

The Common Curriculum Framework

for

K-12 MATHEMATICS

(10-12 is under development)

Western Canadian Protocol for Collaboration in Basic Education

GRADE 5

JUNE 1995

VI. GENERAL OUTCOMES, AND SPECIFIC OUTCOMES WITH ILLUSTRATIVE EXAMPLES (K–9)

This section elaborates on the general outcomes and specific outcomes by providing illustrative examples, by grade, for the K–9 program. Note that the specific outcomes and illustrative examples for the Grade 10 to Grade 12 program will be developed at a later date.

CODING FOR ILLUSTRATIVE EXAMPLES (IEs)

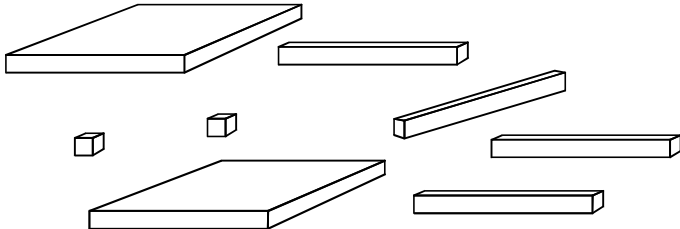
The illustrative examples (IEs) listed on the following pages are organized by grade and have been correlated to specific outcomes (SOs). The coding used recognizes that IEs relating to more than one SO are listed before those relating to only one SO. Examples of the coding system are listed below.

1–4	Means that the IE relates to specific outcomes one through four in the subsection being addressed.
1, 3	Means that the IE relates to specific outcomes one and three in the subsection being addressed.
1, 3.1 1, 3.2	Means that the IEs relate to specific outcomes one and three in the subsection being addressed and that there are two of them.
6.1	Means that the IE relates to specific outcome six in the subsection being addressed.
4.1 4.2 4.3	Means that the IEs relate to specific outcome four in the subsection being addressed and that there are three of them.

Grade 5
Strand: Number (Number Concepts)

Students will:

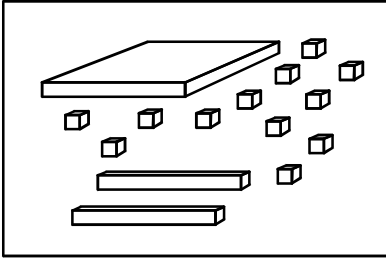
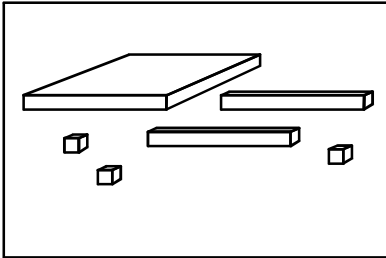
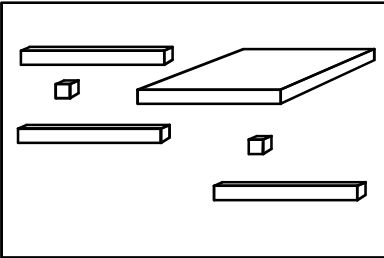
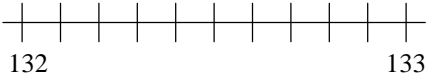
- use numbers to describe quantities
- represent numbers in multiple ways.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Demonstrate a number sense for whole numbers 0 to 100 000, and explore proper fractions and decimals.</p>	<ol style="list-style-type: none"> Demonstrate, concretely and pictorially, an understanding of place value from hundredths. [C, R, V] Read and write numerals to 100 000. [C, CN] Read and write number words to 100 000. [C, CN, V] Use estimation strategies for quantities up to 100 000. [E] 	<p>1–3, 6 Tony drew these five number cards . . . 1 3 0 2 3 Use all of the five cards to show the following: – the greatest possible number – the least possible number – three other possible numbers. Write two of these numbers in words. Rewrite your numbers in order from least to greatest.</p> <p>1–4, 6–7 Scan the newspaper for six different numbers. Be sure at least one number is close to one hundred thousand, and at least two numbers are less than one. Also try to find numbers used in different ways. Arrange your clippings in order, according to the size of the number involved. Rewrite numerals in words and vice versa. Show and explain how each number might be represented with blocks or fraction pieces.</p> <p>1, 9 Let the flat represent 1 unit. Let the long represent 0.1 units. Let the centicube represent 0.01 units.</p> <div style="text-align: center;">  </div> <p>What decimal numbers can you show using any four of these pieces? How can you be sure you have all possible numbers? List the numbers from least to greatest.</p>

Grade 5
Strand: Number (Number Concepts)

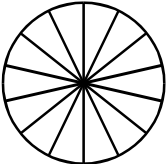
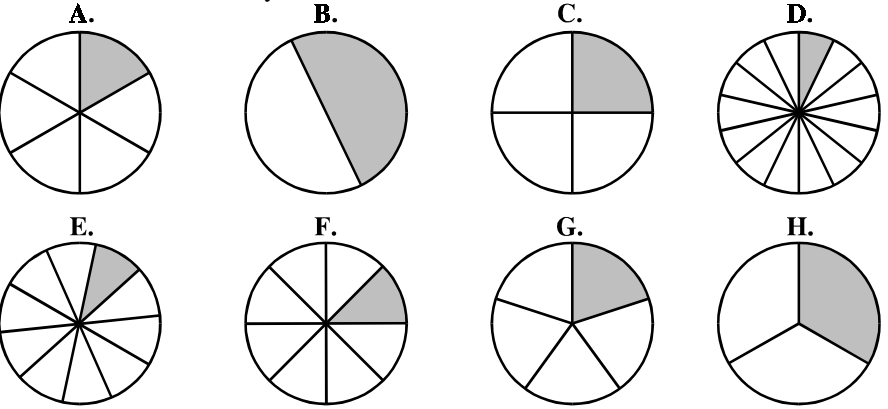
Students will:

- use numbers to describe quantities
- represent numbers in multiple ways.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Demonstrate a number sense for whole numbers 0 to 100 000, and explore proper fractions and decimals.</p>		<p>1.1 Here are three pictures of student models.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Monica</p> </div> <div style="text-align: center;">  <p>Wade</p> </div> <div style="text-align: center;">  <p>Salmo</p> </div> </div> <p>Which model(s) show 1.32? Explain. Janice did not use a 10 by 10 flat in her model of 1.32. Draw a picture of what she could have used for her model.</p> <p>Build another model of 1.32, using base-10 blocks.</p> <p>1.2 Your friend wants to know how many 2s you write down in order to write all the numbers from 1 to 100? How could you figure out the answer without writing all the numbers and counting them?</p> <p>1.3 Locate 132.35 on the number line below and label the point Z.</p> <div style="text-align: center;">  </div>

Grade 5
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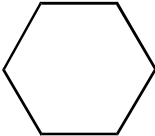
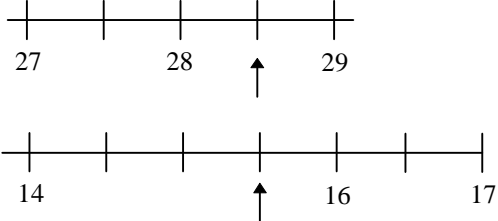
- use numbers to describe quantities
- represent numbers in multiple ways.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Demonstrate a number sense for whole numbers 0 to 100 000, and explore proper fractions and decimals.</p>	<p>7. Represent and describe proper fractions concretely, pictorially and symbolically. [CN, R, V]</p> <p>8. Demonstrate and describe equivalent proper fractions concretely, pictorially and symbolically. [C, R, V]</p> <p>9. Compare and/or order proper fractions and decimals to hundredths. [C, R, V]</p>	<p>7–8. Name some fraction circles that can be used to show one half. What equivalent names match your choices? Give three other names equivalent to one half. Identify fraction circles that show two-thirds. Name a fraction greater than one half but less than two-thirds. How could you use fraction circles to show your reasoning.</p>  <p>7, 9 With the help of fractional strips or segmented circles, put the following fractions into order of increasing size: $\frac{5}{6}, \frac{2}{3}, \frac{3}{8}, \frac{2}{4}$.</p> <p>7.1 Using the following set of fraction pieces, identify and name the fraction or fractions, which:</p> <ul style="list-style-type: none"> – are closest to zero – closer to a half than to zero in size – the largest fraction in your set – closer to zero than to one half in size – close to, but not exactly, one half in size. 

Grade 5
Strand: Number (Number Concepts)

Students will:

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General Outcome	Specific Outcomes	Illustrative Examples
<p>Demonstrate a number sense for whole numbers 0 to 100 000, and explore proper fractions and decimals.</p>		<p>8.1 Show that “one half is equivalent to three sixths”, using the following figure.</p> <div style="text-align: center;">  </div> <p>Add, and trace, more pattern blocks to make a new figure that shows:</p> <ul style="list-style-type: none"> – one fifth is equivalent to two tenths – six eighths is equivalent to three fourths. <p>9.1 Order the following: 25.5, 26.5, 2.5, 27.5 and 24.</p> <p>9.2 Name each letter with the matching decimal fraction.</p> <div style="text-align: center;">  </div> <p>9.3 Put <, = or > in the boxes to show how the numbers or expressions are related.</p> <p>$\frac{1}{4}$ <input type="checkbox"/> 0.2</p> <p>0.61 <input type="checkbox"/> 0.16</p> <p>0.75 <input type="checkbox"/> $\frac{8}{10}$</p>

Grade 5

Strand: Number (Number Operations)

Students will:

- demonstrate an understanding of and proficiency with calculations
- decide which arithmetic operation or operations can be used to solve a problem and then solve the problem.

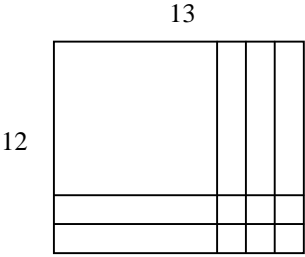
General Outcome	Specific Outcomes	Illustrative Examples																
<p>Apply arithmetic operations on whole numbers and decimals, and illustrate their use in creating and solving problems.</p>	<p>10. Add and subtract decimals to hundredths, concretely, pictorially and symbolically. [PS, V]</p>	<p>10.1 You have this amount of change: 2 dollar coins, 5 quarters, 13 dimes, 6 nickels and 14 pennies. These items are for sale: Pen \$1.95 Note pad (large) 1.89 Note pad (small) 1.19 Pencil .59</p> <p>Use this information to make up a problem.</p> <p>10.2 You just got a gift of three goldfish from your grandmother and she gave you \$20.00 to buy a bowl, a bowl ornament and a supply of fish food. The chart shows the prices of these items at three different stores.</p> <table border="1" data-bbox="1231 902 2120 1099"> <thead> <tr> <th>Item</th> <th>Pet Zoo</th> <th>Pampered Pets Shop</th> <th>Johnson's Animals</th> </tr> </thead> <tbody> <tr> <td>Bowl</td> <td>\$7.00</td> <td>\$6.00</td> <td>\$8.00</td> </tr> <tr> <td>Ornament</td> <td>\$8.50</td> <td>\$8.00</td> <td>\$4.75</td> </tr> <tr> <td>Fish food</td> <td>\$5.50</td> <td>\$4.50</td> <td>\$5.25</td> </tr> </tbody> </table> <p>– Choose a possible selection of bowl, ornament and food that you could buy with the \$20.00. – What is the cost of your selection? – How much change would you receive? – How many different ways could you buy the three things and still spend \$20.00 or less? Show each combination.</p>	Item	Pet Zoo	Pampered Pets Shop	Johnson's Animals	Bowl	\$7.00	\$6.00	\$8.00	Ornament	\$8.50	\$8.00	\$4.75	Fish food	\$5.50	\$4.50	\$5.25
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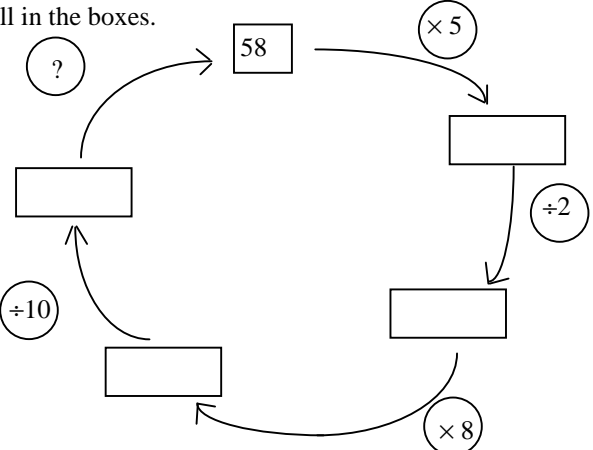
General Outcome	Specific Outcomes	Illustrative Examples
<p>Apply arithmetic operations on whole numbers and decimals, and illustrate their use in creating and solving problems.</p>	<p>11. Estimate, mentally calculate, compute or verify, the product (3-digit by 2-digit) and quotient (3-digit divided by 1-digit) of whole numbers. [E, PS, T]</p>	<p>11.1 Greg and Nabat used base-10 blocks to build an array for 12×13.</p> <div style="text-align: center;">  </div> <p>Greg and Nabat did not record their thinking in the same way.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>GREG</p> $12 \times 13 = (10 \times 13) + (2 \times 13)$ $12 \times 13 = 130 + 26$ $12 \times 13 = 156$ </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>NABAT</p> $12 \times 13 = (12 \times 10) + (12 \times 3)$ $12 \times 13 = 120 + 36$ $12 \times 13 = 156$ </div> </div> <p>Explain the reasoning of each student. Build a model to explain 24×21.</p> <p>11.2 Takashi says he thinks of money when he needs to mentally solve questions like these:</p> <div style="margin-left: 40px;"> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 10px;">24×5</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 20px; margin-bottom: 10px;">24×25</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 40px;">24×50</div> </div> <p>What are the answers, and how could Takashi have done each one?</p>

Grade 5

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General Outcome	Specific Outcomes	Illustrative Examples
<p>Apply arithmetic operations on whole numbers and decimals, and illustrate their use in creating and solving problems.</p>	<p>12. Multiply and divide decimals to hundredths, concretely, pictorially and symbolically, using single-digit, whole number multipliers and divisors. [PS, V]</p>	<p>11.3 Fill in the boxes.</p>  <p>Fill in the final circle in two different ways.</p> <p>11.4 Find two whole numbers (each greater than 10) whose product is 768. Explain how you obtained your answer.</p> <p>12.1 Let a flat represent 1 unit. Let a long represent 0.1 units. Let a centicube represent 0.01 units.</p> <p>Use the blocks to explain the meaning and solution to this expression:</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> 4×1.34 </div> <p>Use your solution to mentally calculate the following:</p> <p>8×1.34 16×1.34 2×1.34</p>

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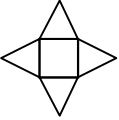
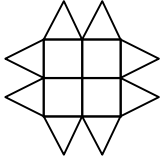
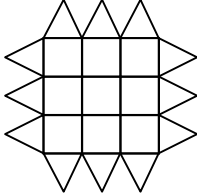




General Outcome	Specific Outcomes	Illustrative Examples
Apply arithmetic operations on whole numbers and decimals, and illustrate their use in creating and solving problems.	13. Solve problems involving multiple steps and multiple operations, and accept that other methods may be equally valid. [PS]	12.2 A total of \$295.79 was collected by 21 Grade 5 students for a field trip. What was the average amount collected by each student. Explain your answer, using play money. 13.1 Using only the <input type="text" value="2"/> , <input type="text" value="+"/> , <input type="text" value="-"/> , <input type="text" value="×"/> , and <input type="text" value="÷"/> keys on your calculator, make the display read 13.

Grade 5

Strand: Patterns and Relations (Patterns)

Students will:

- use patterns to describe the world and to solve problems.

General Outcome	Specific Outcomes	Illustrative Examples																												
<p>Construct, extend and summarize patterns, including those found in nature, using rules, charts, mental mathematics and calculators.</p>	<p>1. Develop charts to record and reveal patterns. [CN, PS]</p>	<p>1-5.1 Study these pattern block flowers.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>1st</p> </div> <div style="text-align: center;">  <p>2nd</p> </div> <div style="text-align: center;">  <p>3rd</p> </div> </div> <ul style="list-style-type: none"> - Make a chart to show this information, for the first six flowers: <ul style="list-style-type: none"> - the number of triangles for each - the number of squares for each. - Write a description of the 4th pattern block flower. - Explain the patterns you see in the numbers on your chart. - Predict the number of triangles and the number of squares you will need to build the 10th flower in the sequence. - If Sharon has 150 triangles and 125 squares, what is the largest flower she can build, using these rules? Explain your thinking. <p>1-5.2 Use stir sticks to copy these triangular shapes. Build the next three shapes. How many stir sticks are needed to build five triangles?</p> <div style="display: flex; justify-content: center; align-items: center; gap: 20px;">     </div> <p>Copy this chart. Complete the chart to record the number of Δs and the matching number of stir sticks in your constructions. Predict the number of stir sticks needed to make 75 triangles. Explain how you arrived at your solution.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td style="width: 25%;">Number of triangles</td> <td>1</td> <td>2</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>10</td> <td></td> <td>75</td> </tr> <tr> <td>Number of sticks</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Number of triangles	1	2	3								10		75	Number of sticks	3												
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Grade 5

Strand: Patterns and Relations (Patterns)

Students will:

- use patterns to describe the world and to solve problems.

General Outcome	Specific Outcomes	Illustrative Examples
Construct, extend and summarize patterns, including those found in nature, using rules, charts, mental mathematics and calculators.		<p>1, 3 Use base-10 unit cubes to make squares. For each square, find its perimeter and its area. Make a chart to find the pattern.</p> <p>1, 4 Chairs have four legs each and stools have three legs each. Make a chart of your own design to determine how many chairs and stools are necessary to come up with 31 legs. Find all possible combinations.</p> <p>1.1 How many numbers less than 1000 have 12 as the sum of their digits. Examples:</p> <p style="margin-left: 40px;">84 8 + 4 = 12 129 1 + 2 + 9 = 12 507 5 + 0 + 7 = 12</p> <p>Carefully organize your investigation. Describe the patterns you see in the numbers.</p> <p>1.2 It takes six police officers on motorcycles to escort one sports team in a parade. The organizers must find four more police officers for each team that joins the parade. Construct and label a chart that can be used to see the number of police officers needed to escort from 1 to 10 sports teams.</p> <p>1.3 Mark, Samual, Anna and Céline each prefer a different flavour of ice cream.</p> <p style="margin-left: 40px;">chocolate mint strawberry vanilla</p> <p>No one prefers a flavour with the same number of letters as his or her name. The one who prefers mint likes sugar cones. The one who loves vanilla always puts chocolate syrup on top of his treat. Anna is allergic to chocolate. Match each person with his or her favourite ice cream.</p>

Grade 5

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
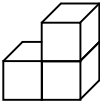
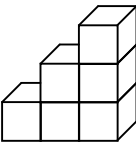
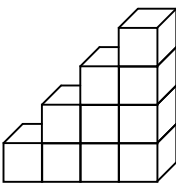
General Outcome	Specific Outcomes	Illustrative Examples
<p>Construct, extend and summarize patterns, including those found in nature, using rules, charts, mental mathematics and calculators.</p>	<p>2. Describe how a pattern grows, using everyday language in spoken and written form. [C, CN]</p>	<p>1.4 In one community club, eight members signed up for cheerleading, 14 for drama and 10 for dance. Of these totals, 2 chose only cheerleading, 3 chose dance and drama and 1 chose all three activities. How many chose only drama? How many chose only dance? How many chose cheerleading and drama? Explain your reasoning for each solution.</p> <div data-bbox="1381 532 1768 727" style="text-align: center;"> <p>A Venn diagram consisting of three overlapping circles arranged in a triangle. Each circle has a horizontal arrow pointing towards it from the outside.</p> </div> <p>2–3 Hanif is building “T” numbers. This is how he describes his models.</p> <p>“I used five tiles to build the first ‘T’ number. Each larger ‘T’ uses three more tiles than the ‘T’ number before it.”</p> <p>Use Hanif’s description to build the first four “T” numbers. Record your models.</p> <p>Construct the first four models of your own 2- or 3-dimensional pattern. Write a description that explains how your pattern grows.</p>

Grade 5

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<p>Construct, extend and summarize patterns, including those found in nature, using rules, charts, mental mathematics and calculators.</p>	<p>3. Construct and expand patterns in two and three dimensions, concretely and pictorially. [PS, V]</p>	<p>2.1 Darcy uses cubes to build these shapes.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>1.</p> </div> <div style="text-align: center;">  <p>2.</p> </div> <div style="text-align: center;">  <p>3.</p> </div> <div style="text-align: center;">  <p>4.</p> </div> </div> <p>Explain how the pattern grows.</p> <p>3–5 Luis developed this chart to match a set of toothpick models.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>1st</th> <th>2nd</th> <th>3rd</th> <th>4th</th> <th>5th</th> <th>6th</th> </tr> </thead> <tbody> <tr> <th>Number of toothpicks</th> <td>6</td> <td>11</td> <td>16</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <ul style="list-style-type: none"> – Predict the next three numbers in the sequence. Explain your reasoning. – Predict the number of toothpicks needed to build the 25th shape. Justify your answer. – Use the toothpicks to build the first three models in the sequence. 		1 st	2 nd	3 rd	4 th	5 th	6 th	Number of toothpicks	6	11	16			
	1 st	2 nd	3 rd	4 th	5 th	6 th										
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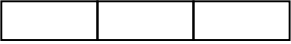
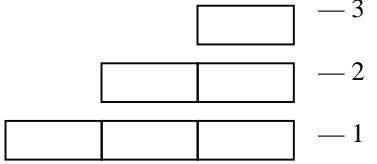
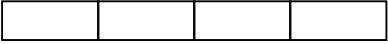
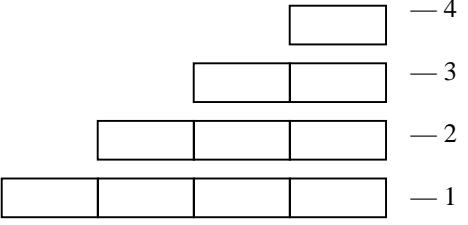

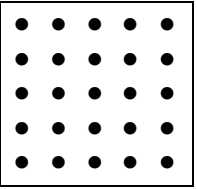
General Outcome	Specific Outcomes	Illustrative Examples
<p>Construct, extend and summarize patterns, including those found in nature, using rules, charts, mental mathematics and calculators.</p>	<p>4. Generate and extend number patterns from a problem-solving context. [PS, R]</p> <p>5. Predict and justify pattern extensions. [C, R]</p>	<p>4-5.1 Use a calculator, if needed. Find answers to each set of problems.</p> <p><u>Set 1</u> $12 \div 2 = \underline{\hspace{2cm}}$ $24 \div 4 = \underline{\hspace{2cm}}$ $48 \div 8 = \underline{\hspace{2cm}}$ $96 \div 16 = \underline{\hspace{2cm}}$</p> <p><u>Set 2</u> $288 \div 24 = \underline{\hspace{2cm}}$ $144 \div 12 = \underline{\hspace{2cm}}$ $72 \div 6 = \underline{\hspace{2cm}}$ $36 \div 3 = \underline{\hspace{2cm}}$</p> <p><u>Set 3</u> $28 \div 4 = \underline{\hspace{2cm}}$ $280 \div 40 = \underline{\hspace{2cm}}$ $2800 \div 400 = \underline{\hspace{2cm}}$ $28\ 000 \div 4000 = \underline{\hspace{2cm}}$</p> <ul style="list-style-type: none"> - Explain the pattern in each set. - For Set 2, what is a problem: <ul style="list-style-type: none"> - that fits before $288 \div 24$? - that fits after $36 \div 3$?

Grade 5

Strand: Patterns and Relations (Patterns)

Students will:

- use patterns to describe the world and to solve problems.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Construct, extend and summarize patterns, including those found in nature, using rules, charts, mental mathematics and calculators.</p>		<p>4-5.2</p> <p>Derek wrote the following in his journal:</p> <p>“I use patterns to help solve geometry problems like these: How many rectangles are there in this figure?”</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Problem 1</p>  <p>Total = 6 Rectangles</p> </div> <div style="text-align: center;">  <p>Problem 2</p>  <p>Total = 10 Rectangles</p> </div> </div> <p>Do you agree with Derek’s solutions? Why? How would you solve these problems?</p> <p>How many rectangles are there in this figure?</p>  <p>How many squares are there in this figure?</p>  <p>Write your own journal entry to explain how you solved these problems.</p>

Grade 5

Strand: Patterns and Relations (Patterns)

Students will:

- use patterns to describe the world and to solve problems.

General Outcome	Specific Outcomes	Illustrative Examples															
<p>Construct, extend and summarize patterns, including those found in nature, using rules, charts, mental mathematics and calculators.</p>		<p>4.1 The community centre was charging \$1.00 to see a movie. \$25.00 was collected on the first day. \$17.00 more was collected on the second day than on the first day. After two days the club had collected \$67.00 in all. On the third day, \$17.00 more than the second day was collected. If the pattern continues, on what day will the club have collected at least \$500.00?</p> <table border="1" data-bbox="1615 553 2360 781"> <thead> <tr> <th></th> <th>Day 1</th> <th>Day 2</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Day's collection (\$)</td> <td>25</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total collected (\$)</td> <td>25</td> <td>67</td> <td></td> <td></td> </tr> </tbody> </table>		Day 1	Day 2			Day's collection (\$)	25				Total collected (\$)	25	67		
	Day 1	Day 2															
Day's collection (\$)	25																
Total collected (\$)	25	67															

Grade 5

Strand: Shape and Space (Measurement)

Students will:

- describe and compare everyday phenomena, using either direct or indirect measurement.

General Outcome	Specific Outcomes	Illustrative Examples
Use measurement concepts, appropriate tools and results of measurements to solve problems in everyday contexts.	<ol style="list-style-type: none">1. Recognize and explain the meaning of length, width, height, depth, thickness, perimeter and circumference. [C] 2. Evaluate the appropriateness of units and measuring tools in practical contexts. [CN]	<ol style="list-style-type: none">1.1 Draw a 3-dimensional outline of each shape:<ul style="list-style-type: none">– soup can– cereal box– story book.<p>Find an object with a:</p><ul style="list-style-type: none">– circumference of approximately 21 cm– depth of approximately 10 cm– perimeter of approximately 20 cm– width of approximately 22 cm– thickness of approximately 1 mm– height of approximately 2 m– an area of approximately 600 cm². 2.1 Identify the measuring tool and unit best used to measure:<ul style="list-style-type: none">– the volume of air in your classroom– the capacity of a pill bottle– the mass of a train car full of wheat– the surface area of a kitchen table.

Grade 5
Strand: Shape and Space (Measurement)

Students will:

- describe and compare everyday phenomena, using either direct or indirect measurement.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Use measurement concepts, appropriate tools and results of measurements to solve problems in everyday contexts.</p>	<p>3. Estimate and measure the perimeter of irregular shapes. [E, R]</p>	<p>3–4</p> <div data-bbox="1521 435 2139 867" style="text-align: center;"> </div> <p>These are the outlines of two countries.</p> <ul style="list-style-type: none"> – Estimate the area of each in squares. Explain your strategy. – Which country has the greatest area? – Which country likely has the longer perimeter? – Outline a shape with more area but about the same perimeter as Finland. – Estimate the area of one square in km^2. Explain your reasoning. <p>3.1 Determine the perimeter of the figure below.</p> <div data-bbox="1247 1198 1537 1398" style="text-align: center;"> </div>

Grade 5

Strand: Shape and Space (Measurement)

Students will:

- describe and compare everyday phenomena, using either direct or indirect measurement.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Use measurement concepts, appropriate tools and results of measurements to solve problems in everyday contexts.</p>	<p>4. Estimate and measure the area of irregular shapes by dividing them into parts. [E, R]</p> <p>5. Estimate and measure the effect of changing one or more dimensions of a rectangle on its:</p> <ul style="list-style-type: none"> • perimeter • area. <p>[E, R]</p> <p>6. Relate perimeter and area of rectangles, using manipulatives and diagrams. [CN, R]</p> <p>7. Estimate, measure, record and order containers by volume, using cm^3. [E, PS]</p>	<p>5–6 Monique used square tiles to construct a rectangle with a perimeter of 20 cm and an area of 21 cm^2. What are the dimensions of the rectangle? Use only whole numbers of centimetres for your answers. She decides to keep the perimeter at 20 cm. Predict what will happen to the area of her rectangle, if she</p> <ul style="list-style-type: none"> – increases the length of her rectangle – decreases the length of her rectangle. <p>Outline and cut all possible rectangles with a perimeter of 20 cm. Check your predictions.</p> <p>6.1 Do you think a square and a rectangle with the same perimeter have the same area? Explain your reasoning. Draw pictures to help others visualize your thinking.</p> <p>7–8.1 Mandi builds a cube with each side 3 cm long, using centicubes. How many cubes does she use? She fills a graduated cylinder with water to the 500 mL mark. Mandi predicts the water will rise to about the 600 mL mark, if she pushes her cube just below the surface of the water. Do you agree with Mandi’s prediction? Why, or why not? Build the cube and conduct the experiment. Do the results verify your thinking? Explain.</p> <p>7–8.2 How many mL of juice will fit inside a plastic container whose volume has been calculated as 705 cm^3? Explain.</p> <p>7.1 Choose three different cracker boxes. Estimate the volume of each box in cubic centimetres. Order the boxes according to your estimate. Show how to use centicubes or a ruler to check your estimates. Were your predictions right? Explain your results.</p>

Grade 5

Strand: Shape and Space (Measurement)

Students will:

- describe and compare everyday phenomena, using either direct or indirect measurement.

General Outcome	Specific Outcomes	Illustrative Examples																	
<p>Use measurement concepts, appropriate tools and results of measurements to solve problems in everyday contexts.</p>	<p>8. Use concrete materials to relate cm^3 to mL. [CN,V]</p> <p>9. Construct objects of a specific volume, expressed in cm^3. [PS]</p> <p>10. Solve problems involving mass (weight), using g, kg and t. [PS]</p> <p>11. Read an analog clock to the nearest minute, and write the time. [C]</p> <p>12. Read and write time on a 24-hour clock. [C]</p>	<p>9.1 Use centicubes or interlocking cubes to build cubes with lengths of 2 and 3 units. Draw 3-D pictures of the first three cubes. Fill in the chart to show the number of cubes needed to build the first four cubes. Then explain how to use a calculator to fill in the remaining numbers on the chart.</p> <table border="1" data-bbox="1228 630 2206 764"> <tr> <td rowspan="2" style="text-align: center;">CUBES</td> <td style="text-align: center;">Length of edge (cm)</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">Number of centicubes used</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>9.2 Construct an object of 24 cm^3.</p> <p>10.1 Supermarkets order groceries in large lots. About how many packages are there in: – 1 t of cookies, packed in 400 g packages – 1 kg of spices, packed in 5 g packages? Explain your reasoning.</p> <p>12.1 An air flight arrives at 21:05 and departs at 22:18. Use numbers and symbols to write each time another way. A sign used the 24-hour clock to show No Parking from 3:30 p.m. to 6:00 p.m. What times must have been written on the No Parking sign?</p>	CUBES	Length of edge (cm)	1	2	3	4				Number of centicubes used							
CUBES	Length of edge (cm)	1		2	3	4													
	Number of centicubes used																		

Grade 5

Strand: Shape and Space (Measurement)

Students will:

- describe and compare everyday phenomena, using either direct or indirect measurement.










General Outcome	Specific Outcomes	Illustrative Examples
Use measurement concepts, appropriate tools and results of measurements to solve problems in everyday contexts.	13. Read and write SI notation for recording date and time. [C]	13.1 Use SI notation to write the following: <ul style="list-style-type: none">- today's date- your birthday- when you will graduate from high school- a date that is special to you.

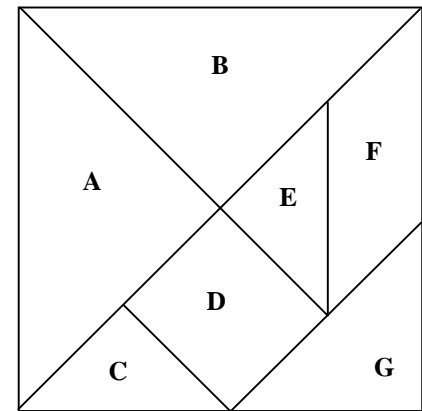
Grade 5

Strand: Shape and Space (3-D Objects and 2-D Shapes)

Students will:

- describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.


General Outcome	Specific Outcomes	Illustrative Examples																														
<p>Use visualization of 3-D objects and 2-D shapes to solve problems related to spatial relations.</p>	<p>14. Construct, analyze and classify triangles according to the side measures. [E, R, V]</p> <p>15. Build, represent and describe geometric objects and shapes. [C, PS]</p> <p>16. Identify and name polygons according to the number of sides, angles and vertices (3, 4, 5, 6 or 8). [C, R, V]</p> <p>17. Cover a given 2-D shape with tangram pieces. [PS, V]</p>	<p>14.1 Kylee had a supply of straws in three different lengths: 9 cm, 15 cm and 20 cm. How many different triangles could she make? Use straws or pictures to explain your answer. Sort the triangles into sets with no equal sides, 2 equal sides and 3 equal sides, and name each set.</p> <p>15, 17 Look at the tangram puzzle shown.</p> <p>Can you make a triangle with 2 tangram pieces? 3 pieces? 4 pieces? 5 pieces? 6 pieces? All 7 pieces? Draw and label pictures to show the triangles and the pieces used.</p> <p>15.1 Make a large class chart like the one below to show the shapes you can build with tangram pieces. Fill all the spaces. Pieces are traced, cut out and posted as solutions are found. Three examples are given. Try to make each shape, using different numbers of tangram pieces. You may not find them all.</p> <table border="1" data-bbox="1494 1068 2360 1357"> <thead> <tr> <th></th> <th>Square</th> <th>Rectangle</th> <th>Triangle</th> <th>Parallelogram</th> <th>Trapezoid</th> </tr> </thead> <tbody> <tr> <td>1 piece</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2 pieces</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3 pieces</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7 pieces</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Add in rows for 4, 5 and 6 pieces</p>		Square	Rectangle	Triangle	Parallelogram	Trapezoid	1 piece						2 pieces						3 pieces						7 pieces					
	Square	Rectangle	Triangle	Parallelogram	Trapezoid																											
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Grade 5
Strand: Shape and Space (Transformations)

Students will:

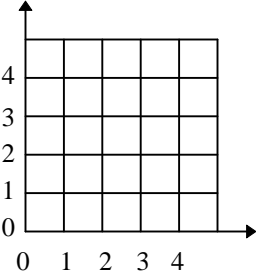
- perform, analyze and create transformations.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Describe motion in terms of a slide, a turn or a flip.</p>	<p>20. Recognize motion as a slide (translation), turn (rotation) or a flip (reflection). [T, V]</p> <p>21. Recognize tessellations created with regular and irregular shapes in the environment. [CN, V]</p> <p>22. Cover a surface, using one or more tessellating shapes. [PS, T, V]</p>	<p>20.1 What kind of motion moves your cursor from cell to cell on a computer spreadsheet. What is one path your cursor might take to move from cell A1 to cell D5?</p> <p>20.2 Cut out the shape. Use it as a tracer to create three different wallpaper designs. Use only slides to create one paper, only flips to create a second paper, and turns as well as slides to create the third paper. Which do you prefer? Explain.</p> <div style="text-align: center;">  </div> <p>21.1 In your neighbourhood what are some examples of tessellations created from tiling with regular shapes? Draw one. What is an irregular shape? Give one instance of such a shape being used in a tessellation. Tell whether you prefer tessellations produced by using regular or irregular shapes. Why?</p> <p>22.1 Demonstrate, with pattern blocks, whether or not it is possible to tessellate a surface, using only:</p> <ul style="list-style-type: none"> – the blue rhombus and slides – the trapezoid and flips – the tan rhombus and turns. <p>If an example is not possible, investigate and report how the block can be used to tessellate a surface.</p> <p>22.2 Use pattern blocks to create a tessellation that is at least 25 cm by 25 cm in area.</p>

Grade 5
Strand: Shape and Space (Transformations)

Students will:

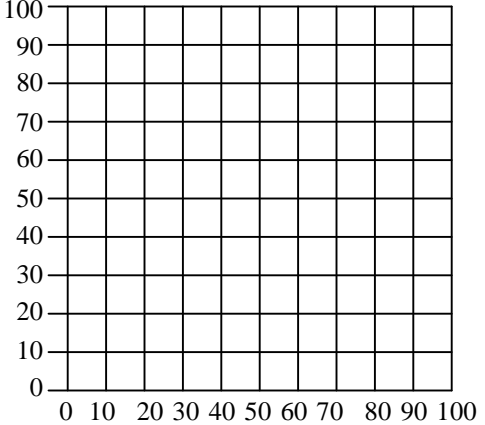
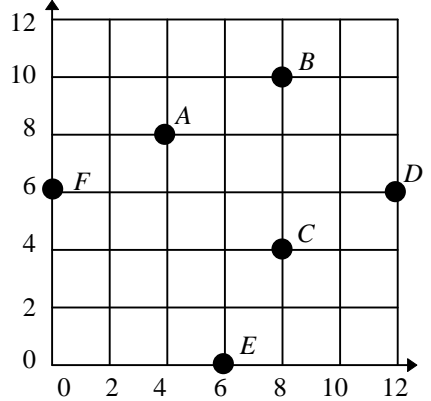
- perform, analyze and create transformations.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Describe motion in terms of a slide, a turn or a flip.</p> <p>Use coordinates to describe the positions of objects in two dimensions.</p>	<p>23. Create tessellations, using regular polygons. [PS, T]</p> <p>24. Identify planes of symmetry by cutting solids. [PS, V]</p> <p>25. Plot whole number ordered pairs in the first quadrant with intervals of 1, 2, 5, 10. [C]</p>	<p>23.1 Use tape to fasten two different regular pattern block pieces together. Will the new shape tessellate a surface? If so, did you use slides, turns or flips? Try different pairs of blocks, then create and colour a tessellation with your favourite block combination.</p> <p>23.2 Use a combination of regular pattern blocks to create a triangle similar to the green triangle. Design the block to have one line of symmetry. Create and colour a tessellation.</p> <p>24.1 Construct 3-D solids out of molding clay. Use a piano wire to cut each solid along a plane that you think divides your solid into two congruent halves. Report your investigation in your mathematics journal. Tell how many planes of symmetry you found in each solid. Draw and label the shape of the symmetrical plane(s) found. Tell where you have seen similar planes in the human-made structures in your community.</p> <p>25–26 [also relates to SO 14] On this grid, mark and label the two points $A(1, 2)$ and $B(3, 2)$. Join these with a straight line.</p>  <p>On the grid mark another point C so that the triangle ABC is an isosceles triangle. Write down the coordinates of point C. Mark point D so that $\triangle ABD$ is a right triangle. Write the coordinates of D. Mark point E so that $\triangle ABE$ is a scalene triangle. Write the coordinates of E.</p>

Grade 5
Strand: Shape and Space (Transformations)

Students will:

- perform, analyze and create transformations.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Use coordinates to describe the positions of objects in two dimensions.</p>	<p>26. Identify a point in the first quadrant, using ordered pairs. [C]</p>	<p>25.1</p> <ul style="list-style-type: none"> Plot the points on the grid. A (10, 30) B (60, 20) C (80, 90) <p>– Join the points to outline a shape</p> <p>– What different ways do you know to describe the shape?</p>  <p>26.1</p> <ul style="list-style-type: none"> Match the given ordered pairs with the letters on the graph. (6, 0) (4, 8) (8, 4) (8, 10) (0, 6) (12, 6) <p>– Slide point E up 1 and left 1. Name its new location.</p> <p>– What kind of quadrilateral is formed by joining the points?</p> <p>– What is the area of this quadrilateral?</p> 

Grade 5
Strand: Statistics and Probability (Data Analysis)

Students will:

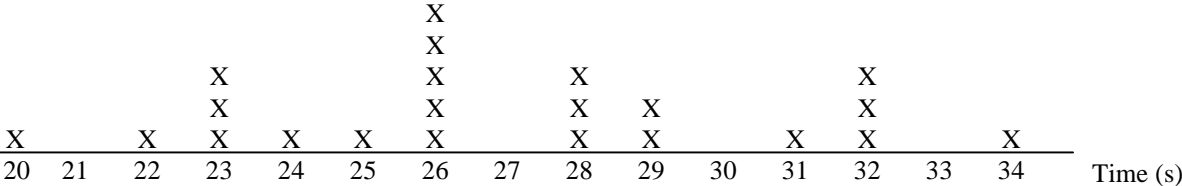
- collect, display and analyze data to make predictions about a population.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Develop and implement a plan for the collection, display and interpretation of data to answer a question.</p>	<ol style="list-style-type: none"> 1. Identify a question to generate appropriate data, and predict results. [C, R] 2. Distinguish between a total population and a sample of that population. [R] 3. Use a variety of methods to collect and record data. [PS, T] 	<p>1, 2 There are many different ways that potatoes can be prepared for eating.</p> <p>How would you word the question, if you want to learn more about peoples' preferred ways of eating potatoes? What results do you predict? Describe a population and a sample that you could use to answer your question.</p> <p>2.1 For what question could our class be considered as:</p> <ul style="list-style-type: none"> – the total population? – a sample of a population? <p>3–4 A Grade 5 class learned that thousands of very large and very small potatoes are left in market gardeners' fields each fall. They decide to investigate only those potatoes that do get picked and packaged for sale in grocery stores. What questions might they use to best guide their investigation. Predict what might be the answer to each question designed.</p> <p>Write out a plan for the investigation. Include information on each of the following:</p> <ul style="list-style-type: none"> – selecting a sample – collecting the data – recording the data – displaying the data. <p>Choose one question, or part of a question, designed above, and follow your plan. Write about the results of your investigation.</p> <p>What things have you learned about potatoes that get packaged for market?</p>

Grade 5
Strand: Statistics and Probability (Data Analysis)

Students will:

- collect, display and analyze data to make predictions about a population.

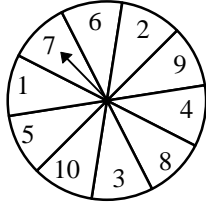
General Outcome	Specific Outcomes	Illustrative Examples												
<p>Develop and implement a plan for the collection, display and interpretation of data to answer a question.</p>	<p>4. Evaluate the graphic presentation of the data to ensure clear representation of the results. [C, R]</p>	<p>3.1 Take some potatoes from a 10 kg bag picked randomly from a grocery store. Use a variety of ways to record your data for the following questions:</p> <ul style="list-style-type: none"> – by observation and counting How many eyes does each potato possess? – by measurement tools How long is each potato? What is the circumference of the potato measured at the middle? What is the mass of each potato? – by survey What is your favourite way to eat potatoes? (mashed, fried, scalloped, baked) <p>Use research to find out what brands of potatoes are most commonly sold in local grocery stores.</p> <p>4–5 A class timed how long it took each person to count to 100.</p>  <table border="1" data-bbox="1231 1133 2386 1279"> <thead> <tr> <th>Time Interval(s)</th> <th>Individual Result(s)</th> <th>Number of Students</th> </tr> </thead> <tbody> <tr> <td>20–24</td> <td>20, 22, 23, 23, 23, 24</td> <td>6</td> </tr> <tr> <td>25–29</td> <td>25, 26, 26, 26, 26, 26, 28, 28, 28, 29, 29</td> <td>11</td> </tr> <tr> <td>30–34</td> <td>31, 32, 32, 32, 34</td> <td>5</td> </tr> </tbody> </table> <p>What is the same about each representation of the data? What is different? Do you think one display better reveals the data than does the other? Why? Choose another way to present the data. Label your work so others can read your graph quickly and accurately.</p>	Time Interval(s)	Individual Result(s)	Number of Students	20–24	20, 22, 23, 23, 23, 24	6	25–29	25, 26, 26, 26, 26, 26, 28, 28, 28, 29, 29	11	30–34	31, 32, 32, 32, 34	5
Time Interval(s)	Individual Result(s)	Number of Students												
20–24	20, 22, 23, 23, 23, 24	6												
25–29	25, 26, 26, 26, 26, 26, 28, 28, 28, 29, 29	11												
30–34	31, 32, 32, 32, 34	5												

Grade 5

Strand: Statistics and Probability (Data Analysis)

Students will:

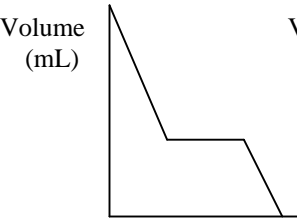
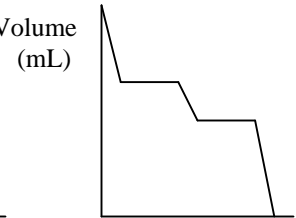
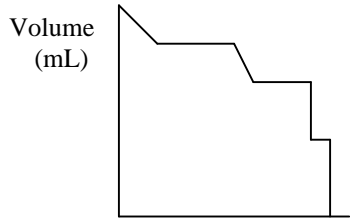
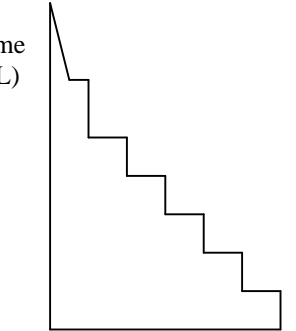
- collect, display and analyze data to make predictions about a population.

General Outcome	Specific Outcomes	Illustrative Examples																			
<p>Develop and implement a plan for the collection, display and interpretation of data to answer a question.</p>	<p>5. Create classifications and ranges for grouping data. [PS, R]</p> <p>6. Display data by hand or by computer in a variety of ways, including:</p> <ul style="list-style-type: none"> • frequency diagrams • line plots • broken-line graphs. <p>[C, T, V]</p> <p>7. Discuss the reasonableness of data and results. [C, R]</p>	<p>5. Determine groupings to show height changes throughout the school year; e.g., September to January/June. Determine the age groupings for the most listened to music. Why did you choose to use the number of intervals you did? E.g., three groups as opposed to four groups.</p> <p>6–8 Wui-Ching needs to spin a 6, or any of its factors, to win a game.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> Spin a Factor of 6 </div>  </div> <p>On a tally chart, record the data from at least 50 spins. Show all your data on a frequency diagram. Do you think Wui-Ching is more likely to win or lose the game? Why?</p> <p>7.1 Tina, Rex and Liz are conducting reaction time experiments with a metre stick. Each person gets three chances to see how quickly they catch the metre stick after it is dropped. Here are their results.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Trial Number</th> <th colspan="3">Distance Dropped (cm)</th> </tr> <tr> <th>Tina</th> <th>Rex</th> <th>Liz</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>50</td> <td>17</td> <td>20</td> </tr> <tr> <td>2</td> <td>40</td> <td>26</td> <td>22</td> </tr> <tr> <td>3</td> <td>15</td> <td>23</td> <td>59</td> </tr> </tbody> </table> <p>Explain who has the best reaction time, if:</p> <ul style="list-style-type: none"> – the lowest number of centimetres on any particular trial wins – the high and low distance for each person is eliminated – the average distance for each person is calculated by adding their three numbers and dividing by 3. <p>What method do you think is most fair for determining the best reaction time? Explain your reasoning. What number represents the mean reaction distance of all three friends? Make a bar graph to visually explain and verify your calculation.</p>	Trial Number	Distance Dropped (cm)			Tina	Rex	Liz	1	50	17	20	2	40	26	22	3	15	23	59
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	Tina	Rex	Liz																		
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Grade 5
 Strand: Statistics and Probability (Data Analysis)

Students will:

- collect, display and analyze data to make predictions about a population.

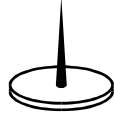

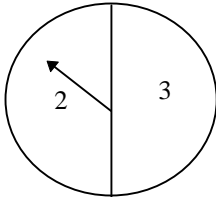
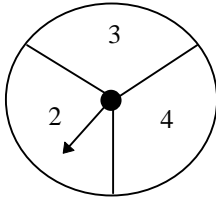
General Outcome	Specific Outcomes	Illustrative Examples
<p>Develop and implement a plan for the collection, display and interpretation of data to answer a question.</p>	<p>8. Make inferences to generate a conclusion about the data. [E, PS]</p>	<p>8.1 Four friends each bought a large cold drink on a hot summer day. Explain what each graph tells you about how each person drank.</p> <p style="text-align: center;"> <u>Graph 1 (Marcel)</u> <u>Graph 2 (Dianne)</u> <u>Graph 3 (Claire)</u> <u>Graph 4 (Chung)</u> </p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Volume (mL)</p>  <p>Time (min.)</p> </div> <div style="text-align: center;"> <p>Volume (mL)</p>  <p>Time (min.)</p> </div> <div style="text-align: center;"> <p>Volume (mL)</p>  <p>Time (min.)</p> </div> <div style="text-align: center;"> <p>Volume (mL)</p>  <p>Time (min.)</p> </div> </div> <p>Draw a graph to represent how you might drink a cold drink on a hot summer day.</p>

Grade 5

Strand: Statistics and Probability (Chance and Uncertainty)

Students will:

- use experimental or theoretical probability to represent and solve problems involving uncertainty.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Predict outcomes, conduct experiments and communicate the probability of single events.</p>	<p>9. List all possible outcomes of an experiment involving a single event. [PS]</p> <p>10. Describe events, using the vocabulary of probability:</p> <ul style="list-style-type: none"> • best/worst • probable/improbable • always/more likely/equally likely/less likely/never. <p>[C, R]</p> <p>11. Conduct probability experiments, and explain the results, using the vocabulary of probability. [C, E, PS]</p> <p>12. Conduct probability experiments to demonstrate that results are not influenced by such factors as the age, experiences or skills of the participant. [R, T]</p>	<p>9–12 Yvon tossed 20 tacks. 13 tacks landed on their points. He uses the fraction $\frac{13}{20}$ to describe the probability of tossing “points”.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Top</p> </div> <div style="text-align: center;">  <p>Point</p> </div> </div> <p>Yvon says he can now predict 39 “points”, if he tosses 60 tacks. Explain his reasoning. Conduct an experiment to test Yvon’s prediction. Compare your results with his prediction. Start a new experiment. Toss the tacks to establish the probability of landing “tops”. Use your fraction to predict tossing “tops”, and conduct an experiment to check your prediction. Compare your results with your expectations. If you continue to conduct experiments with tacks, will you improve your ability to toss exactly the number you predict? Why?</p> <p>9–10 Use one or both spinners shown to make up a true statement, using the following:</p> <ul style="list-style-type: none"> – never – less likely – more likely – always <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Spinner A</p>  </div> <div style="text-align: center;"> <p>Spinner B</p>  </div> </div>