

Curriculum Planning & Assessment Resource

Mathematics Grade 4



**Alberta Regional Professional
Development Consortia**

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opportunities at the local, regional and provincial levels*



Curriculum Planning & Assessment Resource

Mathematics

Grade 4 - Statistics

About This Document

This Curriculum Planning & Assessment Resource is intended to be a collection of sample activities, assessments, and resources that teachers may wish to use as they develop their unit plans. This document is not intended to be a sequential list of activities. Rather, the intent is that teachers choose from this resource what is appropriate for their context, and sequence it in their planning.

The sample activities, assessments and resources included in this document have undergone an initial review to determine appropriateness and alignment to the curriculum. However, it is expected that teachers use their professional judgment in selecting activities, assessments and resources that are appropriate for their context.

While every attempt has been made to provide credit and receive permissions, some errors or omissions may have occurred. Please contact info@arpdc.ab.ca to report any error or omissions.

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Acknowledgements

Thank you to all the teachers, numeracy specialists, and technical expertise from Alberta school divisions and ARPDC who collaborated to develop, review, and revise these planning and assessment documents to support curriculum implementation.

Grade 4 - Statistics

Organizing Idea:

Statistics: The science of collecting, analyzing, visualizing, and interpreting data can inform understanding and decision making.

Guiding Question:

In what ways can communication be shaped by the choice of representation?

Learning Outcome:

4ST1 Students evaluate the use of scale in graphical representations of data.

Summative Assessment(s) - Transfer *(In Progress)*

Summative assessments can include the following.

- *Understanding/making sense of a novel context from the real world using one or more concepts (eg. "How are place value and money related?).*
- *Understanding/making sense of a novel context using one or more understandings (eg. Students use money to model the conversion of base 10 values and relate them to base 10 block').*
- *Being able to describe why (linking concepts) something is true, a result, or what might be an extension using learned concepts and understandings.*
- *Apply learning (create products; undertake projects; taking action such as creating a campaign) in a novel context or taking action using the understanding(s).*
- *Construct arguments by taking a position and verifying/proving it with known understandings.*

Sample Transfer/Summative Assessments

[\[understanding surface vs deep vs transfer\]](#)

[4ST1 Food Labels - Summative](#)

(Cross Curricular with PE&W / ELAL Communication & Presentation)



KUSP 4ST1.1

Prerequisite Knowledge

Students know the meaning of Data, Statistical Questions (initially covered in grade 3), graphing using bar graphs, pictographs, and dot plots from a one-to-one application.

Pre-Assessment

Nelson Pre-Assessments 3 : Finding Each Students Pathway

- Collecting Data - p.37
- Create Bar Graphs - p.38
- Reading Bar Graphs - p. 39

Nelson Pre-Assessments 4 : Finding Each Students Pathway

- Making Pictographs - p.56
- Creating Pictographs - p.57
- Creating Bar Graphs - p.58
- Reading Pictographs - p. 59
- Interpreting Bar Graphs - p.60

Nelson Leaps and Bounds pages will be referenced in the Assessments to follow up for emerging learners.

Student Language | Essential vocabulary & concepts

- **Statistical problem:** a problem that can be solved by collecting and interpreting data
- **Data:** facts or information collected to learn about people or things

I Know Statements | Metacognition

- I know that to solve a statistical problem, I have to write a question, collect and represent the data, then interpret it.

I Can Statements | Skills

- I can use a statistical problem-solving process.
- I can create a statistical question.
- I can collect data.
- I can represent data.
- I can interpret data.

Learning Recovery

- *Please consider sharing any great activities and ideas you have!*

Enhancement

- *Please consider sharing any great activities and ideas you have!*

Learning Outcome 4ST1.1 Students evaluate the use of scale in graphical representations of data.					
Knowledge	Understanding	Skills & Procedures	Achievement Indicators	Illustrative Examples	Assessments (Explainer)
<p>A statistical problem-solving process includes</p> <ul style="list-style-type: none"> • formulating statistical questions • collecting data • representing data • interpreting data 	<p>Representation is part of a statistical problem-solving process.</p>	<p>Engage in a statistical problem-solving process.</p>	<p>Formulate a specific question for investigation</p> <p>Select a method for collecting data to answer a given question and justify the choice.</p> <p>Design and administer a questionnaire for collecting data to answer a given question and record the results.</p> <p>Gather data for the given question.</p>	<p>Teacher Notes:</p> <ul style="list-style-type: none"> • Collecting of data can be done with tally marks but the term ‘frequency’ is not used until grade 5. • Interpreting is part of the process, but in 4ST1.2, students will graph and interpret data. These two Learning Outcomes 4ST1.1 (representing the process) and 4ST1.2 (representing many-to-one) should be done together. • Check the data you are using on websites before sharing or presenting. Consider how some topics could be highly sensitive to youth (e.g., ethnic crimes in youth, teen smokers, etc.). These topics can still be used, but you may need to consider how you will approach them and debrief with discussions. • This Learning Outcome can be easily cross-curricular with other subjects. • In prior grades students have been introduced to pictographs, bar graphs and dot plots. <hr/> <p>Activity:</p> <p>2.3 What Makes a Statistical Question?</p> <p>These three questions are examples of statistical questions:</p> <ul style="list-style-type: none"> • What is the most common color of the cars in the school parking lot? • What percentage of students in the school have a cell phone? • Which kind of literature—fiction or nonfiction—is more popular among students in the school? <p>These three questions are not examples of statistical questions:</p> <ul style="list-style-type: none"> • What color is the principal’s car? • Does Elena have a cell phone? • What kind of literature—fiction or nonfiction—does Diego prefer? <p>1. Study the examples and non-examples. Discuss with your partner:</p> <p>Pause here for a class discussion.</p> <ul style="list-style-type: none"> • How are the three statistical questions alike? What do they have in common? • How are the three non-statistical questions alike? What do they have in common? • How can you find answers to the statistical questions? How about answers to non-statistical questions? • What makes a question a statistical question? <p><i>(Open Up Resources: Lesson 2: Statistical Questions)</i></p>	<p>There are some good questions here that you can use for assessments</p> <p><i>(Open Up Resources: Lesson 2: Statistical Questions)</i></p> <p>Activity:</p> <p>Have students create a question they would like to have answered (e.g., favorite ice cream, favorite sport, how many times the word ‘like’ appears on a page in a book, etc.). Have students gather the data from classmates, from friends or family, or by conducting research (e.g., using books or the Internet). Encourage each student to <i>represent</i> the data on a graph, choosing the type of graph and the scale. (Continued in the next section)</p> <p><i>(ARPD created)</i></p> <p>Example:</p> <p>Which of the following are statistical questions? (A statistical question is one that can be answered by collecting data and where there will be variability in that data.)</p> <ol style="list-style-type: none"> How many days are in March? How old is your dog? On average, how old are the dogs that live on this street? What proportion of the students at your school like watermelons? Do you like watermelons? How many bricks are in this wall? What was the temperature at noon today at City Hall? <p><i>(Illustrative Mathematics - Identifying Statistical Questions)</i></p>

Example:

Have students write statistical questions about an area of interest.
(ARPD created)

Activity: [Data Collection Investigation](#)

Collecting Data

We collect data in order to answer questions. For instance, what is the most popular pet among the students in your school? You could survey the students to find the answer to that question.

(Mathspace - Data Collection (Investigation))

Class Discussion:

a. What would be an appropriate method for collecting data for the following statistical question?

What is your Favorite Pet?

- a. Dog
- b. Cat
- c. Horse
- d. Bird
- e. Other

b. Is there another method that the data could have been collected?

c. If we wanted to ask 1000 people the same question, what would be a more efficient way of collecting data?

(ARPD created)

Representing Data - In 4ST1.2 students create graphs to display a given set of data, using many-to-one correspondence.

Interpreting data - In 4ST1.2 students answer questions by interpreting data from the given graph.

Example:

In the statistical problem-solving process, what does it mean to interpret data?

- a) To formulate statistical questions
- b) To collect data
- c) To represent data
- d) To make sense of the data and draw conclusions

(Personal Communication, April 18, 2024)

Resources

Mathology

[K - 3 Little Books and Correlation Documents](#)
[Link to Grade 4 New Curriculum Correlation](#)

Mathology Activities

- Data Unit 1: Data Management 1: Interpreting and Drawing Pictographs and Dot Plots
- Data Unit 1: Data Management 2: Interpreting and Drawing Bar Graphs
- Data Unit 1: Data Management 3: Comparing Graphs
- Data Unit 1: Data Management 4: Consolidation

Mathology Practice Workbook 4

- Unit 12 Questions 1-4, 6, 9 (pp. 77-81, 83)
- What I Learned (p.83)

Mathology Interactive Tools

- [Data and Graphs](#)
-

Math UP

Grade 4 Collecting, Organizing, and Displaying Data

- Lesson 1: Pictographs With Scale
- Lesson 2: Bar Graphs With Scale
- Lesson 3: Comparing Data Representation
- Lesson 4: Reading, Describing, and Drawing Conclusions From Data

Existing Textbooks

Math Makes Sense 4, Unit 7

Math Focus 4 - Chapter 4 - Lessons 1-5

NCETM (teacher guides and resources)

[Year 3 - Statistics New Curriculum](#)

(this only covers bar graphs and pictographs)

Websites & Resources to Support *Learning*

Manipulative: [NCES Kids' Zone Test Your Knowledge](#) (National Centre of Educational Statistics) - An online graphing tool for students.

Manipulatives: [Graphing Generators](#) (mrmussbaum.com) - There are multiple links on this page for different graphing tools students can use to create different types of graphs.

Website: [Asking Powerful Questions](#), K-12 lesson, Learn Alberta Modelling the Tools

Website: [A Classroom Example of Asking Powerful Questions](#), Learn Alberta Modelling the Tools

Website: [Pictographs](#) (Math is Fun)

Website: [National Centre for Educational Statistics](#) - Students can choose a graph and create one online. It gives a basic description of graphs.

Website: [20 Graphing Activities For Kids hat Really Raise the Bar](#) (We Are Teachers) - Bar graphs, line graphs, pie charts, and more!

Website: [Data Visualization 101 - How to Choose a Chart Type to Describe Your Data Best](#)

(towardsdatascience.com) - This article (for teachers) helps understand what type of chart (or graph) to use to best display data. It shows the pros and cons of each.

Worksheet: [Choose the Best Type of Graph](#) (IXL.com) Students choose the best graph for various

Websites and Resources to Support *Planning*

Inclusion - An [inclusive](#) approach to maths teaching

Inclusion - [Good Practices](#) on Inclusive Curricula in Mathematics Sciences

Differentiation: Preview vocabulary and pre teach to students. Use various forms of media to present vocabulary including simplified explanations, visuals in the form of diagrams to label and connect concepts.

Resources Developed by School Divisions/Educational Institutions

[Edmonton Catholic Pacing Guides](#)

[Edmonton Catholic Curriculum Crates](#)

[LearnAlberta Curriculum](#)

APRDC [New Curriculum Professional learning Resources](#)

Alberta Teachers Association Library [Grades 4-6 Mathematics](#) & [General Mathematics Resources](#)

<p>situations</p> <p>Game: The Jelly Bean Tree (mnrussbaum.com)- There are multiple links on this page for different graphing tools students can use to create different types of graphs.</p>	<p>Mathematics and Numeracy - New Curriculum Toolkit</p> <p>Gizmos New Learn Alberta (Teacher Login Required) New Learn Alberta</p> <p>Graphing Skills</p> <p>Mascot Election (Pictographs and Bar Graphs)</p> <p>Reaction Time 1 (Graphs and Statistics)</p> <p>For access to additional resources login to Gizmos account. Request an account alberta@explorellearning.com</p>
<p>Infusing Indigenous Knowledge - main website Grade 4 Math</p> <p>Explore with examples such as:</p> <ul style="list-style-type: none"> • Storytelling (oral record-keeping) • Cree calendar • Seasonal events and cycles • A priest as a record keeper (deaths, weddings, baptisms, etc.) • Band roll, Census Canada, medical information (population information) <p>Additional Resources</p> <p>Numeracy Promising Practices videos, Empowering the Spirit, by Alberta Regional Professional Development Consortia (ARPDC)</p> <p>Shared Learnings. Integrating BC Aboriginal Content K-10. BC Ministry of Education. p. 45</p> <p>Math Catcher Outreach Program: Mathematics through Aboriginal Storytelling, from Simon Fraser University</p> <p>Math First Peoples Teacher Resource Guide, First Nations Education Steering Committee (FNESC) and First Nations Schools Association (FNSA)</p>	<p>Problem Solving</p> <p>Grade 4 Math Tasks (Calgary Board of Education) - These tasks were curated by the Calgary Board of Education. Tasks listed in these documents support teaching and learning related to the learning outcomes from the 2022 Mathematics Curriculum for Grade 5.</p>



KUSP 4ST1.2

Prerequisite Knowledge

Students should know that to solve a statistical problem by applying the statistical problem solving process (create a statistical question, collect data, represent data, interpret data); know the meaning of Data, Statistical Questions (initially covered in grade 3), graphing using bar graphs, pictographs, and dot plots from a one-to-one application.

Pre-Assessment

Nelson Pre-Assessments 3 : Finding Each Students Pathway

- Collecting Data - p.37
- Create Bar Graphs - p.38
- Reading Bar Graphs - p. 39

Nelson Pre-Assessments 4 : Finding Each Students Pathway

- Making Pictographs - p.56
- Creating Pictographs - p.57
- Creating Bar Graphs - p.58
- Reading Pictographs - p. 59
- Interpreting Bar Graphs - p.60

Student Language | Essential vocabulary & concepts

- **Pictograph:** a graph that uses symbols to represent data
- **Bar graph:** a graph that uses horizontal or vertical bars to represent data
- **Dot plot:** a line on which data are shown by marking “X”s or dots above the categories or numbers on the line
- **Many-to-one correspondence:** a graph where each dot, picture, or grid square represents more than 1 item
- **Scale:** shows the number that each square on a bar graph represents
- **Data:** facts or information collected to learn about people or things

I Know Statements | Metacognition

- I know that data can be represented on a pictograph, bar graph, or dot plot.
- I know that when using many-to-one correspondence, each symbol or grid square represents more than one item.
- I know that data can be interpreted in different ways, resulting in different stories.

I Can Statements | Skills

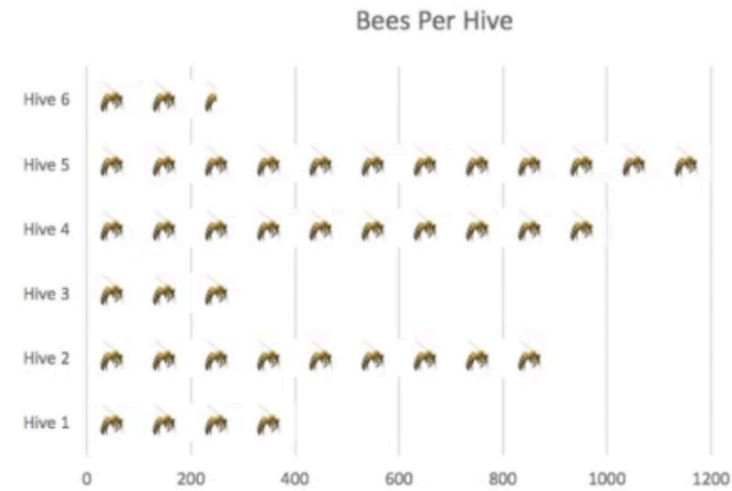
- I can show many-to-one correspondence on graphs.
- I can explain why I chose a type of graph to represent a set of data.
- I can choose an appropriate scale to represent data.
- I can describe how the scale is important in representing data.
- I can compare different graphs that show the same data.
- I can interpret graphs that show the same data.
-

Learning Recovery

Enhancement

Learning Outcome		4ST1.2 Students evaluate the use of scale in graphical representations of data.																									
Knowledge	Understanding	Skills & Procedures	Achievement Indicators	Illustrative Examples	Assessments (Explainer)																						
<p>Many-to-one correspondence is the representation of many objects using one object or interval on a graph.</p> <p>Common graphs include</p> <ul style="list-style-type: none"> • Pictograph • Bar graph • Dot plots 	<p>Representation can express many-to-one correspondence by defining a scale.</p> <p>Different representations tell different stories about the same data.</p>	<p>Select an appropriate scale to represent data.</p> <p>Represent data in a graph using many-to-one correspondence.</p>	<p>Select a scale and type of correspondence for displaying a given set of data on a graph and justify the choice.</p> <p>Create graphs to display a given set of data, using many-to-one correspondence.</p>	<p>Teacher Notes:</p> <ul style="list-style-type: none"> • Interpreting is part of the process, but in 4ST1.2, students will graph and interpret data. These two Learning Outcomes 4ST1.1 (representing the process) and 4ST1.2 (representing many-to-one) should be done together. • In prior grades students have been introduced to pictographs, bar graphs and dot plots. • Review one-to-one correspondence before introducing many-to-one correspondence. • It is important for students to use a consistent interval in the data display. If a graph has a scale with an interval of 2, for example, all of the numbers, beginning with zero, need to increase by 2 (0, 2, 4, 6, 8, 10, 12 ... and not 2, 4, 6, 7, 8, 9, 10, 12...). Depending on the data and the interval chosen, it may become necessary to create bars that fall between numbers. The interval must be clearly shown along a numbered vertical or horizontal axis. Both axes should be labeled and the graph should include a heading. <p>(Manitoba - Mathematics Grade 4 Curriculum Guide 2014, p. 76)</p> <hr/> <p>Example:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Flavor</th> <th>Number of children</th> </tr> </thead> <tbody> <tr> <td>Cheese</td> <td></td> </tr> <tr> <td>Pepperoni</td> <td></td> </tr> <tr> <td>Margherita</td> <td></td> </tr> <tr> <td>BBQ Chicken</td> <td></td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 5px;">Key : Represents 4 children</p> <p>a. Looking at this graph is the one-to-one or many-to-one correspondence? b. What is the scale?</p> <p>(adapted from CueMath - Pictograph)</p>	Flavor	Number of children	Cheese		Pepperoni		Margherita		BBQ Chicken		<p>Activity: (from above) Have students create a question they would like to have answered (e.g., favorite ice cream, favorite sport, how many times the word 'like' appears on a page in a book, etc.). Have students gather the data from classmates, from friends or family, or by conducting research (e.g., using books or the Internet). Encourage each student to <i>represent</i> the data on a graph, choosing the type of graph and the scale. Have students select another type of graph to represent their data. Have them interpret both graphs. How is the information the same/different? (ARPDC created)</p> <p>4ST1.2 Many to One - Surface</p> <p>This table shows the after-school activities of some students. If we were to create a bar graph what scale should we use and why? Demonstrate that if we use one to one our graph would be quite large. What scale would make the most sense? (Deep)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Activity</th> <th>Number of Students</th> </tr> </thead> <tbody> <tr> <td>Music lessons</td> <td>18</td> </tr> <tr> <td>Dancing lessons</td> <td>24</td> </tr> <tr> <td>Playing sports</td> <td>36</td> </tr> <tr> <td>Swimming lessons</td> <td>60</td> </tr> <tr> <td>Computer club</td> <td>42</td> </tr> </tbody> </table> <p>(<i>Math Makes Sense 4</i>, Pearson Education Publishing, p. 267)</p>	Activity	Number of Students	Music lessons	18	Dancing lessons	24	Playing sports	36	Swimming lessons	60	Computer club	42
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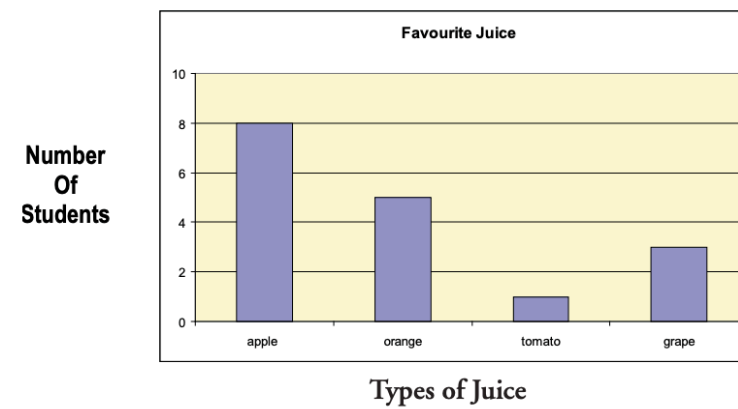
Example:



- Looking at this graph is the one-to-one or many-to-one correspondence?
- What is the scale?
- How many bees are in hive 3?

(adapted from [Reading Pictographs- many to one correspondence](#), Mr. Weatherill)

Example:



Ask questions such as:

- What interval is used on the vertical axis? What does it represent?
- How many people like apple juice?
- How many more like apple juice than tomato juice?
- How many students answered the questions about their favourite juice?
- Why was the interval of 2 chosen?

([Manitoba - Mathematics Grade 4 Curriculum Guide 2014](#), p. 76)

Example:

The table below represents the genres of books elementary students check out at the library over the period of one week:

Genre of Books	Books Checked Out During One Week
Non-fiction	70
Folk Tales	100
Fantasy	65
Historical Fiction	45

Discuss with students whether one-to-one correspondence or many-to-one correspondence would be most appropriate for this data set. Ask students to construct a bar graph to display the data.

(Manitoba - Mathematics Grade 4 Curriculum Guide 2014, p. 77)

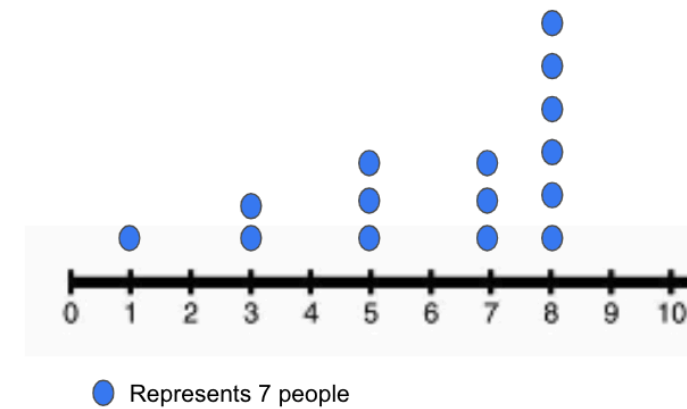
Journal:

Throughout the unit, provide opportunities for students to self-assess their graphs. Suggested prompts include:

- (i) I know I properly constructed a graph because...
- (ii) Some things that are similar between my graph and my classmate's graph are...
- (iii) Some things that are different about my graph and my classmate's graph are...
- (iv) When I make a graph I choose intervals of 1, 2, 5 or 10 when...

(Manitoba - Mathematics Grade 4 Curriculum Guide 2014, p. 77)

Example:



- a. Looking at this graph is the one-to-one or many-to-one correspondence?
 - b. What is the scale?
 - c. Why is having a title for a graph important?
- (ARPD created)*

Activity:

Ask students to find an example of a graph from either newspapers, magazines, or the Internet to present to classmates. Teachers should pose questions to elicit information about the type of correspondence used in the graph.

(Manitoba - Mathematics Grade 4 Curriculum Guide 2014, p. 79)

Teacher Note:

- When creating graphs, it is important that students include a title, labels, and a legend (or key).
- When constructing a pictograph, students need to pay particular attention that the symbols are aligned and are of a consistent size.
- Bar graphs, dot plots and pictographs should be included in this skill and procedure.
- Cross-curricular activities are encouraged.

Activity:

Ask students to collect a set of data from another subject area or related personal interest. Using the data collected, students create a pictograph using a many-to-one correspondence and provide an explanation as to why the particular correspondence was appropriate. Ask students to draw one conclusion based on their graph.

(Manitoba - Mathematics Grade 4 Curriculum Guide 2014, p. 75)

Example:

While on an autumn walk, students collect a variety of leaves. Ask them to classify the leaves according to colour, and display class results on a tally chart. Students then create and label a bar graph using many-to-one correspondence.

- Ask students to interpret graph results by posing questions, such as “Are there less green leaves than the other colours? If so, how many less?”.
- Ask students to create their own questions about the data presented in the graph.

(Manitoba - Mathematics Grade 4 Curriculum Guide 2014, p. 77)

Activity:

Ask students to create a tally chart and use it to construct and label a pictograph with many-to-one correspondence. To gather larger numbers which would be conducive to many-to-one correspondence, data may be collected by surveying other classes.

Favorite Category of Movies

Movie Categories	Number of Students
Adventure	
Comedy	
Drama	
Science Fiction	
Other	

(Manitoba - Mathematics Grade 4 Curriculum Guide 2014, p. 75)

Class Activity: Create Your Own Dot Plot

- Think of a question to ask your classmates e.g. shoe size, type of pet, number of siblings (remember you don't want too many different answers so pick carefully).
- Keep a tally of people's answers.
- Choose a scale for each dot that would best represent your data.
- Create a dot plot of your data. Remember to include a title for your graph, as well as the names of all the possible responses (even if no people picked a particular answer).
- Discuss your results as a class.

(adapted from MathSpace)

Describe the effect of scale on representation.

Describe the effect of scale on representation.

Example:

These pictographs show data from a Grade 4 reading group.
The pictograph on the left is from the Unit Launch.
The pictograph on the right shows the same data.

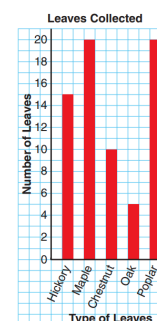


How are the pictographs the same? Different?
Who read the most books in April?
How do you know?

(Math Makes Sense 4, Pearson Education Publishing, p. 254)

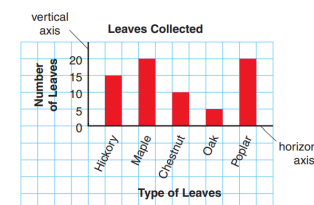
Example:

In a bar graph, bars are used to show data.
The numbers show the **scale**.
These bar graphs show the same data.



In this graph,
1 square represents 1 leaf.

The bar graphs have different scales.
The bars are shorter in the graph on the right.
A scale is chosen so the size of the graph is manageable.



In this graph,
1 square represents 5 leaves.

These are **vertical bar graphs**.
The bars are drawn upward.
The numbers are on the **vertical axis**.
The types of leaves are on the **horizontal axis**.

(Math Makes Sense 4, Pearson Education Publishing, p. 255)

4ST1 Graphing Raisins - surface level

Compare different graphs of the same data.

Compare graphs in which the same data have been displayed using many-to-one correspondences and explain how the graphs are alike and how they are different.

Teacher Note:

Comparing different graphs of the same data can help students justify the choice of graph used to represent the data.

4ST1.2 Eye Colour - surface/deep

Example:

Two students collected these data from students in Grades 4 and 5.

Colours of Eyes in Grades 4 and 5

Blue	Brown	Green	Other
30	42	18	10

Each student drew a graph.

Emil's graph

Safia's graph

- How are the graphs the same? Different?
- What is the scale for each graph?
- Why do you think each person chose the scale he or she did?
- Why do you think the scale is *not* 1 square to 1 person?
- Choose a different scale or choose a key. Draw your own graph. Justify your choice of scale.
- Write 3 things you know from your graph.

(Math Makes Sense 4, Pearson Education Publishing, p. 274)

Justify the choice of graph used to represent certain data.

Interpret data represented in various graphs.

Determine an appropriate type of graph for displaying a set of collected data and justify the choice of graph.

Answer questions by interpreting data from the given graph.

Lesson showing “justifying the choice of graph to represent certain data.” https://www.mathgoodies.com/lessons/graphs/compare_graphs

Example:

City	Typical Number of Wet Days Each Year (1961–1990)
Charlottetown	177
Edmonton	123
Fredericton	156
Montreal	162
Ottawa	159
Victoria	153

- Draw a bar graph. Explain your choice of scale.
- Which city had the fewest wet days?
- Why do you think Victoria had more wet days than Edmoton?
- Write a question you can answer using the table or the graph.

(Math Makes Sense 4, Pearson Education Publishing p. 265)

4ST1.2 Choosing a Graph and Interpreting Data - Surface

Example:

This table shows the heights of some players from the 2006 Canadian women's Olympic hockey team.

Name	Height
Apps	183 cm
Botterill	175 cm
Kellar	170 cm
Ouellette	180 cm
Piper	165 cm
St. Pierre	175 cm
Wickenheiser	178 cm

- a. What kind of graph could be used to represent this data?
- b. Explain why each of these parts of your graph is important: title, bars, labels, scale.
- c. Why is your scale NOT 1 square representing 1 cm?

(Math Makes Sense 4, Pearson Education Publishing p. 265)

Example:

1. This table shows the after-school activities of some students.

- a) Which activity was chosen by the most students? The fewest?
- b) Would you use a bar graph or pictograph to display these data? Explain.
- c) Draw the graph you chose in part b.
- d) Do you think the data would be the same in your school? Explain.

Activity	Number of Students
Music lessons	18
Dancing lessons	24
Playing sports	36
Swimming lessons	60
Computer club	42

(Math Makes Sense 4, Pearson Education Publishing p. 267)

Resources

Mathology

[K - 3 Little Books and Correlation Documents](#)
[Link to Grade 4 New Curriculum Correlation](#)

Mathology Activities

- Data Unit 1: Data Management 1: Interpreting and Drawing Pictographs and Dot Plots
- Data Unit 1: Data Management 2: Interpreting and Drawing Bar Graphs
- Data Unit 1: Data Management 3: Comparing Graphs
- Data Unit 1: Data Management 4: Consolidation

Mathology Practice Workbook 4

- Unit 12 Questions 1-4, 6, 9 (pp. 77-81, 83)
- What I Learned (p.83)

Mathology Interactive Tools

- [Data and Graphs](#)

Math UP

Grade 4 Collecting, Organizing, and Displaying Data

- Lesson 1: Pictographs With Scale
- Lesson 2: Bar Graphs With Scale
- Lesson 3: Comparing Data Representation
- Lesson 4: Reading, Describing, and Drawing Conclusions From Data

Existing Textbooks

Math Makes Sense 4, Unit 7

Math Focus 4 - Chapter 4 - Lessons 1-5

NCETM (teacher guides and resources)

NCETM: [Year 3 - Statistics New Curriculum](#)

(this only covers bar graphs and pictographs)

NCETM: [Year 4 - Statistics New Curriculum](#)

(this only covers bar graphs and pictographs)

Websites & Resources to Support Learning

Manipulative: [NCES Kids' Zone Test Your Knowledge](#) (National Centre of Educational Statistics) - An online graphing tool for students.

Manipulatives: [Graphing Generators](#) (mrmussbaum.com) - There are multiple links on this page for different graphing tools students can use to create different types of graphs.

Website: [Pictographs](#) (Math is Fun)

Website: [National Centre for Educational Statistics](#) - Students can choose a graph and create one online. It gives a basic description of graphs.

Website: [20 Graphing Activities For Kids that Really Raise the Bar](#) (We Are Teachers) - Bar graphs, line graphs, pie charts, and more!.

Video: [Compare picture graphs and bar graphs](#) (LearnZillions) - Comparing bar graphs and pictographs.

Worksheet: [Choose the Best Type of Graph](#) (IXL.com) Students choose the best graph for various situations

Worksheet: [Scaled Pictographs](#) (K5 Learning) - In these pictograph worksheets, symbols represent multiple objects; (e.g. 1 pizza symbol = 10 pizzas). In the last two worksheets, 1/2 symbols are also used (e.g. a 1/2

Websites and Resources to Support Planning

Inclusion - An [inclusive](#) approach to maths teaching

Inclusion - [Good Practices](#) on Inclusive Curricula in Mathematics Sciences

Differentiation: Preview vocabulary and pre teach to students. Use various forms of media to present vocabulary including simplified explanations, visuals in the form of diagrams to label and connect concepts.

Resources Developed by School Divisions/Educational Institutions

[Edmonton Catholic Pacing Guides](#)

[Edmonton Catholic Curriculum Crates](#)

[LearnAlberta Curriculum](#)

APRDC [New Curriculum Professional learning Resources](#)

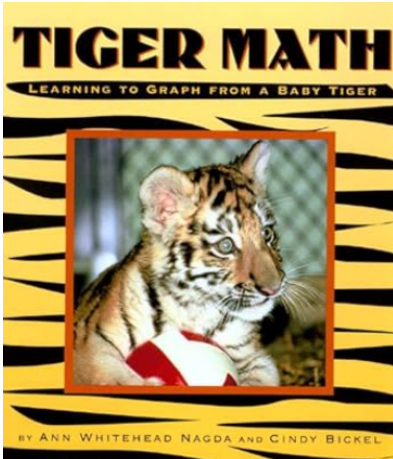
Alberta Teachers Association Library [Grades 4-6 Mathematics](#) & [General Mathematics Resources](#)

Mathematics and Numeracy - [New Curriculum Toolkit](#)

<p>pizza symbol = 5 real pizzas).</p> <p>Worksheet: Comparing Pictographs (K5 Learning) - Students compare two scaled pictographs and answer questions about the displayed data.</p> <p>Game: The Jelly Bean Tree (mrnussbaum.com)- There are multiple links on this page for different graphing tools students can use to create different types of graphs.</p>	<p>Gizmos (Teacher Login Required)</p> <p>New Learn Alberta Graphing Skills Mascot Election (Pictographs and Bar Graphs) Reaction Time 1 (Graphs and Statistics)</p> <p>For access to additional resources login to Gizmos account. Request an account alberta@explorellearning.com</p>
<p>Infusing Indigenous Knowledge - main website Grade 4 Math</p> <p>Explore data representation in nature (animals and plants). Identify types of data analysis such as reading fresh tracks and scat (feces).</p> <p>Additional Resources</p> <p>Numeracy Promising Practices videos, Empowering the Spirit, by Alberta Regional Professional Development Consortia (ARPDC)</p> <p>Shared Learnings, Integrating BC Aboriginal Content K-10, BC Ministry of Education, p. 45</p> <p>Math Catcher Outreach Program: Mathematics through Aboriginal Storytelling, from Simon Fraser University</p> <p>Math First Peoples Teacher Resource Guide, First Nations Education Steering Committee (FNESC) and First Nations Schools Association (FNSA)</p>	<p>Problem Solving</p> <p>Grade 4 Math Tasks (Calgary Board of Education) - These tasks were curated by the Calgary Board of Education. Tasks listed in these documents support teaching and learning related to the learning outcomes from the 2022 Mathematics Curriculum for Grade 5.</p>



Literature Connections

Title & Author	Format (Picture Book, Novel, Non-fiction, other)	Publisher & ISBN	Notes
<p><i>Tiger Math: Learning to Graph from a Baby Tiger</i> by Ann Whitehead Nagda and Cindy Bickel.</p> <p>Learn to graph while following the growth of T.J., an orphaned Siberian tiger cub who is hand-raised at the Denver Zoo.</p> <p>T.J. is a Siberian tiger cub born at the Denver Zoo. One day he stops eating. The zoo staff tries to tempt him with treats, but he refuses them all. The staff doesn't give up, and finally their love and persistence pay off. T.J. grows up to be a huge, healthy tiger.</p> <p>The delightful pictures of T.J. and the heartwarming story of his life will charm young readers as they learn the basics of graphing. Those who like storybooks can read just the right-hand pages of this book. But those who want to know more can use the graphs on the left-hand pages to see exactly how T.J. grew.</p> <p>The story is about an orphaned baby tiger who is hand-raised at a zoo. Different kinds of graphs including pictographs and bar graphs track a variety of data. The format of the book keeps all the graphing on the left side of the book and the story of the tiger on the right side. Have a discussion with the students about the implication of the scale used on page 8. The book allows for conversations about why graphs are used and are important.</p>	<p>Nonfiction Picture Book</p>	<p>Henry Holt and Co. (BYR)</p> <p>10-0805062483 13-978-0805062489</p>	 <p>Read Aloud</p>
<p>Indigenous Math Library from the Alberta Teachers' Association</p>			