Grade 3 Mathematics Big Ideas

Big Ideas –Priority 1 **Supporting Ideas – Priority 2** **Number Facts**

[C] Communication **[PS]** Problem Solving
[CN] Connections **[R]** Reasoning
[ME] Mental Mathematics **[T]** Technology and Estimation **[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.*
1. Say the number sequence 0 to 1000 forward and backward by: • 5s, 10s or 100s, using any starting point • 3s, using starting points that are multiples of 3 • 4s, using starting points that are multiples of 4 • 25s, using starting points that are multiples of 25. [C, CN, ME]	➢ Extend a given skip counting sequence by 5s, 10s or 100s, forward and backward, using a given starting point. ➢ Extend a given skip counting sequence by 3s, forward and backward, starting at a given multiple of 3. ➢ Extend a given skip counting sequence by 4s, forward and backward, starting at a given multiple of 4. ➢ Extend a given skip counting sequence by 25s, forward and backward, starting at a given multiple of 25. ➢ Identify and correct errors and omissions in a given skip counting sequence. ➢ Determine the value of a given set of coins (nickels, dimes, quarters, loonies) by using skip counting. ➢ Identify and explain the skip counting pattern for a given number sequence.

2. Represent and describe numbers to 1000, concretely, pictorially and symbolically. [C, CN, V]	➢ Read a given three-digit numeral without using the word *and*; e.g., 321 is three hundred twenty-one, NOT three hundred AND twenty-one. ➢ Read a given number word (0 to 1000). ➢ Represent a given number as an expression; e.g., 300 – 44 or 20 + 236 for 256. ➢ Represent a given number, using manipulatives such as base ten materials. ➢ Represent a given number pictorially. ➢ Write number words for given multiples of ten to 90. ➢ Write number words for given multiples of a hundred to 900.
3. Compare and order numbers to 1000. [C, CN, R, V]	➢ Place a given set of numbers in ascending or descending order, and verify the result by using a hundred chart (e.g., a one hundred chart, a two hundred chart, a three hundred chart), a number line or by making references to place value. ➢ Create as many different 3-digit numerals as possible, given three different digits. Place the numbers in ascending or descending order. ➢ Identify and explain errors in a given ordered sequence. ➢ Identify missing numbers in parts of a given hundred chart. ➢ Identify errors in a given hundred chart.
4. Estimate quantities less than 1000, using referents. [ME, PS, R, V]	➢ Estimate the number of groups of ten in a given quantity, using 10 as a referent (known quantity). ➢ Estimate the number of groups of a hundred in a given quantity, using 100 as a referent. ➢ Estimate a given quantity by comparing it to a referent. ➢ Select an estimate for a given quantity by choosing among three possible choices. ➢ Select and justify a referent for determining an estimate for a given quantity.

5. Illustrate, concretely and pictorially, the meaning of place value for numerals to 1000. [C, CN, R, V]	➢ Record, in more than one way, the number represented by given proportional materials (e.g., base- ten materials) and non-proportional materials (e.g., money). ➢ Represent a given number in different ways, using proportional and non-proportional materials, and explain how the representations are equivalent; e.g., 351 can be represented as three 100s, five 10s and one 1; or two 100s, fifteen 10s and one 1; or three 100s, four 10s and eleven 1s. ➢ Explain and show, with counters, the meaning of each digit for a given 3-digit numeral with all digits the same; e.g., for the numeral 222, the first digit represents two hundreds (two hundred counters) the second digit represents two tens (twenty counters) and the third digit represents two ones (two counters). ➢ Explain, using concrete materials, the meaning of zero as a place holder in a given number.
6. Describe and apply mental mathematics strategies for adding two 2-digit numerals, such as: • adding from left to right • taking one addend to the nearest multiple of ten and then compensating • using doubles. [C, CN, ME, PS, R, V]	(Students investigate a variety of strategies and become proficient in at least one appropriate and efficient strategy that they understand.) ➢ Add two given 2-digit numerals, using a mental mathematics strategy, and explain or illustrate the strategy. ➢ Explain how to use the "adding from left to right" strategy; e.g., to determine the sum of 23 + 46, think 20 + 40 and 3 + 6. ➢ Explain how to use the "taking one addend to the nearest multiple of ten and then compensating" strategy; e.g., to determine the sum of 28 + 47, think 30 + 47 – 2 or 50 + 28 – 3. ➢ Explain how to use the "using doubles" strategy; e.g., to determine the sum of 24 + 26, think 25 + 25; to determine the sum of 25 + 26, think 25 + 25 + 1 or doubles plus 1. ➢ Apply a mental mathematics strategy for adding two given 2-digit numerals.

7. Describe and apply mental mathematics strategies for subtracting two 2-digit numerals, such as: • taking the subtrahend to the nearest multiple of ten and then compensating • thinking of addition • using doubles. [C, CN, ME, PS, R, V]	(Students investigate a variety of strategies and become proficient in at least one appropriate and efficient strategy that they understand.) ➢ Subtract two given 2-digit numerals, using a mental mathematics strategy, and explain or model the strategy used. ➢ Explain how to use the "taking the subtrahend to the nearest multiple of ten and then compensating" strategy; e.g., to determine the difference of 48 – 19, think 48 – 20 + 1. ➢ Explain how to use the "adding on" strategy; e.g., to determine the difference of 62 – 45, think 45 + 5, then 50 + 12 and then 5 + 12. ➢ Explain how to use the "using doubles" strategy; e.g., to determine the difference of 24 – 12, think 12 + 12 = 24. ➢ Apply a mental mathematics strategy for subtracting two given 2-digit numerals.
8. Apply estimation strategies to predict sums and differences of two 2-digit numerals in a problem-solving context. [C, ME, PS, R]	➢ Estimate the solution for a given problem involving the sum of two 2-digit numerals; e.g., to estimate the sum of 43 + 56, use 40 + 50 (the sum is close to 90). ➢ Estimate the solution for a given problem involving the difference of two 2-digit numerals; e.g., to estimate the difference of 56 – 23, use 50 – 20 (the difference is close to 30).
9. Demonstrate an understanding of addition and subtraction of numbers with answers to 1000 (limited to 1-, 2- and 3-digit numerals), concretely, pictorially and symbolically, by: • using personal strategies for adding and subtracting with and without the support of manipulatives • creating and solving problems in context that involve addition and subtraction of numbers. [C, CN, ME, PS, R, V]	(Students investigate a variety of strategies and become proficient in at least one appropriate and efficient strategy that they understand.) ➢ Model the addition of two or more given numbers, using concrete or visual representations, and record the process symbolically. ➢ Model the subtraction of two given numbers, using concrete or visual representations, and record the process symbolically. ➢ Create an addition or subtraction story problem for a given solution. ➢ Determine the sum of two given numbers, using a personal strategy; e.g., for 326 + 48, record 300 + 60 + 14. ➢ Determine the difference of two given numbers, using a personal strategy; e.g., for 127 – 38, record 38 + 2 + 80 + 7 or 127 – 20 – 10 – 8. ➢ Refine personal strategies to increase their efficiency. ➢ Solve a given problem involving the sum or difference of two given numbers.

10. Apply mental mathematics strategies and number properties, such as: • using doubles • making 10 • using the commutative property • using the property of zero • thinking addition for subtraction in order to understand and recall basic addition facts and related subtraction facts to 18. [C, CN, ME, PS, R, V] Understand, recall and apply addition and related subtraction facts to 18.	➢ Describe a mental mathematics strategy that could be used to determine a given basic fact, such as: • doubles; e.g., for 6 + 8, think 7 + 7 • doubles plus one; e.g., for 6 + 7, think 6 + 6 + 1 • doubles take away one; e.g., for 6 + 7, think 7 + 7 – 1 • doubles plus two; e.g., for 6 + 8, think 6 + 6 + 2 • doubles take away two; e.g., for 6 + 8, think 8 + 8 – 2 • making 10; e.g., for 6 + 8, think 6 + 4 + 4 or 8 + 2 + 4 • commutative property; e.g., for 3 + 9, think 9 + 3 • addition for subtraction; e.g., for 13 – 7, think 7 + ? = 13. ➢ Provide a rule for determining answers when adding and subtracting zero. ➢ Apply a mental mathematics strategy to provide a solution to a given basic addition or subtraction fact to 18. ➢ Demonstrate understanding, recall/memorization and application of addition and related subtraction facts to 18.
11. Demonstrate an understanding of multiplication to 5 × 5 by: • 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. [C, CN, PS, R] Understand and recall multiplication facts to 5 × 5.	➢ Identify events from experience that can be described as multiplication. ➢ Represent a given story problem, using manipulatives or diagrams, and record the problem in a number sentence. ➢ Represent a given multiplication expression as repeated addition. ➢ Represent a given repeated addition as multiplication. ➢ Create and illustrate a story problem for a given number sentence; e.g., 2 × 3 = 6. ➢ Represent, concretely or pictorially, equal groups for a given number sentence. ➢ Represent a given multiplication expression, using an array. ➢ Create an array to model the commutative property of multiplication. ➢ Relate multiplication to division by using arrays and writing related number sentences. ➢ Solve a given multiplication problem. ➢ Demonstrate understanding and recall/memorization of multiplication facts to 5 × 5.

12. Demonstrate an understanding of division (limited to division related to multiplication facts up to 5 × 5) by: • 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. [C, CN, PS, R] Understand and recall division facts related to multiplication facts to 5 × 5.	➢ Identify events from experience that can be described as equal sharing. ➢ Identify events from experience that can be described as equal grouping. ➢ Illustrate, with counters or a diagram, a given story problem, presented orally, that involves equal sharing; and solve the problem. ➢ Illustrate, with counters or a diagram, a given story problem, presented orally, that involves equal grouping; and solve the problem. ➢ Listen to a story problem; represent the numbers, using manipulatives or a sketch; and record the problem with a number sentence. ➢ Create and illustrate, with counters, a story problem for a given number sentence; e.g., 6 ÷ 3 = 2. ➢ Represent a given division expression as repeated subtraction. ➢ Represent a given repeated subtraction as a division expression. ➢ Relate division to multiplication by using arrays and writing related number sentences. ➢ Solve a given problem involving division. ➢ Demonstrate understanding and recall/memorization of division facts related to multiplication facts to 5 × 5.
13. Demonstrate an understanding of fractions by: • explaining that a fraction represents a part of a whole • describing situations in which fractions are used • comparing fractions of the same whole that have like denominators. [C, CN, ME, R, V]	➢ Identify common characteristics of a given set of fractions. ➢ Describe everyday situations where fractions are used. ➢ Cut or fold a whole into equal parts, or draw a whole in equal parts; demonstrate that the parts are equal; and name the parts. ➢ Sort a given set of shaded regions into those that represent equal parts and those that do not, and explain the sorting. ➢ Represent a given fraction concretely or pictorially. ➢ Name and record the fraction represented by the shaded and non-shaded parts of a given region. ➢ Compare given fractions with the same denominator, using models. ➢ Identify the numerator and denominator for a given fraction. ➢ Model and explain the meaning of numerator and denominator.

Strand: Patterns and Relations (Patterns)

General Outcome: Use patterns to describe the world and 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.*
1. Demonstrate an understanding of increasing patterns by: • describing • extending • comparing • creating numerical (numbers to 1000) and non-numerical patterns using manipulatives, diagrams, sounds and actions. [C, CN, PS, R, V]	➢ Describe a given increasing pattern by stating a pattern rule that includes the starting point and a description of how the pattern continues; e.g., for 42, 44, 46 … the pattern rule is start at 42 and add 2 each time. ➢ Identify the pattern rule of a given increasing pattern, and extend the pattern for the next three terms. ➢ Identify and explain errors in a given increasing pattern. ➢ Locate and describe various increasing patterns found on a hundred chart, such as horizontal, vertical and diagonal patterns. ➢ Compare numeric patterns of counting by 2s, 5s, 10s, 25s and 100s. ➢ Create a concrete, pictorial or symbolic representation of an increasing pattern for a given pattern rule. ➢ Create a concrete, pictorial or symbolic increasing pattern; and describe the relationship, using a pattern rule. ➢ Solve a given problem, using increasing patterns. ➢ Identify and describe increasing patterns in the environment. ➢ Identify and apply a pattern rule to determine missing elements for a given pattern. ➢ Describe the strategy used to determine missing elements in a given increasing pattern.

2. Demonstrate an understanding of decreasing patterns by: • describing • extending • comparing • creating numerical (numbers to 1000) and non-numerical patterns using manipulatives, diagrams, sounds and actions. [C, CN, PS, R, V]	➢ Describe a given decreasing pattern by stating a pattern rule that includes the starting point and a description of how the pattern continues. ➢ Identify the pattern rule of a given decreasing pattern, and extend the pattern for the next three terms. ➢ Identify and explain errors in a given decreasing pattern. ➢ Identify and describe various decreasing patterns found on a hundred chart, such as horizontal, vertical and diagonal patterns. ➢ Compare decreasing numeric patterns of counting backward by 2s, 5s, 10s, 25s and 100s. ➢ Create a concrete, pictorial or symbolic decreasing pattern for a given pattern rule. ➢ Create a concrete, pictorial or symbolic decreasing pattern; and describe the relationship, using a pattern rule. ➢ Solve a given problem, using decreasing patterns. ➢ Identify and describe decreasing patterns in the environment. ➢ Identify and apply a pattern rule to determine missing elements for a given pattern. ➢ Describe the strategy used to determine missing elements in a given decreasing pattern.
3. Sort objects or numbers, using one or more than one attribute. [C, CN, R, V]	➢ Classify a given set of numbers according to the number of digits. ➢ Classify a given set of numbers as odd or even. ➢ Classify a given set of numbers as fractions or whole numbers. ➢ Determine the difference between two given pre-sorted sets of objects that have been sorted based on two attributes, and explain a possible sorting rule used to sort them. ➢ Record the sorting of a set of objects, using tools such as Venn diagrams. ➢ Sort a given set of objects or numbers in more than one way, and explain how the sorting rules are different.

4. Solve one-step addition and subtraction equations involving a symbol to represent an unknown number. [C, CN, PS, R, V]	➢ Explain the purpose of the symbol in a given addition or subtraction equation with one unknown; e.g., in the equation 3 + ▲ = 10, the triangle represents the number that would make the equation true. ➢ Create an addition or subtraction equation with one unknown to represent a given combining or separating action. ➢ Provide an alternative symbol for the unknown in a given addition or subtraction equation. ➢ Solve, using manipulatives, a given addition or subtraction equation with one unknown that represents combining or separating actions. ➢ Solve a given addition or subtraction equation with one unknown, using a variety of strategies, including guess and test. ➢ Solve a given addition or subtraction equation when the unknown is on the left or the right side of the equation. ➢ Explain why the unknown in a given addition or subtraction equation has only one value.

Strand: Shape and Space (Measurement)

General Outcome: Use direct and 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.*
1. Relate the passage of time to common activities, using nonstandard and standard units (minutes, hours, days, weeks, months, years). [CN, ME, R]	➢ Select and use a nonstandard unit of measure, such as television shows or pendulum swings, to measure the passage of time, and explain the choice. ➢ Identify activities that can or cannot be accomplished in minutes, hours, days, weeks, months and years. ➢ Provide personal referents for minutes and hours.
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]	➢ Determine the number of days in any given month, using a calendar. ➢ Solve a given problem involving the number of seconds in a minute, minutes in an hour or days in a given month. ➢ Create a calendar that includes days of the week, dates and personal events.

3. Demonstrate an understanding of measuring length (cm, m) by: • 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. [C, CN, ME, PS, R, V]	➢ Provide a personal referent for one centimetre, and explain the choice. ➢ Provide a personal referent for one metre, and explain the choice. ➢ Match a given standard unit to a given referent. ➢ Show that 100 cm is equivalent to 1 m by using concrete materials. ➢ Estimate the length of an object, using personal referents. ➢ Determine and record the length and width of a given 2-D shape. ➢ Determine and record the length, width or height of a given 3-D object. ➢ Draw a line segment of a given length, using a ruler. ➢ Sketch a line segment of a given length without using a ruler.
4. Demonstrate an understanding of measuring mass (g, kg) by: • 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. [C, CN, ME, PS, R, V]	➢ Provide a personal referent for one gram, and explain the choice. ➢ Provide a personal referent for one kilogram, and explain the choice. ➢ Match a given standard unit to a given referent. ➢ Explain the relationship between 1000 g and 1 kg, using a model. ➢ Estimate the mass of a given object, using personal referents. ➢ Determine and record the mass of a given 3-D object. ➢ Measure, using a scale, and record, using the units g and kg, the mass of given everyday objects. ➢ Provide examples of 3-D objects that have a mass of approximately 1 g, 100 g and 1 kg. ➢ Determine the mass of two given similar objects with different masses, and explain the results. ➢ Determine the mass of an object, change its shape, re-measure its mass, and explain the results.

5. Demonstrate an understanding of perimeter of regular and irregular shapes by: • estimating perimeter, using referents for cm or m • 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. [C, ME, PS, R, V]	➢ Measure and record the perimeter of a given regular shape, and explain the strategy used. ➢ Measure and record the perimeter of a given irregular shape, and explain the strategy used. ➢ Construct a shape for a given perimeter (cm, m). ➢ Construct or draw more than one shape for a given perimeter. ➢ Estimate the perimeter of a given shape (cm, m), using personal referents.

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.*
6. Describe 3-D objects according to the shape of the faces and the number of edges and vertices. [C, CN, PS, R, V]	➢ Identify the faces, edges and vertices of given 3-D objects, including cubes, spheres, cones, cylinders, pyramids and prisms. ➢ Identify the shape of the faces of a given 3-D object. ➢ Determine the number of faces, edges and vertices of a given 3-D object. ➢ Construct a skeleton of a given 3-D object, and describe how the skeleton relates to the 3-D object. ➢ Sort a given set of 3-D objects according to the number of faces, edges or vertices.
7. Sort regular and irregular polygons, including: • triangles • quadrilaterals • pentagons • hexagons • octagons according to the number of sides. [C, CN, R, V]	➢ Classify a given set of regular and irregular polygons according to the number of sides. ➢ Identify given regular and irregular polygons that have different dimensions. ➢ Identify given regular and irregular polygons that have different orientations.

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.*
1. Collect first-hand data and organize it using: • tally marks • line plots • charts • lists to answer questions. [C, CN, PS, V] [ICT: C4–1.3]	➢ Record the number of objects in a given set, using tally marks. ➢ Determine the common attributes of line plots by comparing line plots in a given set. ➢ Organize a given set of data, using tally marks, line plots, charts or lists. ➢ Collect and organize data, using tally marks, line plots, charts and lists. ➢ Answer questions arising from a given line plot, chart or list. ➢ Answer questions using collected data.
2. Construct, label and interpret bar graphs to solve problems. [C, PS, R, V] [ICT: C4–1.3, C7–1.3, C7–1.4]	➢ Determine the common attributes, titles and axes of bar graphs by comparing bar graphs in a given set. ➢ Create a bar graph, labelling the title and axes, to represent a given set of data. ➢ Draw conclusions from a given bar graph to solve problems. ➢ Solve problems by constructing and interpreting a bar graph.