

3-20-17

Aim: SWBAT determine the experimental probability an event and make a prediction based on the results.

Do Now: Check hw

HW: Finish worksheets

Quiz Wednesday or Thursday

Introduction to Probability

3. A bag has 24 marbles: 6 green, 6 red, and 12 blue. Lucy reaches into the bag and picks out 1 marble.

Probability	Outcome
Impossible	purple marble <i>not green, red, or blue</i>
Certain	a green, red, or blue marble
As likely as not	a blue marble <i>green or red</i>
More likely than not	a blue or red marble <i>blue or green</i>
Less likely than likely	a green marble <i>a red</i>

4. Imagine that these cards are face down, and you pick one.



Probability	Outcome
0	a D <i>not A, B, or C</i>
1	an A, B, or C
$\frac{1}{2}$	an A <i>B or C</i>
Between 0 and $\frac{1}{2}$	a B <i>a C</i>
Between $\frac{1}{2}$ and 1	an A or B <i>A or C</i>

5. A weatherman in Seattle says there is a 75% chance of rain. A weatherman in Tacoma says there is a  $\frac{1}{4}$  chance of rain. In which city is it more likely to rain? Explain how you know.

*↑ 25%*  
It is more likely to rain in Seattle because 75% is greater than 25%.

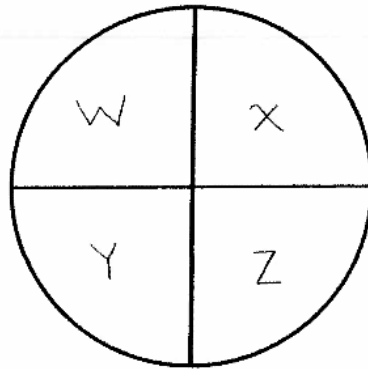
6. For each number shown, describe the probability in words.

- 0 impossible
- $\frac{7}{8}$  more likely than not
- $\frac{1}{3}$  less likely than likely
- 1 certain
- $\frac{1}{2}$  as likely as not

## Introduction to Probability

1. Kelly said that because there are four equal-sized sections on the spinner below, the probability of the spinner landing on X is as likely as not.

$$\frac{1}{2}$$



Explain why Kelly is wrong.

She is wrong because X is  $\frac{1}{4}$  of the spinner, not  $\frac{1}{2}$  of it. So the chances of landing on X is unlikely rather than equally likely.

2. Construct a spinner with the following characteristics:

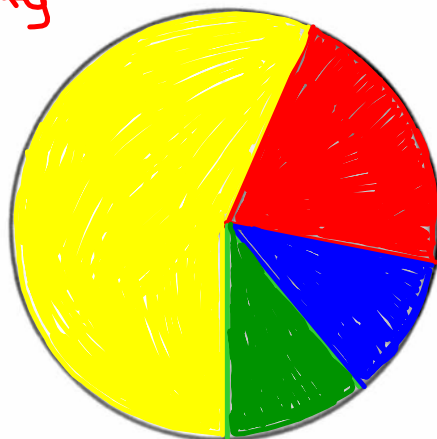
It is certain to land on blue, yellow, green, or red.

It is twice as likely to land on red than green.

It is equally likely to land on blue or green.

It is more likely to land on yellow than not land on yellow.

majority



**Experimental Probability**

**1. Toss a coin 50 times and tally your results.**

Each time you tossed a coin, you conducted an experiment. In probability, we call an experiment a **trial**. The result of the trial is the **outcome**.

You tossed the coin 50 times, so you completed 50 **trials**.

The **outcome** of each trial was either "heads" or "tails".

The notation, **P(outcome)**, is used to represent the probability of getting an outcome. In the case of tossing the coin, we would write **P(heads)** to represent the probability of tossing a coin that lands on "heads" and **P(tails)** to represent the probability of tossing a coin that lands on "tails".

Each outcome can be represented as a ratio that compares the outcomes of the experiment to the number of trials.

P(heads)	P(tails)
$\frac{\# \text{ of times the coin landed on heads}}{\text{number of trials}} = \frac{27}{50}$	$\frac{\# \text{ of times the coin landed on tails}}{\text{number of trials}} = \frac{23}{50}$

Each probability is based on the results of your experiment. If you repeated your experiment, you would likely get proportional results. You can use this proportional relationship to predict the number of times a coin would land on "heads" and "tails" if a coin was tossed 500 times.

A coin landing on "heads"	A coin landing on "tails"
$\frac{27}{50} = \frac{h}{500}$ $\frac{500h}{50} = \frac{13500}{50}$ $h = 270$	$\frac{23}{50} = \frac{t}{500}$ $\frac{500t}{50} = \frac{11500}{50}$ $t = 230$

You can use this proportional relationship to predict the number of times a coin would land on "heads" and "tails" if a coin was tossed 1000 times.

A coin landing on "heads"	A coin landing on "tails"
$\frac{27}{50} = \frac{h}{1000}$ $\frac{1000h}{50} = \frac{27000}{50}$ $h = 540$	$\frac{23}{50} = \frac{t}{1000}$ $\frac{1000t}{50} = \frac{23000}{50}$ $t = 460$

## Experimental Probability

2. Roll a number cube and record the results in a frequency table.

Number Rolled	Tally	Number of Times Rolled
1		7
2		3
3		5
4		3
5		<del>3</del> 3
6		4

Total: 25

Probability ratios using numbers.

Probability ratios using words.

$$P(\text{rolling a } 1) = \frac{\text{number of 1s rolled}}{\text{number of rolls}}$$

$$P(1) = \frac{7}{25}$$

0.28

28%

$$P(\text{rolling a } 2) = \frac{\text{number of 2s rolled}}{\text{number of rolls}}$$

$$P(2) = \frac{3}{25}$$

0.12

12%

$$P(\text{rolling a } 3) = \frac{\text{number of 3s rolled}}{\text{number of rolls}}$$

$$P(3) = \frac{5}{25}$$

0.20

20%

$$P(\text{rolling a } 4) = \frac{\text{number of 4s rolled}}{\text{number of rolls}}$$

$$P(4) = \frac{3}{25}$$

0.12

12%

$$P(\text{rolling a } 5) = \frac{\text{number of 5s rolled}}{\text{number of rolls}}$$

$$P(5) = \frac{3}{25}$$

0.12

12%

$$P(\text{rolling a } 6) = \frac{\text{number of 6s rolled}}{\text{number of rolls}}$$

$$P(6) = \frac{4}{25}$$

0.16

16%

HW

## Experimental Probability

Write and solve a proportion to predict the results.

1. The number of 1s rolled in 250 rolls.

2. The number of 2s rolled in 250 rolls.

$$\frac{7}{25} = \frac{x}{250}$$

3. The number of 3s rolled in 250 rolls.

4. The number of 4s rolled in 250 rolls.

5. The number of 5s rolled in 250 rolls.

6. The number of 6s rolled in 250 rolls.

\*7. How many times did an odd number occur in the original experiment? \_\_\_\_\_

\*8. Use your answer to #7 to predict how many times an odd number will occur in 3000 trials.

9. In the cafeteria, there are 7 teachers, 48 girls, and 45 boys. What is the probability that the next person who enters the cafeteria is a boy?

- A.  $\frac{9}{20}$       B.  $\frac{11}{20}$       C.  $\frac{9}{11}$       D.  $\frac{1}{3}$

## HW

## Experimental Probability

10. A spinner has a sun, moon, and a star section. Alice records her results from her spins in the table shown. Based on these results, predict how many times the pointer will land on the moon in 500 spins.

Shape	Number of Spins
Sun	11
Moon	18
Star	31

11. The owner of a deli recorded the number of customers who ordered each of the four sandwiches available. If the deli has 50 customers in the first hour it is open, predict how many customers will order turkey sandwiches.

Sandwich	Number of Customers
Ham	160
Cheese	100
Turkey	180
Veggie	60

12. Ryan has a bag with marbles. He selects a marble, records the color, and then puts the marble back in the bag. In 25 trials, he selects a green marble 10 times. He selects a blue marble the other times. Based on his results, which is the best prediction of how many times Ryan will select a blue marble in 100 trials?

- A. 35      B. 40      C. 50      D. 60

13. Students spin the pointer on a spinner 500 times. Based on the results of the table, which is a reasonable prediction for the number of times the pointer will land on blue in 100 spins?

Color	Number of Spins
Purple	100
White	200
Blue	150
Pink	50