[C]	Communication	[PS]	Problem Solving
[CN]	Connections	[R]	Reasoning
[ME]	Mental Mathematics and Estimation	[T]	Technology
		[V]	Visualization

Strand: Number	General Learning Outcome: Develop number sense.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*

4.N.1.	Represent and describe whole numbers to 10 000, pictorially and symbolically. [C, CN, V]	■ Read a four-digit numeral without using the word "and" (e.g., 5321 is five thousand three hundred twenty-one, NOT five thousand three hundred AND twenty-one). ■ Write a numeral using proper spacing without commas (e.g., 4567 or 4 567, 10 000). ■ Write a numeral 0 – 10 000 in words. ■ Represent a numeral using a place value chart or diagrams. ■ Describe the meaning of each digit in a numeral. ■ Express a numeral in expanded notation (e.g., 321 = 300 + 20 + 1). ■ Write the numeral represented in expanded notation. ■ Explain the meaning of each digit in a 4-digit numeral with all digits the same (e.g., for the numeral 2222, the first digit represents two thousands, the second digit two hundreds, the third digit two tens, and the fourth digit two ones).
4.N.2.	Compare and order numbers to 10 000. [C, CN]	■ Order a set of numbers in ascending or descending order, and explain the order by making references to place value. ■ Create and order three 4-digit numerals. ■ Identify the missing numbers in an ordered sequence or between two benchmarks on a number line (vertical or horizontal). ■ Identify incorrectly placed numbers in an ordered sequence or between two benchmarks on a number line (vertical or horizontal).

[C] Communication	[PS] Problem Solving
[CN] Connections	[R] Reasoning
[ME] Mental Mathematics and Estimation	[T] Technology
	[V] Visualization

Strand: Number *(continued)*	General Learning Outcome: Develop number sense.

Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators* **may** *be used to determine whether students have met the corresponding specific outcome.*
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 ■ using personal strategies ■ using the standard algorithms ■ estimating sums and differences ■ solving problems [C, CN, ME, PS, R]	■ Model addition and subtraction using concrete materials and visual representations, and record the process symbolically. ■ Determine the sum of two numbers using a personal strategy (e.g., for 1326 + 548, record 1300 + 500 + 74). ■ Determine the difference of two numbers using a personal strategy (e.g., for 4127 – 238, record 238 + 2 + 60 + 700 + 3000 + 127 or 4127 – 27 – 100 – 100 – 11). ■ Model and explain the relationship that exists between an algorithm, place value, and number properties. ■ Determine the sum and difference using the standard algorithms of vertical addition and subtraction. (Numbers are arranged vertically with corresponding place value digits aligned.) ■ Describe a situation in which an estimate rather than an exact answer is sufficient. ■ Estimate sums and differences using different strategies (e.g., front-end estimation and compensation). ■ Solve problems that involve addition and subtraction of more than 2 numbers. ■ Refine personal strategies to increase efficiency when appropriate (e.g., 3000 – 2999 should not require the use of an algorithm).
4.N.4. Explain the properties of 0 and 1 for multiplication and the property of 1 for division. [C, CN, R]	■ Explain the property for determining the answer when multiplying numbers by one. ■ Explain the property for determining the answer when multiplying numbers by zero. ■ Explain the property for determining the answer when dividing numbers by one.

[C] Communication	**[PS]** Problem Solving
[CN] Connections	**[R]** Reasoning
[ME] Mental Mathematics and Estimation	**[T]** Technology
	[V] Visualization

Strand: Number *(continued)*	**General Learning Outcome:** Develop number sense.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.N.5. Describe and apply mental mathematics strategies, such as ■ skip-counting from a known fact ■ using halving/doubling ■ 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. [C, CN, ME, PS, R] ⎡Recall of the multiplication and related division facts up to 5 x 5 is expected by the end of Grade 4.⎦	■ Provide examples for applying mental mathematics strategies: ■ skip-counting from a known fact (e.g., for 6 x 3, think 5 x 3 = 15, then 15 + 3 = 18) ■ halving/doubling (e.g., for 4×3, think $2 \times 6 = 12$) ■ using a known double and adding one more group (e.g., for 3 x 7, think 2 x 7 = 14, then 14 + 7 = 21) ■ repeated doubling (e.g., for 4 x 6, think 2 x 6 = 12 and 2 x 12 = 24) ■ use ten facts when multiplying by 9 (e.g., for 9×6, think $10 \times 6 = 60$, and $60 - 6 = 54$; for 7×9, think $7 \times 10 = 70$, and $70 - 7 = 63$) ■ halving (e.g., for $30 \div 6$, think $15 \div 3 = 5$) ■ relating division to multiplication (e.g., for $64 \div 8$, think $8 \times \square = 64$)
4.N.6. Demonstrate an understanding of multiplication (2- or 3-digit numerals by 1-digit numerals) to solve problems by ■ using personal strategies for multiplication with and without concrete materials ■ using arrays to represent multiplication ■ connecting concrete representations to symbolic representations ■ estimating products [C, CN, ME, PS, R, V]	■ Model a multiplication problem using the distributive property [e.g., $8 \times 365 = (8 \times 300) + (8 \times 60) + (8 \times 5)$]. ■ Use concrete materials, such as base-10 blocks or their pictorial representations, to represent multiplication, and record the process symbolically. ■ Create and solve a multiplication problem that is limited to 2 or 3 digits by 1 digit. ■ Estimate a product using a personal strategy (e.g., 2×243 is close to or a little more than 2×200, or close to or a little less than 2×250). ■ Model and solve a multiplication problem using an array, and record the process. ■ Solve a multiplication problem and record the process.
4.N.7. Demonstrate an understanding of division (1-digit divisor and up to 2-digit dividend) to solve problems by ■ using personal strategies for dividing with and without concrete materials ■ estimating quotients ■ relating division to multiplication [C, CN, ME, PS, R, V]	(It is not intended that remainders be expressed as decimals or fractions.) ■ Solve a division problem without a remainder using arrays or base-10 materials. ■ Solve a division problem with a remainder using arrays or base-10 materials. ■ Solve a division problem using a personal strategy, and record the process. ■ Create and solve a word problem involving a 1- or 2-digit dividend. ■ Estimate a quotient using a personal strategy (e.g., $86 \div 4$ is close to $80 \div 4$ or close to $80 \div 5$).

[C] Communication	[PS] Problem Solving
[CN] Connections	[R] Reasoning
[ME] Mental Mathematics and Estimation	[T] Technology
	[V] Visualization

Strand: Number *(continued)*	General Learning Outcome: Develop number sense.

Specific Learning Outcomes *It is expected that students will:*	Achievement Indicators *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.N.8. Demonstrate an understanding of fractions less than or equal to one by using concrete and pictorial representations to ■ 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 [C, CN, PS, R, V]	■ Represent a fraction using concrete materials. ■ Identify a fraction from its concrete representation. ■ Name and record the shaded and non-shaded parts of a set. ■ Name and record the shaded and non-shaded parts of a whole. ■ Represent a fraction pictorially by shading parts of a set. ■ Represent a fraction pictorially by shading parts of a whole. ■ Explain how denominators can be used to compare two unit fractions. ■ Order a set of fractions that have the same numerator, and explain the ordering. ■ Order a set of fractions that have the same denominator, and explain the ordering. ■ Identify which of the benchmarks 0, $\frac{1}{2}$, or 1 is closest to a fraction. ■ Name fractions between two benchmarks on a number line (horizontal or vertical). ■ Order a set of fractions by placing them on a number line (horizontal or vertical) with benchmarks. ■ Provide examples where two identical fractions may not represent the same quantity (e.g., half of a large apple is not equivalent to half of a small apple; half of ten berries is not equivalent to half of sixteen berries). ■ Provide an example of a fraction that represents part of a set, and a fraction that represents part of a whole, from everyday contexts.
4.N.9. Describe and represent decimals (tenths and hundredths), concretely, pictorially, and symbolically. [C, CN, R, V]	■ Write the decimal for a concrete or pictorial representation of part of a set, part of a region or part of a unit of measure. ■ Represent a decimal using concrete materials or a pictorial representation. ■ Explain the meaning of each digit in a decimal with all digits the same. ■ Represent a decimal using money values (pennies and dimes). ■ Record a money value using decimals. ■ Provide examples of everyday contexts in which tenths and hundredths are used. ■ Model, using manipulatives or pictures, that a tenth can be expressed as hundredths (e.g., 0.9 is equivalent to 0.90 or 9 dimes is equivalent to 90 pennies).

[C] Communication	**[PS]**	Problem Solving
[CN] Connections	**[R]**	Reasoning
[ME] Mental Mathematics	**[T]**	Technology
and Estimation	**[V]**	Visualization

Strand: Number *(continued)*	General Learning Outcome: Develop number sense.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.N.10. Relate decimals to fractions (to hundredths). [CN, R, V]	■ Read decimals as fractions (e.g., 0.5 is zero and five-tenths). ■ Express orally and in written form a decimal in fractional form. ■ Express orally and in written form a fraction with a denominator of 10 or 100 as a decimal. ■ Express a pictorial or concrete representation as a fraction or decimal (e.g., 15 shaded squares on a hundred grid can be expressed as 0.15 or $\frac{15}{100}$). ■ Express orally and in written form the decimal equivalent for a fraction (e.g., $\frac{50}{100}$ can be expressed as 0.50).

4.N.11.   Demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) by
   ■ using compatible numbers
   ■ estimating sums and differences
   ■ using mental math strategies
to solve problems.
[C, ME, PS, R, V]
	■ Predict sums and differences of decimals using estimation strategies.
	■ Solve problems, including money problems, which involve addition and subtraction of decimals, limited to hundredths.
	■ Determine the approximate solution of a problem not requiring an exact answer.
	■ Estimate a sum or difference using compatible numbers.
	■ Count back change for a purchase.

Grade 4

Strand: Patterns and Relations (Patterns)	General Learning Outcome: Use patterns to describe the world and solve problems.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.PR.1. Identify and describe patterns found in tables and charts, including a multiplication chart. [C, CN, PS, V]	■ Identify and describe a variety of patterns in a multiplication chart. ■ Determine the missing elements in a table or chart. ■ Identify error(s) in a table or chart. ■ Describe the pattern found in a table or chart.
4.PR.2. Reproduce a pattern shown in a table or chart using concrete materials. [C, CN, V]	■ Create a concrete representation of a pattern displayed in a table or chart. ■ Explain why the same relationship exists between the pattern in a table and its concrete representation.
4.PR.3. Represent and describe patterns and relationships using charts and tables to solve problems. [C, CN, PS, R, V]	■ Extend patterns found in a table or chart to solve a problem. ■ Translate the information provided in a problem into a table or chart. ■ Identify and extend the patterns in a table or chart to solve a problem.
4.PR.4. Identify and explain mathematical relationships using charts and diagrams to solve problems. [CN, PS, R, V]	■ Complete a Carroll diagram by entering data into correct squares to solve a given problem. ■ Determine where new elements belong in a Carroll diagram. ■ Solve a problem using a Carroll diagram. ■ Identify a sorting rule for a Venn diagram. ■ Describe the relationship shown in a Venn diagram when the circles intersect, when one circle is contained in the other, and when the circles are separate. ■ Determine where new elements belong in a Venn diagram. ■ Solve a problem by using a chart or diagram to identify mathematical relationships.

Grade 4

Strand: Patterns and Relations (Variables and Equations)	General Learning Outcome: Represent algebraic expressions in multiple ways.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.PR.5. Express a problem as an equation in which a symbol is used to represent an unknown number. [CN, PS, R]	■ Explain the purpose of the symbol, such as a triangle or circle, in an addition, subtraction, multiplication, or division equation with one unknown (e.g., $6 = 36 \div \square$). ■ Express a pictorial or concrete representation of an equation in symbolic form. ■ Identify the unknown in a story problem, represent the problem with an equation, and solve the problem concretely, pictorially, or symbolically. ■ Create a problem in context for an equation with one unknown.
4.PR.6. Solve one-step equations involving a symbol to represent an unknown number. [C, CN, PS, R, V]	■ Solve a one-step equation using manipulatives. ■ Solve a one-step equation using guess and test. ■ Describe, orally, the meaning of a one-step equation with one unknown. ■ Solve an equation when the unknown is on the left or right side of the equation. ■ Represent and solve an addition or subtraction problem involving a "part-part-whole" or comparison context using a symbol to represent the unknown. ■ Represent and solve a multiplication or division problem involving equal grouping or partitioning (equal sharing), using symbols to represent the unknown.

[C]	Communication	[PS]	Problem Solving
[CN]	Connections	[R]	Reasoning
[ME]	Mental Mathematics and Estimation	[T]	Technology
		[V]	Visualization

Strand: Shape and Space (Measurement)	General Learning Outcome: Use direct or indirect measurement to solve problems.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.SS.1. Read and record time using digital and analog clocks, including 24-hour clocks. [C, CN, V]	■ State the number of hours in a day. ■ Express the time orally and numerically from a 12-hour analog clock. ■ Express the time orally and numerically from a 24-hour analog clock. ■ Express the time orally and numerically from a 12-hour digital clock. ■ Describe time orally and numerically from a 24-hour digital clock. ■ Describe time orally as "minutes to" or "minutes after" the hour. ■ Explain the meaning of AM and PM, and provide an example of an activity that occurs during the AM and another that occurs during the PM.
4.SS.2. Read and record calendar dates in a variety of formats. [C, V]	■ Write dates in a variety of formats (e.g., yyyy/mm/dd, dd/mm/yyyy, March 21, 2006, dd/mm/yy). ■ Relate dates written in the format yyyy/mm/dd to dates on a calendar. ■ Identify possible interpretations of a given date (e.g., 06/03/04).
4.SS.3. Demonstrate an understanding of area of regular and irregular 2-D shapes by ■ 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 [C, CN, ME, PS, R, V]	■ Describe area as the measure of surface recorded in square units. ■ Identify and explain why the square is the most efficient unit for measuring area. ■ Provide a referent for a square centimetre and explain the choice. ■ Provide a referent for a square metre and explain the choice. ■ Determine which standard square unit is represented by a referent. ■ Estimate the area of a 2-D shape using personal referents. ■ Determine the area of a regular 2-D shape and explain the strategy. ■ Determine the area of an irregular 2-D shape and explain the strategy. ■ Construct a rectangle for a given area. ■ Demonstrate that many rectangles are possible for an area by drawing at least two different rectangles for the same area.

[C] Communication	[PS] Problem Solving
[CN] Connections	[R] Reasoning
[ME] Mental Mathematics and Estimation	[T] Technology
	[V] Visualization

Strand: Shape and Space (3-D Objects and 2-D Shapes)	General Learning Outcome: Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.SS.4. Solve problems involving 2-D shapes and 3-D objects. [C, CN, PS, R, V]	▪ Fill an outline with 2-D shapes (e.g., tangram pieces, pentominoes, or polygons). ▪ Reproduce 2-D shapes from drawings, real objects (e.g., tables, houses, letters of the alphabet), or attributes on geo-boards. ▪ Reproduce a structure using 3-D objects (e.g., cubes, 3-D pentominoes).
4.SS.5. Describe and construct rectangular and triangular prisms. [C, CN, R, V]	▪ Identify and name common attributes of rectangular prisms from sets of rectangular prisms. ▪ Identify and name common attributes of triangular prisms from sets of triangular prisms. ▪ Sort a set of rectangular and triangular prisms using the shape of the base. ▪ Construct and describe a model of rectangular and triangular prisms using materials such as pattern blocks or modelling clay. ▪ Construct rectangular prisms from their nets. ▪ Construct triangular prisms from their nets. ▪ Identify examples of rectangular and triangular prisms found in the environment.

[C]	Communication	[PS]	Problem Solving
[CN]	Connections	[R]	Reasoning
[ME]	Mental Mathematics and Estimation	[T]	Technology
		[V]	Visualization

Strand: Shape and Space (Transformations)	General Learning Outcome: Describe and analyze position and motion of objects and shapes.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.SS.6. Demonstrate an understanding of line symmetry by ■ identifying symmetrical 2-D shapes ■ creating symmetrical 2-D shapes ■ drawing one or more lines of symmetry in a 2-D shape [C, CN, V]	■ Identify the characteristics of symmetrical and non-symmetrical 2-D shapes. ■ Sort a set of 2-D shapes as symmetrical and non-symmetrical. ■ Complete a symmetrical 2-D shape, half the shape, and its line of symmetry. ■ Identify lines of symmetry of a set of 2-D shapes, and explain why each shape is symmetrical. ■ Determine whether or not a 2-D shape is symmetrical by using a Mira or by folding and superimposing. ■ Create a symmetrical shape with or without manipulatives. ■ Provide examples of symmetrical shapes found in the environment, and identify the line(s) of symmetry. ■ Sort a set of 2-D shapes as those that have no lines of symmetry, one line of symmetry, or more than one line of symmetry.

Grade 4

[C] Communication	[PS] Problem Solving
[CN] Connections	[R] Reasoning
[ME] Mental Mathematics and Estimation	[T] Technology
	[V] Visualization

Strand: Statistics and Probability (Data Analysis)	**General Learning Outcome:** Collect, display, and analyze data to solve problems.
Specific Learning Outcomes *It is expected that students will:*	**Achievement Indicators** *The following set of indicators **may** be used to determine whether students have met the corresponding specific outcome.*
4.SP.1. Demonstrate an understanding of many-to-one correspondence. [C, R, T, V]	■ Compare graphs in which different intervals or correspondences are used, and explain why the interval or correspondence was used. ■ Compare graphs in which the same data has been displayed using one-to-one and many-to-one correspondences, and explain how they are the same and different. ■ Explain why many-to-one correspondence is sometimes used rather than one-to-one correspondence. ■ Find examples of graphs in which many-to-one correspondence is used in print and electronic media, such as newspapers, magazines, and the Internet, and describe the correspondence used.
4.SP.2. Construct and interpret pictographs and bar graphs involving many-to-one correspondence to draw conclusions. [C, PS, R, V]	■ Identify an interval and correspondence for displaying a set of data in a graph, and justify the choice. ■ Create and label (with categories, title, and legend) a pictograph to display a set of data using many-to-one correspondence, and justify the choice of correspondence used. ■ Create and label (with axes and title) a bar graph to display a set of data using many-to-one correspondence, and justify the choice of interval used. ■ Answer a question using a graph in which data is displayed using many-to-one correspondence.