

Lesson: Probability! Simple and Compound Events!

Sixth Grade Objective: 4.04 Determine and compare experimental and theoretical probabilities for simple and compound events.

Lesson

Probability is the likelihood of something happening. You can predict what will happen with the help of theoretical probability and you can determine what will happen with experimental probability.

Let's look at a coin.

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.

Step 2:

Write the fraction and convert it to a percent.

Theoretically you have a $\frac{1}{2}$ or 50% chance of landing on heads or tails.

Simple Events (one event)

Problem:

You have a die with six sides. What is the probability of landing on an even number?

Step 1:

Ask yourself, how many sides? Six, use this as the denominator. Ask yourself, how many numbers are even? Three, this becomes the numerator.

Step 2:

Create your fraction to show the theoretical probability of rolling an even number.

$$\frac{3}{6} = \frac{1}{2} = 50\%$$

Compound Events (two or more events)

<i>Event</i>	<i>Possible Outcome</i>
Flip coin	Heads or Tails
Roll die	Numbers 1-6

Problem:

Find the probability of landing on heads and rolling a three.

Step 1:

Determine the theoretical probability for each event.

$$\text{Coin} = \frac{1}{2} \quad \text{Die} = \frac{1}{6}$$

Step 2: Multiply your theoretical probability. $\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$ The probability is $\frac{1}{12}$.

Try these on your own!

1. Lacey had four red blocks, five green blocks and three blue blocks. She put them all in the box and pulled one block out of the box. What is the probability that she pulled a blue block out of the box?
2. Stephen has a die and a bag full of cubes. The bag contains 6 red cubes, 7 yellow cubes and 2 green cubes. What is the probability that he would roll an odd number pull a red cube out of the bag?

Check your answers!

1. There are a total of 12 blocks. She has three blue blocks. Her chance of pulling a blue block is $\frac{3}{12} = \frac{1}{4} = 25\%$.

2. The die has six sides. Three are odd so the probability is $\frac{3}{6} = \frac{1}{2}$.

The bag has a total of 15 cubes, six are red. The probability is $\frac{6}{15} = \frac{2}{5}$.

$\frac{1}{2} \times \frac{1}{5} = \frac{1}{10} = 10\%$ The probability of rolling an odd number and pulling a red cube is $\frac{1}{10}$ or 10%.

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Quiz Yourself

1. The students in class are conducting an experiment. They have a bag full of popsicle sticks. There are 10 blue sticks, 30 green sticks, 40 red sticks and 20 orange sticks. They want to know the theoretical probability for pulling out all of the sticks before they do the experiment. Find the probability for all of the colors.
2. After doing the experiment with the bag of popsicle sticks they wanted to add a pile of number cards that were numbered 1-9. Use the same numbers with number one and find the probability of drawing a number card of two and pulling a red stick.

3. Using the same information in number two find the probability of pulling an orange stick and drawing even numbered cards.
4. Elaine bought 25 flowers. She had 10 pansies, 5 roses, 8 daisies and 2 lilies. If Elaine chose a flower at random with her eyes closed what is the probability she would choose a lily?
5. Look back at number four. What is the probability of choosing a daisy and a rose?

Check Your Answers

1. Total colors = 100.

$$\text{Blue} = \frac{10}{100} = \frac{1}{10}$$

$$\text{Red} = \frac{40}{100} = \frac{2}{5}$$

$$\text{Green} = \frac{30}{100} = \frac{3}{10}$$

$$\text{Orange} = \frac{20}{100} = \frac{1}{5}$$

2. Red = $\frac{2}{5}$ There are a total of nine cards and one card with a two = $\frac{1}{9}$.

$$\frac{2}{5} \times \frac{1}{9} = \frac{2}{45} \quad \text{The probability of pulling a red and drawing a two is } \frac{2}{45}.$$

3. Orange = $\frac{1}{5}$ Even cards = $\frac{4}{9}$ $\frac{1}{5} \times \frac{4}{9} = \frac{4}{45}$.

The probability of pulling an orange stick and an even card is $\frac{4}{45}$.

4. $\frac{2}{25}$

5. $\frac{13}{25}$