Grade 5

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

Strand: Number	**General Outcome:** Develop number sense.
Specific 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.*
5.N.1. Represent and describe whole numbers to 1 000 000. [C, CN, T, V]	■ Write a numeral using proper spacing without commas (e.g., 934 567 and not 934,567). ■ Describe the pattern of adjacent place positions moving from right to left. ■ Describe the meaning of each digit in a numeral. ■ Provide examples of large numbers used in print or electronic media. ■ Express a given numeral in expanded notation (e.g., 45 321 = [4 × 10 000] + [5 × 1000] + [3 × 100] + [2 × 10] + [1 × 1] or 40 000 + 5000 + 300 + 20 + 1). ■ Write the numeral represented in expanded notation.
5.N.2. Apply estimation strategies including ■ front-end rounding ■ compensation ■ compatible numbers in problem-solving contexts [C, CN, ME, PS, R, V]	■ Provide a context for when estimation is used to ▪ make predictions ▪ check reasonableness of an answer ▪ determine approximate answers ■ Describe contexts in which overestimating is important. ■ Determine the approximate solution to a problem not requiring an exact answer. ■ Estimate a sum or product using compatible numbers. ■ Estimate the solution to a problem using compensation, and explain the reason for compensation. ■ Select and use an estimation strategy to solve a problem. ■ Apply front-end rounding to estimate ▪ sums (e.g., 253 + 615 is more than 200 + 600 = 800) ▪ differences (e.g., 974 – 250 is close to 900 – 200 = 700) ▪ products (e.g., the product of 23 × 24 is greater than 20 × 20 or 400 and less than 25 × 25 or 625) ■ quotients (e.g., the quotient of 831 ÷ 4 is greater than 800 ÷ 4 or 200).

Grade 5

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

Strand: Number *(continued)*	**General Outcome:** Develop number sense.
Specific 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.*
5.N.3. Determine multiplication facts (to 81) and related division facts. [C, CN, ME, R, V]	■ Describe the mental mathematics strategy used to determine a basic fact, such as ▪ skip-count up by one or two groups from a known fact (e.g., if 5 × 7 = 35, then 6 × 7 is equal to 35 + 7 and 7 × 7 is equal to 35 + 7 + 7) ▪ skip-count down by one or two groups from a known fact (e.g., if 8 × 8 = 64, then 7 × 8 is equal to 64 – 8 and 6 × 8 is equal to 64 – 8 – 8) ▪ doubling (e.g., for 8 × 3 think 4 × 3 = 12, and 8 × 3 = 12 + 12) ▪ patterns when multiplying by 9 (e.g., for 9 × 6, think 10 × 6 = 60, and 60 – 6 = 54; for 7 × 9, think 7 × 10 = 70, and 70 – 7 = 63) ▪ repeated doubling (e.g., if 2 × 6 is equal to 12, then 4 × 6 is equal to 24, and 8 × 6 is equal to 48) ▪ repeated halving (e.g., for 60 ÷ 4, think 60 ÷ 2 = 30 and 30 ÷ 2 = 15) ■ Recall the multiples of 0, 1, 2, 3, and 5 to 81 and related division facts. ■ Recall the multiplication facts that are squares: 1 × 1, 2 × 2 , … up to 9 × 9).
5.N.4. Apply mental mathematics strategies for multiplication, such as ■ annexing then adding zeros ■ halving and doubling ■ using the distributive property [C, ME, R]	■ Determine the products when one factor is a multiple of 10, 100, or 1000 by annexing zero or adding zeros (e.g., for 3 × 200 think 3 × 2 and then add two zeros). ■ Apply halving and doubling when determining a product (e.g., 32 × 5 is the same as 16 × 10). ■ Apply the distributive property to determine a product involving multiplying factors that are close to multiples of 10 [e.g., 98 × 7 = (100 × 7) – (2 × 7]).

Grade 5

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

Strand: Number	**General Outcome:** Develop number sense.
Specific 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.*
5.N.5. Demonstrate an understanding of multiplication (2-digit numerals by 2-digit numerals) to solve problems. [C, CN, PS, V]	■ Illustrate partial products in expanded notation for both factors [e.g., for 36 × 42, determine the partial products for (30 + 6) × (40 + 2)]. ■ Represent both 2-digit factors in expanded notation to illustrate the distributive property [e.g., to determine the partial products of 36 × 42, (30 + 6) × (40 + 2) = 30 × 40 + 30 × 2 + 6 × 40 + 6 × 2 = 1200 + 60 + 240 + 12 = 1512]. ■ Model the steps for multiplying 2-digit factors using an array and base-10 blocks, and record the process symbolically. ■ Describe a solution procedure for determining the product of two 2-digit factors using a pictorial representation, such as an area model. ■ Solve a multiplication problem in context using personal strategies, and record the process.

5.N.6. Demonstrate an understanding of division (3-digit numerals by 1-digit numerals) with and without concrete materials, and interpret remainders to solve problems. [C, CN, PS]	■ Model the division process as equal sharing using base-10 blocks, and record it symbolically.
	■ Explain that the interpretation of a remainder depends on the context:
	  ■ ignore the remainder (e.g., making teams of 4 from 22 people)
	  ■ round up the quotient (e.g., the number of five passenger cars required to transport 13 people)
	  ■ express remainders as fractions (e.g., five apples shared by two people)
	  ■ express remainders as decimals (e.g., measurement or money)
	■ Solve a division problem in context using personal strategies, and record the process.

5.N.7. Demonstrate an understanding of fractions by using concrete and pictorial representations to ■ create sets of equivalent fractions ■ compare fractions with like and unlike denominators [C, CN, PS, R, V]	■ Create a set of equivalent fractions and explain why there are many equivalent fractions for any fraction using concrete materials. ■ Model and explain that equivalent fractions represent the same quantity. ■ Determine if two fractions are equivalent using concrete materials or pictorial representations. ■ Formulate and verify a rule for developing a set of equivalent fractions. ■ Identify equivalent fractions for a fraction. ■ Compare two fractions with unlike denominators by creating equivalent fractions. ■ Position a set of fractions with like and unlike denominators on a number line (vertical or horizontal), and explain strategies used to determine the order.

Grade 5

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

Strand: Number *(continued)*	**General Outcome:** Develop number sense.
Specific 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.*
5.N.8. Describe and represent decimals (tenths, hundredths, thousandths) 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. ■ Represent an equivalent tenth, hundredth, or thousandth for a decimal, using a grid. ■ Express a tenth as an equivalent hundredth and thousandth. ■ Express a hundredth as an equivalent thousandth. ■ Describe the value of each digit in a decimal.
5.N.9. Relate decimals to fractions (tenths, hundredths, thousandths). [CN, R, V]	■ Write a decimal in fractional form. ■ Write a fraction with a denominator of 10, 100, or 1000 as a decimal. ■ Express a pictorial or concrete representation as a fraction or decimal (e.g., 250 shaded squares on a thousandth grid can be expressed as 0.250 or $\frac{250}{1000}$).
5.N.10. Compare and order decimals (tenths, hundredths, thousandths) by using ■ benchmarks ■ place value ■ equivalent decimals [CN, R, V]	■ Order a set of decimals by placing them on a number line (vertical or horizontal) that contains benchmarks, 0.0, 0.5, 1.0. ■ Order a set of decimals including only tenths using place value. ■ Order a set of decimals including only hundredths using place value. ■ Order a set of decimals including only thousandths using place value. ■ Explain what is the same and what is different about 0.2, 0.20, and 0.200. ■ Order a set of decimals including tenths, hundredths, and thousandths using equivalent decimals.
5.N.11. Demonstrate an understanding of addition and subtraction of decimals (limited to thousandths). [C, CN, PS, R, V]	■ Place the decimal point in a sum or difference using front-end estimation (e.g., for 6.3 + 0.25 + 306.158, think 6 + 306, so the sum is greater than 312). ■ Correct errors of decimal point placements in sums and differences without using paper and pencil. ■ Explain why keeping track of place value positions is important when adding and subtracting decimals. ■ Predict sums and differences of decimals using estimation strategies. ■ Solve a problem that involves addition and subtraction of decimals, limited to thousandths.

Grade 5

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

Strand: Patterns and Relations (Patterns)	**General Outcome:** Use patterns to describe the world and solve problems.
Specific 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.*
5.PR.1. Determine the pattern rule to make predictions about subsequent elements. [C, CN, PS, R, V]	■ Extend a pattern with or without concrete materials, and explain how each element differs from the proceeding one. ■ Describe, orally or in writing, a pattern using mathematical language, such as one more, one less, five more. ■ Write a mathematical expression to represent a pattern, such as $r + 1$, $r - 1$, $r + 5$. ■ Describe the relationship in a table or chart using a mathematical expression. ■ Determine and explain why a number is or is not the next element in a pattern. ■ Predict subsequent elements in a pattern. ■ Solve a problem by using a pattern rule to determine subsequent elements. ■ Represent a pattern visually to verify predictions.

Grade 5

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

Strand: Patterns and Relations (Variables and Equations)	**General Outcome:** Represent algebraic expressions in multiple ways.
Specific 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.*
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]	■ Express a problem in context as an equation where the unknown is represented by a letter variable. ■ Solve a single-variable equation with the unknown in any of the terms (e.g., $n + 2 = 5$, $4 + a = 7$, $6 = r - 2$, $10 = 2c$). ■ Create a problem in context for an equation.

Grade 5

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

Strand: Shape and Space (Measurement)	**General Outcome:** Use direct or indirect measurement to solve problems.
Specific 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.*
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]	■ Construct or draw two or more rectangles for a given perimeter in a problem-solving context. ■ Construct or draw two or more rectangles for a given area in a problem-solving context. ■ Illustrate that for any perimeter, the square or shape closest to a square will result in the greatest area. ■ Illustrate that for any perimeter, the rectangle with the smallest possible width will result in the least area. ■ Provide a real-life context for when it is important to consider the relationship between area and perimeter.
5.SS.2. Demonstrate an understanding of measuring length (mm) by ■ selecting and justifying referents for the unit mm ■ modelling and describing the relationship between mm and cm units, and between mm and m units [C, CN, ME, PS, R, V]	■ Provide a referent for one millimetre and explain the choice. ■ Provide a referent for one centimetre and explain the choice. ■ Provide a referent for one metre and explain the choice. ■ Show that 10 millimetres is equivalent to 1 centimetre using concrete materials (e.g., ruler). ■ Show that 1000 millimetres is equivalent to 1 metre using concrete materials (e.g., metre stick). ■ Provide examples of when millimetres are used as the unit of measure.

Grade 5

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

Strand: Shape and Space (Measurement) *(continued)*	**General Outcome:** Use direct or indirect measurement to solve problems.
Specific 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.*
5.SS.3. Demonstrate an understanding of volume by ■ selecting and justifying referents for cm^3 or m^3 units ■ 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 [C, CN, ME, PS, R, V]	■ Identify the cube as the most efficient unit for measuring volume and explain why. ■ Provide a referent for a cubic centimetre and explain the choice. ■ Provide a referent for a cubic metre and explain the choice. ■ Determine which standard cubic unit is represented by a given referent. ■ Estimate the volume of a 3-D object using personal referents. ■ Determine the volume of a 3-D object using manipulatives and explain the strategy. ■ Construct a rectangular prism for a given volume. ■ Explain that many rectangular prisms are possible for a given volume by constructing more than one rectangular prism for the same volume.
5.SS.4. Demonstrate an understanding of capacity by ■ describing the relationship between mL and L ■ selecting and justifying referents for mL or L units ■ estimating capacity by using referents for mL or L ■ measuring and recording capacity (mL or L) [C, CN, ME, PS, R, V]	■ Demonstrate that 1000 millilitres is equivalent to 1 litre by filling a 1-litre container using a combination of smaller containers. ■ Provide a referent for a litre and explain the choice. ■ Provide a referent for a millilitre and explain the choice. ■ Determine which capacity unit (mL or L) is represented by a given referent. ■ Estimate the capacity of a container using personal referents. ■ Determine the capacity of a container using materials that take the shape of the inside of the container (e.g., a liquid, rice, sand, beads), and explain the strategy.

Grade 5

[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 Outcome:** Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.
Specific 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.*
5.SS.5. Describe and provide examples of edges and faces of 3-D objects, and sides of 2-D shapes, that are ■ parallel ■ intersecting ■ perpendicular ■ vertical ■ horizontal [C, CN, R, T, V]	■ Identify parallel, intersecting, perpendicular, vertical, and horizontal edges and faces on 3-D objects. ■ Identify parallel, intersecting, perpendicular, vertical, and horizontal sides on 2-D shapes. ■ Provide examples from the environment that show parallel, intersecting, perpendicular, vertical, and horizontal line segments. ■ Find examples of edges, faces, and sides that are parallel, intersecting, perpendicular, vertical, and horizontal in print and electronic media, such as newspapers, magazines, and the Internet. ■ Draw 2-D shapes or 3-D objects that have edges, faces, and sides that are parallel, intersecting, perpendicular, vertical, or horizontal. ■ Describe the faces and edges of a 3-D object using terms such as parallel, intersecting, perpendicular, vertical, or horizontal. ■ Describe the sides of a 2-D shape using terms such as parallel, intersecting, perpendicular, vertical, or horizontal.
5.SS.6. Identify and sort quadrilaterals, including ■ rectangles ■ squares ■ trapezoids ■ parallelograms ■ rhombuses according to their attributes. [C, R, V]	■ Identify and describe the characteristics of a pre-sorted set of quadrilaterals. ■ Sort a set of quadrilaterals and explain the sorting rule. ■ Sort a set of quadrilaterals according to the lengths of the sides. ■ Sort a set of quadrilaterals according to whether or not opposite sides are parallel.

Grade 5

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

Strand: Shape and Space (Transformations)	**General Outcome:** Describe and analyze position and motion of objects and shapes.
Specific 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.*
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]	■ Translate a 2-D shape horizontally, vertically, or diagonally, and describe the position and orientation of the image. ■ Rotate a 2-D shape about a point, and describe the position and orientation of the image. ■ Reflect a 2-D shape in a line of reflection, and describe the position and orientation of the image. ■ Perform a transformation of a 2-D shape by following instructions. ■ Draw a 2-D shape, translate the shape, and record the translation by describing the direction and magnitude of the movement (e.g., the circle moved 3 cm to the left). ■ Draw a 2-D shape, rotate the shape, and describe the direction of the turn (clockwise or counter-clockwise), the fraction of the turn, and point of rotation. ■ Draw a 2-D shape, reflect the shape, and identify the line of reflection and the distance of the image from the line of reflection. ■ Predict the result of a single transformation of a 2-D shape and verify the prediction.

Grade 5

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

Strand: Shape and Space (Transformations) *(continued)*	**General Outcome:** Describe and analyze position and motion of objects and shapes.
Specific 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.*
5.SS.8. Identify a single transformation (translation, rotation, or reflection) of 2-D shapes. [C, T, V]	■ Provide an example of a translation, a rotation, and a reflection. ■ Identify a single transformation as a translation, rotation, or reflection. ■ Describe a rotation by the direction of the turn (clockwise or counter-clockwise).

Grade 5

[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 Outcome:** Collect, display, and analyze data to solve problems.
Specific 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.*
5.SP.1. Differentiate between first-hand and second-hand data. [C, R, T, V]	■ Explain the difference between first-hand and second-hand data. ■ Formulate a question that can best be answered using first-hand data and explain why. ■ Formulate a question that can best be answered using second-hand data and explain why. ■ Find examples of second-hand data in print and electronic media, such as newspapers, magazines, and the Internet.
5.SP.2. Construct and interpret double bar graphs to draw conclusions. [C, PS, R, T, V]	■ Determine the attributes (title, axes, intervals, and legend) of double bar graphs by comparing a set of double bar graphs. ■ Represent a set of data by creating a double bar graph, label the title and axes, and create a legend with or without the use of technology. ■ Draw conclusions from a double bar graph to answer questions. ■ Provide examples of double bar graphs used in a variety of print and electronic media, such as newspapers, magazines, and the Internet. ■ Solve a problem by constructing and interpreting a double bar graph.

Grade 5

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

Strand: Statistics and Probability (Chance and Uncertainty)	**General Outcome:** Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.
Specific 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.*
5.SP.3. Describe the likelihood of a single outcome occurring, using words such as ■ impossible ■ possible ■ certain [C, CN, PS, R]	■ Provide examples of events that are impossible, possible, or certain from personal contexts. ■ Classify the likelihood of a single outcome occurring in a probability experiment as impossible, possible, or certain. ■ Design and conduct a probability experiment in which the likelihood of a single outcome occurring is impossible, possible, or certain. ■ Conduct a probability experiment a number of times, record the outcomes, and explain the results.
5.SP.4. Compare the likelihood of two possible outcomes occurring, using words such as ■ less likely ■ equally likely ■ more likely [C, CN, PS, R]	■ Identify outcomes from a probability experiment which are less likely, equally likely, or more likely to occur than other outcomes. ■ Design and conduct a probability experiment in which one outcome is less likely to occur than the other outcome. ■ Design and conduct a probability experiment in which one outcome is equally as likely to occur as the other outcome. ■ Design and conduct a probability experiment in which one outcome is more likely to occur than the other outcome.