

<b>[C]</b> Communication	<b>[PS]</b> Problem Solving
<b>[CN]</b> Connections	<b>[R]</b> Reasoning
<b>[ME]</b> Mental Mathematics and Estimation	<b>[T]</b> Technology
	<b>[V]</b> 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.,  $45\,321 = [4 \times 10\,000] + [5 \times 1000] + [3 \times 100] + [2 \times 10] + [1 \times 1]$  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  $23 \times 24$  is greater than  $20 \times 20$  or 400 and less than  $25 \times 25$  or 625)
  - quotients (e.g., the quotient of  $831 \div 4$  is greater than  $800 \div 4$  or 200).

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	<b>[V]</b> 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  $5 \times 7 = 35$ , then  $6 \times 7$  is equal to  $35 + 7$  and  $7 \times 7$  is equal to  $35 + 7 + 7$ )
  - skip-count down by one or two groups from a known fact (e.g., if  $8 \times 8 = 64$ , then  $7 \times 8$  is equal to  $64 - 8$  and  $6 \times 8$  is equal to  $64 - 8 - 8$ )
  - doubling (e.g., for  $8 \times 3$  think  $4 \times 3 = 12$ , and  $8 \times 3 = 12 + 12$ )
  - patterns when multiplying by 9 (e.g., for  $9 \times 6$ , think  $10 \times 6 = 60$ , and  $60 - 6 = 54$ ; for  $7 \times 9$ , think  $7 \times 10 = 70$ , and  $70 - 7 = 63$ )
  - repeated doubling (e.g., if  $2 \times 6$  is equal to 12, then  $4 \times 6$  is equal to 24, and  $8 \times 6$  is equal to 48)
  - repeated halving (e.g., for  $60 \div 4$ , think  $60 \div 2 = 30$  and  $30 \div 2 = 15$ )
- Recall the multiples of 0, 1, 2, 3, and 5 to 81 and related division facts.
- Recall the multiplication facts that are squares:  $1 \times 1$ ,  $2 \times 2$ , ... up to  $9 \times 9$ .

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  $3 \times 200$  think  $3 \times 2$  and then add two zeros).
- Apply halving and doubling when determining a product (e.g.,  $32 \times 5$  is the same as  $16 \times 10$ ).
- Apply the distributive property to determine a product involving multiplying factors that are close to multiples of 10 [e.g.,  $98 \times 7 = (100 \times 7) - (2 \times 7)$ ].

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	<b>[V]</b> 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  $36 \times 42$ , determine the partial products for  $(30 + 6) \times (40 + 2)$ ].
- Represent both 2-digit factors in expanded notation to illustrate the distributive property [e.g., to determine the partial products of  $36 \times 42$ ,  $(30 + 6) \times (40 + 2) = 30 \times 40 + 30 \times 2 + 6 \times 40 + 6 \times 2 = 1200 + 60 + 240 + 12 = 1512$ ].
- 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

<b>[C]</b> Communication	<b>[PS]</b> Problem Solving
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<b>[ME]</b> Mental Mathematics and Estimation	<b>[T]</b> Technology
	<b>[V]</b> 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.

[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

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

<b>Strand:</b> Patterns and Relations (Variables and Equations)	<b>General Outcome:</b> Represent algebraic expressions in multiple ways.
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<b>Specific Outcomes</b> <i>It is expected that students will:</i>	<b>Achievement Indicators</b> <i>The following set of indicators <b>may</b> be used to determine whether students have met the corresponding specific outcome.</i>
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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]	<ul style="list-style-type: none"><li>■ Express a problem in context as an equation where the unknown is represented by a letter variable.</li><li>■ Solve a single-variable equation with the unknown in any of the terms (e.g., <math>n + 2 = 5</math>, <math>4 + a = 7</math>, <math>6 = r - 2</math>, <math>10 = 2c</math>).</li><li>■ Create a problem in context for an equation.</li></ul>
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[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.

<b>[C]</b> Communication	<b>[PS]</b> Problem Solving
<b>[CN]</b> Connections	<b>[R]</b> Reasoning
<b>[ME]</b> Mental Mathematics and Estimation	<b>[T]</b> Technology
	<b>[V]</b> 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  $\text{cm}^3$  or  $\text{m}^3$  units
- estimating volume by using referents for  $\text{cm}^3$  or  $\text{m}^3$
- measuring and recording volume ( $\text{cm}^3$  or  $\text{m}^3$ )
- 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.

<b>[C]</b> Communication	<b>[PS]</b> Problem Solving
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<b>[ME]</b> Mental Mathematics and Estimation	<b>[T]</b> Technology
	<b>[V]</b> 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.

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<b>[ME]</b> Mental Mathematics and Estimation	<b>[T]</b> Technology
	<b>[V]</b> 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.

<b>[C]</b> Communication	<b>[PS]</b> Problem Solving
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<b>[ME]</b> Mental Mathematics and Estimation	<b>[T]</b> Technology
	<b>[V]</b> Visualization

<b>Strand:</b> Shape and Space (Transformations) <i>(continued)</i>	<b>General Outcome:</b> Describe and analyze position and motion of objects and shapes.
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<b>Specific Outcomes</b> <i>It is expected that students will:</i>	<b>Achievement Indicators</b> <i>The following set of indicators <b>may</b> be used to determine whether students have met the corresponding specific outcome.</i>
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<p>5.SS.8. Identify a single transformation (translation, rotation, or reflection) of 2-D shapes. [C, T, V]</p>	<ul style="list-style-type: none"> <li>■ Provide an example of a translation, a rotation, and a reflection.</li> <li>■ Identify a single transformation as a translation, rotation, or reflection.</li> <li>■ Describe a rotation by the direction of the turn (clockwise or counter-clockwise).</li> </ul>
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<b>[CN]</b> Connections	<b>[R]</b> Reasoning
<b>[ME]</b> Mental Mathematics and Estimation	<b>[T]</b> Technology
	<b>[V]</b> 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.

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	<b>[V]</b> 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.