Simulations
Chapter 9 Lesson 4
1. Find the sample space using a tree diagram. Then give the total number of outcomes if choosing a cat or dog and choosing the colors black, brown, or spotted.

2. Using the spinner, what is the probability of spinning two odd numbers in two spins?

3. **TEST PRACTICE** How many styles of sneakers are possible if Jared can choose from high-top or low-top, shoelaces or Velcro, and the colors black, white, or red?

   - A. 3
   - B. 6
   - C. 12
   - D. 24
ANSWERS

1. Animal
   - cat
     - black: black cat
     - brown: brown cat
     - spotted: spotted cat
   - dog
     - black: black dog
     - brown: brown dog
     - spotted: spotted dog

Sample Space: 6

2. $\frac{1}{4}$

3. C
Vocabulary

- **Simulation** - A mathematical experiment that approximates a real-world process
1. A cereal company is placing one of eight different trading cards in its boxes of cereal. If each card is equally likely to appear in a box of cereal, describe a model that could be used to simulate the cards you would find in 15 boxes of cereal.

Choose a method that has 8 possible outcomes, such as tossing 3 coins. Let each outcome represent a different card.

For example, the outcome of all three coins landing heads up could simulate finding card 1.

Toss 3 coins to simulate the cards that might be in 15 boxes of cereal. Repeat 15 times.

<table>
<thead>
<tr>
<th>Coin Toss Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcom</strong></td>
</tr>
<tr>
<td>HHHH</td>
</tr>
<tr>
<td>HHT</td>
</tr>
<tr>
<td>HTH</td>
</tr>
<tr>
<td>HTT</td>
</tr>
</tbody>
</table>
2. Every student who volunteers at the concession stand during basketball games will receive a free school T-shirt. The T-shirts come in 3 different designs.

Design a simulation that could be used to model this situation. Use your simulation to find how many times a student must volunteer in order to get all 3 T-shirts.

1. Use a spinner divided into 3 equal sections. Assign each section one of the T-shirts. Spin the spinner until you land on each section.

   - first spin
   - second spin
   - third spin
   - fourth spin

2. Based on this simulation, a student should volunteer 4 times in order to get all 3 T-shirts.
Practice Problems

1. A supermarket is issuing one of six different in-store discount coupons to each customer who enters the store. If the coupons are given out randomly, describe a model that could be used to simulate which coupons would be given to the first 100 customers.

2. Every marathon runner that passes the halfway point gets a gel pack. There are four different flavors available and they are given out randomly. Describe a model that could be used to simulate this situation. Based on your simulation, how many runners will get gel packs before all four flavors are given out?
1. Sample answer: Assign each face of a number cube to a type of coupon and roll the number cube 100 times.

2. Sample answer: Spin a spinner that has four equal sections until each section is spun once.
3. There is a 60% chance of rain for each of the next two days. Describe a method you could use to find the experimental probability of having rain on both of the next two days.

1. Place 3 red and 2 blue marbles in a bag.
   Let 60% or \( \frac{3}{5} \) of them represent rain.
   Let 40% or \( \frac{2}{5} \) of them represent no rain.

2. Randomly pick one marble to simulate the first day. Replace the marble and pick again to simulate the second day. Find the probability of rain on both days.
During the regular season, Keisha had base hits 40% of her times at bat. Describe an experiment she could use to simulate her next 20 times at bat.
How did you do?

Sample answer: $40\% = \frac{2}{5}$, so Keisha could use a spinner with 5 sections, 2 representing making a base hit and 3 representing a failure to make a base hit. She would spin the spinner 20 times.
Describe a simulation you have used in another class.
Homework

- Pages 745 - 748
- #1 - 10 all and
- #16 - 20 all