



Lesson Objectives

Use counting methods to determine possible outcomes

Vocabulary

sample space (p. 636) _____

Fundamental Counting Principle (p. 637) _____

Additional Examples

Example 1

PROBLEM SOLVING APPLICATION

One bag has a red tile, a blue tile, and a green tile. A second bag has a red tile and a blue tile. Vincent draws one tile from each bag. What are all the possible outcomes? How many outcomes are in the sample space?

1. Understand the Problem

Rewrite the question as a statement.

- Find all the possible _____ of drawing one tile from each bag, and determine the size of the _____ space.

List the important information:

- There are _____ bags.
- One bag has a _____ tile, a _____ tile, and a _____ tile.
- The other bag has a _____ tile and a _____ tile.

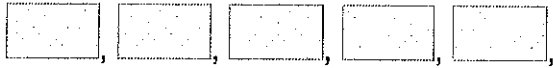
2. Make a Plan

You can make an organized list to show all possible outcomes.

3. Solve

Let R = red tile, B = blue tile, and G = green tile.
Record each possible outcome.

The possible outcomes are



and . There are possible outcomes in the sample space.

Bag 1	Bag 2

4. Look Back

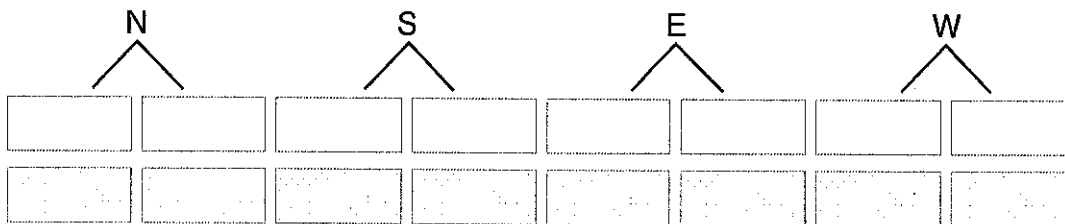
Each possible outcome that is recorded in the list is different.

Example 2

There are 4 cards and 2 tiles in a board game. The cards are labeled N, S, E, and W. The tiles are numbered 1 and 2. A player randomly selects one card and one tile. What are all the possible outcomes? How many outcomes are in the sample space?

You can make a diagram to show the sample space.

List each letter of the cards. Then list each color of the tiles.



There are possible outcomes in the sample space.

Example 3

Carrie rolls two 1-6 number cubes. How many outcomes are possible?

The first number cube has outcomes.

The second number cube has outcomes.

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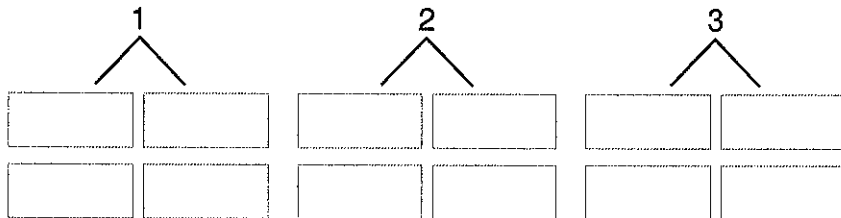
Use the Fundamental Counting Principle.

There are possible outcomes.

Try This

1. Darren has two bags of marbles. One has a green marble and a red marble. The second bag has a blue and a red marble. Darren draws one marble from each bag. What are all the possible outcomes? How many outcomes are in the sample space?

2. There are 2 marbles and 3 cubes in a board game. The marbles are black and red. The cubes are numbered 1, 2, and 3. A player randomly selects one marble and one cube. What are all the possible outcomes? How many outcomes are in the sample space?



3. Juan tosses a coin and rolls a number cube. How many outcomes are possible?

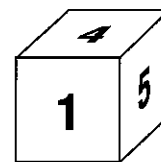
LESSON

Reteach

11-3 Make a List to Find Sample Spaces

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

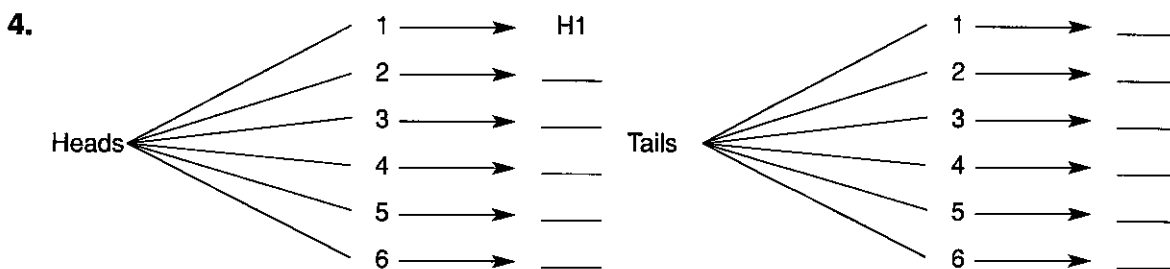
A coin is tossed, and a number cube is rolled. What are all the possible outcomes? How many outcomes are in the sample space? There are two ways to show the sample space for an experiment. You can make a list, or you can make a tree diagram.



Make a list.

1. The possible outcomes for tossing a coin are _____ (H) and _____ (T).
2. The possible outcomes for rolling a number cube are _____, _____, _____, _____, _____, and _____.
3. The sample space is (H, 1), (H, 2), (H, 3), (H, 4), (H, 5), (H, 6), (T, 1), (T, 2), (T, 3), (T, 4), (T, 5), (T, 6). There are _____ possible outcomes in the sample space.

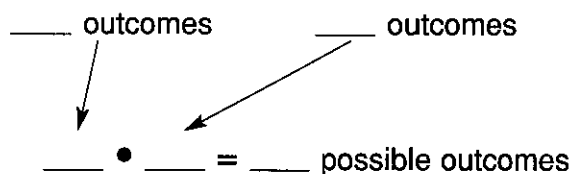
Make a tree diagram.



You can also find the number of possible outcomes by using the Fundamental Counting Principle.

Multiply the possible outcomes of each event.

5. flipping the coin rolling the number cube



LESSON

Practice A

11-3 *Make a List to Find Sample Spaces*

1. Lindsay flips a coin and rolls a 1–6 number cube at the same time. What are the possible outcomes?

2. Jordan has a choice of wheat bread or rye bread and a choice of turkey, ham, or tuna for lunch. What are all the possible choices of sandwiches he can have?

3. Marisol has to decide whether to study Italian, French, or Spanish, and whether to take golf, tennis, or archery in gym class. What are the possible choices that Marisol has?

Choose the letter for the best answer.

4. Chad and Victoria are playing a game with a quarter and a spinner divided into sixths, numbered 1–6. Each player spins the spinner and tosses the coin. How many outcomes are possible in the game?

A 2 **C** 10
B 8 **D** 12

5. For a snack, Sophie can choose milk, apple juice, orange juice, or punch. To go with her drink, she can choose a chocolate cupcake, oatmeal cookie, or crackers. How large is the sample space?

F 12 **H** 4
G 7 **J** 3

6. Marva has a spinner divided into fourths and a 1–6 number cube. She spins the spinner and rolls the number cube. How many outcomes are possible in the game?

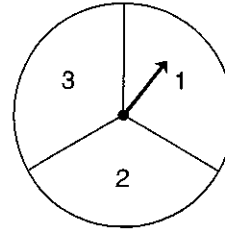
A 4 **C** 10
B 6 **D** 24

7. Larry has a choice of vanilla, chocolate, or strawberry ice cream. The choices of toppings are nuts, sprinkles, or coconut. How many one-topping sundaes can he make?

F 3 **H** 9
G 6 **J** 12

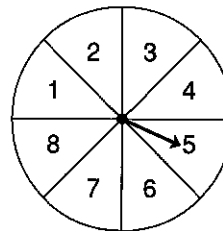
LESSON
11-3 **Practice B**
Make a List to Find Sample Spaces

1. Marcus spins the spinner at the right and flips a dime at the same time. What are the possible outcomes? How many outcomes are in the sample space?



2. For lunch, Britney has a choice of a hot dog, a hamburger, or pizza and a choice of an apple, a pear, or grapes. What are all the possible choices of lunch she can have? How many outcomes are in the sample space?

3. Susan and Ryan are playing a game that involves spinning the spinner at the right and flipping a penny. How many outcomes are possible in the game?



4. An Italian restaurant offers small, medium, and large calzones. The choices of fillings are cheese, sausage, spinach, or vegetable. How many different calzones can you order?

5. There are 5 ways to go from Town X to Town Y. There are 3 ways to go from Town Y to Town Z. How many different ways are there to go from Town X to Town Z, passing through Town Y?

6. Rasheed has tan pants, black pants, gray pants, and blue pants. He has a brown sweater and a white sweater. How many different ways can he wear a sweater and pants together?

LESSON
11-3

Problem Solving

Make a List to Find Sample Spaces

Write the correct answer.

- If you order one topping, how many different choices of bagel and toppings can you order?

- Santana only likes cream cheese or jam on his bagel. How many choices does he have for a one-topping bagel?

- Yesterday, Benny ran out of raisin bagels. How many choices of a bagel and one topping were there?

Benny's Bagels

Bagels	Toppings
Plain	Cream cheese
Poppy	Honey
Raisin	Butter
Sesame	Jam
Egg	

- Today, Benny has all 5 types of bagels but runs out of honey. How many choices of a bagel with one topping can you order?

Choose the letter for the best answer.

- The mall movie multiplex is showing 12 movies. Each movie is shown at five different times during the day. How many choices of movies and showtimes does Reggie have?

A 5	C 17
B 12	D 60
- At Hi-Top Ski Resort, there are three chair lifts to the top of the mountain. There are six ski trails to the bottom of the mountain. How many possible choices of lifts and trails do the skiers have?

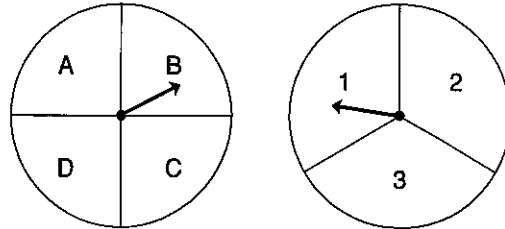
F 9	H 81
G 18	J 2
- In a Little League game, Geri can bat first, second, or third. When at bat, she could strike out, walk, or get a hit. How many outcomes are in the sample space for these events?

A 3
B 6
C 9
D 18
- Ty is flipping a coin. He has decided that if he flips the same result twice in a row, he will do his homework. If he flips 2 different results, then he will go jogging. How likely is it that he will study?

F as likely as not
G likely
H unlikely
J certain

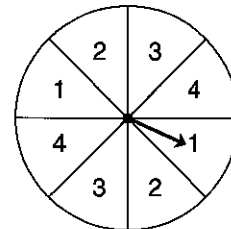
LESSON **11-3** **Practice C**
Make a List to Find Sample Spaces

1. Joanna spins the spinners at the right at the same time. What are the possible outcomes? How many outcomes are in the sample space?



2. For breakfast, Armando has a choice of pancakes, eggs, or cereal and a choice of milk, hot cocoa, or juice. What are all the possible choices of breakfast he can have? How many outcomes are in the sample space?

3. Shannon and Tyler are playing a game that involves spinning the spinner shown at the right and tossing a 1–6 number cube. How many outcomes are possible in the game?



4. If you flip a penny, toss a 1–6 number cube, and flip a quarter, how many outcomes are possible?
5. A Chinese restaurant has a special on Friday nights. For \$20, you can choose one dish from 6 choices in column A and one dish from 5 choices in Column B. In addition, you can choose egg drop or wonton soup. How many different specials can you order?
6. Lisa has a beige skirt, a black skirt, and a denim skirt. She has a red sweater and a white sweater, and she has a white blouse, a blue blouse, and a green blouse. How many different ways can she wear a skirt, sweater, and blouse together?
