

The Common Curriculum Framework

for

K-12 MATHEMATICS

(10-12 is under development)

Western Canadian Protocol for Collaboration in Basic Education

GRADE 4

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)

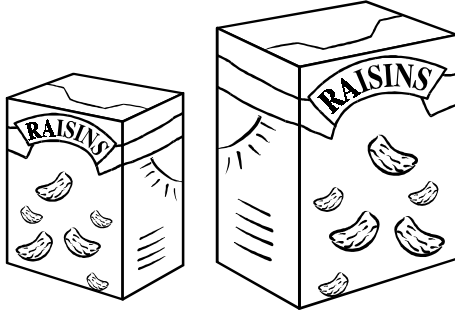
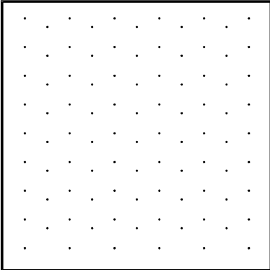
The illustrative examples (IEs) listed on the following pages are organized by grade and have been correlated to specific outcomes (SOs). The coding used recognizes that IEs relating to more than one SO are listed before those relating to only one SO. Examples of the coding system are listed below.

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 4
 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 10 000, and explore proper fractions.</p>	<p>1. Estimate, then count the number of objects in a set (0 to 1000), and compare the estimate with the actual number. [C, E]</p>	<p>1.1 Estimate the number of raisins in a 14 g snack box. Check by counting, and find the difference between your estimate and the count. Use this information to predict the number of raisins in a 42 g snack box. Check. Was your estimate about right? Explain.</p> <div style="text-align: center;">  </div> <p>Suppose you could count the number of raisins in a 450 g box. About how many raisins would you expect to find? Explain your reasoning.</p> <p>1.2 Estimate the number of holes in a ceiling tile as pictured below. Predict how many tiles you will need to have a total of 1000 holes.</p> <div style="text-align: center;">  </div> <p>Count the holes. Do you need to adjust your predicted number of tiles? Explain why or why not.</p>

Grade 4
Strand: Number (Number Concepts)

Students will:

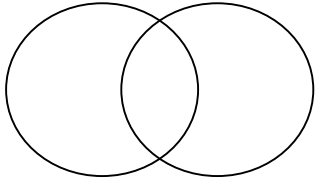
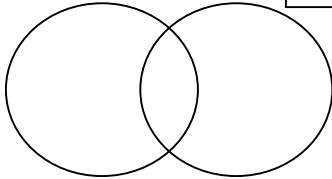
- use numbers to describe quantities
- represent numbers in multiple ways.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Demonstrate a number sense for whole numbers 0 to 10 000, and explore proper fractions.</p>	<p>2. Use skip counting (forward and backward) to support an understanding of patterns in multiplication and division. [C, CN]</p> <p>3. Read and write numerals to 10 000. [R, V]</p> <p>4. Read and write number words to 1000. [C, CN]</p> <p>5. Compare and order whole numbers up to 10 000. [C]</p> <p>6. Demonstrate concretely, pictorially and symbolically place value concepts to give meaning to numbers up to 10 000. [C, V, R, T]</p>	<p>2.1 <div style="border: 1px solid black; padding: 5px; display: inline-block;"> Dear Mom, I can do division questions by counting multiples. Example, $54 \div 9 = \square$. Skip count by 9 . . . 9, 18, 27, 36, 45, 54 ① ② ③ ④ ⑤ ⑥ Six skips of 9 is 54 so $54 \div 9 = 6$. Love Roxie. </div></p> <p>Use Roxie's method to solve these problems. $65 \div 7 = \square$ $6 \times 8 = \square$</p> <p>3, 5, 8 Use numerals to write the number that is: – three thousand greater than one thousand twenty-nine – one hundred ten less than eight thousand one hundred twenty-three – 1995 rounded to the nearest thousand.</p> <p>4–5, 8 Use words to write the number which is: – 150 less than 500 – 275 greater than 450 – 895 rounded to the nearest ten – 895 rounded to the nearest hundred.</p> <p>5.1 Use digit cards from 0 to 9. Pick any four cards. Make the smallest possible 4-digit number. Make the largest possible 4-digit number. Make three more 4-digit numbers, and order them from smallest to largest.</p> <p>6.1 Dale's teacher asked him to build a model of two thousand one hundred thirty-four. Dale has these blocks on his desk: two large cubes, two flats, twenty-five small cubes. Can Dale build the model? Use diagrams and numbers to explain your answer(s).</p>

Grade 4
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 10 000, and explore proper fractions.</p>	<p>7. Represent and describe numbers to 10 000 in a variety of ways. [C, PS, R, V]</p> <p>8. Round numbers to the nearest thousand. [E]</p> <p>9. Sort numbers into categories, using one or more attributes. [CN, R]</p>	<p>6.2 Enter this number on a calculator: <div style="border: 1px solid black; padding: 2px; display: inline-block;">two thousand seventy-nine</div></p> <p>Without clearing this number: – change the zero to four – change the seven to nine – restore the original number in one step.</p> <p>Make up a similar problem. Show that your directions are correct.</p> <p>7.1 450 can be represented as 150×3. Represent 450 two more ways.</p> <p>8.1 The coastline of British Columbia is 7024.43 km long. Round to the nearest thousand kilometres.</p> <p>9.1 Write the numbers from 0 to 12 on separate pieces of paper. Place each number in the Venn diagrams according to the rules shown. When your work is complete, write each number on the diagram.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> Even >5 </div>  </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> <10 Multiples of 3 </div>  </div> </div>

Grade 4
Strand: Number (Number Concepts)

Students will:

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

General Outcome	Specific Outcomes	Illustrative Examples
Demonstrate a number sense for whole numbers 0 to 10 000, and explore proper fractions.	10. Illustrate and explain hundredths as part of a region or set. [C, R, V] 11. Connect proper fractions to decimals (tenths and hundredths), using manipulatives, diagrams and symbols. [CN, R, V]	10–11 Let the base-10 flat represent one whole square. Use centimetre cubes to build a one-layer shape that is less than one whole square. Record your shape on cm grid paper. Write a fraction and a decimal to tell how much of the square is covered by your shape. Is not covered by your shape.

Grade 4
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
Apply arithmetic operations on whole numbers, and illustrate their use in creating and solving problems.	12. Use manipulatives, diagrams and symbols, in a problem-solving context, to demonstrate and describe the process of addition and subtraction of numbers up to 10 000. [C, PS, R, V]	12–13 Each week day a mail truck leaves the city post office to deliver mail to our town. The distance to the city and back to our town is one hundred thirty-four kilometres. Use base-10 blocks to show how you could represent the number of kilometres the mail truck travels each week. Show how you might use numbers to calculate the total number of kilometres travelled in one week. 12.1 A visitor from Mars arrives on your doorstep and is confused by the house number 631 he sees on your house. He asks you “Is 6 plus 31 equal to 631?” Answer his question and explain your answer.

Grade 4
Strand: Number (Number Operations)

Students will:

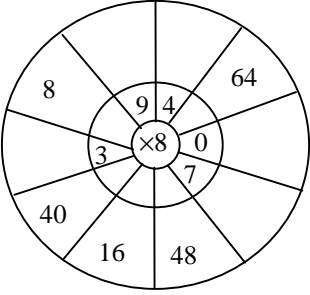
- demonstrate an understanding of and proficiency with calculations
- decide which arithmetic operation or operations can be used to solve a problem and then solve the problem.

General Outcome	Specific Outcomes	Illustrative Examples											
<p>Apply arithmetic operations on whole numbers, and illustrate their use in creating and solving problems.</p>	<p>13. Demonstrate and describe the process of multiplication (3-digit by 1-digit), using manipulatives, diagrams and symbols. [C, PS, R, T, V]</p>	<p>12.2 Marnie is asked to show two thousand eight hundred fifteen. Show the number using base-10 blocks and in a place value chart.</p> <table border="1" data-bbox="1502 483 2153 691"> <thead> <tr> <th data-bbox="1507 483 1669 532">TH</th> <th data-bbox="1674 483 1830 532">H</th> <th data-bbox="1835 483 1991 532">T</th> <th data-bbox="1997 483 2153 532">Ones</th> </tr> </thead> <tbody> <tr> <td data-bbox="1507 535 1669 691"></td> <td data-bbox="1674 535 1830 691"></td> <td data-bbox="1835 535 1991 691"></td> <td data-bbox="1997 535 2153 691"></td> </tr> </tbody> </table> <p>Then Marnie drew the following three cards.</p> <table border="1" data-bbox="1303 776 1615 883"> <tbody> <tr> <td data-bbox="1303 776 1400 883">3 H</td> <td data-bbox="1416 776 1513 883">9 Ones</td> <td data-bbox="1529 776 1615 883">2 TH</td> </tr> </tbody> </table> <p>Show the number in a place value chart. Describe how Marnie might use the blocks to show how she subtracts the two numbers. Draw a picture of her answer.</p> <p>13.1 Use a calculator to find whole numbers that divide evenly into 196. How many are there altogether?</p> <p>13.2 Use a calculator to find two numbers whose product is 462. How many such numbers are there?</p>	TH	H	T	Ones					3 H	9 Ones	2 TH
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Grade 4
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.

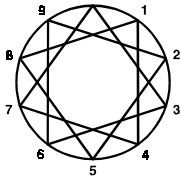
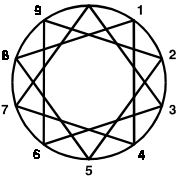
General Outcome	Specific Outcomes	Illustrative Examples
<p>Apply arithmetic operations on whole numbers, and illustrate their use in creating and solving problems.</p>	<p>14. Demonstrate and describe the process of division (2-digit by a 1-digit), using manipulatives, diagrams and symbols. [C, PS, R, V]</p> <p>15. Recall multiplication and division facts to 81 (9×9 on a multiplication grid). [E]</p>	<p>14.1 $91 \div 7$</p> <p>Make up a story problem to match this expression. Explain how you would estimate the quotient. Show how you would use base-10 blocks and numbers to calculate the quotient.</p> <p>15–16, 18 In each row, circle the pair of numbers you would use to best estimate the product. Explain your choice.</p> <p>$27 \times 16 =$ 30×20 20×20 30×10 $33 \times 24 =$ 40×20 30×20 30×30</p> <p>Use a calculator to compare each estimate to the actual product. Did you make the best choice? Use your strategy to best estimate 28×36.</p> <p>15.1 Fill in the missing numbers.</p> 

Grade 4

Strand: Patterns and Relations (Patterns)

Students will:

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

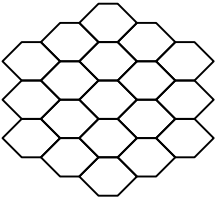
General Outcome	Specific Outcomes	Illustrative Examples																																																					
<p>Investigate, establish and communicate rules for, and predictions from, numerical and non-numerical patterns, including those found in the community.</p>	<p>1. Identify and explain mathematical relationships and patterns, using:</p> <ul style="list-style-type: none"> • grids/tables/objects • Venn/Carroll/tree diagrams • graphs • objects or models • technology. <p>[C, CN, PS, R, T]</p>	<p>1–2 Janice wrote in her journal about investigating circle patterns for multiplication facts.</p> <p>“I found the circle patterns for the multiples of three and seven are the same because the digits in the ones place are the same but are located by moving in opposite directions around the circle.”</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Multiples of Three</p>  </div> <div style="text-align: center;"> <p>Multiples of Seven</p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <table border="1" data-bbox="1198 802 1623 899"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>0</td><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td><td>18</td><td>21</td><td>24</td><td>27</td><td>30</td></tr> </table> <table border="1" data-bbox="1776 802 2201 899"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>0</td><td>7</td><td>14</td><td>21</td><td>28</td><td>35</td><td>42</td><td>49</td><td>56</td><td>63</td><td>70</td></tr> </table> </div> <p>Investigate circle patterns for other multiplication facts. Can you find another pair of numbers whose multiples produce an identical circle pattern? Write a journal entry to explain your investigation.</p> <p>1.1 Complete the Carroll diagram below by entering the whole numbers from 1 to 20, inclusive, into the correct squares.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">Greater Than 9</td> <td style="text-align: center;">Less Than or Equal to 9</td> </tr> <tr> <td style="text-align: center;">Even</td> <td style="width: 100px; height: 40px;"></td> <td style="width: 100px; height: 40px;"></td> </tr> <tr> <td style="text-align: center;">Odd</td> <td style="width: 100px; height: 40px;"></td> <td style="width: 100px; height: 40px;"></td> </tr> </table>	0	1	2	3	4	5	6	7	8	9	10	0	3	6	9	12	15	18	21	24	27	30	0	1	2	3	4	5	6	7	8	9	10	0	7	14	21	28	35	42	49	56	63	70		Greater Than 9	Less Than or Equal to 9	Even			Odd		
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Grade 4

Strand: Patterns and Relations (Patterns)

Students will:

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

General Outcome	Specific Outcomes	Illustrative Examples																
<p>Investigate, establish and communicate rules for, and predictions from, numerical and non-numerical patterns, including those found in the community.</p>	<p>2. Make and justify predictions, using numerical and non-numerical patterns. [C, PS, R]</p>	<p>1.2 Cliff, Emile and Azima each have a different favourite sport; basketball, skydiving, figure skating. Cliff and Emile do not like basketball. Emile is afraid of heights. What is the favourite sport of each person?</p> <table border="1" data-bbox="1247 483 2053 686"> <thead> <tr> <th></th> <th>Basketball</th> <th>Skydiving</th> <th>Figure Skating</th> </tr> </thead> <tbody> <tr> <td>Cliff</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Emile</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Azima</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>2.1 Bees made a honeycomb. They started on day 1 with the middle cell. Each day they added another ring of cells all around the honeycomb.</p> <p>How many cells were there after the 7th day?</p> <p>What was the first day on which there were more than 1000 cells?</p> 		Basketball	Skydiving	Figure Skating	Cliff				Emile				Azima			
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Grade 4

Strand: Patterns and Relations (Patterns)

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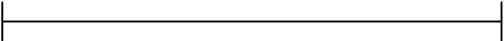
General Outcome	Specific Outcomes	Illustrative Examples
<p>Investigate, establish and communicate rules for, and predictions from, numerical and non-numerical patterns, including those found in the community.</p>		<p>2.2 This 3 by 3 array shows 3 groups of 3.</p> $\begin{array}{ccc} \star & \star & \star \\ \star & \star & \star \\ \star & \star & \star \end{array} \quad \begin{array}{l} 3 + 3 + 3 = 9 \\ \text{or} \\ 3 \times 3 = 9 \end{array}$ <p>The same array shows the sum of three odd numbers.</p> $\begin{array}{ccc} \star & \star & \star \\ \star & \star & \star \\ \star & \star & \star \end{array} \quad 1 + 3 + 5 = 9$ <p>Use arrays to answer these questions:</p> <ul style="list-style-type: none"> – Does a 4 by 4 array show the sum of four odd numbers? – Does a 5×5 array show the sum of five odd numbers? – Does this pattern continue? Why?

Grade 4

Strand: Shape and Space (Measurement)

Students will:

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

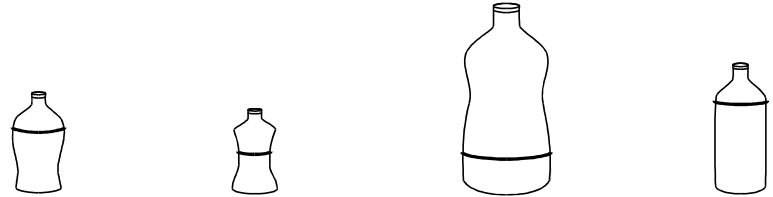
General Outcome	Specific Outcomes	Illustrative Examples
<p>Estimate, measure and compare, using decimal numbers and standard units of measure.</p>	<ol style="list-style-type: none"> 1. Construct items of specific lengths, including mm. [E, V] 2. Select the most appropriate standard unit to measure length. [E, R, V] 3. Describe the relationships among mm, cm, dm, m and km. [C] 4. Estimate, measure, record, compare and order objects by length, height, perimeter and circumference, using standard units. [E, PS] 	<p>1.1 Look at the line segment provided. Estimate if it is more or less than 100 mm long. Add to, or subtract from, the line segment to make it 100 mm long. Explain what helps you make your estimate.</p>  <p>1.2 Use a ruler to draw a four-sided figure with a perimeter of 36 cm.</p> <p>2–4 Measure a variety of items in the room. Make a list and record the measurements without the unit of measure. Exchange papers with a friend who must complete the list by adding the units; e.g., My pencil is 172 ____ long. My book is 0.8 ____ thick. Prepare a second list changing the unit of measure. For example, measure the pencil in mm, and write: “My pencil is 172 cm long.” Leave out the decimal point. The friend must decide where to place the decimal point.</p> <p>4.1 Choose five different empty cans. Include a pop, soup, juice and potato chip can, if possible. Estimate each can’s height in mm and its circumference in cm. Decide which will be greater, the can’s height or its distance around. Record all your estimates before measuring. How close were your estimated lengths. Were your predictions about height, circumference and the relationship correct?</p> <p>4.2 Create a board by using the following directions.</p> <p>Use blue cardboard to make a lake, which is a square of 30 cm per side. Cut and glue on to it:</p> <ul style="list-style-type: none"> – a rectangular island (A) with a perimeter of 16 cm – a triangular island (B) with a perimeter of 18 cm – an irregular shape (C) with a perimeter of 25 cm – a circular shape (D) with a circumference of about 30 cm.

Grade 4

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>Estimate, measure and compare, using decimal numbers and standard units of measure.</p>	<p>5. Estimate, measure, record, compare and order shapes by area, using standard units (cm², m²). [E, PS]</p> <p>6. Construct a number of shapes given a specific area (cm²). [PS]</p> <p>7. Select the most appropriate standard unit to measure area. [E, V]</p> <p>8. Relate the size of a unit to the number of units used to measure: <ul style="list-style-type: none"> length volume/capacity area. [CN, R]</p> <p>9. Estimate, measure, record, compare and order the capacity of containers, using standard units (mL, L). [E, PS]</p>	<p>5.1 Trace your hand, your shoe, a paper bill, such as \$2.00 or \$5.00, a CD jacket, a telephone book cover and a computer disk. Estimate the area of each in square centimetres. Order your estimates. Use a sheet of clear acetate cm grid or a measuring tape to determine the area of each object. Compare your estimates and your order to your measurements. Tell how successful you are at estimating area.</p> <p>6.1 What are the dimensions of all the rectangles with whole number sides that can be constructed having an area of 24 cm²? Use grid paper to record each rectangle.</p> <p>6.2 All seven pieces of the tangram puzzle can be arranged to form one large square. Make the square. Rearrange the pieces in the square to make a different quadrilateral, having the same area. What is the area?</p> <p>7.1 Name two things whose area is best described in square centimetres and two shapes whose area is best described in square metres. Explain why.</p> <p>8.1 Murray says: “The larger the unit, the more you need to measure the area of a surface. So, the smaller the unit, the fewer you need.” Use drawings, or examples, to prove or disprove Murray’s conclusion.</p> <p>9.1 The following plastic containers have elastic bands placed at different heights: a 750-mL cooking oil bottle, a 600-mL vinegar bottle, a 2-L drink bottle and a 1-L drink bottle. Estimate the number of mL needed to fill each container to the elastic band. Order your estimates. Find containers like the ones shown, and measure to check your predictions.</p> <div style="text-align: center;">  <p>750 mL 600 mL 2 L 1 L</p> </div>

Grade 4

Strand: Shape and Space (Measurement)

Students will:

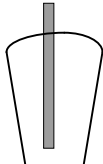
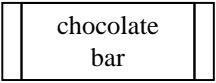
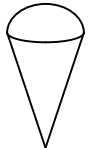
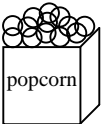
- describe and compare everyday phenomena, using either direct or indirect measurement.

General Outcome	Specific Outcomes	Illustrative Examples
Estimate, measure and compare, using decimal numbers and standard units of measure.	<p>10. Describe the relationship between g and kg. [C]</p> <p>11. Solve problems involving mass (weight), using g and kg. [PS]</p> <p>12. Relate the size of a unit to the number of units used to measure mass (weight). [R]</p> <p>13. Relate years to decades; decades to centuries; centuries to millenniums. [CN]</p>	<p>9.2 Approximately how many litres of water does your bathtub hold? Describe how you estimated the answer.</p> <p>10.1 There are three objects. Their weights are: 1950 g; 2020 g and 1590 g. Which object is closest to 2 kg? Explain your reasoning.</p> <p>11.1 Grade A large eggs weigh 56 to 63 grams each. A one dozen egg carton weighs about 50 grams. Denny says he's holding about 3 kilograms of large eggs. Explain how to find the number of full cartons of eggs Denny must be holding.</p> <p>12.1 Will it take more kilograms to balance a large tub of margarine, or more grams to balance a large tub of margarine? Give reasons for your answer.</p> <p>13.1 Jill's great-grandmother was born in the first decade of the 20th century. What might have been her year of birth? Explain. The year 2001 will begin the 3rd millennium. Will you be living by the first year of the 4th millennium? Why or why not?</p>

Grade 4
Strand: Shape and Space (Measurement)

Students will:

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

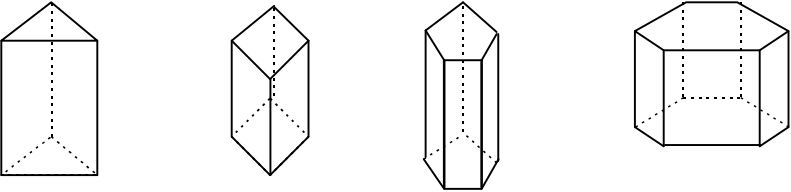
General Outcome	Specific Outcomes	Illustrative Examples
<p>Estimate, measure and compare, using decimal numbers and standard units of measure.</p>	<p>14. Read an analog clock to the nearest 5 minutes, and write time, using am and pm. [C]</p> <p>15. Estimate, count and record collections of coins and bills up to \$50. [E]</p> <p>16. Make purchases and change up to \$50. [PS]</p>	<p>14.1 Observe or research the following times. Record each time to the nearest 5 minutes, using numbers and symbols:</p> <ul style="list-style-type: none"> – sunrise and sunset today – moonrise and moonset today – the arrival and departure of a boat, ferry, plane, bus or train in your community. <p>15.1 Estimate the number of coins in a cupful of pennies . . . nickels, dimes, quarters, dollar coins. Count each, and record its total value. How would knowing the value of a cupful help you estimate the total value of a jar full? A piggy bank full? Explain.</p> <p>16.1 Iris is given \$5.00, but she is only to spend up to \$3.50. She is to buy at least one treat for her sister, brother and herself. What combinations of items can she buy? Count back the change she should receive from each possible purchase.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end; text-align: center;"> <div data-bbox="1376 885 1478 1104">  99¢ </div> <div data-bbox="1553 933 1768 1104">  69¢ </div> <div data-bbox="1913 885 2002 1104">  \$1.75 </div> <div data-bbox="2128 909 2231 1104">  \$1.19 </div> </div> <p>16.2 Kenryu paid for an item with two, twenty-dollar bills. His change was \$8.32. What did the item cost? What coins and bills did Kenryu likely receive as change? Count back Kenryu's change, beginning with the cost of his purchase.</p>

Grade 4

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.


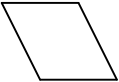


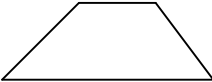
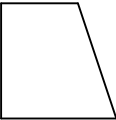
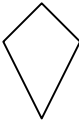
General Outcome	Specific Outcomes	Illustrative Examples
<p>Describe, classify, construct and relate 3-D objects and 2-D shapes, using mathematical vocabulary.</p>	<p>17. Design and construct nets for pyramids and prisms. [E, PS, V]</p> <p>18. Relate nets to 3-D objects. [CN, V]</p> <p>19. Compare and contrast:</p> <ul style="list-style-type: none"> pyramids prisms pyramids and prisms. <p>[C, R]</p> <p>20. Recognize, from everyday experience, and identify:</p> <ul style="list-style-type: none"> point line parallel lines intersecting lines perpendicular lines vertical lines horizontal lines. <p>[C, V]</p>	<p>17.1 Troy found there are 12 different nets that fold to make a cube. He concluded that a 3-D object will have twice as many nets as it has faces. Choose one pyramid and one prism. Find all possible nets for each. Is Troy correct? Explain.</p> <p>18.1 A net has five faces. What object might it produce when folded? Use drawings in your explanation.</p> <p>19.1 Count the faces, vertices and edges for each of these prisms. Is there a pattern?</p> <div style="text-align: center;">  </div> <p>20, 26</p> <p>Demonstrate each step of the following activity on a 5 by 5 geoboard. Record each step on geodot paper.</p> <p>Outline the largest possible rectangle that is not square. Use an orange marker.</p> <p>Identify the number of points touched by the outline. Colour them brown.</p> <p>Place a geoband that is equal in length and perpendicular to a short edge but is not a line of symmetry. Use a yellow marker.</p> <p>Place a geoband that is equal in length and parallel to a short edge but is not a line of symmetry. Use a blue marker.</p> <p>Find a way to name and describe the location of the point where the perpendicular and parallel lines intersect. Colour it green.</p> <p>What fraction of the whole rectangle is each outlined part?</p>

Grade 4

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

Students will:

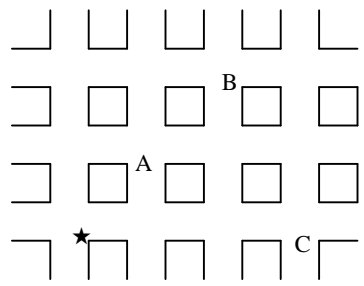
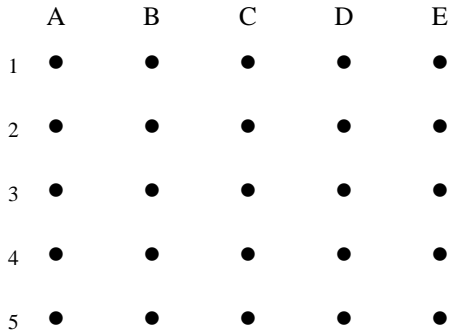
- describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Describe, classify, construct and relate 3-D objects and 2-D shapes, using mathematical vocabulary.</p>	<p>21. Classify angles in a variety of orientations according to whether they are right angle, less than right angle, or greater than right angle. [E, V]</p> <p>22. Identify and sort specific quadrilaterals, including squares, rectangles, parallelograms and trapezoids. [R, V]</p>	<p>20.1 Find a black and white picture in a magazine, newspaper or colouring book. Do each activity:</p> <ul style="list-style-type: none"> – find a vertical line, and colour it green – find a horizontal line, and colour it blue – find two other lines that are perpendicular and colour them red – find two different lines that are parallel, and colour them orange – find a point not already coloured, and colour it purple. <p>21.1 Demonstrate how to use a scrap of paper to create a right angle. Use your right angle to locate classroom objects with examples of the following angles:</p> <ul style="list-style-type: none"> – an angle that is less than right – an angle that is greater than right – a right angle. <p>22.1 Name each quadrilateral:</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">   </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 20px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p style="margin-top: 20px;">Sort the quadrilaterals using these rules:</p> <ul style="list-style-type: none"> – parallel edges – right angle – parallel edges and a right angle – more than one pair of parallel edges and a right angle.

Grade 4
Strand: Shape and Space (Transformations)

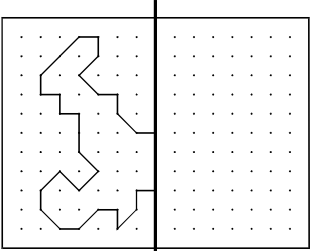
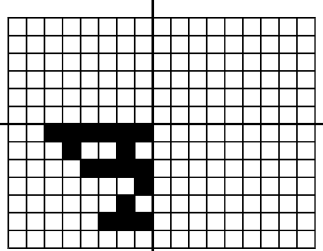
Students will:

- perform, analyze and create transformations.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Use numbers and direction words to describe the relative positions of objects in two dimensions, using everyday contexts.</p>	<p>23. Communicate and apply terms of direction, such as north, south, east, west, and relate to maps and grids. [T]</p> <p>24. Place an object on a grid, using columns and rows. [C, CN]</p> <p>25. Trace a path, using oral or written instructions, and write instructions for a given path. [C, PS, T]</p>	<p>23.1 On a simplified street map, locate special points of interest; e.g., store, school, mall, bridge; from a point of reference (home) ★. Describe the path from ★ to B, using directions, N, S, E, W.</p>  <p>24.1 I am hiding at one of the points on the 5 by 5 geoboard. Use the numbers and letters to locate me in as few guesses as possible.</p>  <p>25.1 Write directions for going from your school to your home. Write directions to go from your home to your school. How are they the same? How are they different?</p>

Grade 4
 Strand: Shape and Space (Transformations)
Students will:

- perform, analyze and create transformations.

General Outcome	Specific Outcomes	Illustrative Examples
<p>Use numbers and direction words to describe the relative positions of objects in two dimensions, using everyday contexts.</p>	<p>26. Create and verify symmetrical 2-D shapes by drawing lines of symmetry. [PS, V]</p>	<p>26.1 Complete each picture, using the lines of symmetry shown.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>1 line of symmetry</p> </div> <div style="text-align: center;">  <p>2 lines of symmetry</p> </div> </div>

Grade 4
Strand: Statistics and Probability (Data Analysis)

Students will:

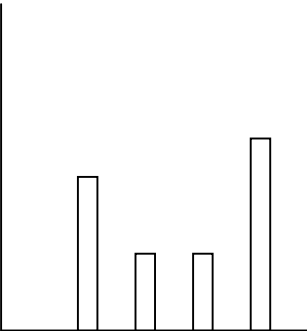
- collect, display and analyze data to make predictions about a population.

General Outcome	Specific Outcomes	Illustrative Examples																																												
<p>Collect first- and second-hand data, assess and validate the collection process, and graph the data.</p>	<p>1. Select a sample or population, and organize the collection of data. [PS]</p>	<p>1–3 How Tall Will I Be? The activities on this sheet allow children to complete information about height expectations and answer questions about the heights of family members. The table displays average heights for children. Family records might furnish data on a particular family. Other resources, such as an encyclopedia, an almanac, or the <i>Guinness Book of World Records</i> can yield interesting related information. Have fun with these real-life mathematics activities.</p> <p style="text-align: center;">AVERAGE HEIGHT FOR CHILDREN</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">Boys</th> <th colspan="2" style="text-align: center;">Girls</th> </tr> <tr> <th style="text-align: center;">Age in Years</th> <th style="text-align: center;">Height in cm</th> <th style="text-align: center;">Age in Years</th> <th style="text-align: center;">Height in cm</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">2</td><td style="text-align: center;">96.2</td><td style="text-align: center;">2</td><td style="text-align: center;">95.7</td></tr> <tr><td style="text-align: center;">4</td><td style="text-align: center;">103.4</td><td style="text-align: center;">4</td><td style="text-align: center;">103.2</td></tr> <tr><td style="text-align: center;">6</td><td style="text-align: center;">117.5</td><td style="text-align: center;">6</td><td style="text-align: center;">115.9</td></tr> <tr><td style="text-align: center;">8</td><td style="text-align: center;">130.0</td><td style="text-align: center;">8</td><td style="text-align: center;">128.6</td></tr> <tr><td style="text-align: center;">10</td><td style="text-align: center;">140.3</td><td style="text-align: center;">10</td><td style="text-align: center;">138.6</td></tr> <tr><td style="text-align: center;">12</td><td style="text-align: center;">149.6</td><td style="text-align: center;">12</td><td style="text-align: center;">151.9</td></tr> <tr><td style="text-align: center;">14</td><td style="text-align: center;">162.7</td><td style="text-align: center;">14</td><td style="text-align: center;">159.6</td></tr> <tr><td style="text-align: center;">16</td><td style="text-align: center;">171.6</td><td style="text-align: center;">16</td><td style="text-align: center;">162.2</td></tr> <tr><td style="text-align: center;">18</td><td style="text-align: center;">174.5</td><td style="text-align: center;">18</td><td style="text-align: center;">162.5</td></tr> </tbody> </table> <p style="text-align: right; margin-right: 20px;">Source: <i>Current Pediatric Diagnosis and Treatment 1987</i>, edited by C. Henry, M.D., et al. Norwalk, CN: Appleton & Lang, 1987.</p> <p>Vital Statistics</p> <p>My height at birth: ___ I am taller/shorter than at age six: ___ average (circle one). My age today is: ___ I predict that my height will I am ___ cm tall. be ___ cm when I am I am ___ cm taller fourteen. than I was at age six. I predict that my height will be ___ cm in ten years.</p> <p>Predictions about Height</p> <p>Use the table “Average Height for Children” to answer the following questions.</p> <ol style="list-style-type: none"> 1. Would you say that most members of your family are tall or short? Explain your answer. 2. Ravi noted that he was 150 cm tall at age ten. Do you think he would be 300 cm tall at age twenty? Explain your answer. 3. Do you expect to be about average, taller than average, or shorter than average by age twenty? Explain your response. 4. How likely are you to grow to be over 160 cm tall? Explain your answer. 5. Make a bar graph comparing the heights of everyone living in your house. Order the heights according to the ages of the persons measured, beginning with the youngest. <p style="text-align: center; margin-top: 20px;">Adapted from the <i>Arithmetic Teacher</i>, September 1991.</p>	Boys		Girls		Age in Years	Height in cm	Age in Years	Height in cm	2	96.2	2	95.7	4	103.4	4	103.2	6	117.5	6	115.9	8	130.0	8	128.6	10	140.3	10	138.6	12	149.6	12	151.9	14	162.7	14	159.6	16	171.6	16	162.2	18	174.5	18	162.5
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Grade 4
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>Collect first- and second-hand data, assess and validate the collection process, and graph the data.</p>	<p>2. Manipulate data to create an interval graph/table for display purposes. [PS, V]</p> <p>3. Construct a bar graph and a pictograph, using many-to-one correspondence, and justify the choice of intervals and correspondence used. [C, T, V]</p> <p>4. Discuss the process by which the data was collected. [C, R]</p>	<p>1.1 A Grade 4 class wants to learn if more families make popcorn at home in the microwave than by any other method.</p> <p>How might they word their question? Whom should they survey? Why? What method should they use to best keep their information organized? Explain with words and a drawing.</p> <p>3.1 What might the following graph represent? Label the axes and show the scale(s) being used.</p>  <p>4.1 Shinobu and her brother were arguing if Grade 4 students would rather watch hockey or figure skating on TV. Shinobu asked the first 20 students in the morning. From the results, she decided about half the school would prefer watching hockey and half would prefer figure skating. Her brother Kelly asked 40 boys from Grade 4 and Grade 5. He concluded that all 200 students in the school would rather watch hockey on TV.</p> <p>Which person had the better plan for collecting good data? What would be a better way to collect this data?</p>

Grade 4

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>Design and use simple probability experiments to explain outcomes.</p>	<p>5. Identify an outcome as possible, impossible, certain, uncertain. [C, R]</p> <p>6. Compare outcomes as equally likely, more likely, less likely. [C, R]</p> <p>7. Design and conduct experiments to answer one's own questions. [C, E, PS]</p>	<p>5-6.1 For each of the following, draw a spinner that matches the statement.</p> <ul style="list-style-type: none"> - It is impossible to land on 5. - You are more likely to land on red than on green. - It is equally likely that the spinner will stop on red, yellow, blue or white. - You are certain to spin an even number. <p>5-6.2 From a bag containing 3 red and 3 green cubes:</p> <ul style="list-style-type: none"> - Is it possible to pull out a blue cube? - Is it possible to pull out a red cube? - Of what can you be certain? <p>Pull out a cube, record the colour, and replace the cube in the bag. Repeat a number of times. What is likely to come out next?</p> <ul style="list-style-type: none"> - If we change the cubes to 5 red and 1 green, will the outcome be different? - What if we increased the number of cubes? - How have the outcomes changed? - What other things might affect the outcomes? <p>6-7 Chinua and Scott put five tiles in a bag—4 yellow and 1 green.</p> <ul style="list-style-type: none"> - Chinua makes up a game. He says he gets 1 point for every yellow tile, and Scott gets twice as many points for every green tile they pull from the bag. Will the game be fair? Why? - Conduct experiments to see if the game is fair. Stop each game when one colour has earned 10 points. Is the game fair? If not, how would you change it to make it fair? - Scott says the game would be better, if there were 10 green and 40 yellow tiles in the bag. Would this change the game? Explain your answer.