

## **Lesson: Probability! Independent and Dependent Events**

**Sixth Grade Objective:** 4.05 Determine and compare experimental and theoretical probabilities for independent and dependent events.

### **Lesson: Independent Events**

Independent events are two or more events that occur but they do not affect one another. The probability of independent events can be found by multiplying the probability of one event by the probability of the other event.

Let's look at a coin and a spinner that has six sections numbered 1-6.

#### **Problem:**

What is the probability of flipping heads and spinning a six.

#### **Step 1:**

Ask yourself, how many sides are there on a coin? Two! That is correct, probability is written as a percent or as a fraction so the two will be your denominator. Your numerator

is one because the coin can only show one side when you flip it.  $\frac{1}{2}$

#### **Step 2:**

Ask yourself, how many sections on the spinner? Six! That is your denominator. How

many sections are numbered six? One! That is your numerator.  $\frac{1}{6}$

#### **Step 3:**

Multiply the two events.  $\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$

The probability of flipping heads and spinning six is  $\frac{1}{12}$ .

### **Lesson: Dependent Events**

Dependent events are two or more events that occur and affect one another. The probability of dependent events can be found by multiplying the probability of the first event times the probability of the second event (making sure to remember the affect of the first event on the second one).

**Problem:** You have ten marbles in a jar. There are 4 blue, 3 green and 3 orange. If you pick a marble, take it out, and pick another marble, what is the probability that you will pick a blue marble first and then an orange marble second?

**Step 1:** Determine the probability for blue with all ten marbles:  $\frac{4}{10} = \frac{2}{5}$

**Step 2:** Determine the probability for orange but remember there are only nine marbles

in the jar:  $\frac{3}{9} = \frac{1}{3}$

**Step 3:**

**Multiply!**  $\frac{2}{5} \times \frac{1}{3} = \frac{2}{15}$  **The probability is**  $\frac{2}{15}$ .

**Try these on your own!**

1. You have a bag of colored tiles. There are 10 red, 8 blue, 4 green, 3 orange and 5 purple. You also have a spinner with five sections numbered 1-5. What is the probability of choosing a purple and spinning an odd number?
2. You have a drawer full of socks. Two pair of blue, three pair of red, four pair of white and 11 pair of brown. If you choose one and set it out and then choose another, what is the probability of choosing a brown the first time and blue the second?

**Check your answers!**

1. Purple =  $\frac{5}{30} = \frac{1}{6}$  Spinner =  $\frac{3}{5}$

Multiply the events:  $\frac{1}{6} \times \frac{3}{5} = \frac{1}{10}$  The probability is  $\frac{1}{10}$ .

2. Brown =  $\frac{11}{20}$  Blue =  $\frac{2}{19}$  (Remember that one pair was set aside, making the total 19.)

Multiply the events:  $\frac{11}{20} \times \frac{2}{19} = \frac{11}{190}$  The probability is  $\frac{11}{190}$ .

**Quiz Yourself**

1. A spinner numbered 1-8 is spun and a six-sided die is rolled. What is the probability of landing on a two and rolling an even number?

2. You have a standard deck of 52 playing cards. If you choose one and replace it what is the probability of choosing an eight of hearts and then a queen of diamonds?
3. You have a standard deck of 52 playing cards. If you choose one and do not replace it what is the probability of choosing an eight of hearts and then a queen of diamonds?
4. A jar contains 5 green balls, 2 white balls, 3 orange balls and 5 purple balls. If one ball is chosen and not replaced and then another is chosen, what is the probability of choosing a green and then an orange?
5. Using the same information in number four what is the probability of choosing a purple and then a white?

**Extra Practice!**

<http://www.betweenwaters.com/probab/probab.html>

**Check Your Answers**

1.  $\frac{1}{8} \times \frac{1}{2} = \frac{1}{16}$

2.  $\frac{1}{52} \times \frac{1}{52} = \frac{1}{2,704}$

3.  $\frac{1}{52} \times \frac{1}{51} = \frac{1}{2,652}$

4. Green  $\frac{5}{15} = \frac{1}{3}$       Orange  $\frac{3}{14}$       Multiply:  $\frac{1}{3} \times \frac{3}{14} = \frac{3}{42}$

5. Purple  $\frac{5}{15} = \frac{1}{3}$       White  $\frac{2}{14}$       Multiply:  $\frac{1}{3} \times \frac{2}{14} = \frac{2}{42}$