# Mathletics

## Ontario Program of Studies

### Skill Quests


**Grades 4 – 6**

May, 2022

Mathletics

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Skill Quests

May 2022

# Grade 4

## 1 Number

### 1.1 Number sense: demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life

| Outcome | Quests | Content |
|---|---|---|
| 1. Whole numbers: 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 | Numbers up to 10 000 | Reading & writing 4-digit numbers |
| | | Using place value to partition 4-digit numbers |
| | | Identifying place value: 4-digit numbers |
| 2. Whole numbers: compare and order whole numbers up to and including 10 000, in various contexts | Compare & order 4-digit numbers | Comparing & ordering 4-digit numbers |
| 3. Whole numbers: round whole numbers to the nearest ten, hundred, or thousand, in various contexts | Round 4-digit numbers | Rounding 4-digit numbers |
| 4. Fractions and decimals: represent fractions from halves to tenths using drawings, tools, and standard fractional notation, and explain the meanings of the denominator and the numerator | Represent fractions, halves to tenths | Introducing the terms numerator & denominator |
| | | Representing halves, fourths & eighths |
| | | Representing thirds & sixths |
| | | Representing fifths & tenths |
| 5. Fractions and decimals: 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 | Compare & order fractions with models | Comparing & ordering fractions with models |
| | | Comparing fractions, same numerator or denominator |
| 6. Fractions and decimals: count to 10 by halves, thirds, fourths, fifths, sixths, eighths, and tenths, with and without the use of tools | Counting in fractions | Counting up to 10 in halves & fourths |
| | | Counting in thirds on a number line up to 3 |
| | | Counting in tenths |
| | | Counting in fractions |
| 7. Fractions and decimals: read, represent, compare, and order decimal tenths, in various contexts | Decimal tenths | Introducing decimal tenths |
| | | Comparing & ordering decimal tenths |

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| 8. Fractions and decimals: round decimal numbers to the nearest whole number, in various contexts | Round decimal tenths | Round decimal tenths, nearest whole |
| 9. Fractions and decimals: describe relationships and show equivalences among fractions and decimal tenths, in various contexts | Equivalence, fractions & decimal tenths | Connecting decimal tenths to common fractions |

### 1.2 Operations: use knowledge of numbers and operations to solve mathematical problems encountered in everyday life

| Outcome | Quests | Content |
|---|---|---|
| 1. Properties and relationships: 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 | Inverse operations & properties | The distributive property |
| | | The commutative property |
| | | The associative property |
| | | Inverse relationships, addition & subtraction |
| | | Inverse relationships, multiplication & division |
| 2. Math facts: recall and demonstrate multiplication facts for 1 × 1 to 10 × 10, and related division facts | Multiplication/division facts, 1–10 | Recalling multiplication facts for 2, 5 & 10 |
| | | Recalling multiplication facts for 3, 6 & 9 |
| | | Recalling multiplication facts for 4 & 8 |
| | | Recalling multiplication facts for 7 |
| | | Recalling multiplication facts up to 10 × 10 |
| | | Recalling the division facts for 2, 5 & 10 |
| | | Recalling the division facts for 3, 6 & 9 |
| | | Recalling division facts for 4 & 8 |
| | | Recalling division facts for 7 |
| 3. Mental math: 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 | Mental math: add/subtract decimal tenths | Adding & subtracting tenths, mental strategies |
| | Multiply & divide by 10, 100, 1000 | Multiply/divide whole numbers by 10, 100 & 1000 |
| | | Dividing whole numbers by 10 |
| 4. Addition and subtraction: represent and solve problems involving the addition and subtraction of whole numbers that | Add & subtract decimal tenths | Adding decimal tenths |
| | | Subtracting decimal tenths |
| | Add & subtract whole numbers to 10 000 | Add numbers up to 5 digits, mental strategies |

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| add up to no more than 10 000 and of decimal tenths, using appropriate tools and strategies, including algorithms | | Add numbers up to 4 digits, algorithm |
| | | Subtract numbers up to 5 digits, mental strategies |
| | | Subtract numbers up to 4 digits, algorithm |
| 5. Multiplication and division: 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 | Multiply 2-digit & 3-digit numbers | Multiplying by 100 |
| | | Multiplication strategies |
| 6. Multiplication and division: 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 | Divide 2-digits & 3-digits by 1-digit | Division strategies |
| | | Dividing using place value |
| | | Dividing with remainders |
| 7. Multiplication and division: 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 | Multiply unit fractions by whole numbers | Multiply unit fractions by whole numbers, models |
| 8. Multiplication and division: show simple multiplicative relationships involving whole-number rates, using various tools and drawings | Solve problems involving rates | Solving problems involving rates |

# 2 Algebra

## 2.1 Patterns and relationships: identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. Patterns: identify and describe repeating and growing patterns, including patterns found in real-life contexts | ID/describe repeating & growing patterns | Identifying & describing growing patterns |
| | | Identifying & describing repeating patterns |
| 2. Patterns: create and translate repeating and growing patterns using various representations, including tables of values and graphs | Create repeating & growing patterns | Creating growing patterns |
| | | Creating repeating patterns |
| 3. Patterns: determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating and growing patterns | Pattern rules: repeating & growing | Investigating number patterns |
| | | Finding a rule for a given shape pattern |
| 4. Patterns: create and describe patterns to illustrate relationships among whole numbers and decimal tenths | Patterns: whole numbers & decimal tenths | Patterns: whole numbers & decimal tenths |

## 2.2 Equations and inequalities: demonstrate an understanding of variables, expressions, equalities, and inequalities, and apply this understanding in various contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. Variables: identify and use symbols as variables in expressions and equations | Teacher directed | Teacher directed |
| 2. Equalities and Inequalities: solve equations that involve whole numbers up to 50 in various contexts, and verify solutions | Solve equations | Solving 1-step equations |
| 3. Equalities and Inequalities: solve inequalities that involve addition and subtraction of whole numbers up to 20, and verify and graph the solutions | Solve inequalities | Solving inequalities |

## 2.3 Coding: solve problems and create computational representations of mathematical situations using coding concepts and skills

| Outcome | Quests | Content |
|---|---|---|
| 1. Coding skills: solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves sequential, concurrent, repeating, and nested events | Teacher directed | Teacher directed |
| 2. Coding skills: 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 | Teacher directed | Teacher directed |

# 3 Data

## 3.1 Data literacy: manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life

| Outcome | Quests | Content |
|---|---|---|
| 1. Data collection and organization: describe the difference between qualitative and quantitative data, and describe situations where each would be used | Qualitative & quantitative data | Identifying qualitative & quantitative data |
| 2. Data collection and organization: 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 | Collect & compare data | Collecting & recording category data in tables |
| | | Stem-and-leaf plots |
| 3. Data visualization: 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 | Graphs: multiple-bar graphs | Representing data in a multiple-bar graph |
| | | Representing data in a pictograph |
| 4. Data visualization: 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 | Teacher directed | Teacher directed |
| 5. Data Analysis: 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 | Mean, median & mode | Understanding & calculating the mean |
| | | Understanding & calculating the median |
| | | Understanding & calculating the mode |
| 6. Data analysis: analyse different sets of data presented in various ways, including in stem-and-leaf plots and multiple-bar graphs, by | Analyse data | Analysing data in stem-and-leaf plots |
| | | Analysing data in multiple-bar graphs |

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| asking and answering questions about the data and drawing conclusions, then make convincing arguments and informed decisions | | Analysing data in bar graphs, pictographs & tables |

### 3.2 Probability: describe the likelihood that events will happen, and use that information to make predictions

| Outcome | Quests | Content |
|---|---|---|
| 1. Probability: 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 | Probability language | Describe the chances of everyday events occurring |
| 2. Probability: 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 | Teacher directed | Teacher directed |

# 4 Spatial Sense

## 4.1 Geometric and spatial reasoning: describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them

| Outcome | Quests | Content |
|---|---|---|
| 1. Geometric reasoning: identify geometric properties of rectangles, including the number of right angles, parallel and perpendicular sides, and lines of symmetry | Teacher directed | Teacher directed |
| 2. Location and movement: 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 | The Cartesian plane | The Cartesian coordinate system, 1st quadrant |
| | | Investigating translations in the 1st quadrant |
| 3. Location and movement: describe and perform translations and reflections on a grid, and predict the results of these transformations | Translations & reflections | Translations & reflections |

## 4.2 Measurement: compare, estimate, and determine measurements in various contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. The metric system: 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 | Mass & capacity | Introducing units of mass: the gram & kilogram |
| | | Introducing capacity units: millilitres & litres |
| | | Estimating capacities using millilitres & litres |
| 2. The metric system: use metric prefixes to describe the relative size of different metric units, and choose appropriate units and tools to measure length, mass, and capacity | Length, mass, capacity: units & tools | Select & use metric units & tools, mass |
| | | Select & use metric units & tools, capacity |
| | | Select metric units, length |
| 3. Time: solve problems involving elapsed time by applying the relationships between different units of time | Solve problems involving elapsed time | Calculating elapsed time |

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| 4. Angles: identify angles and classify them as right, straight, acute, or obtuse | Identify & classify angles | Classifying angles |
| 5. Area: 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 | Area of rectangles, models | Finding the area of a rectangle, arrays |
| | | Finding the area of a rectangle, area model |
| 6. Area: apply the formula for the area of a rectangle to find the unknown measurement when given two of the three | Area of rectangles, formula | Finding the area of rectangles, formula |

# 5 Financial Literacy

## 5.1 Money and finances: demonstrate the knowledge and skills needed to make informed financial decisions

| Outcome | Quests | Content |
|---|---|---|
| 1. Money concepts: identify various methods of payment that can be used to purchase goods and services | Teacher directed | Teacher directed |
| 2. Money concepts: 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 | Calculate the purchase cost & change | Calculating the purchase cost & change |
| 3. Financial management: explain the concepts of spending, saving, earning, investing, and donating, and identify key factors to consider when making basic decisions related to each | Teacher directed | Teacher directed |
| 4. Financial management: explain the relationship between spending and saving, and describe how spending and saving behaviours may differ from one person to another | Teacher directed | Teacher directed |
| 5. Consumer and civic awareness: describe some ways of determining whether something is reasonably priced and therefore a good purchase | Teacher directed | Teacher directed |

# Grade 5

## 1 Number

### 1.1 Number sense: demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life

| Outcome | Quests | Content |
|---|---|---|
| 1. Whole numbers: 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 | Numbers up to 100 000 | Reading & writing 5-digit numbers |
| | | Identifying place value: 5-digit numbers |
| | | Using place value to partition 5-digit numbers |
| | | Rounding 5-digit numbers |
| 2. Whole numbers: compare and order whole numbers up to and including 100 000, in various contexts | Compare & order 5-digit numbers | Comparing & ordering 5-digit numbers |
| 3. Fractions, decimals, and percents: represent equivalent fractions from halves to twelfths, including improper fractions and mixed numbers, using appropriate tools, in various contexts | Equivalent fractions | Finding equivalent fractions using multiplication |
| | | Finding equivalent fractions using a number line |
| 4. Fractions, decimals, and percents: compare and order fractions from halves to twelfths, including improper fractions and mixed numbers, in various contexts | Compare & order fractions | Comparing & ordering fractions |
| | | Comparing & ordering fractions using models |
| 5. Fractions, decimals, and percents: read, represent, compare, and order decimal numbers up to hundredths, in various contexts | Decimal hundredths | Introducing decimal hundredths |
| 6. Fractions, decimals, and percents: round decimal numbers to the nearest tenth, in various contexts | Round decimal hundredths | Round decimal hundredths, nearest whole & tenth |
| 7. Fractions, decimals, and percents: describe relationships and show equivalences among fractions, decimal numbers up to hundredths, and whole number | Fractions, decimals & percents | Connecting decimals & fractions |
| | | Representing fractions as percents |
| | | Representing percents & decimals |

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| percents, using appropriate tools and drawings, in various contexts | | Fraction, decimal & percent equivalence |

## 1.2 Operations: use knowledge of numbers and operations to solve mathematical problems encountered in everyday life

| Outcome | Quests | Content |
|---|---|---|
| 1. Properties and relationships: 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 | Inverse operations & properties | Using inverse operations to solve problems |
| 2. Math facts: recall and demonstrate multiplication facts from 0 × 0 to 12 × 12, and related division facts | Multiplication & division facts, 0–12 | Multiplication properties |
| | | Multiplication facts for 2, 5 & 10 |
| | | Multiplication facts for 3, 6 & 9 |
| | | Multiplication facts for 4 & 8 |
| | | Multiplication facts for 7 |
| | | Multiplication facts for 11 & 12 |
| | | Division facts for 2, 5 & 10 |
| | | Division facts for 3, 6 & 9 |
| | | Division facts for 7 |
| | | Division facts for 4 & 8 |
| | | Division facts for 11 & 12 |
| | | Recalling multiplication facts up to 12 × 12 |
| 3. Mental math: 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 | Mental math strategies, decimals | Adding & subtracting decimals, mental strategies |
| | | Dividing whole numbers by 10 |
| | | Multiplying whole numbers by 0.1 & 0.01 |
| 4. Addition and subtraction: 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 | Add & subtract whole numbers & decimals | Adding & subtracting 5-digit numbers, algorithm |
| | | Adding & subtracting 5-digit numbers, mentally |
| | | Adding & subtracting decimals to hundredths |
| 5. Addition and subtraction: add and subtract fractions with like denominators, in various contexts | Add/subtract fractions, like denominator | Add fractions with like denominators |
| | | Subtract fractions with like denominators |

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| 6. Multiplication and division: 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 | Multiply 2-digit by 2-digit | Multiplying 2-digit numbers by 2-digit numbers |
| 7. Multiplication and division: 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 | Divide 3-digits by 2-digits | Dividing 2 & 3-digit numbers by<br>2-digit numbers |
| 8. Multiplication and division: multiply and divide one-digit whole numbers by unit fractions, using appropriate tools and drawings | Multiply & divide unit fractions | Multiplying unit fractions by whole numbers |
| | | Dividing unit fractions by whole numbers |
| 9. Multiplication and division: represent and create equivalent ratios and rates, using a variety of tools and models, in various contexts | Equivalent ratios & rates | Equivalent ratios & rates |

# 2 Algebra

## 2.1 Patterns and relationships: identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. Patterns: identify and describe repeating, growing, and shrinking patterns, including patterns found in real-life contexts | Identify & describe patterns | Identify/create growing & shrinking patterns |
| 2. Patterns: create and translate growing and shrinking patterns using various representations, including tables of values and graphs | Create growing & shrinking patterns | Creating growing & shrinking patterns |
| 3. Patterns: determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, growing, and shrinking patterns | Determine rules & extend patterns | Extending repeating, growing & shrinking patterns |
| | | Determining & using pattern rules |

## 2.2 Equations and inequalities: demonstrate an understanding of variables, expressions, equalities, and inequalities, and apply this understanding in various contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. Variables and expressions: translate among words, algebraic expressions, and visual representations that describe equivalent relationships | Translate algebraic expressions | Translate among words & algebraic expressions |
| 2. Variables and expressions: evaluate algebraic expressions that involve whole numbers | Evaluate algebraic expressions | Evaluating algebraic expressions |
| 3. Equalities and inequalities: solve equations that involve whole numbers up to 100 in various contexts, and verify solutions | Solve equations, numbers up to 100 | Solving equations |
| | | Solving equations using models |
| 4. Equalities and inequalities: solve inequalities that involve one operation and whole numbers up to 50, and verify and graph the solutions | Solve inequalities | Solving inequalities |

## 2.3 Coding: solve problems and create computational representations of mathematical situations using coding concepts and skills

| Outcome | Quests | Content |
|---|---|---|
| 1. Coding skills: solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves conditional statements and other control structures | Teacher directed | Teacher directed |
| 2. Coding skills: 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 | Teacher directed | Teacher directed |

# 3 Data

## 3.1 Data literacy: manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life

| Outcome | Quests | Content |
|---|---|---|
| 1. Data collection and organization: explain the importance of various sampling techniques for collecting a sample of data that is representative of a population | Teacher directed | Teacher directed |
| 2. Data collection and organization: collect data, using appropriate sampling techniques as needed, to answer questions of interest about a population, and organize the data in relative-frequency tables | Relative-frequency tables | Finding the relative frequency in a table |
| 3. Data visualization: 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 their choice of graphs | Data displays | Understanding stacked-bar graphs |
| | | Graphing relative frequency |
| 5. Data analysis: 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 | Measures of central tendency | Understanding & calculating the mean |
| | | Understanding & calculating the median |
| | | Understanding & calculating the mode |
| 6. Data analysis: 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 | Analyse data displays | Interpreting stacked-bar graphs |
| | | Interpreting bar graphs |
| | | Interpreting data in tables |
| | | Interpreting line plots |

### 3.2 Probability: describe the likelihood that events will happen, and use that information to make predictions

| Outcome | Quests | Content |
|---|---|---|
| 1. Probability: 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 | Express probability with fractions | Expressing probability on a probability line |
| | | Expressing probability with fractions |
| 2. Probability: determine and compare the theoretical and experimental probabilities of an event happening | Theoretical & experimental probability | Comparing theoretical & experimental probability |

# 4 Spatial Sense

## 4.1 Geometric and spatial reasoning: describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them

| Outcome | Quests | Content |
|---|---|---|
| 1. Geometric reasoning: identify geometric properties of triangles, and construct different types of triangles when given side or angle measurements | Classify triangles | Classifying triangles |
| 2. Geometric reasoning: identify and construct congruent triangles, rectangles, and parallelograms | Identify congruent shapes | Identifying congruent shapes |
| 3. Geometric reasoning: draw top, front, and side views of objects, and match drawings with objects | Top, front & side views of objects | Matching drawings with objects |
| | | Top, front & side views of objects |
| 4. Location and movement: 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 | The Cartesian plane, 1st quadrant | The Cartesian plane, 1st quadrant |
| | | Investigating translations in the 1st quadrant |
| 5. Location and movement: describe and perform translations, reflections, and rotations up to 180° on a grid, and predict the results of these transformations | Translations, reflections & rotations | Translations, reflections & rotations |

## 4.2 Measurement: compare, estimate, and determine measurements in various contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. The metric system: use appropriate metric units to estimate and measure length, area, mass, and capacity | Measure in metric units | Measuring length using metric units |
| | | Measuring mass using metric units |
| 2. The metric system: solve problems that involve converting larger metric units into smaller | Convert metric units | Converting metric units of length |
| | | Converting metric units of mass |

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| ones, and describe the base ten relationships among metric units | | Converting metric units of capacity |
| 3. Angles: compare angles and determine their relative size by matching them and by measuring them using appropriate non-standard units | Compare angles | Comparing angles |
| 4. Angles: explain how protractors work, use them to measure and construct angles up to 180°, and use benchmark angles to estimate the size of other angles | Teacher directed | Teacher directed |
| 5. Area: 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 | Area: parallelograms & triangles | Finding the area of a triangle |
| | | Finding the area of a parallelogram |
| 6. Area: show that two-dimensional shapes with the same area can have different perimeters, and solve related problems | Area & perimeter relationships | Comparing area & perimeter of rectangles |
| | | Solving perimeter & area problems |

# 5 Financial Literacy

## 5.1 Money and finances: demonstrate the knowledge and skills needed to make informed financial decisions

| Outcome | Quests | Content |
|---|---|---|
| 1. Money concepts: describe several ways money can be transferred among individuals, organizations, and businesses | Teacher directed | Teacher directed |
| 2. Money concepts: estimate and calculate the cost of transactions involving multiple items priced in dollars and cents, including sales tax, using various strategies | Money problems, dollars & cents | Solving money problems |
| 3. Financial management: design sample basic budgets to manage finances for various earning and spending scenarios | Teacher directed | Teacher directed |
| 4. Financial management: explain the concepts of credit and debt, and describe how financial decisions may be impacted by each | Teacher directed | Teacher directed |
| 5. Consumer and civic awareness: calculate unit rates for various goods and services, and identify which rates offer the best value | Unit rate & best value | Calculating unit rate to determine the best value |
| 6. Consumer and civic awareness: 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 | Teacher directed | Teacher directed |

# Grade 6

## 1 Number

### 1.1 Number sense: demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life

| Outcome | Quests | Content |
|---|---|---|
| 1. Rational numbers: read and represent whole numbers up to and including one million, using appropriate tools and strategies, and describe various ways they are used in everyday life | Numbers to one million | Reading & writing 6-digit numbers |
| | | Identifying place value: 6-digit numbers |
| | | Using place value to partition 6-digit numbers |
| 2. Rational numbers: read and represent integers, using a variety of tools and strategies, including horizontal and vertical number lines | Read & represent integers | Investigating integers |
| 3. Rational numbers: compare and order integers, decimal numbers, and fractions, separately and in combination, in various contexts | Compare/order: integer/decimal/fraction | Comparing & ordering integers |
| | | Comparing & ordering fractions & mixed numbers |
| | | Ordering fractions & decimals |
| 4. Fractions, decimals, and percents: read, represent, compare, and order decimal numbers up to thousandths, in various contexts | Decimals up to thousandths | Decimals up to thousandths |
| 5. Fractions, decimals, and percents: round decimal numbers, both terminating and repeating, to the nearest tenth, hundredth, or whole number, as applicable, in various contexts | Round decimals: tenth, hundredth, whole | Rounding decimals: tenth, hundredth, whole |
| 6. Fractions, decimals, and percents: describe relationships and show equivalences among fractions and decimal numbers up to thousandths, using appropriate tools and drawings, in various contexts | Relate fractions & decimals, thousandths | Relating fractions & decimals up to thousandths |

## 1.2 Operations: use knowledge of numbers and operations to solve mathematical problems encountered in everyday life

| Outcome | Quests | Content |
|---|---|---|
| 1. Properties and relationships: use the properties of operations, and the relationships between operations, to solve problems involving whole numbers, decimal numbers, fractions, ratios, rates, and whole number percents, including those requiring multiple steps or multiple operations | Properties & inverse operations | Using inverse operations, whole numbers |
| | | The commutative property |
| | | The associative property |
| | | The distributive property |
| 2. Math facts: understand the divisibility rules and use them to determine whether numbers are divisible by 2, 3, 4, 5, 6, 8, 9, and 10 | Divisibility rules | Divisibility rules for dividing by 2 |
| | | Divisibility rules for dividing by 3 |
| | | Divisibility rules for dividing by 4 |
| | | Divisibility rules for dividing by 5 |
| | | Divisibility rules for dividing by 6 |
| | | Divisibility rules for dividing by 8 |
| | | Divisibility rules for dividing by 9 |
| | | Divisibility rules for dividing by 10 |
| | | Divisibility rules: dividing by 2, 3, 4, 5, 6, 10 |
| 3. Mental math: use mental math strategies to calculate percents of whole numbers, including 1%, 5%, 10%, 15%, 25%, and 50%, and explain the strategies used | Calculate percents of whole numbers | Calculating simple percentages |
| 4. Addition and subtraction: represent and solve problems involving the addition and subtraction of whole numbers and decimal numbers, using estimation and algorithms | Add & subtract whole numbers & decimals | Adding whole numbers & decimals |
| | | Subtracting whole numbers & decimals |
| 5. Addition and subtraction: add and subtract fractions with like and unlike denominators, using appropriate tools, in various contexts | Add fractions | Adding fractions, like denominator |
| | | Adding a whole number & a fraction |
| | | Adding fractions, unlike denominator |

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| | Subtract fractions | Subtracting fractions, like denominator |
| | | Subtracting a fraction from a whole number |
| | | Subtracting fractions, unlike denominator |
| 6. Multiplication and division: represent composite numbers as a product of their prime factors, including through the use of factor trees | Prime & composite numbers | Introducing prime & composite numbers |
| | Prime factors | Using prime factors |
| 7. Multiplication and division: represent and solve problems involving the multiplication of three-digit whole numbers by decimal tenths, using algorithms | Multiply whole numbers by tenths | Multiplying 3-digit whole numbers by tenths |
| 8. Multiplication and division: represent and solve problems involving the division of three-digit whole numbers by decimal tenths, using appropriate tools, strategies, and algorithms, and expressing remainders as appropriate | Divide whole numbers by tenths | Dividing 3-digit whole numbers by tenths |
| 9. Multiplication and division: multiply whole numbers by proper fractions, using appropriate tools and strategies | Multiply whole numbers & fractions | Multiplying whole numbers & proper fractions |
| 10. Multiplication and division: divide whole numbers by proper fractions, using appropriate tools and strategies | Divide whole numbers by fractions | Dividing whole numbers by proper fractions |
| 11. Multiplication and division: represent and solve problems involving the division of decimal numbers up to thousandths by whole numbers up to 10, using appropriate tools and strategies | Divide decimals by whole numbers | Dividing decimals to thousandths by whole numbers |
| 12. Multiplication and division: solve problems involving ratios, including percents and rates, using appropriate tools and strategies | Solve problems involving ratios | Solving problems with unit rates |
| | | Solving ratio problems |
| | | Expressing simple ratios as percents |
| | | Dividing a quantity into a given ratio |
| | | Simplifying & comparing rates |
| | | Solving rate problems |

### 1.3 Patterns and relationships: identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. Patterns: identify and describe repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and specify which growing patterns are linear | Identify linear growing patterns | Identifying linear growing patterns |
| 2. Patterns: create and translate repeating, growing, and shrinking patterns using various representations, including tables of values, graphs, and, for linear growing patterns, algebraic expressions and equations | Create patterns | Representing linear growing patterns |
| | | Creating tables of values for linear relations |
| | | Matching graphs & linear relations |
| 3. Patterns: determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, growing, and shrinking patterns, and use algebraic representations of the pattern rules to solve for unknown values in linear growing patterns | Linear pattern rules | Linear pattern rules |
| 4. Patterns: create and describe patterns to illustrate relationships among whole numbers and decimal numbers | Patterns with decimals | Multiplying decimals by 10, 100, 1000 |
| | | Dividing decimals by 10, 100, 1000 |

### 1.4 Equations and inequalities: demonstrate an understanding of variables, expressions, equalities, and inequalities, and apply this understanding in various contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. Variables and expressions: add monomials with a degree of 1 that involve whole numbers, using tools | Add monomials | Adding monomials |
| 2. Variables and expressions: evaluate algebraic expressions that involve whole numbers and decimal tenths | Evaluate algebraic expressions | Evaluating algebraic expressions |
| 3. Equalities and inequalities: solve equations that involve multiple | Linear equations, whole numbers | Solving 1-step & 2-step equations |

| | | |
|---|---|---|
| terms and whole numbers in various contexts, and verify solutions | | Solving 1-step & 2-step equations, algebra tiles |
| | | Modelling real-life scenarios using equations |
| 4. Equalities and inequalities: solve inequalities that involve two operations and whole numbers up to 100, and verify and graph the solutions | Solve inequalities | Solving inequalities |

## 1.5 Coding: solve problems and create computational representations of mathematical situations using coding concepts and skills

| Outcome | Quests | Content |
|---|---|---|
| 1. Coding skills: solve problems and create computational representations of mathematical situations by writing and executing efficient code, including code that involves conditional statements and other control structures | Teacher directed | Teacher directed |
| 2. Coding skills: 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 and the efficiency of the code | Teacher directed | Teacher directed |

# 2 Data

## 2.1 Data literacy: manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life

| Outcome | Quests | Content |
|---|---|---|
| 2. Data collection and organization: collect qualitative data and discrete and continuous quantitative data to answer questions of interest about a population, and organize the sets of data as appropriate, including using intervals | Statistical investigations | Conducting a statistical investigation |
| 3. Data visualization: select from among a variety of graphs, including histograms and broken-line 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 | Construct graphs | Constructing broken-line graphs |
| | | Constructing histograms |
| | | Selecting appropriate data displays |
| 4. Create an infographic about a data set, representing the data in appropriate ways, including in tables, histograms, and broken-line graphs, and incorporating any other relevant information that helps to tell a story about the data | Teacher directed | Teacher directed |
| 5. Data analysis: determine the range as a measure of spread and the measures of central tendency for various data sets, and use this information to compare two or more data sets | Measures of central tendency & spread | Measure of spread: range |
| | | Comparing measures of central tendency & spread |
| | | Recognising appropriate statistical measures |
| | | Understand measures of central tendency & spread |
| 6. Data analysis: analyse different sets of data presented in various ways, including in histograms and broken-line 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 | Analyse histograms & broken-line graphs | Evaluating graphs for misleading information |
| | | Reading & interpreting data in a histogram |
| | | Interpreting data in a broken-line graph |

## 2.2 Probability: describe the likelihood that events will happen, and use that information to make predictions

| Outcome | Quests | Content |
|---|---|---|
| 1. Probability: use fractions, decimals, and percents to express the probability of events happening, represent this probability on a probability line, and use it to make predictions and informed decisions | Probability: fractions/decimals/percents | Probability: fractions, decimals & percents |
| 2. Probability: determine and compare the theoretical and experimental probabilities of two independent events happening | Probability: two independent events | Identifying the sample space: 2 independent events |
| | | Understanding independent events |
| | | Interpreting & constructing tree diagrams |

# 3 Spatial Sense

## 3.1 Geometric and spatial reasoning: describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them

| Outcome | Quests | Content |
|---|---|---|
| 1. Geometric reasoning: create lists of the geometric properties of various types of quadrilaterals, including the properties of the diagonals, rotational symmetry, and line symmetry | Properties of quadrilaterals | Classifying quadrilaterals |
| | | Investigating diagonals of special quadrilaterals |
| | | Line & rotational symmetry |
| 2. Geometric reasoning: construct three-dimensional objects when given their top, front, and side views | Teacher directed | Teacher directed |
| 3. Location and movement: plot and read coordinates in all four quadrants of a Cartesian plane, and describe the translations that move a point from one coordinate to another | The Cartesian plane, 4 quadrants | Plotting & reading coordinates in all 4 quadrants |
| | | Translations of points on the Cartesian plane |
| 4. Location and movement: describe and perform combinations of translations, reflections, and rotations up to 360° on a grid, and predict the results of these transformations | Combinations of transformations | Identifying combinations of transformations |

## 3.2 Measurement: compare, estimate, and determine measurements in various contexts

| Outcome | Quests | Content |
|---|---|---|
| 1. The metric system: measure length, area, mass, and capacity using the appropriate metric units, and solve problems that require converting smaller units to larger ones and vice versa | Convert metric units | Converting metric units of length |
| | | Converting metric units of mass |
| | | Converting metric units of capacity |
| 2. Angles: use a protractor to measure and construct angles up to 360°, and state the relationship between angles that are measured | Measure angles | Measuring angles up to 360° |

| | | |
|---|---|---|
| clockwise and those that are measured counter clockwise | | |
| 3. Angles: use the properties of supplementary angles, complementary angles, opposite angles, and interior and exterior angles to solve for unknown angle measures | Solve for unknown angle measures | Supplementary angles |
| | | Complementary angles |
| | | Opposite angles |
| | | Interior & exterior angles of a triangle |
| 4. Area and surface area: determine the areas of trapezoids, rhombuses, kites, and composite polygons by decomposing them into shapes with known areas | Area: quadrilaterals, composite polygons | Finding the area of a trapezoid |
| | | Finding the area of a rhombus |
| | | Finding the area of a kite |
| | | Finding the area of composite shapes |
| 5. Area and surface area: create and use nets to demonstrate the relationship between the faces of prisms and pyramids and their surface areas | Nets: prisms & pyramids | Connecting prisms & pyramids with their nets |
| 6. Area and surface area: determine the surface areas of prisms and pyramids by calculating the areas of their two-dimensional faces and adding them together | Surface area: prisms & pyramids | Finding the surface area of prisms |
| | | Finding the surface area of pyramids |

# 4 Financial Literacy

## 4.1 Money and finances: demonstrate the knowledge and skills needed to make informed financial decisions

| Outcome | Quests | Content |
|---|---|---|
| 1. Money concepts: describe the advantages and disadvantages of various methods of payment that can be used to purchase goods and services | Teacher directed | Teacher directed |
| 2. Financial management: identify different types of financial goals, including earning and saving goals, and outline some key steps in achieving them | Teacher directed | Teacher directed |
| 3. Financial management: identify and describe various factors that may help or interfere with reaching financial goals | Teacher directed | Teacher directed |
| 4. Consumer and civic awareness: explain the concept of interest rates, and identify types of interest rates and fees associated with different accounts and loans offered by various banks and other financial institutions | Teacher directed | Teacher directed |
| 5. Consumer and civic awareness: describe trading, lending, borrowing, and donating as different ways to distribute financial and other resources among individuals and organizations | Teacher directed | Teacher directed |

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