

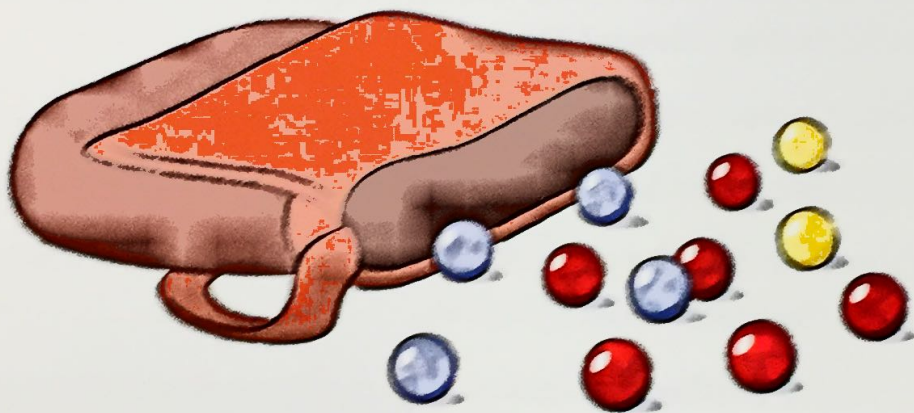
2.2 Choosing Marbles

Developing Probability Models

Sammy collects marbles. He asks his teacher if the class could experiment with marbles instead of blocks. The teacher says, "What really matters is whether we can predict the probabilities in a situation using marbles. Let's try a bag with marbles of different colors."

Problem 2.2

- A** A bag contains two yellow marbles, four blue marbles, and six red marbles. You choose a marble from the bag at random. Answer the following questions and explain your reasoning.



1. What is the probability the marble is yellow? The probability it is blue? The probability it is red?
2. What is the sum of the probabilities from part (1)?
3. What color is the selected marble most likely to be?
4. What is the probability the marble is not blue?
5. What is the probability the marble is either red or yellow?
6. What is the probability the marble is white?
7. Jakayla says the probability the marble is blue is $\frac{12}{4}$. Adsila says $\frac{12}{4}$ is impossible. Which girl is correct?

Problem 2.2 *continued*

- B** Suppose a new bag has twice as many marbles of each color.
1. Do the probabilities change? Explain.
 2. How many blue marbles should you add to this bag to have the probability of choosing a blue marble equal to $\frac{1}{2}$?
- C** A different bag contains several marbles. Each marble is red or white or blue. The probability of choosing a red marble is $\frac{1}{3}$, and the probability of choosing a white marble is $\frac{1}{6}$.
1. What is the probability of choosing a blue marble? Explain.
 2. What is the least number of marbles that can be in the bag?
Suppose the bag contains the least number of marbles.
How many of each color does the bag contain?
 3. Can the bag contain 48 marbles? If so, how many of each color does it contain?
 4. Suppose the bag contains 8 red marbles and 4 white marbles.
How many blue marbles does it contain?
- D**
1. Do you think the experimental probabilities would be different with blocks instead of marbles? How about theoretical probabilities?
 2. Design a fair way for Calvin to choose his breakfast cereal using blocks or marbles.