

# YEAR 8 - REPRESENTATIONS... Tables and Probability

@whisto\_maths

## What do I need to be able to do?

By the end of this unit you should be able to:

- Construct a sample space diagram
- Systematically list outcomes
- Find the probability from two-way tables
- Find the probability from Venn diagrams

## Keywords

**Outcomes:** the result of an event that depends on probability

**Probability:** the chance that something will happen

**Set:** a collection of objects

**Chance:** the likelihood of a particular outcome

**Event:** the outcome of a probability — a set of possible outcomes

**Biased:** a built in error that makes all values wrong by a certain amount

**Union:** Notation 'U' meaning the set made by comparing the elements of two sets

## Construct sample space diagrams



Sample space diagrams provide a systematic way to display outcomes from events

The possible outcomes from tossing a coin

The possible outcomes from rolling a dice

	1	2	3	4	5	6
H	1H	2H	3H	4H	5H	6H
T	1T	2T	3T	4T	5T	6T

This is the set notation to list the outcomes  $S =$

$$S = \{1H, 2H, 3H, 4H, 5H, 6H, 1T, 2T, 3T, 4T, 5T, 6T\}$$

In between the  $\{ \}$  are  $a_i$  the possible outcomes

## Probability from sample space

The possible outcomes from rolling a dice

The possible outcomes from tossing a coin

	1	2	3	4	5	6
H	1H	2H	3H	4H	5H	6H
T	1T	2T	3T	4T	5T	6T

This is the set notation that represents the question P

What is the probability that an outcome has an even number and a tails?

$$P(\text{Even number and Tails}) = \frac{3}{12}$$

In between the  $( )$  is the event asked for

There are three even numbers with tails

Numerator: the event

Denominator: the total number of outcomes

There are twelve possible outcomes

## Probability from two-way tables

	Car	Bus	Walk	Total
Boys	15	24	14	53
Girls	6	20	21	47
Total	21	44	35	100

$$P(\text{Girl walk to school}) = \frac{21}{100}$$

The total number of items

The event

The total in the set

## Product Rule

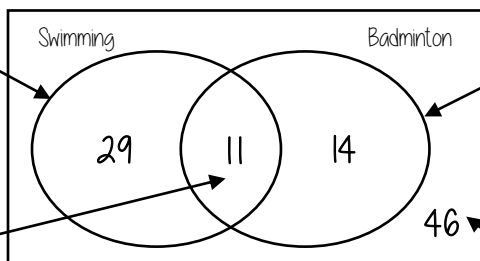
The number of items in event a

x

The number of items in event b

## Probability from Venn diagrams

This whole curve includes everyone that went swimming. Because 11 did both we calculate just swimming by  $40 - 11$



The intersection represents both Swimming AND badminton

This whole curve includes everyone that went to badminton. Because 11 did both we calculate just badminton by  $25 - 11$

The number outside represents those that did neither badminton or swimming

$$P(\text{Just swimming}) = \frac{29}{100}$$

$$100 - 29 - 11 - 14$$

100 students were questioned if they played badminton or went to swimming club. 40 went swimming, 25 went to badminton and 11 went to both