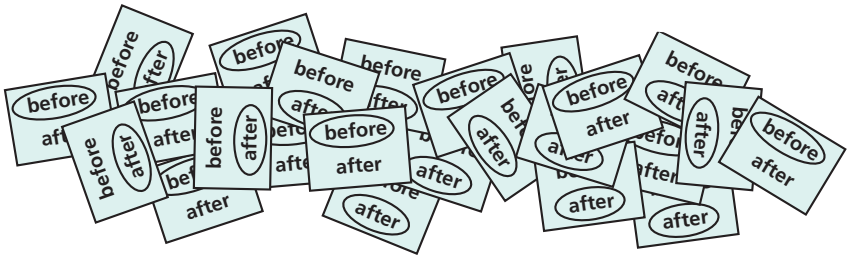
Chapter

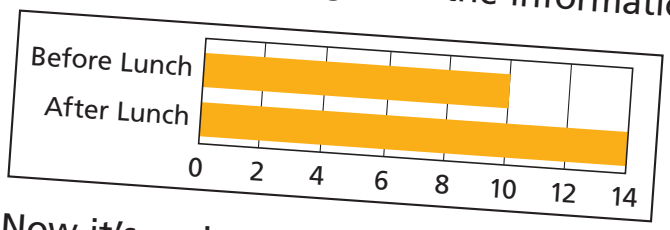
8 Charts and Graphs

Dear Student,

The way you display information can help you see patterns and draw conclusions. For example, imagine that your class voted on whether to have recess before or after lunch. Here are the ballots:



Which choice got the most votes? It is difficult to tell until you organize the information:



Now it's easier to see which time the class prefers.

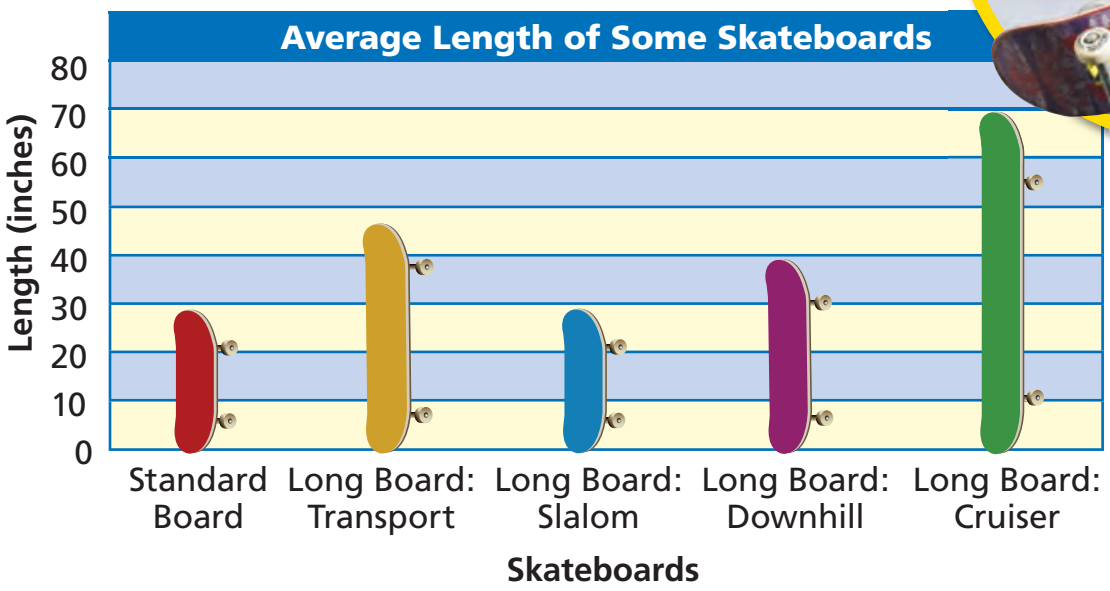
In this chapter, you will use tables and graphs to organize information in different ways to help you solve different problems.

Mathematically yours,
The authors of ***Think Math!***

Wheels in the Air

FACT·ACTIVITY 1

How high can you jump? Can you flip and twist in the air? Skateboarders can perform amazing jumps and tricks with just a board and 4 wheels. There are different lengths of skateboards. The following chart shows the average length of some skateboards.



Use the chart for the problems.

1. How long is the Slalom long board? Explain how you know.
2. How long is the Downhill long board?
3. How much longer is the Cruiser long board than the Standard board?
4. Name two boards whose combined length would be the same as the Cruiser long board.

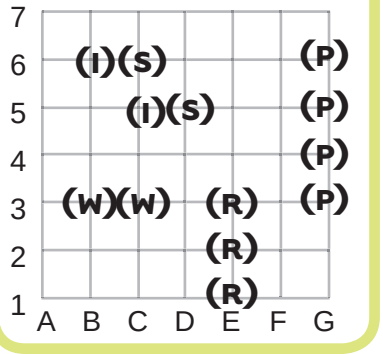
FACT·ACTIVITY 2

The popularity of skateboarding has created a demand for more public skate parks. More cities are providing parks for skateboarders to practice their riding tricks.

Use the map to answer the questions.

1. At what 2 positions would you find the iron railing?
2. What is located at G6?
3. At what 3 positions would you find the ramp?
4. If the park designers wanted to make the ramp longer, at what position could they add an extension?

Map of a Skate Park



KEY:

iron railing	(I)
stairwell	(S)
ramp	(R)
pipe	(P)
wall	(W)

CHAPTER PROJECT

Suppose you have a skateboard, and you have saved up $100 to spend on additional skateboarding gear. Use newspapers, magazines, and catalogs to find the typical price of each of the following items: pads (knee and elbow, pair of each), wrist guards (pair), helmet, wheels (set of 4).

Make a list of the items and their prices. Then determine all the ways you can spend your money without exceeding $100. Make a chart to help you plan your possible purchases. On your chart, include the total cost of what you can buy and your change from $100.

- Can you buy all four of the items? Explain.
- Can you buy three of the items? Which ones?

ALMANAC Fact

Danny Way, a pro skateboarder, performed a stunning jump in the summer of 2005 by jumping over the Great Wall of China from a 9-story "MegaRamp."

Chapter 8

Lesson 3

EXPLORE
Different Pictographs, Same Data

1 Students at Lincoln Elementary were surveyed about school lunch. They were asked to choose their favorite lunch from these five choices. Here are the results:

H	Hamburger or cheeseburger	33
T	Tuna sandwich	24
C	Chicken tenders	72
M	Macaroni and cheese	48
P	Pizza	66

A On a separate sheet of paper, make a pictograph to show the data. Use a plate symbol (◯) to represent 6 students.

B How did you represent the results for hamburger or cheeseburger in your pictograph?

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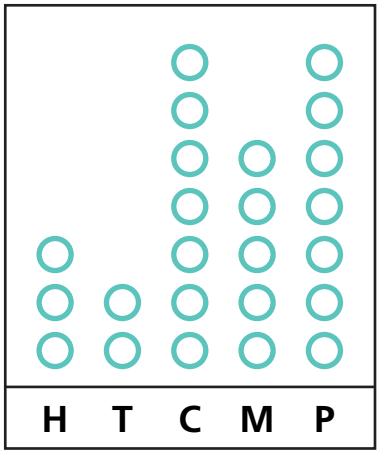
2 Here is another pictograph of the same data, where each ◯ represents 10 students. (Each number of students is rounded to the nearest multiple of 10.)

Looking at this pictograph, what is the most popular lunch?



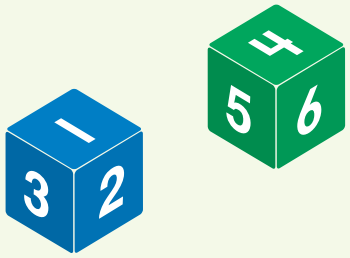
Chapter 8

Lesson 4

EXPLORE
Tossing Two Number Cubes

Imagine that you toss two number cubes and find the sum of the results.

(Each number cube is numbered 1 through 6.)



Classify the following events as *possible (P) or impossible (I)*.

1. The sum is 6.
2. The sum is 4.
3. The sum is 1.
4. The sum is 9, and one cube shows 2.
5. The sum is 8, and one cube shows 4.
6. The sum is 10, and neither cube shows 5.
7. The sum is 13.
8. The sum is multiple of 7.

9. Toss two number cubes 30 times and record the sum for each toss.

10. On a separate sheet of paper, make a pictograph of the data from Problem 9 as shown at right.

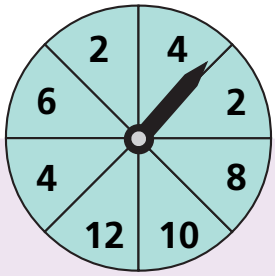
			4									
			4		5				7			

Chapter 8

Lesson 4

REVIEW MODEL
Describing the Likelihood of an Event

You can describe the likelihood of an event.



An event is **possible** if it could happen.

Example: Spin a number greater than 2 on the spinner shown. The numbers 4, 6, 8, 10, and 12 are greater than 2, so this could happen.

An event is **impossible** if it can never happen.

Example: Spin a 1. There are no 1s on the spinner, so this can never happen.

More likely than and **less likely** than are used to compare the likelihood of two events.

Example: You are **more likely** to spin a 2 than a 6.

Example: You are **less likely** to spin an 8 than a 4.

Check for Understanding

For 1 to 6, use the spinner above.

On a separate piece of paper, write *possible* or *impossible* for each event.

1. Spin an even number.
2. Spin an odd number.
3. Spin a number greater than 12.

On a separate piece of paper, write *more likely* or *less likely*.

4. You are ___?___ to spin a one-digit number than a two-digit number.
5. You are ___?___ to spin a number greater than 10 than a number less than 10.
6. You are ___?___ to spin a 4 than a 6.

Chapter 8

Lesson 5

REVIEW MODEL
Listing Outcomes

You can use a table to list possible outcomes for an experiment.

How many possible outcomes are there if you toss two coins?

There is 1 way to get 2 heads.

There are 2 ways to get 1 heads and 1 tails.

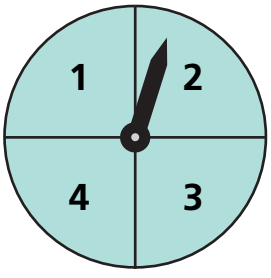
There is 1 way to get 2 tails.

So, there are 4 possible ways the two coins can land.

POSSIBLE WAYS FOR TWO COINS TO LAND	
First Coin	Second Coin
heads	heads
heads	tails
tails	heads
tails	tails

Check for Understanding

On a separate piece of paper, complete the table and answer the question.



Coin	Number
heads	1
?	■
?	■
?	4
tails	■
?	■
?	■
?	■

1. How many possible outcomes are there if you toss a coin and spin the pointer shown above?

EXPLORE
Prices at the Class Store

Erasers and pencils are on sale!

Limit: no more than 3 of each item to a customer.

1. Chani bought 2 pencils and 2 erasers. How much did she spend?

2. If Chani gave the cashier a quarter, how much change did she receive?

3. List all the purchases you could make for 10¢ or less.

4. Miya spent exactly 17¢. What did she buy?

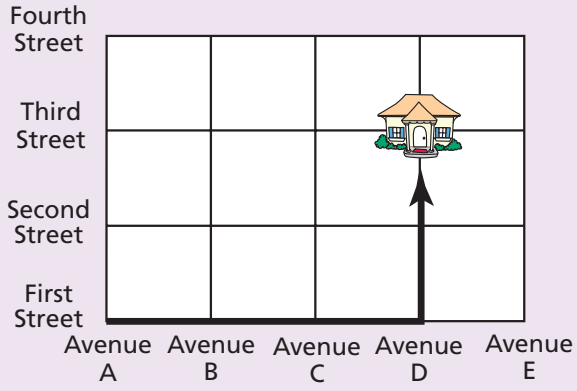
Chapter 8

Lesson 8

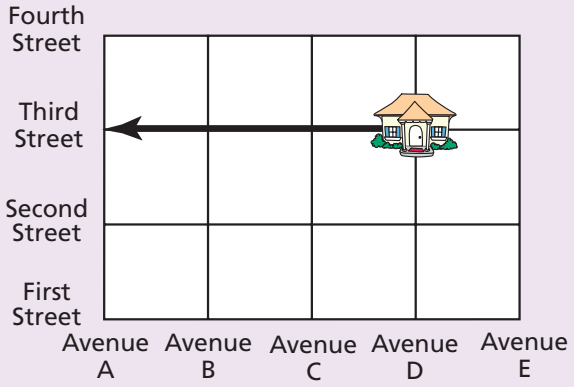
REVIEW MODEL
Using a Map Grid

You can name locations on a map grid.

Activity Jerome's house is at the intersection of two streets. Name the location of Jerome's house.



Step 1 Trace along the bottom of the grid until you reach the vertical line that crosses Jerome's house. Look at the label below the graph that gives the street name.



Step 2 Find the horizontal line that crosses Jerome's house. Find the label on the side of the grid that shows the name of the other street.

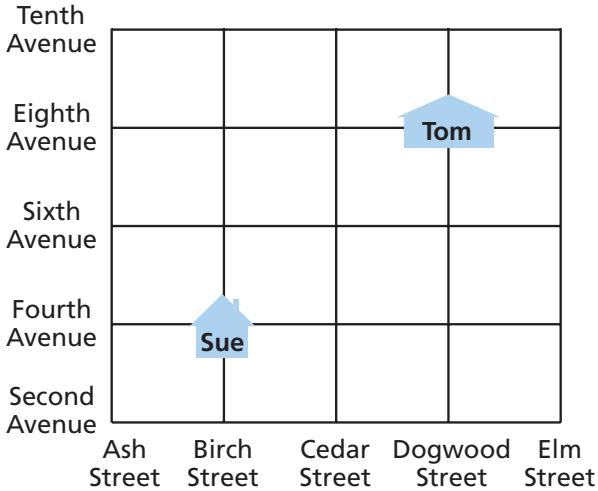
So, Jerome's house is at the intersection of Avenue D and Third Street.

Check for Understanding

Name the location of each house.

1. Sue's house is at the intersection of ___?___ Street and ___?___ Avenue.

2. Tom's house is at the intersection of ___?___ Street and ___?___ Avenue.



Chapter 8

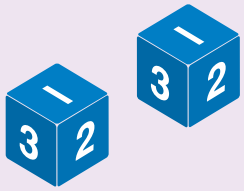
Lesson 10

REVIEW MODEL

Problem Solving Strategy

Make a Table

Lori has two number cubes. Each cube has the numbers 1, 1, 2, 2, 3, and 3. She tosses the cubes and finds the sum. What sums can she toss?



Strategy: Make a Table

Read to Understand

What do you know from reading the problem?

Lori tosses two number cubes numbered 1, 1, 2, 2, 3, and 3 and finds the sum.

What do you need to find out?

All the possible sums Lori can toss.

Plan

How can you solve the problem?

I can make a table.

Solve

How can you make a table to solve the problem?

List all the different tosses for each number cube in the table. Record the sums for each toss in the table. Then look for all the possible sums.

Number Cube 1 \ Number Cube 2	1	2	3
1	2	3	4
2	3	4	5
3	4	5	6

Lori can toss a sum of 2, 3, 4, 5, and 6.

Check

Look back at the problem. Did you answer the question that was asked? Does the answer make sense?

Problem Solving Practice

Make a table to solve.

1. You have only dimes, nickels, and pennies in your bank. You want to buy a pen for 16¢. What are all the ways you can pay for the pen?

2. Sam would like to buy stickers to decorate his notebook. One sticker costs 12¢. Two stickers cost 24¢, and three stickers cost 36¢. If Sam has a total of 72¢ to spend, how many stickers can he buy?

Problem Solving Strategies

- ✔ Act It Out
- ✔ Draw a Picture
- ✔ Guess and Check
- ✔ Look for a Pattern
- ✔ Make a Graph
- ✔ Make a Model
- ✔ Make an Organized List
- ✔ **Make a Table**
- ✔ Solve a Simpler Problem
- ✔ Use Logical Reasoning
- ✔ Work Backward
- ✔ Write a Number Sentence

Mixed Strategy Practice

Use any strategy to solve. Explain.

3. Annabelle eats 5 servings of vegetables each day. How many servings of vegetables does Annabelle eat in a week?

4. If $\frac{1}{4}$ of a box of crayons is 12 crayons, how many crayons are in the whole box?

5. It takes Manuel 15 minutes to ride his bike to Jake's house. Manuel and Jake want to play video games together for an hour. What time should Manuel leave his house to play video games with Jake and be back home at 6:00 P.M.?

6. Sasha tossed a coin 15 times. She tossed heads twice as many times as tails. How many times did Sasha toss heads?

Chapter 8 Vocabulary

Choose the best vocabulary term from Word List A for each sentence.

1. The number 8 is a(n) ___?___, but $3\frac{1}{2}$ is not.
2. Walking to the sun is a(n) ___?___ event.
3. A group of questions used to collect data is called a(n) ___?___.
4. Going to school on Friday is ___?___ going to school on Saturday.
5. A(n) ___?___ shows how to measure bars in a bar graph.
6. The place where two lines cross each other is called an ___?___.

Word List A

- data
- impossible
- intersection
- less likely than
- more likely than
- possible
- price
- scale
- spend
- survey
- whole number

Complete each analogy. Use the best term from Word List B.

7. Symbol is to pictograph as bar is to ___?___.
8. Word is to story as ___?___ is to graph.

Word List B

- bar graph
- data
- experiment
- possible

Talk Math

Discuss with a partner what you have learned about pictographs and bar graphs. Use the vocabulary terms *data, graph, label,* and *symbol*.

9. How can you make a bar graph?
10. How are a pictograph and a bar graph alike? How are they different?

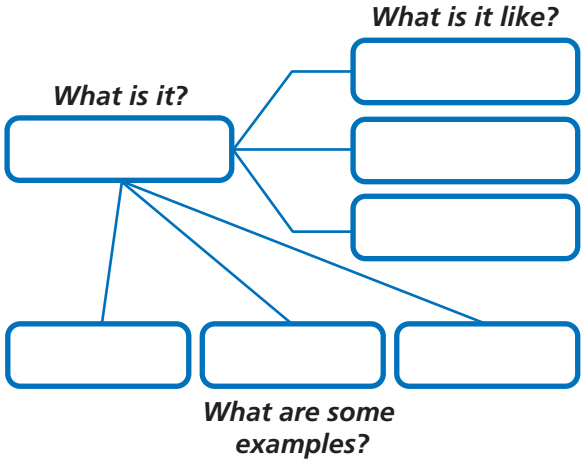
Word Definition Map

11 **Create a word definition map for the term *survey.***

A What is it?

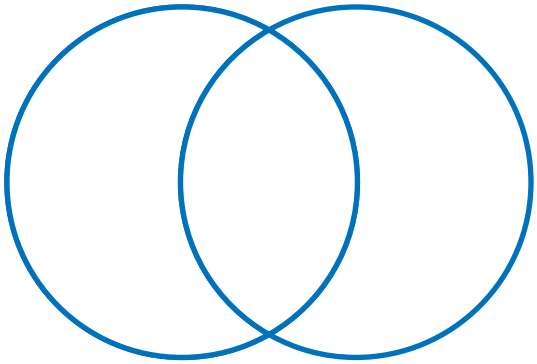
B What is it like?

C What are some examples?



Venn Diagram

12 **Create a Venn diagram about pictographs and bar graphs. Use the words *data, graph, label, scale,* and *symbol.***



EXPERIMENT An *experiment* is "a trial or a test." *Experiments* are done to discover something, test a guess, or try out a new idea. We use the word *experiment* in everyday life, in science, and in math. School cafeteria workers might do an *experiment* to see if offering more food choices will affect how many lunches are sold. In a science *experiment,* a scientist might test how weather affects plant growth. A math *experiment* could be tossing a coin many times to see how often heads is tossed. For most *experiments,* the results are recorded. Then conclusions can be made from the data.

GO ONLINE **Technology**
Multimedia Math Glossary
www.harcourtschool.com/thinkmath

GAME

Where's My House?

Game Purpose
To practice locating an object on a grid

Materials
- Activity Master 88: Where's My House?
- Activity Master 89: House Pieces
- Two-color counters

How to Play the Game

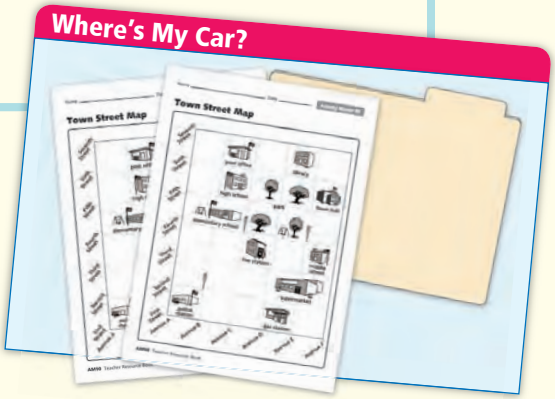
1. Play this game with a partner. Each player will need a *Where's My House?* gameboard and 1 house piece.
   - Stand an open book or folder between you and your partner so you cannot see each other's gameboard.
   - Secretly place your house in one square of your gameboard.
2. Decide who will play first.
   - Take turns guessing the location of your partner's house. Ask whether the house is in a certain square.
   - Your partner says, "yes," "no," or "near." (Near means your guess is one of the eight squares touching the square with the house.)
   - Use two-color counters to mark your guesses. Use one color for "no." Use the other color for "near."
3. The winner is the first player to find the other player's house. Play as many rounds as time allows.

GAME

Where's My Car?

Game Purpose
To practice naming intersections on a map grid

Materials
- Activity Master 90: Town Street Map
- Tokens
- Two-color counters



How to Play the Game

1. Play this game with a partner. Each player will need a Town Street Map and 1 token to use as a car.
   - Stand an open book or folder between you and your partner so you cannot see each other's map.
   - Secretly place your car on a street or avenue on your map. The car can be at an intersection or between intersections.
2. Decide who will play first.
   - Take turns guessing the location of your partner's car. Ask whether it is at a certain intersection, between intersections, or anywhere along a certain street.
   - Use two-color counters to mark your partner's responses to your guesses. Use one color for "no." Use the other color for "near."
3. The winner is the first player to find the other player's car. Play as many rounds as time allows.

CHALLENGE

Ozzie surveyed his classmates. He asked "How many days last week did your ride your bicycle?" Ozzie made a table to show the results.

NUMBER OF DAYS LAST WEEK WE RODE OUR BICYCLES	
Number of Days	**Number of Students**
0	2
1 or 2	4
3 or 4	8
5 or 6	6
I don't ride a bicycle.	4

Make a bar graph or a pictograph from the data in the table. Then use the table or your graph to answer the questions.

1. How many classmates answered the survey question?

2. How many classmates rode their bicycles last week?

3. How many classmates rode more than 2 days?

4. How many classmates who rode their bicycles said they rode fewer than 3 days?