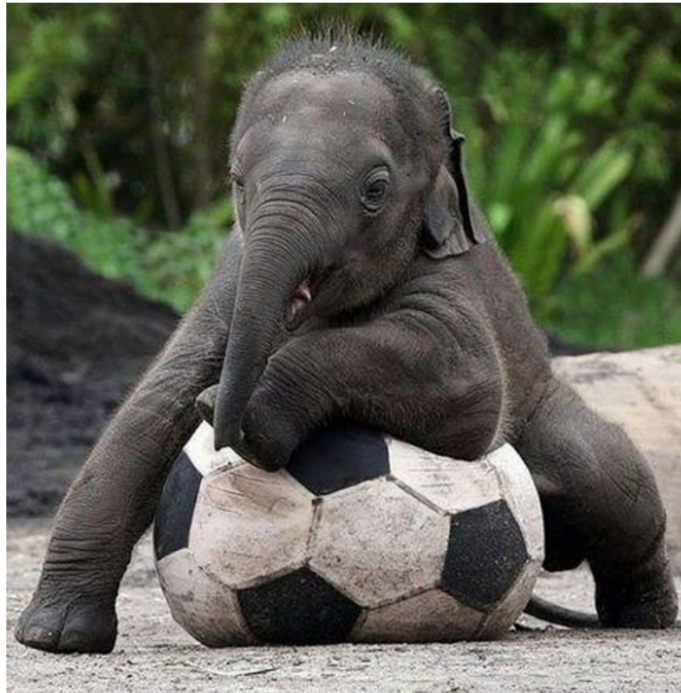


April 30, 2015<sup>1st</sup><sub>2nd</sub>

Get out your homework



Mandingo

## 4/30 Experimental and Theoretical Probability

When you conduct an experiment, the **relative frequency** of an event is the fraction or percent of the time that the event occurs.

$$\text{relative frequency} = \frac{\text{number of times the event occurs}}{\text{total number of times you conduct the experiment}}$$

With a partner, flip a coin 20 times and record the results.

	Flipping Heads	Flipping Tails
Relative Frequency	12	8
	8	12

Compare your chart with those of other groups. What did you find?



Combine all of the results of the class. What do you notice?

Heads 164  
 12, 11, 11, 7, 11  
 10, 10, 12, 6, 13  
 6, 12, 7  
 13, 12, 11

Tails 156  
 8, 9, 13, 8, 7  
 10, 8, 10, 9  
 14, 13, 14, 7, 9, 8  
 9

What if everyone in the school did the experiment, what do you think you would see?

You have a bag of colored chips. In an experiment, you randomly select a chip from the bag and replace it. The table shows the number of times you select each color.

Red	Blue	Green	Yellow
24	12	15	9



If there are 20 chips in the bag, how can you use the table to find the exact number of each color in the bag? Explain.

Red:

$$\frac{n \cdot 3}{20 \cdot 3} = \frac{24}{60}$$
$$\frac{3n}{3} = \frac{24}{3}$$
$$n = 8 \text{ chips}$$

If you toss a thumb tack onto a table, there are two ways the thumbtack can land.

True or False?

Because there are two outcomes, the probability of the thumbtack landing point up must be  $1/2$ .



Point up



On its side

Explain.

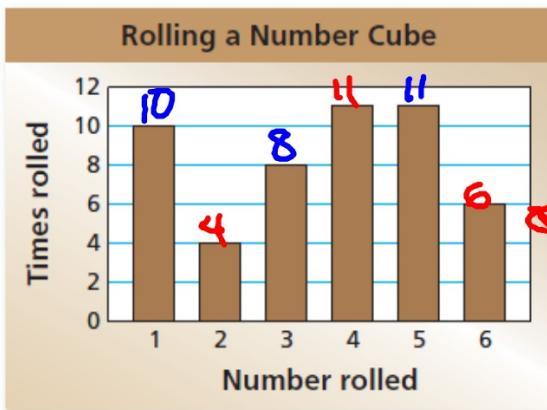
The 2 possible outcomes do not have an equal possibility of getting:  
odd shapes  
gravity

### **Experimental Probability**

Probability that is based on repeated trials of an experiment is called **experimental probability**.

$$P(\text{event}) = \frac{\text{number of times the event occurs}}{\text{total number of trials}}$$

Results of an actual experiment.



The bar graph shows the results of rolling a number cube 50 times. What is the experimental probability of rolling an odd number?

$$\frac{29}{50}$$

What is the experimental probability of rolling an even number?

$$4+11+6$$

$$\frac{21}{50}$$



It rains 2 out of the last 12 days in March. If this trend continues, how many rainy days would you expect in April?

$$\frac{2}{12} = \frac{n}{30}$$

$n = 5$  days would rain

"April showers bring May flowers." Old Proverb, 1557

At a clothing company, an inspector finds 5 defective pairs of jeans in a shipment of 200. If this trend continues, about how many pairs of jeans would you expect to be defective in a shipment of 5000?

$$\frac{5}{200} = \frac{n}{5000}$$

$$\frac{200n}{200} = \frac{25000}{200}$$

$$n = 125 \text{ pairs}$$



## Theoretical Probability

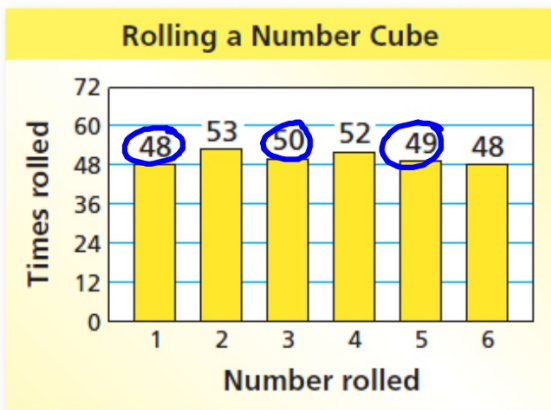
When all possible outcomes are equally likely, the **theoretical probability** of an event is the ratio of the number of favorable outcomes to the number of possible outcomes.

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



If you randomly choose one of the blocks shown, what is the **theoretical probability** of choosing...

- ...a vowel?  $\frac{3}{7}$
- ...a red letter?  $\frac{3}{7}$
- ...an E?  $\frac{2}{7}$



The bar graph shows the results of rolling a number cube 300 times.

What is the **experimental probability** of rolling an odd number?

$$\frac{147}{300}$$

What is the **theoretical probability** of rolling an odd number?

$$\frac{150}{300} \leftarrow \text{Half of}$$

The theoretical probability of winning this bobble-head when spinning a prize wheel is  $\frac{1}{6}$ . The wheel has 3 bobble-head sections. How many sections are on the wheel?

$$\frac{1 \cdot 3}{6 \cdot 3} = \frac{3}{n}$$

$$18 = n$$

Sections



# Homework

Green WS 5

**Due** Monday