OVERVIEW

A continuum of proficiency in foundational **Math** skills from Kindergarten through Grade 4.

The grade level proficiency descriptors highlight what key foundational learning may look like for a proficient student in relation to the **Math** curriculum

Each **ASPECT** represents a set of foundational math knowledge.

A proficient student must develop, practice, and demonstrate each aspect to be proficient.

All aspects are important when building mathematical knowledge.

Each **SUB-ASPECT** further defines the foundational knowledge within each aspect.

The **DESCRIPTOR** is grade specific and describes what proficient student learning looks like at the end of the year/term

DEFINITIONS, further explanation of the developmental progression of key concepts, and example teaching strategies which support the **foundational proficiency descriptors** can be found here.

K-4 Foundational Math Learning Progressions

Aspect: Number Sense
The student can develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving in order to:

Sub-aspect	Kindergarten	Gr. 1	Gr. 2	Gr. 3	Gr. 4

Whole number concepts	For numbers up to 10:
	• Accurately count (**stable order counting**):
	  ○ Forwards from 1 to 10
	  ○ Backwards from 10 to 1
	  ○ Forwards to 10 from different starting points
	  ○ Backwards to 1 from different starting points
	  ○ A group of up to 10 objects (**one-to-one correspondence**)
	  ○ A group of up to 10 objects which has been rearranged (**conservation**)
	• Visually represent the number of objects in a group in **concrete, pictorial, and symbolic forms** such as using a numeral, using manipulatives such as interlocking cubes, or using tally marks (**cardinality**), to make sense of quantities
	• Write the numerals 0-9
	• Instantly recognizes the number of objects (**subitizing**) in sets up to 5 (e.g. images, objects, dots, ten frame)
		For numbers up to 20:
		• Accurately count (**stable order counting**):
		  ○ Forwards from 1 to 20
		  ○ Backwards from 20 to 1
		  ○ Forwards to 20 from different starting points
		  ○ **Skip count** by 2, 5, and 10
		• Compare and order numbers to make sense of quantities:
		  ○ Use relational language (e.g. more than, less than, equal to)
		  ○ Identify surrounding numbers using tools such as a number line or hundreds chart (e.g. 1 more or 2 less)
		  ○ Recognize numbers as odd or even
		• Visually represent the number of objects in a group in **concrete, pictorial, and symbolic forms** such as with a numeral, manipulatives such as interlocking cubes, or tally marks (**cardinality**) in order to make sense of quantities
		• Write the numbers 0-20
			For numbers up to 100,
			• Compare and order numbers to make sense of quantities
			• **Skip-count** by 2, 5, and 10, using different starting points
			• Backward **skip count**
			• Identify surrounding numbers (+1, +2, and +10, -1, -2, and -10)
			• Recognize if a number is odd or even and explain why (concept of pairs: even numbers can be decomposed to pairs)
			• Estimate the number of objects in a set up to 100 by **decomposing** the set into smaller sets or using **referents/benchmarks**
			• Understand **place value** as the relationship between the digits within a number and their value, to 99 (e.g., the digit 4 in 49 has the value of 40)
			  ○ Understand how numbers can be decomposed into 10s and 1s. (e.g. 47 is 4 tens and 7 ones, 100 is 10 tens OR 100 ones)
			  ○ Visually represent place value concepts in **concrete, pictorial, and symbolic forms** such as using base-10 blocks or expanded form of numbers
				For numbers up to 1000,
				• Compare and order numbers to make sense of quantities
				• **Skip-count** by 2, 5, and 10, using different starting points
				• Backward **skip count**
				• Recognize if a number is odd or even and explain why (concept of pairs/dividing by 2: even numbers can be divided into 2 equal groups)
				• Estimate the number of objects in a set up to 1000 by **decomposing** the set into smaller sets or using **referents/benchmarks**
				• Understand **place value** as the relationship between the digits within a number and their value, to 999 (e.g., the digit 4 in 342 has the value of 40 ones or 4 tens) to make sense of quantities
				  ○ Understand how numbers can be decomposed into 100s, 10s and 1s. (i.e. 140 is 14 tens OR 140 ones or 1 hundred, 4 tens and 0 ones)
				  ○ Use **concrete, pictorial, and symbolic forms** of number to explore place-value based counting patterns (e.g. counting by 10s, 100s)
				  ○ Understand the role of zero as a placeholder (e.g. 701 means that there are 0 tens)
				  ○ Explore patterns in base-10 numbers (e.g. six 10s is 60, six 100s is 600)
				  ○ Expanded form (e.g. 123 = 100 + 20 + 3)
					For numbers up to 10 000,
					• Visually represent numbers in **concrete, pictorial, and symbolic forms**
					• Compare and order numbers
					• Use flexible counting strategies (e.g. parts- whole knowledge, benchmark numbers like multiples of 5 and 10, 25s, **skip counting** forwards and backwards)
					• Estimate the number of objects in a set up to 10 000 by **decomposing** the set into smaller sets (**benchmarks**)
					• Understand **place value** as the relationship between the digits within a number and their value, to 9999 (e.g., the digit 4 in 8342 has the value of 40 ones or 4 tens or the digit 8 is worth 8000) to make sense of quantities
					  ○ Understand how numbers can be **decomposed** (i.e. 8342 can be decomposed to 4000 and 4342 or) and connect to expanded form (e.g. 8342 = 800 0+ 300 + 40 + 2)
					  ○ Use **concrete, pictorial, and symbolic forms** of number to explore place-value based counting patterns (e.g., counting by 10s, 100s)
					  ○ Understand the role of zero as a placeholder (e.g. 701 means that there are 0 tens)

Whole Number Concepts: Students develop an understanding that numbers can represent a quantity. They also learn how to communicate numbers:
- symbolically (ie writing numerals)
- orally (ie counting out loud)
- visually (ie tally marks or manipulatives such as base-10 blocks)

As students move to higher grades, they investigate relationships and patterns between numbers such as concepts of place value to be able to fluently add, subtract, multiply, and divide.

Aspect: Number Sense The student can develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving in order to:					
Sub-aspect	**Kindergarten**	**Gr. 1**	**Gr. 2**	**Gr. 3**	**Gr. 4**

Whole number concepts	For numbers up to 10:
	• Accurately count (**stable order counting**):
	  ○ Forwards from 1 to 10
	  ○ Backwards from 10 to 1
	  ○ Forwards to 10 from different starting points
	  ○ Backwards to 1 from different starting points
	  ○ A group of up to 10 objects (**one-to-one correspondence**)
	  ○ A group of up to 10 objects which has been rearranged (**conservation**)
	• Visually represent the number of objects in a group in **concrete, pictorial, and symbolic forms** such as using a numeral, using manipulatives such as interlocking cubes, or using tally marks (**cardinality**), to make sense of quantities
	• Write the numerals 0-9
	• Instantly recognizes the number of objects (**subitizing**) in sets up to 5 (e.g. images, objects, dots, ten frame)
		For numbers up to 20:
		• Accurately count (**stable order counting**):
		  ○ Forwards from 1 to 20
		  ○ Backwards from 20 to 1
		  ○ Forwards to 20 from different starting points
		  ○ **Skip count** by 2, 5, and 10
		• Compare and order numbers to make sense of quantities:
		  ○ Use relational language (e.g. more than, less than, equal to)
		  ○ Identify surrounding numbers using tools such as a number line or hundreds chart (e.g. 1 more or 2 less)
		  ○ Recognize numbers as odd or even
		• Visually represent the number of objects in a group in **concrete, pictorial, and symbolic forms** such as with a numeral, manipulatives such as interlocking cubes, or tally marks (**cardinality**) in order to make sense of quantities
		• Write the numbers 0-20
			For numbers up to 100,
			• Compare and order numbers to make sense of quantities
			• **Skip-count** by 2, 5, and 10, using different starting points
			• Backward **skip count**
			• Identify surrounding numbers (+1, +2, and +10, -1, -2, and -10)
			• Recognize if a number is odd or even and explain why (concept of pairs: even numbers can be decomposed to pairs)
			• Estimate the number of objects in a set up to 100 by **decomposing** the set into smaller sets or using **referents/benchmarks**
			• Understand **place value** as the relationship between the digits within a number and their value, to 99 (e.g., the digit 4 in 49 has the value of 40)
			  ○ Understand how numbers can be decomposed into 10s and 1s. (e.g. 47 is 4 tens and 7 ones, 100 is 10 tens OR 100 ones)
			  ○ Visually represent place value concepts in **concrete, pictorial, and symbolic forms** such as using base-10 blocks or expanded form of numbers
				For numbers up to 1000,
				• Compare and order numbers to make sense of quantities
				• **Skip-count** by 2, 5, and 10, using different starting points
				• Backward **skip count**
				• Recognize if a number is odd or even and explain why (concept of pairs/dividing by 2: even numbers can be divided into 2 equal groups)
				• Estimate the number of objects in a set up to 1000 by **decomposing** the set into smaller sets or using **referents/benchmarks**
				• Understand **place value** as the relationship between the digits within a number and their value, to 999 (e.g., the digit 4 in 342 has the value of 40 ones or 4 tens) to make sense of quantities
				  ○ Understand how numbers can be decomposed into 100s, 10s and 1s. (i.e. 140 is 14 tens OR 140 ones or 1 hundred, 4 tens and 0 ones)
				  ○ Use **concrete, pictorial, and symbolic forms** of number to explore place-value based counting patterns (e.g. counting by 10s, 100s)
				  ○ Understand the role of zero as a placeholder (e.g. 701 means that there are 0 tens)
				  ○ Explore patterns in base-10 numbers (e.g. six 10s is 60, six 100s is 600)
				  ○ Expanded form (e.g. 123 = 100 + 20 + 3)
					For numbers up to 10 000,
					• Visually represent numbers in **concrete, pictorial, and symbolic forms**
					• Compare and order numbers
					• Use flexible counting strategies (e.g. parts- whole knowledge, benchmark numbers like multiples of 5 and 10, 25s, **skip counting** forwards and backwards)
					• Estimate the number of objects in a set up to 10 000 by **decomposing** the set into smaller sets (**benchmarks**)
					• Understand **place value** as the relationship between the digits within a number and their value, to 9999 (e.g., the digit 4 in 8342 has the value of 40 ones or 4 tens or the digit 8 is worth 8000) to make sense of quantities
					  ○ Understand how numbers can be **decomposed** (i.e. 8342 can be decomposed to 4000 and 4342 or) and connect to expanded form (e.g. 8342 = 800 0+ 300 + 40 + 2)
					  ○ Use **concrete, pictorial, and symbolic forms** of number to explore place-value based counting patterns (e.g., counting by 10s, 100s)
					  ○ Understand the role of zero as a placeholder (e.g. 701 means that there are 0 tens)

Fractions, decimals, percentages,				• Understand that **fractions** can represent parts of a whole or parts of a set (e.g. 2 out of 15 buttons are blue).	**Fractions** • Visually represent a fraction in **concrete, pictorial, and symbolic**

and ratio concepts				• Visually represent a fraction in **concrete** (e.g. measuring cups for baking), **pictorial** (e.g. on a number line), and **symbolic** (e.g. ½) forms	**forms** as part of a whole (part of an area), part of a set, using a number line, or as a part of a standard measurement. • Order and compare fractions with the same denominators. • Order and compare fractions using visual representations or math vocabulary for fraction benchmarks (e.g, zero, half, whole) **Decimals to hundredths** • Visually represent a decimal to hundredths in **concrete, pictorial, and symbolic forms**; as part of a whole (part of an area), part of a set, using a number line, or as a part of a standard measurement. • Order and compare decimals to hundredths using visual representations • Compose and decompose decimal numbers by connecting decimal place value and whole number place value concepts (e.g. by using models such as base-10 blocks, hundreds chart) • Use math vocabulary for decimal benchmarks (e.g, tenth, half, hundredth, whole) to make connections to fractions with denominators of 2, 10, and 100

Whole Number Concepts: Students develop an understanding that numbers can represent a quantity. They also learn how to communicate numbers:

- symbolically (ie writing numerals)
- orally (ie counting out loud)
- visually (ie tally marks or manipulatives such as base-10 blocks)

As students move to higher grades, they investigate relationships and patterns between numbers such as concepts of place value to be able to fluently add, subtract, multiply, and divide.

Fractions, decimals, percentages, and ratio concepts

Fractions, decimals, and percentages are numbers that represent an amount or quantity that is not a whole number**.** Fractions, decimals, percentages, and ratios can also represent part of an area or part of a set of objects.

Definitions:

Stable order counting: accurately counting numbers in the correct sequence
One-to-one correspondence: using one number per object for accurate counting
Cardinality: knowing that numbers can represent the quantity in a set
Conservation: knowing the number of objects remains the same despite the size of objects or how they are organized
Subitize: Instantly recognizing how many there are in a set without counting. Subitizing can usually be done for a group of up to 5 objects
Decompose: Breaking down a number or shape into smaller or simpler parts. For example, 12 = 10 + 2.

Referents: concrete object or objects that can be used to help with an estimate. For example, if I know the distance between my wrist and my elbow is about 30 cm (the length of a ruler) then I can estimate that the desk is about 60 cm in height.
Benchmarks: standard or reference numbers that are easy to comprehend and use in mathematics, such as 5, 10, 100, 1000, 25, 50
Concrete forms: manipulatives such as 10 frames, base 10 blocks, counters
Pictorial forms: pictures, graphs
Symbolic forms: numerals, tallies, mathematical notation such as <. >, =
Place value: the relationship between the digits within a number and their value, e.g., the digit 4 in 49 has the value of 40
Skip counting: method of counting in which students add a number to the previous number. For example, skip counting by 5, starting at 0 is 0, 5, 10, 15, ...
Fractions: quantities that are not a whole number. The denominators of fractions represent equal-sized portions of a whole or unit and the numerators represent the number of portions within the fraction. For example, 2/3 represents 2 portions out of a whole that has been divided into 3 portions.

Aspect: Operational Sense The student can develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving in order to:					
Sub-aspect	**Kindergarten**	**Gr. 1**	**Gr. 2**	**Gr. 3**	**Gr. 4**
Knowledge and fluency of math facts • Addition and subtraction • Multiplication and division	**In kindergarten, students learn patterns and relationships between numbers up to 10 as a foundation to the development of math fact fluency and to the understanding of operations with larger numbers in later grades.** • Apply visual and mental math tools and strategies (such as a 10 frame, using manipulatives, or **skip counting**) to observe patterns in and relationships between numbers up to 10 • Compare quantities using relational math vocabulary (e.g. more, less, equal) • Apply whole number concepts to begin to add (join sets together) or subtract (decompose or split sets) sets of up to 10 objects • **Decompose** a set of objects, pictures, or symbols	• Apply visual and mental math tools and strategies (such as a 10 frame, using manipulatives, or **skip counting**) to observe patterns in numbers up to 20 • Represent addition and subtraction in **concrete, pictorial, and symbolic forms** • Describe and use **computational and mental math strategies** • Understand and apply math vocabulary such as addition, subtraction, equation, plus, minus, equal, sum, take away, difference • Understand that addition and subtraction are related/opposite operations (e.g. **fact families** such as 2 + 7 = 9 and 9 – 7 = 2)	• Develop addition and subtraction fact fluency for numbers up to 20 using a variety of **strategies** • Represent and observe patterns in numbers up to 20 using tools and strategies such as a 10 frame or using manipulatives • Begin to use **computational and mental math strategies**	• Develop an understanding of, accuracy, and fluency in addition and subtraction facts for numbers up to 20 using a variety of **strategies** • Use **oral**, **concrete, pictorial, and symbolic** representations of math facts up to 20. • Proficiently use **computational and mental math strategies**	**Addition and subtraction facts to 20** • Quickly and accurately recall addition and subtraction facts for numbers up to 20 • Proficiently use **computational and mental math strategies** including additive strategies (joining groups of different sizes) and related/opposite operations (e.g. **fact families** such as 12 + 7 = 19 and 19 – 7 = 12) • Use math facts in a variety of activities such as games, discussions (number talks) and problem solving • Reflect on and adjust thinking, incorporate ideas of others, and explain and justify strategies for addition and subtraction **Multiplication and division facts to 100** • Begin to develop multiplication and division fact fluency for numbers up to 100 using a variety of **strategies** • Quickly and accurately recall the 2s, 5s, 10s multiplication facts • Use **oral, concrete, pictorial, and symbolic** representations of multiplication and division math facts for numbers up to 100.
Understanding of Operations • Addition and subtraction • Multiplication and division		• Solve addition and subtraction problems with sums up to 20 • Apply an understanding of addition and subtraction to 20 to solve **contextual problems** • Choose the appropriate operation and strategy to solve a **contextual problem**	• Solve addition and subtraction problems with sums up to 100 • Visually represent adding and subtracting to 100 using **concrete, pictorial, and symbolic** forms. • Estimate sums and differences to 100 • Apply an understanding of addition and subtraction to 100 to solve **contextual problems** • Choose an appropriate operation and strategy to solve a **contextual problem**	• Solve addition and subtraction problems with sums up to 1 000 • Visually represent adding and subtracting to 1 000 using **concrete, pictorial, and symbolic** forms . • Estimate sums and differences to 1 000 • Apply an understanding of addition and subtraction to 1 000 to solve **contextual problems** • Choose an appropriate operation and strategy to solve a **contextual problem**	**Addition and subtraction to 10 000** **Addition and subtraction of decimals to hundredths** • Solve addition and subtraction problems with sums up to 10 000 and decimal numbers to the tenths and hundredths • Visually represent adding and subtracting using **concrete, pictorial, and symbolic** forms • Apply understanding of concepts of place value, and composition and decomposition of whole and decimal

				Concepts of multiplication and division • Visually represent multiplication as groups of equal numbers of objects, arrays, repeated addition, **skip counting** mentally or using a number line or hundred chart • Visually represent division as equal sharing, grouping, repeated subtraction, backwards **skip counting** • Understand that multiplication and division are related/opposite operations (e.g. Fact families such as 2 x 7 = 14 and 14 / 7 = 2)	numbers, to solve addition and subtraction problems • Estimate sums and differences to 10 000 • Apply an understanding of addition and subtraction to solve **contextual problems** • Choose an appropriate operation and strategy to solve a **contextual problem.** Reflect and justify the use of a variety of strategies in problem solving. **Multiplication and division of two- or three-digit numbers by one-digit numbers** • Define **multiplication** and **division.** Understand the relationships between multiplication and repeated addition, division and repeated subtraction, and multiplication and division (inverse operations) • Visually represent multiplication and division using **concrete, pictorial, and symbolic** forms • Understand, analyze, choose, reflect, and justify the use of a variety of **strategies** for multiplication and division. Flexibly use multiple computational strategies • Model, understand and explain multiplication by 0 and 1, division by 1, and why division by 0 is not possible • Apply an understanding of multiplication and division to solve **contextual problems**. Choose an appropriate operation and strategy to solve a **contextual problem**. Reflect and justify the use of a variety of strategies in problem solving.

Knowledge and fluency of math facts

- Addition and subtraction
- Multiplication and division

Students are introduced to and practice **math facts** (quick and accurate knowledge of addition/subtraction and multiplication/division facts) to build arithmetic fluency. **Fact fluency** (accurate, efficient and flexible knowledge of math facts) based on whole number understanding (ie multiplication is repeated addition, or number patterns) is encouraged rather than memorization of discrete facts. Various visual and oral methods (such as a hundred chart or multiplication table, using manipulatives, or skip counting) should be utilized in the classroom.

Definitions:
Decompose: Breaking down a number or shape into smaller or simpler parts. For example, 12 = 3 x 4 or 3 groups of 4
Benchmarks: standard or reference numbers that are easy to comprehend and use in mathematics, such as 5, 10, 100, 1000, 25, 50
Referent: A known or familiar quantity that is used to help estimate or understand other quantities. (e.g. A baseball bat could be used to show the length of a metre)
Concrete forms: manipulatives such as 10 frames, base 10 blocks, counters
Pictorial forms: pictures, graphs
Symbolic forms: numerals, tallies, mathematical notation such as <. >, =

Strategies:
Computational and mental math strategies: counting on and counting back, doubles and related doubles, making 10, bridging over 10, decomposing, using known facts, (aka 10-pairs, friendly numbers), benchmarks of 5 and 10, **commutative property**, skip counting and estimation

- **Bridging over:** A mental math strategy used to simplify addition and subtraction, by "bridging" to the closest whole number, typically a group of ten. (Ex. 8+5. The 8 can be "bridged" to 10 by adding 2. Then, just add the remaining 3)
- **Skip counting:** method of counting in which students add a number to the previous number. For example, skip counting by 5, starting at 0 is 0, 5, 10, 15, …
- **Fact families:** A group of related math facts (Ex. 2 + 3 = 5 and 5 – 2 = 3)
- **Commutative property:** the order of the numbers in an addition equation does not change the sum, ie 3 + 5 = 5 + 3 = 8
- **Oral strategies:** stories, songs, poems, picture books

Understanding of Operations

- Addition and subtraction
- Multiplication and division

The development and practice of multiple strategies builds flexibility in doing arithmetic operations as students apply and select strategies to use in different contexts. Operational understanding builds on fluency in math facts and requires an understanding of concepts such as place value to be able to add, subtract, multiply, and divide larger numbers beyond known math facts.

Definitions:
Contextual problem/experience: a problem that is set within a real-world or practical situation, requiring students to apply mathematical concepts to solve it. Students identify and apply the best mathematical strategy to fit the context based on their current knowledge and available tools.

Strategies:
Multiplication and division: Students' use of strategies which utilize an understanding of place value (e.g. partial quotient or area model) develop and practice both number sense and computational understanding. These strategies are encouraged, rather than teaching traditional algorithms which rely on digit math and memorization of an algorithm (e.g. long division)

Aspect: Algebraic Thinking The student can develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving in order to:					
Sub-aspect	**Kindergarten**	**Gr. 1**	**Gr. 2**	**Gr. 3**	**Gr. 4**
Patterning	• Identify the **core** of a pattern consisting of 2 or 3 repeating elements • Sort and classify patterns using a single **attribute** • Identify patterns in the world: art, music, dance, movement, Indigenous beadwork, textiles • Represent different types of patterns in **concrete, pictorial, and symbolic forms** e.g. visual: shape, letter; physical: rhythm, movement pattern	• Identify the **core** of a pattern consisting of 3 to 5 repeating elements • Compare the **attributes** of repeating patterns • Identify and describe pattern rules. Represent pattern rules in symbolic forms, e.g. using letter codes like ABABAB • Translate patterns from one representation to another (e.g., an orange-blue pattern could be represented by a circle-square pattern) • Predict an element in a repeating pattern • Create their own repeating pattern with 3 elements • Explore patterns in the environment and in daily life	• Identify the **core** of patterns and the relationship between elements within a pattern • Represent pattern rules in symbolic forms, e.g. Using letter codes like ABBABBABB • Predict elements of and extend a pattern using reasoning • Explore repeating patterns in **concrete, pictorial, and symbolic forms** (e.g. using manipulatives, sounds, actions, numbers 0 to 100, colours, shapes, and in the real world) • Explore complex repeating patterns (e.g., positional patterns, circular patterns) • Explore increasing numerical patterns in **concrete, pictorial, and symbolic forms** (e.g., skip-counting by 2s or 5s on a hundred chart)	• Represent pattern rules in symbolic forms, e.g. using letter codes like ABCABCABC and extend a pattern using reasoning • Explore complex repeating patterns (e.g., positional patterns, circular patterns) • Explore increasing and decreasing numerical patterns in **concrete, pictorial, and symbolic forms** (e.g., skip-counting by 2s or 5s on a hundred chart)	• Represent changes in patterns using tables, charts, and graphs. Use mathematical vocabulary to describe changes in patterns. • Represent pattern rules for increasing and decreasing patterns in **concrete, pictorial, and symbolic forms** • Explore more complex repeating, increasing, and decreasing patterns in the real world e.g. salmon counts by season, monthly average temperatures

Algebraic Thinking	• Model equality as balanced and inequality as imbalanced using concrete and pictorial models (e.g., using a pan balance with cubes on each side to show equal and not equal)
	• Accurately use **symbols of equality** (= sign)
	• Make connections to operational sense: decomposing and recomposing quantities to 10 (eg how many more objects are needed to make 10?)
		• Accurately use **symbols of equality and inequality** (= or ≠)
		• Create accurate addition and subtraction equations for numbers up to 20
		• Demonstrate **change tasks** and explain reasoning
			• Use **symbols of equality and inequality (< > = ≠).** Understand that equal quantities can be made in different ways, e.g. 14 + 6 = 3 + 17
			• Describe **change tasks** and explain reasoning
			• Explore and describe **equivalents** in the real world (connection to measurement, e.g. 1 m = 100 cm)
				• Solve one-step addition and subtraction equations with an unknown number
				• Make connections to change in quantity e.g.:
				  ○ Start unknown (e.g., n + 15 = 20 or □ + 15 = 20)
				  ○ Change unknown (e.g., 12 + n = 20 or 12 + □ = 20)
				  ○ Result unknown (e.g., 6 + 13 = n or 6 + 13 = □)
					• Make connections to patterns and representing changes in patterns using tables, charts, and graphs
					• Explore algebraic relationships by using **ratio tables**
					• Represent and solve one-step equations for all operations involving an unknown number (e.g., ___ + 4 = 15, 15 – □ = 11)
					  ○ Start unknown (e.g., n + 15 = 20; 20 – 15 = □)
					  ○ Change unknown (e.g., 12 + n = 20)
					  ○ Result unknown (e.g., 6 + 13 = __)
					• Explain and justify thinking by using manipulatives or visual representations

Patterning Noticing repetition in patterns helps students develop skills to observe, identify, and classify, and supports developing prediction skills.					

Definitions:
Core: repeating element in a pattern
Attribute: description of elements in a pattern, such as colour, shape, size, number/letter/symbol, object, direction, position

Algebraic Thinking
Algebraic thinking includes recognizing and analyzing patterns, studying and representing relationships between numbers and in context, making generalizations, and analyzing change. Students also explore concepts and symbols of equality

Definitions:
Symbols of equality and inequality: The = sign means "the same as", e.g. 4 + 6 = 3 + 7. elements on both sides of the = sign are balanced regardless of size or shape
Change tasks: demonstrating changing a quantity using concrete, pictorial, and symbolic models (e.g. using manipulatives, showing changing 8 to 12 objects by adding 4 objects)
Equivalents: quantities that are equal in value, function, amount, or meaning, but not necessarily number, ie 1 m = 100 cm, 4 quarters = 1 loonie
Ratio table: list of equivalent quantities to help understand the relationship between the quantities (e.g. a t-chart to record the total number of meals eaten at a camp, per day)
Concrete forms: manipulatives such as counters, loose parts, or blocks
Pictorial forms: pictures, drawings, artwork
Symbolic forms: numbers, letters, symbols

Aspect: Spatial Understanding The student can develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving in order to:					
Sub-aspect	**Kindergarten**	**Gr. 1**	**Gr. 2**	**Gr. 3**	**Gr. 4**
Measurement	• Use **non-standard units** to measure the length, width, height, mass, or capacity of an object • Use math vocabulary to make qualitative comparisons (e.g. bigger, smaller, longer, shorter, wider, narrower, heavier, lighter, holds more, holds less)	• Accurately measure the length of an object, edge to edge • Use **non-uniform** or **uniform** units to measure the length, width, height, mass, or capacity of an object • Use math vocabulary to make qualitative comparisons (e.g. bigger, smaller, longer, shorter, wider, narrower, heavier, lighter, holds more, holds less)	• Use standard metric units (e.g. millimeter, liter, gram) to accurately measure and record the length, width, height, mass, or capacity of an object • Estimate the length, height, and width of an object, using standard metric units (centimeters and millimeters)	• Make connections between the metric system to place value concepts and base-10 • Estimate measurements, using standard metric units and by using referents (e.g., If this cup holds 100 millilitres, about how much does this jug hold?) • Understand units of time (e.g., second, minute, hour, day, week, month, year). Telling time is not expected at this level. • Understand important relationships/conversions between units of time: 1 minute = 60 seconds; 1 hour = 60 minutes; 1 hour = 3600 seconds; 1 day = 24 hours; 1 week = 7 days • Estimate time using environmental references such as natural daily/seasonal cycles, weather patterns. Explore calendar systems from around the world	• Understand how to tell time with analog and digital clocks, including using 12 and 24-hour clocks, and the concept of a.m. and p.m. • Tell time in five-minute intervals; tell time to the nearest minute • Make connections to **skip counting** by 5 and 10 and **base-12** to support telling time with analog clocks • Make connections from benchmark fraction vocabulary to time vocabulary (e.g., half past, quarter to) • Understand and solve problems using important relationships/conversions between units of time: 1 minute = 60 seconds; 1 hour = 60 minutes; 1 hour = 3600 seconds; 1 day = 24 hours; 1 week = 7 days; 365 days = 1 year
2D shapes and 3D objects	• Identify, describe, and create **basic 2D shapes** • Create larger shapes by using smaller shapes (e.g. 2 triangles make a rectangle) by drawing, using digital technology or manipulatives like tangrams • Begin to recognize and identify similarities between **3D objects**. At this level, using specific math terminology to name and identify 3D objects is not expected • Sort 2D shapes and 3D objects using a single **attribute** and explain their thinking	• Identify, describe, and sort **2D shapes** and **3D objects** using a single **attribute** and explain their thinking • Compose and decompose larger 2D shapes by using smaller shapes (e.g. decomposing a hexagon into triangles) by drawing or using digital technology or manipulatives like tangrams • Recognize and identify similarities between **3D objects** and begin to create 3D objects. At this level, using specific math terminology to name and identify 3D objects is not expected • Use mathematical vocabulary to describe **attributes** of shapes	• Identify, describe, and sort **2D shapes** and **3D objects** using **attributes** and explain their thinking • Identify 2D shapes as part of 3D objects (e.g. the face of a cube is a square) • Compose and decompose larger 2D shapes and 3D objects by using smaller shapes (e.g. slicing a round loaf of bread into ovals) by drawing, using digital technology or manipulatives like tangrams • Use mathematical vocabulary to describe **attributes** of shapes • Explore 2D shapes and 3D objects in the real world (e.g. bentwood box, pit houses, soccer ball, boxes, cans, dice)	• Identify, describe, and sort **2D shapes** and **3D objects** using mathematical vocabulary for **attributes** and explain their thinking • Identify 3D objects according to the 2D shapes of the faces, and the number of edges and vertices • Understand the **preservation of shape** • Explore 3D skeletons (shape representation without the faces) and nets (3D object representation if laid flat) • Explore 2D shapes and 3D objects in the real world (e.g. bentwood box, pit houses, soccer ball, boxes, cans, dice)	• Describe and sort regular and **irregular polygons** based on multiple **attributes** • Use mathematical vocabulary for **attributes** of shapes including extending descriptive vocabulary such as curved sides, parallel and perpendicular lines, angles • Explore polygons in the real world e.g. Indigenous blanket patterns, stop signs, building architecture, classroom windows

		• Explore 2D shapes and 3D objects in the real world (e.g. bentwood box, pit houses, soccer ball, boxes, cans, dice)			
Measuring shapes and describing position	• Describe the position of an object qualitatively (e.g. above, below, beside, in front of, behind)	• Describing relative position, using qualitative, positional language (e.g. up and down, in and out)	• Connect qualitative, positional language (e.g. up and down, in and out) with quantitative language (e.g. measurements with metric units)	• Measure an area using square units (e.g. with printed blocks or interlocking cubes). Connect area measurement to concepts of multiplication e.g. arrays • Understand the concepts of perimeter, area, and circumference (the distance around); use of a formula or pi for calculations is not intended at this level	• Measure perimeter and area using manipulatives such as geoboards, pattern blocks, interlocking cubes, base-10 blocks and grids • Connect perimeter measurement to addition and area measurement to multiplication • Create designs that have a mirror image within them using concrete materials such as pattern blocks • Explore shapes in the real world e.g. Indigenous art and engineering such as borders and canoe building, or structures

Measurement
Measurements can use standard units (established systems such as metric) and/or non-standard units (i.e., using hands or blocks to measure height). Comparisons can be descriptive (qualitative) or numerical (quantitative). Includes concepts of time.

Definitions:
Non-standard units: measurement units using everyday objects such as a pencil, arm, shoe
Non-uniform units: not consistent in size e.g., children's hands, pencils)
Uniform units: consistent in size e.g., interlocking cubes, standard paper clips
Base-12: a number system that uses 12 as the basis for a whole. For example, a clock has 12 numbers with each number representing 1 hour and also 5 minutes (12 x 5 minutes = 60 minutes = 1 hour).

2D shapes and 3D objects
Noticing attributes of shapes helps students develop skills to observe, identify, classify, and supports developing creation skills.

Definitions:
Basic 2D shapes: circle, square, rectangle, triangle, heart, diamond
3D objects: sphere, cone, cube, rectangular prism, pyramid
Attributes: Size, shape, colour, faces, edges, vertices
Polygons: An enclosed 2D shape made up of straight lines
Preservation of shape: the orientation/position of a shape will not change its attributes but will change its appearance
irregular polygons: 2D shapes in which all sides may not be equal in length or all angles not equal in measure

Measuring shapes and describing position
Concepts of area, perimeter, and symmetry

Aspect: Collecting and Representing Data The student can develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving in order to:					
Sub-aspect	**Kindergarten**	**Gr. 1**	**Gr. 2**	**Gr. 3**	**Gr. 4**
Graphs and visual representations	• Infer a piece of information from a graph or diagram (such as a tally chart, calendar, bar graph, pictograph)	• Record data using tally marks or manipulatives • Represent information on a graph using **one-to-one correspondence** • Represent data using different representations (e.g. bar graphs, pictographs, tally marks) • Interpret results using comparative language (e.g. more people liked skipping than running)	• Collect data to make sense of the world around them ▪ Record data using tally marks or manipulatives ▪ Represent information on a graph using **one-to-one correspondence** ▪ Represent data using different representations (e.g. bar graphs, pictographs, tally charts) ▪ Interpret results by making quantitative comparisons (e.g. 8 more people liked skipping than running)	• Collect data, create a graph, and describe, compare, and discuss the results ▪ Record data using a chosen method such as tally marks, numerals, or manipulatives ▪ Represent information on a graph using **one-to-one correspondence** ▪ Represent data using different representations (bar graphs, pictographs, tally charts) ▪ Interpret and discuss results by making quantitative comparisons (e.g. 4 people like broccoli, 7 people like brussels sprouts, and 10 people like carrots best. Therefore our class's favourite vegetable is carrots) • Choose a suitable graph or visual to represent the data (e.g. bar graphs are used to compare things between different groups or to track changes over time; pictographs are used to express large amounts of information in a simple manner as it is easy to read)	• Collect data, create a graph, and describe, compare, and discuss the results ○ Record data using a chosen method such as tally marks, counters, or numerals ○ Represent information on a graph using one-to-one correspondence. ○ Represent data using different representations (bar graphs, pictographs, tally charts) ○ Interpret and discuss results by making quantitative comparisons (e.g. average air temperature decreases 10 degrees from October to January) and provide a plausible explanation for why • Choose a suitable graph or visual to represent the data (e.g. bar graphs are used to compare things between different groups or to track changes over time; pictographs are used to express large information in a simple manner as it is easy to read) • Understand **many-to-one correspondence** in graphs: one symbol represents a group or value (e.g., on a bar graph, one square may represent five cookies)
Probability	• Describe the likelihood of a familiar event (such as the chance of snow) using age-appropriate probability language (never, always sometimes, maybe) with supportive reasoning	• Describe the likelihood of a familiar event (such as the chance of snow) using age-appropriate probability language (never, always, sometimes, maybe, unlikely and likely) with supportive reasoning	• Describe the likelihood of familiar life events such as the chance of seeing an eagle, using comparative language related to probability (e.g., certain, uncertain; more, less, or equally likely) with supportive reasoning	• Describe the likelihood of simulated events (such as a coin toss), using comparative language related to probability (e.g., certain, uncertain; more, less, or equally likely) • Develop an understanding of chance through experimentation (e.g., tossing a coin creates a 50-50 chance of landing a head or tail; drawing from a bag, using spinners, and rolling dice all simulate probability events)	• Predict single outcomes of simulated events (e.g., using a spinner which lands on a single colour) and explain their thinking • Predict outcomes of **independent events** and **dependent events** and explain their thinking • In probability experiments: record results using tallies, express probabilities as fractions, and compare the relative probability of different events

Graphs and visual representations
Graphs help to visually represent observations and data. Students build proficiency in inferring information from graphs and collecting data to represent in various types of graphs.

Definitions:
One to one correspondence: on a pictograph, where each picture symbol corresponds to one unit of data

Probability
Students discuss the likelihood of an event using language of probability, such as unlikely or likely (e.g., could it snow tomorrow?). As students move to higher grades they will begin to use more numerical (quantitative) terms such as describing probability with fractions, decimals, percentages, and ratios.

Definitions:
Independent events: when the occurrence of one possibility does not affect the occurrence of the next e.g. using spinners, rolling dice, tossing a coin
Dependent events: when the occurrence of one possibility affects the occurrence of the next e.g. in a deck of cards: if a 5 of spades is selected, the probability of selecting another 5 or another spade is reduced

Aspect: Financial Literacy The student can develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving in order to:					
Sub-aspect	**Kindergarten**	**Gr. 1**	**Gr. 2**	**Gr. 3**	**Gr. 4**
Currency	• Observe and describe Canadian coins (loonies and toonies) by their size and design	• Identify and name Canadian coins (nickels, dimes, quarters loonies, toonies) by their size, design, and value • Sort and count the number of types of coins in a mixed set	• Identify and name the value of Canadian coins (nickels, dimes, loonies, quarters, toonies) • Count the value of a mixed set of coins • Create different combinations of coins to make 100 cents • Solve simple addition and subtraction questions during financial role playing by using a variety of coins	• Count the value of mixed combinations of coins and bills up to $100 • Solve simple addition and subtraction questions during financial role playing by using a variety of coins and bills. Make connections to addition and subtraction up to 100 and explain their thinking process.	• Make financial calculations in real-life contexts using decimal notation • Apply a variety of strategies to calculate totals and make change, such as counting up, counting back, decomposing and rounding to the nearest nickel (base 5), and explain their thinking process

Financial Planning and Decision Making	• Role play financial transactions such as in a restaurant, bakery, or store
	• Make a connection to ways to make 5 and composition to 10 using visual representations of money (e.g., a muffin is $2 and juice is $1; pay with a toonie and a loonie)
	• Make a connection to wants and needs (Career Education, Core Competencies)
		• Role play financial transactions such as in a restaurant, bakery, or store
		• Calculate the total price (in whole numbers) by adding and subtracting to $20
		• Make connections to concepts such as
		  ○ Roles, responsibilities, and jobs in the community (Career Education)
		  ○ Integrating the concept of wants and needs (Core Competencies)
			• Explore the concepts of spending and saving
			• Make connections to concepts such as
			  ○ Roles, responsibilities, and jobs in the community (Career Education)
			  ○ Integrating the concept of wants and needs (Core Competencies)
				• Understand and explore the concept that payments can be made in flexible ways (e.g., cash, cheques, credit, electronic transactions, trading goods and services)
				• Understand and explore the concept that there are different developmentally and contextually appropriate ways of earning money to reach a financial goal (e.g., recycling, holding bake sales, selling items, walking a neighbour's dog)
				• Make connections to concepts such as
				  ○ Roles, responsibilities, and jobs in the community (Career Education)
				  ○ Integrating the concept of wants and needs (Core Competencies)
				  ○ Trading and forms of currency in First Peoples history (Social Studies)
					• Make simple financial decisions involving earning, spending, saving, and giving
					• Understand and explore the concept that payments can be made in flexible ways (e.g., cash, cheques, credit, electronic transactions, trades, goods and services)
					• Understanding that there are different developmentally and contextually appropriate ways of earning money to reach a financial goal (e.g., recycling, holding bake sales, selling items, walking a neighbour's dog)

Currency
Identifying, understanding the value of, and combining coins and bills fluently, with an emphasis on Canadian currency.

Financial Planning and Decision Making
Concepts of earning, saving, spending, and making financial plans and decisions.