

# Counting Outcomes (Pages 146–151)

Suppose you can order a T-shirt in any of 3 sizes and 3 colors. You can use a **tree diagram** or the **Fundamental Counting Principle** to find the number of possible choices or **outcomes** for ordering the T-shirt. The choice of size is one **event** and the choice of color is another event. The list of all possible outcomes is the **sample space**.

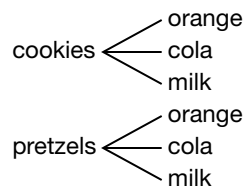
## Fundamental Counting Principle

If event  $M$  can occur in  $m$  ways and is followed by event  $N$  that can occur in  $n$  ways, then the event  $M$  followed by event  $N$  can occur in  $m \times n$  ways.

## EXAMPLES

- A** For a snack, you can choose to have cookies or pretzels. In addition, you can choose one drink from orange, cola, or milk. How many possible outcomes are there?

Use a tree diagram. This tree diagram shows that there are 6 possible outcomes.



- B** Enrique needs to choose a class elective. He can take Spanish, French, Tech I, or Mechanical Drawing. He can take the class during Periods 1, 3, or 4. Find the number of possible outcomes.

Use the Fundamental Counting Principle. There are 4 classes and 3 periods, so the number of possible outcomes is  $4 \times 3$  or 12.

## PRACTICE

**Find the number of possible outcomes by drawing a tree diagram.**

- Eva forgot to study one of the chapters for her history test, so she had to guess on two multiple-choice questions. Each question had four answer choices. How many different outcomes are possible?
- You are making a sandwich for lunch and need to choose one item from each category shown in the table at the right. How many different outcomes are possible?

Bread Type	Meat	Cheese
rye	ham	swiss
white	turkey	cheddar
	beef	

**Find the number of possible outcomes by using the Fundamental Counting Principle.**

- different wrapping choices if a gift wrapping service offers paper in sunflowers, stripes, spirals, or silver plaid, and ribbon in white, yellow, red, silver, and gold



- 4. Standardized Test Practice** How many different cars are possible when choosing from four color options, manual or automatic, and cassette or CD player?

**A** 4  
**C** 16

**B** 8  
**D** 64

Answers: 1–2. See Answer Key. 3. 20 4. C