[C]	Communication	[PS]	Problem Solving
[CN]	Connections	[R]	Reasoning
[ME]	Mental Mathematics and Estimation	[T] [V]	Technology 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.*
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]	■ Determine if a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10, and explain why. ■ Sort a set of numbers based upon their divisibility using organizers, such as Venn or Carroll diagrams. ■ Determine the factors of a number using the divisibility rules. ■ Explain, using an example, why numbers cannot be divided by 0.
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]	■ Solve a problem involving the addition of two or more decimal numbers. ■ Solve a problem involving the subtraction of decimal numbers. ■ Solve a problem involving the multiplication or division of decimal numbers (for more than 1-digit divisors or 2-digit multipliers, technology could be used). ■ Place the decimal in a sum or difference using front-end estimation (e.g., for 4.5 + 0.73 + 256.458, think 4 + 256, so the sum is greater than 260). ■ Place the decimal in a product using front-end estimation (e.g., for $12.33 × 2.4, think $12 × 2, so the product is greater than $24). ■ Place the decimal in a quotient using front-end estimation (e.g., for 51.50 m ÷ 2.1, think 50 m ÷ 2, so the quotient is approximately 25 m). ■ Check the reasonableness of answers using estimation. ■ Solve a problem that involves operations on decimals (limited to thousandths), taking into consideration the order of operations. ■ Explain, using an example, how to use mental math for products or quotients when the multiplier or the divisor is 0.1 or 0.5 or 0.25.

[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.*
7.N.3. Solve problems involving percents from 1% to 100%. [C, CN, ME, PS, R, T]	■ Express a percent as a decimal or fraction. ■ Solve a problem that involves finding a percent. ■ Determine the answer to a percent problem where the answer requires rounding, and explain why an approximate answer is needed (e.g., total cost including taxes).
7.N.4. Demonstrate an understanding of the relationship between repeating decimals and fractions, and terminating decimals and fractions. [C, CN, R, T]	■ Predict the decimal representation of a fraction using patterns (e.g., $\frac{1}{11} = 0.\overline{09}$, $\frac{2}{11} = 0.\overline{18}$, $\frac{3}{11} = ?$ …). ■ Match a set of fractions to their decimal representations. ■ Sort a set of fractions as repeating or terminating decimals. ■ Express a fraction as a terminating or repeating decimal. ■ Express a repeating decimal as a fraction. ■ Express a terminating decimal as a fraction. ■ Provide an example where the decimal representation of a fraction is an approximation of its exact value.

[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.*

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]	■ Model addition and subtraction of positive fractions or mixed numbers using concrete representations, and record symbolically. ■ Determine the sum of two positive fractions or mixed numbers with like denominators. ■ Determine the difference of two positive fractions or mixed numbers with like denominators. ■ Determine a common denominator for a set of positive fractions or mixed numbers. ■ Determine the sum of two positive fractions or mixed numbers with unlike denominators. ■ Determine the difference of two positive fractions or mixed numbers with unlike denominators. ■ Simplify a positive fraction or mixed number by identifying the common factor between the numerator and denominator. ■ Simplify the solution to a problem involving the sum or difference of two positive fractions or mixed numbers. ■ Solve a problem involving the addition or subtraction of positive fractions or mixed numbers, and determine if the solution is reasonable.
7.N.6. Demonstrate an understanding of addition and subtraction of integers, concretely, pictorially, and symbolically. [C, CN, PS, R, V]	■ Explain, using concrete materials such as integer tiles and diagrams, that the sum of opposite integers is equal to zero. ■ Illustrate, using a horizontal or vertical number line, the results of adding or subtracting negative and positive integers (e.g., a move in one direction followed by an equivalent move in the opposite direction results in no net change in position). ■ Add two integers using concrete materials or pictorial representations, and record the process symbolically. ■ Subtract two integers using concrete materials or pictorial representations, and record the process symbolically. ■ Solve a problem involving the addition and subtraction of integers.

[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.*

7.N.7. Compare and order fractions, decimals (to thousandths), and integers by using
   ■ benchmarks
   ■ place value
   ■ equivalent fractions and/or decimals
   [CN, R, V]
	■ Order the numbers of a set that includes fractions, decimals, or integers in ascending or descending order, and verify the result using a variety of strategies.
	■ Identify a number that would be between two numbers in an ordered sequence or on a horizontal or vertical number line.
	■ Identify incorrectly placed numbers in an ordered sequence or on a horizontal or vertical number line.
	■ Position fractions with like and unlike denominators from a set on a horizontal or vertical number line, and explain strategies used to determine order.
	■ Order the numbers of a set by placing them on a horizontal or vertical number line that contains benchmarks, such as 0 and 1 or 0 and 5.
	■ Position a set of fractions, including mixed numbers and improper fractions, on a horizontal or vertical number line, and explain strategies used to determine position.

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

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.*
7.PR.1. Demonstrate an understanding of oral and written patterns and their corresponding relations. [C, CN, R]	■ Formulate a relation to represent the relationship in an oral or written pattern. ■ Provide a context for a relation that represents a pattern. ■ Represent a pattern in the environment using a relation.
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]	■ Create a table of values for a relation by substituting values for the variable. ■ Create a table of values using a relation, and graph the table of values (limited to discrete elements). ■ Sketch the graph from a table of values created for a relation, and describe the patterns found in the graph to draw conclusions (e.g., graph the relationship between n and $2n + 3$). ■ Describe the relationship shown on a graph using everyday language in spoken or written form to solve problems. ■ Match a set of relations to a set of graphs. ■ Match a set of graphs to a set of relations.

Grade 7

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.*
7.PR.3. Demonstrate an understanding of preservation of equality by ■ modelling preservation of equality, concretely, pictorially, and symbolically ■ applying preservation of equality to solve equations [C, CN, PS, R, V]	■ Model the preservation of equality for addition, subtraction, multiplication, or division using concrete materials or using pictorial representations, explain the process orally, and record it symbolically. ■ Solve a problem by applying preservation of equality.
7.PR.4. Explain the difference between an expression and an equation. [C, CN]	■ Identify and provide an example of a constant term, a numerical coefficient, and a variable in an expression and an equation. ■ Explain what a variable is and how it is used in an expression. ■ Provide an example of an expression and an equation, and explain how they are similar and different.
7.PR.5. Evaluate an expression given the value of the variable(s). [CN, R]	■ Substitute a value for each unknown in an expression and evaluate the expression.
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]	■ Represent a problem with a linear equation and solve the equation using concrete models. ■ Draw a visual representation of the steps required to solve a linear equation. ■ Solve a problem using a linear equation. ■ Verify the solution to a linear equation using concrete materials or diagrams. ■ Substitute a possible solution for the variable in a linear equation to verify the equality.

[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) *(continued)*	**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.*

| 7.PR.7. | Model and solve problems that can be represented by linear equations of the form:
 ■ $ax + b = c$
 ■ $ax = b$
 ■ $\frac{x}{a} = b, a \neq 0$
 concretely, pictorially, and symbolically, where *a*, *b*, and *c*, are whole numbers.
 [CN, PS, R, V] | ■ Model a problem with a linear equation and solve the equation using concrete models.
 ■ Draw a visual representation of the steps used to solve a linear equation.
 ■ Solve a problem using a linear equation and record the process.
 ■ Verify the solution to a linear equation using concrete materials or diagrams.
 ■ Substitute a possible solution for the variable in a linear equation to verify the equality. |

[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.*
7.SS.1. Demonstrate an understanding of circles by ■ 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 [C, CN, R, V]	■ Illustrate and explain that the diameter is twice the radius in a circle. ■ Illustrate and explain that the circumference is approximately three times the diameter in a circle. ■ Explain that, for all circles, pi (π) is the ratio of the circumference to the diameter ($\frac{c}{d}$), and its value is approximately 3.14. ■ Explain, using an illustration, that the sum of the central angles of a circle is 360°. ■ Draw a circle with a given radius or diameter with or without a compass. ■ Solve a contextual problem involving circles.
7.SS.2. Develop and apply a formula for determining the area of ■ triangles ■ parallelograms ■ circles [CN, PS, R, V]	■ Illustrate and explain how the area of a rectangle can be used to determine the area of a triangle. ■ Generalize a rule to create a formula for determining the area of triangles. ■ Illustrate and explain how the area of a rectangle can be used to determine the area of a parallelogram. ■ Generalize a rule to create a formula for determining the area of parallelograms. ■ Illustrate and explain how to estimate the area of a circle without the use of a formula. ■ Apply a formula for determining the area of a circle. ■ Solve a problem involving the area of triangles, parallelograms, or circles.

[C]	Communication	[PS]	Problem Solving
[CN]	Connections	[R]	Reasoning
[ME]	Mental Mathematics	[T]	Technology
	and Estimation	[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.*
7.SS.3. Perform geometric constructions, including ■ perpendicular line segments ■ parallel line segments ■ perpendicular bisectors ■ angle bisectors [CN, R, V]	■ Describe examples of parallel line segments, perpendicular line segments, perpendicular bisectors, and angle bisectors in the environment. ■ Identify line segments on a diagram that are parallel or perpendicular. ■ Draw a line segment perpendicular to another line segment, and explain why they are perpendicular. ■ Draw a line segment parallel to another line segment, and explain why they are parallel. ■ Draw the bisector of an angle using more than one method, and verify that the resulting angles are equal. ■ Draw the perpendicular bisector of a line segment using more than one method, and verify the construction.

[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.*
7.SS.4. Identify and plot points in the four quadrants of a Cartesian plane using ordered pairs. [C, CN, V]	■ Label the axes of a Cartesian plane and identify the origin. ■ Identify the location of a point in any quadrant of a Cartesian plane using an ordered pair. ■ Plot the point corresponding to a ordered pair on a Cartesian plane with units of 1, 2, 5, or 10 on its axes. ■ Draw shapes and designs, using ordered pairs, in a Cartesian plane. ■ Create shapes and designs in a Cartesian plane and identify the points used.
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]	(It is intended that the original shape and its image have vertices with integral coordinates.) ■ Identify the coordinates of the vertices of a 2-D shape on a Cartesian plane. ■ Describe the horizontal and vertical movement required to move from a given point to another point on a Cartesian plane. ■ Describe the positional change of the vertices of a 2-D shape to the corresponding vertices of its image as a result of a transformation or successive transformations on a Cartesian plane. ■ Perform a transformation or consecutive transformations on a 2-D shape, and identify coordinates of the vertices of the image. ■ Describe the image resulting from the transformation of a 2-D shape on a Cartesian plane by comparing the coordinates of the vertices of the image.

[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:** 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.*
7.SP.1. Demonstrate an understanding of central tendency and range by ■ determining the measures of central tendency (mean, median, mode) and range ■ determining the most appropriate measures of central tendency to report findings [C, PS, R, T]	■ Determine mean, median, and mode for a set of data, and explain why these values may be the same or different. ■ Determine the range of a set of data. ■ Provide a context in which the mean, median, or mode is the most appropriate measure of central tendency to use when reporting findings. ■ Solve a problem involving the measures of central tendency.
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]	■ Analyze a set of data to identify any outliers. ■ Explain the effect of outliers on the measures of central tendency for a data set. ■ Identify outliers in a set of data and justify whether or not they are to be included in the reporting of the measures of central tendency. ■ Provide examples of situations in which outliers would or would not be used in determining the measures of central tendency.

7.SP.3. Construct, label, and interpret circle graphs to solve problems.
[C, CN, PS, R, T, V]
	■ Identify common attributes of circle graphs, such as
	  ▪ title, label, or legend
	  ▪ the sum of the central angles is 360°
	  ▪ the data is reported as a percent of the total and the sum of the percents is equal to 100%
	■ Create and label a circle graph, with or without technology, to display a set of data.
	■ Find and compare circle graphs in a variety of print and electronic media, such as newspapers, magazines, and the Internet.
	■ Translate percentages displayed in a circle graph into quantities to solve a problem.
	■ Interpret a circle graph to answer questions.

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

Strand: Statistics and Probability (Chance and Uncertainty)	General Learning Outcome: Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.
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.*
7.SP.4. Express probabilities as ratios, fractions, and percents. [C, CN, R, T, V]	■ Determine the probability of an outcome occurring for a probability experiment, and express it as a ratio, fraction, or percent. ■ Provide an example of an event with a probability of 0 or 0% (impossible) and an event with a probability of 1 or 100% (certain).
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]	■ Provide an example of two independent events, such as 　▪ spinning a four-section spinner and an eight-sided die 　▪ tossing a coin and rolling a twelve-sided die 　▪ tossing two coins 　▪ rolling two dice 　and explain why they are independent. ■ Identify the sample space (all possible outcomes) for an experiment involving two independent events using a tree diagram, table, or another graphic organizer.
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]	■ Determine the theoretical probability of an outcome for an experiment involving two independent events. ■ Conduct a probability experiment for an outcome involving two independent events, with or without technology, to compare the experimental probability to the theoretical probability. ■ Solve a probability problem involving two independent events.