numbers by powers of 10.</p> <ul style="list-style-type: none"> <li>- Models and develops meanings for division of whole numbers that result in fractions.</li> </ul> <p><b>Developing fluency of operations</b></p> <ul style="list-style-type: none"> <li>- Estimates the result of whole number operations using contextually relevant strategies (e.g., How many buses are needed to take the Grade 8 classes to the museum?).</li> <li>- Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase).</li> </ul>
B2.7 represent the relationship between the repeated addition of a unit fraction and the multiplication of that unit fraction by a whole number, using tools, drawings, and standard fractional notation	<p><b>Number Unit 7: Operations with Fractions and Decimals</b></p> <p>39: Repeated Addition with Unit Fractions</p> <p>40: Consolidation of Operations with Fractions and Decimals</p>	<p><b>Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units.</b></p> <p><b>Partitioning quantities to form fractions</b></p> <ul style="list-style-type: none"> <li>- Uses models to describe, name, and count forward and backward by unit fractions.</li> <li>- Understands the meaning of an <math>\frac{a}{b}</math> fraction as a multiple of the unit fraction <math>\frac{1}{b}</math> (e.g., <math>\frac{3}{5} = 3 \times \frac{1}{5}</math>).</li> </ul>
B2.8 show simple multiplicative relationships involving whole-number rates, using various tools and drawings	<p><b>Number Unit 5: Fluency with Multiplication and Division Facts</b></p> <p>28: Whole Number Rates</p> <p>29: Consolidation of Fluency with Multiplication and Division</p>	<p><b>Big Idea: Numbers are related in many ways. Using ratios, rates, proportions, and percents creates a relationship between quantities</b></p> <ul style="list-style-type: none"> <li>- Demonstrates multiplicative reasoning by applying unit rates in whole number contexts (e.g., If she earns \$12 per hour, how much will she earn for 5 hours of work?).</li> <li>- Understands the concept of ratio as a relationship between two quantities (e.g., 3 wins to 2 losses).</li> <li>- Understands and applies the concept of unit rates (e.g., If 3 kg is \$5, how much is 1 kg or how many kg for \$1?).</li> </ul>

<b>C. Algebra</b>		
<b>C.1 Patterns and Relationships</b>		
identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts		
<b>Patterns</b>		
C1.1 identify and describe repeating and growing patterns, including patterns found in real-life contexts	<b>Patterning Unit 1: Patterns and Relations</b> 1: Repeating and Growing Patterns 6: Consolidation of Patterns and Relations	<b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b> <b>Representing patterns, relations, and functions</b> - Describes, generates, extends, translates, and corrects number and shape patterns that follow a predetermined rule. <b>Generalizing and analyzing patterns, relations, and functions</b> - Explains the rule for numeric patterns including the starting point and change (e.g., given: 16, 22, 28, 34, ... Start at 16 and add 6 each time). - Describes numeric and shape patterns using words and numbers.
C1.2 create and translate repeating and growing patterns using various representations, including tables of values and graphs	<b>Patterning Unit 1: Patterns and Relations</b> 1: Repeating and Growing Patterns 3: Representing Patterns 6: Consolidation of Patterns and Relations	<b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b> <b>Representing patterns, relations, and functions</b> - Describes, generates, extends, translates, and corrects number and shape patterns that follow a predetermined rule. - Uses multiple approaches to model situations involving repetition (i.e., repeating patterns) and change (i.e., increasing/decreasing patterns) (e.g., using objects, tables, graphs, symbols, loops and nested loops in coding). <b>Generalizing and analyzing patterns, relations, and functions</b> - Explains the rule for numeric patterns including the starting point and change (e.g., given: 16, 22, 28, 34, ... Start at 16 and add 6 each time).

		- Describes numeric and shape patterns using words and numbers.
C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating and growing patterns	<b>Patterning Unit 1: Patterns and Relations</b> 1: Repeating and Growing Patterns 6: Consolidation of Patterns and Relations	<b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b> <b>Representing patterns, relations, and functions</b> - Describes, generates, extends, translates, and corrects number and shape patterns that follow a predetermined rule. <b>Generalizing and analyzing patterns, relations, and functions</b> - Explains the rule for numeric patterns including the starting point and change (e.g., given: 16, 22, 28, 34, ... Start at 16 and add 6 each time). - Describes numeric and shape patterns using words and numbers.
C1.4 create and describe patterns to illustrate relationships among whole numbers and decimal tenths	<b>Patterning Unit 1: Patterns and Relations</b> 4: Investigating Number Relationships 6: Consolidation of Patterns and Relations	<b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b> <b>Representing patterns, relations, and functions</b> - Describes, generates, extends, translates, and corrects number and shape patterns that follow a predetermined rule. <b>Generalizing and analyzing patterns, relations, and functions</b> - Explains the rule for numeric patterns including the starting point and change (e.g., given: 16, 22, 28, 34, ... Start at 16 and add 6 each time). - Describes numeric and shape patterns using words and numbers.

<b>C.2 Equations and Inequalities</b> demonstrate an understanding of variables, expressions, equalities, and inequalities, and apply this understanding in various contexts		
<b>Variables</b>		
C2.1 identify and use symbols as variables in expressions and equations	<b>Patterning Unit 2: Variables and Equations</b> 7: Using Symbols 8: Solving Equations Concretely 9: Solving Addition and Subtraction Equations 11: Solving Multiplication and Division Equations 12: Using Equations to Solve Problems 13. Consolidation of Variables and Equations	<b>Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.</b> <b>Understanding equality and inequality, building on generalized properties of numbers and operations</b> - Expresses a one-step mathematical problem as an equation using a symbol or letter to represent an unknown number (e.g., Sena had some tokens and used four. She has seven left: $\square - 4 = 7$ ). <b>Using variables, algebraic expressions, and equations to represent mathematical relations</b> - Understands an unknown quantity (i.e., variable) may be represented by a symbol or letter (e.g., $13 - \square = 8$ ; $4n = 12$ ). - Flexibly uses symbols and letters to represent unknown quantities in equations (e.g., knows that $4 + \square = 7$ ; $4 + x = 7$ ; and $4 + y = 7$ all represent the same equation with $\square$ , $x$ , and $y$ representing the same value). - Interprets and writes algebraic expressions (e.g., $2n$ means two times a number; subtracting a number from 7 can be written as $7 - n$ ). - Understands a variable as a changing quantity (e.g., $5s$ , where $s$ can be any value).

<b>Equalities and Inequalities</b>		
C2.2 solve equations that involve whole numbers up to 50 in various contexts, and verify solutions	<b>Patterning Unit 2: Variables and Equations</b> 8: Solving Equations Concretely 9: Solving Addition and Subtraction Equations 11: Solving Multiplication and Division Equations 12: Using Equations to Solve Problems 13. Consolidation of Variables and Equations	<b>Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.</b> <b>Understanding equality and inequality, building on generalized properties of numbers and operations</b> - Determines an unknown number in simple one-step equations using different strategies (e.g., $n \times 3 = 12$ ; $13 - \square = 8$ ). - Uses arithmetic properties to investigate and transform one-step addition and multiplication equations (e.g., $5 + 4 = 9$ and $5 + a = 9$ have the same structure and can be rearranged in similar ways to maintain equality: $4 + 5 = 9$ and $a + 5 = 9$ ). - Uses arithmetic properties to investigate and transform one-step subtraction and division equations (e.g., $12 - 5 = 7$ and $12 - b = 7$ have the same structure and can be rearranged in similar ways to maintain equality: $12 - 7 = 5$ and $12 - 7 = b$ ).
C2.3 solve inequalities that involve addition and subtraction of whole numbers up to 20, and verify and graph the solutions	<b>Patterning Unit 2: Variables and Equations</b> 10: Solving Addition and Subtraction Inequalities 13. Consolidation of Variables and Equations	
<b>C3. Coding</b>		
solve problems and create computational representations of mathematical situations using coding concepts and skills		
<b>Coding Skills</b>		
C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves sequential, concurrent, repeating, and nested events	<b>Patterning Unit 3: Coding</b> 14: Writing Code 15: Making Shapes 16: Coding a Shape Design 17. Consolidation of Coding	<b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b> <b>Representing patterns, relations, and functions.</b> -Uses multiple approaches to model situations involving repetition (i.e., repeating patterns) and change (i.e., increasing/decreasing patterns) (e.g., using objects, tables, graphs, symbols, loops and nested loops in coding).

		<p><b>Big Idea: 2-D shapes and 3-D solids can be analyzed and classified in different ways by their attributes.</b></p> <p><b>Investigating geometric attributes and properties of 2-D shapes and 3-D solids</b></p> <ul style="list-style-type: none"> <li>- Sorts, describes, constructs, and classifies polygons based on side attributes (e.g., parallel, perpendicular, regular/irregular).</li> <li>- Understands angle as a geometric figure formed from two rays or line segments sharing a common endpoint.</li> </ul> <p><b>Big Idea: Objects can be located in space and viewed from multiple perspectives.</b></p> <p><b>Locating and mapping objects in space</b></p> <ul style="list-style-type: none"> <li>- Extends understanding of locating, describing, and relating the movement of objects on grids and maps.</li> </ul>
<p>C3.2 read and alter existing code, including code that involves sequential, concurrent, repeating, and nested events, and describe how changes to the code affect the outcomes</p>	<p><b>Patterning Unit 3: Coding</b></p> <p>15: Making Shapes 16: Coding a Shape Design 17: Consolidation of Coding</p>	<p><b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b></p> <p><b>Representing patterns, relations, and functions.</b></p> <ul style="list-style-type: none"> <li>-Uses multiple approaches to model situations involving repetition (i.e., repeating patterns) and change (i.e., increasing/decreasing patterns) (e.g., using objects, tables, graphs, symbols, loops and nested loops in coding).</li> </ul> <p><b>Big Idea: 2-D shapes and 3-D solids can be analyzed and classified in different ways by their attributes.</b></p> <p><b>Investigating geometric attributes and properties of 2-D shapes and 3-D solids</b></p> <ul style="list-style-type: none"> <li>- Sorts, describes, constructs, and classifies polygons based on side attributes (e.g., parallel, perpendicular, regular/irregular).</li> <li>- Understands angle as a geometric figure formed from two rays or line segments sharing a common endpoint.</li> </ul> <p><b>Big Idea: Objects can be located in space and viewed from multiple perspectives.</b></p> <p><b>Locating and mapping objects in space</b></p>

		- Extends understanding of locating, describing, and relating the movement of objects on grids and maps.
<b>C4. Mathematical Modeling</b>		
Apply the process of mathematical modelling to represent, analyse, make predictions, and provide insight into real-life situations		
<p><i>This overall expectation has no specific expectations. <b>Mathematical modelling</b> is an <b>iterative</b> and interconnected process that is applied to various contexts, allowing students to bring in learning from other strands. Students' demonstration of the process of mathematical modelling, as they apply concepts and skills learned in other strands, is assessed and evaluated.</i></p>	<p><b>Number</b>  5: Estimating to Solve Problems  11: Creating and Solving Problems  16: Sharing Equally  22: Comparing and Ordering Decimals  27: Strategies for Division  30: Exploring Strategies for Multiplying  34: Dividing with Remainders  36: Estimating Sums and Differences with Decimals  41: Purchasing and Making Change (Whole-Dollar Amounts)</p> <p><b>Patterning</b>  3: Representing Patterns  12: Using Equations to Solve Problems  14: Writing Code</p> <p><b>Measurement</b></p>	

	6: Exploring the Area of Rectangles 9: Investigating Capacity 16: Exploring Elapsed Time  <b>Geometry</b> 2: Properties of Rectangles 5: Investigating Translations  <b>Data Management</b> 5: Analyzing Data 8: Making and Testing Predictions	
<b>D. Data</b>		
<b>D1. Data Literacy</b>		
manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life		
<b>Data Collection and Organization</b>		
D1.1 describe the difference between qualitative and quantitative data, and describe situations where each would be used	<b>Data Management Unit 1B: Data Management</b> 1: Qualitative and Quantitative Data 2: Collecting and Organizing Data 7. Consolidation of Data Management	<b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness. Collecting data and organizing it into categories</b> - Distinguishes between categorical (e.g., pet type, occupation) and discrete (e.g., class size, free throws made) data.
D1.2 collect data from primary and secondary sources to answer questions of interest that involve comparing two or more sets of data, and organize the data in frequency tables and stem-and-leaf plots	<b>Data Management Unit 1B: Data Management</b> 1: Qualitative and Quantitative Data 2: Collecting and Organizing Data 3: Exploring Stem-and-Leaf Plots and Multiple-Bar Graphs 6: Creating Infographics 7. Consolidation of Data Management	<b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness. Collecting data and organizing it into categories</b> - Constructs data organizers to support data collection (e.g., creates tally chart or line plot on a grid to collect survey data).

		<ul style="list-style-type: none"> <li>- Selects and justifies an appropriate method of data collection (e.g., experiment, observation, survey) based on question posed.</li> </ul> <p><b>Creating graphical displays of collected data</b></p> <ul style="list-style-type: none"> <li>- Creates charts and graphs with appropriate titles and labels to represent data collected (e.g., bar graph, line plot, pictograph, stem-and-leaf plot).</li> <li>- Visually represents two or more data sets (e.g., double bar chart, stacked bar graph, multi-line graph, multi-column table).</li> </ul>
<b>Data Visualization</b>		
D1.3 select from among a variety of graphs, including multiple-bar graphs, the type of graph best suited to represent various sets of data; display the data in the graphs with proper sources, titles, and labels, and appropriate scales; and justify their choice of graph	<p><b>Data Management Unit 1B: Data Management</b></p> <p>3: Exploring Stem-and-Leaf Plots and Multiple-Bar Graphs</p> <p>5: Analyzing Data</p> <p>7. Consolidation of Data Management</p>	<p><b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness.</b></p> <p><b>Creating graphical displays of collected data</b></p> <ul style="list-style-type: none"> <li>- Creates charts and graphs with appropriate titles and labels to represent data collected (e.g., bar graph, line plot, pictograph, stem-and-leaf plot).</li> <li>- Represents data graphically using many-to-one correspondence with appropriate scales and intervals (e.g., each symbol on pictograph represents 10 people).</li> <li>- Visually represents two or more data sets (e.g., double bar chart, stacked bar graph, multi-line graph, multi-column table).</li> </ul>
D1.4 create an infographic about a data set, representing the data in appropriate ways, including in frequency tables, stem-and-leaf plots, and multiple-bar graphs, and incorporating any other relevant information that helps to tell a story about the data	<p><b>Data Management Unit 1B: Data Management</b></p> <p>6: Creating Infographics</p> <p>7. Consolidation of Data Management</p>	<p><b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness.</b></p> <p><b>Creating graphical displays of collected data</b></p> <ul style="list-style-type: none"> <li>- Creates charts and graphs with appropriate titles and labels to represent data collected (e.g., bar graph, line plot, pictograph, stem-and-leaf plot).</li> </ul>

		<ul style="list-style-type: none"> <li>- Represents data graphically using many-to-one correspondence with appropriate scales and intervals (e.g., each symbol on pictograph represents 10 people).</li> <li>- Chooses and justifies appropriate visual representations for displaying discrete (e.g., bar graph) and continuous (e.g., line graph) data).</li> <li>- Visually represents two or more data sets (e.g., double bar chart, stacked bar graph, multi-line graph, multi-column table).</li> </ul>
<b>Data Analysis</b>		
<p>D1.5 determine the mean and the median and identify the mode(s), if any, for various data sets involving whole numbers, and explain what each of these measures indicates about the data</p>	<p><b>Data Management Unit 1B:</b>  <b>Data Management</b>  4: Determining Mean, Median, and Mode  5: Analyzing Data  6: Creating Infographics  7. Consolidation of Data Management</p>	<p><b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness. Reading and interpreting data displays and analyzing variability</b></p> <ul style="list-style-type: none"> <li>- Visualizes and determines the median value as a middle measure representing a whole data set.</li> <li>- Visualizes and determine the mean of a data set.</li> <li>- Understands that measures of central tendency (i.e., mode, median, mean) are summary measures that represent all values in a data set with a single number (i.e., most frequent value; middle value; balance point of values).</li> </ul> <p><b>Using the language and tools of chance to describe and predict events</b></p> <ul style="list-style-type: none"> <li>- Describes data using frequency counts (e.g., 5 people chose peppermint) and modal value (e.g., dogs are the most common pet).</li> </ul>

<p>D1.6 analyse different sets of data presented in various ways, including in stem-and-leaf plots and multiple-bar graphs, by asking and answering questions about the data and drawing conclusions, then make convincing arguments and informed decisions</p>	<p><b>Data Management Unit 1B: Data Management</b>  3: Exploring Stem-and-Leaf Plots and Multiple-Bar Graphs  5: Analyzing Data  6: Creating Infographics  7. Consolidation of Data Management</p>	<p><b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness. Drawing conclusions by making inferences and justifying decisions based on data collected</b></p> <ul style="list-style-type: none"> <li>- Draws conclusions based on data presented.</li> <li>- Interprets the results of data presented graphically from primary (e.g., class survey) and secondary (e.g., online news report) sources.</li> </ul>
<p><b>D2. Probability</b>  describe the likelihood that events will happen, and use that information to make predictions</p>		
<p><b>Probability</b></p>		
<p>D2.1 use mathematical language, including the terms “impossible”, “unlikely”, “equally likely”, “likely”, and “certain”, to describe the likelihood of events happening, represent this likelihood on a probability line, and use it to make predictions and informed decisions</p>	<p><b>Data Management Unit 2: Probability</b>  8: Describing Likelihood of Events  9: Predicting Outcomes of an Event  12. Consolidation of Probability</p>	<p><b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness. Using the language and tools of chance to describe and predict events</b></p> <ul style="list-style-type: none"> <li>- Locates the likelihood of outcomes on a vocabulary-based probability continuum (e.g., impossible, unlikely, likely, certain).</li> <li>- Distinguishes between equally likely events (e.g., heads or tails on a fair coin) and unequally likely events (e.g., spinner with differently sized sections).</li> </ul>
<p>D2.2 make and test predictions about the likelihood that the mean, median, and mode(s) of a data set will be the same for data collected from different populations</p>	<p><b>Data Management Unit 2: Probability</b>  8: Describing Likelihood of Events  9: Predicting Outcomes of an Event  10: Conducting Experiments to Check Predictions</p>	<p><b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness. Collecting data and organizing it into categories</b></p> <ul style="list-style-type: none"> <li>- Records the results of multiple trials of simple events.</li> </ul>

	11: Making and Testing Predictions 12. Consolidation of Probability	<b>Using the language and tools of chance to describe and predict events</b> - Identifies the sample space of independent events in an experiment (e.g., flipping a cup, drawing a coloured cube from a bag).
<b>E. Spatial Sense</b>		
<b>E1. Geometric and Spatial Reasoning</b> describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them		
<b>Geometric Reasoning</b>		
E1.1 identify geometric properties of rectangles, including the number of right angles, parallel and perpendicular sides, and lines of symmetry	<b>Geometry Unit 1B: 2-D Shapes and Angles</b> 2: Properties of Rectangles 4. Consolidation of 2-D Shapes and Angles	<b>Big Idea: 2-D shapes and 3-D solids can be analyzed and classified in different ways by their attributes.</b> <b>Investigating geometric attributes and properties of 2-D shapes and 3-D solids</b> - Sorts, describes, constructs, and classifies polygons based on side attributes (e.g., parallel, perpendicular, regular/irregular). - Sorts, describes, and classifies 2-D shapes based on their geometric properties (e.g., side lengths, angles, diagonals). <b>Investigating 2-D shapes, 3- D solids, and their attributes through composition and decomposition</b> - Identifies types of lines in 2-D images (e.g., parallel, intersecting, perpendicular).
<b>Location and Movement</b>		
E1.2 plot and read coordinates in the first quadrant of a Cartesian plane, and describe the translations that move a point from one coordinate to another	<b>Geometry Unit 2: Grids and Transformations</b> 6: Plotting and Reading Coordinates 8. Consolidation of Grids and Transformations	<b>Big Idea: 2-D shapes and 3-D solids can be transformed in many ways and analyzed for change.</b> <b>Exploring 2-D shapes and 3-D solids by applying and visualizing transformations</b> - Identifies, describes, and performs single transformations (i.e., translation, reflection, rotation) on 2-D shapes. <b>Big Idea: Objects can be located in space and viewed from multiple perspectives.</b> <b>Locating and mapping objects in space</b>

		<ul style="list-style-type: none"> <li>- Develops understanding of a Cartesian plane as a coordinate system using perpendicular axes.</li> <li>- Plots and locates points on a Cartesian plane, and relates the location to the two axes. (Limited to the first quadrant.)</li> </ul>
E1.3 describe and perform translations and reflections on a grid, and predict the results of these transformations	<b>Geometry Unit 2: Grids and Transformations</b> 5: Investigating Translations 7: Investigating Reflections 8. Consolidation of Grids and Transformations	<b>Big Idea: 2-D shapes and 3-D solids can be transformed in many ways and analyzed for change.</b> <b>Exploring 2-D shapes and 3-D solids by applying and visualizing transformations</b> <ul style="list-style-type: none"> <li>- Identifies, describes, and performs single transformations (i.e., translation, reflection, rotation) on 2-D shapes.</li> </ul>
<b>E2. Measurement</b> compare, estimate, and determine measurements in various contexts		
<b>The Metric System</b>		
E2.1 explain the relationships between grams and kilograms as metric units of mass, and between litres and millilitres as metric units of capacity, and use benchmarks for these units to estimate mass and capacity	<b>Measurement Unit 2: Mass, Capacity</b> 8: Investigating Mass 9: Investigating Capacity 10: Exploring Metric Prefixes 11: Consolidation of Mass and Capacity	<b>Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.</b> <b>Understanding relationships among measured units</b> <ul style="list-style-type: none"> <li>- Understands and applies the multiplicative relationships among metric units of length, mass, and capacity.</li> </ul>
E2.2 use metric prefixes to describe the relative size of different metric units, and choose appropriate units and tools to measure length, mass, and capacity	<b>Measurement Unit 1: Length, Perimeter, and Area</b> 1: Estimating and Measuring in Millimetres 2: Measuring Length in Different Units 7: Consolidation of Length, Perimeter, and Area  <b>Measurement Unit 2: Mass, Capacity</b> 8: Investigating Mass 9: Investigating Capacity	<b>Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.</b> <b>Selecting and using units to estimate, measure, construct, and make comparisons</b> <ul style="list-style-type: none"> <li>- Chooses the most appropriate unit to measure a given attribute of an object (e.g., classroom area measured in square metres).</li> </ul> <b>Understanding relationships among measured units</b> <ul style="list-style-type: none"> <li>- Understands and applies the multiplicative relationships among metric units of length, mass, and capacity.</li> </ul>

	10: Exploring Metric Prefixes 11: Consolidation of Mass and Capacity	
<b>Time</b>		
E2.3 solve problems involving elapsed time by applying the relationships between different units of time	<b>Measurement Unit 3: Time</b> 14: Telling Time on a 24-Hour Clock 15: Relationships Between Units of Time 16: Exploring Elapsed Time 18. Consolidation of Time	<b>Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.</b> <b>Selecting and using units to estimate, measure, construct, and make comparisons</b> - Reads and records time (i.e., digital and analogue) and calendar dates. <b>Understanding relationships among measured units</b> - Understands relationships among different measures of time (e.g., seconds, minutes, hours, days, decades).
<b>Angles</b>		
E2.4 identify angles and classify them as right, straight, acute, or obtuse	<b>Geometry Unit 1B: 2-D Shapes and Angles</b> 1: Exploring Benchmark Angles 4. Consolidation of 2-D Shapes and Angles	<b>Big Idea: 2-D shapes and 3-D solids can be analyzed and classified in different ways by their attributes.</b> <b>Investigating geometric attributes and properties of 2-D shapes and 3-D solids</b> - Understands angle as a geometric figure formed from two rays or line segments sharing a common endpoint. - Draws, compares, and classifies angles (i.e., right, acute, obtuse, straight, reflex).
<b>Area</b>		
E2.5 use the row and column structure of an array to measure the areas of rectangles and to show that the area of any rectangle can be found by multiplying its side lengths	<b>Measurement Unit 1: Length, Perimeter, and Area</b> 4: Estimating and Measuring Area in Square Metres 5: Estimating and Measuring Area in Square Centimetres 6: Exploring the Area of Rectangles 7. Consolidation of Length, Perimeter, and Area	<b>Big Idea: Many things in our world (e.g., objects, spaces, events) have attributes that can be measured and compared.</b> <b>Understanding attributes that can be measured, compared, and ordered</b> - Understands area as an attribute of 2-D shapes that can be measured and compared. <b>Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.</b>

		<p><b>Selecting and using units to estimate, measure, construct, and make comparisons</b></p> <ul style="list-style-type: none"> <li>- Develops understanding of square units (e.g., square unit, square cm, square m) to measure area of 2-D shapes.</li> </ul> <p><b>Understanding relationships among measured units</b></p> <ul style="list-style-type: none"> <li>- Develops and generalizes strategies to compute area and perimeter of rectangles.</li> </ul>
E2.6 apply the formula for the area of a rectangle to find the unknown measurement when given two of the three	<p><b>Measurement Unit 1: Length, Perimeter, and Area</b></p> <p>6: Exploring the Area of Rectangles</p> <p>7. Consolidation of Length, Perimeter, and Area</p>	<p><b>Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.</b></p> <p><b>Using variables, algebraic expressions, and equations to represent mathematical relations</b></p> <ul style="list-style-type: none"> <li>- Uses expressions and equations with variables to represent generalized relations and algorithms (e.g., <math>P = 2l + 2w</math>).</li> </ul> <p><b>Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.</b></p> <p><b>Understanding relationships among measured units</b></p> <ul style="list-style-type: none"> <li>- Develops and generalizes strategies to compute area and perimeter of rectangles.</li> </ul>
<b>Financial Literacy</b>		
<b>F1. Money and Finances</b>		
demonstrate the knowledge and skills needed to make informed financial decisions		
<b>Money Concepts</b>		
F1.1 identify various methods of payment that can be used to purchase goods and services	<p><b>Number Unit 8: Financial Literacy</b></p> <p>43: Making Financial Decisions</p>	
F1.2 estimate and calculate the cost of transactions involving multiple items priced in whole-dollar amounts, not including sales tax, and the amount of	<p><b>Number Unit 8: Financial Literacy</b></p> <p>41: Purchasing and Making Change (Whole-Dollar Amounts)</p>	<p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b></p> <p><b>Developing fluency of operations</b></p> <ul style="list-style-type: none"> <li>- Estimates the result of whole number</li> </ul>

change needed when payment is made in cash, using mental math	45: Consolidation of Financial Literacy	operations using contextually relevant strategies (e.g., How many buses are needed to take the Grade 8 classes to the museum?). - Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase). - Estimates sums and differences of decimal numbers (e.g., calculating cost of transactions involving dollars and cents). - Solves decimal number computation using efficient strategies.
<b>Financial Management</b>		
F1.3 explain the concepts of spending, saving, earning, investing, and donating, and identify key factors to consider when making basic decisions related to each	<b>Number Unit 8: Financial Literacy</b> 43: Making Financial Decisions 44: Making Good Purchases 45: Consolidation of Financial Literacy	
F1.4 explain the relationship between spending and saving, and describe how spending and saving behaviours may differ from one person to another	<b>Number Unit 8: Financial Literacy</b> 43: Making Financial Decisions 45: Consolidation of Financial Literacy	
<b>Consumer and Civic Awareness</b>		
F1.5 describe some ways of determining whether something is reasonably priced and therefore a good purchase	<b>Number Unit 8: Financial Literacy</b> 44: Making Good Purchases 45: Consolidation of Financial Literacy	