

# Collect and Organize Data

**FAST FACT • SCIENCE** The waters around the Florida Keys are home to more than 6,000 species of marine plants and animals.

**PROBLEM SOLVING** The tally table lists the 5 most frequently sighted types of fish in the Florida Keys and shows how many of each type a diver saw during one dive. Make a bar graph of the data and order the types of fish from most to least seen.

FISH SEEN DURING ONE DIVE

Type of Fish	Number Seen
Blue tang	
Stoplight parrotfish	
Yellowtail snapper	
Bluehead	
Sergeant major	



## CHECK WHAT YOU KNOW


















Use this page to help you review and remember important skills needed for Chapter 6.

### ✓ READ PICTOGRAPHS

For 1–4, use the pictograph.

- How many members of the Running Club are in fourth grade?
- If 5 more third graders joined the Running Club, how many symbols would there be for third grade?
- What is the total number of members in the Running Club?
- How many fifth-grade members are in the Running Club?

RUNNING CLUB MEMBERS	
Third grade	  
Fourth grade	     
Fifth grade	    

Key: Each  = 2 members.

### ✓ TALLIES TO FREQUENCY TABLES

For 5–7, use the table.

- Use the tally table to make a frequency table.
- How many pieces of fruit were sold in Weeks 1 and 2?
- How many more pieces of fruit were sold in Weeks 1 and 2 than in Weeks 3 and 4?

SCHOOL FRUIT STAND	
Week	Pieces of Fruit Sold
1	
2	
3	
4	

## VOCABULARY POWER



### REVIEW

**data** [dā'tə] *noun*

Data is information collected about people or things from which conclusions can be drawn. There are many different ways to show the collected data. Describe some of the ways that data can be displayed.

### PREVIEW

**survey**

**frequency**

**cumulative frequency**

**mean**

**mode**

**median**

**line plot**

**range**

**outlier**

**stem-and-leaf plot**

**stem**

**leaf**

**scale**

**interval**



[www.harcourtschool.com/mathglossary](http://www.harcourtschool.com/mathglossary)



# Collect and Organize Data

## Learn

**TAKE YOUR PICK** You are taking a **survey** when you ask different people the same questions and record their answers. Follow these rules to get the information you want:

- Make the questions clear and simple.
- Ask each person the questions only once.
- Use tally marks to record each person's answer, or response.

Jason and Susie each wrote a question to find the class's favorite color for School Spirit Day decorations. Compare the results of their surveys.

## Quick Review

- $315 + 70$
- $817 - 209$
- $257 + 43$
- $1,000 - 430$
- $15 + 25 + 16 + 24$

## VOCABULARY

**survey**      **frequency**  
**cumulative frequency**



## Remember

In a tally table, tally marks are used to record data. The tally marks  $\text{||||}$  stand for 6.



Is your favorite color red, blue, or yellow?

SUSIE'S SURVEY DATA	
Color	Votes
Red	$\text{    }$ $\text{    }$
Blue	$\text{    }$ $\text{    }$ $ $
Yellow	$\text{    }$ $\text{  }$

What is your favorite color?

JASON'S SURVEY DATA

Color	Votes
Yellow	$\text{   }$
Green	$\text{    }$ $\text{    }$
Blue	$\text{    }$ $ $
Red	$\text{    }$ $ $
Orange	$\text{   }$



Both surveys ask about favorite colors, but Jason's allows more color choices. His survey allows any colors, such as orange or green. Susie's question allows only 3 color choices.

## Frequency Tables

A frequency table helps you organize the data from a tally table. The **frequency** is the number of times a response occurs. The **cumulative frequency** is a running total of the frequencies.

These tables show the numbers of loggerhead sea turtle nests found in four days on Fort Lauderdale Beach, Florida. Use them to find the day when the most turtle nests were found, and the total number of nests found.

LOGGERHEAD TURTLE NESTS FOUND		
Day	Frequency (Number of Nests Found)	Cumulative Frequency
May 11	4	4
May 12	6	10
May 13	9	19
May 14	6	25

$$\leftarrow 4 + 6 = 10$$

$$\leftarrow 10 + 9 = 19$$

$$\leftarrow 19 + 6 = 25 \leftarrow \text{Total number of turtle nests found}$$

LOGGERHEAD TURTLE NESTS FOUND	
Day	Tally
May 11	
May 12	I
May 13	
May 14	I

May 13 had the greatest frequency, so May 13 was the day that the most turtle nests were found. The total number of nests found was 25.



**MATH IDEA** Tables can be used to collect, organize, and display data.



### Check

1. **Write** a survey question, with choices, to find your classmates' favorite type of pizza.

Use Jason's and Susie's survey results on page 114. Tell whether each statement is *true* or *false*. Explain.

2. Susie's data show that more students prefer blue than red.
3. Jason's data show that red is the students' favorite color.

For 4–6, use this frequency table.

4. How many slices were sold in Hour 2?
5. By the end of Hour 3, how many slices had been sold?
6. How many more slices were sold in Hour 1 than Hour 4?

Pizza Slices Sold		
Hour	Frequency	Cumulative Frequency
1	16	16
2	20	36
3	12	48
4	9	57

LESSON CONTINUES





**Practice and Problem Solving** Extra Practice, page 130, Set A

Gina asked her friends, "What is your favorite kind of party?" She put the data in a table.

FAVORITE KIND OF PARTY	
Party	Votes
Bowling	7
Skating	8
Movie	4
Pool	5

For 7–9, use the table to tell whether each statement is *true* or *false*. Explain.

- Gina's data show that more friends prefer a bowling party than a pool party.
- Gina's data show that a pool party is the least favorite choice.
- Gina's data show that a skating party is the favorite party of the greatest number of her friends.
- Copy the party table and add a cumulative frequency column. How many friends did Gina survey?
- Write a survey question to find favorite fruits. Survey your classmates. Make a tally table and a frequency table for your data.
- Write About It** Write a problem using this data: Rosa buys four items priced at \$27, \$12, \$15, and \$32.

For 13–15, use the table.

- Copy and complete the table. How many tickets were sold on Wednesday?
- How many tickets were sold during the 4 days?
- On which two days were the most tickets sold?

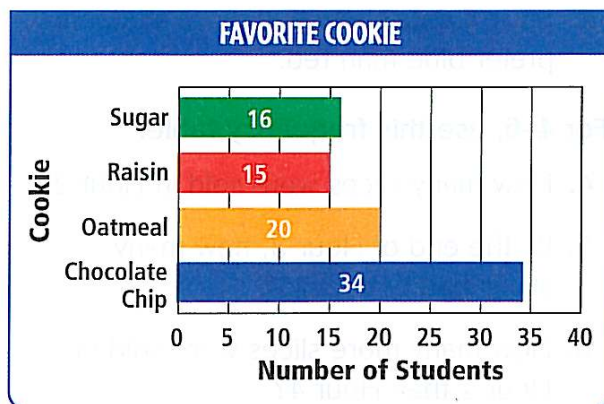


SKATING TICKETS SOLD		
Day	Tickets Sold	Cumulative Frequency
Tuesday	5	
Wednesday		23
Thursday	10	
Friday		45

- Nancy planted a 4-year-old tree in the park in 1988. How old will the tree be in 2010?
- Mrs. Barker was 34 years old in 1998. How old was she in 1979?

For 18–20, use the bar graph.

- Which cookie is the students' favorite?
- How many more students chose chocolate chip cookies than raisin cookies?
- REASONING** How many students were surveyed in all?



For 21–23, use the table.

21. How many bottles of juice were sold Monday and Tuesday?
22. How many more bottles of juice were sold on Thursday than Tuesday?
23. How many bottles of juice were sold in all?

JOE'S JUICE STAND		
Day	Frequency	Cumulative Frequency
Monday	140	140
Tuesday	197	337
Wednesday	259	596
Thursday	238	834

### Mixed Review and Test Prep

24. Round 56,341 to the nearest ten thousand. (p. 30)
25. Which is greater, 1,364,217 or 1,436,217? (p. 20)
26. Subtract 40,135 from 56,091. (p. 52)
27. Find the missing number in the pattern: 56,410; 45,410; ■; 23,410; 12,410. Describe the pattern. (p. 74)
28. Find the sum of 25,984 and the number that is 10,000 greater than 31,092. (p. 52)
29. Find the value of the expression  $(56 - 39) + 48$ . (p. 64)
30.  $80,000$  (p. 50)      31.  $67,813$  (p. 52)  
 $- 4,705$                        $+ 14,589$
32. **TEST PREP**  $10 \times \blacksquare = 8 \times 5$   
 A 3                              C 5  
 B 4                              D 6
33. **TEST PREP**  $2,890 + 3,678 + 4,722$  (p. 48)  
 F 9,180                      H 11,180  
 G 10,290                      J 11,290

### Problem Solving

### Thinker's Corner

Taking a survey is a good way to predict how people will vote in an election. A random survey is one where each voter has the same chance of being surveyed. A survey that is not random may ask the same question of a group of people with similar interests.

Angela and Paul are running for class president. Angela has promised more computer time if elected, and Paul has a lot of friends in the band.

Use the survey results to answer each question.

1. Which group of people was probably chosen at random?
2. Explain why you think Kim's results were different from Seth's.
3. Who do you think will win the election? Tell why you think this.

**KIM**

Computer Club  
Members  
Who would you  
vote for?  
Angela 9 votes  
Paul 1 vote

**TOSHIO**

Band Members  
Who would you  
vote for?  
Angela 2 votes  
Paul 8 votes

**SETH**

Students  
at Lunch  
Who would you  
vote for?  
Angela 14 votes  
Paul 20 votes



## Find Mean, Median, and Mode

## Learn

Mr. Humphrey's class went whale watching. The table shows how many whales the students saw on the trip. Find the mean number of whale sightings.

The **mean** is the average of a set of numbers, and is found by dividing the sum of a set of numbers by the number of addends.

## Quick Review

- $3 + 4 + 4 + 5$
- $16 \div 4$
- $2 + 3 + 5 + 5 + 6$
- $20 \div 5$
- $4 + 5 + 8 + 9$

## VOCABULARY

mean

mode

median

HANDS ON

## Activity 1

MATERIALS: connecting cubes

## STEP 1

Make stacks of cubes to model the number of whales each student saw.



## STEP 2

Rearrange the stacks so that they are equal. The mean is the number in each stack.



So, the mean number of whales is 3 whales.

You also can use paper and pencil to find the mean of a data set.

## Example

Some students saw dolphins. Jennifer saw 3 dolphins, Leon saw 5, Kari saw 5, and Josh saw 7. Find the mean number of dolphins.

## STEP 1

Add all of the numbers in the data set.  
 $3 + 5 + 5 + 7 = 20$

## STEP 2

Divide the sum by the number of addends. The quotient is the mean.  
 $20 \div 4 = 5$

So, the mean number of dolphins is 5 dolphins.



WHALE SIGHTINGS

Student	Number of Whales
Joni	3
Pablo	4
Emma	1
Mitchell	4
Chad	3

- How is rearranging the stacks of cubes like dividing?
- Travis saw 2 dolphins and Sheri saw 2 dolphins. Include the data in the example above. Then, find the mean.



## Finding Mode and Median

Mr. Alber's class recorded the high temperatures for the first 11 days of October. Find the mode and median of the data.

OCTOBER HIGH TEMPERATURES (in degrees Fahrenheit)											
Date	1	2	3	4	5	6	7	8	9	10	11
Temp.	65	62	62	62	65	60	59	59	57	58	60



### Activity 2

**MATERIALS:** index cards

#### STEP 1

Find the mode.

Write the 11 temperatures on index cards. Sort the cards by numbers. The **mode** is the number that occurs most often. There may be more than one mode, or there may be no mode.

57	58	59
60	62	65

#### STEP 2

Find the median.

Order the index cards from least to greatest. Turn one card over on each end. Keep doing this, moving toward the middle, until only one number is showing. That number is the **median**, or middle number.



- What is the mode of the data? What is the median?

### Example

Find the median of the data set.

Order the data from least to greatest.

2, 3, 4, 4, 4, 6, 6, 7, 7, 7  
                   ↑  ↑  
           middle numbers

#### Points Scored by Mia

Points	2	3	4	5	6	7
Frequency	1	1	3	0	2	3



When a data set has two middle numbers, the median is the mean of the two numbers.

#### STEP 1

Add the two middle numbers.

$$6 + 4 = 10$$

#### STEP 2

Then, divide the sum by 2.

$$10 \div 2 = 5$$

So, the median of the data is 5.

LESSON CONTINUES



## Check

1. **Explain** how to find the mode and mean of the data in the Example at the bottom of page 119.

Find the mean, median, and mode.

2.

STRAWBERRIES PICKED					
Day	1	2	3	4	5
Baskets	5	7	6	4	3

3.

KITTENS BORN						
Litter	1	2	3	4	5	6
Kittens	3	5	5	6	3	2

Find the median.

4.

SCIENCE TEST SCORES					
Test	1	2	3	4	5
Score	88	95	67	86	95

5.

SHELLS COLLECTED							
Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Shells	31	17	18	15	19	23	31

## Practice and Problem Solving

Extra Practice, page 130, Set B

Find the mean, median, and mode.

6.

POINTS SCORED					
Game	1	2	3	4	5
Points	12	12	7	9	10

7.

ALLIGATORS SIGHTED						
Day	1	2	3	4	5	6
Alligators	4	2	4	4	2	2


Find the median.

8.

STUDENTS' HEIGHTS (in inches)					
Student	Ann	Bob	Carl	Dan	Ed
Height	54	53	56	54	55


9.

SWIM TEAM				
Age	9	10	11	12
Frequency	4	3	2	2

10.  **What's the Error?** Jim says the median of the data below is 220 and the mode is 170. Describe his error and write the correct median and mode.

PLAY TICKETS SOLD					
Week	1	2	3	4	5
Tickets	150	170	220	160	220

11. **REASONING** Carol scored 89, 88, 93, 88, 85, and 93 on six tests. After she took the seventh test, the mode was 93. Find the median of the seven scores.

12.  **Write About It** Record the high temperatures for your city for a one-week period and put the data in a table. Find the median and the mode.

13. **Vocabulary Power** The words *mean* and *median* both come from the same root word and originally meant the same thing. Explain how today's meanings of the mean and median of a set of data are different.



14. **ESTIMATION** The summer temperature in Scottsdale, Arizona, can be  $104^{\circ}\text{F}$ . The summer temperature in Anchorage, Alaska, can be  $65^{\circ}\text{F}$ . About how much warmer could it be in Scottsdale than in Anchorage?

15. The boat taking Mr. Humphrey's class leaves at 9:40 A.M. The trip lasts 3 hours and 15 minutes. What time will the class return from the trip?

## Mixed Review and Test Prep

For 16–17, write  $<$  or  $>$  for each  $\bullet$ . (p. 48)

16.  $7,500 - 1,000 \bullet 7,400$

17.  $8,395 \bullet 7,059 + 1,300$

For 18–22, find the sum or difference.

(p. 48)

18.  $549 + 301$

19.  $287 + 109 + 91$

20.  $867 - 329$

21.  $506 - 207$

22.  $8,467 + 1,212$

23. **TEST PREP** Mr. Key is traveling for 832 miles. He has driven 453 miles so far. How many more miles does he have to drive? (p. 48)

A 379

C 479

B 389

D 1,285

24. **TEST PREP** Which equation shows the Associative Property of Addition?

(p. 68)

F  $35 + 6 = 6 + 35$

G  $(35 + 6) + 18 = 35 + (6 + 18)$

H  $35 + 0 = 35$

J  $35 + 6 + 18 = 59$

## Problem Solving

## Thinker's Corner



**MORE ABOUT MODE** The mode often is used when dealing with groups of objects which are not numbers. Look at the Favorite Marine Animal table. Dolphin received the most responses, so dolphin represents the mode.

Find the mode.

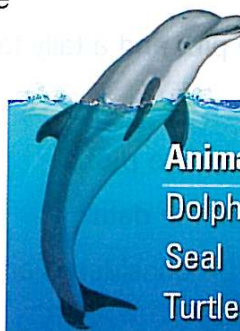
1.

VOTES FOR CLASS PRESIDENT			
Student	Tammy	Kevin	Janice
Frequency	9	13	1

2.

BATS OBSERVED			
Type	Brown	Red	Indiana
Frequency	15	7	5

FAVORITE MARINE ANIMAL	
Animal	Frequency
Dolphin	61
Seal	48
Turtle	30

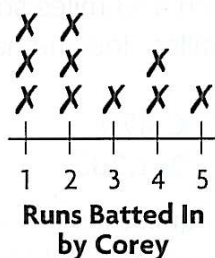




## Read Line Plots

## Learn

**"X" MARKS THE SPOT** A graph that shows the frequency of data along a number line is called a **line plot**. This line plot shows the number of runs Corey batted in during one baseball season.



The three X's above the 2 on the line plot show that Corey batted in 2 runs in 3 different games.

You can use a line plot to find the range. The **range** is the difference between the greatest and the least values in a set of data.

$$5 - 1 = 4 \quad \text{The range is 4.}$$

Look at the line plot of the number of brothers and sisters. Most of the data form a cluster, or group, from 0 to 3. The value 7 is called an outlier. An **outlier** is a value separated from the rest of the data.

## Check

1. **Explain** how a line plot and a tally table are alike.

For 2–3, use the library line plot.

2. What is the range of the data?
3. What value would be considered an outlier? Explain.

## Quick Review

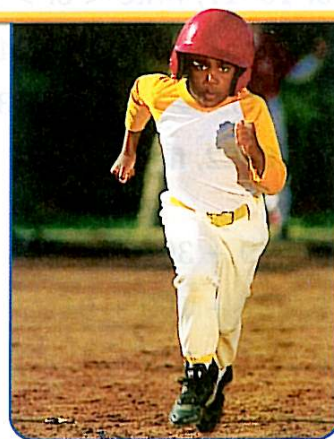
1.  $480 + 120$
2.  $61 + 59$
3.  $100 - 43$
4.  $1,000 - 350$
5.  $165 + 135$

## VOCABULARY

line plot

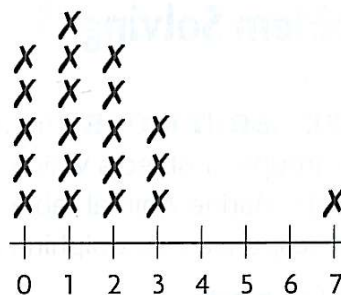
range

outlier

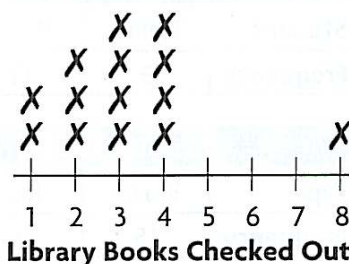


## Technology Link

More Practice: Harcourt Mega Math The Number Games, *ArachnaGraph*, Levels E and F



Number of Brothers and Sisters







## Practice and Problem Solving

Extra Practice, page 130, Set C

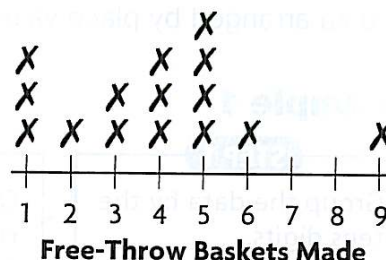
For 4–6, use the first line plot.

4. How many teams won three races? How many races is that in all?
5. How many teams are shown? How do you know?
6. How many races were won in all?



For 7–9, use the second line plot.

7. Each X in this line plot stands for one player. What do the numbers on the line plot stand for?
8. What value would be considered an outlier? Explain.
9. What is the range of the number of free-throw baskets made? What is the median?



For 10–12, use this table.

10. Make a line plot of the data. Find the mean, median, mode, and range of the number of juice packs bought.
11. **REASONING** Find the total number of juice packs the students bought.
12. How many students bought juice packs?
13. Jackie worked in the garden for 25 min. Then she walked the dog for 15 min. If she started at 11:30 A.M., what time did she finish?

JUICE PACKS BOUGHT	
Juice Packs	Students
0	I
1	II
2	II
3	IIII

14. **What's the Question?** Molly has  $n$  nickels. She gives 14 to her brother. The answer is  $n - 14$ .

## Mixed Review and Test Prep

Round to the nearest thousand. (p. 30)

15. 75,391

16. 148,569

17. Write a number greater than 23,487 and less than 23,847. (p. 24)

18.  $378 + (813 - 72)$  (p. 64)

19. **TEST PREP** What is 1,276 subtracted from 1,493? (p. 48)

A 216

C 223

B 217

D 769



# Make Stem-and-Leaf Plots

**LIVE CORAL** There are more than 50 different known corals in the Florida Keys. Use the data for the number of different corals seen by 9 divers to make a stem-and-leaf plot.

NUMBER OF DIFFERENT CORALS SEEN									
13	21	26	17	34	29	34	30	11	

A **stem-and-leaf plot** shows groups of data arranged by place value.

The coral reef off of the Florida Keys is the only living coral reef in the continental United States. ▶

## Quick Review

- $330 + 50 + 200$
- $75 + 9$
- $47 + 16$
- $80 - 45$
- $66 - 38$

## VOCABULARY

**stem-and-leaf plot**

**stem**

**leaf**

### Example 1

#### STEP 1

Group the data by the tens digits.

10: 13 17 11  
20: 21 26 29  
30: 34 34 30

#### STEP 2

Order the tens digits in a column from least to greatest to form the stems. Draw a line to the right of the stems.

1  
2  
3

Each tens digit is called a **stem**.

#### STEP 3

Write each ones digit to the right of its tens digit.

1 | 3 7 1  
2 | 1 6 9  
3 | 4 4 0

Each ones digit is called a **leaf**.

#### STEP 4

Order the leaves from least to greatest. Include a title, labels, and a key to show what each stem and leaf represents.

#### Number of Different Corals Seen

Stem	Leaves
1	1 3 7
2	1 6 9
3	0 4 4

2 | 1 = 21 corals.

Since the stem-and-leaf plot organizes data in order of place value, you can use it to find the median of a set of data.

### Example 2 Use the stem-and-leaf plot to find the median.

Begin by crossing off the least leaf and the greatest leaf on the plot. Keep crossing off pairs of leaves that are the least and greatest until only one leaf remains. That number is the median. If two leaves remain, the median is the mean of those leaves. So, the median number of corals seen is 26.

#### Number of Different Corals Seen

Stem	Leaves
1	<del>1</del> 3 7
2	1 6 9
3	0 4 <del>4</del>





## Check

1. **Explain** how you could find the median in Example 2 if another diver had seen 32 corals.

For 2–3, use the stem-and-leaf plot of the different fish spotted in the Florida Keys.

2. What are the least and greatest numbers of different fish spotted?
3. What is the mode? the median?

**Number of Different Fish Spotted**

Stem	Leaves
2	0 0 1
3	3 6 6 8 9
4	4 5 7 8
5	2

$$2|0 = 20 \text{ fish.}$$

## Practice and Problem Solving

Extra Practice, page 130, Set D

For 4–6, use the stem-and-leaf plot of miniature golf scores.

4. Which digits are stems?
5. What is the mode? the median?
6. What are the lowest and highest miniature golf scores? What is the range?

**Miniature Golf Scores**

Stem	Leaves
2	8
3	0 5 5 7
4	1 2 2 4 8
5	0 0 1 3 3 3 7

$$3|5 = 35.$$

For 7–8, use the stem-and-leaf plot of Kay's bowling scores.

7. Write all of the scores shown on this stem-and-leaf plot.
8. What is the median of Kay's bowling scores?

**Kay's Bowling Scores**

Stem	Leaves
10	0 3 8
11	0 4 5 6
12	3 7

$$10|0 = 100.$$

9. The heights of Mr. Jin's students are 53, 48, 55, 49, 49, 51, 55, 57, 57, 59, 54, 55, and 48 inches. Make a stem-and-leaf plot of these data. Find the median and the mode of the heights.
10. Josie is making a pictograph with a key in which each symbol stands for 5 students. How many symbols stand for 20 students? 25 students?
11. **Write About It** Explain the difference between stems and leaves on a stem-and-leaf plot.

## Mixed Review and Test Prep

12. 
$$\begin{array}{r} 15,982 \\ +16,775 \\ \hline \end{array}$$
 (p. 52)

13. 
$$\begin{array}{r} 3,901 \\ +2,881 \\ \hline \end{array}$$
 (p. 48)

14. Write an expression using the variable  $n$  for a number of cards minus 8 cards. (p. 64)

15. Order 86,962; 86,923; 85,816 from least to greatest. (p. 24)

16. **TEST PREP** Choose the number that does *not* round to 8,600. (p. 30)

A 8,596

C 8,547

B 8,623

D 8,647



# Compare Graphs

## Learn

**RAISE THE BAR** Graphs A and B show the same data. However, the graphs look different.

The **scale** of a graph is a series of numbers placed at fixed, or equal, distances. Both graphs have a scale of 0–50. The highest value of the scale should be greater than the greatest value of the data.

The **interval** of a graph is the difference between two numbers on the scale. Graph A's scale has an interval of 5. Graph B's scale has an interval of 10.

## Quick Review

1.  $349 + 690$

2.  $921 - 487$

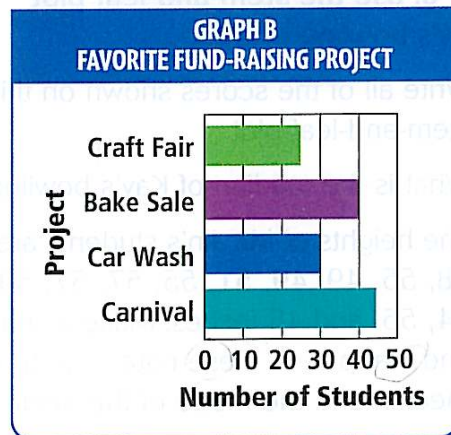
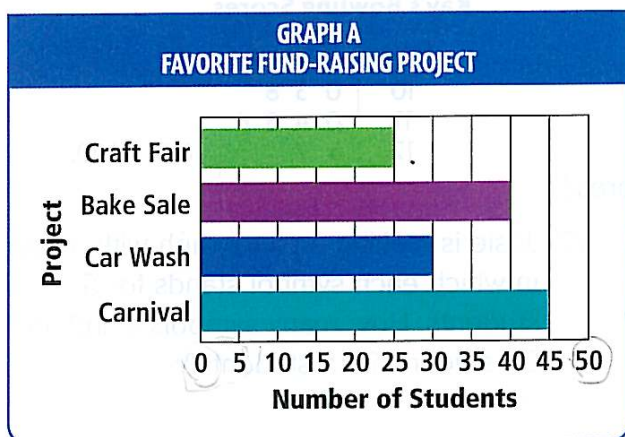
3.  $14 + \square + 6 = 38$

4.  $3 \times 4$       5.  $5 \times 8$

## VOCABULARY

**scale**

**interval**



- Why is it easier to compare the bars in Graph A?

## Check

1. **Explain** why the lengths of the bars in Graph A and the lengths of the bars in Graph B are different.

For 2–3, explain how the length of the bars would change in Graph B above.

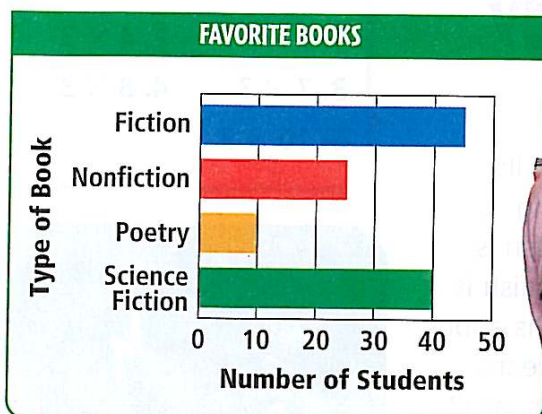
2. if the interval were 20
3. if the interval were 2





## Practice and Problem Solving

Extra Practice, page 130, Set E



For 4–7, explain how the lengths of the bars would change in the graph above.

4. if the interval were 1
5. if the interval were 2
6. if the interval were 20
7. if the interval were 25
8. What is the mode of the data in the graph above?
9. What is the scale of the graph above?

For 10–13, choose 5, 10, or 100 as the most reasonable interval for each set of data. Explain your choice.

10. 5, 16, 20, 11, 15
11. 15, 31, 48, 30, 69
12. 100, 200, 200, 450, 500, 300
13. 32, 50, 89, 60, 101

For 14–16, use the graph above.

14. Make a new graph with an interval of 5. Explain how the length of the bars changed.
15. **Write a problem** with an answer of 25, using the data from the graph.
16. **REASONING** Josef's choice had 15 more votes than nonfiction. Zoe's choice had the fewest votes. Ali's choice was different from Josef's and Zoe's, but it was not fiction. What did each student choose?

## Mixed Review and Test Prep

17. Write eight hundred seventy-two thousand, one hundred six in standard form. (p. 4)
18. 
$$\begin{array}{r} 6,000 \\ -1,753 \\ \hline \end{array}$$
 (p. 50)
19. 
$$\begin{array}{r} 4,000 \\ -2,995 \\ \hline \end{array}$$
 (p. 50)
20. Find the value of  $(36 - 12) + 14$ . (p. 64)
21. **TEST PREP** Choose the equation that best fits these words: Nine eggs plus some more eggs are 12 eggs. (p. 70)
  - A  $9 - n = 12$
  - B  $12 + 9 = n$
  - C  $9 + n = 12$
  - D  $12 + n = 9$



# Problem Solving Strategy

## Make a Graph

**PROBLEM** You can determine the age of a fish by its scales, which have growth rings like trees. Each ring represents 1 year. The life span of a French angelfish is about 14 years, and the life span of a queen parrotfish is about 5 years. The life span of a queen triggerfish is about 12 years, and the life span of a coney is about 4 years. Which two fish have the greatest difference in life spans?

### UNDERSTAND

- What are you asked to find?
- What information will you use?
- Is there any information you will not use? If so, what?



### PLAN

- What strategy can you use to solve the problem?  
*You can make a graph to help you see the information easily.*

### SOLVE



















- What graph or plot can you make to help you solve the problem?

*You can make a pictograph to compare the life spans of the fish.*

On the graph, the French angelfish has the greatest number of symbols, so its life span is the longest. The coney has the least number of symbols, so its life span is the shortest.

So, the French angelfish and the coney have the greatest difference in life spans.

LIFE SPANS OF FISH

Type of Fish	Life Span (in years)
French angelfish	      
Queen parrotfish	  
Queen triggerfish	     
Coney	 

Key: Each  = 2 years.

### CHECK

- How can you check to see whether your graph is correct?



## Problem Solving Practice

1. **What if** you wanted to add the bonefish to your pictograph? The bonefish has a life span of about 10 years. How many symbols would you use on your pictograph for this fish?
2. **FAST FACT • SCIENCE** The maximum length of a neon goby is 5 cm. For a reef butterflyfish it is 15 cm, for a striped parrotfish it is 35 cm, and for a purple reefish it is 10 cm. Make a pictograph of the data. Then find the median.

For 3–4 use the table.

3. How many trees were planted by Tate School?  
 A 20                      C 24  
 B 23                      D 25
4. How many more trees did Tate School plant in 2001 than in 2002?  
 F 2                        H 4  
 G 3                        J 5



## Mixed Strategy Practice

5. Henri found that 986 people went to a movie on Friday, 1,453 people went on Saturday, and 1,622 went on Sunday. How many people went to the movie in all?
6. Each of the 24 students is playing either basketball or volleyball. If 4 students switched from basketball to volleyball, there would be an equal number playing each sport. How many students are playing volleyball?
7. There are 57 shirts. Twenty of them are blue and the others are yellow. Write an equation using the variable  $y$  to show this.
8. Ben has 3 times as many marbles as Jon. Together they have between 18 and 25 marbles. How many marbles might Jon have?
9. Carmen bought a shirt for \$14.99. She bought a sweater for \$25.39. Estimate to the nearest dollar the amount that Carmen spent.
10. The product of two numbers is 36. Their sum is 13. What are the numbers? What is their difference?

## Strategies

Draw a Diagram or Picture  
 Make a Model or Act It Out  
 Make an Organized List  
 Find a Pattern

**Make a Table or Graph**  
 Predict and Test  
 Work Backward  
 Solve a Simpler Problem  
 Write an Equation  
 Use Logical Reasoning



# Extra Practice

## Set A (pp. 114–117)

Use the frequency table.

- During which hour were the most cups of juice sold?
- How many total cups of juice were sold?

CUPS OF JUICE SOLD AT THE FESTIVAL		
Hour	Frequency	Cumulative Frequency
1	15	15
2	26	41
3	28	69
4	19	88

## Set B (pp. 118–121)

Find the mean, median, and mode.

1.

CARS WASHED				
Hour	1	2	3	4
Cars	6	4	3	7

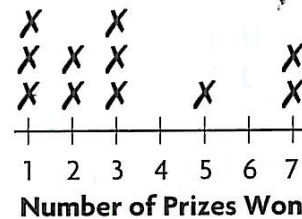
2.

MOVIES SEEN IN THE SUMMER					
Student	Ed	Sue	Bob	Jan	Ann
Movies	7	6	9	4	4

## Set C (pp. 122–123)

Use the line plot.

- How many total prizes were won?
- Find the range, the mode(s), and the median, of the number of prizes won.



## Set D (pp. 124–125)

Use the stem-and-leaf plot.

- What is the mode? What is the median?
- Find the lowest score and the highest score. What is the range?

Spelling Test Scores						
Stem	Leaves					
7	1	4	4	6	6	
8	2	2	3	5	8	8
9	2	2	4	4	4	4

## Set E (pp. 126–127)

Use the graph.

- What is the scale of the graph? What is the interval?
- How would the bars change if the interval were 10? if it were 3?

