

# Cycle 1: Understanding

## Cluster 1: Understanding Our World: Algebraic & Spatial Skills

## Cluster 2: Everyday Math: Financial Literacy & Understanding Data

### C. Algebra

#### C1. Patterns and Relationships

C1.1 identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and compare linear growth patterns on the basis of their constant rates and initial values.

C1.4 create and describe patterns to illustrate relationships among integers.

#### C2: Equations and Inequalities

C2.1 add and subtract monomials with a degree of 1 that involve whole numbers, using tools.

### E. Spatial Sense

#### E1. Geometric and Spatial Reasoning

E1.1 describe and classify cylinders, pyramids, and prisms according to their geometric properties, including planes and rotational symmetry.

E1.2 draw top, front, and side views, as well as perspective views, of objects and physical spaces, using appropriate scales.

#### E2. Measurement

E2.1 describe the differences and similarities between volume and capacity, and apply the relationship between millilitres (mL) and cubic centimetres (cm<sup>3</sup>) to solve problems.

### B. Number

#### B1. Number Sense

B1.1 represent and compare whole numbers up to and including one billion, including in expanded form using powers of ten, and describe various ways they are used in everyday life.

B1.5 generate fractions and decimal numbers between any two quantities.

B1.6 round decimal numbers to the nearest tenth, hundredth, or whole number, as applicable, in various contexts.

#### B2. Operations

B2.9 multiply and divide decimal numbers by decimal numbers, in various contexts.

B2.8 multiply and divide fractions by fractions, using tools in various contexts.

B2.6 determine the greatest common factor for a variety of whole numbers up to 144 and the lowest common multiple for two and three whole numbers.

B2.5 add and subtract fractions, including by creating equivalent fractions, in various contexts.

B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving whole numbers, decimal numbers, fractions, ratios, rates, and percents, including those requiring multiple steps or multiple operations.

B2.2 understand and recall commonly used percents, fractions, and decimal equivalents.

B2.4 use objects, diagrams, and equations to represent, describe, and solve situations involving addition and subtraction of integers.

### D. Data

#### D1. Data Literacy

D1.1 explain why percentages are used to represent the distribution of a variable for a population or sample in large sets of data, and provide examples.

D1.2 collect qualitative data and discrete and continuous quantitative data to answer questions of interest, and organize the sets of data as appropriate, including using percentages.

### F. Financial Literacy

#### F1. Money and Finances

F1.1 identify and compare exchange rates, and convert foreign currencies to Canadian dollars and vice versa.

F1.2 identify and describe various reliable sources of information that can help with planning for and reaching a financial goal.

# Cycle 2: Representing

## Cluster 1: Understanding Our World: Algebraic & Spatial Skills

## Cluster 2: Everyday Math: Financial Literacy & Understanding Data

### C. Algebra

#### C1: Patterns and Relationships

C1.1 Identify and compare a variety of repeating, growing, and decaying patterns, including patterns found in real-life contexts, and compare linear growing patterns on the basis of their constant rates and initial values.

C1.2 Create and translate repeating, growing, and decaying patterns involving whole numbers and decimal numbers using various representations, including algebraic expressions and equations for linear growing patterns.

C1.3 Add and subtract monomials with a degree of 1 that involve whole numbers, using tools.

C1.4 Create and describe patterns to illustrate relationships among integers.

#### C2: Equations and Inequalities

C2.1 Evaluate algebraic expressions that involve whole numbers and decimal numbers.

C2.2 Solve problems and create contextual representations of mathematical situations by writing and solving efficient code, including code that involves events influenced by a defined count and/or subprogram and other control structures.

#### C3: Coding

### E. Spatial Sense

#### E1: Geometric and Spatial Reasoning

E1.1 Describe and classify cylinders, pyramids, and prisms according to their geometric properties, including prism and rotational symmetry.

E1.2 Draw top, front, and side views, as well as perspective views, of objects and physical spaces using appropriate scales.

E1.3 Perform dilations and describe the similarity between the image and the original shape.

E1.4 Describe and perform translations, reflections, and rotations on a Cartesian plane, and predict the results of these transformations.

#### E2: Measurement

E2.1 Solve problems involving perimeter, area, and volume that require converting from one metric unit of measurement to another.

E2.2 Show the relationships between the radius, diameter, and area of a circle, and use these relationships to explain the formula for measuring the area of a circle and to solve related problems.

E2.3 Represent cylinders as nets and determine their surface area by adding the areas of their parts.

### B. Number

#### B1: Number Sense

B1.1 Represent and compare whole numbers up to and including one billion, including in expanded form using powers of ten, and describe various ways they are used in everyday life.

B1.2 Identify and represent perfect squares and determine their square roots, in various contexts.

B1.3 Read, represent, compare, and order rational numbers, including positive and negative fractions and decimal numbers to thousandths, in various contexts.

B1.4 Use equivalent fractions to simplify, when appropriate, in various contexts.

B1.5 Round decimal numbers to the nearest tenth, hundredth, or whole number, as applicable, in various contexts.

B1.6 Convert between fractions, decimal numbers, and percents, in various contexts.

#### B2: Operations

B2.1 Identify proportional and non-proportional situations and apply proportional reasoning to solve problems.

B2.2 Evaluate and express repeated multiplication of whole numbers using exponential notation, in various contexts.

B2.3 Use the properties and order of operations, and the relationships between operations, to solve problems involving whole numbers, decimal numbers, fractions, ratios, rates, and percents, including those requiring multiple steps or multiple operations.

B2.4 Understand and recall commonly used percents, fractions, and decimal equivalents.

B2.5 Use mental math strategies to increase and decrease a whole number by 1%, 2%, 10%, 20%, 50%, and 100%, and explain the strategies used.

#### B2.10 Identify proportional and non-proportional situations and apply proportional reasoning to solve problems.

B2.11 Evaluate and express repeated multiplication of whole numbers using exponential notation, in various contexts.

B2.12 Use the properties and order of operations, and the relationships between operations, to solve problems involving whole numbers, decimal numbers, fractions, ratios, rates, and percents, including those requiring multiple steps or multiple operations.

B2.13 Understand and recall commonly used percents, fractions, and decimal equivalents.

B2.14 Use mental math strategies to increase and decrease a whole number by 1%, 2%, 10%, 20%, 50%, and 100%, and explain the strategies used.

### D. Data

#### D1: Data Literacy

D1.1 Describe the differences and similarities between volume and capacity, and apply the relationship between volume (mL) and cubic centimetres (cm<sup>3</sup>) to solve problems.

D1.2 Collect qualitative data and discrete and continuous quantitative data to answer questions of interest, and organize the sets of data as appropriate, including using percentages.

D1.3 Select from among a variety of graphs, including circle 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 units, and justify their choice of graphs.

D1.4 Create an infographic about a data set, representing the data in appropriate ways, including tables and circle graphs, and incorporating any other relevant information that helps to tell a story about the data.

D1.5 Determine the impact of adding or removing data from a data set on a measure of central tendency, and describe how these changes alter the shape and distribution of the data.

#### D2: Probability

D2.1 Describe the difference between independent and dependent events, and explain how their probabilities differ, providing examples.

### F. Financial Literacy

#### F1: Money and Finances

F1.1 Identify and compare exchange rates, and convert foreign currencies to Canadian dollars and vice versa.

F1.2 Identify and describe various reliable sources of information that can help with planning for and reaching a financial goal.

F1.3 Create, track, and adjust sample budgets designed to meet longer-term financial goals for various scenarios.

F1.4 Compare interest rates and fees for different accounts and loans offered by various financial institutions, and determine the best option for different scenarios.

# Cycle 3: Analyzing

## Cluster 1: Understanding Our World: Algebraic & Spatial Skills

## Cluster 2: Everyday Math: Financial Literacy & Understanding Data

### C. Algebra

#### C1. Patterns and Relationships

- C1.1 Identify and compare a variety of repeating, growing, and decaying patterns, including patterns found in real-life contexts, and compare linear growth patterns on the basis of their constant rates and initial values
- C1.2 Create and translate repeating, growing, and decaying patterns involving whole numbers and decimal numbers using various representations, including algebraic expressions and equations for linear growth patterns
- C1.3 Determine pattern rules and use them to select patterns, make and justify predictions, and identify missing elements in repeating, growing, and decaying patterns involving whole numbers and decimal numbers, and use algebraic representations of the patterns to solve for unknown values in linear growth patterns

#### C2. Equations and Inequalities

- C2.1 Add and subtract monomials with a degree of 1 that involve whole numbers, using tools
- C2.2 Evaluate algebraic expressions that involve whole numbers and decimal numbers
- C2.3 Solve equations that involve multiple terms, whole numbers, and decimal numbers in various contexts, and verify solutions

#### C3. Coding

- C3.1 Read and alter existing code, including code that involves events influenced by a defined count and/or integration and other control structures, and describe how changes to the code affect the outcome and the efficiency of the code

### E. Spatial Sense

#### E1. Geometric and Spatial Reasoning

- E1.1 Describe and classify cylinders, pyramids, and prisms according to their geometric properties, including plane and rotational symmetry
- E1.2 Perform dilations and describe the similarity between the image and the original shape
- E1.3 Describe and perform translations, reflections, and rotations on a Cartesian plane, and predict the results of these transformations

#### E2. Measurement

- E2.1 Describe the differences and similarities between volume and capacity, and apply the relationship between milliliters (mL) and cubic centimeters (cm<sup>3</sup>) to solve problems
- E2.2 Show that the volume of a prism or cylinder can be determined by multiplying the area of its base by its height, and apply this relationship to find the area of the base, volume, and height of prisms and cylinders when given two of the three measurements
- E2.3 Represent cylinders as nets and determine their surface area by adding the areas of their parts
- E2.4 Show the relationships between the radius, diameter, and area of a circle, and use these relationships to explain the formula for measuring the area of a circle and to solve related problems
- E2.5 Use the relationships between the radius, diameter, and circumference of a circle to explain the formula for finding the circumference and to solve related problems

### B. Number

#### B1. Number Sense

- B1.1 Represent and compare whole numbers up to and including one billion, including in expanded form using powers of ten, and describe various ways they are used in everyday life
- B1.2 Identify and represent perfect squares, and determine their square roots, in various contexts
- B1.3 Read, represent, compare, and order rational numbers, including positive and negative fractions and decimal numbers to thousandths, in various contexts
- B1.4 Use equivalent fractions to simplify fractions, when appropriate, in various contexts
- B1.5 Generate fractions and decimal numbers between any two quantities
- B1.6 Round decimal numbers to the nearest tenth, hundredth, or whole number, as applicable, in various contexts
- B1.7 Convert between fractions, decimal numbers, and percents, in various contexts

#### B2. Operations

- B2.1 Use the properties and order of operations, and the relationships between operations, to solve problems involving whole numbers, decimal numbers, fractions, ratios, rates, and percents, including those requiring multiple steps or multiple operations
- B2.2 Understand and recall commonly used percents, fractions, and decimal equivalents
- B2.3 Use mental math strategies to increase and decrease a whole number by 1%, 5%, 10%, 25%, 50%, and 100%, and explain the strategies used
- B2.4 Use objects, diagrams, and equations to represent, describe, and solve situations involving addition and subtraction of integers
- B2.5 Add and subtract fractions, including by creating equivalent fractions, in various contexts
- B2.6 Determine the greatest common factor for a variety of whole numbers up to 144 and the lowest common multiple for two and three whole numbers
- B2.7 Evaluate and express repeated multiplication of whole numbers using exponential notation, in various contexts
- B2.8 Multiply and divide fractions by fractions, using tools in various contexts
- B2.9 Multiply and divide decimal numbers by decimal numbers, in various contexts
- B2.10 Identify proportional and non-proportional situations and apply proportional reasoning to solve problems

### D. Data

#### D1. Data Literacy

- D1.5 Determine the impact of adding or removing data from a data set on a measure of central tendency, and describe how these changes affect the shape and distribution of the data
- D1.6 Analyze different sets of data presented in various ways, including in circle graphs and in two-way tables, by asking and answering questions about the data, identifying trends, and drawing conclusions, then make convincing arguments and informed decisions

#### D2. Probability

- D2.1 Describe the difference between independent and dependent events, and explain how their probabilities differ, providing examples
- D2.2 Determine and compare the theoretical and experimental probabilities of two independent events happening and of two dependent events happening

### F. Financial Literacy

#### F1. Money and Finances

- F1.1 Identify and describe various reliable sources of information that can help with planning for and reaching a financial goal
- F1.2 Explain how interest rates can impact savings, investments, and the cost of borrowing to pay for goods and services over time
- F1.3 Compare interest rates and fees for different accounts and loans offered by various financial institutions, and determine the best option for different scenarios
- F1.4 Identify various social and personal factors that may influence financial decision making, and describe the effects that each might have

# Cycle 4: Solving

## Cluster 1: Understanding Our World: Algebraic & Spatial Skills

## Cluster 2: Everyday Math: Financial Literacy & Understanding Data

### C. Algebra

#### C1. Patterns and Relationships

#### C2. Equations and Inequalities

#### C3. Coding

### E. Spatial Sense

#### E1. Geometric and Spatial Reasoning

#### E2. Measurement

### B. Number

#### B1. Number Sense

#### B2. Operations

### D. Data

#### D1. Data Literacy

#### D2. Probability

### F. Financial Literacy

#### F1. Money and Finances

C1.2 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in sequencing, growing, and shrinking patterns involving whole numbers and decimal numbers, and use patterns to solve for unknown values in linear growing patterns

C1.4 create and describe patterns to illustrate relationships among integers

C2.3 solve equations that involve multiple terms, whole numbers, and decimal numbers in various contexts, and verify solutions

C2.4 solve inequalities that involve multiple terms and whole numbers, and verify and graph the solutions

C3.1 solve problems and create computational representations of mathematical situations by writing and executing efficient code, including code that involves events influenced by a defined count and/or subprogram and other control structures

E1.3 perform dilations and describe the similarity between the image and the original shape

E1.4 describe and perform translations, reflections, and rotations on a Cartesian plane, and predict the results of these transformations

E2.2 solve problems involving perimeter, area, and volume that require converting from one metric unit of measurement to another

E2.3 use the relationships between the radius, diameter, and circumference of a circle to explain the formula for finding the circumference and to solve related problems

E2.5 show the relationships between the radius, diameter, and area of a circle, and use these relationships to explain the formula for measuring the area of a circle and to solve related problems

E2.7 show that the volume of a prism or cylinder can be determined by multiplying the area of its base by its height, and apply this relationship to find the area of the base, volume, and height of prisms and cylinders when given two of the three measurements

B1.1 represent and compare whole numbers up to and including one billion, including in expanded form using powers of ten, and describe various ways they are used in everyday life

B1.2 identify and represent perfect squares, and determine their square roots, in various contexts

B1.3 read, represent, compare, and order rational numbers, including positive and negative fractions and decimal numbers to thousandths, in various contexts

B1.4 use equivalent fractions to simplify fractions, when appropriate, in various contexts

B1.5 generate fractions and decimal numbers between any two quantities

B1.6 round decimal numbers to the nearest tenth, hundredth, or whole number, as applicable, in various contexts

B1.7 convert between fractions, decimal numbers, and percents, in various contexts

B2.10 identify proportional and non-proportional situations and apply proportional reasoning to solve problems

B2.9 multiply and divide decimal numbers by decimal numbers, in various contexts

B2.8 multiply and divide fractions by fractions, using tools in various contexts

B2.7 evaluate and express repeated multiplication of whole numbers using exponential notation, in various contexts

B2.6 determine the greatest common factor for a variety of whole numbers up to 144 and the lowest common multiple for two and three whole numbers

B2.5 add and subtract fractions, including by creating equivalent fractions, in various contexts

B2.4 use objects, diagrams, and equations to represent, describe, and solve situations involving addition and subtraction of integers

B2.3 use mental math strategies to increase and decrease a whole number by 1%, 5%, 10%, 25%, 50%, and 100%, and resolve the strategies used

B2.2 understand and recall commonly used percents, fractions, and decimal equivalents

D1.2 collect qualitative data and discrete and continuous quantitative data to answer questions of interest, and organize the sets of data as appropriate, including using percentages

D1.4 create an infographic about a data set, representing the data in appropriate ways, including in tables and circle graphs, and incorporating any other relevant information that helps to tell a story about the data

D2.2 determine and compare the theoretical and experimental probabilities of two independent events happening and of two dependent events happening

F1.3 create, track, and adjust sample budgets designed to meet longer-term financial goals for various scenarios

F1.5 explain how interest rates can impact savings, investments, and the cost of borrowing to pay for goods and services over time

F1.6 compare interest rates and fees for different accounts and loans offered by various financial institutions, and determine the best option for different scenarios