## Objective

Build a spinner that models a set of probabilities.

## Common Core State Standards

7.SP. 5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $1 / 2$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

## Modeling Probability: Building Spinners

A spinner is a convenient way to model probability-the likelihood that a specified event will occur. Probability can be expressed as a fraction, decimal, or percent. In this lesson, students will build spinners to model probabilities expressed as fractions.

## Try lt! Perform the Try It! activity on the next page.

## Talk About It

## Discuss the Try It! activity.

- Discuss with students the fractions they were given in the problem and have students tell you what the fractions represent.
- Have students write an equation for each spinner showing the sum of the probabilities. Elicit that the sum is always 1 . Ask: Can a probability ever be greater than 1? Elicit that probability is always between 0 and 1. Explain that a value near 0 means an event is unlikely, that a value near 1 means the event is likely, and that a value near $\frac{1}{2}$ means the event is neither unlikely nor likely.


## Solve It

Reread the problem with students. Have them use unit fractions or a combination of unit fractions to create the spinners as described. Have students use the rings to check the accuracy of the spinners and to help them draw the spinners on a piece of paper.

## More Ideas

For other ways to teach about modeling probability-

- Have students extend this activity by creating a spinner that represents the following probabilities: $P($ color 1$)=\frac{1}{10} ; P($ color 2$)=\frac{2}{5} ; P($ color 3$)=\frac{1}{5}$; $P($ color 4$)=\frac{3}{10}$.
- Have students design a number cube with the following probabilities: $P(1)=\frac{1}{6} ; P(2)=\frac{1}{2} ; P(3)=\frac{1}{3}$.


## Formative Assessment

Have students try the following problem.
Which of the following probabilities is correct for the spinner shown here?
A. $P($ green $)=\frac{1}{3}$
B. $P($ yellow $)=\frac{1}{2}$
C. $P($ yellow $)=\frac{1}{6}$
D. $P($ green $)=\frac{1}{2}$


## Try lt !

30 minutes | Groups of 4
Here is a problem about building spinners to model probabilities.

Jake found an old board game in the attic that he'd like to play. The problem is that all of the spinners for the game are missing. Luckily, he found a description of them in the directions. He needs to replace the three spinners described here:

Spinner 1: $P($ color 1$)=\frac{1}{3} ; P($ color 2$)=\frac{1}{2} ; P($ color 3$)=\frac{1}{6}$
Spinner 2: $P($ color 1$)=\frac{5}{12} ; P($ color 2$)=\frac{1}{4} ; P(\operatorname{color} 3)=\frac{1}{3}$
Spinner 3: $P($ color 1$)=\frac{3}{10} ; P($ color 2$)=\frac{1}{5} ; P($ color 3$)=\frac{1}{2}$
Help Jake accurately re-create the spinners he will need.

Introduce the problem. Then have students do the activity to solve the problem. Distribute the materials.


1. Have students build Spinner 1, using the appropriate Fraction Circles to represent each probability. Ask: What color fraction piece will you use to represent $\frac{1}{3}$ ?


## Materials

- Deluxe Rainbow Fraction ${ }^{\circledR}$ Circles
- Rainbow Fraction Circle Rings
- drawing compass
- colored markers


2. Next have students build Spinners 2 and 3, using the appropriate Fraction Circles. Ask: How will you represent $\frac{5}{12}$ ?

## A Look Out!

Some students might struggle to associate the value of a probability with the idea of an event being likely, unlikely, or neither. Use Fraction Towers with a 0-1 number line to demonstrate the concept. represent the correct probabilities. Have them use the ring as an aid to draw the spinners. Students may use markers to color in the sections. Students should label each section with the appropriate fraction.
3. Have students use the Measurement Ring to confirm that the spinner sections

## Use Fraction Circles and the Measurement Ring to make a spinner for the probabilities given. <br> (Check students' work.)

1. 

| Color | Probability |
| :---: | :---: |
| Black | $\frac{1}{12}$ |
| Gray | $\frac{2}{3}$ |
| White | $\frac{1}{4}$ |



Using Fraction Circles and the Measurement Ring, make a spinner for the probabilities given.
2.

| Pattern | Probability |
| :---: | :---: |
| dotted | $\frac{1}{4}$ |
| striped | $\frac{1}{8}$ |
| clear | $\frac{3}{8}$ |
| solid | $\frac{1}{4}$ |

3. 

| Letter | Probability |
| :---: | :---: |
| A | $\frac{3}{10}$ |
| B | $\frac{2}{5}$ |
| C | $\frac{1}{10}$ |
| $D$ | $\frac{1}{5}$ |



## Answer Key

Challenge! When making a spinner showing certain probabilities, what must the sum of the probabilities equal? Explain. Draw a picture to help.

Challenge: (Sample) The probabilities must have a sum of 1 because together they represent the whole circle.
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Name

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