UNIT 7

Data Analysis

At the Vet

Learning Goals

- collect and organize data
- use tally marks, charts, lists, and line plots
- read bar graphs
- draw bar graphs
- use bar graphs to solve problems

FARM ANIMALS SEEN IN A DAY

PLACE	NUMBER OF ANIMALS
Vet Clinic	𝍸
Farms	𝍸 𝍸 II

FARM ANIMALS IN THE CLINIC LAST WEEK

DAY	NUMBER OF ANIMALS
Monday	8
Tuesday	8
Wednesday	4
Thursday	10

UNUSUAL ANIMALS SEEN IN A YEAR

Ostriches	☆☆☆
Alpacas	☆☆☆☆☆☆☆☆☆☆
Bison	☆☆☆☆☆☆☆☆
Llamas	☆☆☆☆☆☆☆☆☆

The tally marks, charts, and pictograph show data about vets.

What can you find out from each set of data?

What other data might you find out about farm animals or vets?

Key Words

- data
- chart
- list
- tally mark
- tally chart
- line plot
- bar graph
- title
- axis (axes)
- scale

LESSON 1

Collecting and Organizing Data

Data are facts or information.
Here are some ways to collect data.

- You can measure.
- You can count.
- You can ask questions.

You can collect data in a **chart**.

Explore

You will need a metre stick.

In your group, whose knee is farthest from the ground?
Measure to find out.
Record your data in a chart.

Student	Ground to Knee

Show *and* Share

Share your results with another group.
Whose knee is farthest from the ground?
Closest to the ground?

Connect

You collect data to learn about people and things.
To collect data, begin with these questions:

- WHAT do you want to know?
- WHAT question will you ask?
- WHOM will you ask?
- HOW will you show what you find out?

You can record data in **tally charts** or **lists**.

Our Birthdays	
January	II
February	III
March	𝍸 II

Birds Spotted on Spring Days	
Day 1	4
Day 2	9
Day 3	3

Practice

1. Work with a partner.
Measure the distance from elbow to fingertip on 5 classmates.
Record your data in a chart.
Whose elbow-to-fingertip distance is the longest? The shortest?

2. Yoshi asked his classmates to name their favourite fruit.

a) Which fruit was the most popular? The least popular?

b) Why did Yoshi include "Other" in his list?

c) What else do you know from the data?

Our Favourite Fruit		
Fruit	Tally	Number of Children
Apple	IIII	4
Orange	𝍸 𝍸	10
Banana	𝍸 II	7
Pear	II	2
Strawberry	𝍸 IIII	9
Other	IIII	4

3. Work with the class.
Are you wearing shoes with laces or shoes without laces?

a) Record your answer on the board.

b) How many children are wearing shoes with laces?

c) How many children are wearing shoes without laces?

d) Are more children wearing shoes with laces or without laces?

Our Shoes	
Shoes with laces	Shoes without laces

4. **a)** Which animal in the chart jumps farthest?
How far does it jump?

b) How much farther does the kangaroo jump than the frog?

c) Write 2 other questions about the data in the chart.
Answer the questions.

Animal Long Jump

Animal	Distance
Snowshoe Hare	3 m
Red Kangaroo	5 m
Cougar	9 m
Northern Leopard Frog	1 m

5. Allie asked her classmates to wink.
She organized the data in a list.

Our Winks	
Closed Right Eye	Closed Left Eye
Tyler	Edith
Jessie	Avril
Madison	

a) How many children closed their right eye?

b) Write a question about Allie's list.
Answer your question.

c) Trade questions with a classmate.
Compare answers.

6. Some children made these name tags.

a) Organize the names in lists by their first letters.
b) Which letter has the most names?
c) Organize the names a different way.
Tell how you organized the names.
d) Write a question about your lists.
Answer your question.

7. Which season do you and your classmates like best?

a) Record your favourite season on the board.
b) Record all the data in a tally chart.
c) What did you find out?
Explain.

Our Favourite Seasons

Seasons	Tally	Number
Spring		
Summer		
Fall		
Winter		

8. **a)** Ask some classmates to say their favourite colour.
b) Tell how you collected and organized the data.
c) Write 3 things your data shows.

Reflect

Choose a *Practice* question from this lesson.
Why might someone want to collect data about this question?

LESSON 2

Line Plots

Explore

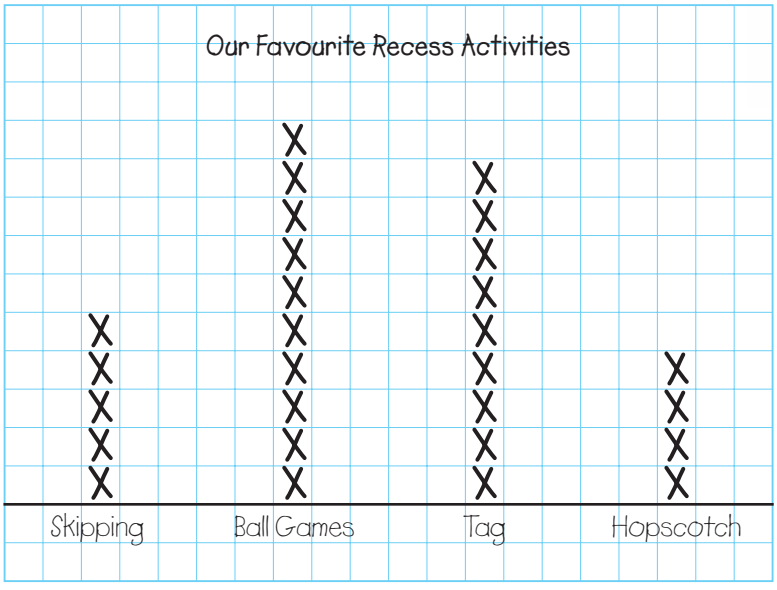
Natalie asked her classmates:

What is your favourite recess activity?

skipping ___ ball games ___

tag ___ hopscotch ___

She marked an X to show each choice.



Write 2 questions about Natalie's data.
Answer your questions.

Show *and* Share

Trade questions with another pair of classmates.
Answer the questions. Check each other's work.

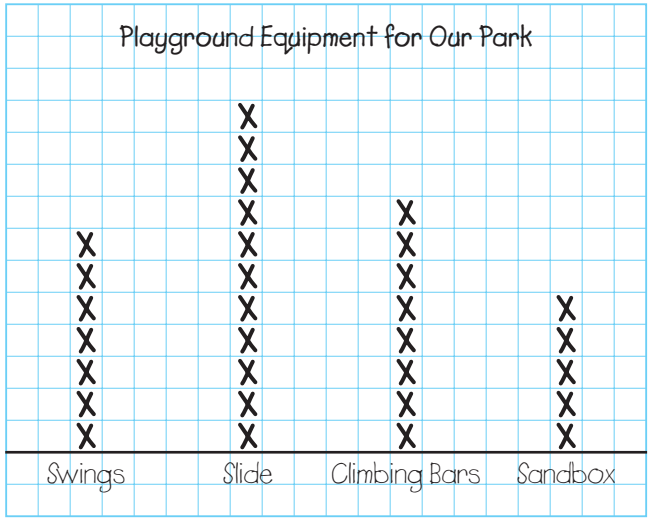
Connect

A park is getting a new piece of playground equipment.
Monika's job is to choose the equipment.

She asks the children in the neighbourhood to help.
Each child can vote for 1 choice.

Monika uses these steps to make a **line plot** of the data.

- Draw a line on grid paper. Write the types of playground equipment below the line.
- Mark an X to show each vote.
- Write a title.

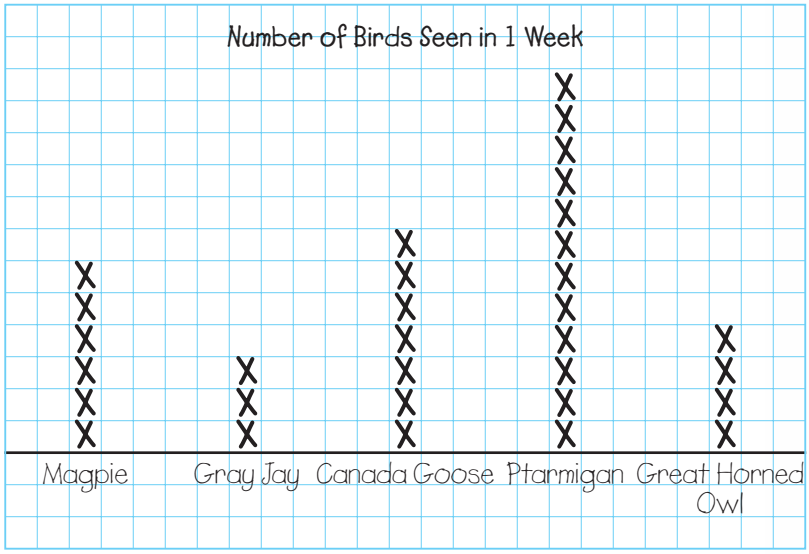


The line plot shows that more children chose a slide than any other type of playground equipment.

The line plot shows that 11 children chose a slide.
You can use a line plot to make comparisons.

Practice

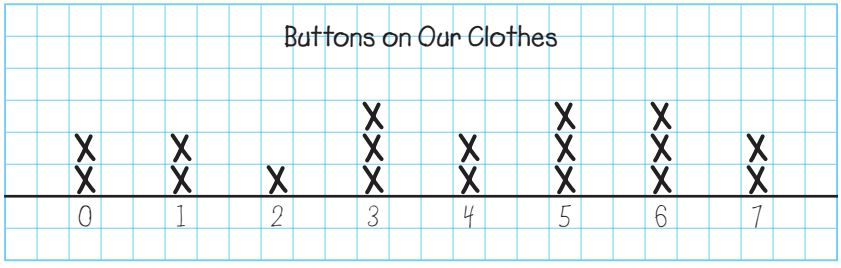
1. Blossom likes to go bird watching with her grandmother. She recorded the types of birds they saw in 1 week.



a) Which type of bird did Blossom and her grandmother see most often? Least often?
How do you know?

b) Write 3 other things you know from the line plot.

2. Irina made this line plot to show the number of buttons on classmates' clothes.



a) How many children have 6 buttons?

b) What is the most number of buttons for any child?
How many children have this many buttons?

c) Is everyone in the classroom wearing clothes with buttons?
How does the line plot show this?

3. **a)** Ask some classmates:

> Which playground equipment would you choose for a park?
> swing set ___ slide ___ climbing bars ___

Collect and organize the data in a line plot.

b) Suppose you are choosing the equipment for the park. What would you buy? Why?

4. Ethan listed shoe sizes of some Grade 3 children.
4, 5, 2, 3, 4, 5, 4, 2, 4, 3, 2, 1, 2, 1, 3, 4, 1, 2, 3, 4, 2, 3, 4
a) Show the data in a line plot.
b) Write what you know from the line plot.

5. **a)** Write the names of 8 of your classmates.
b) Show the number of letters in each name on a line plot.
c) Write 3 things you know from the line plot.

6. **a)** Choose a line plot from this lesson. Draw the line plot with the labels in a different order.
b) Are the data the same? Explain.

7. How are all the line plots in this lesson the same?

At Home

Think of something you would like to know about your family or friends.
Collect the data with a line plot, chart, or list.
What did you find out?

Reflect

How is a line plot the same as a tally chart? How is it different? Which do you like more? Why?

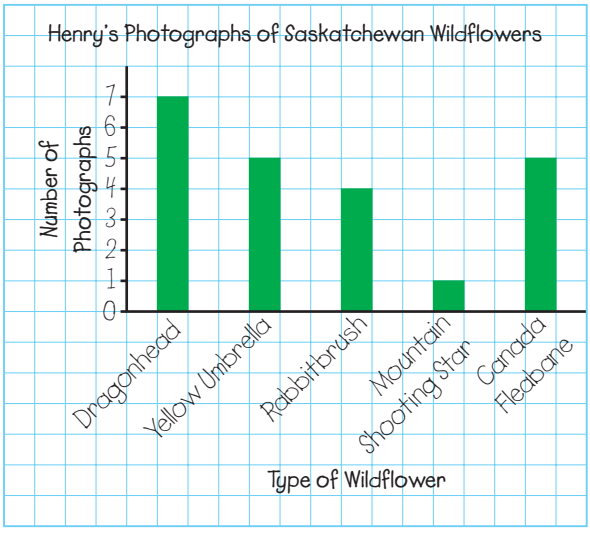
LESSON 3

Reading Bar Graphs

Henry takes photographs of Saskatchewan wildflowers.

Explore

Henry drew this graph about his photographs. List 5 things you know from looking at Henry's graph.



Show *and* Share

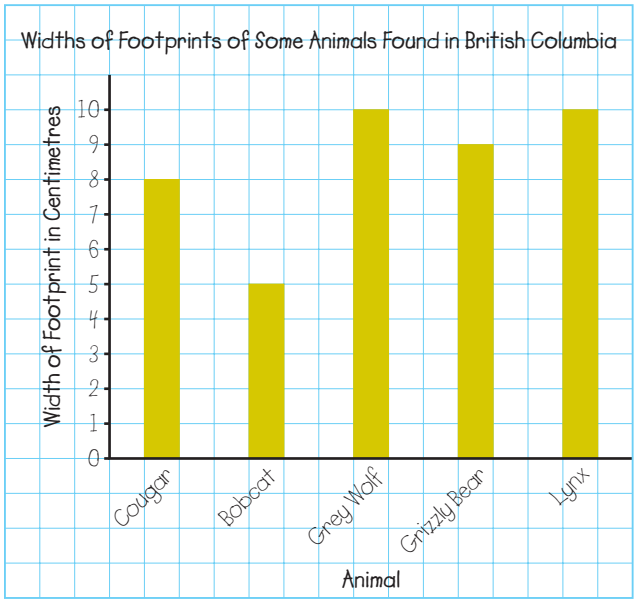
Share your list with another pair of classmates.

Why do you think Henry's graph is called a bar graph?

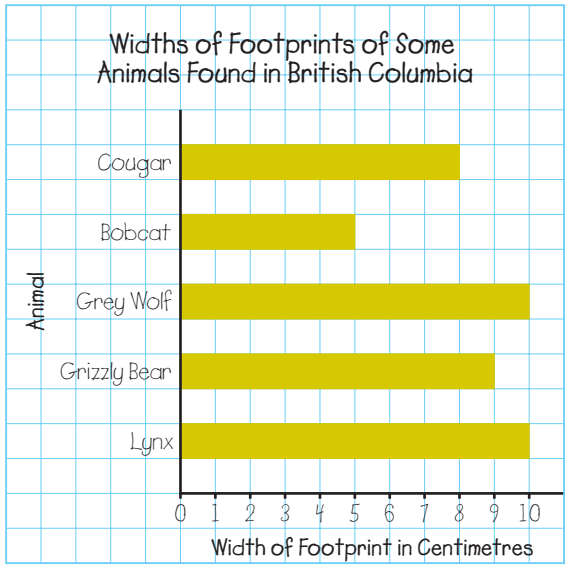
Connect

Andrea and Lim learned about some animals in British Columbia.
They drew bar graphs about their footprints.

Andrea's graph:



Lim's graph:

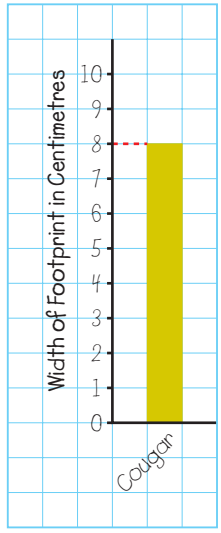


The **title** tells what the graph shows.

The labels on the **axes** tell about the data.

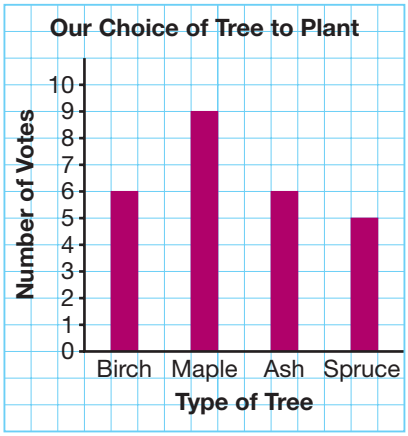
The numbers on the **axis** labelled "Width of Footprint in Centimetres" show the **scale**.
The scale is: 1 square represents a width of 1 cm.

On both bar graphs, the bars for
Cougar line up with 8.
So, the width of a cougar footprint is 8 cm.



Practice

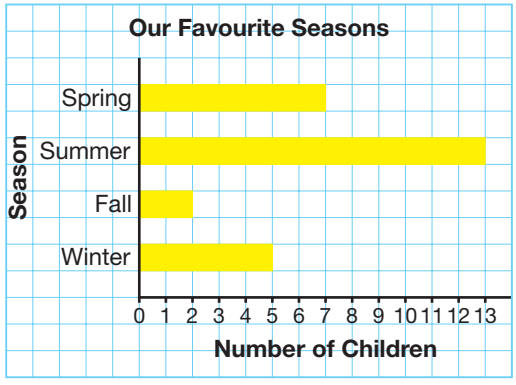
1. Eric's class voted on the type of tree to plant in their school yard.



a) What do the labels on the axes tell you?
b) What does the graph tell you about the votes?
c) Which type of tree do you think the class will plant? Explain.

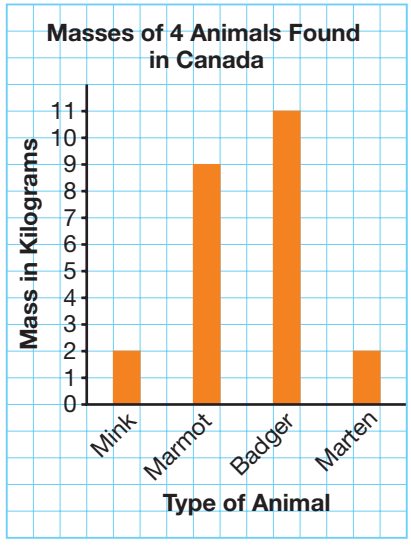
2. Lia asked classmates which season they like best.

a) Which season do most children like best?
b) How many classmates did Lia ask?
c) Write 2 other things you know from Lia's graph.

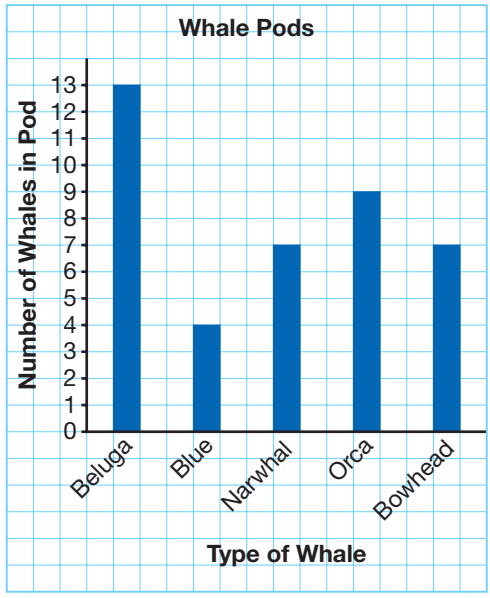


3. This bar graph shows the masses of some animals found in Canada.

a) Which animals have the same mass?
b) Order the masses from least to greatest. How did you do this?
c) What is the difference between the mass of a mink and the mass of a badger?
d) Write 2 questions about the data. Answer your questions.



4. This graph shows the number of whales counted in some pods.

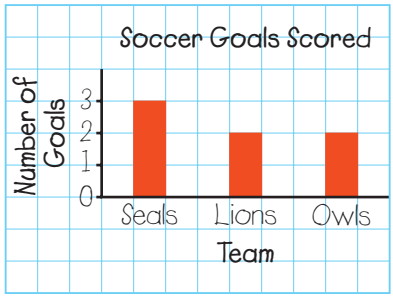


a) What does each axis tell you?

b) Write 3 things you know from this graph.

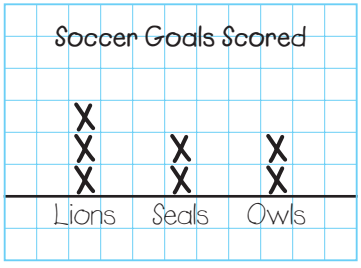
c) Suppose there was 1 more whale in the Bowhead pod.
How would the graph change?

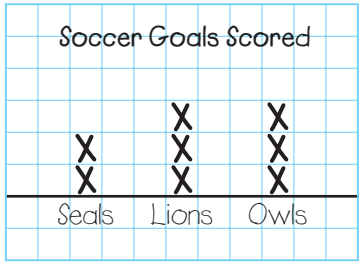
5. Frank made a bar graph about the goals scored by 3 teams in his soccer league.

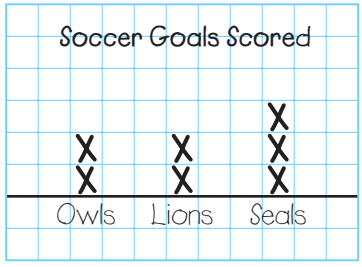


a) Which team scored the most goals? Describe how you can tell.

b) Which line plot matches Frank's bar graph? How do you know?







6. How are all the bar graphs in this lesson the same?
How are some of the bar graphs different from others?

Reflect

Suppose the order of the bars in a graph is changed.
Would the graph show the same data? Explain.

LESSON 4

Drawing Bar Graphs

What types of movies do you and your classmates like best?

On the board, draw a **tally mark** beside the type of movie you like best.

Explore

You will need grid paper and a ruler.

- Use the tally marks on the board.
  Draw a bar graph to show the movie data.
  Colour 1 square to represent 1 choice.
- Write 3 questions about your graph.
  Answer your questions.

Show *and* Share

Talk with another pair about how you drew the graphs.
How are the graphs the same? How are they different?
Discuss your questions and answers.

Connect

Elena asked her classmates:

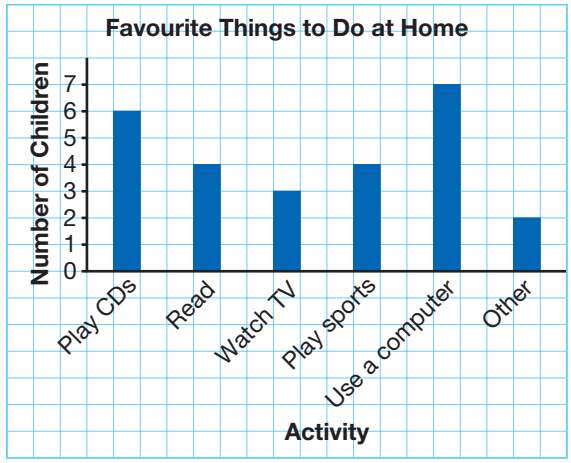
What is your favourite activity to do at home?
play CDs ___
read ___
watch TV ___
play sports ___
use a computer ___
other ___

Favourite Activities to Do at Home

Activity	Tally	Number of Children
Play CDs	𝍸 I	6
Read	IIII	4
Watch TV	III	3
Play sports	IIII	4
Use a computer	𝍸 II	7
Other	II	2

To draw a bar graph:

- Draw 2 axes on grid paper.
- Write the title.
- Label one axis "Activity." Write the names of the activities on this axis.
- Label the other axis "Number of Children." Write the numbers along this axis.
- Colour 1 square over an activity for each child that chose it.



Here are some things we know from the graph:

- Using a computer was the most popular activity.
- The same number of children chose reading and playing sports.

Practice

1. Use the data in *Connect*.

a) Draw a bar graph with the bars going sideways.

b) Compare your bar graph with the one in *Connect*.

2. Emma asked her classmates who they would like to invite for lunch.

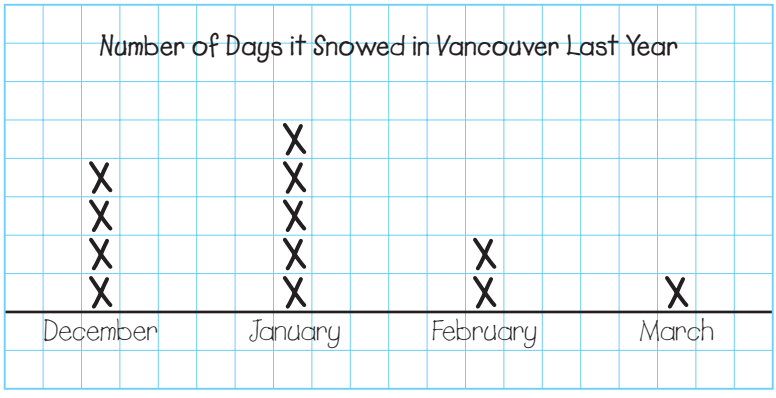
a) Draw a bar graph to show the data.

b) How many children altogether picked the top 2 choices?

c) Suppose 2 of the children changed their answer from "Musician" to "RCMP officer." Tell how this would change your graph.

Lunch Guests	
Person	Number of Votes
Athlete	7
Nurse	4
Musician	6
RCMP officer	5

3. A class in Vancouver kept track of the number of days it snowed last year. They showed the data in a line plot.



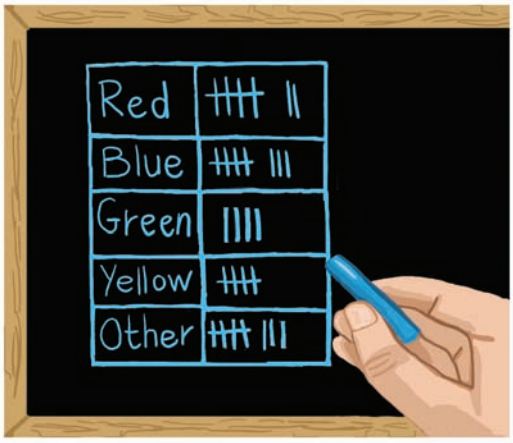
a) Why do you think the class did not show the other months of the year in their line plot?

b) Draw a bar graph to show the data.

c) On how many days did Vancouver have snow?

d) Write 2 other things you know from the bar graph.

4. Kumar wrote these data on the board.



a) What do you think he asked the class?
b) Draw a bar graph for these data.

5. **a)** Draw a bar graph to show the data in the chart.
b) What is the difference in the lengths of the 2 shortest dinosaurs? Explain 2 ways to find the answer.
c) Write a question about the graph. Answer your question.

Lengths of Dinosaurs

Dinosaur	Body Length
Tyrannosaurus Rex	14 m
Albertosaurus	8 m
Triceratops	9 m
Ankylosaurus	10 m
Dromaeosaurus	2 m
Pachycephalosaurus	5 m

Reflect

What mistake do you think someone might make drawing a bar graph?
How would you correct the mistake?

LESSON 5

Using Graphs to Solve Problems

➤ Talk about ways to find answers to these questions:
- How many children in your class play sports?
- Do your classmates prefer to watch sports or take part in sports?
- What is the favourite sport of each child in your class?

Explore

You will need grid paper and a ruler.

➤ Choose a question.
- Which sport will your class watch on a trip to a high school?
- Who will you invite to your class?
- What sports will be in a sports day?

➤ In your group, talk about:
- what question you will ask,
- whom you will ask, and
- how you will record the answers.

➤ Collect the data. Draw a bar graph.

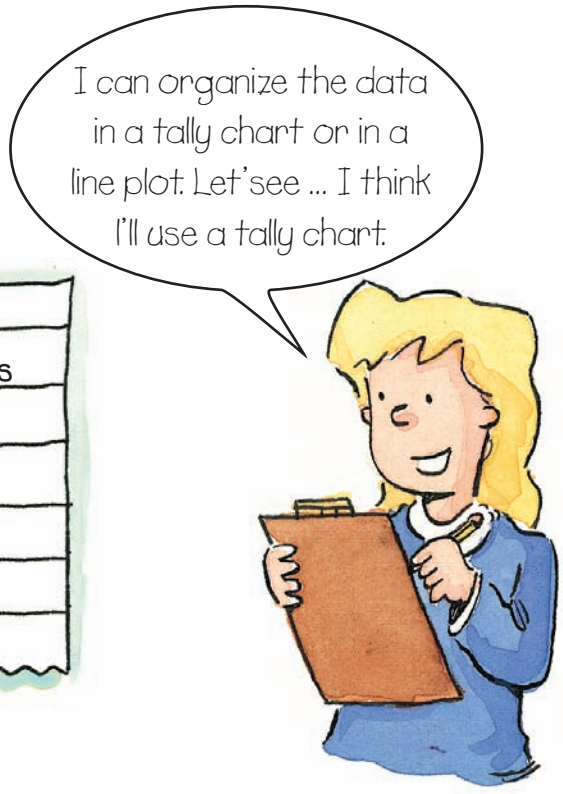
➤ How will you answer your question?

Show *and* Share

Share your question and data with another group.
Talk about your decisions.

Connect

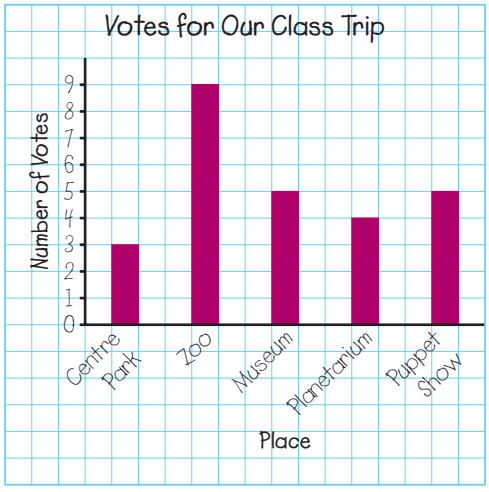
Angie wanted to solve a problem about planning a class trip.



➤ Angie made a chart to collect data from her classmates.

Votes for Our Class Trip		
Place	Tally	Number of Votes
Centre Park	III	3
Zoo	𝍸 IIII	9
Museum	𝍸	5
Planetarium	IIII	4
Puppet Show	𝍸	5

➤ She drew a graph.



Angie found out:

- More children chose the zoo than any other place.
- The children's next choice was the museum or a puppet show.

So, Angie's solution was to plan a trip to the zoo.

Practice

1. Solve this problem.
What trip would you plan for your classmates?

a) List places to go.
Decide if you want to use "Other" for children who prefer to go somewhere else.

b) Collect and organize the data.

c) Draw a bar graph to show your data.

d) How would you solve the problem? Explain.

2. Choose a topic for a problem.

a) Write the problem you will solve.

b) What question will you ask?

c) Collect and organize the data.

d) Draw a bar graph to show your data.

e) What is your solution for the problem? Tell how your graph helped you to solve the problem.

Problem Topics
- Story for the class to read together
- Game to play for indoor recess
- A visitor to invite to the classroom
- Music to play at a class party

3. **a)** Write a question about your problem and solution for question 2.
Answer your question.

b) Share your work with a classmate. Answer each other's questions.
Compare answers.

Math Link

Your World

Many kinds of graphs are used in newspapers, magazines, and on the Internet to show data.

Reflect

Describe a problem you solved in this lesson.
What would you do differently next time?

Reach Up or Sideways

You will need 2 number cubes, and a game board for each player.

The object of the game is to shade 6 squares in 1 bar, or to shade 1 square for each number from 0 to 12.

- Each player rolls a number cube.
  The player with the highest roll starts.
- On your turn, roll the number cubes. Add or subtract the numbers. Shade a square on your bar graph to show the answer.
- Take turns rolling the number cubes and shading a square.
- The winner is the first player to shade 6 squares in 1 bar, or to shade 1 square for each number from 0 to 12.

LESSON 6

Strategies Toolkit

Explore

Shane had nickels, dimes, and quarters.
He bought a used comic book for 25¢.
He did not get any change.
How many different ways could
Shane have paid for the comic book?

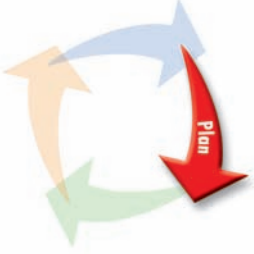
Show *and* Share

Show your classmates how you solved the problem.
How do you know you have found all the different ways?

Connect

Amy had pennies, nickels, and dimes.
She bought a pencil for 20¢.
Amy did not get any change.
How many different ways could
Amy have paid for the pencil?

What do you know?
- Amy paid 20¢.
- Amy used pennies, nickels, and dimes.



Think of a strategy to help you solve the problem.
- You can **solve a simpler problem**.
- Use play money.

Strategies

- Make a chart.
- Use a model.
- Draw a picture.
- **Solve a simpler problem.**
- Work backward.
- Guess and test.
- Make an organized list.
- Use a pattern.

Record the different ways to make 5¢.
Record all the different ways
to make 10¢, then 15¢, then 20¢.
Use a chart to record each way.
How many different ways can you make 20¢?

How could you have solved this problem
another way?

Practice

Choose one of the **Strategies**

1. Show 4 ways you could make 55¢ with 6 or fewer coins.

2. The pizzas in Tony's Restaurant have these toppings: pepperoni, mushroom, and green pepper.
You can choose 1, 2, or 3 toppings.
How many different pizzas can you make?

3. What number am I?
   - I have 2 digits.
   - I am less than 90.
   - I am more than 20.
   - My ones digit is 1 more than my tens digit.

   How many numbers did you find?

Reflect

Tell about a time when you had to buy something with coins.
How did you decide which coins to use?

Unit 7 Show What You Know

LESSON

1

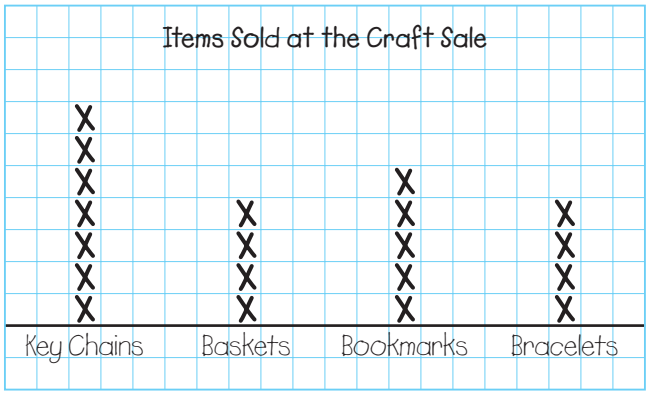
1. **a)** Ask your classmates:
Are you left-handed, right-handed, or both?
Record the data in a tally chart.
b) Tell 3 things your chart shows.

2. **a)** Ask your classmates to name their favourite TV show.
Record the data in a list.
b) Ask a question about your data.
Answer the question.
c) Why might someone want to know about these data?

3. **a)** Measure the distance from wrist to shoulder on 5 classmates.
Record the measurements in a chart.
b) How well do you think the chart shows this data?
Explain.

2

4. Emily made this line plot to record the items she sold at a craft sale.



a) How many items did Emily sell altogether?
b) Suppose Emily sold 1 more bracelet and 1 less basket. How would the line plot change?

LESSON

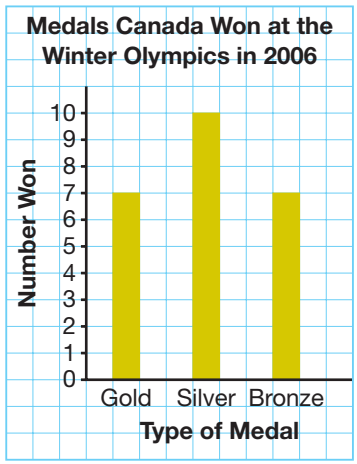
3

5. Children in Grade 3 read about the medals Canada won at the Winter Olympics in 2006.

a) Did Canada win more silver or bronze medals? How many more?

b) How many medals did Canada win altogether at these games?

c) Write 2 other things you know from the graph.



4

6. Ty used tally marks to show the number of stamps in his collection.

a) Draw a bar graph to show the data.

b) Ty wants 1 page in his album to have all the stamps from 2 countries.
He wants 16 stamps on this page.
From which countries should Ty choose the stamps?

c) Why do you think Ty used "Other"?

Stamp Collection	
France	𝍸 I
Spain	𝍸
Mexico	𝍸 𝍸
Sweden	𝍸 III
Other	III

3
4

7. **a)** Draw a different bar graph to show the data in question 6.

b) How are the bar graphs the same?

5

8. Choose a chart, list, line plot, or graph from this unit.

a) Write a problem you can solve with the data.

b) Solve the problem.
Tell about your solution.

UNIT 7

Learning Goals

- ☑ collect and organize data
- ☑ use tally marks, charts, lists, and line plots
- ☑ read bar graphs
- ☑ draw bar graphs
- ☑ use bar graphs to solve problems

Unit Problem

At the Vet

Veterinarians record data about animals.

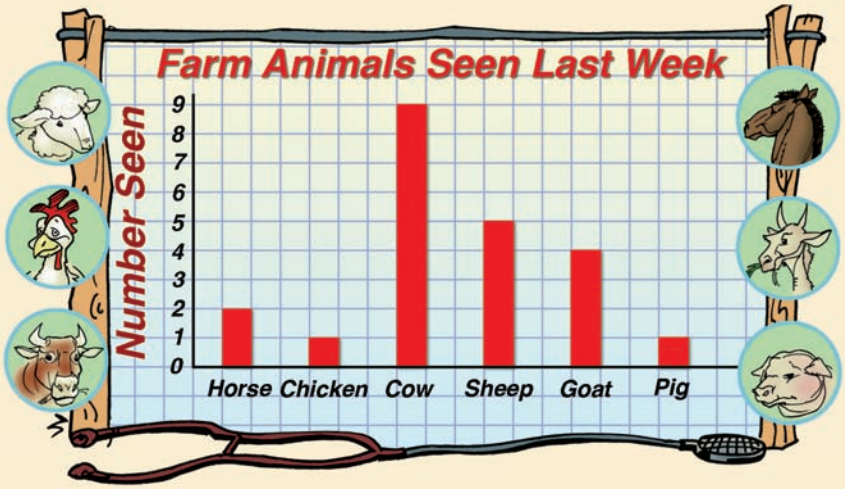
Part 1

- Ask your classmates to name their favourite farm animal.
- Collect the data in a tally chart or line plot.
- Tell how you organized the data.
- Write 3 things you know from your data.

Part 2

Use the bar graph.

- Which 2 types of animals did the vet see the same number of times? How do you know?
- How many animals did the vet see altogether?
- Write a question about the bar graph. Answer your question.



Part 3

Make up a problem about a vet or about farm animals.

- ➤ Write a question that can help you solve your problem.
- ➤ Collect and organize the data.
- ➤ Show the data in a bar graph.
- ➤ Solve the problem.
- ➤ How did you use the graph to solve the problem?

Check List

Your work should show

- ☑ a clear explanation of the given data
- ☑ your data in a tally chart, line plot, chart, or list
- ☑ a bar graph that is easy to understand, with labels and a title
- ☑ clear explanations of what you found out

Problem Topics

- a visit to the open house at a vet's clinic
- a day travelling to farms with a vet
- unusual farm animals
- a bison farm

Reflect on Your Learning

What have you learned about collecting and organizing data?