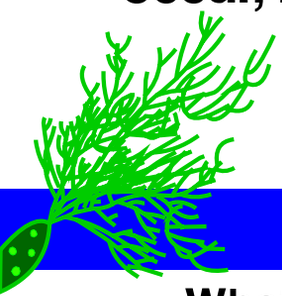
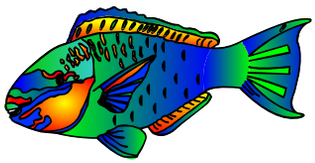
# Probability 1

*From: A Maths Dictionary for Kids by Jenny Eather at www.amathsdictionaryforkids.com*

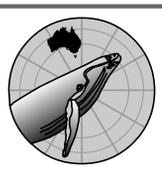
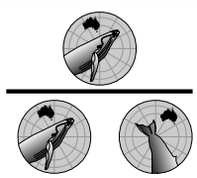
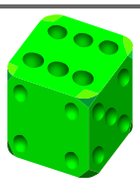
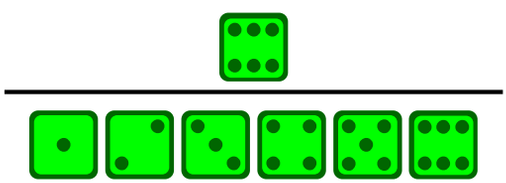
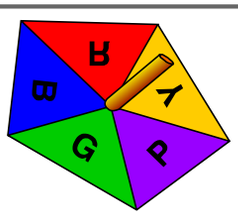
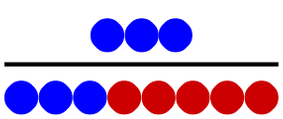
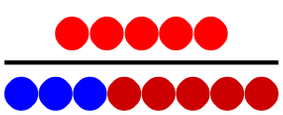
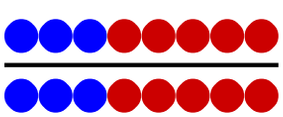
**Probability is the chance or likelihood that a particular outcome will occur, measured as a fraction of the total possible outcomes.**



$$\text{probability} = \frac{\text{favourable outcomes}}{\text{possible outcomes}}$$

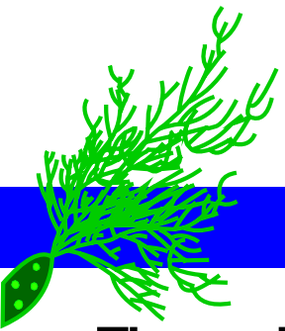


## Examples

| What are the chances of ... ? | favourable outcomes / possible outcomes | Probability |
|---|---|---|
|  • tossing heads |  heads (H) tails (T) | $\frac{1}{2}$ |
|  • rolling a six |  | $\frac{1}{6}$ |
|  • stopping on purple | P / P G B R Y | $\frac{1}{5}$ |
|  • getting a blue |  | $\frac{3}{8}$ |
| • NOT getting a blue |  | $\frac{5}{8}$ |
| • getting red or blue |  | $\frac{8}{8}$ |

# Probability 2

*From: A Maths Dictionary for Kids by Jenny Eather at www.amathsdictionaryforkids.com*



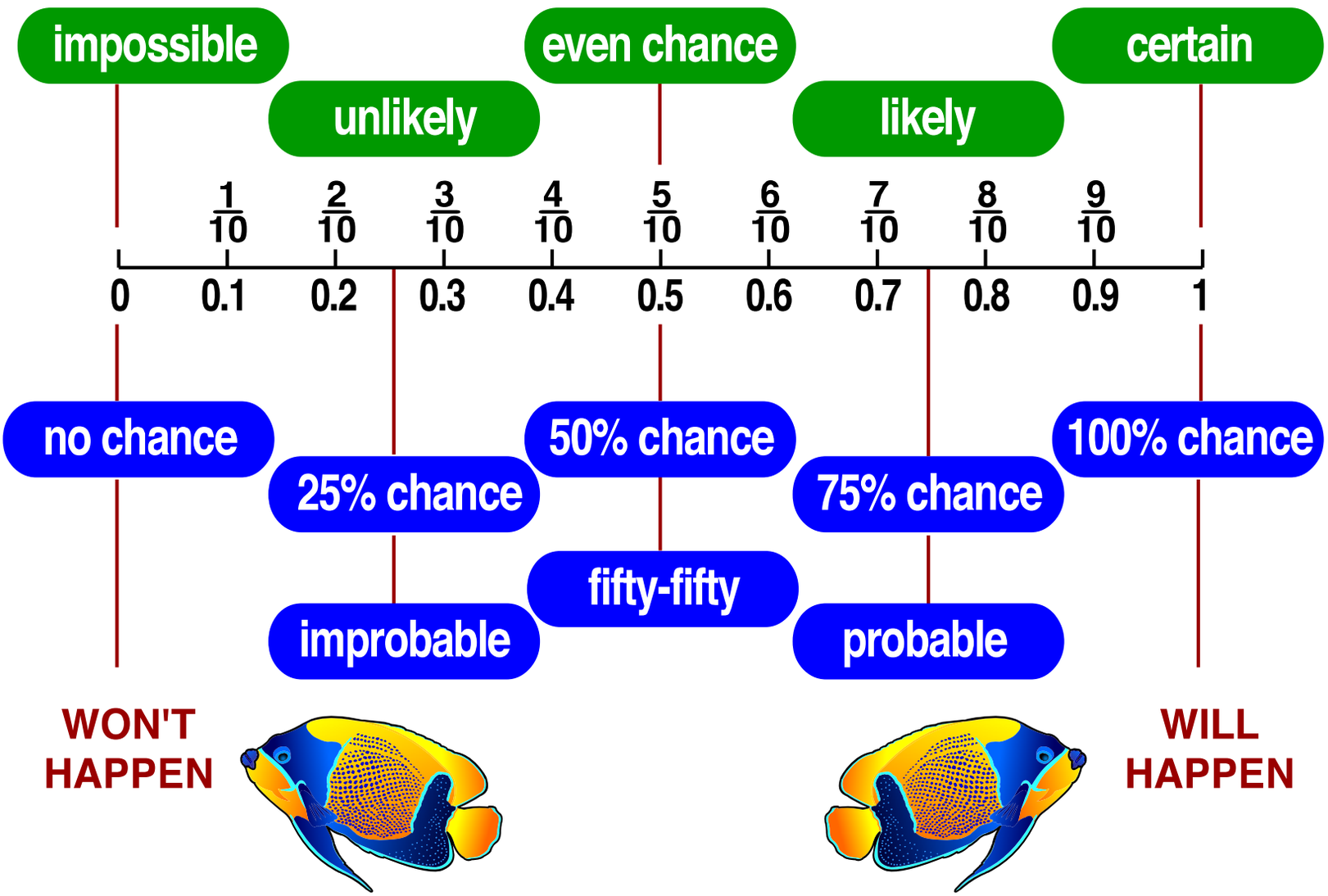
$$\text{probability} = \frac{\text{favourable outcomes}}{\text{possible outcomes}}$$

## Probability range

**The probability (chance or likelihood) that a particular outcome will occur ranges between 0 and 1.**

## Probability line

**Probability can be recorded on a probability line, ranging between 0 (impossible) and 1 (certain).**



# Probability - some terminology

From: A Maths Dictionary for Kids by Jenny Eather at www.amathsdictionaryforkids.com

**Probability is used to measure the chance or likelihood of an event or events occurring in the future.**

## Some terminology

**Probability**

$P(E) = \frac{E}{S}$

A number between 0 and 1 that indicates the chance or likelihood of an event happening.

*Event A = Rolling a 6.* $P(A) = \frac{1}{6}$

**Probability experiment**

A situation where a number of trials are conducted to determine probability.

*Rolling a die 24 times (24 trials).*

**Outcome**

Result of one trial in a probability experiment.

*Roll 1 = 2.*

**Event *(E)***

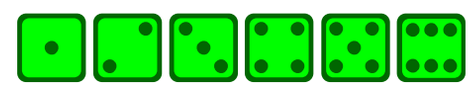
One or more favourable outcomes of a probability experiment. A subset of the sample space.

*Denoted by capital letters A, B, C, ...*

*Event A = Rolling a 6.*

**Sample space *(S)***

Set of all possible outcomes of any trial in a probability experiment.



*S = {1, 2, 3, 4, 5, 6}*

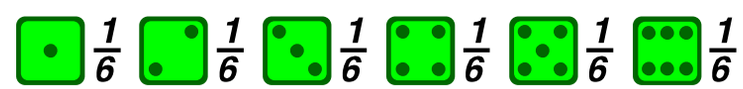
**Sample point**

One element of the sample space.

*6*

**Equally likely outcomes**

Outcomes with the same probability.



$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$

**Complement of an event**

$P(\bar{E}) = 1 - P(E)$

All outcomes that are not the event *($\bar{E}$)*.

*Event: A* $\frac{1}{6}$ $\bar{A}$ $\frac{5}{6}$ $\frac{5}{6} = 1 - \frac{1}{6}$

**Independent events**

Where the outcome of an event has no effect on the outcome of any further event(s).

**Dependent events**

Where the outcome of an event does have an effect on the outcome of any further event(s).

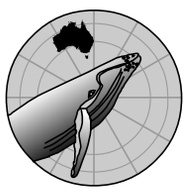
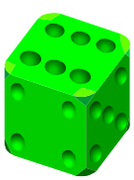
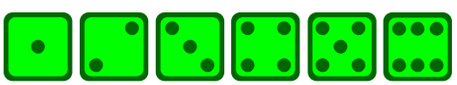
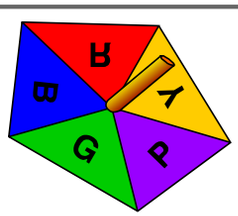
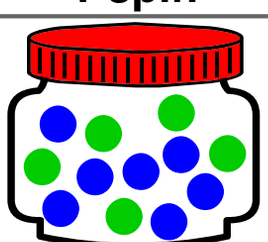
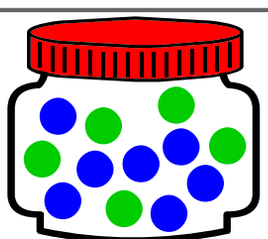
# Sample Space

*From: A Maths Dictionary for Kids by Jenny Eather at www.amathsdictionaryforkids.com*

**Sample space is the set of all possible outcomes of any trial in a probability experiment.**

$$S = \{ O_1, O_2, O_3, O_4, \ldots \}$$

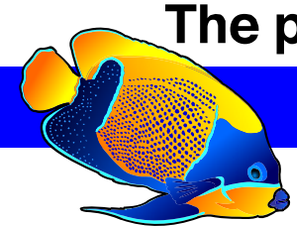
## Examples

| Trial | All possible outcomes | Sample space |
|---|---|---|
|  1 toss |  heads (H)  tails (T) | S = { H, T } |
|  1 roll |  1 2 3 4 5 6 | S = { 1, 2, 3, 4, 5, 6 } |
|   1 spin |   | S = { P, G, B, R, Y } |
|  1 counter |  | S = { G, B } |
|  2 counters |  | S = { (G,G), (G,B), (B,G), (B,B) } |

# Tree diagrams

*From: A Maths Dictionary for Kids by Jenny Eather at www.amathsdictionaryforkids.com*

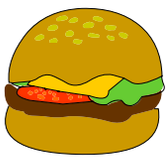
**Tree diagrams use one branch for each possible outcome. The probability of each may be written on its branch.**



## Example 1

If you choose 1 burger, 1 side serve and 1 drink ... how many combinations (outcomes) are possible?

### burgers



- beef
- chicken
- fish

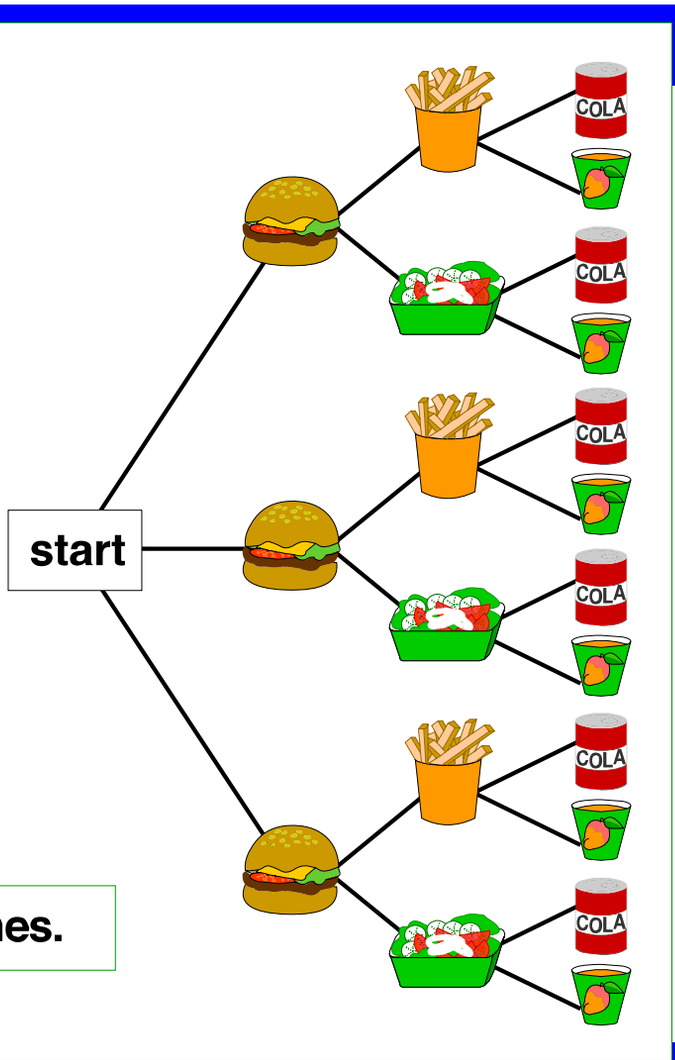
### side serves

- fries
- salad

### drinks

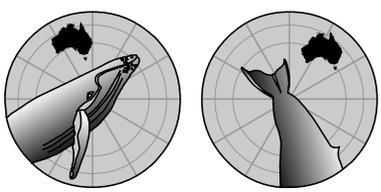

- cola
- juice

There are 12 possible outcomes.



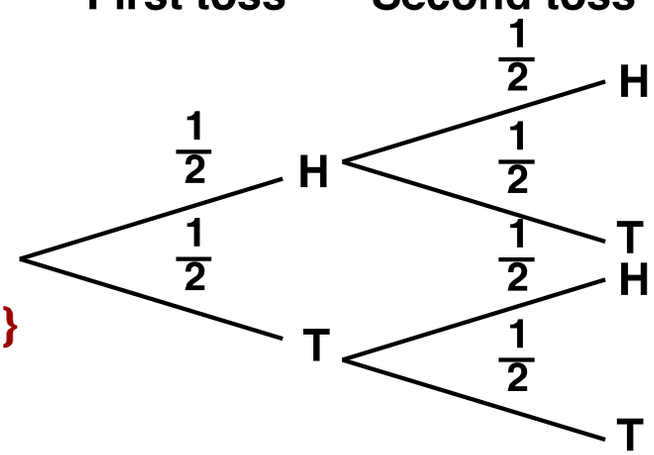

## Example 2

**Two coin toss.**



heads (H) tails (T)

S = { HH,HT, TH, TT }



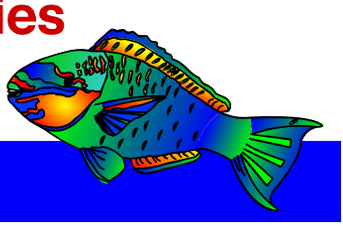

**Multiply along the branches to determine the probability for each outcome.**

# Counting or multiplication principle

*From: A Maths Dictionary for Kids by Jenny Eather at www.amathsdictionaryforkids.com*

**In probability, the counting or multiplication principle is a method that uses multiplication to work out the total number of possible outcomes or combinations.**

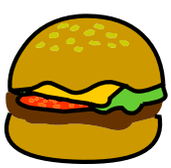
**The number of possibilities in one set of choices is multiplied by the number of possibilities in each other set of choices.**



## Example 1

**When choosing 1 burger, 1 side serve and 1 drink ... how many combinations are possible?**

**burgers**



- beef
- chicken
- fish
- vegetarian

**side serves**

- fries
- salad

**drinks**


- juice
- coffee
- cola
- water

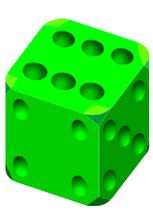
**4 possibilities x 2 possibilities x 4 possibilities**

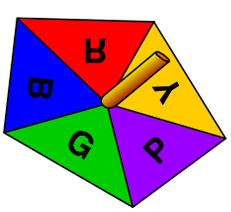
**Total outcomes = 4 x 2 x 4 = 32**

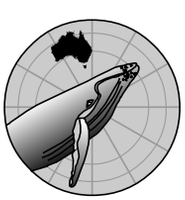
**There are 32 possible combinations.**

## Example 2

**When rolling 1 die once, spinning 1 spinner once and tossing 1 coin once ... how many combinations are possible?**





**6 possibilities x 5 possibilities x 2 possibilities**

**Total outcomes = 6 x 5 x 2 = 60**

**There are 60 possible combinations.**