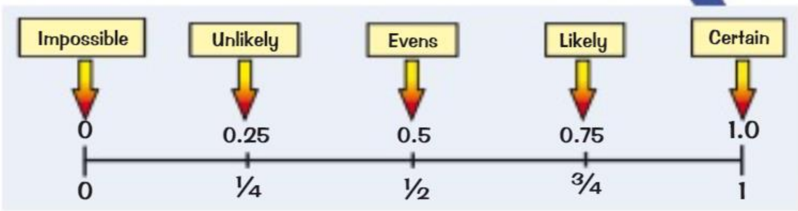
Knowledge Organiser: Year 7 Maths; Probability (Part 1)

Believe me, probability's not as bad as you think it is, but YOU MUST LEARN THE BASIC FACTS.

All Probabilities are Between 0 and 1

Probabilities can only have values from 0 to 1 (including those values).
You can show the probability of any event happening on this scale of 0 to 1.



Likeliness of a probability

R

Impossible
0 or 0%

Even chance
0.5, $\frac{1}{2}$ or 50%

Certain
1 or 100%

The more likely an event the further up the probability it will be in comparison to another event. (It will have a probability closer to 1)

Sample space

The possible outcomes from rolling a dice

R

The possible outcomes from tossing a coin

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

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

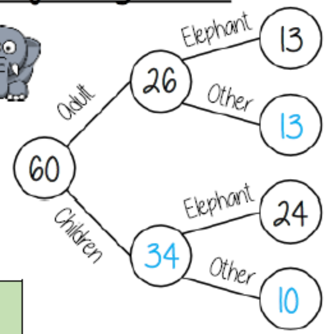
Keywords

Event: one or more outcomes from an experiment
Outcome: the result of an experiment
Intersection: elements (parts) that are common to both sets
Union: the combination of elements in two sets
Expected Value: the value/ outcome that a prediction would suggest you will get
Universal Set: the set that has all the elements
Systematic: ordering values or outcomes with a strategy and sequence
Product: the answer when two or more values are multiplied together

Tables, Venn diagrams, Frequency trees

Frequency trees

60 people visited the zoo one Saturday morning. 26 of them were adults. 13 of the adult's favourite animal was an elephant. 24 of the children's favourite animal was an elephant.



Frequency trees and two-way tables can show the same information

The total columns on two-way tables show the possible denominators

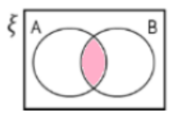
P(adult) = $\frac{26}{60}$

P(Child with favourite animal as elephant) = $\frac{13}{37}$

Two-way table

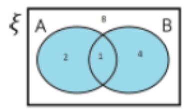
	Adult	Child	Total
Elephant	13	24	37
Other	13	10	23
Total	26	34	60

Venn diagram



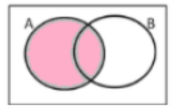
in set A AND set B

$P\ (A \cap B)$



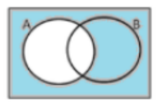
in set A OR set B

$P\ (A \cup B)$



in set A

$P\ (A)$



NOT in set A

$P\ (A')$

Knowledge Organiser: Year 7 Maths; Probability (Part 2)

Probability of a single event

Probability = $\frac{\text{number of times event happens}}{\text{total number of possible outcomes}}$

P(Blue) = $\frac{4}{10}$ ← There are 4 blue sectors

There are 10 sectors overall

$= \frac{2}{5}$

Probability notation P (event)

Probability can be a fraction, decimal or percentage value

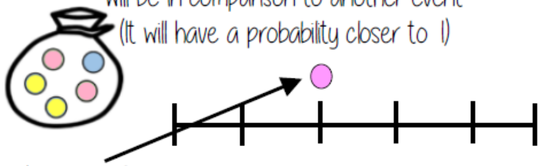
$\frac{4}{10} = \frac{40}{100} = 0.40 = 40\%$

Probability is always a value between 0 and 1

The probability scale

Impossible	Even chance	Certain
0 or 0%	0.5, $\frac{1}{2}$ or 50%	1 or 100%

The more likely an event the further up the probability it will be in comparison to another event (It will have a probability closer to 1)



There are 2 pink and 2 yellow balls, so they have the same probability

There are 5 possible outcomes
So 5 intervals on this scale, each interval value is $\frac{1}{5}$

Sum of probabilities

Probability is always a value between 0 and 1

The probability of getting a blue ball is $\frac{1}{5}$

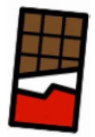
∴The probability of NOT getting a blue ball is $\frac{4}{5}$

The sum of the probabilities is 1

The table shows the probability of selecting a type of chocolate

Dark	Milk	White
0.15	0.35	

P(white chocolate) = 1 – 0.15 – 0.35
= 0.5



Sample space – for single events

A sample space for rolling a six-sided dice is S = {1, 2, 3, 4, 5, 6}

A sample space for this spinner is S = {Pink, Blue, Yellow}

You only need to write each element once in a sample space diagram

- A Sample space represents a possible outcome from an event
- They can be interpreted in a variety of ways because they do not tell you the probability

Sample Space Diagrams ***Show All Possible Outcomes***

When there are two things happening (e.g. two spinners being spun), you can use a table as a sample space diagram.

EXAMPLE: The fair spinners on the right are spun, and the outcomes listed.

a) Complete this sample space diagram showing the possible outcomes.

The possible outcomes for one spinner go down the side. The outcomes for the other spinner go along the top.

	Red	Blue	Green
1	1R	1B	1G
2	2R	2B	2G
3	3R	3B	3G

Spinning both spinners gives 3 × 3 = 9 different combinations, so there are 9 outcomes here.

b) Find the probability of spinning a 2 and a green (2G).

$$P(2G) = \frac{\text{ways to spin 2 and green}}{\text{total number of possible outcomes}} = \frac{1}{9}$$

c) Find the probability of spinning an odd number and a red.

$$P(\text{odd and red}) = \frac{\text{ways to spin odd and red}}{\text{total number of possible outcomes}} = \frac{2}{9}$$

There are 2 ways of doing this — 1R and 3R.

How do we use Knowledge Organisers in Mathematics?

How can you use knowledge organisers at home to help us?

- **Retrieval Practice**: Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

How will we use knowledge organisers in Mathematics?

Knowledge organisers will be used before I complete a Learning Check or Common Assessment. I will spend part of the lesson looking over each of the key topics of the half term before completing the Learning Check or Common Assessment.

I will also use these at home to complete my own independent learning and revision of these key topics.

GLUE HERE