

The *Glance Across the Grades: Kindergarten to Grade 9 Mathematics* resource is a compilation of the outcomes into suggested categories or *learning targets*. These *learning targets* sort the outcomes and allow teachers to preview the outcomes across grade levels. It should be noted that this is only one way to sort the outcomes across the grades; however, this breakdown will enable teachers to differentiate teaching within each strand of the curriculum. This resource can assist teachers in

- deepening understandings of the mathematics strands and outcomes
- facilitating purposeful teaching
- identifying the continuum of student learning across the *learning targets*
- monitoring individual student learning and being able to specifically discuss his or her progress and identify learning gaps
- differentiating instruction
- building essential connections to learning within and between the *learning targets*

The *big ideas*, located under each learning target, are statements of an idea that is central to the learning of mathematics and makes instruction purposeful. The *big ideas* are compilations from the work of Marian Small, John Van de Walle, and Randall I. Charles.

STRANDS

NUMBER

- ◆ Counting
- ◆ Representation of Whole Numbers
- ◆ Representation of Rational Numbers
- ◆ Operations with Whole Numbers
 - Addition/Subtraction
 - Multiplication/Division
- ◆ Operations with Rational Numbers

PATTERNS AND RELATIONS

- ▶ **Patterns**
 - ◆ Patterning and Algebraic Thinking
- ▶ **Variables and Equations**
 - ◆ Algebraic Representations with Expressions
 - ◆ Algebraic Representations with Equations

SHAPE AND SPACE

- ▶ **Measurement**
 - ◆ Length
 - ◆ Area
 - ◆ Volume (Capacity)
 - ◆ Mass (Weight)
 - ◆ Time
 - ◆ Angles
- ▶ **3-D Objects and 2-D Shapes**
 - ◆ Identifying, Sorting, Comparing, and Constructing
- ▶ **Transformations**
 - ◆ Position and Motion

STATISTICS AND PROBABILITY

- ▶ **Data Analysis**
 - ◆ Collection, Organization, and Analysis of Data
- ▶ **Chance and Uncertainty**
 - ◆ Probability

- ▶ **Substrands**
 - ◆ Learning Targets

Big Ideas

Number Strand

Counting

- Counting tells how many or how much.
- Numbers are related to each other through a variety of number relationships.
- Quantities can be estimated by using referents.

Representation of Whole Numbers

Representation of Rational Numbers

- Quantities can be represented concretely, pictorially, and symbolically.
- There are different but equivalent representations of numbers.
- Benchmark numbers are useful for comparing, relating, and estimating numbers.
- Our number system is based on patterns (place value).
- The position of a digit in a number determines the quantity it represents.
- Classifying numbers provides information about their characteristics.

Operations with Whole Numbers (Addition/Subtraction)

Operations with Whole Numbers (Multiplication/Division)

Operations with Rational Numbers

- The four operations are intrinsically related.
- Flexible methods of calculation in all operations involve decomposing and composing numbers in a wide variety of ways.
- Flexible methods of calculation require a strong understanding of the operations and properties of the operations.
- There are a variety of appropriate ways to estimate sums, differences, products, and quotients, depending on the context and the numbers involved.
- Personal strategies and algorithms provide flexible and efficient methods of calculating that vary depending on the context and the numbers involved.

Patterns and Relations Strand

Patterns

Patterning and Algebraic Thinking

- Patterns can be represented in a variety of ways.
- Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.
- Data can be arranged to highlight patterns and relationships.

Variables and Equations

Algebraic Representations with Expressions

Algebraic Representations with Equations

- Algebra, with the use of symbols or variables, expressions, and equations, is a tool for generalizing arithmetic and representing mathematical situations and patterns in our world.
- The equal sign describes the balance that exists between the quantities on either side of the equal sign.
- Equality and inequality are used to express relationships between two quantities.
- Relationships between quantities can be described using rules involving variables.

Shape and Space Strand

Measurement

Length / Area / Volume (Capacity) / Mass (Weight) / Time / Angles

- It is necessary to understand the attributes of the object before anything can be measured.
- Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units of the same attribute.
- The longer the unit of measure, the fewer units it takes to measure the object.
- The use of standard measurement units simplifies communication about the size of objects.

3-D Objects and 2-D Shapes

Identifying, Sorting, Comparing, and Constructing

- Two- and three-dimensional objects can be described, classified, and analyzed by their attributes.

Transformations

Position and Motion

- Shapes can be relocated and reoriented using mathematical procedures.
- Shapes can be described in terms of their location in a plane or in a space.

Statistics and Probability Strand

Data Analysis

Collection, Organization, and Analysis of Data

- Data is gathered and organized in order to answer questions.
- The question that needs to be answered determines the data that will be collected.
- The type of data determines the best way to organize and represent it.
- Visual displays quickly reveal information about data.
- Information from data representations is used to make references, to interpret, to draw conclusions, and to make predictions.

Chance and Uncertainty

Probability

- Probability involves the use of mathematics to describe the level of certainty that an event will occur.
- Probabilities, both theoretical and experimental, can be determined in different ways.

Glance Across the Grades: NUMBER

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: **Develop number sense.**

Specific Learning Outcomes

Counting

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Counting tells how many or how much. Numbers are related to each other through a variety of number relationships. Quantities can be estimated by using referents. 	<p>K.N.1. Say the number sequence by 1s, starting anywhere from 1 to 30 and from 10 to 1. [C, CN, V]</p> <p>K.N.5. Demonstrate an understanding of counting to 10 by</p> <ul style="list-style-type: none"> indicating that the last number said identifies “how many” showing that any set has only one count <p>[C, CN, ME, R, V]</p>	<p>1.N.1. Say the number sequence by</p> <ul style="list-style-type: none"> 1s forward and backward between any two given numbers (0 to 100) 2s to 30, forward starting at 0 5s and 10s to 100, forward starting at 0 <p>[C, CN, ME, V]</p> <p>1.N.3. Demonstrate an understanding of counting by</p> <ul style="list-style-type: none"> using the counting-on strategy using parts or equal groups to count sets <p>[C, CN, ME, R, V]</p> <p>1.N.6. Estimate quantities to 20 by using referents. [C, ME, PS, R, V]</p> <p>1.N.8. Identify the number, up to 20, that is one more, two more, one less, and two less than a given number. [C, CN, ME, R, V]</p>	<p>2.N.1. Say the number sequence from 0 to 100 by</p> <ul style="list-style-type: none"> 2s, 5s, and 10s, forward and backward, using starting points that are multiples of 2, 5, and 10 respectively 10s using starting points from 1 to 9 2s starting from 1 <p>[C, CN, ME, R]</p> <p>2.N.6. Estimate quantities to 100 using referents. [C, ME, PS, R]</p>	<p>3.N.1. Say the number sequence between any two given numbers forward and backward</p> <ul style="list-style-type: none"> from 0 to 1000 by <ul style="list-style-type: none"> 10s or 100s, using any starting point 5s, using starting points that are multiples of 5 25s, using starting points that are multiples of 25 from 0 to 100 by <ul style="list-style-type: none"> 3s, using starting points that are multiples of 3 4s, using starting points that are multiples of 4 <p>[C, CN, ME]</p> <p>3.N.4. Estimate quantities less than 1000 using referents. [ME, PS, R, V]</p>						

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Specific Learning Outcomes

Representation of Whole Numbers

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Quantities can be represented concretely, pictorially, and symbolically. There are different but equivalent representations of numbers. Benchmark numbers are useful for comparing, relating, and estimating numbers. Our number system is based on patterns (place value). The position of a digit in a number determines the quantity it represents. Classifying numbers provides information about their characteristics. 	<p>K.N.2. Subitize and name familiar arrangements of 1 to 6 dots (or objects). [C, CN, ME, V]</p> <p>K.N.3. Relate a numeral, 1 to 10, to its respective quantity. [CN, R, V]</p> <p>K.N.4. Represent and describe numbers 2 to 10 in two parts, concretely and pictorially. [C, CN, ME, R, V]</p> <p>K.N.6. Compare quantities, 1 to 10</p> <ul style="list-style-type: none"> using one-to-one correspondence by ordering numbers representing different quantities. <p>[C, CN, V]</p>	<p>1.N.2. Subitize and name familiar arrangements of 1 to 10 dots (or objects). [C, CN, ME, V]</p> <p>1.N.4. Represent and describe numbers to 20, concretely, pictorially, and symbolically. [C, CN, V]</p> <p>1.N.5. Compare and order sets containing up to 20 elements to solve problems by using</p> <ul style="list-style-type: none"> referents one-to-one correspondence <p>[C, CN, ME, PS, R, V]</p> <p>1.N.7. Demonstrate, concretely and pictorially, how a number, up to 30, can be represented by a variety of equal groups with and without singles. [C, R, V]</p>	<p>2.N.2. Demonstrate if a number (up to 100) is even or odd. [C, CN, PS, R]</p> <p>2.N.3. Describe order or relative position using ordinal numbers. [C, CN, R]</p> <p>2.N.4. Represent and describe numbers to 100, concretely, pictorially, and symbolically. [C, CN, V]</p> <p>2.N.5. Compare and order numbers up to 100. [C, CN, R, V]</p> <p>2.N.7. Illustrate, concretely and pictorially, the meaning of place value for numbers to 100. [C, CN, R, V]</p>	<p>3.N.2. Represent and describe numbers to 1000, concretely, pictorially, and symbolically. [C, CN, V]</p> <p>3.N.3. Compare and order numbers to 1000. [CN, R, V]</p> <p>3.N.5. Illustrate, concretely and pictorially, the meaning of place value for numerals to 1000. [C, CN, R, V]</p>	<p>4.N.1. Represent and describe whole numbers to 10 000, pictorially and symbolically. [C, CN, V]</p> <p>4.N.2. Compare and order numbers to 10 000. [C, CN]</p>	<p>5.N.1. Represent and describe whole numbers to 1 000 000. [C, CN, T, V]</p>	<p>6.N.1. Demonstrate an understanding of place value for numbers</p> <ul style="list-style-type: none"> greater than one million less than one-thousandth <p>[C, CN, R, T]</p> <p>6.N.7. Demonstrate an understanding of integers, concretely, pictorially, and symbolically. [C, CN, R, V]</p>		<p>8.N.1. Demonstrate an understanding of perfect squares and square roots, concretely, pictorially, and symbolically (limited to whole numbers). [C, CN, R, V]</p>	<p>9.N.1. Demonstrate an understanding of powers with integral bases (excluding base 0) and whole-number exponents by</p> <ul style="list-style-type: none"> representing repeated multiplication using powers using patterns to show that a power with an exponent of zero is equal to 1 solving problems involving powers <p>[C, CN, PS, R]</p>

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- [C]** Communication
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General Learning Outcome: **Develop number sense.**

Specific Learning Outcomes

Representation of Rational Numbers

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> • Quantities can be represented concretely, pictorially, and symbolically. • There are different but equivalent representations of numbers. • Benchmark numbers are useful for comparing, relating, and estimating numbers. • Our number system is based on patterns (place value). • The position of a digit in a number determines the quantity it represents. • Classifying numbers provides information about their characteristics. 				<p>3.N.13. Demonstrate an understanding of fractions by</p> <ul style="list-style-type: none"> ■ explaining that a fraction represents a portion of a whole divided into equal parts ■ describing situations in which fractions are used ■ comparing fractions of the same whole with like denominators <p>[C, CN, ME, R, V]</p>	<p>4.N.8. Demonstrate an understanding of fractions less than or equal to one by using concrete and pictorial representations to</p> <ul style="list-style-type: none"> ■ name and record fractions for the parts of a whole or a set ■ compare and order fractions ■ model and explain that for different wholes, two identical fractions may not represent the same quantity ■ provide examples of where fractions are used <p>[C, CN, PS, R, V]</p> <p>4.N.9. Describe and represent decimals (tenths and hundredths) concretely, pictorially, and symbolically. [C, CN, R, V]</p> <p>4.N.10. Relate decimals to fractions (to hundredths). [CN, R, V]</p>	<p>5.N.7. Demonstrate an understanding of fractions by using concrete and pictorial representations to</p> <ul style="list-style-type: none"> ■ create sets of equivalent fractions ■ compare fractions with like and unlike denominators <p>[C, CN, PS, R, V]</p> <p>5.N.8. Describe and represent decimals (tenths, hundredths, thousandths), concretely, pictorially, and symbolically. [C, CN, R, V]</p> <p>5.N.9. Relate decimals to fractions (tenths, hundredths, thousandths). [CN, R, V]</p> <p>5.N.10. Compare and order decimals (tenths, hundredths, thousandths) by using</p> <ul style="list-style-type: none"> ■ benchmarks ■ place value ■ equivalent decimals <p>[CN, R, V]</p>	<p>6.N.1. Demonstrate an understanding of place value for numbers</p> <ul style="list-style-type: none"> ■ greater than one million ■ less than one-thousandth <p>[C, CN, R, T]</p> <p>6.N.4. Relate improper fractions to mixed numbers. [CN, ME, R, V]</p> <p>6.N.5. Demonstrate an understanding of ratio, concretely, pictorially, and symbolically. [C, CN, PS, R, V]</p> <p>6.N.6. Demonstrate an understanding of percent (limited to whole numbers), concretely, pictorially, and symbolically. [C, CN, PS, R, V]</p>	<p>7.N.4. Demonstrate an understanding of the relationship between repeating decimals and fractions, and terminating decimals and fractions. [C, CN, R, T]</p> <p>7.N.7. Compare and order fractions, decimals (to thousandths), and integers by using</p> <ul style="list-style-type: none"> ■ benchmarks ■ place value ■ equivalent fractions and/or decimals <p>[CN, R, V]</p>	<p>8.N.4. Demonstrate an understanding of ratio and rate. [C, CN, V]</p>	<p>9.N.3. Demonstrate an understanding of rational numbers by</p> <ul style="list-style-type: none"> ■ comparing and ordering rational numbers ■ solving problems that involve arithmetic operations on rational numbers <p>[C, CN, PS, R, T, V]</p>

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General Learning Outcome: **Develop number sense.**

Specific Learning Outcomes

Operations with Whole Numbers Addition / Subtraction

Big Ideas	KINDER-GARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> • The four operations are intrinsically related. • Flexible methods of calculation in all operations involve decomposing and composing numbers in a wide variety of ways. • Flexible methods of calculation require a strong understanding of the operations and properties of the operations. • There are a variety of appropriate ways to estimate sums, differences, products, and quotients, depending on the context and the numbers involved. • Personal strategies and algorithms provide flexible and efficient methods of calculating that vary depending on the context and the numbers involved. 		<p>1.N.9. Demonstrate an understanding of addition of numbers with answers to 20 and their corresponding subtraction facts, concretely, pictorially, and symbolically, by</p> <ul style="list-style-type: none"> ■ using familiar and mathematical language to describe additive and subtractive actions from their experience ■ creating and solving problems in context that involve addition and subtraction ■ modelling addition and subtraction using a variety of concrete and visual representations, and recording the process symbolically <p>[C, CN, ME, PS, R, V]</p> <p>1.N.10. Describe and use mental mathematics strategies, including</p> <ul style="list-style-type: none"> ■ counting on, counting back ■ using one more, one less ■ making 10 ■ starting from known doubles ■ using addition to subtract to determine the basic addition and related subtraction facts to 18. <p>[C, CN, ME, PS, R, V]</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Recall of one more and one less, complementary (compatible) numbers that add up to 5 and 10, doubles (up to $5 + 5$), and related subtraction facts is expected by the end of Grade 1.</p> </div>	<p>2.N.8. Demonstrate and explain the effect of adding zero to or subtracting zero from any number.</p> <p>[C, R]</p> <p>2.N.9. Demonstrate an understanding of addition (limited to 1- and 2-digit numerals) with answers to 100 and the corresponding subtraction by</p> <ul style="list-style-type: none"> ■ using personal strategies for adding and subtracting with and without the support of manipulatives ■ creating and solving problems that involve addition and subtraction ■ explaining that the order in which numbers are added does not affect the sum ■ explaining that the order in which numbers are subtracted may affect the difference <p>[C, CN, ME, PS, R, V]</p> <p>2.N.10. Apply mental mathematics strategies, including</p> <ul style="list-style-type: none"> ■ using doubles ■ making 10 ■ using one more, one less ■ using two more, two less ■ building on a known double ■ using addition for subtraction to develop recall of basic addition facts to 18 and related subtraction facts. <p>[C, CN, ME, R, V]</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Recall of facts to 10, doubles to $9 + 9$, and related subtraction facts is expected by the end of Grade 2.</p> </div>	<p>3.N.6. Describe and apply mental mathematics strategies for adding two 2-digit numerals, such as</p> <ul style="list-style-type: none"> ■ adding from left to right ■ taking one addend to the nearest multiple of ten and then compensating ■ using doubles <p>[C, ME, PS, R, V]</p> <p>3.N.7. Describe and apply mental mathematics strategies for subtracting two 2-digit numerals, such as</p> <ul style="list-style-type: none"> ■ taking the subtrahend to the nearest multiple of ten and then compensating ■ thinking of addition ■ using doubles <p>[C, ME, PS, R, V]</p> <p>3.N.8. Apply estimation strategies to predict sums and differences of two 2-digit numerals in a problem-solving context.</p> <p>[C, ME, PS, R]</p> <p>3.N.9. Demonstrate an understanding of addition and subtraction of numbers with answers to 1000 (limited to 1-, 2-, and 3-digit numerals) by</p> <ul style="list-style-type: none"> ■ using personal strategies for adding and subtracting with and without the support of manipulatives ■ creating and solving problems in contexts that involve addition and subtraction of numbers, concretely, pictorially, and symbolically <p>[C, CN, ME, PS, R]</p> <p>3.N.10. Apply mental math strategies to determine addition facts and related subtraction facts to 18 ($9 + 9$).</p> <p>[C, CN, ME, R, V]</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Recall of addition and related subtraction facts to 18 is expected by the end of Grade 3.</p> </div>	<p>4.N.3. Demonstrate an understanding of addition of numbers with answers to 10 000 and their corresponding subtractions (limited to 3- and 4-digit numerals), concretely, pictorially, and symbolically, by</p> <ul style="list-style-type: none"> ■ using personal strategies ■ using the standard algorithms ■ estimating sums and differences ■ solving problems <p>[C, CN, ME, PS, R]</p>	<p>5.N.2. Apply estimation strategies, including</p> <ul style="list-style-type: none"> ■ front-end rounding ■ compensation ■ compatible numbers <p>in problem-solving contexts.</p> <p>[C, CN, ME, PS, R, V]</p>	<p>6.N.2. Solve problems involving large numbers, using technology.</p> <p>[ME, PS, T]</p> <p>6.N.9. Explain and apply the order of operations, excluding exponents (limited to whole numbers).</p> <p>[CN, ME, PS, T]</p>	<p>7.N.6. Demonstrate an understanding of addition and subtraction of integers, concretely, pictorially, and symbolically.</p> <p>[C, CN, PS, R, V]</p>		<p>9.N.4. Explain and apply the order of operations, including exponents, with and without technology.</p> <p>[PS, T]</p>

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General Learning Outcome: **Develop number sense.**

Specific Learning Outcomes

Operations with Whole Numbers Multiplication / Division

Big Ideas	KINDER-GARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> The four operations are intrinsically related. Flexible methods of calculation in all operations involve decomposing and composing numbers in a wide variety of ways. Flexible methods of calculation require a strong understanding of the operations and properties of the operations. There are a variety of appropriate ways to estimate sums, differences, products, and quotients, depending on the context and the numbers involved. Personal strategies and algorithms provide flexible and efficient methods of calculating that vary depending on the context and the numbers involved. 				<p>3.N.11. Demonstrate an understanding of multiplication to 5×5 by</p> <ul style="list-style-type: none"> representing and explaining multiplication using equal grouping and arrays creating and solving problems in context that involve multiplication modelling multiplication using concrete and visual representations, and recording the process symbolically relating multiplication to repeated addition relating multiplication to division <p>[C, CN, PS, R]</p> <p>3.N.12. Demonstrate an understanding of division by</p> <ul style="list-style-type: none"> representing and explaining division using equal sharing and equal grouping creating and solving problems in context that involve equal sharing and equal grouping modelling equal sharing and equal grouping using concrete and visual representations, and recording the process symbolically relating division to repeated subtraction relating division to multiplication (limited to division related to multiplication facts to 5×5). <p>[C, CN, PS, R]</p>	<p>4.N.4. Explain the properties of 0 and 1 for multiplication, and the property of 1 for division. [C, CN, R]</p> <p>4.N.5. Describe and apply mental mathematics strategies, such as</p> <ul style="list-style-type: none"> skip-counting from a known fact using doubling, halving using doubling and adding one more group using patterns in the 9s facts using repeated doubling to develop an understanding of basic multiplication facts to 9×9 and related division facts. <p>[C, CN, ME, PS, R]</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Recall of the multiplication and related division facts up to 5×5 is expected by the end of Grade 4. </div> <p>4.N.6. Demonstrate an understanding of multiplication (2- or 3-digit numerals by 1-digit numerals) to solve problems by</p> <ul style="list-style-type: none"> using personal strategies for multiplication with and without concrete materials using arrays to represent multiplication connecting concrete representations to symbolic representations estimating products <p>[C, CN, ME, PS, R, V]</p> <p>4.N.7. Demonstrate an understanding of division (1-digit divisor and up to 2-digit dividend) to solve problems by</p> <ul style="list-style-type: none"> using personal strategies for dividing with and without concrete materials estimating quotients relating division to multiplication <p>[C, CN, ME, PS, R, V]</p>	<p>5.N.2. Apply estimation strategies, including</p> <ul style="list-style-type: none"> front-end rounding compensation compatible numbers <p>in problem-solving contexts. [C, CN, ME, PS, R, V]</p> <p>5.N.3. Apply mental math strategies to determine multiplication and related division facts to 81 (9×9). [C, CN, ME, R, V]</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Recall of multiplication facts to 81 and related division facts is expected by the end of Grade 5. </div> <p>5.N.4. Apply mental mathematics strategies for multiplication, such as</p> <ul style="list-style-type: none"> annexing then adding zeros halving and doubling using the distributive property <p>[C, ME, R]</p> <p>5.N.5. Demonstrate an understanding of multiplication (1- and 2-digit multipliers and up to 4-digit multiplicands), concretely, pictorially, and symbolically, by</p> <ul style="list-style-type: none"> using personal strategies using the standard algorithm estimating products to solve problems. <p>[C, CN, ME, PS, V]</p> <p>5.N.6. Demonstrate an understanding of division (1- and 2-digit divisors and up to 4-digit dividends), concretely, pictorially, and symbolically, and interpret remainders by</p> <ul style="list-style-type: none"> using personal strategies using the standard algorithm estimating quotients to solve problems. <p>[C, CN, ME, PS]</p>	<p>6.N.2. Solve problems involving large numbers, using technology. [ME, PS, T]</p> <p>6.N.3. Demonstrate an understanding of factors and multiples by</p> <ul style="list-style-type: none"> determining multiples and factors of numbers less than 100 identifying prime and composite numbers solving problems involving factors or multiples <p>[PS, R, V]</p> <p>6.N.9 Explain and apply the order of operations, excluding exponents (limited to whole numbers). [CN, ME, PS, T]</p>	<p>7.N.1. Determine and explain why a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10, and why a number cannot be divided by 0. [C, R]</p>	<p>8.N.1. Demonstrate an understanding of perfect squares and square roots, concretely pictorially, and symbolically (limited to whole numbers). [C, CN, R, V]</p> <p>8.N.7. Demonstrate an understanding of multiplication and division of integers, concretely, pictorially, and symbolically. [C, CN, PS, R, V]</p>	<p>9.N.1. Demonstrate an understanding of powers with integral bases (excluding base 0) and whole-number exponents by</p> <ul style="list-style-type: none"> representing repeated multiplication using powers using patterns to show that a power with an exponent of zero is equal to 1 solving problems involving powers <p>[C, CN, PS, R]</p> <p>9.N.2. Demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole-number exponents. [C, CN, PS, R, T]</p> <p>9.N.4. Explain and apply the order of operations, including exponents, with and without technology. [PS, T]</p>

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Specific Learning Outcomes

Operations with Rational Numbers

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> The four operations are intrinsically related. Flexible methods of calculation in all operations involve decomposing and composing numbers in a wide variety of ways. Flexible methods of calculation require a strong understanding of the operations and properties of the operations. There are a variety of appropriate ways to estimate sums, differences, products, and quotients, depending on the context and the numbers involved. Personal strategies and algorithms provide flexible and efficient methods of calculating that vary depending on the context and the numbers involved. 					<p>4.N.11. Demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) by</p> <ul style="list-style-type: none"> using compatible numbers estimating sums and differences using mental math strategies <p>to solve problems. [C, ME, PS, R, V]</p>	<p>5.N.11. Demonstrate an understanding of addition and subtraction of decimals (to thousandths), concretely, pictorially, and symbolically, by</p> <ul style="list-style-type: none"> using personal strategies using the standard algorithms using estimation solving problems <p>[C, CN, ME, PS, R, V]</p>	<p>6.N.8. Demonstrate an understanding of multiplication and division of decimals (involving 1-digit whole-number multipliers, 1-digit natural number divisors, and multipliers and divisors that are multiples of 10), concretely, pictorially, and symbolically, by</p> <ul style="list-style-type: none"> using personal strategies using the standard algorithms using estimation solving problems <p>[C, CN, ME, PS, R, V]</p>	<p>7.N.2. Demonstrate an understanding of the addition, subtraction, multiplication, and division of decimals to solve problems (for more than 1-digit divisors or 2-digit multipliers, technology could be used). [ME, PS, T]</p> <p>7.N.3. Solve problems involving percents from 1% to 100%. [C, CN, PS, ME, R, T]</p> <p>7.N.5. Demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially, and symbolically (limited to positive sums and differences). [C, CN, ME, PS, R, V]</p>	<p>8.N.2. Determine the approximate square root of numbers that are not perfect squares (limited to whole numbers). [C, CN, ME, R, T]</p> <p>8.N.3. Demonstrate an understanding of percents greater than or equal to 0%. [CN, PS, R, V]</p> <p>8.N.5. Solve problems that involve rates, ratios, and proportional reasoning. [C, CN, PS, R]</p> <p>8.N.6. Demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers, concretely, pictorially, and symbolically. [C, CN, ME, PS]</p> <p>8.N.8. Solve problems involving positive rational numbers. [C, CN, ME, PS, R, T, V]</p>	<p>9.N.3. Demonstrate an understanding of rational numbers by</p> <ul style="list-style-type: none"> comparing and ordering rational numbers solving problems that involve arithmetic operations on rational numbers <p>[C, CN, PS, R, T, V]</p> <p>9.N.5. Determine the square root of positive rational numbers that are perfect squares. [C, CN, PS, R, T]</p> <p>9.N.6. Determine an approximate square root of positive rational numbers that are non-perfect squares. [C, CN, PS, R, T]</p>

Glance Across the Grades: PATTERNS AND RELATIONS (Patterns)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use patterns to describe the world and solve problems.

Specific Learning Outcomes

Patterning and Algebraic Thinking

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Patterns can be represented in a variety of ways. Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. Data can be arranged to highlight patterns and relationships. 	<p>K.PR.1. Demonstrate an understanding of repeating patterns (two or three elements) by</p> <ul style="list-style-type: none"> identifying reproducing extending creating <p>patterns using manipulatives, sounds, and actions. [C, CN, PS, V]</p>	<p>1.PR.1. Demonstrate an understanding of repeating patterns (two to four elements) by</p> <ul style="list-style-type: none"> describing reproducing extending creating <p>patterns using manipulatives, diagrams, sounds, and actions. [C, PS, R, V]</p> <p>1.PR.2. Translate repeating patterns from one representation to another. [C, R, V]</p>	<p>2.PR.1. Predict an element in a repeating pattern using a variety of strategies. [C, CN, PS, R, V]</p> <p>2.PR.2. Demonstrate an understanding of increasing patterns by</p> <ul style="list-style-type: none"> describing reproducing extending creating <p>patterns using manipulatives, diagrams, sounds, and actions (numbers to 100). [C, CN, PS, R, V]</p>	<p>3.PR.1. Demonstrate an understanding of increasing patterns by</p> <ul style="list-style-type: none"> describing extending comparing creating <p>patterns using manipulatives, diagrams, and numbers (to 1000). [C, CN, PS, R, V]</p> <p>3.PR.2. Demonstrate an understanding of decreasing patterns by</p> <ul style="list-style-type: none"> describing extending comparing creating <p>patterns using manipulatives, diagrams, and numbers (starting from 1000 or less). [C, CN, PS, R, V]</p>	<p>4.PR.1. Identify and describe patterns found in tables and charts, including a multiplication chart. [C, CN, PS, V]</p> <p>4.PR.2. Reproduce a pattern shown in a table or chart using concrete materials. [C, CN, V]</p> <p>4.PR.3. Represent and describe patterns and relationships using charts and tables to solve problems. [C, CN, PS, R, V]</p> <p>4.PR.4. Identify and explain mathematical relationships using charts and diagrams to solve problems. [CN, PS, R, V]</p>	<p>5.PR.1. Determine the pattern rule to make predictions about subsequent elements. [C, CN, PS, R, V]</p>	<p>6.PR.1. Demonstrate an understanding of the relationships within tables of values to solve problems. [C, CN, PS, R]</p> <p>6.PR.2. Represent and describe patterns and relationships using graphs and tables. [C, CN, ME, PS, R, V]</p>	<p>7.PR.1. Demonstrate an understanding of oral and written patterns and their corresponding relations. [C, CN, R]</p> <p>7.PR.2. Construct a table of values from a relation, graph the table of values, and analyze the graph to draw conclusions and solve problems. [C, CN, R, V]</p>	<p>8.PR.1. Graph and analyze two-variable linear relations [C, ME, PS, R, T, V]</p>	<p>9.PR.1. Generalize a pattern arising from a problem-solving context using linear equations, and verify by substitution. [C, CN, PS, R, V]</p> <p>9.PR.2. Graph linear relations, analyze the graph, and interpolate or extrapolate to solve problems. [C, CN, PS, R, T, V]</p>

Glance Across the Grades: PATTERNS AND RELATIONS (Variables and Equations)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use patterns to describe the world and solve problems.

Specific Learning Outcomes

Algebraic Representations with Expressions

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Algebra, with the use of symbols or variables, expressions, and equations, is a tool for generalizing arithmetic and representing mathematical situations and patterns in our world. The equal sign describes the balance that exists between the quantities on either side of the equal sign. Equality and inequality are used to express relationships between two quantities. Relationships between quantities can be described using rules involving variables. 								<p>7.PR.4. Explain the difference between an expression and an equation. [C, CN]</p> <p>7.PR.5. Evaluate an expression given the value of the variable(s). [CN, R]</p>		<p>9.PR.5. Demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2). [C, CN, R, V]</p> <p>9.PR.6. Model, record, and explain the operations of addition and subtraction of polynomial expressions, concretely, pictorially, and symbolically (limited to polynomials of degree less than or equal to 2). [C, CN, PS, R, V]</p> <p>9.PR.7. Model, record, and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to 2) by monomials, concretely, pictorially, and symbolically. [C, CN, R, V]</p>

Glance Across the Grades: PATTERNS AND RELATIONS (Variables and Equations)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use patterns to describe the world and solve problems.

Specific Learning Outcomes

Algebraic Representations with Equations

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Algebra, with the use of symbols or variables, expressions, and equations, is a tool for generalizing arithmetic and representing mathematical situations and patterns in our world. The equal sign describes the balance that exists between the quantities on either side of the equal sign. Equality and inequality are used to express relationships between two quantities. Relationships between quantities can be described using rules involving variables. 		<p>1.PR.3. Describe equality as a balance and inequality as an imbalance, concretely and pictorially (0 to 20). [C, CN, R, V]</p> <p>1.PR.4. Record equalities using the equal symbol (0 to 20). [C, CN, PS, V]</p>	<p>2.PR.3. Demonstrate and explain the meaning of equality and inequality by using manipulatives and diagrams (0 to 100). [C, CN, R, V]</p> <p>2.PR.4. Record equalities and inequalities symbolically using the equal symbol or the not-equal symbol. [C, CN, R, V]</p>	<p>3.PR.3. Solve one-step addition and subtraction equations involving symbols representing an unknown number. [C, CN, PS, R, V]</p>	<p>4.PR.5. Express a problem as an equation in which a symbol is used to represent an unknown number. [CN, PS, R]</p> <p>4.PR.6. Solve one-step equations involving a symbol to represent an unknown number. [C, CN, PS, R, V]</p>	<p>5.PR.2. Solve problems involving single-variable (expressed as symbols or letters), one-step equations with whole-number coefficients, and whole-number solutions. [C, CN, PS, R]</p>	<p>6.PR.3. Represent generalizations arising from number relationships using equations with letter variables. [C, CN, PS, R, V]</p> <p>6.PR.4. Demonstrate and explain the meaning of preservation of equality, concretely, pictorially, and symbolically. [C, CN, PS, R, V]</p>	<p>7.PR.3. Demonstrate an understanding of preservation of equality by</p> <ul style="list-style-type: none"> modelling preservation of equality, concretely, pictorially, and symbolically applying preservation of equality to solve equations <p>[C, CN, PS, R, V]</p> <p>7.PR.4. Explain the difference between an expression and an equation. [C, CN]</p> <p>7.PR.6. Model and solve problems that can be represented by one-step linear equations of the form $x + a = b$, concretely, pictorially, and symbolically, where a and b are integers. [CN, PS, R, V]</p> <p>7.PR.7. Model and solve problems that can be represented by linear equations of the form:</p> <ul style="list-style-type: none"> $ax + b = c$ $ax = b$ $\frac{x}{a} = b, a \neq 0$ <p>concretely, pictorially, and symbolically, where $a, b,$ and c are whole numbers. [CN, PS, R, V]</p>	<p>8.PR.2. Model and solve problems using linear equations of the form:</p> <ul style="list-style-type: none"> $ax = b$ $\frac{x}{a} = b, a \neq 0$ $ax + b = c$ $\frac{x}{a} + b = c, a \neq 0$ $a(x + b) = c$ <p>concretely, pictorially, and symbolically, where $a, b,$ and c are integers. [C, CN, PS, V]</p>	<p>9.PR.3. Model and solve problems using linear equations of the form:</p> <ul style="list-style-type: none"> $ax = b$ $\frac{x}{a} = b, a \neq 0$ $ax + b = c$ $\frac{x}{a} + b = c, a \neq 0$ $ax = b + cx$ $a(x + b) = c$ $ax + b = cx + d$ $a(bx + c) = d(ex + f)$ $\frac{a}{x} = b, x \neq 0$ <p>where $a, b, c, d, e,$ and f are rational numbers. [C, CN, PS, V]</p> <p>9.PR.4. Explain and illustrate strategies to solve single variable linear inequalities with rational number coefficients within a problem-solving context. [C, CN, PS, R, V]</p>

Glance Across the Grades: SHAPE AND SPACE (Measurement)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use direct or indirect measurement to solve problems.

Specific Learning Outcomes

Length

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> It is necessary to understand the attributes of the object before anything can be measured. Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units of the same attribute. The longer the unit of measure, the fewer units it takes to measure the object. The use of standard measurement units simplifies communication about the size of objects. 	<p>K.SS.1. Use direct comparison to compare two objects based on a single attribute, such as length (height), mass (weight), and volume (capacity). [C, CN, PS, R, V]</p>	<p>1.SS.1. Demonstrate an understanding of measurement as a process of comparing by</p> <ul style="list-style-type: none"> identifying attributes that can be compared ordering objects making statements of comparison filling, covering, or matching <p>[C, CN, PS, R, V]</p>	<p>2.SS.2. Relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass (weight). [C, CN, ME, R, V]</p> <p>2.SS.3. Compare and order objects by length, height, distance around, and mass (weight) using non-standard units, and make statements of comparison. [C, CN, ME, R, V]</p> <p>2.SS.4. Measure length to the nearest non-standard unit by</p> <ul style="list-style-type: none"> using multiple copies of a unit using a single copy of a unit (iteration process) <p>[C, ME, R, V]</p> <p>2.SS.5. Demonstrate that changing the orientation of an object does not alter the measurements of its attributes. [C, R, V]</p>	<p>3.SS.3. Demonstrate an understanding of measuring length (cm, m) by</p> <ul style="list-style-type: none"> selecting and justifying referents for the units cm and m modelling and describing the relationship between the units cm and m estimating length using referents measuring and recording length, width, and height <p>[C, CN, ME, PS, R, V]</p> <p>3.SS.5. Demonstrate an understanding of perimeter of regular and irregular shapes by</p> <ul style="list-style-type: none"> estimating perimeter using referents for centimetre or metre measuring and recording perimeter (cm, m) constructing different shapes for a given perimeter (cm, m) to demonstrate that many shapes are possible for a perimeter <p>[C, ME, PS, R, V]</p>		<p>5.SS.1. Design and construct different rectangles given either perimeter or area, or both (whole numbers), and draw conclusions. [C, CN, PS, R, V]</p> <p>5.SS.2. Demonstrate an understanding of measuring length (mm) by</p> <ul style="list-style-type: none"> selecting and justifying referents for the unit mm modelling and describing the relationship between mm and cm units, and between mm and m units <p>[C, CN, ME, PS, R, V]</p>	<p>6.SS.3. Develop and apply a formula for determining the</p> <ul style="list-style-type: none"> perimeter of polygons area of rectangles volume of right rectangular prisms <p>[C, CN, PS, R, V]</p>	<p>7.SS.1. Demonstrate an understanding of circles by</p> <ul style="list-style-type: none"> describing the relationships among radius, diameter, and circumference of circles relating circumference to pi (π) determining the sum of the central angles constructing circles with a given radius or diameter solving problems involving the radii, diameters, and circumferences of circles <p>[C, CN, R, V]</p>	<p>8.SS.1. Develop and apply the Pythagorean theorem to solve problems. [CN, PS, R, V, T]</p>	<p>9.SS.1. Solve problems and justify the solution strategy using circle properties, including</p> <ul style="list-style-type: none"> the perpendicular from the centre of a circle to a chord bisects the chord the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc the inscribed angles subtended by the same arc are congruent a tangent to a circle is perpendicular to the radius at the point of tangency <p>[C, CN, PS, R, T, V]</p> <p>9.SS.3. Demonstrate an understanding of similarity of polygons. [C, CN, PS, R, V]</p>

Glance Across the Grades: SHAPE AND SPACE (Measurement)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use direct or indirect measurement to solve problems.

Specific Learning Outcomes

Area

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> It is necessary to understand the attributes of the object before anything can be measured. Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units of the same attribute. The longer the unit of measure, the fewer units it takes to measure the object. The use of standard measurement units simplifies communication about the size of objects. 		<p>1.SS.1. Demonstrate an understanding of measurement as a process of comparing by</p> <ul style="list-style-type: none"> identifying attributes that can be compared ordering objects making statements of comparison filling, covering, or matching <p>[C, CN, PS, R, V]</p>	<p>2.SS.5. Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.</p> <p>[C, R, V]</p>		<p>4.SS.3. Demonstrate an understanding of area of regular and irregular 2-D shapes by</p> <ul style="list-style-type: none"> recognizing that area is measured in square units selecting and justifying referents for the units cm^2 or m^2 estimating area by using referents for cm^2 or m^2 determining and recording area (cm^2 or m^2) constructing different rectangles for a given area (cm^2 or m^2) in order to demonstrate that many different rectangles may have the same area <p>[C, CN, ME, PS, R, V]</p>	<p>5.SS.1. Design and construct different rectangles given either perimeter or area, or both (whole numbers), and draw conclusions.</p> <p>[C, CN, PS, R, V]</p>	<p>6.SS.3. Develop and apply a formula for determining the</p> <ul style="list-style-type: none"> perimeter of polygons area of rectangles volume of right rectangular prisms <p>[C, CN, PS, R, V]</p>	<p>7.SS.2. Develop and apply a formula for determining the area of</p> <ul style="list-style-type: none"> triangles parallelograms circles <p>[CN, PS, R, V]</p>	<p>8.SS.3. Determine the surface area of</p> <ul style="list-style-type: none"> right rectangular prisms right triangular prisms right cylinders to solve problems. <p>[C, CN, PS, R, V]</p>	<p>9.SS.2. Determine the surface area of composite 3-D objects to solve problems.</p> <p>[C, CN, PS, R, V]</p>

Glance Across the Grades: SHAPE AND SPACE (Measurement)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use direct or indirect measurement to solve problems.

Specific Learning Outcomes

Volume (Capacity)

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> It is necessary to understand the attributes of the object before anything can be measured. Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units of the same attribute. The longer the unit of measure, the fewer units it takes to measure the object. The use of standard measurement units simplifies communication about the size of objects. 	<p>K.SS.1. Use direct comparison to compare two objects based on a single attribute, such as length (height), mass (weight), and volume (capacity). [C, CN, PS, R, V]</p>	<p>1.SS.1. Demonstrate an understanding of measurement as a process of comparing by</p> <ul style="list-style-type: none"> identifying attributes that can be compared ordering objects making statements of comparison filling, covering, or matching <p>[C, CN, PS, R, V]</p>	<p>2.SS.5. Demonstrate that changing the orientation of an object does not alter the measurements of its attributes. [C, R, V]</p>			<p>5.SS.3. Demonstrate an understanding of volume by</p> <ul style="list-style-type: none"> selecting and justifying referents for the units cm^3 or m^3 estimating volume by using referents for cm^3 or m^3 measuring and recording volume (cm^3 or m^3) constructing rectangular prisms for a given volume <p>[C, CN, ME, PS, R, V]</p> <p>5.SS.4. Demonstrate an understanding of capacity by</p> <ul style="list-style-type: none"> describing the relationship between mL and L selecting and justifying referents for the units mL or L estimating capacity by using referents for mL or L measuring and recording capacity (mL or L) <p>[C, CN, ME, PS, R, V]</p>	<p>6.SS.3. Develop and apply a formula for determining the</p> <ul style="list-style-type: none"> perimeter of polygons area of rectangles volume of right rectangular prisms <p>[C, CN, PS, R, V]</p>		<p>8.SS.4. Develop and apply formulas for determining the volume of right prisms and right cylinders. [C, CN, PS, R, V]</p>	

Glance Across the Grades: SHAPE AND SPACE (Measurement)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use direct or indirect measurement to solve problems.

Specific Learning Outcomes

Mass (Weight)

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> It is necessary to understand the attributes of the object before anything can be measured. Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units of the same attribute. The longer the unit of measure, the fewer units it takes to measure the object. The use of standard measurement units simplifies communication about the size of objects. 	<p>K.SS.1. Use direct comparison to compare two objects based on a single attribute, such as length (height), mass (weight), and volume (capacity). [C, CN, PS, R, V]</p>	<p>1.SS.1. Demonstrate an understanding of measurement as a process of comparing by</p> <ul style="list-style-type: none"> identifying attributes that can be compared ordering objects making statements of comparison filling, covering, or matching <p>[C, CN, PS, R, V]</p>	<p>2.SS.2. Relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass (weight). [C, CN, ME, R, V]</p> <p>2.SS.3. Compare and order objects by length, height, distance around, and mass (weight) using non-standard units, and make statements of comparison. [C, CN, ME, R, V]</p> <p>2.SS.5. Demonstrate that changing the orientation of an object does not alter the measurements of its attributes. [C, R, V]</p>	<p>3.SS.4. Demonstrate an understanding of measuring mass (g, kg) by</p> <ul style="list-style-type: none"> selecting and justifying referents for the units g and kg modelling and describing the relationship between the units g and kg estimating mass using referents measuring and recording mass <p>[C, CN, ME, PS, R, V]</p>						

Glance Across the Grades: SHAPE AND SPACE (Measurement)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: **Use direct or indirect measurement to solve problems.**

Specific Learning Outcomes

Time

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> It is necessary to understand the attributes of the object before anything can be measured. Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units of the same attribute. The longer the unit of measure, the fewer units it takes to measure the object. The use of standard measurement units simplifies communication about the size of objects. 			2.SS.1. Relate the number of days to a week and the number of months to a year in a problem-solving context. [C, CN, PS, R]	3.SS.1. Relate the passage of time to common activities using non-standard and standard units (minutes, hours, days, weeks, months, years). [CN, ME, R] 3.SS.2. Relate the number of seconds to a minute, the number of minutes to an hour, and the number of days to a month in a problem-solving context. [C, CN, PS, R, V]	4.SS.1. Read and record time using digital and analog clocks, including 24-hour clocks. [C, CN, V] 4.SS.2. Read and record calendar dates in a variety of formats. [C, V]					

Glance Across the Grades: SHAPE AND SPACE (Measurement)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use direct or indirect measurement to solve problems.

Specific Learning Outcomes

Angles

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> It is necessary to understand the attributes of the object before anything can be measured. Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units of the same attribute. The longer the unit of measure, the fewer units it takes to measure the object. The use of standard measurement units simplifies communication about the size of objects. 							<p>6.SS.1. Demonstrate an understanding of angles by</p> <ul style="list-style-type: none"> identifying examples of angles in the environment classifying angles according to their measure estimating the measure of angles using 45°, 90°, and 180° as reference angles determining angle measures in degrees drawing and labelling angles when the measure is specified <p>[C, CN, ME, V]</p> <p>6.SS.2. Demonstrate that the sum of interior angles is</p> <ul style="list-style-type: none"> 180° in a triangle 360° in a quadrilateral <p>[C, R]</p>	<p>7.SS.1. Demonstrate an understanding of circles by</p> <ul style="list-style-type: none"> describing the relationships among radius, diameter, and circumference of circles relating circumference to pi (π) determining the sum of the central angles constructing circles with a given radius or diameter solving problems involving the radii, diameters, and circumferences of circles <p>[C, CN, R, V]</p>		<p>9.SS.1. Solve problems and justify the solution strategy using circle properties, including</p> <ul style="list-style-type: none"> the perpendicular from the centre of a circle to a chord bisects the chord the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc the inscribed angles subtended by the same arc are congruent a tangent to a circle is perpendicular to the radius at the point of tangency <p>[C, CN, PS, R, T, V]</p> <p>9.SS.3. Demonstrate an understanding of similarity of polygons.</p> <p>[C, CN, PS, R, V]</p>

Glance Across the Grades: SHAPE AND SPACE (3-D Objects and 2-D Shapes)

[C] Communication
[CN] Connections
[ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
[R] Reasoning
[T] Technology
[V] Visualization

General Learning Outcome: Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.

Specific Learning Outcomes

Identifying, Sorting, Comparing, and Constructing

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Two- and three-dimensional objects can be described, classified, and analyzed by their attributes. 	<p>K.SS.2. Sort 3-D objects using a single attribute. [C, CN, PS, R, V]</p> <p>K.SS.3. Build and describe 3-D objects. [CN, PS, V]</p>	<p>1.SS.2. Sort 3-D objects and 2-D shapes using one attribute, and explain the sorting rule. [C, CN, R, V]</p> <p>1.SS.3. Replicate composite 2-D shapes and 3-D objects. [CN, PS, V]</p> <p>1.SS.4. Compare 2-D shapes to parts of 3-D objects in the environment. [C, CN, V]</p>	<p>2.SS.6. Sort 2-D shapes and 3-D objects using two attributes, and explain the sorting rule. [C, CN, R, V]</p> <p>2.SS.7. Describe, compare, and construct 3-D objects, including</p> <ul style="list-style-type: none"> cubes spheres cones cylinders prisms pyramids <p>[C, CN, R, V]</p> <p>2.SS.8. Describe, compare, and construct 2-D shapes, including</p> <ul style="list-style-type: none"> triangles squares rectangles circles <p>[C, CN, R, V]</p> <p>2.SS.9. Identify 2-D shapes as parts of 3-D objects in the environment. [C, CN, R, V]</p>	<p>3.SS.6. Describe 3-D objects according to the shape of their faces and the number of edges and vertices. [C, CN, PS, R, V]</p> <p>3.SS.7. Sort regular and irregular polygons, including</p> <ul style="list-style-type: none"> triangles quadrilaterals pentagons hexagons octagons <p>according to the number of sides. [C, CN, R, V]</p>	<p>4.SS.4. Solve problems involving 2-D shapes and 3-D objects. [CN, PS, V]</p> <p>4.SS.5. Describe and construct rectangular and triangular prisms. [C, CN, R, V]</p>	<p>5.SS.5. Describe and provide examples of edges and faces of 3-D objects, and sides of 2-D shapes, that are</p> <ul style="list-style-type: none"> parallel intersecting perpendicular vertical horizontal <p>[C, CN, R, T, V]</p> <p>5.SS.6. Identify and sort quadrilaterals, including</p> <ul style="list-style-type: none"> rectangles squares trapezoids parallelograms rhombuses <p>according to their attributes. [C, R, V]</p>	<p>6.SS.4. Construct and compare triangles, including</p> <ul style="list-style-type: none"> scalene isosceles equilateral right obtuse acute <p>in different orientations. [C, PS, R, V]</p> <p>6.SS.5. Describe and compare the sides and angles of regular and irregular polygons. [C, PS, R, V]</p>	<p>7.SS.3. Perform geometric constructions, including</p> <ul style="list-style-type: none"> perpendicular line segments parallel line segments perpendicular bisectors angle bisectors <p>[CN, R, V]</p>	<p>8.SS.2. Draw and construct nets for 3-D objects. [C, CN, PS, V]</p> <p>8.SS.5. Draw and interpret top, front, and side views of 3-D objects composed of right rectangular prisms. [C, CN, R, T, V]</p>	<p>9.SS.2. Determine the surface area of composite 3-D objects to solve problems. [C, CN, PS, R, V]</p> <p>9.SS.3. Demonstrate an understanding of similarity of polygons. [C, CN, PS, R, V]</p>

Glance Across the Grades: SHAPE AND SPACE (Transformations)

[C] Communication
[CN] Connections
[ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
[R] Reasoning
[T] Technology
[V] Visualization

General Learning Outcome: Describe and analyze position and motion of objects and shapes.

Specific Learning Outcomes

Position and Motion

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Shapes can be relocated and reoriented using mathematical procedures. Shapes can be described in terms of their location in a plane or in a space. 					<p>4.SS.6. Demonstrate an understanding of line symmetry by</p> <ul style="list-style-type: none"> identifying symmetrical 2-D shapes creating symmetrical 2-D shapes drawing one or more lines of symmetry in a 2-D shape <p>[C, CN, V]</p>	<p>5.SS.7. Perform a single transformation (translation, rotation, or reflection) of a 2-D shape, and draw and describe the image. [C, CN, T, V]</p> <p>5.SS.8. Identify a single transformation (translation, rotation, or reflection) of 2-D shapes. [C, T, V]</p>	<p>6.SS.6. Perform a combination of transformations (translations, rotations, or reflections) on a single 2-D shape, and draw and describe the image. [C, CN, PS, T, V]</p> <p>6.SS.7. Perform a combination of successive transformations of 2-D shapes to create a design, and identify and describe the transformations. [C, CN, T, V]</p> <p>6.SS.8. Identify and plot points in the first quadrant of a Cartesian plane using whole-number ordered pairs. [C, CN, V]</p> <p>6.SS.9. Perform and describe single transformations of a 2-D shape in the first quadrant of a Cartesian plane (limited to whole-number vertices). [C, CN, PS, T, V]</p>	<p>7.SS.4. Identify and plot points in the four quadrants of a Cartesian plane using ordered pairs. [C, CN, V]</p> <p>7.SS.5. Perform and describe transformations of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral vertices). [C, CN, PS, T, V]</p>	<p>8.SS.6. Demonstrate an understanding of tessellation by</p> <ul style="list-style-type: none"> explaining the properties of shapes that make tessellating possible creating tessellations identifying tessellations in the environment <p>[C, CN, PS, T, V]</p>	<p>9.SS.4. Draw and interpret scale diagrams of 2-D shapes. [CN, R, T, V]</p> <p>9.SS.5. Demonstrate an understanding of line and rotation symmetry. [C, CN, PS, V]</p>

Glance Across the Grades: STATISTICS AND PROBABILITY (Data Analysis)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 Reasoning
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: **Collect, display, and analyze data to solve problems.**

Specific Learning Outcomes

Collection, Organization, and Analysis of Data

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Data is gathered and organized in order to answer questions. The question that needs to be answered determines the data that will be collected. The type of data determines the best way to organize and represent it. Visual displays quickly reveal information about data. Information from data representations is used to make references, to interpret, to draw conclusions, and to make predictions. 			<p>2.SP.1. Gather and record data about self and others to answer questions. [C, CN, PS, V]</p> <p>2.SP.2. Construct and interpret concrete graphs and pictographs to solve problems. [C, CN, PS, R, V]</p>	<p>3.SP.1. Collect first-hand data and organize it using</p> <ul style="list-style-type: none"> tally marks line plots charts lists <p>to answer questions. [C, CN, V]</p> <p>3.SP.2. Construct, label, and interpret bar graphs to solve problems. [PS, R, V]</p>	<p>4.SP.1. Demonstrate an understanding of many-to-one correspondence. [C, R, T, V]</p> <p>4.SP.2. Construct and interpret pictographs and bar graphs involving many-to-one correspondence to draw conclusions. [C, PS, R, V]</p>	<p>5.SP.1. Differentiate between first-hand and second-hand data. [C, R, T, V]</p> <p>5.SP.2. Construct and interpret double bar graphs to draw conclusions. [C, PS, R, T, V]</p>	<p>6.SP.1. Create, label, and interpret line graphs to draw conclusions. [C, CN, PS, R, V]</p> <p>6.SP.2. Select, justify, and use appropriate methods of collecting data, including</p> <ul style="list-style-type: none"> questionnaires experiments databases electronic media <p>[C, PS, T]</p> <p>6.SP.3. Graph collected data and analyze the graph to solve problems. [C, CN, PS]</p>	<p>7.SP.1. Demonstrate an understanding of central tendency and range by</p> <ul style="list-style-type: none"> determining the measures of central tendency (mean, median, mode) and range determining the most appropriate measures of central tendency to report findings <p>[C, PS, R, T]</p> <p>7.SP.2. Determine the effect on the mean, median, and mode when an outlier is included in a data set. [C, CN, PS, R]</p> <p>7.SP.3. Construct, label, and interpret circle graphs to solve problems. [C, CN, PS, R, T, V]</p>	<p>8.SP.1. Critique ways in which data are presented. [C, R, T, V]</p>	<p>9.SP.1. Describe the effect of</p> <ul style="list-style-type: none"> bias use of language ethics cost time and timing privacy cultural sensitivity on the collection of data. <p>[C, CN, R, T]</p> <p>9.SP.2. Select and defend the choice of using either a population or a sample of a population to answer a question. [C, CN, PS, R]</p> <p>9.SP.3. Develop and implement a project plan for the collection, display, and analysis of data by</p> <ul style="list-style-type: none"> formulating a question for investigation choosing a data collection method that includes social considerations selecting a population or a sample collecting the data displaying the collected data in an appropriate manner drawing conclusions to answer the question <p>[C, PS, R, T, V]</p>

Glance Across the Grades: STATISTICS AND PROBABILITY (Chance and Uncertainty)

[C] Communication
 [CN] Connections
 [ME] Mental Mathematics
 and Estimation

[PS] Problem Solving
 [R] Reasoning
 [T] Technology
 [V] Visualization

General Learning Outcome: Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

Specific Learning Outcomes

Probability

Big Ideas	KINDERGARTEN	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7	GRADE 8	GRADE 9
<ul style="list-style-type: none"> Probability involves the use of mathematics to describe the level of certainty that an event will occur. Probabilities, both theoretical and experimental, can be determined in different ways. 						<p>5.SP.3. Describe the likelihood of a single outcome occurring, using words such as</p> <ul style="list-style-type: none"> impossible possible certain <p>[C, CN, PS, R]</p> <p>5.SP.4. Compare the likelihood of two possible outcomes occurring, using words such as</p> <ul style="list-style-type: none"> less likely equally likely more likely <p>[C, CN, PS, R]</p>	<p>6.SP.4. Demonstrate an understanding of probability by</p> <ul style="list-style-type: none"> identifying all possible outcomes of a probability experiment differentiating between experimental and theoretical probability determining the theoretical probability of outcomes in a probability experiment determining the experimental probability of outcomes in a probability experiment comparing experimental results with the theoretical probability for an experiment <p>[C, ME, PS, T]</p>	<p>7.SP.4. Express probabilities as ratios, fractions, and percents. [C, CN, R, T, V]</p> <p>7.SP.5. Identify the sample space (where the combined sample space has 36 or fewer elements) for a probability experiment involving two independent events. [C, ME, PS]</p> <p>7.SP.6. Conduct a probability experiment to compare the theoretical probability (determined using a tree diagram, table, or another graphic organizer) and experimental probability of two independent events. [C, PS, R, T]</p>	<p>8.SP.2. Solve problems involving the probability of independent events. [C, CN, PS, T]</p>	<p>9.SP.4. Demonstrate an understanding of the role of probability in society. [C, CN, R, T]</p>

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