

LESSON
13-3

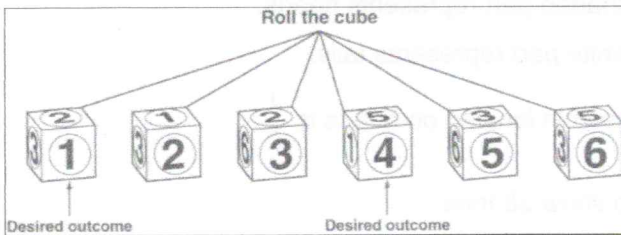
Making Predictions with Theoretical Probability

Reteach

Predictions are thoughtful guesses about what will happen.
You can create an "outcome tree" to keep track of outcomes.

Sally is going to roll a number cube 21 times.
She wants to know how many times she can expect to roll a 1 or 4.

There are a total of 6 **outcomes**.
Of these, **two** outcomes (1 and 4) are desirable.



Use probability to predict the number of times Sally would roll a 1 or 4.

$$P(\text{1 or 4}) = \frac{\text{number of desirable outcomes}}{\text{number of possible outcomes}} = \frac{2}{6} = \frac{1}{3}$$

want
total

Set up a **proportion** relating the probability to the number of tries.

$$\frac{1}{3} = \frac{x}{21}$$

times rolling

3x = 21 Cross-multiply.

x = 7 Simplify.

~~$\frac{1}{3} = \frac{x}{21}$~~
 ~~$3x = 21$~~
 ~~$x = 7$~~

In 21 tries, Sally can expect to roll seven 1s or 4s.

For each **odd-numbered** question, find the **theoretical probability**.
Use that probability to make a prediction in the **even-numbered** question that follows it.

1. Sandra flips a **coin**. What is the probability that the coin will land on **tails**?

want
total

$$P(\text{tails}) = \frac{1}{2}$$

2. Sandra flips the coin **20 times**. How many times can Sandra expect the coin to land on tails?

$$\frac{1}{2} = \frac{x}{20}$$

$x = 10$

~~$\frac{1}{2} = \frac{x}{20}$~~
 ~~$2x = 20$~~
 ~~$x = 10$~~

3. A spinner is divided into **four** equal sections labeled 1 to 4. What is the probability that the spinner will land on **2**?

want
total

$$P(2) = \frac{1}{4}$$

4. If the spinner is **spun 80 times**, how often can you expect it to land on 2?

$$\frac{1}{4} = \frac{x}{80}$$

$x = 20$

~~$\frac{1}{4} = \frac{x}{80}$~~
 ~~$4x = 80$~~
 ~~$x = 20$~~