Grade Four (Ages 9 – 10)

Number Sense and Numeration

A.1. Reading, representing, comparing, and ordering whole numbers to 10 000, decimal numbers to tenths, and simple fractions, and represent money amounts to $100

- Representing, comparing, and ordering whole numbers to 10 000, using a variety of tools
- Demonstrating an understanding of place value in whole numbers and decimal numbers from 0.1 to 10 000, using a variety of tools and strategies
- Reading and printing in words whole numbers to one thousand, using meaningful contexts
- Rounding four-digit whole numbers to the nearest ten, hundred, and thousand, in problems arising from real-life situations
- Representing, comparing, and ordering decimal numbers to tenths, using a variety of tools and using standard decimal notation
- Representing fractions using concrete materials, words, and standard fractional notation, and explaining the meaning of the denominator as the number of the fractional parts of a whole or a set, and the numerator as the number of fractional parts being considered
- Comparing and ordering fractions by considering the size and the number of fractional parts
- Comparing fractions to the benchmarks of 0, ½, 1
- Demonstrating and explaining the relationship between equivalent fractions,
using concrete materials and drawings
• Reading and representing money amounts to $100
• Solving problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 10 000

A.2. Demonstrating an understanding of magnitude by counting forward and backwards by 0.1 and by fractional amounts
• Counting forward by halves, thirds, fourths, and tenths to beyond one whole, using concrete materials and number lines
• Counting forward by tenths from any decimal number expressed to one decimal place, using concrete materials and number lines

A.3. Solving problems involving the addition, subtraction, multiplication, and division of single- and multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to tenths and money amounts, using a variety of strategies
• Adding and subtracting two-digit numbers, using a variety of mental strategies
• Solving problems involving the addition and subtraction of four-digit numbers, using student-generated algorithms and standard algorithms
• Adding and subtracting decimal numbers to tenths, using concrete materials and student-generated algorithms
• Adding and subtracting money amounts by making simulated purchases and providing change for amounts up to $100, using a variety of tools
• Multiplying to 9 x 9 and divide to 81 ÷ 9, using a variety of mental strategies
• Solving problems involving the multiplication of one-digit whole numbers, using a variety of mental strategies
• Multiplying whole numbers by 10, 100, and 1000, and divide whole numbers by 10 and 100, using mental strategies
• Multiplying two-digit whole numbers by one-digit whole numbers, using a variety of tools, student-generated algorithms, and standard algorithms
• Dividing two-digit whole numbers by one digit whole numbers, using a variety of tools and student-generated algorithms
• Using estimation when solving problems involving the addition, subtraction, and multiplication of whole numbers, to help judge the reasonableness of a solution
A.4. Demonstrating an understanding of proportional reasoning by investigating whole-number unit rates
• Describing relationships that involve simple whole-number multiplication
• Determining and explaining, through investigation, the relationship between fractions and decimals to tenths, using a variety of tools and dividing each fifth into two equal parts to
• Demonstrating an understanding of simple multiplicative relationships involving unit rates, through investigation using concrete materials and drawings

Measurement

B.1. Estimating, measuring, and recording length, perimeter, area, mass, capacity, volume, and elapsed time, using a variety of strategies
• Estimating, measuring, and recording length, height, and distance, using standard units
• Drawing items using a ruler, given specific lengths in millimetres or centimeters
• Estimating, measuring, and representing time intervals to the nearest minute
• Estimating and determining elapsed time, with and without using a time line, given the durations of events expressed in five-minute intervals, hours, days, weeks, months, or years
• Estimating, measure using a variety of tools and strategies, and recording the perimeter and area of polygons
• Estimating, measuring, and recording the mass of objects, using the standard units of the kilogram and the gram
• Estimating, measuring, and recording the capacity of containers, using the standard units of the litre and the milliliter
• Estimating, measure using concrete materials, and recording volume, and relating volume to the space taken up by an object

B.2. Determining the relationships among units and measurable attributes, including the area and perimeter of rectangles
• Describing, through investigation, the relationship between various units of length
• Selecting and justifying the most appropriate standard unit to measure the side lengths and perimeters of various polygons
• Determining, through investigation, the relationship between the side lengths of a rectangle and its perimeter and area
• Posing and solving meaningful problems that require the ability to distinguish perimeter and area
• Comparing and ordering a collection of objects, using standard units of mass and/or capacity
• Determining, through investigation, the relationship between grams and kilograms
• Determining, through investigation, the relationship between millilitres and litres
• Selecting and justifying the most appropriate standard unit to measure mass and the most appropriate standard unit to measure the capacity of a container
• Solving problems involving the relationship between years and decades, and between decades and centuries
• Comparing, using a variety of tools, two-dimensional shapes that have the same perimeter or the same area

**Geometry and Spatial Sense**

C.1. Identifying quadrilaterals and three-dimensional figures and classify them by their geometric properties, and compare various angles to benchmarks
• Drawing the lines of symmetry of two-dimensional shapes, through investigation using a variety of tools and strategies
• Identifying and comparing different types of quadrilaterals and sorting and classifying them by their geometric properties
• Identifying benchmark angles, using a reference tool, and comparing other angles to these benchmarks
• Relating the names of the benchmark angles to their measures in degrees
• Identifying and describing prisms and pyramids, and classifying them by their geometric properties, using concrete materials

C.2. Constructing three-dimensional figures, using two-dimensional shapes
• Constructing a three-dimensional figure from a picture or model of the figure, using connecting cubes
• Constructing skeletons of three-dimensional figures, using a variety of tools, and sketching the skeletons
• Drawing and describing nets of rectangular and triangular prisms
• Constructing prisms and pyramids from given nets
• Constructing three-dimensional figures, using only congruent shapes

C.3. Identifying and describing the location of an object, using a grid map, and reflect two-dimensional shapes
• Identifying and describing the general location of an object using a grid system
• Identifying, performing, and describing reflections using a variety of tools
• Creating and analyzing symmetrical designs by reflecting a shape, or shapes, using a variety of tools, and identify the congruent shapes in the designs

Patterning and Algebra

D.1. Describing, extending, and creating a variety of numeric and geometric patterns, making predictions related to the patterns, and investigate repeating patterns involving reflections
• Extending, describing, and creating repeating, growing, and shrinking number patterns
• Connecting each term in a growing or shrinking pattern with its term number, and recording the patterns in a table of values that shows the term number and the term;
• Creating a number pattern involving addition, subtraction, or multiplication, given a pattern rule expressed in words
• Making predictions related to repeating geometric and numeric patterns
• Extending and creating repeating patterns that result from reflections, through investigation using a variety of tools

D.2. Demonstrating an understanding of equality between pairs of expressions, using addition, subtraction, and multiplication
• Determining, through investigation, the inverse relationship between multiplication and division
• Determining the missing number in equations involving multiplication of one- and two-digit numbers, using a variety of tools and strategies
• Identifying, through investigation, and using the commutative property of
multiplication to facilitate computation with whole numbers

- Identifying, through investigation, and using the distributive property of multiplication over addition to facilitate computation with whole numbers

**Data Management and probability**

E.1. Collecting and organizing discrete primary data and display the data using charts and graphs, including stem-and-leaf plots and double bar graphs

- Collecting data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or the community, or content from another subject, and record observations or measurements
- Collecting and organizing discrete primary data and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools

E.2. Reading, describing, and interpreting primary data and secondary data presented in charts and graphs, including stem-and-leaf plots and double bar graphs

- Reading, interpreting, and drawing conclusions from primary data and from secondary data, presented in charts, tables, and graphs
- Demonstrating, through investigation, an understanding of median, and determining the median of a set of data
- Describing the shape of a set of data across its range of values, using charts, tables, and graphs
- Comparing similarities and differences between two related sets of data, using a variety of strategies

E.3. Predicting the results of a simple probability experiment, then conducting the experiment and comparing the prediction to the results

- Predicting the frequency of an outcome in a simple probability experiment, explaining their reasoning; conduct the experiment; and compare the result with the prediction
- Determining, through investigation, how the number of repetitions of a probability experiment can affect the conclusions drawn
Number Sense and Numeration

A.1. Reading, representing, comparing, and ordering whole numbers to 100 000, decimal numbers to hundredths, proper and improper fractions, and mixed numbers
- Representing, comparing, and ordering whole numbers and decimal numbers from 0.01 to 100 000, using a variety of tools
- Demonstrating an understanding of place value in whole numbers and decimal numbers from 0.01 to 100 000, using a variety of tools and strategies
- Reading and printing in words whole numbers to ten thousand, using meaningful contexts
- Rounding decimal numbers to the nearest tenth, in problems arising from real-life situations
- Representing, comparing, and ordering fractional amounts with like denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation
- Demonstrating and explaining the concept of equivalent fractions, using concrete materials
- Demonstrating and explaining equivalent representations of a decimal number, using concrete materials and drawings
- Reading and writing money amounts to $1000
- Solving problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 100 000

A.2. Demonstrating an understanding of magnitude by counting forward and backwards by 0.01
- Counting forward by hundredths from any decimal number expressed to two decimal places, using concrete materials and number lines

A.3. Solving problems involving the multiplication and division of multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to
hundredths, using a variety of strategies
• Solving problems involving the addition, subtraction, and multiplication of whole numbers, using a variety of mental strategies
• Adding and subtracting decimal numbers to hundredths, including money amounts, using concrete materials, estimation, and algorithms
• Multiplying two-digit whole numbers by two-digit whole numbers, using estimation, student-generated algorithms, and standard algorithms
• Dividing three-digit whole numbers by one-digit whole numbers, using concrete materials, estimation, student-generated algorithms, and standard algorithms
• Multiplying decimal numbers by 10, 100, 1000, and 10 000, and dividing decimal numbers by 10 and 100, using mental strategies
• Using estimation when solving problems involving the addition, subtraction, multiplication, and division of whole numbers, to help judge the reasonableness of a solution

A.4. Demonstrating an understanding of proportional reasoning by investigating whole-number rates
• Describing multiplicative relationships between quantities by using simple fractions and decimals
• Determining and explaining, through investigation using concrete materials, drawings, and calculators, the relationship between fractions and their equivalent decimal forms
• Demonstrating an understanding of simple multiplicative relationships involving whole-number rates, through investigation using concrete materials and drawings

Measurements

B.1. Estimating, measuring, and recording perimeter, area, temperature change, and elapsed time, using a variety of strategies
• Estimating, measuring, and representing time intervals to the nearest second
• Estimating and determining elapsed time, with and without using a time line, given the durations of events expressed in minutes, hours, days, weeks, months, or years
• Measuring and recording temperatures to determine and represent temperature changes over time
• Estimating and measuring the perimeter and area of regular and irregular polygons, using a variety of tools and strategies

B.2. Determining the relationships among units and measurable attributes, including the area of a rectangle and the volume of a rectangular prism
• Selecting and justify the most appropriate standard unit to measure length, height, width, and distance, and to measure the perimeter of various polygons
• Solving problems requiring conversion from metres to centimetres and from kilometers to metres
• Solving problems involving the relationship between a 12-hour clock and a 24-hour clock
• Creating, through investigation using a variety of tools and strategies, two-dimensional shapes with the same perimeter or the same area
• Determining, through investigation using a variety of tools and strategies, the relationships between the length and width of a rectangle and its area and perimeter, and generalize to develop the formulas
• Solving problems requiring the estimation and calculation of perimeters and areas of rectangles
• Determining, through investigation, the relationship between capacity and volume, by comparing the volume of an object with the amount of liquid it can contain or displace
• Determining, through investigation using stacked congruent rectangular layers of concrete materials, the relationship between the height, the area of the base, and the volume of a rectangular prism, and generalize to develop the formula
• Selecting and justifying the most appropriate standard unit to measure mass

Geometry and Spatial sense

C.1. Identifying and classifying two-dimensional shapes by side and angle properties, and comparing and sorting three-dimensional figures
• Distinguishing among polygons, regular polygons, and other two-dimensional shapes
• Distinguishing among prisms, right prisms, pyramids, and other three-dimensional Figures
• Identifying and classifying acute, right, obtuse, and straight angles
• Measuring and constructing angles up to 90°, using a protractor
• Identifying triangles, and classify them according to angle and side properties
• Constructing triangles, using a variety of tools, given acute or right angles and side measurements

C.2. Identifying and constructing nets of prisms and pyramids
• Identifying prisms and pyramids from their nets
• Constructing nets of prisms and pyramids, using a variety of tools

C.3. Identifying and describing the location of an object, using the cardinal directions, and translate two-dimensional shapes
• Locating an object using the cardinal directions and a coordinate system
• Comparing grid systems commonly used on maps
• Identifying, performing, and describing translations, using a variety of tools
• Creating and analyzing designs by translating and/or reflecting a shape, or shapes, using a variety of tools

Patternning and Algebra

D.1. Determining, through investigation using a table of values, relationships in growing and shrinking patterns, and investigate repeating patterns involving translations
• Creating, identifying, and extending numeric and geometric patterns, using a variety of tools
• Building a model to represent a number pattern presented in a table of values that shows the term number and the term
• Making a table of values for a pattern that is generated by adding or subtracting a number to get the next term, or by multiplying or dividing by a constant to get the next term, given either the sequence or the pattern rule in words
• Making predictions related to growing and shrinking geometric and numeric patterns
• Extending and creating repeating patterns that result from translations, through investigation using a variety of tools
D.2. Demonstrating, through investigation, an understanding of the use of variables in equations
• Demonstrating, through investigation, an understanding of variables as changing quantities, given equations with letters or other symbols that describe relationships involving simple rates
• Demonstrating, through investigation, an understanding of variables as unknown quantities represented by a letter or other symbol
• Determining the missing number in equations involving addition, subtraction, multiplication, or division and one- or two digit numbers, using a variety of tools and strategies

Data Management

E.1. Collecting and organizing discrete or continuous primary data and secondary data and displaying the data using charts and graphs, including broken-line graphs
• Distinguishing between discrete data and continuous data
• Collecting data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject, and record observations or measurements
• Collecting and organizing discrete or continuous primary data and secondary data and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools
• Demonstrating an understanding that sets of data can be samples of larger populations
• Describing, through investigation, how a set of data is collected and explain whether the collection method is appropriate

E.2. Reading, describing, and interpreting primary data and secondary data presented in charts and graphs, including broken-line graphs
• Reading, interpreting, and drawing conclusions from primary data and from secondary data, presented in charts, tables, and graphs
• Calculating the mean for a small set of data and use it to describe the shape of the data set across its range of values, using charts, tables, and graphs
• Comparing similarities and differences between two related sets of data, using a variety of strategies

E.3. Representing as a fraction the probability that a specific outcome will occur in a simple probability experiment, using systematic lists and area models
• Determining and representing all the possible outcomes in a simple probability Experiment
• Representing, using a common fraction, the probability that an event will occur in simple games and probability experiments
• Posing and solving simple probability problems, and solving them by conducting probability experiments and selecting appropriate methods of recording the results
Number Sense and Numeration

A.1. Reading, representing, comparing, and ordering whole numbers to 1 000 000, decimal numbers to thousandths, proper and improper fractions, and mixed numbers
   • Representing, comparing, and ordering whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools
   • Demonstrating an understanding of place value in whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools and strategies
   • Reading and printing in words whole numbers to one hundred thousand, using meaningful contexts
   • Representing, comparing, and ordering fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation
   • Estimating quantities using benchmarks of 10%, 25%, 50%, 75%, and 100%
   • Solving problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 1 000 000
   • Identifying composite numbers and prime numbers, and explaining the relationship between them

A.2. Solving problems involving the multiplication and division of whole numbers, and the addition and subtraction of decimal numbers to thousandths, using a variety of strategies
   • Using a variety of mental strategies to solve addition, subtraction, multiplication, and division problems involving whole numbers
   • Solving problems involving the multiplication and division of whole numbers, using a variety of tools
   • Adding and subtracting decimal numbers to thousandths, using concrete materials, estimation, algorithms, and calculators
   • Multiplying and dividing decimal numbers to tenths by whole numbers, using concrete materials, estimation, algorithms, and calculators
   • Multiplying whole numbers by 0.1, 0.01, and 0.001 using mental strategies
   • Multiplying and dividing decimal numbers by 10, 100, 1000, and 10 000 using
mental strategies
• Using estimation when solving problems involving the addition and subtraction of whole numbers and decimals, to help judge the reasonableness of a solution
• Explaining the need for a standard order for performing operations, by investigating the impact that changing the order has when performing a series of operations

A.3. Demonstrating an understanding of relationships involving percent, ratio, and unit rate
• Representing ratios found in real-life contexts, using concrete materials, drawings, and standard fractional notation
• Determining and explaining, through investigation using concrete materials, drawings, and calculators, the relationships among fractions, decimal numbers, and percents
• Representing relationships using unit rates

Measurements

B.1. Estimating, measuring, and recording quantities, using the metric measurement system
• Demonstrating an understanding of the relationship between estimated and precise measurements, and determining and justifying when each kind is appropriate
• Estimating, measuring, and recording length, area, mass, capacity, and volume, using the metric measurement system.

B.2. Determining the relationships among units and measurable attributes, including the area of a parallelogram, the area of a triangle, and the volume of a triangular prism
• Selecting and justifying the appropriate metric unit to measure length or distance in a given real-life situation
• Solving problems requiring conversion from larger to smaller metric units
• Constructing a rectangle, a square, a triangle, and a parallelogram, using a variety of tools
• Determining, through investigation using a variety of tools and strategies, the relationship between the area of a rectangle and the areas of parallelograms and triangles, by decomposing and composing
• Developing the formulas for the area of a parallelogram
• Solving problems involving the estimation and calculation of the areas of triangles and the areas of parallelograms
• Determining, using concrete materials, the relationship between units used to measure area, and apply the relationship to solve problems that involve conversions from square metres to square centimeters
• Determining, through investigation using a variety of tools and strategies, the relationship between the height, the area of the base, and the volume of a triangular prism, and generalize to develop the formula
• Determining, through investigation using a variety of tools and strategies, the surface area of rectangular and triangular prisms
• Solving problems involving the estimation and calculation of the surface area and volume of triangular and rectangular prisms

Geometry and Spatial Sense

C.1. Classifying and constructing polygons and angles
• Sorting and classifying quadrilaterals by geometric properties related to symmetry, angles, and sides, through investigation using a variety of tools and strategies
• Sorting polygons according to the number of lines of symmetry and the order of rotational symmetry, through investigation using a variety of tools
• Measuring and constructing angles up to 180° using a protractor, and classifying them as acute, right, obtuse, or straight angles
• Constructing polygons using a variety of tools, given angle and side measurements

C.2. Sketching three-dimensional figures, and construct three-dimensional figures from drawings
• Building three-dimensional models using connecting cubes, given isometric sketches or different views of the structure
• Sketching, using a variety of tools, isometric perspectives and different views of three dimensional figures built with interlocking cubes
C.3. Describing location in the first quadrant of a coordinate system, and rotate two-dimensional shapes
• Explaining how a coordinate system represents location, and plotting points in the first quadrant of a Cartesian coordinate plane
• Identifying, performing, and describing, through investigation using a variety of tools, rotations of 180° and clockwise and counterclockwise rotations of 90°, with the centre of rotation inside or outside the shape
• Creating and analyzing designs made by reflecting, translating, and/or rotating a shape, or shapes, by 90° or 180°

Patterning and Algebra
D.1. Describing and representing relationships in growing and shrinking patterns, and investigating repeating patterns involving rotations
• Identifying geometric patterns, through investigation using concrete materials or drawings, and represent them numerically
• Making tables of values for growing patterns, given pattern rules in words, then listing the ordered pairs and plot the points in the first quadrant, using a variety of tools
• Determining the term number of a given term in a growing pattern that is represented by a pattern rule in words, a table of values, or a graph
• Describing pattern rules that generate patterns by adding or subtracting a constant, or multiplying or dividing by a constant, to get the next term, then distinguishing such pattern rules from pattern rules, given in words, that describe the general term by referring to the term number
• Determining a term, given its term number, by extending growing and shrinking patterns that are generated by adding or subtracting a constant, or multiplying or dividing by a constant, to get the next term
• Extending and creating repeating patterns that result from rotations, through investigation using a variety of tools

D.2. Using variables in simple algebraic expressions and equations to describe relationships
• Demonstrating an understanding of different ways in which variables are used
• Identifying, through investigation, the quantities in an equation that vary and those that remain constant
• Solving problems that use two or three symbols or letters as variables to represent
different unknown quantities
• Determining the solution to a simple equation with one variable, through investigation using a variety of tools and strategies

Data Management

E.1. Collecting and organizing discrete or continuous primary data and secondary data and displaying the data using charts and graphs, including continuous line graphs
  • Collecting data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject, and record observations or measurements
  • Collecting and organizing discrete or continuous primary data and secondary data and displaying the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools
  • Selecting an appropriate type of graph to represent a set of data, graphing the data using technology, and justifying the choice of graph
  • Determining, through investigation, how well a set of data represents a population, on the basis of the method that was used to collect the data

E.2. Reading, describing, and interpreting data, and explaining relationships between sets of data
  • Reading, interpreting, and drawing conclusions from primary data and from secondary data
  • Comparing, through investigation, different graphical representations of the same data
  • Explaining how different scales used on graphs can influence conclusions drawn from the data
  • Demonstrating an understanding of mean, and use the mean to compare two sets of related data, with and without the use of technology
  • Demonstrating, through investigation, an understanding of how data from charts, tables, and graphs can be used to make inferences and convincing arguments

E.3. Determining the theoretical probability of an outcome in a probability experiment, and using it to predict the frequency of the outcome
  • Expressing theoretical probability as a ratio of the number of favourable
outcomes to the total number of possible outcomes, where all outcomes are equally likely
• Representing the probability of an event, using a value from the range of 0 to 1
• Predicting the frequency of an outcome of a simple probability experiment or game, by calculating and using the theoretical probability of that outcome