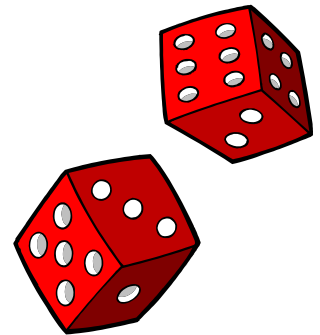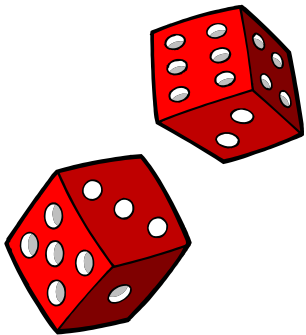# Probability of Compound Events

10.4

Probability of Compound Events

Essential Question:

(1) How do I find the probability of a compound event?

(2) How can I distinguish between a simple and compound event?

Probability of Compound Events

Vocabulary:

- **Sample Space** – the list of possible outcomes for one or more events.

- **Fundamental Counting Principle** – another way to find the total number of possible outcomes.

- **Compound Event** – consists of two or more events. The probability of a compound event is the ratio of the number of favorable outcomes to the number of possible outcomes.
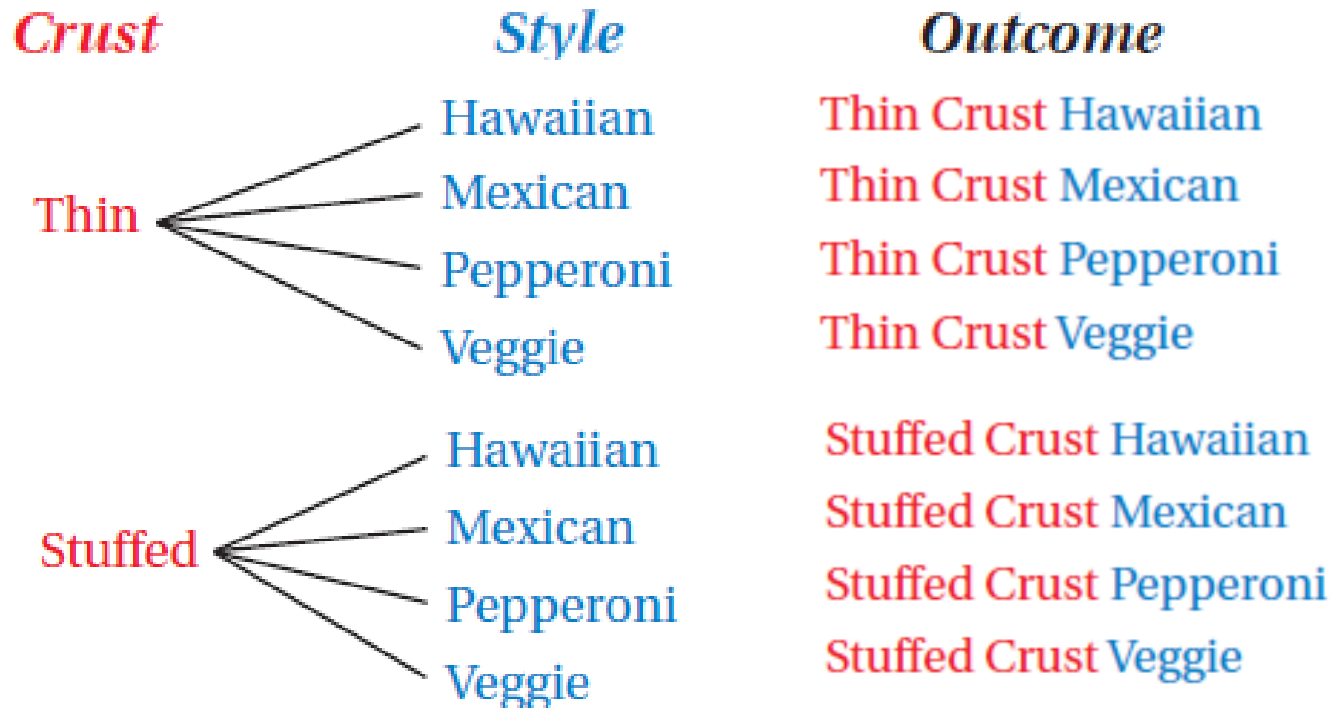
Finding Sample Space

You can use tables and tree diagrams to find the sample space of two or more events.

Example 1:

You randomly choose a crust and style of pizza. Find the sample space. How many different pizzas are possible?

Use a tree diagram to find the sample space.

Crust	Style	Outcome
Thin	Hawaiian	Thin Crust Hawaiian
	Mexican	Thin Crust Mexican
	Pepperoni	Thin Crust Pepperoni
	Veggie	Thin Crust Veggie
Stuffed	Hawaiian	Stuffed Crust Hawaiian
	Mexican	Stuffed Crust Mexican
	Pepperoni	Stuffed Crust Pepperoni
	Veggie	Stuffed Crust Veggie

There 8 different outcomes. So there are 8 different pizzas possible.

Fundamental Counting Principle

- There is a quicker way to determine the number of outcomes. It is called the Fundamental Counting Principle.

- In our pizza problem, simply multiply the number of types of crust (2) times the number of styles (4).
- 2 x 4 = 8

Find the total number of possible outcomes of rolling a number cube and flipping a coin.

Use a table to find the sample space. Let H = heads and T = tails.

	1	2	3	4	5	6
(quarter)						
(quarter)						

There are 12 possible outcomes.

Use the Fundamental Counting Principle. Identify the number of possible outcomes of each event.

Event 1: Rolling a number cube has 6 possible outcomes.

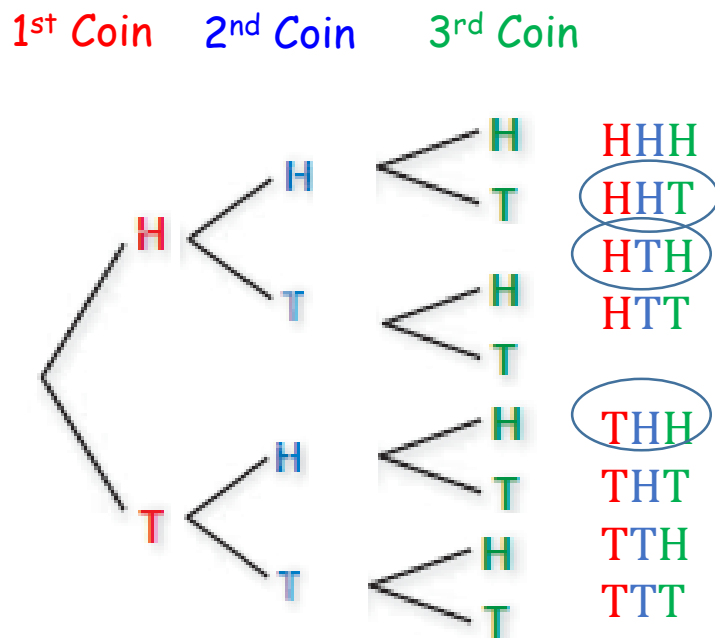*Event 2:* Flipping a coin has 2 possible outcomes.

$$6 \times 2 = 12$$

There are 12 possible outcomes.

Probability of Compound Events

You flip three nickels. What is the probability of flipping two heads and one tails?

Use a tree diagram to find the sample space. Let H = heads and T = tails.

1st Coin   2nd Coin   3rd Coin

$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

$$P(2 \text{ heads and } 1 \text{ tails}) = \frac{3}{8}$$

The probability is $\frac{3}{8}$, or 37.5%.