DRAFT Kindergarten to Grade 4 Mathematics

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Essential Understanding	**Organizing and representing quantitative information develops additive and multiplicative thinking to make meaningful connections and support problem solving.**				
Guiding Questions	**How can we represent quantities in everyday life with numbers?**	**How can we represent quantities with numbers?**	**How can we use numbers to represent and interpret quantities?**	**How can we represent and interpret numbers?**	**How can we represent and interpret different kinds of numbers?**
Learning Outcomes	**Children explore quantities within 10.**	**Students explore and make meaning of quantities within 100.**	**Students make meaning of quantities within 120.**	**Students make meaning of whole numbers within 1000.**	**Students make meaning of whole numbers within 10 000.**
Conceptual Knowledge	• quantity is "how many" • the purpose of counting is to determine how many (quantify) • each object is counted once and only once (one-to-one correspondence) • the order of words used to count never changes (stable order) • the last number used to count represents the number of objects (cardinality) • when counting, a quantity includes all of the previous numbers (hierarchical inclusion) • the count stays the same no matter how the objects are arranged (conservation of number) • the count stays the same regardless of the order in which the objects are counted (order irrelevance) • anything can be counted (abstraction principle) • quantities can be represented in many ways	• the purpose of counting is to determine how many (quantify) • each object is counted once and only once (one-to-one correspondence) • the order of words used to count never changes (stable order) • the last number used to count represents the number of objects (cardinality) • when counting, a quantity includes all of the previous numbers (hierarchical inclusion) • the count stays the same no matter how the objects are arranged (conservation of number) • the count stays the same regardless of the order in which the objects are counted (order irrelevance) • anything can be counted (abstraction principle) • quantities can be represented in many ways • quantities can be represented symbolically, including "none" represented by 0	• the position of a digit in a number determines its value (place value) • grouping by 10 creates patterns in place value (unitizing) to make working with numbers efficient • skip counting is an efficient way of counting larger quantities and can include quantities left over (remainders) • numbers, including 0, occupy space on a number line • numbers, including 0, can be associated with a specific point • the position of something can be indicated using ordinal numbers • quantities can be represented symbolically with numerals, including 0 • estimation is used when an exact count is not needed	• place value and unitizing applies to larger numbers • place value is the basis for the base-ten number system • estimation can be applied to larger numbers • there are patterns in how numbers are named and represented symbolically • a number line can be extended to include larger numbers and does not have to start at 0	• each place value is 10 times the value of the place to its right • estimation can be applied to larger numbers • there are patterns in how numbers are named and represented symbolically (International System of Units (SI) representation) • a number line can be extended to include larger numbers and does not have to start at 0
Procedural Knowledge	• demonstrating early counting principles, including one-to-one correspondence, stable order, cardinality, conservation of number, hierarchical inclusion, order irrelevance, and abstraction • counting to 10, forward and backward, starting at any number • relating a numeral, 1 to 10, to a specific quantity • exploring different ways to represent whole numbers less than or equal to 10 • building (composing) and breaking apart (decomposing) quantities to 10 concretely • recognizing sets to 6 at a glance (subitizing)	• demonstrating early counting principles, including one-to-one correspondence, stable order, cardinality, conservation of number, hierarchical inclusion, order irrelevance, and abstraction • counting to 100, forward by 1, starting at any number • counting backward from 20 to 0 by 1 • skip counting to 100 forward by 5 and 10 • skip counting to 20 forward by 2 • relating a numeral, 0 to 100, to a specific quantity • representing quantities concretely, pictorially, and symbolically • subitizing to 10	• decomposing numbers using standard form (place value) and non-standard form • skip counting forward and backward by 2, 5, and 10, starting at multiples of 2, 5, and 10 respectively • determining the monetary value of collections of coins and bills of the same denomination using counting by 1 and skip counting by 2, 5, 10, and 25 • skip counting sets, including those with remainders • ordering numbers, including using benchmarks on a number line • recognizing and representing quantities with numbers • estimating quantities using referents	• skip counting forward and backward by 2, 5, 10, and 100, starting at any number • counting and recording the monetary value of collections of coins (cents) or bills (dollars) of varying denominations • estimating quantities using referents • recognizing and representing numbers • ordering numbers, including using benchmarks on a number line	• skip counting by place value units • estimating quantities using referents • recognizing and representing quantities with numbers, including a space between every three digits from the decimal • ordering numbers using benchmarks on a number line

DRAFT Kindergarten to Grade 4 Mathematics

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Competencies	• Managing Information	• Critical Thinking • Managing Information	• Managing Information • Critical Thinking	• Managing Information • Critical Thinking	• Managing Information • Communication • Critical Thinking
Literacy	• LKU3b.K: Vocabulary	None identified	None identified	None identified	None identified
Numeracy	• NA1a.K: Purpose • NKU1b.K: Using Numbers • NKU4b.K: Estimation • NKU4c.K: Methods or Tools • NKU3a.K Interpret/Represent	• NA1a.1: Purpose • NKU1b.1: Using Numbers • NKU1d.1: Patterns and Relationships • NKU4b.1: Estimation • NKU3a.1 Interpret/Represent • NKUC.1 Communication	• NKU1b.1: Using Numbers • NKU1d.1: Patterns and Relationships • NKU4b.1: Estimation • NKU3a.1 Interpret/Represent • NKUC.1 Communication	• NKU1a.1: Magnitude • NKU1b.1: Using Numbers • NKU1d.1: Patterns and Relationships • NKU4b.1: Estimation • NKU3a.1 Interpret/Represent • NKUC.1 Communication	• NKU1a.2: Magnitude • NKU1d.2: Patterns and Relationships • NKU3a.2: Interpretation and Representation of Quantitative Information • NKU4b.2: Estimation • NKUC.2 Communication
Learning Outcomes		**Students make meaning of one-half in familiar contexts.**	**Students make meaning of halves and quarters in familiar contexts.**	**Students make meaning of part-to-whole relationships expressed as fractions.**	**Students make meaning of part-to-whole relationships expressed as fractions and decimals.**
Conceptual Knowledge		• objects and sets can be split (partitioned) into two equal-sized parts (halves)	• objects and sets can be partitioned into equal-sized parts in different ways • the part is related to the whole (part-to-whole relationship)	• fractions are numbers used to represent part-to-whole relationships • fraction notation shows the relationship between the whole (denominator) and the number of parts (numerator) • the denominator indicates the number of pieces in the whole, not the size of the pieces • fractions occupy space on a number line • fractions can be associated with a specific point on a number line	• fractions are numbers used to represent part-to-whole relationships • decimals are numbers used to represent part-to-whole relationships • the same part-to-whole relationship can be represented with fractions of different denominators (equivalent fractions) • the same part-to-whole relationship can be represented with a fraction and a decimal • place value patterns extend to decimals • fractions and decimals occupy space on a number line • fractions and decimals can be associated with a specific point on a number line
Procedural Knowledge		• splitting (partitioning) a set of objects into two equal groups • splitting (partitioning) an object into two equal-sized pieces	• counting by halves and quarters to one whole concretely or pictorially • partitioning objects and sets into halves and quarters • describing part-to-whole relationships with halves and quarters	• partitioning a set, length, and area to create halves, thirds, quarters, fifths, and tenths • representing fractions symbolically • comparing different unit fractions from the same set, length, and area • counting by unit fractions to build one whole, limited to 1/2, 1/3, 1/4, 1/5, and 1/10 • determining the location of a unit fraction on a number line	• relating fractions to decimals, limited to tenths • representing decimals concretely, pictorially, or symbolically, limited to tenths • exploring equivalent fractions concretely or pictorially, limited to denominators of 10 or less • counting beyond 1 using improper fractions, limited to same denominator • counting beyond 1 using decimals, limited to tenths • comparing fractions and decimals to the benchmarks of 0, 1/2, and 1 • determining the location of fractions and decimals on a number line

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Competencies		• Managing Information • Critical Thinking	• Managing Information • Critical Thinking	• Communication • Critical Thinking	• Communication • Critical Thinking
Literacy		None identified	• LKU3b.1: Vocabulary	• LKU3b.1: Vocabulary	• LKU3b.2: Vocabulary • LKU3c.2: Text Organization
Numeracy		• NA1a.1: Purpose • NA3a.1: Task Analysis • NKU1a.1: Magnitude	• NA1a.1: Purpose • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication	• NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication	• NKU3a.2: Interpretation and Representation of Quantitative Information • NKU3c.2: Communication
Guiding Questions		**How can we compose and decompose quantities?**	**How can we compose and decompose numbers?**	**How can we flexibly compose and decompose numbers to solve problems?**	**How can we flexibly use additive thinking strategies to solve problems?**
Learning Outcomes		**Students explore and represent composition and decomposition of quantities.**	**Students explore and apply additive thinking strategies**.	**Students represent and solve problems using additive thinking strategies.**	**Students represent and solve problems using refined additive thinking strategies.**
Conceptual Knowledge		• addition and subtraction are operations used to compose and decompose numbers • part-part-whole relationships can be represented using addition and subtraction • numbers can be added in any order (commutative property)	• addition and subtraction are operations used when applying additive thinking strategies • an addition situation can be represented as a subtraction situation (addition and subtraction are inverse operations) • addition and subtraction are part-part-whole relationships that can be represented symbolically (+, –, =) • numbers can be added in any order (commutative and associative properties)	• additive thinking strategies can be applied to compose and decompose larger numbers • unitizing is used for the purpose of regrouping in addition and subtraction • when subtracting, the order of numbers is important • problems can be solved in different ways • strategies can be chosen based on the nature of the problem • estimation can be used in problem-solving situations, including when an exact value is not needed or to verify a solution • knowledge of single-digit addition and subtraction number facts are used to add and subtract larger numbers	• additive thinking strategies can be applied to whole numbers and decimals • problems can be solved in different ways • strategies can be chosen based on the nature of the problem • some strategies lend themselves to mental math • strategies can be refined over time • additive thinking strategies can be represented with step-by-step procedures (algorithm)
Procedural Knowledge		• exploring various ways to compose and decompose quantities • exploring patterns in addition and subtraction • representing addition and subtraction strategies concretely, pictorially, or symbolically • adding and subtracting in joining, separating, and comparing situations • adding and subtracting quantities within 20, including 0 • recalling single-digit addition number facts to a sum of 10 and related subtraction number facts	• applying strategies to single-digit addition number facts to a sum of 18 and related subtraction number facts • representing addition and subtraction strategies concretely, pictorially, or symbolically • adding and subtracting numbers within 120, including 0 • recognizing patterns in addition and subtraction • adding and subtracting in joining, separating, and comparing situations • creating and solving problems that involve addition and subtraction	• applying concrete, pictorial, symbolic, or mental math strategies • adding and subtracting in joining, separating, and comparing situations • recognizing reliability of a chosen strategy • recalling single-digit addition number facts to a sum of 18 and related subtraction number facts • adding and subtracting numbers within 1000, including 0 • creating and solving problems that involve addition and subtraction • estimating sums and differences as part of a problem-solving process	• applying and refining concrete, pictorial, symbolic, or mental math strategies • adding and subtracting in joining, separating, and comparing situations • refining a chosen strategy • adding and subtracting whole numbers within 10 000 • applying a variety of strategies to calculate totals within 100 cents and 100 dollars, limited to whole number calculations • expressing a preferred strategy for addition and subtraction of whole numbers in algorithmic form • adding and subtracting decimals, limited to tenths • creating and solving problems that involve addition and subtraction

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
					• estimating sums and differences as part of a problem-solving process
Competencies		• Problem Solving • Communication	• Managing Information • Problem Solving	• Problem Solving • Managing Information	• Problem Solving • Managing Information
Literacy		• LKU3b.1: Vocabulary • LKU3d.1: Comprehension Strategies	• LKU3b.1: Vocabulary • LKU3c.1: Text Organization • LKU3d.1: Comprehension Strategies	• LKU3b.1: Vocabulary • LKU3d.1: Comprehension Strategies	• LKU3b.2: Vocabulary • LKU3c.2: Text Organization • LKU4a.2: Clarity
Numeracy		• NKU1c.1: Calculations • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU4a.1: Strategies • NKU4c.1: Methods or Tools	• NKU1c.1: Calculations • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU4a.1: Strategies • NKU4c.1: Methods or Tools • NA3A.1: Analysis	• NA2a.1: Personal Insight • NKU1c.1: Calculations • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU4a.1: Strategies • NKU4b.1: Estimation • NKU4c.1: Methods or Tools • NA3A.1: Analysis	• NA2a.2: Personal Insight • NKU1c.2: Calculations • NKU3a.2: Interpretation and Representation of Quantitative Information • NKU4a.2: Strategies • NKU4b.2: Estimation • NKU4c.2: Methods or Tools • NA3A.2: Analysis
Guiding Questions		**How can we share and group quantities?**	**How can we use sharing and grouping in familiar contexts?**	**How can we use sharing and grouping to solve number problems?**	**How can we use sharing and grouping flexibly to solve number problems?**
Learning Outcomes		**Students explore sharing and grouping situations using quantities within 20.**	**Students explore and make meaning of sharing and grouping situations using quantities within 60.**	**Students represent and solve problems using multiplicative thinking strategies.**	**Students represent and solve problems using refined multiplicative thinking strategies.**
Conceptual Knowledge		• some quantities can be shared or grouped equally • the quantity stays the same no matter how the objects are grouped or shared (conservation of number)	• sharing and grouping situations can have quantities left over (remainders) • even numbers can be grouped by 2 with nothing left over • odd numbers can be grouped by 2 with 1 left over	• multiplication and division are operations used when applying multiplicative thinking strategies • multiplication and division involve a whole, a number of groups, and a quantity in each group • multiplication and division are sharing and grouping situations that can be represented symbolically (×, ÷, =) • a multiplication situation can be represented as a division situation (multiplication and division are inverse operations) • numbers can be multiplied in any order (commutative property)	• multiplicative thinking strategies can be applied to larger numbers • numbers can be multiplied in any order (commutative and associative properties) • when dividing, the order of numbers is important • problems can be solved in different ways • strategies can be chosen based on the nature of the problem • some strategies lend themselves to mental math • strategies can be refined over time • estimation can be used in problem-solving situations, including when an exact value is not needed or to verify a solution • division situations may or may not have remainders
Procedural Knowledge		• representing equal-sharing situations concretely or pictorially • representing equal-grouping situations concretely or pictorially • applying conservation of number when sharing or grouping	• representing sharing a set into a given number of groups with or without remainders • representing sharing a set into groups of a given size with or without remainders • grouping by twos to identify odd and even numbers	• representing multiplication and division strategies concretely, pictorially, or symbolically • exploring patterns in multiplication and division	• applying and refining concrete, pictorial, symbolic, or mental math strategies • recognizing patterns in multiplication and division • multiplying and dividing in sharing, grouping, array, combination, area, and

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
				• multiplying and dividing in sharing, grouping, array, and combination situations, with remainders in context • applying strategies to single-digit multiplication number facts to products of 81 and related division number facts • multiplying and dividing whole numbers within 100 • multiplying by 0 and 1	comparison (rate) situations, with remainders in context • refining a chosen strategy • recalling single-digit multiplication number facts to products of 81 and related division number facts • multiplying a 2- or 3-digit whole number by a 1-digit whole number concretely, pictorially, or symbolically • dividing a 2-digit dividend by a 1-digit divisor, limited to whole numbers, concretely, pictorially, or symbolically • multiplying or dividing in parts (distributive property) • estimating products and quotients as part of a problem-solving process
Competencies		• Critical Thinking • Managing Information	• Critical Thinking • Managing Information	• Problem Solving • Managing Information	• Problem Solving • Managing Information
Literacy		• LKU3b.1: Vocabulary	• LKU3b.1: Vocabulary	• LKU3b.1: Vocabulary • LKU3d.1: Comprehension Strategies	• LKU3b.2: Vocabulary
Numeracy		• NA1a.1: Purpose • NA3a.1: Task Analysis • NKU1a.1: Magnitude • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication	• NA1a.1: Purpose • NA3a.1: Task Analysis • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication	• NA3a.1: Task Analysis • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU4b.1: Estimation • NKU4c.1: Methods or Tools • NKU3c.1: Communication • NKU1D.1: Patterns and Relations	• NA2a.2: Personal Insight • NA3a.2: Task Analysis • NKU3a.2: Interpretation and Representation of Quantitative Information • NKU4a.2: Strategies • NKU4b.2: Estimation • NKU4c.2: Methods or Tools • NKU3c.2: Communication • NKU1D.2: Patterns and Relations

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Essential Understanding	**Visualizing and describing spatial relationships through geometry enhances interpretations of the physical world.**				
Guiding Questions	**Where do we find shapes in our world?**	**How can we compare shapes using attributes?**	**How can we identify shapes using geometric properties?**	**How can we replicate shapes using geometric properties?**	**How can we analyze and describe shapes using geometric properties?**
Learning Outcomes	**Children explore and recognize shapes in their surroundings.**	**Students describe and compare shapes in the environment.**	**Students consider attributes and geometric properties when comparing shapes.**	**Students classify and create shapes using geometric properties.**	**Students analyze and visualize shapes using geometric properties.**
Conceptual Knowledge	• 2-D and 3-D shapes can be found in their surroundings • size, colour, or number of sides can be used to describe shapes (attributes) • some 3-D shapes roll, stack, or slide • shapes can be combined together to create other shapes	• attributes are characteristics that can be used to compare, sort, and describe shapes • some shapes have matching halves (symmetry) • size and shape are not affected by orientation	• attributes are geometric properties when they are specific to a given shape • geometric properties, including sides, corners, faces, and edges, are the mathematical characteristics used to sort 2-D and 3-D shapes • the faces of 3-D shapes are 2-D shapes	• geometric properties, including sides, corners, faces, and edges, allow for classification of shapes • geometric properties determine whether a shape is a regular or irregular polygon	• lines that are always the same distance apart (parallel lines) and lines that form an L shape (perpendicular lines) are geometric properties that help classify shapes • geometric properties, including parallel sides and faces, perpendicular sides and faces, and angles at vertices, allow for classification of shapes
Procedural Knowledge	• relating 2-D shapes, including squares, circles, rectangles, and triangles, to objects in their surroundings • sorting familiar 2-D shapes by a single attribute and describing the sorting rule • exploring rolling, stacking, and sliding attributes of 3-D shapes • composing and decomposing composite 2-D shapes	• sorting 2-D shapes, including squares, circles, rectangles, and triangles, and 3-D shapes, including cubes, cones, cylinders, and spheres, by a single attribute and describing the sorting rule • relating the attributes of 2-D and 3-D shapes to objects in the environment • identifying and describing 2-D and 3-D shapes in varying orientations • composing and decomposing composite 2-D shapes • exploring symmetry concretely	• sorting 2-D shapes, including triangles, quadrilaterals, pentagons, hexagons, and octagons, and 3-D shapes, including cubes, cones, cylinders, spheres, and pyramids, by one or two attributes and describing the sorting rule • determining whether attributes are geometric properties • identifying and describing 2-D shapes in varying orientations • identifying 2-D shapes in composite 2-D shapes and designs • relating the faces of 3-D shapes to 2-D shapes • composing and decomposing composite 3-D shapes	• sorting 2-D and 3-D shapes by one or two geometric properties and describing the sorting rule • identifying and describing regular and irregular polygons, including triangles, quadrilaterals, pentagons, hexagons, and octagons, in varying orientations • replicating composite 2-D and 3-D shapes from verbal instructions, visualization, or memory • modelling 3-D shapes, including cubes and pyramids, concretely • identifying and describing 3-D shapes from different views	• classifying and identifying quadrilaterals according to geometric properties • identifying and describing 3-D shapes, including right rectangular prisms and right triangular prisms, according to geometric properties • modelling 3-D shapes, including right rectangular prisms and right triangular prisms, concretely
Competencies	• Communication • Critical Thinking	• Communication • Critical Thinking	• Critical Thinking • Managing Information	• Critical Thinking • Creativity and Innovation	• Critical Thinking
Literacy	• LKU3b.K: Vocabulary • LKU4a.K: Clarity	• LKU3b.1: Vocabulary • LKU4a.1: Clarity	• LKU3b.1: Vocabulary • LKU4a.1: Clarity	• LKU3b.1: Vocabulary • LKU4a.1: Clarity	• LKU3b.2: Vocabulary
Numeracy	• NA1a.K: Purpose • NKU1e.K: Organization of Data • NKU2a.K: Spatial Visualization • NKU3b.K: Interpretation and Representation of Spatial Information • NKU3c.K: Communication	• NA1a.1: Purpose • NKU1e.1: Organization of Data • NKU2a.1: Spatial Visualization • NKU3b.1: Interpretation and Representation of Spatial Information • NKU3c.1: Communication	• NA1a.1: Purpose • NKU1e.1: Organization of Data • NKU2a.1: Spatial Visualization • NKU3b.1: Interpretation and Representation of Spatial Information • NKU3c.1: Communication	• NA3a.1: Task Analysis • NKU1e.1: Organization of Data • NKU2a.1: Spatial Visualization • NKU3b.1: Interpretation and Representation of Spatial Information • NKU3c.1: Communication	• NA3a.1: Task Analysis • NKU1e.2: Organization of Data • NKU2a.2: Spatial Visualization • NKU3b.2: Interpretation and Representation of Spatial Information • NKU3c.2: Communication

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Guiding Questions			**How can we explore position and movement?**	**How can we express the movement of shapes?**	**How can we interpret the movement of shapes?**
Learning Outcomes			**Students explore position and movement of objects.**	**Students visualize and describe the movement of shapes.**	**Students analyze and demonstrate transformation of shapes.**
Conceptual Knowledge			• slides and flips can describe the movement of objects • an object that has been moved is the same size (congruent) as the original object • slides and flips can be found in natural and created patterns • symmetry can be created with a flip	• slides (translations), flips (reflections), and turns (rotations) can describe the movement of shapes • lines of symmetry allow for more precise descriptions of reflections	• transformations (translations, reflections, and rotations) can describe the movement of shapes • directions, including up, down, left, right, clockwise, and counter-clockwise, can be used to describe transformations • rotation is the basis of rotational symmetry in shapes
Procedural Knowledge			• demonstrating slides and flips concretely or pictorially • recognizing slides and flips in designs • creating 2-D symmetrical designs • recognizing that an object is the same size and shape after sliding or flipping	• visualizing a slide, flip, or turn and representing the result concretely or pictorially • using slides, flips, or turns to match two congruent shapes • describing a reflection using one line of symmetry • identifying 2-D shapes that have line symmetry	• visualizing a transformation and representing the result concretely or pictorially • recognizing congruency between the original and transformed shape • describing transformations that match two congruent shapes • exploring rotational symmetry of 2-D shapes concretely
Competencies			• Managing Information	• Critical Thinking • Communication	• Critical Thinking • Communication
Literacy			• LKU3b.1: Vocabulary • LKU4a.1: Clarity	• LKU3b.1: Vocabulary • LKU4a.1: Clarity	• LKU3b.2: Vocabulary • LKU4a.2: Clarity
Numeracy			• NKU2a.1: Spatial Visualization • NKU2b.1: Management of Space • NKU3c.1: Communication • NKU4a.1: Strategies	• NKU2a.1: Spatial Visualization • NKU2b.1: Management of Space • NKU3c.1: Communication • NKU4a.1: Strategies	• NKU2a.2: Spatial Visualization • NKU3c.2: Communication • NKU4a.2: Strategies
Guiding Questions	**How can we compare objects?**	**How can comparing objects help us to measure?**	**How can we measure objects?**	**How can we use standard units to express a measurement?**	**How can we relate measurement to perimeter and area?**
Learning Outcomes	**Children compare familiar objects using length and mass.**	**Students compare length and mass of familiar objects using non-standard units.**	**Students compare and describe measures of objects using non-standard units.**	**Students compare and describe measures of objects using standard units.**	**Students compare and describe measures related to perimeter and area.**
Conceptual Knowledge	• length and mass can be compared and ordered using words, including longer, taller, shorter, heavier, and lighter	• length and mass are attributes that can be measured (measurable attributes) • objects can be measured using direct or indirect comparison • measurable attributes can be compared using words, including longest, tallest, shortest, lightest, and heaviest • a unit is used to compare measurable attributes • non-standard units must be identical for a count to represent the measure	• a single object may have multiple attributes that are measurable, including mass and length • measuring is a process of comparing attributes using units and tools • length is expressed by counting the total number of identical units without gaps or overlaps	• measuring is a process of comparing attributes using units and tools • centimetre, metre, gram, and kilogram are units within the International System of Units (SI) • width, height, length, and perimeter are all linear measures • the measure of a length stays the same when repositioned or partitioned (conservation of number) • standard units enable a common language around measurement	• millimetre, centimetre, metre, square centimetre, and square metre are units within the International System of Units (SI) • length, perimeter, and area are related measures • area is the space inside a 2-D shape and is measured in square units • the area of a shape stays the same when repositioned or decomposed (conservation of number) • units of measure can be converted for efficiency in different contexts

DRAFT Kindergarten to Grade 4 Mathematics

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Procedural Knowledge	• comparing the length or mass of one object to another (direct comparison) • ordering familiar objects by length or mass	• ordering objects by length or mass using direct comparison • comparing two objects indirectly using a third object (indirect comparison) • measuring length using many copies of the same non-standard unit	• creating a tool to measure length with non-standard units • selecting non-standard units to estimate, measure, and compare length and mass • measuring length using non-standard units, either a single unit used repeatedly or many copies of the same unit • comparing and ordering objects in more than one way using different measurable attributes	• selecting appropriate standard units and tools to measure, record, and compare length, width, height, and mass • selecting referents for the units centimetre, metre, gram, and kilogram to estimate length and mass • describing the relationship between centimetre and metre, gram and kilogram • adding multiple lengths to determine the total length • estimating, measuring, and recording perimeter	• describing the relationship between millimetres, centimetres, and metres • selecting and justifying units used for perimeter • determining area by tiling inside a 2-D shape • estimating area using referents for square centimetre and square metre
Competencies	• Critical Thinking • Managing Information	• Critical Thinking • Managing Information	• Critical Thinking • Managing Information	• Communication • Managing Information	• Critical Thinking • Communication
Literacy	• LKU3b.K: Vocabulary	• LKU3b.1: Vocabulary	• LKU3b.1: Vocabulary	• LKU1b.1: Conventions • LKU3b.1: Vocabulary • LKU3c.1: Text Organization • LKU4a.1: Clarity	• LKU1b.2: Conventions • LKU3b.2: Vocabulary • LKU3c.2: Text Organization
Numeracy	• NKU1e.K: Organization of Data • NKU2a.K: Spatial Visualization • NKU2c.K: Measurement • NKU3c.K: Communication	• NKU1e.1: Organization of Data • NKU2c.1: Measurement • NKU2d.1: Units of Measurement • NKU3c.1: Communication • NKU4a.1: Strategies	• NKU2c.1: Measurement • NKU2d.1: Units of Measurement • NKU4a.1: Strategies • NKU4b.1: Estimation • NKU4c.1: Methods or Tools	• NKU2c.1: Measurement • NKU2d.1: Units of Measurement • NKU4a.1: Strategies • NKU4b.1: Estimation • NKU4c.1: Methods or Tools	• NKU2c.2: Measurement • NKU2d.2: Units of Measurement • NKU2e.2: Conversions • NKU3b.2: Interpretation and Representation of Spatial Information • NKU4b.2: Estimation • NKU4c.2: Methods or Tools

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Essential Understanding	**Exploring dynamic interconnections in the world and universe strengthens our understandings of relationships.**				
Guiding Questions	**How can we describe the relationships between quantities?**	**How can we represent relationships between quantities?**	**How can we represent equal and no equal relationships between quantities?**	**How can we create equations to represent relationships between quantities?**	**How can we represent situations using equations with unknowns?**
Learning Outcomes	**Children explore the relationship between quantities.**	**Students demonstrate equality as a relationship between quantities.**	**Students represent quantities as equal or not equal.**	**Students create and solve equations to represent quantitative relationships.**	**Students create and solve equations that represent problem-solving situations.**
Conceptual Knowledge	• quantities can be the same or not the same • quantities can be more or less	• equality is a relationship between quantities • equality can be represented symbolically (=) • quantity stays the same no matter how objects are arranged (conservation of number)	• equality and inequality are relationships between quantities • equality and inequality can be represented symbolically (= and ≠)	• equations are representations of equality between two expressions • an equal sign indicates a relationship of equality between two expressions • symbols are used to represent unknown values (unknowns) in equations	• situations or problems can be generalized and represented with equations • equations can be solved to find unknown values • symbols are used to represent unknowns in equations
Procedural Knowledge	• exploring same, not same, more, and less concretely or pictorially • describing the relationships between quantities using same, not same, more, or less	• representing equality concretely or pictorially • recording equalities using the equal sign (=) • exploring equality as a balance	• recording equalities and inequalities symbolically • demonstrating equality as a balance and inequality as an imbalance • changing an inequality into an equality concretely or pictorially	• creating a one-step equation with one unknown value • solving equations with addition and subtraction concretely, pictorially, or symbolically	• creating an equation with an unknown to represent a problem or situation • creating a problem for a given equation • solving equations concretely, pictorially, or symbolically
Competencies	• Critical Thinking • Communication	• Critical Thinking • Communication	• Critical Thinking • Communication	• Problem Solving • Communication	• Problem Solving • Communication
Literacy	• LKU3b.K: Vocabulary • LKU4a.K: Clarity	• LKU3b.1: Vocabulary	• LKU3b.1: Vocabulary • LKU4a.1: Clarity	• LKU3c.1: Text Organization	• LA3a.2: Task Analysis • LKU3d.2: Comprehension Strategies
Numeracy	• NKU1a.K: Magnitude • NKU1c.K: Calculations • NKU3a.K: Interpretation and Representation of Quantitative Information • NKU3c.K: Communication	• NKU1a.1: Magnitude • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication	• NKU1a.1: Magnitude • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication	• NKU1a.1: Magnitude • NKU1c.1: Calculations • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication	• NA3a.2: Task Analysis • NKU1c.2: Calculations • NKU3a.2: Interpretation and Representation of Quantitative Information • NKU3c.2: Communication
Guiding Questions	**How can we explore relationships between pattern elements?**	**How can we express relationships between pattern elements?**	**How can we express patterns in different representations?**	**How can we use patterns to make predictions?**	**How can we use patterns to solve problems?**
Learning Outcomes	**Children explore the relationship between elements in a repeating pattern.**	**Students describe relationships among elements in a repeating pattern.**	**Students represent patterns in various ways.**	**Students analyze a pattern and determine the relationship that produces the pattern rule.**	**Students analyze a pattern and generalize the pattern rule to solve a problem.**
Conceptual Knowledge	• each part (element) of a pattern has attributes, including size, colour, and shape • repeating patterns have a set of elements that repeat • patterns can be described (pattern rule) • patterns can be found in their surroundings • patterns can be created using objects, images, sounds, or actions	• patterns can be found in the environment • patterns can be created using objects, images, sounds, or actions • repeating patterns have a set of elements that repeat (pattern core) • a repeating pattern can be represented in different ways	• patterns are sequences that follow a rule • repeating patterns have a pattern core • increasing patterns change according to a rule • patterns can be represented in different ways, including non-linear designs	• repetition and change can create increasing and decreasing patterns • repetition and change can be described with a pattern rule • rules allow for prediction beyond the information at hand	• repetition and change can create increasing and decreasing patterns that model problems • repetition and change can be generalized to solve problems
Procedural Knowledge	• identifying and describing patterns	• identifying and describing patterns	• creating repeating patterns with three to five elements in the pattern core	• creating increasing patterns using addition and decreasing patterns using subtraction • determining a rule for a given pattern	• creating patterns using addition, subtraction, multiplication, or division

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
	• reproducing, extending, and creating repeating patterns with two or three elements	• reproducing, extending, and creating repeating patterns with two to four elements • translating a pattern from one representation to another	• creating an increasing pattern from a pattern rule • translating a pattern from one representation to another	• creating a pattern from a given rule • predicting the next term of a pattern	• recognizing when a pattern can be used to solve a problem • determining a pattern rule and applying it to a problem
Competencies	• Critical Thinking	• Critical Thinking • Communication	• Critical Thinking • Communication	• Critical Thinking	• Critical Thinking • Problem Solving
Literacy	• LKU4a.K: Clarity	None identified	None identified	None identified	None identified
Numeracy	• NA1a.K: Purpose • NKU1d.K: Patterns and Relationships • NKU1e.K: Organization of Data • NKU4a.K: Strategies • NKU3c.K: Communication	• NKU1d.1: Patterns and Relationships • NKU1e.1: Organization of Data • NKU3c.1: Communication	• NKU1d.1: Patterns and Relationships • NKU1e.1: Organization of Data • NKU3c.1: Communication	• NKU1c.1: Calculations • NKU1d.1: Patterns and Relationships • NKU1e.1: Organization of Data • NKU4a.1: Strategies • NKU4b.1: Estimation • NKU3c.1: Communication	• NKU1c.2: Calculations • NKU1d.2: Patterns and Relationships • NKU1e.2: Organization of Data • NKU4a.2: Strategies • NKU3c.2: Communication
Guiding Questions	**How can we explore the relationship between time and events?**	**How can we relate time to events?**	**How can we measure and describe time and cycles in a variety of contexts?**	**How can we measure and communicate time?**	**How can we measure and communicate the passage of time?**
Learning Outcome	**Children explore relationships between time and experiences.**	**Students describe relationships between time and experiences.**	**Students relate units of time to various representations.**	**Students relate time to clocks and cycles.**	**Students relate the passage of time to clocks and cycles.**
Conceptual Knowledge	• events can be compared and sequenced in time • time can be experienced in cycles and patterns, including seasons • First Nations, Métis, and Inuit relate time to changes in nature	• events can be compared and sequenced in time • time can be experienced in cycles and patterns, including seasons • some traditional cultural activities, including those of First Nations, Métis, and Inuit, are connected to seasons • time can be measured	• a calendar can show relationships between months, weeks, and days • analog clocks show relationships between minutes and hours • First Nations, Métis, and Inuit recognize that patterns of the sun and moon provide a sense of time • personal referents for time can be used to estimate duration	• a clock is a tool for measuring time based on 12-hour cycles • analog clocks show relationships between minutes and hours • digital clocks display hours and minutes • there are relationships between analog and digital clocks • First Nations, Métis, and Inuit relate time to human cycles of life and seasons • units of time are selected according to context	• there is a relationship between a 12-hour clock and a 24-hour clock • the second is the International System of Units (SI) base unit for time • there are relationships between seconds, minutes, and hours • units of time can be converted for efficiency in different contexts • passage of time can be measured in various ways • First Nations, Métis, and Inuit passage of time is communicated by recording significant events within natural cycles
Procedural Knowledge	• describing a sequence of events using time vocabulary in familiar contexts (before, after, then, next, and a long time ago) • connecting lived experiences and cultural events to time • exploring how seasons are cycles of time	• describing a sequence of events using time vocabulary in familiar contexts (yesterday, today, tomorrow, morning, afternoon, evening, past, present, and future) • connecting lived experiences and cultural events to time • exploring cultural stories, including those of First Nations, Métis, and Inuit, that describe traditional activities in relation to seasons • estimating and measuring time using non-standard units • comparing the duration of activities	• relating personal or cultural events to a date on a calendar • comparing days to weeks and months to years • relating units of time on a clock, including minutes to quarter-hour, half-hour, and hour • connecting sun and moon patterns to time references, including cycles of day and night • comparing events of different durations using non-standard units	• reading and recording time to the hour, half-hour, and quarter-hour using analog clocks • relating digital clock time to analog clock time • relating time to human and seasonal cycles, including First Nations' medicine wheels • selecting appropriate units of time based on context • comparing events that have different durations using standard units • estimating duration of an event using a referent	• measuring time in relation to seasons and events, including First Nations' Winter Counts • reading and recording time using digital and analog clocks, including 24-hour clocks • calculating elapsed time in hours and minutes • estimating duration for a sequence of familiar events • converting units of time, including hours to minutes and minutes to seconds

DRAFT Kindergarten to Grade 4 Mathematics

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Competencies	• Managing Information	• Communication • Managing Information	• Communication • Managing Information	• Managing Information • Critical Thinking	• Managing Information • Critical Thinking
Literacy	• LKU3a.K: Background Knowledge • LKU3b.K: Vocabulary	• LKU3a.1: Background Knowledge • LKU3b.1: Vocabulary • LKU4d.1: Modes and Media	• LKU3a.1: Background Knowledge • LKU3b.1: Vocabulary • LKU4d.1: Modes and Media	• LKU1b.1: Conventions • LKU3a.1: Background Knowledge • LKU4d.1: Modes and Media	• LKU1b.2: Conventions • LKU3a.2: Background Knowledge • LKU4d.2: Modes and Media
Numeracy	• NKU1d.K: Patterns and Relationships • NKU2f.K: Time • NKU3c.K: Communication	• NKU1d.1: Patterns and Relationships • NKU2d.1: Units of Measurement • NKU3c.1: Communication	• NKU1d.1: Patterns and Relationships • NKU2d.1: Units of Measurement • NKU2f.1: Time • NKU4c.1: Methods or Tools	• NKU1d.1: Patterns and Relationships • NKU2c.1: Measurement • NKU2d.1: Units of Measurement • NKU2f.1: Time • NKU4b.1: Estimation • NKU4c.1: Methods or Tools	• NKU1d.2: Patterns and Relationships • NKU2c.2: Measurement • NKU2d.2: Units of Measurement • NKU2e.2: Conversions • NKU2f.2: Time • NKU4c.1: Methods or Tools • NKU4c.2: Calculations

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Essential Understanding	**Developing communication and expression allows us to represent and interpret our understandings of the world in multiple ways.**				
Guiding Questions	**How can we answer questions with data?**	**How can we collect data to answer questions?**	**How can we represent and describe data?**	**How can we interpret data?**	**How can we represent data efficiently?**
Learning Outcomes	**Children describe authentic data in response to a given question.**	**Students represent and describe authentic data in response to a given question.**	**Students represent and describe authentic data in response to student-generated questions.**	**Students represent and interpret data to answer questions.**	**Students represent and interpret data to solve problems.**
Conceptual Knowledge	• data can be collected to answer a question • data can be represented concretely (concrete graphs) • a graph is a way to communicate mathematically about data	• data can be collected to answer a question • data can be represented concretely (concrete graphs) or pictorially (pictographs) • a graph is a way to communicate mathematically about data	• numerical summaries can organize collected data • data can be represented pictorially (pictographs) or graphically (bar graphs) • graphs and numerical summaries are ways to organize and communicate mathematically about data	• numerical summaries can organize data • bar graphs can represent first-hand or second-hand data • data can be used to answer questions • graphs and numerical summaries are ways to organize and communicate mathematically about data	• numerical summaries are chosen based on the size of the data set • scale allows a single symbol to represent a number of items (many-to-one correspondence) • to organize and communicate more efficiently, larger data sets can be graphed using a scale • data can be used to solve problems
Procedural Knowledge	• collecting first-hand data to answer a question • representing data in concrete graphs using one-to-one correspondence • describing data in a graph using comparative vocabulary, including more, less, same, and not same	• collecting and classifying first-hand data • representing data in concrete graphs and pictographs using one-to-one correspondence • describing data in a graph using comparative vocabulary, including more, less, most, least, same, and not same	• formulating simple questions to collect data • collecting first-hand data using numerical summaries, including tally marks, tables, and counts • constructing pictographs and bar graphs using one-to-one correspondence • extracting information from a numerical summary or a graph	• formulating relevant questions to collect first-hand data • organizing first-hand or second-hand data using numerical summaries, including tally marks, tables, and line plots • constructing bar graphs and line plots using one-to-one correspondence • extracting information from a numerical summary or a graph to make comparisons and inferences	• clarifying the problem • constructing bar graphs and pictographs using a scale • making and justifying inferences and drawing conclusions from data • solving a problem using data
Competencies	• Managing Information • Communication	• Managing Information • Communication	• Managing Information • Communication	• Managing Information • Communication	• Managing Information • Problem Solving
Literacy	• LKU2b.K: Access • LKU4c.K: Intent • LKU4a.K: Clarity	• LKU2b.1: Access • LKU4a.1: Clarity • LKU3b.1: Vocabulary	• LKU2a.1: Develop Questions • LKU2b.1: Access • LKU4a.1: Clarity • LKU4b.1: Audience • LKU4d.1: Modes and Media	• LKU2a.1: Develop Questions • LKU2b.1: Access • LKU4a.1: Clarity • LKU4b.1: Audience • LKU4d.1: Modes and Media	• LKU2b.2: Access • LKU4b.2: Audience • LKU4d.2: Modes and Media • LKU4c.2: Intent
Numeracy	• NKU1e.K: Organization of Data • NKU1f.K: Collection of Data • NKU1g.K: Interpretation of Data • NKU3a.K: Interpretation and Representation of Quantitative Information • NKU3c.K: Communication	• NA1a.1: Purpose • NKU1e.1: Organization of Data • NKU1f.1: Collection of Data • NKU1g.1: Interpretation of Data • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication	• NA1a.1: Purpose • NKU1e.1: Organization of Data • NKU1f.1: Collection of Data • NKU1g.1: Interpretation of Data • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication • NKU4c.1: Methods or Tools	• NA1a.1: Purpose • NKU1e.1: Organization of Data • NKU1f.1: Collection of Data • NKU1g.1: Interpretation of Data • NKU3a.1: Interpretation and Representation of Quantitative Information • NKU3c.1: Communication • NKU4c.1: Methods or Tools	• NA1a.2: Purpose • NKU1e.2: Organization of Data • NKU1f.2: Collection of Data • NKU1g.2: Interpretation of Data • NKU3a.2: Interpretation and Representation of Quantitative Information • NKU3c.2: Communication • NKU4a.2: Strategies

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Essential Understanding	**Developing logical thought through reasoning enables us to achieve outcomes and solve problems.**				
Guiding Questions	**Why is it important for us to follow instructions carefully?**	**Why is it important for us to create clear instructions?**	**How can we interpret instructions to explain the desired outcome?**	**How can we simplify instructions that include repetition?**	**How can we create an algorithm that solves a problem?**
Learning Outcomes	**Children follow a sequence of steps related to a learning experience.**	**Students give and follow instructions in a sequence that achieves a desired outcome.**	**Students interpret instructions that achieve a desired outcome.**	**Students create instructions that include repetitions.**	**Students create and explain an algorithm that solves a problem.**
Conceptual Knowledge	• instructions can take many forms, including verbal and visual forms • steps in instructions are sequenced in a logical way to achieve a desired outcome	• instructions can take many forms, including verbal, visual, and written forms • sequencing is used to order steps in instructions in a logical way • instructions are informed by cues around us	• precise instructions can be followed by people or machines • instructions may not always achieve the desired outcome • order of steps may or may not affect the outcome	• instructions may be simplified by repeating steps • order of steps may be changed to achieve a different outcome	• everyday problems can be solved using algorithmic thinking • algorithms can vary in efficiency based on contexts and users • different algorithms can lead to the same outcome
Procedural Knowledge	• following a sequence of two steps related to a learning experience	• following 2- or 3-step instructions to achieve a desired outcome • creating 1- to 3-step instructions to achieve a desired outcome • sequencing 2 or 3 steps to achieve a desired outcome	• explaining instructions in their own words • predicting and testing the outcome of 3- to 4-step instructions • removing or fixing any errors in a set of instructions	• creating instructions with repetition to achieve a desired outcome • adjusting instructions to achieve a different outcome	• designing an algorithm to solve a stated problem • reviewing the reliability and efficiency of an algorithm • adjusting an algorithm to obtain a different outcome
Competencies	• Communication • Managing Information	• Communication • Managing Information	• Managing Information • Critical Thinking	• Managing Information • Communication	• Problem Solving • Creativity and Innovation
Literacy	• LKU3d.K: Comprehension Strategies	• LA3a.1: Task Analysis • LKU3c.1: Text Organization • LKU3d.1: Comprehension Strategies	• LA3a.1: Task Analysis • LKU3c.1: Text Organization • LKU3d.1: Comprehension Strategies	• LA3a.1: Task Analysis • LKU3c.1: Text Organization • LKU3d.1: Comprehension Strategies	• LA3a.2: Task Analysis • LKU3c.2: Text Organization • LKU3d.2: Comprehension Strategies
Numeracy	• NKU1e.K: Organization of Data • NKU2f.K: Time • NKU2g.K: Location and Direction	• NKU1b.1: Using Numbers • NKU1e.1: Organization of Data • NKU2g.1: Location and Direction	• NA3a.1: Task Analysis • NKU1e.1: Organization of Data • NKU4b.1: Estimation	• NA3a.1: Task Analysis • NKU1b.1: Using Numbers • NKU1e.1: Organization of Data	• NA3a.2: Task Analysis • NKU1e.2: Organization of Data • NKU4a.2: Strategies