# Probability

# Let's work on some definitions

**Experiment-** is a situation involving a chance that leads to results called outcomes.

An **outcome** is the result of a single trial of an experiment.

An **event** is one or more outcomes of an experiment.

**Probability** is the measure of how likely an event will occur.

# Probability of an event

- The probability of event A is the number of ways event A can occur divided by the total number of possible outcomes.
- $P(A)=\frac{\text{The number of ways an event can occur}}{\text{Total number of possible outcomes}}$

# Probability

If P = 0, then the event cannot occur.

It is impossible

If P = 1, then the event must occur.

It is certain

So probability is always a number between 0 and 1.

# Complements

All of the probabilities must add up to 100% or 1.0 in decimal form.

****Complement = 1 - Event**

Example: Classroom

P (picking a boy) = 0.60

P (picking a girl) = **1 – 0.60 = 040**

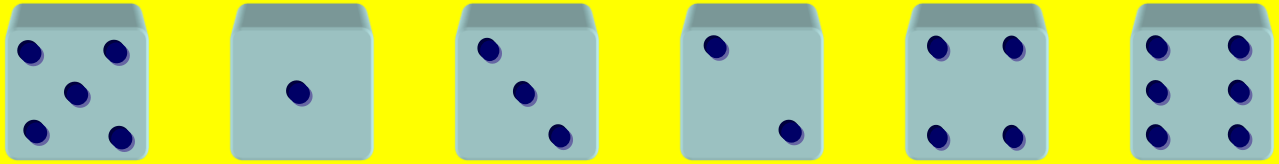
A glass jar contains 6 red, 5 green, 8 blue and 3 yellow marbles.
Experiment: A marble is chosen at random.

- Possible outcomes: choosing a red, blue, green or yellow marble.
- Probabilities:

$$P(\text{red}) = \frac{\text{number of red marbles}}{\text{total number of marbles}} = \frac{6}{22} = \frac{3}{11}$$

**P(green)=$\frac{5}{22}$ , P(blue)= $\frac{8}{22} = \frac{4}{11}$ , P(yellow)= $\frac{3}{22}$**

Ex. You roll a six-sided die whose sides are numbered from 1 through 6. **What is the probability of rolling an ODD number?**



**There are 3 ways to roll an odd number: 1, 3, 5.**

$$P(odd) = \frac{3}{6} = \frac{1}{2}$$