

# Ontario Mathematics

EP Curriculum Map

## Grade 4 Mathematics

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### B. Number

#### B1. Number Sense

##### Whole Numbers

Specific Expectations	Lesson Title
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	<a href="#">Exploring Whole Numbers</a>
B1.2 compare and order whole numbers up to and including 10 000, in various contexts	
B1.3 round whole numbers to the nearest ten, hundred, or thousand, in various contexts	<a href="#">Rounding Whole Numbers</a>

##### Fractions and Decimals

Specific Expectations	Lesson Title
B1.4 represent fractions from halves to tenths using drawings, tools, and standard fractional notation, and explain the meanings of the denominator and the numerator	<a href="#">Explaining Fractions</a>
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	
B1.6 count to 10 by halves, thirds, fourths, fifths, sixths, eighths, and tenths, with and without the use of tools	
B1.7 read, represent, compare, and order decimal tenths, in various contexts	<a href="#">Exploring Decimal Tenths</a>

B1.9 describe relationships and show equivalences among fractions and decimal tenths, in various contexts	
B1.8 round decimal numbers to the nearest whole number, in various contexts	<a href="#">Rounding Decimal Numbers</a>

## B2. Operations

### Properties and Relationships

Specific Expectations	Lesson Title
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	<a href="#">Applying Addition and Subtraction</a> <a href="#">Applying Multiplication and Division</a>

### Math Facts

Specific Expectations	Lesson Title
B2.2 recall and demonstrate multiplication facts for $1 \times 1$ to $10 \times 10$ , and related division facts	<a href="#">Mastering Multiplication and Division Facts</a>

### Mental Math

Specific Expectations	Lesson Title
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	<a href="#">Mental Math Strategies</a>

### Addition and Subtraction

Specific Expectations	Lesson Title
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	<a href="#">Solving Problems with Whole Numbers and Decimal Tenths</a>

### Multiplication and Division

Specific Expectations	Lesson Title
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	<a href="#">Multiplication with Whole Numbers</a>
B2.6 represent and solve problems involving the division of two-	<a href="#">Division with Whole Numbers</a>

or three-digit whole numbers by one-digit whole numbers, expressing any remainder as a fraction when appropriate, using appropriate tools, including arrays	
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	<a href="#">Multiplying Unit Fractions</a>
B2.8 show simple multiplicative relationships involving whole-number rates, using various tools and drawings	<a href="#">Exploring Whole Number Rates</a>

## C. Algebra

### C1. Patterns and Relationships

#### Patterns

Specific Expectations	Lesson Title
C1.1 identify and describe repeating and growing patterns, including patterns found in real-life contexts	<a href="#">Exploring Patterns in Real-Life</a>
C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating and growing patterns	
C1.2 create and translate repeating and growing patterns using various representations, including tables of values and graphs	<a href="#">Patterns with Whole Numbers and Decimal Tenths</a>
C1.4 create and describe patterns to illustrate relationships among whole numbers and decimal tenths	

### C2. Equations and Inequalities

#### Variables

Specific Expectations	Lesson Title
C2.1 identify and use symbols as variables in expressions and equations	<a href="#">Using Symbols as Variables</a>

#### Equalities and Inequalities

Specific Expectations	Lesson Title
C2.2 solve equations that involve whole numbers up to 50 in various contexts, and verify solutions	<a href="#">Solving Equations with Whole Numbers</a>

C2.3 solve inequalities that involve addition and subtraction of whole numbers up to 20, and verify and graph the solutions

## C3. Coding

### Coding Skills

Specific Expectations	Lesson Title
<p>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</p> <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><a href="#">Computational Representations</a></p> <p><a href="#">Nested Loops Using Scratch</a></p>

## C4. Mathematical Modelling

Specific Expectations	Lessons
<p>This overall expectation has no specific expectations. Mathematical modelling is an iterative 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.</p>	<p><i>EP supports this overall expectation by integrating modelling activities throughout our resources. These activities encourage students to investigate, explore and model situations using relevant mathematical skills and concepts.</i></p>

## D. Data

### D1. Data Literacy

#### Data Collection and Organization

Specific Expectations	Lesson Title
<p>D1.1 describe the difference between qualitative and quantitative data, and describe situations where each would be used</p> <p>D1.2 collect data from different 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</p>	<p><a href="#">Collecting and Organizing Data</a></p>

## Data Visualization

Specific Expectations	Lesson Title
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 graphs	<a href="#">Selecting the Best Graph Representation</a>
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	<a href="#">Creating Informative Infographics</a>

## Data Analysis

Specific Expectations	Lesson Title
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	<a href="#">Analyzing Data Sets</a>
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	

## D2. Probability

### Probability

Specific Expectations	Lesson Title
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	<a href="#">Likelihood and Predictions</a>
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	

## E. Spatial Sense

### E1. Geometric and Spatial Reasoning

#### Geometric Reasoning

Specific Expectations	Lesson Title
E1.1 identify geometric properties of rectangles, including the number of right angles, parallel and perpendicular sides, and lines of symmetry	<a href="#">Properties of Rectangles</a>

#### Location and Movement

Specific Expectations	Lesson Title
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	<a href="#">Cartesian Plane and Coordinates</a>
E1.3 describe and perform translations and reflections on a grid, and predict the results of these transformations	<a href="#">Transformations on a Grid</a>

### E2. Measurement

#### The Metric System

Specific Expectations	Lesson Title
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	<a href="#">Metric Units and Conversion</a>
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	

#### Time

Specific Expectations	Lesson Title
E2.3 solve problems involving elapsed time by applying the relationships between different units of time	<a href="#">Solving Problems with Elapsed Time</a>

## Angles

Specific Expectations	Lesson Title
E2.4 identify angles and classify them as right, straight, acute, or obtuse	<a href="#">Identifying and Classifying Angles</a>

## Area

Specific Expectations	Lesson Title
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	<a href="#">Measuring Area of Rectangles</a>
E2.6 apply the formula for the area of a rectangle to find the unknown measurement when given two of the three	

# F. Financial Literacy

## F1. Money and Finances

### Money Concepts

Specific Expectations	Lesson Title
F1.1 identify various methods of payment that can be used to purchase goods and services	<a href="#">Methods of Payment</a>
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 change needed when payment is made in cash, using mental math	<a href="#">Calculating Transaction Costs and Change</a>

### Financial Management

Specific Expectations	Lesson Title
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	<a href="#">Explaining Financial Decisions</a>
F1.4 explain the relationship between spending and saving, and describe how spending and saving behaviours may differ from one person to another	<a href="#">The Relationships between Spending and Saving</a>

### Consumer and Civic Awareness

Specific Expectations	Lesson Title
F1.5 describe some ways of determining whether something is	<a href="#">Determining Reasonable Prices</a>

reasonably priced and therefore a good purchase	
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# Grade 5 Mathematics

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## B. Number

### B1. Number Sense

#### Whole Numbers

Specific Expectations	Lesson Title
B1.1 read, represent, compose, and decompose whole numbers up to and including 100 000, using appropriate tools and strategies, and describe various ways they are used in everyday life	<a href="#">Whole Numbers to 100 000</a>
B1.2 compare and order whole numbers up to and including 100 000, in various contexts	

#### Fractions, Decimals, and Percents

Specific Expectations	Lesson Title
B1.3 represent equivalent fractions from halves to twelfths, including improper fractions and mixed numbers, using appropriate tools, in various contexts	<a href="#">Representing and Comparing Fractions</a>
B1.4 compare and order fractions from halves to twelfths, including improper fractions and mixed numbers, in various contexts	
B1.5 read, represent, compare, and order decimal numbers up to hundredths, in various contexts	<a href="#">Relationships Between Fractions, Decimals, and Percents</a>
B1.7 describe relationships and show equivalences among fractions, decimal numbers up to hundredths, and whole number percents, using appropriate tools and drawings, in various contexts	
B1.6 round decimal numbers to the nearest tenth, in various contexts	<a href="#">Rounding Decimal Numbers to the Nearest Tenth</a>



## B2. Operations

### Properties and Relationships

Specific Expectations	Lesson Title
B2.1 use the properties of operations, and the relationships between operations, to solve problems involving whole numbers and decimal numbers, including those requiring more than one operation, and check calculations	<a href="#">Problem-Solving with Whole Numbers and Decimal Numbers</a>

### Math Facts

Specific Expectations	Lesson Title
B2.2 recall and demonstrate multiplication facts from $0 \times 0$ to $12 \times 12$ , and related division facts	<a href="#">Combined Times Tables (1-12)</a>
	<a href="#">Combined Division Table (1-12)</a>

### Mental Math

Specific Expectations	Lesson Title
B2.3 use mental math strategies to multiply whole numbers by 0.1 and 0.01 and estimate sums and differences of decimal numbers up to hundredths, and explain the strategies used	<a href="#">Mental Math Strategies for Decimals</a>

### Addition and Subtraction

Specific Expectations	Lesson Title
B2.4 represent and solve problems involving the addition and subtraction of whole numbers that add up to no more than 100 000, and of decimal numbers up to hundredths, using appropriate tools, strategies, and algorithms	<a href="#">Solving Addition and Subtraction Problems with Whole Numbers and Decimal Numbers</a>
B2.5 add and subtract fractions with like denominators, in various contexts	<a href="#">Adding and Subtracting Fractions with Like Denominators</a>

### Multiplication and Division

Specific Expectations	Lesson Title
B2.6 represent and solve problems involving the multiplication of two-digit whole numbers by two-digit whole numbers using the area model and using algorithms, and make connections between the two methods	<a href="#">Representing and Solving Multiplication Problems with Two-Digit Whole Numbers</a>
B2.7 represent and solve problems involving the division of three-digit whole numbers by two-digit whole numbers using the area model and using algorithms, and make connections between the two methods, while expressing any remainder appropriately	<a href="#">Representing and Solving Division Problems with Three-Digit Whole Numbers</a>

B2.8 multiply and divide one-digit whole numbers by unit fractions, using appropriate tools and drawings	<a href="#">Multiplying and Dividing One-Digit Whole Numbers by Unit Fractions</a>
B2.9 represent and create equivalent ratios and rates, using a variety of tools and models, in various contexts	<a href="#">Representing and Creating Equivalent Ratios and Rates</a>

## C. Algebra

### C1. Patterns and Relationships

#### Patterns

Specific Expectations	Lesson Title
C1.1 identify and describe repeating, growing, and shrinking patterns, including patterns found in real-life contexts	<a href="#">Creating and Translating Patterns</a>
C1.2 create and translate growing and shrinking patterns using various representations, including tables of values and graphs	
C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, growing, and shrinking patterns	<a href="#">Patterns and Relationships Among Numbers</a>
C1.4 create and describe patterns to illustrate relationships among whole numbers and decimal tenths and hundredths	

### C2. Equations and Inequalities

#### Variables and Expressions

Specific Expectations	Lesson Title
C2.1 translate among words, algebraic expressions, and visual representations that describe equivalent relationships	<a href="#">Translating Among Words, Algebraic Expressions, and Visual Representations</a>
C2.2 evaluate algebraic expressions that involve whole numbers	

#### Equalities and Inequalities

Specific Expectations	Lesson Title
C2.3 solve equations that involve whole numbers up to 100 in various contexts, and verify solutions	<a href="#">Evaluating Algebraic Expressions and Solving Equations</a>
C2.4 solve inequalities that involve one operation and whole numbers up to 50, and verify and graph the solutions	<a href="#">Solving Inequalities with Whole Numbers</a>

## C3. Coding

### Coding Skills

Specific Expectations	Lesson Title
C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves conditional statements and other control structures	<a href="#">Conditional Statements</a>
C3.2 read and alter existing code, including code that involves conditional statements and other control structures, and describe how changes to the code affect the outcomes	<a href="#">Coding and Computational Representations</a>

## C4. Mathematical Modelling

Specific Expectations	Lessons
This overall expectation has no specific expectations. Mathematical modelling is an iterative 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>EP supports this overall expectation by integrating modelling activities throughout our resources. These activities encourage students to investigate, explore and model situations using relevant mathematical skills and concepts.</i>

## D. Data

### D1. Data Literacy

#### Data Collection and Organization

Specific Expectations	Lesson Title
D1.1 explain the importance of various sampling techniques for collecting a sample of data that is representative of a population	<a href="#">Sampling Techniques and Representative Data</a>
D1.2 collect data, using appropriate sampling techniques as needed, to answer questions of interest about a population, and organize the data in relative-frequency tables	<a href="#">Data Collection and Relative-Frequency Tables</a>

#### Data Visualization

Specific Expectations	Lesson Title
D1.3 select from among a variety of graphs, including stacked-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	<a href="#">Choosing the Right Graph and Creating Stacked-Bar Graphs</a>

their choice of graphs	
D1.4 create an infographic about a data set, representing the data in appropriate ways, including in relative-frequency tables and stacked-bar graphs, and incorporating any other relevant information that helps to tell a story about the data	<a href="#">Creating Infographics</a>

## Data Analysis

Specific Expectations	Lesson Title
D1.5 determine the mean and the median and identify the mode(s), if any, for various data sets involving whole numbers and decimal numbers, and explain what each of these measures indicates about the data	<a href="#">Measures of Central Tendency</a>
D1.6 analyse different sets of data presented in various ways, including in stacked-bar graphs and in misleading graphs, by asking and answering questions about the data, challenging preconceived notions, and drawing conclusions, then make convincing arguments and informed decisions	<a href="#">Analyzing Graphs</a>

## D2. Probability

### Probability

Specific Expectations	Lesson Title
D2.1 use fractions to express the probability of events happening, represent this probability on a probability line, and use it to make predictions and informed decisions	<a href="#">Likelihood and Probability</a>
D2.2 determine and compare the theoretical and experimental probabilities of an event happening	<a href="#">Theoretical and Experimental Probabilities</a>

## E. Spatial Sense

### E1. Geometric and Spatial Reasoning

#### Geometric Reasoning

Specific Expectations	Lesson Title
E1.1 identify geometric properties of triangles, and construct different types of triangles when given side or angle measurements	<a href="#">Congruent Triangles, Rectangles, and Parallelograms</a>
E1.2 identify and construct congruent triangles, rectangles, and parallelograms	<a href="#">Properties and Construction of Triangles</a>
E1.3 draw top, front, and side views of objects, and match	<a href="#">Drawing Views of Objects</a>

drawings with objects

## Location and Movement

Specific Expectations	Lesson Title
E1.4 plot and read coordinates in the first quadrant of a Cartesian plane using various scales, and describe the translations that move a point from one coordinate to another	<a href="#">Coordinates and Translations on a Cartesian Plane</a>
E1.5 describe and perform translations, reflections, and rotations up to $180^\circ$ on a grid, and predict the results of these transformations	<a href="#">Transformations on a Grid</a>

## E2. Measurement

### The Metric System

Specific Expectations	Lesson Title
E2.1 use appropriate metric units to estimate and measure length, area, mass, and capacity	<a href="#">Converting Metric Units</a>
E2.2 solve problems that involve converting larger metric units into smaller ones, and describe the base ten relationships among metric units	

### Angles

Specific Expectations	Lesson Title
E2.3 compare angles and determine their relative size by matching them and by measuring them using appropriate non-standard units	<a href="#">Comparing and Measuring Angles</a>
E2.4 explain how protractors work, use them to measure and construct angles up to $180^\circ$ , and use benchmark angles to estimate the size of other angles	

### Area

Specific Expectations	Lesson Title
E2.5 use the area relationships among rectangles, parallelograms, and triangles to develop the formulas for the area of a parallelogram and the area of a triangle, and solve related problems	<a href="#">Area Formulas and Problem Solving</a>
E2.6 show that two-dimensional shapes with the same area can have different perimeters, and solve related problems	<a href="#">Relationships between Area and Perimeter</a>

## F. Financial Literacy

### F1. Money and Finances

#### Money Concepts, Financial Management and Consumer and Civic Awareness

Specific Expectations	Lesson Title
F1.1 describe several ways money can be transferred among individuals, organizations, and businesses	<a href="#">Methods of Money Transfer</a>
F1.2 estimate and calculate the cost of transactions involving multiple items priced in dollars and cents, including sales tax, using various strategies	<a href="#">Calculating Transaction Costs with Sales Tax</a>
F1.3 design sample basic budgets to manage finances for various earning and spending scenarios	<a href="#">Designing Sample Budgets</a>
F1.4 explain the concepts of credit and debt, and describe how financial decisions may be impacted by each	<a href="#">Explaining Credit and Debt</a>
F1.5 calculate unit rates for various goods and services, and identify which rates offer the best value	<a href="#">Calculating Unit Rates and Identifying Value</a>
F1.6 describe the types of taxes that are collected by the different levels of government in Canada, and explain how tax revenue is used to provide services in the community	<a href="#">Explaining Taxes and Their Impact</a>