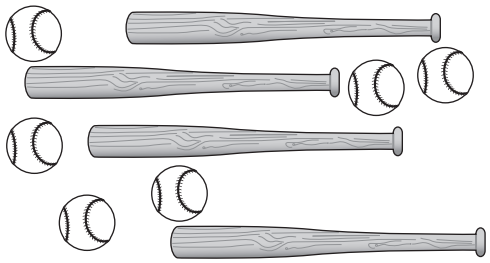
Name_____ Date _____

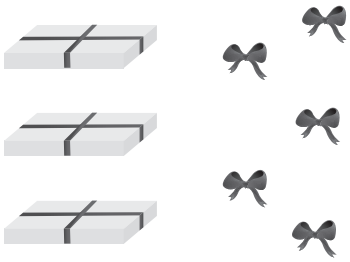
# Chapter 10 Fair Game Review

**Write the ratio in simplest form.**

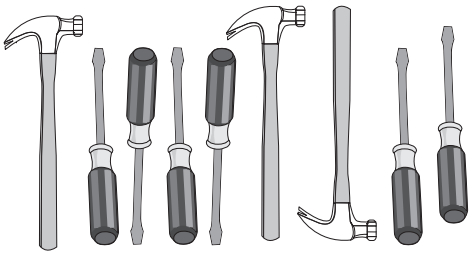
**1.** bats to baseballs



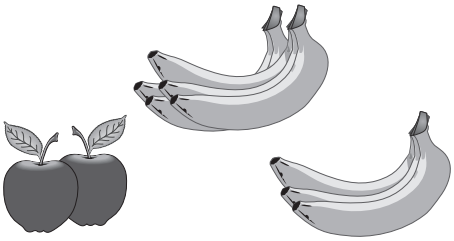
**2.** bows to gift boxes



**3.** hammers to screwdrivers



**4.** apples to bananas



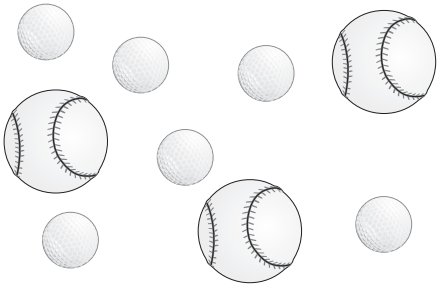
**5.** There are 100 students in the sixth grade. There are 15 sixth-grade teachers. What is the ratio of teachers to students?

Name _____ Date _____

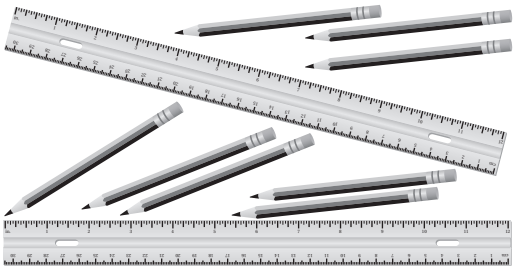
# Chapter 10 Fair Game Review (continued)

**Write the ratio in simplest form.**

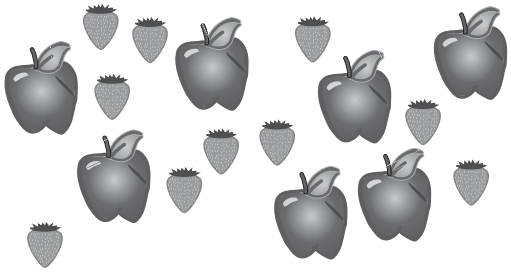
**6.** golf balls to total number of balls



**7.** rulers to total pieces of equipment



**8.** apples to total number of fruit



**9.** small fish to total number of fish

**10.** There are 24 flute players and 18 trumpet players in the band. Write the ratio of trumpet players to total number of trumpet players and flute players.

Name_____ Date _____

# 10.1 Outcomes and Events

**For use with Activity 10.1**

**Essential Question** In an experiment, how can you determine the number of possible results?

An *experiment* is an investigation or a procedure that has varying results. Flipping a coin, rolling a number cube, and spinning a spinner are all examples of experiments.

## 1 ACTIVITY: Conducting Experiments

**Work with a partner.**

**a.** You flip a dime.

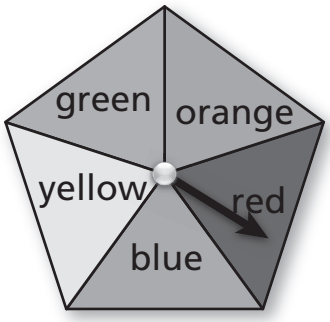

There are _____ possible results.

Out of 20 flips, you think you will flip heads _____ times.

Flip a dime 20 times. Tally your results in a table. How close was your guess?

| Flip | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Result | | | | | | | | | | | | | | | | | | | | |

**b.** You spin the spinner shown.



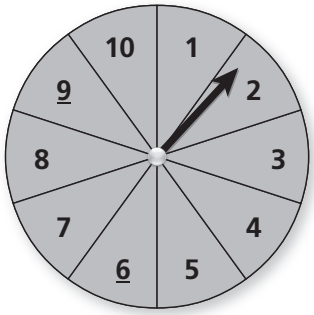

There are _____ possible results.

Out of 20 spins, you think you will spin orange _____ times.

Spin the spinner 20 times. Tally your results in a table. How close was your guess?

| Spin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Result | | | | | | | | | | | | | | | | | | | | |

**c.** You spin the spinner shown.




There are _____ possible results.

Out of 20 spins, you think you will spin a 4 _____ times.

Spin the spinner 20 times. Tally your results in a table. How close was your guess?

| Spin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Result | | | | | | | | | | | | | | | | | | | | |

Name _____ Date _____

## 10.1 Outcomes and Events (continued)

### 2 ACTIVITY: Comparing Different Results

**Work with a partner. Use the spinner in Activity 1(c).**

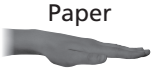
**a.** Do you have a better chance of spinning an even number or a multiple of 4? Explain your reasoning.

**b.** Do you have a better chance of spinning an even number or an odd number? Explain your reasoning.

### 3 ACTIVITY: Rock Paper Scissors

**Work with a partner.**

**a.** Play Rock Paper Scissors 30 times. Tally your results in the table.

| Rock *breaks* scissors.<br>Paper *covers* rock.<br>Scissors *cut* paper. | | **Player A** | | |
|---|---|---|---|---|
| | |  Rock |  Paper |  Scissors |
| **Player B** |  Rock | | | |
| |  Paper | | | |
| |  Scissors | | | |

## 10.1 Outcomes and Events (continued)

**b.** How many possible results are there?

**c.** Of the possible results, in how many ways can Player A win? Player B win? the players tie?

**d.** Does one of the players have a better chance of winning than the other player? Explain your reasoning.

## What Is Your Answer?

**4. IN YOUR OWN WORDS** In an experiment, how can you determine the number of possible results?

Name _____ Date _____

# 10.1 Practice

**For use after Lesson 10.1**

**A bag is filled with 4 red marbles, 3 blue marbles, 3 yellow marbles, and 2 green marbles. You randomly choose one marble from the bag. (a) Find the number of ways the event can occur. (b) Find the favorable outcomes of the event.**

**1.** Choosing red

**2.** Choosing green

**3.** Choosing yellow

**4.** Choosing *not* blue

**5.** In order to figure out who will go first in a game, your friend asks you to pick a number between 1 and 25.

**a.** What are the possible outcomes?

**b.** What are the favorable outcomes of choosing an even number?

**c.** What are the favorable outcomes of choosing a number less than 20?

Name_____ Date _____

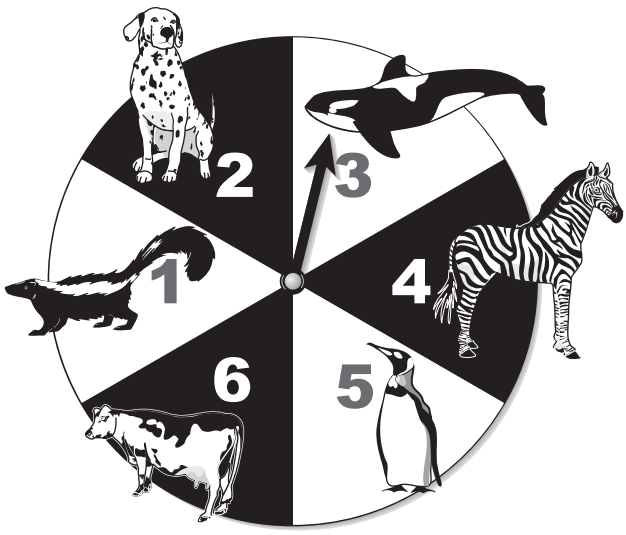
# 10.2 Probability

**For use with Activity 10.2**

**Essential Question** How can you describe the likelihood of an event?

## 1 ACTIVITY: Black-and-White Spinner Game

**Work with a partner. You work for a game company. You need to create a game that uses the spinner below.**




**a.** Write rules for a game that uses the spinner. Then play it.

**b.** After playing the game, do you want to revise the rules? Explain.

**c. CHOOSE TOOLS** Using the center of the spinner as the vertex, measure the angle of each pie-shaped section. Is each section the same size? How do you think this affects the likelihood of spinning a given number?

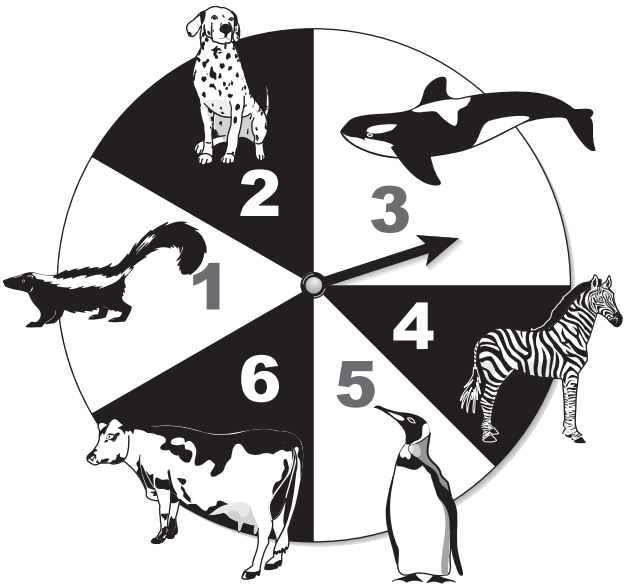
**d.** Your friend is about to spin the spinner and wants to know how likely it is to spin a 3. How would you describe the likelihood of this event to your friend?

## 2 ACTIVITY: Changing the Spinner

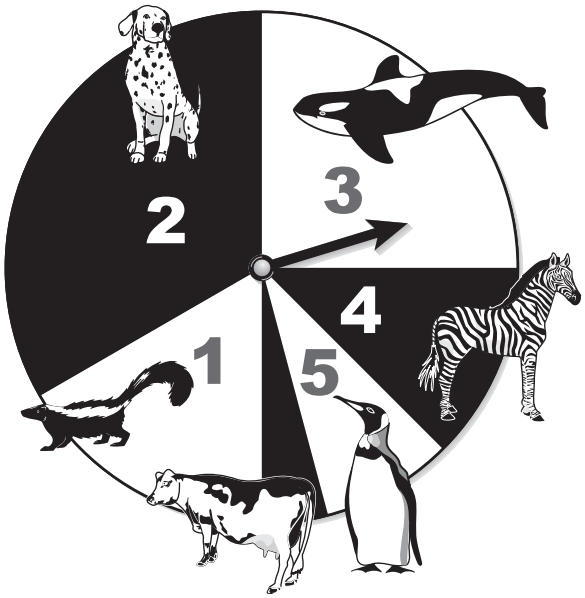
**Work with a partner. For each spinner, do the following.**

- Measure the angle of each pie-shaped section.
- Tell whether you are more likely to spin a particular number. Explain your reasoning.
- Tell whether your rules from Activity 1 make sense for these spinners. Explain your reasoning.

**a.**




**b.**



## 3 ACTIVITY: Is This Game Fair?

**Work with a partner. Apply the following rules to each spinner in Activities 1 and 2. Is the game fair? Why or why not? If not, who has the better chance of winning?**

- **Take turns spinning the spinner.**
- **If you spin an odd number, Player 1 wins.**
- **If you spin an even number, Player 2 wins.**

## What Is Your Answer?

4. **IN YOUR OWN WORDS** How can you describe the likelihood of an event?

5. Describe the likelihood of spinning an 8 in Activity 1.

6. Describe a career in which it is important to know the likelihood of an event.

Name _____ Date _____

# 10.2 Practice

**For use after Lesson 10.2**

**Describe the likelihood of the event given its probability.**

**1.** There is a 30% chance of snow tomorrow.

**2.** You solve a brain teaser 0.75 of the time.

**You randomly choose one hat from 3 green hats, 4 black hats, 2 white hats, 2 red hats, and 1 blue hat. Find the probability of the event.**

**3.** Choosing a red hat

**4.** Choosing a black hat

**5.** *Not* choosing a white hat

**6.** Choosing a blue hat

**7.** *Not* choosing a black hat

**8.** *Not* choosing a green hat

**9.** The probability that you draw a mechanical pencil from a group of 25 mechanical and wooden pencils is $\frac{3}{5}$. How many are mechanical pencils?

Name_____ Date _____

# 10.3 Experimental and Theoretical Probability

**For use with Activity 10.3**

**Essential Question** How can you use relative frequencies to find probabilities?

When you conduct an experiment, the **relative frequency** of an event is the fraction or percent of the time that the event occurs.

$$\text{relative frequency} = \frac{\text{number of times the event occurs}}{\text{total number of times you conduct the experiment}}$$

## 1 ACTIVITY: Finding Relative Frequencies

**Work with a partner.**

**a.** Flip a quarter 20 times and record your results. Then complete the table. Are the relative frequencies the same as the probability of flipping heads or tails? Explain.

| | Flipping Heads | Flipping Tails |
|---|---|---|
| **Relative Frequency** | | |

**b.** Compare your results with those of other students in your class. Are the relative frequencies the same? If not, why do you think they differ?

**c.** Combine all of the results in your class. Then complete the table again. Did the relative frequencies change? What do you notice? Explain.

**d.** Suppose everyone in your school conducts this experiment and you combine the results. How do you think the relative frequencies will change?

Name _____ Date _____

## 10.3 Experimental and Theoretical Probability (continued)

### 2 ACTIVITY: Using Relative Frequencies

**Work with a partner. You have a bag of colored chips. You randomly select a chip from the bag and replace it. The table shows the number of times you select each color.**

| Red | Blue | Green | Yellow |
|---|---|---|---|
| 24 | 12 | 15 | 9 |

**a.** There are 20 chips in the bag. Can you use the table to find the exact number of each color in the bag? Explain.

**b.** You randomly select a chip from the bag and replace it. You do this 50 times, then 100 times, and you calculate the relative frequencies after each experiment. Which experiment do you think gives a better approximation of the exact number of each color in the bag? Explain.

### 3 ACTIVITY: Conducting an Experiment

**Work with a partner. You toss a thumbtack onto a table. There are two ways the thumbtack can land.**

Point up

On its side

**a.** Your friend says that because there are two outcomes, the probability of the thumbtack landing point up must be $\frac{1}{2}$. Do you think this conclusion is true? Explain.

**b.** Toss a thumbtack onto a table 50 times and record your results. In a *uniform probability model*, each outcome is equally likely to occur. Do you think this experiment represents a uniform probability model? Explain.

Use the relative frequencies to complete the following.

$P(\text{point up}) =$ _____ $P(\text{on its side}) =$ _____

## 10.3 Experimental and Theoretical Probability (continued)

### What Is Your Answer?

**4. IN YOUR OWN WORDS** How can you use relative frequencies to find probabilities? Give an example.

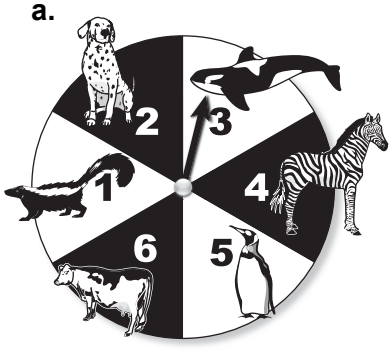
**5.** Your friend rolls a number cube 500 times. How many times do you think your friend will roll an odd number? Explain your reasoning.

**6.** In Activity 2, your friend says, "There are no orange-colored chips in the bag." Do you think this conclusion is true? Explain.

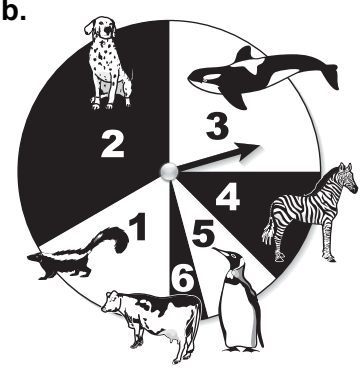
**7.** Give an example of an experiment that represents a uniform probability model.

**8.** Tell whether you can use each spinner to represent a uniform probability model. Explain your reasoning.

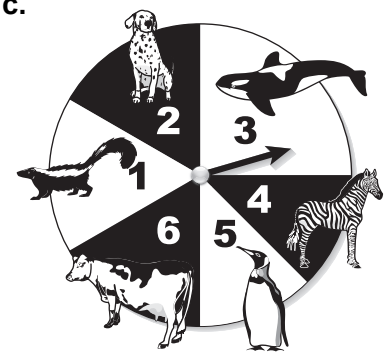
**a.**




**b.**




**c.**

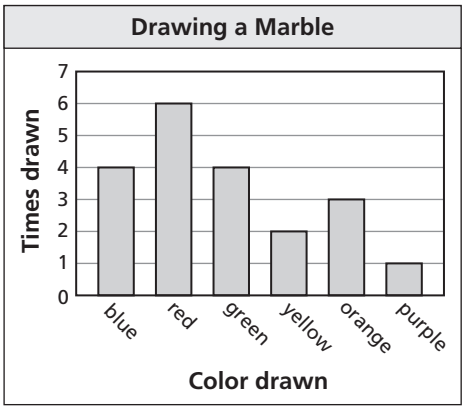


Name _____ Date _____

# 10.3 Practice

**For use after Lesson 10.3**

**Use the bar graph to find the experimental probability of the event.**




**1.** Drawing red

**2.** Drawing orange

**3.** Drawing *not* yellow

**4.** Drawing a color with more than 4 letters in its name

**5.** There are 25 students' names in a hat. You choose 5 names. Three are boys' names and two are girls' names. How many of the 25 names would you expect to be boys' names?

**Use a number cube to determine the theoretical probability of the event.**

**6.** Rolling a 2

**7.** Rolling a 5

**8.** Rolling an even number

**9.** Rolling a number greater than 1

Name_____ Date _____

# 10.4 Compound Events

**For use with Activity 10.4**

**Essential Question** How can you find the number of possible outcomes of one or more events?

## 1 ACTIVITY: Comparing Combination Locks

**Work with a partner. You are buying a combination lock. You have three choices.**


**a.** This lock has 3 wheels. Each wheel is numbered from 0 to 9.

The least three-digit combination possible is _____.

The greatest three-digit combination possible is _____.

How many possible combinations are there?

**b.** Use the lock in part (a).

There are _____ possible outcomes for the first wheel.

There are _____ possible outcomes for the second wheel.

There are _____ possible outcomes for the third wheel.

How can you use multiplication to determine the number of possible combinations?

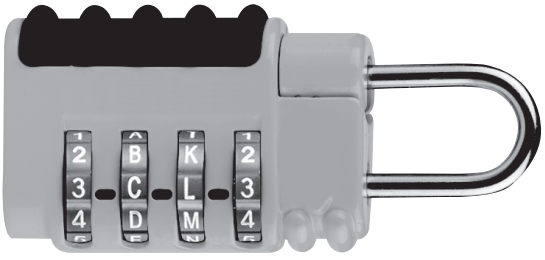

**c.** This lock is numbered from 0 to 39. Each combination uses three numbers in a right, left, right pattern. How many possible combinations are there?

**d.** This lock has 4 wheels.

**Wheel 1:** 0–9 **Wheel 2:** A–J

**Wheel 3:** K–T **Wheel 4:** 0–9

How many possible combinations are there?



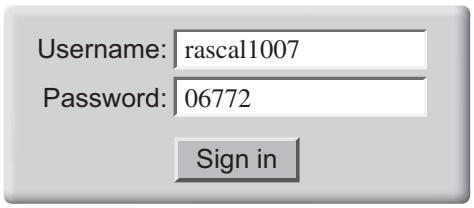
**e.** For which lock is it most difficult to guess the combination? Why?

## 2 ACTIVITY: Comparing Password Security

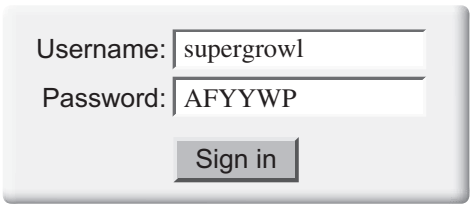
**Work with a partner. Which password requirement is most secure? Explain your reasoning. Include the number of different passwords that are possible for each requirement.**

**a.** The password must have four digits.

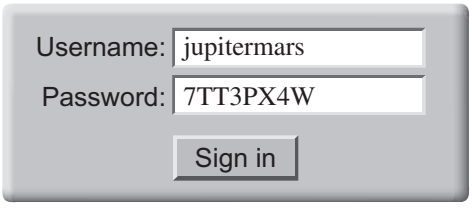

**b.** The password must have five digits.




**c.** The password must have six letters.




**d.** The password must have eight digits or letters.



## 10.4 Compound Events (continued)

### What Is Your Answer?

3. **IN YOUR OWN WORDS** How can you find the number of possible outcomes of one or more events?

4. **SECURITY** A hacker uses a software program to guess the passwords in Activity 2. The program checks 600 passwords per minute. What is the greatest amount of time it will take the program to guess each of the four types of passwords?

   **a.** four digits

   **b.** five digits

   **c.** six letters

   **d.** eight digits or letters

Name _____ Date _____

# 10.4 Practice

**For use after Lesson 10.4**

**1.** Use a tree diagram to find the total number of possible outcomes.

| Bed Sheets | |
|---|---|
| **Size** | Twin, Twin XL, Full, Queen, King |
| **Style** | Solid, Patterned |

**Use the Fundamental Counting Principle to find the total number of possible outcomes.**

**2.**

| Photos | |
|---|---|
| **Size** | Wallet, 4 by 6, 5 by 7, 8 by 10, 11 by 14, 16 by 20 |
| **Finish** | Matte, Glossy |
| **Edits** | Red eye, Black and white, Crop |

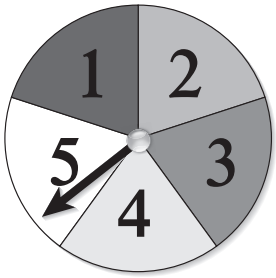
**3.**

| Laptops | |
|---|---|
| **Hard Drive** | 250 GB, 320 GB, 500 GB |
| **Style** | HD, LCD |
| **Color** | Black, White, Red, Blue, Pink, Green, Purple |

**You spin the spinner and flip a coin. Find the probability of the events.**

**4.** Spinning a 2 and flipping tails

**5.** Spinning a 7 and flipping heads




**6.** *Not* spinning a 4 and flipping tails

Name_____ Date _____

# 10.5 Independent and Dependent Events

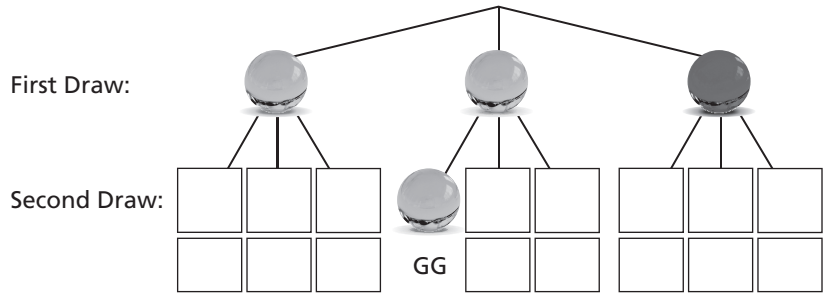
**For use with Activity 10.5**

**Essential Question** What is the difference between dependent and independent events?

## 1 ACTIVITY: Drawing Marbles from a Bag (With Replacement)

**Work with a partner. You have three marbles in a bag. There are two green marbles and one purple marble. Randomly draw a marble from the bag. Then put the marble back in the bag and draw a second marble.**

**a.** Complete the tree diagram. Let G = Green and P = Purple. Find the probability that both marbles are green.

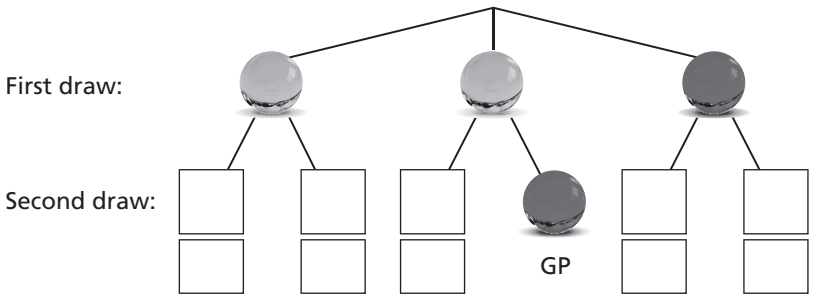



**b.** Does the probability of getting a green marble on the second draw *depend* on the color of the first marble? Explain.

## 2 ACTIVITY: Drawing Marbles from a Bag (Without Replacement)

**Work with a partner. Using the same marbles from Activity 1, randomly draw two marbles from the bag.**

**a.** Complete the tree diagram. Let G = Green and P = Purple. Find the probability that both marbles are green.




Is this event more likely than the event in Activity 1? Explain.

**b.** Does the probability of getting a green marble on the second draw *depend* on the color of the first marble? Explain.

Name _____ Date _____

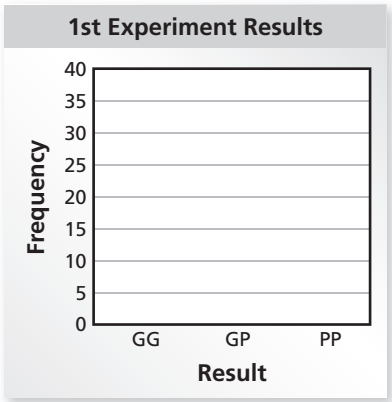
## 10.5 Independent and Dependent Events (continued)

### 3 ACTIVITY: Conducting an Experiment

**Work with a partner. Conduct two experiments using two green marbles (G) and one purple marble (P).**

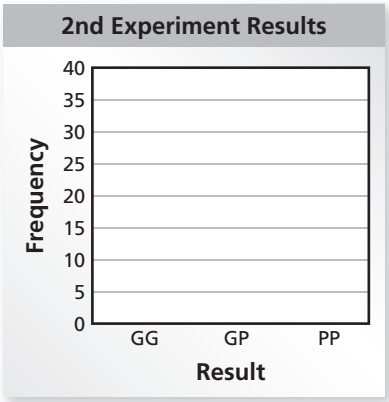
**a.** In the first experiment, randomly draw one marble from the bag. Put it back. Draw a second marble. Repeat this 36 times. Record each result. Make a bar graph of your results.

| | |
|---|---|
| **GG** | |
| **GP** | |
| **PP** | |




**b.** In the second experiment, randomly draw two marbles from the bag 36 times. Record each result. Make a bar graph of your results.

| | |
|---|---|
| **GG** | |
| **GP** | |
| **PP** | |




**c.** For each experiment, estimate the probability of drawing two green marbles.

**d.** Which experiment do you think represents *dependent events*? Which represents *independent events*? Explain your reasoning.

## 10.5 Independent and Dependent Events (continued)

### What Is Your Answer?

**4. IN YOUR OWN WORDS** What is the difference between *dependent* and *independent* events? Describe a real-life example of each.

**In Questions 5–7, tell whether the events are *independent* or *dependent*. Explain your reasoning.**

**5.** You roll a 5 on a number cube and spin blue on a spinner.

**6.** Your teacher chooses one student to lead a group, and then chooses another student to lead another group.

**7.** You spin red on one spinner and green on another spinner.

**8.** In Activities 1 and 2, what is the probability of drawing a green marble on the first draw? on the second draw? How do you think you can use these two probabilities to find the probability of drawing two green marbles?

Name _____ Date _____

# 10.5 Practice

**For use after Lesson 10.5**

**You roll a number cube twice. Find the probability of the events.**

**1.** Rolling a 3 twice

**2.** Rolling an even number and a 5

**3.** Rolling an odd number and a 2 or a 4

**4.** Rolling a number less than 6 and a 3 or a 1

**You randomly choose a letter from a hat with the letters A through J. Without replacing the first letter, you choose a second letter. Find the probability of the events.**

**5.** Choosing an H and then a D

**6.** Choosing a consonant and then an E or an I

**7.** Choosing a vowel and then an F

**8.** Choosing a vowel and then a consonant

**9.** You have 3 clasp bracelets, 4 watches, and 5 stretch bracelets. You randomly choose two from your jewelry box. What is the probability that you will choose 2 watches?

**You flip a coin, and then roll a number cube twice. Find the probability of the event.**

**10.** Flipping heads, rolling a 5, and rolling a 2

**11.** Flipping tails, rolling an odd number, and rolling a 4

**12.** Flipping tails, rolling a 6 or a 1, and rolling a 3

**13.** Flipping heads, *not* rolling a 2, and rolling an even number

Name_____ Date _____

**Extension 10.5**

# Practice

**For use after Extension 10.5**

**1.** You write a four-question survey. Each question has a *yes* or *no* answer. You have your friend answer the survey.

**a.** Design a simulation that you can use to model the answers.

**b.** Use your simulation to find the experimental probability that your friend answers *yes* to all four questions.

Name _____ Date _____

**Extension 10.5** **Practice (continued)**

**2.** There is a 70% chance of snow today and tomorrow.

**a.** Design and use a simulation that generates 50 randomly generated numbers.

**b.** Find the experimental probability that it snows one of those days.

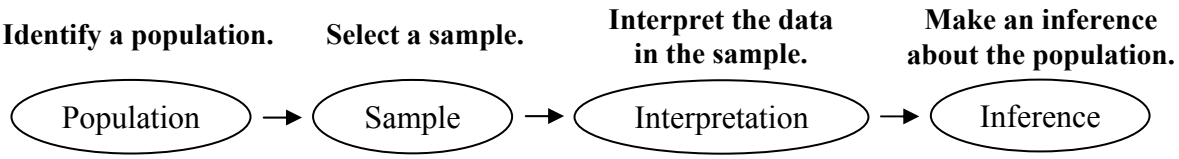
Name_____ Date _____

# 10.6 Samples and Populations

**For use with Activity 10.6**

**Essential Question** How can you determine whether a sample accurately represents a population?

A **population** is an entire group of people or objects. A **sample** is a part of the population. You can use a sample to make an inference, or conclusion, about a population.

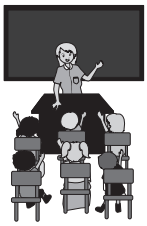



## 1 ACTIVITY: Identifying Populations and Samples

**Work with a partner. Identify the population and the sample.**

**a.**

The students in a school



The students in a math class

**b.**

The grizzly bears with GPS collars in a park

The grizzly bears in a park

**c.**

150 Quarters

All quarters in circulation

**d.**

All books in a library

10 fiction books in a library

## 2 ACTIVITY: Identifying Random Samples

**Work with a partner. When a sample is selected at random, each member of the population is equally likely to be selected. You want to know the favorite extracurricular activity of students at your school. Determine whether each method will result in a random sample. Explain your reasoning.**

**a.** You ask members of the school band.

**b.** You publish a survey in the school newspaper.

**c.** You ask every eighth student who enters the school in the morning.

**d.** You ask students in your class.

## 3 ACTIVITY: Identifying Representative Samples

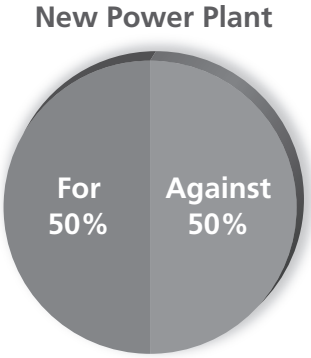
**Work with a partner. A new power plant is being built outside a town. In each situation below and on the next page, residents of the town are asked how they feel about the new power plant. Determine whether each conclusion is valid. Explain your reasoning.**

**a.** A local radio show takes calls from 500 residents. The table shows the results. The radio station concludes that most of the residents of the town oppose the new power plant.

| New Power Plant | |
|---|---|
| For | 70 |
| Against | 425 |
| Don't know | 5 |

## 10.6 Samples and Populations (continued)

**b.** A news reporter randomly surveys 2 residents outside a supermarket. The graph shows the results. The reporter concludes that the residents of the town are evenly divided on the new power plant.




**c.** You randomly survey 250 residents at a shopping mall. The table shows the results. You conclude that there are about twice as many residents of the town against the new power plant than for the new power plant.

| New Power Plant | |
|---|---|
| For | 32% |
| Against | 62% |
| Don't know | 6% |

## What Is Your Answer?

**4. IN YOUR OWN WORDS** How can you determine whether a sample accurately represents a population?

**5. RESEARCH** Choose a topic that you would like to ask people's opinions about, and then write a survey question. How would you choose people to survey so that your sample is random? How many people would you survey? Conduct your survey and display your results. Would you change any part of your survey to make it more accurate? Explain.

**6.** Does increasing the size of a sample necessarily make the sample representative of a population? Give an example to support your explanation.

Name _____ Date _____

# 10.6 Practice

**For use after Lesson 10.6**

**Determine whether the sample is *biased* or *unbiased*. Explain.**

1. You want to estimate the number of students in your school who want a football stadium to be built. You survey the first 20 students who attend a Friday night football game.

2. You want to estimate the number of students in your school who drive their own cars to school. You survey every 8th person who enters the cafeteria for lunch.

**Determine whether the conclusion is valid. Explain.**

3. You want to determine the number of city residents who want to have 38th Street repaved. You randomly survey 15 residents who live on 38th Street. Twelve want the street to be repaved and three do not. So, you conclude that 80% of city residents want the street to be repaved.

4. You want to determine how many students consider math to be their favorite school subject. You randomly survey 75 students. Thirty-three students consider math to be their favorite subject and forty-two do not. So, you conclude that 40% of students at your school consider math to be their favorite subject.

Name_____ Date _____

# Extension 10.6 Generating Multiple Samples

**For use with Extension 10.6**

You have already used unbiased samples to make inferences about a population. In some cases, making an inference about a population from only one sample is not as precise as using multiple samples.

## 1 ACTIVITY: Using Multiple Random Samples

**Work with a partner. You and a group of friends want to know how many students in your school listen to pop music. There are 840 students in your school. Each person in the group randomly surveys 20 students.**

**Step 1:** The table shows your results. Make an inference about the number of students in your school who prefer pop music.

| Favorite Type of Music | | | |
|---|---|---|---|
| Country | Pop | Rock | Rap |
| 4 | 10 | 5 | 1 |

**Step 2:** The table shows Kevin's results. Use these results to make another inference about the number of students in your school who prefer pop music.

| Favorite Type of Music | | | |
|---|---|---|---|
| Country | Pop | Rock | Rap |
| 2 | 13 | 4 | 1 |

Compare the results of Steps 1 and 2.

**Step 3:** The table shows the results of three other friends. Use these results to make three more inferences about the number of students in your school who prefer pop music.

| | Favorite Type of Music | | | |
|---|---|---|---|---|
| | Country | Pop | Rock | Rap |
| **Steve** | 3 | 8 | 7 | 2 |
| **Laura** | 5 | 10 | 4 | 1 |
| **Ming** | 5 | 9 | 3 | 3 |

Name _____ Date _____

## Extension 10.6 Generating Multiple Samples (continued)

**Step 4:** Describe the variation of the five inferences. Which one would you use to describe the number of students in your school who prefer pop music? Explain your reasoning.

**Step 5:** Show how you can use all five samples to make an inference.

## Practice

**1.** Work with a partner. Mark 24 packing peanuts with either a red or a black marker. Put the peanuts into a paper bag. Trade bags with other students in the class.

**a.** Generate a sample by choosing a peanut from your bag six times, replacing the peanut each time. Record the number of times you choose each color. Repeat this process to generate four more samples. Organize the results in a table.

**b.** Use each sample to make an inference about the number of red peanuts in the bag. Then describe the variation of the five inferences. Make inferences about the numbers of red and black peanuts in the bag based on all the samples.

**c.** Take the peanuts out of the bag. How do your inferences compare to the population? Do you think you can make a more accurate prediction? If so, explain how.

Name_____ Date _____

**Extension 10.6** **Generating Multiple Samples (continued)**

## 2 ACTIVITY: Using Measures from Multiple Random Samples

**Work with a partner. You want to know the mean number of hours students with part-time jobs work each week. You go to 8 different schools. At each school, you randomly survey 10 students with part-time jobs. Your results are shown at the right.**

**Hours Worked Each Week**
**1:** 6, 8, 6, 6, 7, 4, 10, 8, 7, 8
**2:** 10, 4, 4, 6, 8, 6, 7, 12, 8, 8
**3:** 10, 9, 8, 6, 5, 8, 6, 6, 9, 10
**4:** 4, 8, 4, 4, 5, 4, 4, 6, 5, 6
**5:** 6, 8, 8, 6, 12, 4, 10, 8, 6, 12
**6:** 10, 10, 8, 9, 16, 8, 7, 12, 16, 14
**7:** 4, 5, 6, 6, 4, 5, 6, 6, 4, 4
**8:** 16, 20, 8, 12, 10, 8, 8, 14, 16, 8

**Step 1:** Find the mean of each sample.

**Step 2:** Make a box-and-whisker plot of the sample means.

**Step 3:** Use the box-and-whisker plot to estimate the actual mean number of hours students with part-time jobs work each week. How does your estimate compare to the mean of the entire data set?

## 3 ACTIVITY: Using a Simulation

**Work with a partner. Another way to generate multiple samples of data is to use a simulation. Suppose 70% of all seventh graders watch reality shows on television.**

**Step 1:** Design a simulation involving 50 packing peanuts by marking 70% of the peanuts with a certain color. Put the peanuts into a paper bag.

**Step 2:** Simulate choosing a sample of 30 students by choosing peanuts from the bag, replacing the peanut each time. Record the results. Repeat this process to generate eight more samples. How much variation do you expect among the samples? Explain.

Name _____ Date _____

**Extension 10.6** **Generating Multiple Samples (continued)**

**Step 3:** Display your results.

## Practice

**2.** You want to know whether student-athletes prefer water or sports drinks during games. You go to 10 different schools. At each school, you randomly survey 10 student-athletes. The percents of student-athletes who prefer water are shown.

60% 70% 60% 50% 80% 70% 30% 70% 80% 40%

**a.** Make a box-and-whisker plot of the data.

**b.** Use the box-and-whisker plot to estimate the actual percent of student-athletes who prefer water. How does your estimate compare to the mean of the data?

**3.** Repeat Activity 2 using the medians of the samples.

**4.** In Activity 3, how do the percents in your samples compare to the actual percent of seventh graders who watch reality shows on television?

**5.** **REASONING** Why is it better to make inferences about a population based on multiple samples instead of only one sample? What additional information do you gain by taking multiple random samples? Explain.

Name_____ Date _____

# 10.7 Comparing Populations

**For use with Activity 10.7**

**Essential Question** How can you compare data sets that represent two populations?

## 1 ACTIVITY: Comparing Two Data Distributions

**Work with a partner. You want to compare the shoe sizes of male students in two classes. You collect the data shown in the table.**

| Male Students in Eighth-Grade Class | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 9 | 8 | $7\frac{1}{2}$ | $8\frac{1}{2}$ | 10 | 6 | $6\frac{1}{2}$ | 8 | 8 | $8\frac{1}{2}$ | 9 | 11 | $7\frac{1}{2}$ | $8\frac{1}{2}$ |
| **Male Students in Sixth-Grade Class** | | | | | | | | | | | | | | |
| 6 | $5\frac{1}{2}$ | 6 | $6\frac{1}{2}$ | $7\frac{1}{2}$ | $8\frac{1}{2}$ | 7 | $5\frac{1}{2}$ | 5 | $5\frac{1}{2}$ | $6\frac{1}{2}$ | 7 | $4\frac{1}{2}$ | 6 | 6 |

**a.** How can you display both data sets so that you can visually compare the measures of center and of variation? Make the data display you chose.

**b.** Describe the shape of each distribution.

**c.** Complete the table.

| | Male Students in Eighth Grade Class | Male Students in Sixth Grade Class |
|---|---|---|
| **Mean** | | |
| **Median** | | |
| **Mode** | | |
| **Range** | | |
| **Interquartile Range (IQR)** | | |
| **Mean absolute Deviation (MAD)** | | |

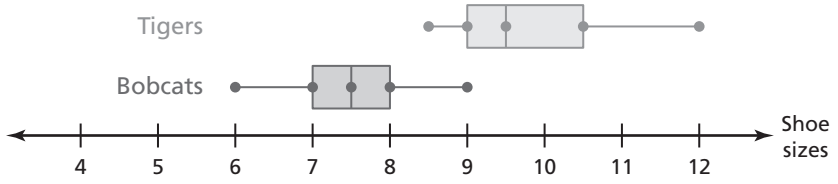
## 10.7 Comparing Populations (continued)

**d.** Compare the measures of center for the data sets.

**e.** Compare the measures of variation for the data sets. Does one data set show more variation than the other? Explain.

**f.** Do the distributions overlap? How can you tell using the data display you chose in part (a)?

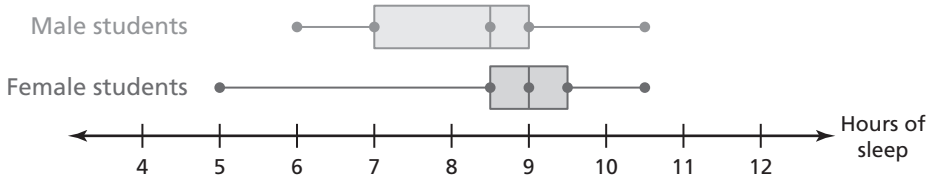
**g.** The double box-and-whisker plot below shows the shoe sizes of the members of two girls basketball teams. Can you conclude that at least one girl from each team has the same shoe size? Can you conclude that at least one girl from the Bobcats has a larger shoe size than one of the girls from the Tigers? Explain your reasoning.




## 2 ACTIVITY: Comparing Two Data Distributions

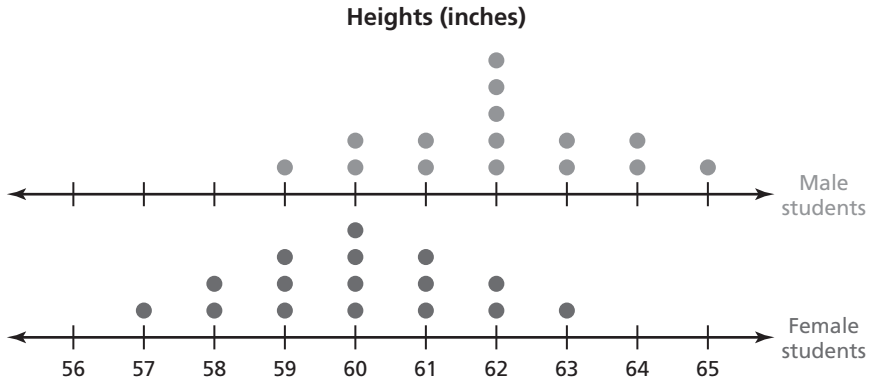
**Work with a partner. Compare the shapes of the distributions. Do the two data sets overlap? Explain. If so, use measures of center and the least and the greatest values to describe the overlap between the two data sets.**

**a.**



## 10.7 Comparing Populations (continued)

**b.**




**c. Ages of People in Two Exercise Classes**

| 10:00 A.M. Class | | | | | | | 8:00 P.M. Class | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | 8 | 9 | | | | |
| | | | | | | 2 | 1 | 2 | 2 | 7 | 9 | 9 |
| | | | | | | 3 | 0 | 3 | 4 | 5 | 7 | |
| 9 | 7 | 3 | 2 | 2 | 2 | 4 | 0 | | | | | |
| | 7 | 5 | 4 | 3 | 1 | 5 | | | | | | |
| | | | 7 | 0 | 0 | 6 | | | | | | |
| | | | | | 0 | 7 | | | | | | |

**Key: 1 | 8 = 18**

## What Is Your Answer?

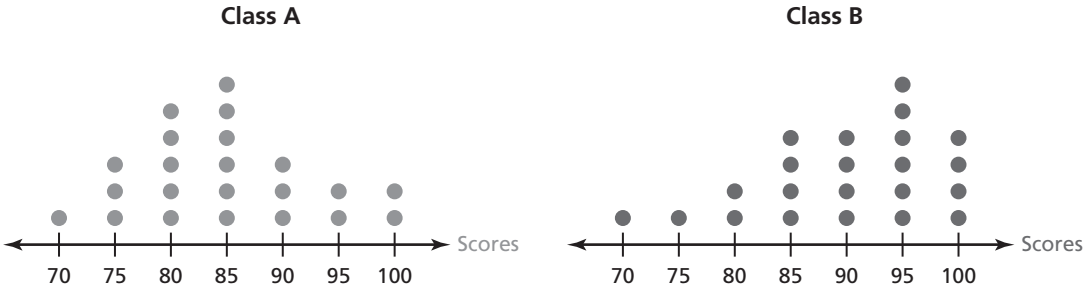
3. **IN YOUR OWN WORDS** How can you compare data sets that represent two populations?

Name _____ Date _____

# 10.7 Practice

**For use after Lesson 10.7**

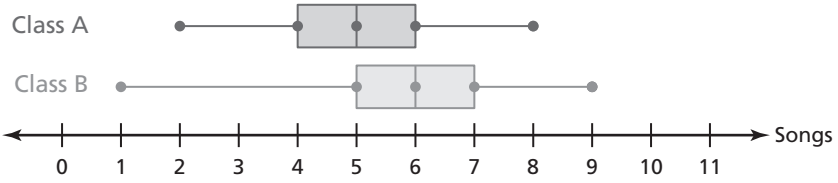
**1.** The dot plots show the quiz scores for two classes taught by the same teacher.




**a.** Compare the populations using measures of center and variation.

**b.** Express the difference in the measures of center as a multiple of the measure of variation.

**2.** The double box-and-whisker plot shows the number of song downloads a month by two seventh grade classes.




**a.** Compare the populations using measures of center and variation.

**b.** Express the difference in the measures of center as a multiple of the measure of variation.