Primary Mathematics (Kindergarten to Grade 3)
Strands & Expectations in the Ontario Curriculum

Note to user: This concept map is designed to help pre-service and in-service teachers develop a research strategy to locate library materials relevant to their daily lessons. It should not be used in place of the Ontario curriculum. Please visit the Ontario Ministry of Education website –www.edu.gov.on.ca – to access the Ontario curriculum online.

Kindergarten (Ages 4 – 5)

Number Sense and Numeration

• Investigating the idea that quantity is greater when counting forwards and less when counting backwards
• Investigating some concepts of quantity through identifying and comparing sets with more, fewer, or the same number of objects
• Recognizing some quantities without having to count, using a variety of tools or strategies
• Beginning to use information to estimate the number in a small set
• Using, reading, and representing whole numbers to 10 in a variety of meaningful contexts
• Using ordinal numbers in a variety of everyday contexts
• Demonstrating an understanding of number relationships for numbers from 0 to 10, through investigation
• Investigating and developing strategies for composing and decomposing quantities to 10
• Exploring different Canadian coins, using coin manipulatives
• Demonstrating understanding of the counting concepts of stable order and of order irrelevance
• Beginning to make use of one-to-one correspondence in counting objects and matching groups of objects
• Investigating addition and subtraction in everyday activities through the use of manipulatives, visual models, or oral exploration

Measurement
• Comparing and ordering two or more objects according to an appropriate measure, and using measurement terms
• Demonstrating, through investigation, an awareness of the use of different measurement tools for measuring different things
• Demonstrating awareness of non-standard measuring devices and strategies for using them
• Demonstrating, through investigation, a beginning understanding of the use of non-standard units of the same size

Geometry and Spatial Sense

• Exploring, sorting, and comparing traditional and non-traditional two-dimensional shapes and three-dimensional figures
• Identifying and describing, using common geometric terms, two-dimensional shapes and three-dimensional figures through investigations with concrete materials
• Composing pictures and build designs, shapes, and patterns in two-dimensional shapes, and decomposing two-dimensional shapes into smaller shapes, using various tools or strategies
• Building three-dimensional structures using a variety of materials, and beginning to recognize the three-dimensional figures that the structure contains
• Investigating the relationship between two-dimensional shapes and three dimensional figures in objects that they have made
• Demonstrating an understanding of basic spatial relationships and movements

Patterning

• Identifying, extending, reproducing, and creating repeating patterns through investigation, using a variety of materials and actions
• Identifying and describing informally the repeating nature of patterns in everyday contexts, using oral expressions

Data Management and Probability

• Sorting, classifying, and comparing objects and describe the attributes used
• Collecting objects or data and make representations of their observations, using concrete graphs
• Responding to and posing questions about data collection and graphs
• Using mathematical language in informal discussions to describe probability
Grade One (Ages 6 – 7)

Number Sense and Numeration

A.1. Reading, representing, comparing, and ordering whole numbers to 50, and using concrete materials to investigate fractions and money amounts
• Representing, comparing, and ordering whole numbers to 50, using a variety of tools
• Reading and printing in words whole numbers to ten, using meaningful contexts
• Demonstrating, using concrete materials, the concept of conservation of number
• Relating numbers to the anchors of 5 and 10
• Identifying and describing various coins, using coin manipulatives or drawings, and state their value
• Representing money amounts to 20¢, through investigation using coin manipulatives
• Estimating the number of objects in a set, and check by counting
• Composing and decomposing numbers up to 20 in a variety of ways, using concrete materials
• Dividing whole objects into parts and identify and describe, through investigation, equal-sized parts of the whole, using fractional names

A.2. Demonstrating an understanding of magnitude by counting forward to 100 and backwards from 20
• Demonstrating, using concrete materials, the concept of one-to-one correspondence between number and objects when counting
• Counting forward by 1’s, 2’s, 5’s, and 10’s to 100, using a variety of tools and strategies
• Counting backwards by 1’s from 20 and any number less than 20, with and without the use of concrete materials and number lines;
• Counting backwards from 20 by 2’s and 5’s, using a variety of tools
• Using ordinal numbers to thirty-first in meaningful contexts

A.3. Solving problems involving the addition and subtraction of single-digit whole numbers, using a variety of strategies
• Solving a variety of problems involving the addition and subtraction of whole numbers to 20, using concrete materials and drawings
• Solving problems involving the addition and subtraction of single-digit whole numbers, using a variety of mental strategies
• Adding and subtracting money amounts to 10¢, using coin manipulatives and drawings

Measurement

B.1. Estimating, measuring, and describing length, area, mass, capacity, time, and temperature, using non-standard units of the same size
• Demonstrating an understanding of the use of non-standard units of the same size
• Estimating, measuring, and recording lengths, heights, and distances
• Constructing, using a variety of strategies, tools for measuring lengths, heights, and distances in non-standard units
• Estimating, measuring, and describing area, through investigation using non-standard units
• Estimating, measuring, and describing the capacity and/or mass of an object, through investigation using non-standard units
• Estimating, measuring, and describing the passage of time, through investigation using nonstandard units
• Reading demonstration digital and analogue clocks, and use them to identify benchmark times and to tell and write time to the hour and half-hour in everyday settings
• Naming the months of the year in order, and read the date on a calendar
• Relating temperature to experiences of the seasons

B.2. Comparing, describing, and ordering objects, using attributes measured in non-standard units
• Comparing two or three objects using measurable attributes, and describing the objects using relative terms
• Comparing and ordering objects by their linear measurements, using the same non-standard unit
• Using the metre as a benchmark for measuring length, and comparing the metre with non-standard units
• Describing, through investigation using concrete materials, the relationship between the size of a unit and the number of units needed to measure length

Geometry and Spatial Sense

C.1. Identifying common two-dimensional shapes and three-dimensional figures and sort and classify them by their attributes
• Identifying and describing common two-dimensional shapes and sort and classifying them by their attributes, using concrete materials and pictorial representations
• Tracing and identifying the two-dimensional faces of three-dimensional figures, using concrete models
• Identifying and describing common three-dimensional figures and sorting and classifying them by their attributes, using concrete materials and pictorial representations
• Describing similarities and differences between an everyday object and a three-dimensional figure
• Locating shapes in the environment that have symmetry, and describing the symmetry

C.2. Composing and decomposing common two-dimensional shapes and three-dimensional figures
• Composing patterns, pictures, and designs, using common two-dimensional shapes
• Identifying and describing shapes within other shapes
• Building three-dimensional structures using concrete materials, and describing the two-dimensional shapes the structures contain
• Covering outline puzzles with two-dimensional shapes

C.3. Describing the relative locations of objects using positional language
• Describing the relative locations of objects or people using positional language
• Describing the relative locations of objects on concrete maps created in the classroom
• Creating symmetrical designs and pictures, using concrete materials, and describing the relative locations of the parts

Patterning and Algebra

D.1. Identifying, describing, extending, and creating repeating patterns
• Identifying, describing, and extending, through investigation, geometric repeating patterns involving one attribute
• Identifying and extending, through investigation, numeric repeating patterns
• Describing numeric repeating patterns in a hundreds chart
• Identifying a rule for a repeating pattern
• Creating a repeating pattern involving one attribute
• Representing a given repeating pattern in a variety of ways

D.2. Demonstrating an understanding of the concept of equality, using concrete materials and addition and subtraction to 10
• Creating a set in which the number of objects is greater than, less than, or equal to the number of objects in a given set
• Demonstrating examples of equality, through investigation, using a “balance” model
• Determining, through investigation using a “balance” model and whole numbers to 10, the number of identical objects that must be added or subtracted to establish equality

Data management and probability

E.1. Collecting and organizing categorical primary data and display the data using concrete graphs and pictographs, without regard to the order of labels on the horizontal axis
• Demonstrating an ability to organize objects into categories by sorting and classifying objects using one attribute, and by describing informal sorting experiences
• Collecting and organizing primary data that is categorical, and displaying the data using one-to-one correspondence, prepared templates of concrete graphs and pictographs, and a variety of recording methods

E.2. Reading and describing primary data presented in concrete graphs and pictographs
• Reading primary data presented in concrete graphs and pictographs, and describing the data using comparative language
• Posing and answering questions about collected data

E.3. Describing the likelihood that everyday events will happen
• Describing the likelihood that everyday events will occur, using mathematical language
Grade Two (Ages 7 – 8)

Number Sense and Numeration

A.1. Reading, representing, comparing, and ordering whole numbers to 100, and using concrete materials to represent fractions and money amounts to 100¢
  • Representing, comparing, and ordering whole numbers to 100, including money amounts to 100¢, using a variety of tools
  • Reading and printing in words whole numbers to twenty, using meaningful contexts
  • Composing and decomposing two-digit numbers in a variety of ways, using concrete materials
  • Determining, using concrete materials, the ten that is nearest to a given two-digit number, and justifying the answer
  • Determining, through investigation using concrete materials, the relationship between the number of fractional parts of a whole and the size of the fractional parts
  • Regrouping fractional parts into wholes, using concrete materials
  • Comparing fractions using concrete materials, without using standard fractional notation
  • Estimating, counting, and representing the value of a collection of coins with a maximum value of one dollar

A.2. Demonstrating an understanding of magnitude by counting forward to 200 and backwards from 50, using multiples of various numbers as starting points
  • Counting forward by 1’s, 2’s, 5’s, 10’s, and 25’s to 200, using number lines and hundreds charts, starting from multiples of 1, 2, 5, and 10
  • Counting backwards by 1’s from 50 and any number less than 50, and counting backwards by 10’s from 100 and any number less than 100, using number lines and hundreds charts
  • Locating whole numbers to 100 on a number line and on a partial number line

A.3. Solving problems involving the addition and subtraction of one- and two-digit whole numbers, using a variety of strategies, and investigating multiplication and division
  • Solving problems involving the addition and subtraction of whole numbers to 18, using a variety of mental strategies
• Describing relationships between quantities by using whole-number addition and subtraction
• Representing and explaining, through investigation using concrete materials and drawings, multiplication as the combining of equal groups
• Representing and explaining, through investigation using concrete materials and drawings, division as the sharing of a quantity equally
• Solving problems involving the addition and subtraction of two-digit numbers, with and without regrouping, using concrete materials, student-generated algorithms, and standard algorithms
• Adding and subtracting money amounts to 100¢, using a variety of tools and strategies

Measurement

B.1. Estimating, measuring, and recording length, perimeter, area, mass, capacity, time, and temperature, using non-standard units and standard units
• Choosing benchmarks – in this case, personal referents – for a centimetre and a metre to help them perform measurement tasks
• Estimating and measuring length, height, and distance, using standard units and non-standard units
• Recording and representing measurements of length, height, and distance in a variety of ways
• Selecting and justifying the choice of a standard unit or a non-standard unit to measure length
• Estimating, measuring, and recording the distance around objects, using non-standard units
• Estimating, measuring, and recording area, through investigation using a variety of non-standard units
• Estimating, measuring, and recording the capacity and/or mass of an object, using a variety of non-standard units
• Telling and writing time to the quarter-hour, using demonstration digital and analogue clocks
• Constructing tools for measuring time intervals in non-standard units
• Describing how changes in temperature affect everyday experiences
• Using a standard thermometer to determine whether temperature is rising or falling

B.2. Comparing, describing, and ordering objects, using attributes measured in non-standard units and standard units
• Describing, through investigation, the relationship between the size of a unit of area and the number of units needed to cover a surface
• Comparing and ordering a collection of objects by mass and/or capacity, using non-standard units
• Determining, through investigation, the relationship between days and weeks and between months and years

Geometry and Spatial Sense

C.1. Identifying two-dimensional shapes and three-dimensional figures and sorting and classifying them by their geometric properties
• Distinguishing between the attributes of an object that are geometric properties and the attributes that are not geometric properties
• Identifying and describing various polygons and sort and classify them by their geometric properties, using concrete materials and pictorial representations
• Identifying and describing various three dimensional figures and sorting and classifying them by their geometric properties, using concrete materials
• Creating models and skeletons of prisms and pyramids, using concrete materials, and describing their geometric properties
• Locating the line of symmetry in a two dimensional shape

C.2. Composing and decomposing two-dimensional shapes and three-dimensional figures
• Composing and describing pictures, designs, and patterns by combining two-dimensional shapes
• Composing and decomposing two-dimensional shapes
• Covering an outline puzzle with two dimensional shapes in more than one way
• Building a structure using three-dimensional figures, and describing the two-dimensional shapes and three-dimensional figures in the structure

C.3. Describing and representing the relative locations of objects, and represent objects on a map
• Describing the relative locations and the movements of objects on a map
• Drawing simple maps of familiar settings, and describing the relative locations of objects on the maps
• Creating and describing symmetrical designs using a variety of tools

Patterning and Algebra
D.1. Identifying, describing, extending, and creating repeating patterns, growing patterns, and shrinking patterns
• Identifying and describing, through investigation, growing patterns and shrinking patterns generated by the repeated addition or subtraction of 1’s, 2’s, 5’s, 10’s, and 25’s on a number line and on a hundreds chart
• Identifying, describing, and creating, through investigation, growing patterns and shrinking patterns involving addition and subtraction, with and without the use of calculators
• Identifying repeating, growing, and shrinking patterns found in real-life contexts
• Representing a given growing or shrinking pattern in a variety of ways
• Creating growing or shrinking patterns
• Creating a repeating pattern by combining two attributes
• Demonstrating, through investigation, an understanding that a pattern results from repeating an operation or making a repeated change to an attribute

D.2. Demonstrating an understanding of the concept of equality between pairs of expressions, using concrete materials, symbols, and addition and subtraction to 18
• Demonstrating an understanding of the concept of equality by partitioning whole numbers to 18 in a variety of ways, using concrete
• Representing, through investigation with concrete materials and pictures, two number expressions that are equal, using the equal sign
• Determining the missing number in equations involving addition and subtraction to 18, using a variety of tools and strategies
• Identifying, through investigation, and using the commutative property of addition
• Identifying, through investigation, the properties of zero in addition and subtraction

Data Management and Probability

E.1. Collecting and organizing categorical or discrete primary data and display the data, using tally charts, concrete graphs, pictographs, line plots, simple bar graphs, and other graphic organizers, with labels ordered appropriately along horizontal axes, as needed
• Demonstrating an ability to organize objects into categories, by sorting and classifying objects using two attributes simultaneously
• Gathering data to answer a question, using a simple survey with a limited number of responses
• Collecting and organizing primary data that is categorical or discrete

E.2. Reading and describing primary data presented in tally charts, concrete graphs, pictographs, line plots, simple bar graphs, and other graphic organizers
• Reading primary data presented in concrete graphs, pictographs, line plots, simple bar graphs, and other graphic organizers, and describing the data using mathematical language
• Posing and answering questions about class generated data in concrete graphs, pictographs, line plots, simple bar graphs, and tally charts
• Distinguishing between numbers that represent data values and numbers that represent the frequency of an event
• Demonstrating an understanding of data displayed in a graph, by comparing different parts of the data and by making statements about the data as a whole

E.3. Describing probability in everyday situations and simple games
• Describing probability as a measure of the likelihood that an event will occur, using mathematical language
• Describing the probability that an event will occur, through investigation with simple games and probability experiments and using mathematical language
Grade 3 (ages 8-9)

Number Sense and Numeration

A.1. Reading, representing, comparing, and ordering whole numbers to 1000, and using concrete materials to represent fractions and money amounts to $10
• Representing, comparing, and ordering whole numbers to 1000, using a variety of tools
• Reading and printing in words whole numbers to one hundred, using meaningful contexts
• Identifying and representing the value of a digit in a number according to its position in the number
• Composing and decomposing three-digit numbers into hundreds, tens, and ones in a variety of ways, using concrete materials
• Rounding two-digit numbers to the nearest ten, in problems arising from real-life situations
• Representing and explaining, using concrete materials, the relationship among the numbers 1, 10, 100, and 1000
• Dividing whole objects and sets of objects into equal parts, and identifying the parts using fractional names, without using numbers in standard fractional notation
• Representing and describing the relationships between coins and bills up to $10
• Estimating, counting, and representing the value of a collection of coins and bills with a maximum value of $10
• Solving problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 1000

A.2. Demonstrating an understanding of magnitude by counting forward and backwards by various numbers and from various starting points
• Counting forward by 1’s, 2’s, 5’s, 10’s, and 100’s to 1000 from various starting points, and by 25’s to 1000 starting from multiples of 25, using a variety of tools and strategies
• Counting backwards by 2’s, 5’s, and 10’s from 100 using multiples of 2, 5, and 10 as starting points, and counting backwards by 100’s from 1000 and any number less than 1000, using a variety of tools and strategies

A.3. Solving problems involving the addition and subtraction of single- and multi-digit whole numbers, using a variety of strategies, and demonstrating an understanding of multiplication and division
• Solving problems involving the addition and subtraction of two-digit numbers, using a variety of mental strategies
• Adding and subtracting three-digit numbers, using concrete materials, student generated algorithms, and standard algorithms
• Using estimation when solving problems involving addition and subtraction, to help judge the reasonableness of a solution
• Adding and subtracting money amounts, using a variety of tools, to make simulated purchases and change for amounts up to $10
• Relating multiplication of one-digit numbers and division by one-digit divisors to real life situations, using a variety of tools and strategies
• Multiplying to 7 x 7 and divide to 49 ÷ 7, using a variety of mental strategies

Measurement

B.1. Estimating, measuring, and recording length, perimeter, area, mass, capacity, time, and temperature, using standard units
• Estimating, measuring, and recording length, height, and distance, using standard units
• Drawing items using a ruler, given specific lengths in centimeters
• Reading time using analogue clocks, to the nearest five minutes, and using digital clocks, and represent time in 12-hour notation
• Estimating, reading, and recording positive temperatures to the nearest degree Celsius
• Identifying benchmarks for freezing, cold, cool, warm, hot, and boiling temperatures as they relate to water and for cold, cool, warm, and hot temperatures as they relate to air
• Estimating, measuring, and recording the perimeter of two-dimensional shapes, through investigation using standard units
• Estimating, measuring, and recording area
• Choosing benchmarks for a kilogram and a litre to help them perform measurement tasks
• Estimating, measuring, and recording the mass of objects, using the standard unit of the kilogram or parts of a kilogram
• Estimating, measuring, and recording the capacity of containers, using the standard unit of the litre or parts of a litre

B.2. Comparing, describing, and order objects, using attributes measured in standard units
• Comparing standard units of length, and selecting and justifying the most appropriate standard unit to measure length
• Comparing and ordering objects on the basis of linear measurements in centimetres and/or metres in problem-solving contexts
• Comparing and ordering various shapes by area, using congruent shapes and grid paper for measuring
• Describing, through investigation using grid paper, the relationship between the size of a unit of area and the number of units needed to cover a surface
• Comparing and ordering a collection of objects, using standard units of mass and/or capacity
• Solving problems involving the relationships between minutes and hours, hours and days, days and weeks, and weeks and years, using a variety of tools

Geometry and Spatial Sense

C.1. Comparing two-dimensional shapes and three-dimensional figures and sorting them by their geometric properties
• Using a reference tool to identify right angles and to describe angles as greater than, equal to, or less than a right angle
• Identifying and comparing various polygons and sort them by their geometric properties
• Comparing various angles, using concrete materials and pictorial representations, and describing angles as bigger than, smaller than, or about the same as other angles
• Comparing and sorting prisms and pyramids by geometric properties, using concrete materials
• Constructing rectangular prisms, and describing geometric properties of the prisms

C.2. Describing relationships between two-dimensional shapes, and between two-dimensional shapes and three-dimensional figures
• Solving problems requiring the greatest or least number of two-dimensional shapes needed to compose a larger shape in a variety of ways
• Explaining the relationships between different types of quadrilaterals
• Identifying and describing the two-dimensional shapes that can be found in a three dimensional figure
• Describing and naming prisms and pyramids by the shape of their base
• Identifying congruent two-dimensional shapes by manipulating and matching concrete materials
C.3. Identifying and describing the locations and movements of shapes and objects
• Describing movement from one location to another using a grid map
• Identifying flips, slides, and turns, through investigation using concrete materials and physical motion, and name flips, slides, and turns as reflections, translations, and rotations
• Completing and describing designs and pictures of images that have a vertical, horizontal, or diagonal line of symmetry

Patterning and Algebra

D.1. Describing, extending, and creating a variety of numeric patterns and geometric patterns
• Identifying, extending, and creating a repeating pattern involving two attributes, using a variety of tools
• Identifying and describing, through investigation, number patterns involving addition, subtraction, and multiplication, represented on a number line, on a calendar, and on a hundreds chart
• Extending repeating, growing, and shrinking number patterns
• Creating a number pattern involving addition or subtraction, given a pattern represented on a number line or a pattern rule expressed in words
• Representing simple geometric patterns using a number sequence, a number line, or a bar graph
• Demonstrating, through investigation, an understanding that a pattern results from repeating an action, repeating an operation, using a transformation, or making some other repeated change to an attribute

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

E.1. Collecting and organizing categorical or discrete primary data and displaying the data using charts and graphs, including vertical and horizontal bar graphs, with labels ordered appropriately along horizontal axes, as needed
• Demonstrating an ability to organize objects into categories, by sorting and classifying objects using two or more attributes simultaneously
• Collecting data by conducting a simple survey about themselves, their environment, issues in their school or community, or content from another subject
• Collecting and organizing categorical or discrete primary data and display the data in charts, tables, and graphs, with appropriate titles and labels and with labels ordered appropriately along horizontal axes, as needed, using many-to-one correspondence

E.2. Reading, describing, and interpreting primary data presented in charts and graphs, including vertical and horizontal bar graphs
• Reading primary data presented in charts, tables, and graphs, then describing the data using comparative language, and describe the shape of the data
• Interpreting and drawing conclusions from data presented in charts, tables, and graphs
• Demonstrating an understanding of mode, and identify the mode in a set of data

E.3. Predicting and investigating the frequency of a specific outcome in a simple probability experiment
• Predicting the frequency of an outcome in a simple probability experiment or game, then perform the experiment, and compare the results with the predictions, using mathematical language
• Demonstrating, through investigation, an understanding of fairness in a game and relating this to the occurrence of equally likely outcomes