Key Concept and Vocabulary

The set of all outcomes of an experiment is called the sample space.

The sum of the probabilities of all outcomes in a sample space is 1.

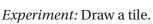


Skill Examples

- **1.** You flip a coin. The sample space of the experiment is Heads (H), Tails (T).
- **2.** You roll a number cube. The sample space of the experiment is 1, 2, 3, 4, 5, 6.
- **3.** You flip a coin and roll a number cube. The sample space of the experiment is H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6.

Visual Model

A hat contains 3 tiles with the letters P, R, and O.



Sample Space:







Probabilities:

$$\frac{1}{3}$$





Sum of Probabilities: $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$

Application Example

- **4.** A referee flips a coin twice. Find the sample space. Show that the sum of the probabilities of all outcomes is 1.
 - The sample space is HH, HT, TH, TT. The probability of each outcome is $\frac{1}{4}$.

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$$

PRACTICE MAKES PURR-FECT®

Check your answers at BigIdeasMath.com. -

Find the sample space of the experiment.

5. Drawing a marble



green, yellow, purple, blue, red

6. Rolling a cube with letters of the word *sample*



s, a, m, p, l, e

7. Rolling a number cube twice
1, 1; 1, 2; 1, 3; 1, 4; 1, 5; 1, 6; 2, 1; 2, 2;
2, 3; 2, 4; 2, 5; 2, 6; 3, 1; 3, 2; 3, 3; 3, 4;
3, 5; 3, 6; 4, 1; 4, 2; 4, 3; 4, 4; 4, 5; 4, 6;

5, 1; 5, 2; 5, 3; 5, 4; 5, 5; 5, 6; 6, 1; 6, 2; 6, 3; 6, 4; 6, 5; 6, 6

- 8. Flipping a coin and rolling the cube in Exercise 6Hs, Ha, Hm, Hp, Hl, He,Ts, Ta, Tm, Tp, Tl, Te
- **9. BILLIARDS** The three balls shown are left on a billiards table. You choose a ball at random, set it aside, and then choose another ball. Find the sample space. Show that the sum of the probabilities of all outcomes is 1.

 $\frac{6, 8; 6, 10; 8, 6; 8, 10; 10, 6; 1}{\frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = 1}$

