Knowledge Organiser. Year 9: Pop Art and Vanitas

LINE	TONE	PATTERN	TEXTURE	FORM	COLOUR

In this unit of work, we look at 2 Art movements: Pop Art, the American Art movement of 1960s New York, and Vanitas – a still life movement starting in the 17th century. Both art styles are very different, but give you a chance to experiment with various Art styles and techniques.

What will you learn? (overview of knowledge)

Students will be revisiting vital skills covered in Y7 and Y8, these skills will be important should they choose to take Art at GCSE. They will be researching, experimenting, drawing and designing their own artwork.

What skills will you learn/develop?
- Advanced colour theory
- Tonal values
- Painting/oil pastel/printing
- Analysis at GCSE
- Annotation at GCSE

Support/Challenge:
https://www.bbc.co.uk/bitesize/subjects/z6hs34j
https://www.tate.org.uk/kids/explore/what-is/pop-art
https://www.tate.org.uk/art/art-terms/v/vanitas

Below are some key words we will be using in the classroom:			
COLOUR	TONE	LINE	FORM
DRAWING	SKILLS	TECHNIQUE	ANNOTATE
HARMONIOUS	COMPLEMENTARY	PRIMARY	DETAIL
TERTIARY	WATERCOLOUR	MIXING	PAINT
COLLAGE	OBSERVE	ANNOTATE	ANALYSE

look   say   cover   write   check

Year 9 Algorithms

What you are going to learn: A problem-solving approach that uses techniques from computer science but that can be used everywhere.

Key Words:

Algorithm: a step by step sequence of instructions that can be followed to complete a task.

Abstraction : removing unnecessary detail

Decomposition: breaking down a problem into sub-problems

Computational thinking — Decomposition, Abstraction, Pattern recognition, Algorithms
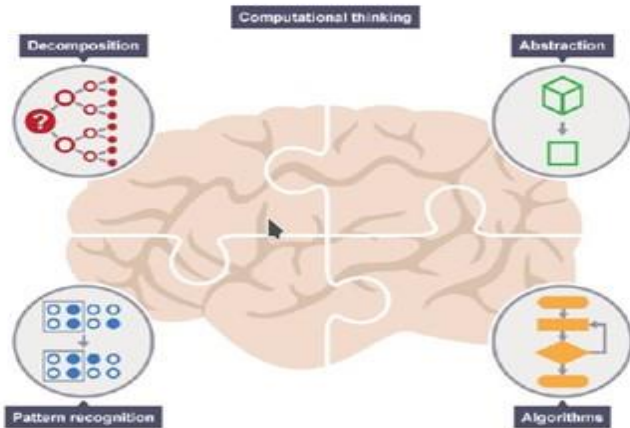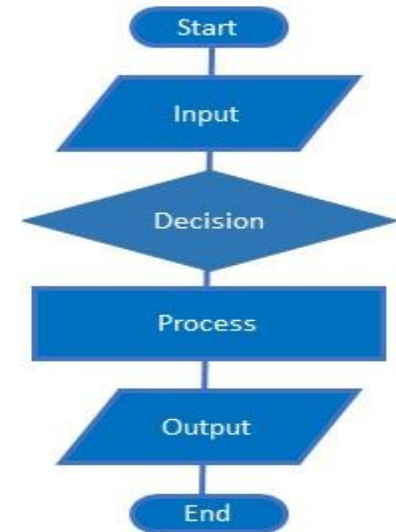
Example program written in Pseudocode:

```
OUTPUT 'What is your name?'
INPUT user inputs their name
STORE the user's input in the name variable
OUTPUT 'Hello' + name
OUTPUT 'How old are you?'
INPUT user inputs their age
STORE the user's input in the age variable
IF age >= 70 THEN
        OUTPUT 'You are aged to perfection!'
ELSE
        OUTPUT 'You are a spring chicken!'
```

Searching and sorting:

Linear Search – looks at each record at a time

Binary Search – keeps halving the list until a match is found

Bubble Sort – keeps moving the highest value up the list until all in order.

Merge Sort – splits and then puts data back together in twos, fours and then a whole.

Flowchart: Start → Input → Decision → Process → Output → End

Resources and Challenges:

Sorting Algorithms:: https://www.toptal.com/developers/sorting-algorithms
BBC Bytesize: https://www.bbc.co.uk/bitesize/topics/z7d634j

look say cover write check

Year 9 More Python

Summary

You will learn how to write computer programs in Python using a variety of techniques including user-input, variables using different datatypes, using Python if-elif-else statements and comparing values. Throughout the unit you will become familiar with different types of errors and how to correct them.

Example code

The code below inputs a number and stores it in a variable called "fav_num". If the number is 7 it will print "Good guess!", if it is less than 7 it will print "Too low!" and for anything else it will print "Too high!".

```python
fav_num = int(input("Pick a number between 1 & 10..."))

if(fav_num == 7):
    print("Good guess!")
elif(fav_num < 7):
    print("Too low!")
else:
    print("Too high!")
```

Comparative operators

==	Equal to
!=	Not equal to
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

## Websites

Learn Python using these websites:
- www.w3schools.com/python/
- www.codecademy.com/learn/learn-python

Keywords

Algorithm	Set of instructions or rules that need to be followed in order to perform calculations or to solve a problem.
Sequence	The set of instructions or rules that an algorithm uses have to be in the right order.
Data type	A data type is used to identify data that has common characteristics and purpose. Python has four data types: string (text), integers (whole numbers), floats (decimal numbers) and Boolean (either a 'true' value or a 'false' value).
Variable	Name given to an item of data that is stored in memory location while your Python program is running. Variables enable you to input data from the keyboard and to change the data
Condition/ Selection	The name given to Python's if-elif-else statement that is used to decide which path a program will take. If a condition is 'true' then Python will choose to run specific lines of code, but if false Python will choose to run different lines of code.
Constant	Named location in memory that does not change during the execution of the Python program
Syntax Error	Mistake in your Python program that prevents it from running (executing). Syntax errors are like spelling and grammar errors.
Logical error	Occurs when the program runs without error but produces an incorrect result.

```python
from turtle import *
color('red', 'yellow')
begin_fill()
while True:
    forward(200)
    left(170)
    if abs(pos()) < 1:
        break
end_fill()
done()
```

look say cover write check
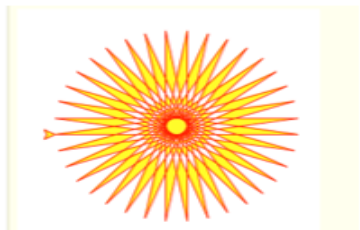
Year 9 Business Knowledge Organiser

Aim of the unit

The aim of this unit is to provide a foundational knowledge of business. Students will learn the basic concepts in business, which will help them in making informed decision when choosing business as one of the optional subjects.

Overview

Students will be finding out about different business ownership concepts such as, sole trader, partnership, franchise. They will also improve their problem-solving skill by explaining different cost and calculate fixed, variable cost, revenue and profit. Students will develop market segmentation skill and be able to produce a customer profile. In addition, they will assess different pricing strategies used for effective marketing. Students will learn these concepts for 6 weeks.

SOLE PROPIETORSHIP

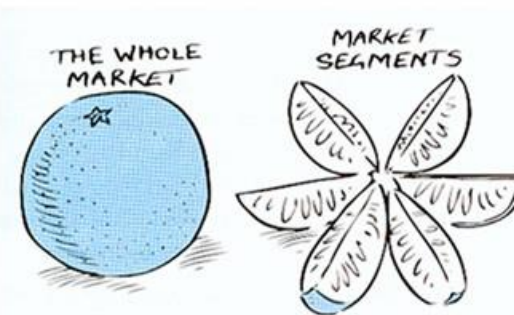| PROS	CONS
Little to no restrictions	All power is given to one person
Low startup costs	Hard to raise money
No additional federal taxes	Unlimited liability

Key skills

Team working – work in teams, shares ideas and boost interpersonal skill.
Analytical skill - compare ideas from both sides and use personal opinion to provide constructive criticism.
IT skill - using MS word office to report on the findings from research note-taking.
Research skill - making research and provide findings from research

Key vocabulary

Sole trader – one person own and run business, but can employ few staff to help.
Partnership - between 2-20 people own and run business, and share profit and responsibilities.
franchise – licence to run a business using name of another business.
cost - expenditures in running a business.
segmentation - dividing customers into groups due to their buying habit.
Pricing – setting a price on a product.

Fixed Costs vs. Variable Costs

Assessments

Assessment is based on class work and homework which is issued to students once every 2 weeks.

Benefits of Franchise

- Increased the name recognitions
- Increased the advertising and market budget
- Minimum risk
- Advertising and promotion
- Better performance

Pricing Strategies

Premium Pricing, Bundle Pricing, Economy Pricing, Value Pricing, Psychology Pricing, Types of Pricing Strategies, Penetration Pricing, Promotional Pricing, Price Skimming, Cost-Based Pricing

Support/challenges

Differentiated tasks, homework

look   say   cover   write   check

Victorian Literature Knowledge Organiser

Victoria was Queen from 20th June 1837 until 22nd January 1901. Her reign lasted 63 years and 7 months. She is the second longest serving Queen. Queen Elizabeth II is the first. Many well know novels were written at this time, such as Charles Dickens' 'Oliver Twist'.

The Victorian era refers to rule of Queen Victoria in England. We also refer to the Victorian era as the 19th century. If you study 19th century literature, it was written from 1800-1899.

Queen Victoria was married to Prince Albert.

The Victorian era was a time just after the Industrial revolution, where people moved from rural communities to big cities such as London to find work.

R3 Evaluate

Link to the question

Terminology

Evaluative language

Short sharp quotation

Meanings

Zoom

Effect and writer's perspectives and views R9

Famous Writers and ideas

Thomas Malthus	He was a Victorian writer who believed that the rich should not help the poor.	**Charles Darwin**	He was a very famous Victorian writer and Scientist who studied evolution. He wrote the book 'On the Origin of Species,' which challenged many traditional ideas.
Charles Dickens	He wrote many Victorian novels including ' Oliver Twist' and 'A Christmas Carol.' His novels often illustrated the harsh social conditions experienced by the poor at the time, critiquing the attitudes of the rich.	**Mary Gaskell**	She wrote the famous novel 'North and South' which is often called a social problem novel. Characters such as John Barton in this novel criticised the attitudes of the rich towards the poor. The working conditions for the poor are shown to be terrible.
Mary Prince	Mary Prince was an abolitionist writer. She was a former slave who wrote about her experiences.	**Mary Shelley**	Mary Shelley was a famous female writer. She wrote Frankenstein, a novel about a scientist who tried to create human life.

Key ideas linked to the workhouse

The Workhouse	The workhouse was a desperate place, where people went if they had no other choice. People were offered a poor standard of food and accommodation in return for work.	**Picking Oakum**	This was a time consuming task given to the poor in the workhouse.
The board	This board of rich adults met at the workhouse . They were well known for their lack of compassion.	**Gruel**	Gruel is a thin porridge made from oats and water served in the workhouse. Oliver Twist eats gruel in the workhouse.

freytag's pyramid

Structure key terms:

Dialogue:
Speech between characters.
Focus shifts:
Using paragraphs to zoom in and out and highlight an event or characters' importance to the story.
Minor sentences:
One word used for emphasis.
Main clause/simple sentence:
Usually used to keep information clear or as a series to build pace and tension.
Compound and complex sentences:
Linked clauses used to provide detail.
Single line paragraphs:
To emphasise an important point.
Flashback/flash forward:
Not using a chronological structure.
Cyclical structure:
The ending links to the beginning.
Exposition:
The opening descriptions of setting, time and character.
Genre:
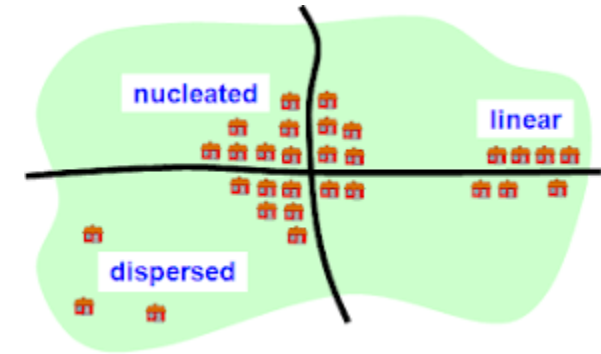Indicating the type of narrative through the use of common motifs.

Language key terms:

Figurative language:
The use of metaphors, similes and personification to establish mood, atmosphere or character.
Mood:
Influencing how the reader feels when reading the text.
Pathetic fallacy:
Using the weather and setting to help establish or suggest a mood.
Juxtaposition:
Creating a contrast between two characters, settings or images.
Evocative vocabulary:
Words which are chosen to have a specific emotional effect on the reader.
Personification:
The attribution of a human characteristic to something non human.
Onomatopoeia:
Using words which sound like the event they describe – 'smash' or 'clash'.
Sensory language:
Appealing to the five senses within description.
Sibilance:
Using repeated 's' sounds to either create a soothing or threatening tone

look   say   cover   write   check

Key Terms

Suburbs	A zone of housing around the edge of a city.
Urban Model	A simple pattern to show the usual land use in a city.
Public Transport	Transport provided for the general public to share such as buses and trains.
Settlement	A place where people live or work.
Inner City	An area of old factories and housing near to the city centre. It may be redeveloped.
Function	The main purpose of a town or parts of a town, such as residential, industrial, commercial or recreational.
High and Low Order Goods	Items sold in a shop which cost a lot and are sold in small volumes (eg wedding ring) or are of low value and sold in large number (eg loaf of bread).
Accessibility	How easy a place is to get to.
Central Business District (CBD)	The middle of a town or city where most shops and offices are found.
Suburbanised Village	A small rural settlement that has had many new buildings added.
Hierarchy	A ranked list of settlements in order of importance or size.
Site	The physical location of a town or city.
Situation	The location of a town or city in relation to its surroundings.
Pattern	The physical layout of a settlement such as linear, nucleated or dispersed.

Increase in size of settlement, higher population and more services — Decrease in Frequency

Conurbation
City
Large town
Small town
Village
Hamlet
Isolated dwelling

nucleated | linear | dispersed

PROBLEMS IN THE INNER CITY

Social / housing:

Racial tension (large presence of immigrants)

Pensioners (former workers)

Vandalism and crime   Poor quality of housing

Lower standards of life (health problems)   Few ammenities and services
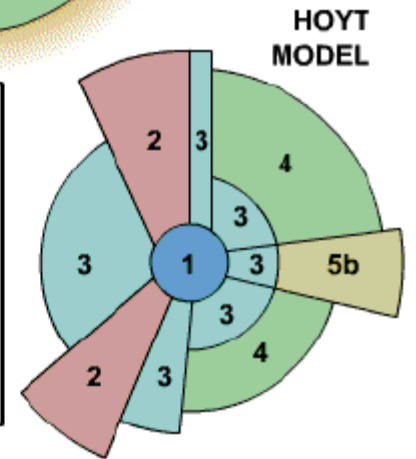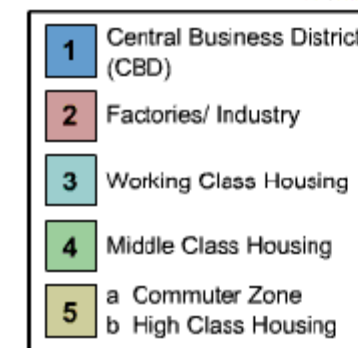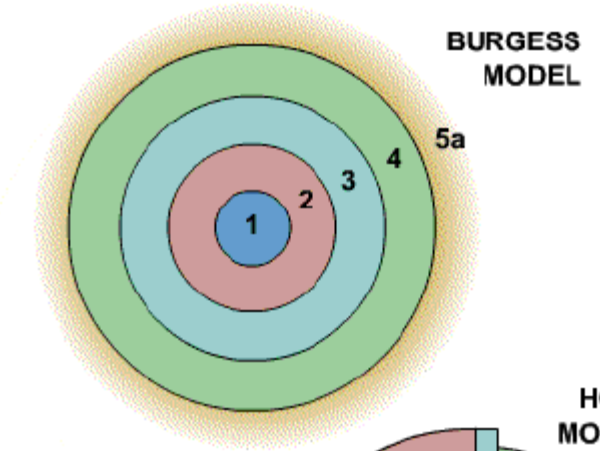
Economical:

Most of factories have been closed → Lack of jobs → Unemployment → Low incomes → Poverty

Environmental:

Problems of waste collection

Noise and air pollution due to the traffic   Lack of parks and derelict buildings

BURGESS MODEL

HOYT MODEL

| 1	Central Business District (CBD)
2	Factories/ Industry
3	Working Class Housing
4	Middle Class Housing
5	a Commuter Zone b High Class Housing

Keywords and definitions

Alliance	A group of countries that are formally united or working together for a similar aim or common purpose.
Imperialism	Extending a country's influence by building a large overseas **empire**–usually using military force
Nationalism	A feeling of being superior to other countries and following your own national interest above all else.
Militarism	The belief that a country should keep a strong military and be prepared to use it to defend national interests

The relationship had been tense between many European countries in the years before. Most had not forgiven each other for past rivalries, as they looked to become more powerful than their neighbours. In fact, the killing of Archduke Franz Ferdinand may have been the tipping point towards a war that had been brewing for years.

Keywords and definitions

Trench	Long narrow ditch in the ground, protecting soldiers from enemy gunfire.
No man's land	Area separating opposing armies in trench warfare
Artillery	Large transportable guns.
Frontline	The forefront line of defence.

BRITAIN DECLARES WAR ON GERMANY
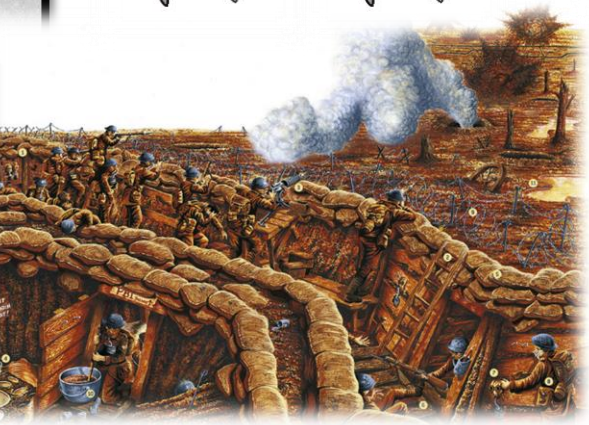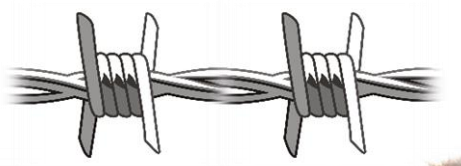
YEAR 9 – REASONING WITH ALGEBRA...
Forming and Solving Equations

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:
- Solve inequalities with negative numbers
- Solve equations with unknowns on both sides
- Solve inequalities with unknowns on both sides
- Substitute into formulae and equations
- Rearrange formulae

Keywords

Inequality: an inequality compares who values showing if one is greater than, less than or equal to another

Variable: a quantity that may change within the context of the problem

Rearrange: Change the order

Inverse operation: the operation that reverses the action

Substitute: replace a variable with a numerical value

Solve: find a numerical value that satisfies an equation

Solve equations with brackets (R)

| 2x + 4 | 2x + 4 | 2x + 4 |
| 30 | | |

$3(2x + 4) = 30$

Expand the brackets

$6x + 12 = 30$

$-12 \qquad -12$

$6x = 18$
$\div 6 \qquad \div 6$
$x = 3$

| x | 3 |

Form and solve inequalities (R)

Two more than treble my number is greater than 11

Find the possible range of values

$3x + 2 > 11$

Solve

$x \leftarrow -3 \leftarrow -2 \leftarrow 11$

$x > 3$

Inequalities with negatives

Method 1   Make x positive first

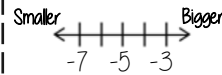$2 - 3x > 17$
$+3x \qquad +3x$
$2 > 17 + 3x$
$-17 \qquad -17$
$-15 > 3x$
$\div 3 \qquad \div 3$
$-5 > x$

x is true for any value smaller than -5

✓ **CHECK IT!**
$2 - 3(-6) = 20$
TRUE/ CORRECT

Smaller ⟷ Bigger
-7 -5 -3

Method 2   Keep the negative x

$2 - 3x > 17$
$-2 \qquad -2$
$-3x > 15$
$\div -3 \qquad \div -3$
$x > -5$

x is true for any value bigger than -5

This cannot be true…

$x < -5$

When you multiply or divide x by a negative you need to reverse the inequality

Equations with unknown on both sides

$4x + 5 = 3x + 24$
$-3x \qquad -3x$

$x + 5 = 24$
$-5 \qquad -5$

$x = 19$

| x | x | x | x | 5 |
| x | x | x | 24 | |

Inequalities with unknown on both sides

Solving inequalities has the same method as equations

$5(x + 4) < 3(x + 2)$
$5x + 20 < 3x + 6$
$2x + 20 < 6$
$2x < -14$
$x < -7$

Check it!

$5(-8 + 4) < 3(-8 + 2)$
$5(-4) < 3(-6)$
$-20 < -18$
✓ -20 IS smaller than -18

Formulae and Equations

Substitute in values

Formulae – all expressed in symbols → **Equations** – include numbers and can be solved

Rearranging Formulae (one step)

| x | |
| y | z |

$x = y + z$

Rearrange to make y the subject.
$y = x - z$

$y \longrightarrow +z \longrightarrow x$

$y \longleftarrow -z \longleftarrow x$

Using inverse operations or fact families will guide you through rearranging formulae

Rearranging can also be checked by substitution.

Language of rearranging…

Make XXX the subject

Change the subject

Rearrange

Rearranging Formulae (two step)

In an equation (find x)

$4x - 3 = 9$
$+3 \qquad +3$
$4x = 12$
$\div 4 \qquad \div 4$
$x = 3$

In a formula (make x the subject)

$xy - s = a$
$+s \qquad +s$
$xy = a + s$
$\div y \qquad \div y$
$x = \dfrac{a + s}{y}$

The steps are the same for solving and rearranging

Rearranging is often needed when using $y = mx + c$

eg Find the gradient of the line $2y - 4x = 9$

Make y the subject first $y = \dfrac{4x + 9}{2}$ Gradient $= \dfrac{4}{2} = 2$

Algebraic Representation

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:
- Draw quadratic graphs
- Interpret quadratic graphs
- Interpret other graphs including reciprocals
- Represent inequalities

Keywords

Quadratic: a curved graph with the highest power being 2. Square power.
Inequality: makes a non equal comparison between two numbers
Reciprocal: a reciprocal is 1 divided by the number
Cubic: a curved graph with the highest power being 3. Cubic power.
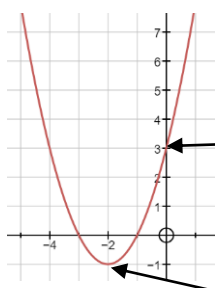**Origin:** the coordinate (0, 0)
Parabola: a 'u' shaped curve that has mirror symmetry

Quadratic Graphs

$$y = x^2 + 4x + 3$$

If x^2 is the highest power in your equation then you have a <u>quadratic graph</u>.

It will have a parabola shape

Intersection with the y axis

Substitute the x values into the equation of your line to find the y coordinates

x	-4	-3	-2	-1	0	1
y	3	0	-1	0	3	8

Coordinate pairs for plotting $(-3, 0)$

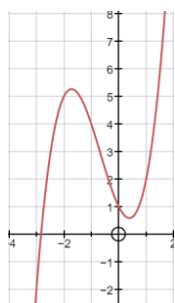Plot all of the coordinate pairs and join the points with a curve (freehand)

Quadratic graphs are always symmetrical with the turning point in the middle

Interpret other graphs

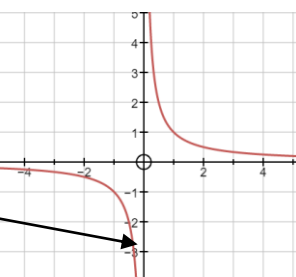### Cubic Graphs

$$y = x^3 + 2x^2 - 2x + 1$$

If x^3 is the highest power in your equation then you have a <u>cubic graph</u>

Reciprocal Graphs

$$y = \frac{1}{x}$$

Reciprocal graphs never touch the y axis.
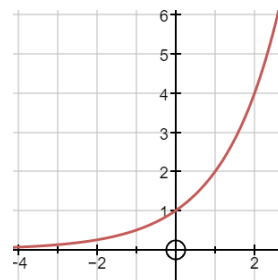This is because x cannot be 0
This is an <u>asymptote</u>

Exponential Graphs

$$y = 2^x$$

Exponential graphs have a power of x

Represent Inequalities

Multiple methods of representing inequalities
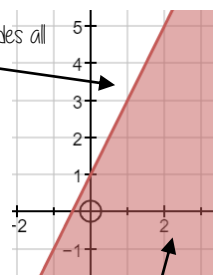
$$x < 4$$

All values are less than 4
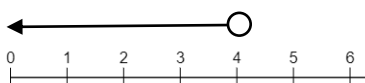
The shaded area indicates all possible values of x
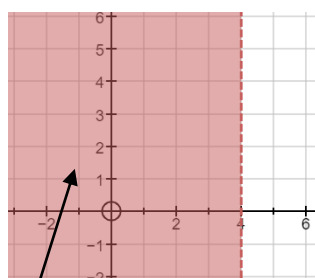
The dotted line shows that the inequality does not include these points

The solid line shows that the inequality includes all the points on this line

$$y \geq 2x + 1$$

The shaded area indicates all possible solutions to this inequality

Probability

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:
- Find single event probability
- Find relative frequency
- Find expected outcomes
- Find independent events
- Use diagrams to work out probabilities

Keywords

Probability: the chance that something will happen
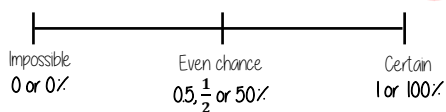**Relative Frequency**: how often something happens divided by the outcomes
Independent: an event that is not effected by any other events.
Chance: the likelihood of a particular outcome.
Event: the outcome of a probability — a set of possible outcomes.
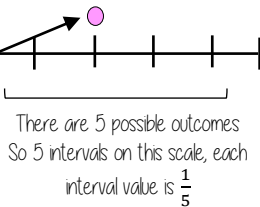**Biased**: a built in error that makes all values wrong by a certain amount.

The probability scale　(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)

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 $\frac{1}{5}$

Single event probability　(R)

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

Relative Frequency

$$\frac{\text{Frequency of event}}{\text{Total number of outcomes}}$$

Remember to calculate or identify the overall number of outcomes!

Colour	Frequency	Relative Frequency
Green	6	0.3
Yellow	12	0.6
Blue	2	0.1
	20	

Relative frequency can be used to find expected outcomes

e.g. Use the relative probability to find the expected outcome for green if there are 100 selections.

Relative frequency x Number of times
$0.3 \times 100 = 30$

Expected outcomes

Expected outcomes are estimations. It is a long term average rather than a prediction.

Dark	Milk	White
0.15	0.35	0.5

The sum of the probabilities is 1

An experiment is carried out **400** times.
Show that dark chocolate is expected to be selected **60** times

$0.15 \times 400 = 60$

Independent events

The rolling of one dice has no impact on the rolling of the other. The individual probabilities should be calculated separately.
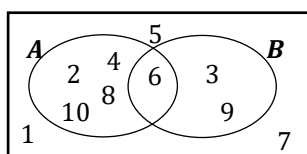
Probability of event 1 × Probability of event 2

$P(5) = \frac{1}{6}$　　　$P(R) = \frac{1}{4}$

Find the probability of getting a 5 and a red

$P(5 \text{ and } R) = \frac{1}{6} \times \frac{1}{4} = \frac{1}{24}$

Using diagrams　(R)

Recap Venn diagrams, Sample space diagrams and Two-way tables

A　5　B
2　4　6　3
8
10
1　9　7

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

The possible outcomes from tossing a coin

The possible outcomes from rolling a dice

	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

YEAR 9 – REASONING WITH GEOMETRY...
Enlargement & Similarity

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:
- Recognise enlargement and similarity
- Enlarge a shape by a positive SF
- Enlarge a shape from a point
- Enlarge a shape by a fractional SF
- Work out missing sides and angles in a pair of similar shapes.

Keywords

Similar Shapes: shapes of different sizes that have corresponding sides in equal proportion and identical corresponding angles.
Scale Factor: the multiple describing how much a shape has been enlarged
Enlarge: to change the size of a shape (enlargement is not always making a shape bigger)
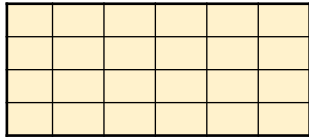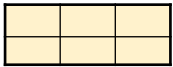**Corresponding**: objects (or sides) that appear in the same place in two similar situations.
Image: the picture or visual representation of the shape

Recognise enlargement & similarity

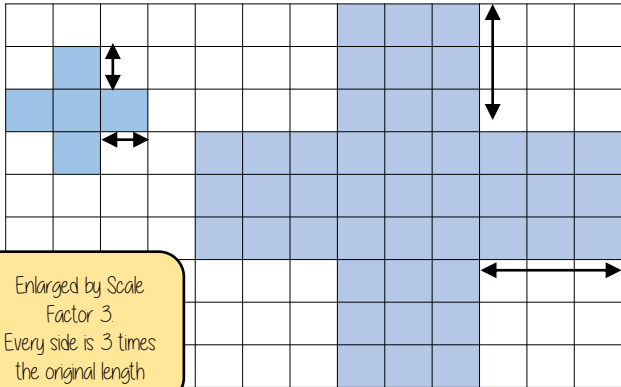Shapes are similar if all pairs of corresponding sides are in the same ratio

These shapes are similar because all sides are increased by the same ratio

Enlargements are similar shapes with a ratio other than 1

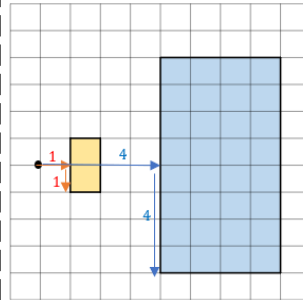## Enlarge by a positive scale factor

With a scale factor larger than 1 it makes the shape **bigger**

Enlarged by Scale Factor 3.
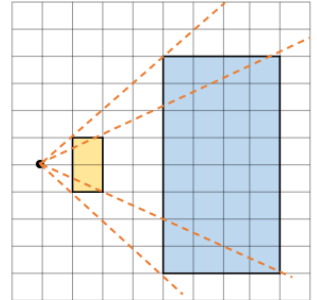Every side is 3 times the original length

Positive fractional scale factor

With a scale factor between 0 and 1 it makes the shape **smaller**

5 cm
12cm

Scale Factor of $\frac{1}{5}$

1 cm
2.4 cm

8 cm
10 cm

Scale Factor of $\frac{5}{2}$

20 cm
25 cm

Enlarge a shape from a point

Scaled distances method

Scale the distance between the point of enlargement and each corresponding vertices

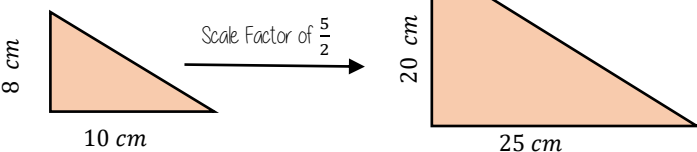### Rays method

Multiply the distance from the centre of corresponding vertices by the scale factor along the ray
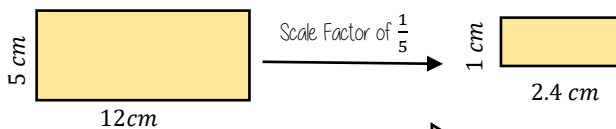
Calculations in similar shapes

Don't forget that properties of shapes don't change with enlargements or in similar shapes

The two trapezium are similar find the missing side and angle

2 cm
130°
6 cm

x cm
?
12 cm
60°
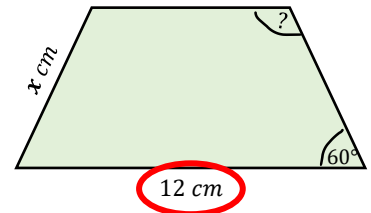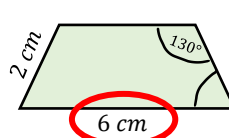
Corresponding sides identify the scale factor

$$\frac{12}{6} = 2$$

Scale Factor = **2**

Calculate the missing side   Length (corresponding side) x scale factor
$$2cm \times 2$$
$$x = 4cm$$

Enlargement does not change angle size

Calculate the missing angle   Corresponding angles remain the same
$$130°$$

What do I need to be able to do?

By the end of this unit you should be able to:
- Identify the order of rotational symmetry
- Rotate a shape about a point on the shape
- Rotate a shape about a point not on a shape
- Translate by a given vector
- Compare rotations and reflections

Keywords

Rotate: a rotation is a circular movement.

Symmetry: when two or more parts are identical after a transformation.

Regular: a regular shape has angles and sides of equal lengths.

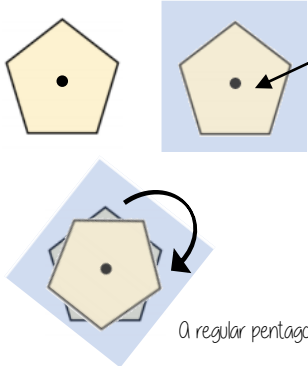**Invariant:** a point that does not move after a transformation.

Vertex: a point two edges meet.

Horizontal: from side to side

Vertical: from up to down

Rotational Symmetry

Tracing paper helps check rotational symmetry.

1. Trace your shape (mark the centre point)

2. Rotate your tracing paper on top of the original through 360°

3. Count the times it fits back into itself

A regular pentagon has rotational symmetry of order 5

Rotate from a point (in a shape)

Original shape
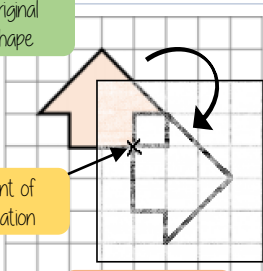
Point of rotation

Image: 90° clockwise

1. Trace the original shape (mark the point of rotation)

2. Keep the point in the same place and turn the tracing paper

3. Draw the new shape

Clockwise   Anti-Clockwise

Rotate from a point (outside a shape)

Image: 90° anti - clockwise

Point of rotation
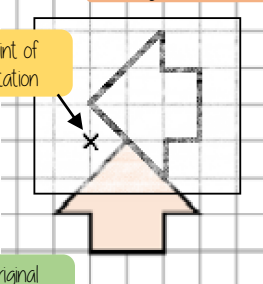
Original shape

1. Trace the original shape (mark the point of rotation)

2. Keep the point in the same place and turn the tracing paper

3. Draw the new shape

Translation and vector notation

Vector Notation $\rightarrow \begin{pmatrix} 1 \\ -2 \end{pmatrix}$

How far left or right to move
Negative value (left)
Positive value (right)

How far up or down to move
Negative value (down)
Positive value (up)

Translation $\begin{pmatrix} -3 \\ 3 \end{pmatrix}$

Original shape

Every vertex has been translated by the same amount

Compare rotations and reflections

R Reflections are a mirror image of the original shape.

Information needed to perform a reflection:
- Line of reflection (Mirror line)

Rotations are the movement of a shape in a circular motion

Information needed to perform a rotation:
- Point of rotation
- Direction of rotation
- Degrees of rotation
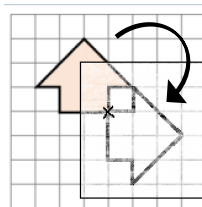
Probability

What do I need to be able to do?

By the end of this unit you should be able to:
- Add, Subtract and multiply fractions
- Find probabilities using likely outcomes
- Use probability that sums to 1
- Estimate probabilities
- Use Venn diagrams and frequency trees
- Use sample space diagrams
- Calculate probability for independent events
- Use tree diagrams

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.

Add, Subtract and multiply fractions (R)

Addition and Subtraction

$$\frac{4}{5} - \frac{2}{3}$$

$$\frac{12}{15} - \frac{10}{15} = \frac{2}{15}$$

Use equivalent fractions to find a common multiple for both denominators

Multiplication

$$\frac{3}{4} \times \frac{2}{3}$$

$$\frac{3}{4} \times \frac{2}{3} = \frac{6}{12}$$

Parts shaded

Total number of parts in the diagram

Modelled:

Likeliness of a probability (R)

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)
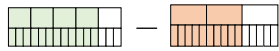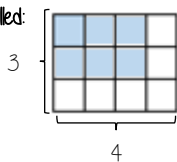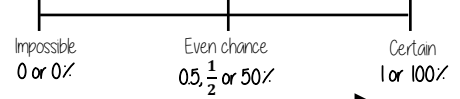
Sum to 1 (R)

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

Experimental data

Theoretical probability — What we expect to happen

Experimental probability — What actually happens when we try it out

The more trials that are completed the closer experimental probability and theoretical probability become

The probability becomes more accurate with more trials.
Theoretical probability is proportional

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) $= \frac{3}{12}$

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.

Adult 26 → Elephant 13, Other 13
60 → Children 34 → Elephant 24, Other 10
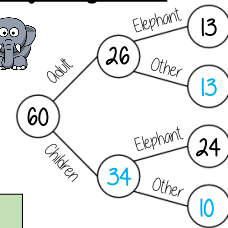
Frequency trees and two-way tables can show the same information

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

$P(adult) = \frac{26}{60}$
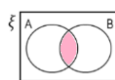
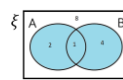$P(Child$ with favourite animal as elephant$) = \frac{13}{37}$

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 — $P(A')$

Independent events

The outcome of two events happening. The outcome of the first event has no bearing on the outcome of the other

$$P (A \text{ and } B) = P (A) \times P (B)$$

Tree diagram for independent event
Isobel has a bag with 3 blue counters and 2 yellow. She picks a counter and replaces it before the second pick.

Because they are replaced the second pick has the same probability

3 out of 5 are blue

Blue $\frac{3}{5}$ → Blue $\frac{3}{5}$ = $P(BB)$ $\frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$
Blue $\frac{3}{5}$ → Yellow $\frac{2}{5}$ = $P(BY)$ $\frac{3}{5} \times \frac{2}{5} = \frac{6}{25}$
Yellow $\frac{2}{5}$ → Blue $\frac{3}{5}$ = $P(YB)$ $\frac{2}{5} \times \frac{3}{5} = \frac{6}{25}$
Yellow $\frac{2}{5}$ → Yellow $\frac{2}{5}$ = $P(YY)$ $\frac{2}{5} \times \frac{2}{5} = \frac{4}{25}$

2 out of 5 are yellow

Sum of probabilities = 1

Dependent events

The outcome of the first event has an impact on the second event
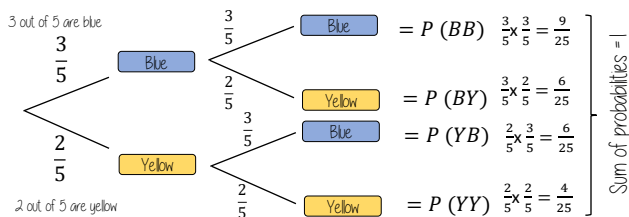
Tree diagram for dependent event
A sock drawer has 5 black and 4 white socks, Jamie picks 2 socks from the drawer.

Pick first sock

$\frac{5}{9}$ → $\frac{4}{8}$ = $P(BB)$ $\frac{5}{9} \times \frac{4}{8} = \frac{20}{72}$
$\frac{5}{9}$ → $\frac{4}{8}$ = $P(BW)$ $\frac{5}{9} \times \frac{4}{8} = \frac{20}{72}$
$\frac{4}{9}$ → $\frac{5}{8}$ = $P(WB)$ $\frac{4}{9} \times \frac{5}{8} = \frac{20}{72}$
$\frac{4}{9}$ → $\frac{3}{8}$ = $P(WW)$ $\frac{4}{9} \times \frac{3}{8} = \frac{12}{72}$

A white sock has been removed

Sum of probabilities = 1
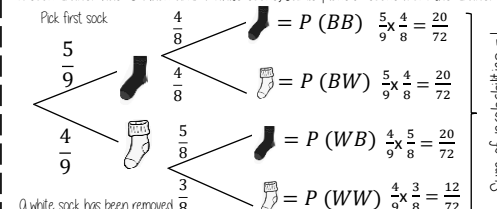
NOTE: as "socks" are removed from the drawer the number of items in that drawer is also reduced ∴ the denominator is also reduced for the second pick

YEAR 7 — FRACTIONAL THINKING
Addition and subtraction of fractions

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:
- Convert between mixed numbers and fractions
- Add/Subtract unit fractions (same denominator)
- Add/Subtract fractions (same denominator)
- Add/Subtract fractions from integers
- Use equivalent fractions
- Add/Subtract any fractions
- Add/Subtract improper fractions and mixed numbers
- Use fractions in algebraic contexts

Keywords

Numerator : the number above the line on a fraction. The top number. Represents how many parts are taken
Denominator: the number below the line on a fraction. The number represent the total number of parts
Equivalent: of equal value
Mixed numbers: a number with an integer and a proper fraction
Improper fractions: a fraction with a bigger numerator than denominator
Substitute: replace a variable with a numerical value
Place value: the value of a digit depending on its place in a number. In our decimal number system, each place is 10 times bigger than the place to its right

Representing Fractions

$\frac{1}{4}$ is represented in all the images

$1 \div 4$

Mixed numbers and fractions

$\frac{7}{5}$ Improper fraction

$1\frac{2}{5}$ Mixed number

In this model 5 parts make up a whole

Fractions can be bigger than a whole

Add/Subtract unit fractions   Same denominator

$\frac{1}{12} + \frac{1}{12} - \frac{1}{12}$ = $\frac{2}{12}$

$\frac{1}{4} + \frac{1}{4}$ = $\frac{2}{4}$

With the same denominator ONLY the numerator is added or subtracted

Add/Subtract fractions   Same denominator

$\frac{2}{7} + \frac{3}{7}$ = $\frac{5}{7}$

Sequences

$\frac{1}{3}, 1, 1\frac{2}{3}, 2\frac{1}{3}, 3, ...$

$+\frac{2}{3}$ $+\frac{2}{3}$

Represent this on a number line to help

Add/Subtract from integers

$1 - \frac{2}{6}$ = $\frac{4}{6}$

$3 + \frac{1}{6}$ = $3\frac{1}{6}$

The denominator indicates the number of parts a whole is made up of

Equivalent fractions   Numerator and denominator have the same multiplier

$\frac{2}{3}$ = $\frac{4}{6}$

$\frac{1}{3} = \frac{2}{6}$

Add/Subtraction fractions (common multiples)

$\frac{3}{5} + \frac{7}{10}$

$\frac{6}{10} + \frac{7}{10}$

Addition/Subtraction needs a common denominator

$\frac{13}{10}$

Add/Subtraction any fractions

$\frac{4}{5} - \frac{2}{3}$ = $\frac{2}{15}$

$\frac{12}{15}$ — $\frac{10}{15}$

Use equivalent fractions to find a common multiple for both denominators

Add/Subtraction fractions (improper and mixed)

$2\frac{1}{5} - 1\frac{3}{10}$

$2\frac{2}{10}$

$\frac{22}{10} - \frac{13}{10}$ = $\frac{9}{10}$

- Convert to an improper fraction
- Calculate with common denominator

Partitioning method

$2\frac{1}{5} - 1\frac{3}{10}$ = $2\frac{2}{10} - 1\frac{3}{10}$ = $2\frac{2}{10} - 1 - \frac{3}{10}$ = $1\frac{2}{10} - \frac{3}{10}$ = $\frac{9}{10}$

Fractions in algebraic contexts

$p = 5 \quad m = 2$

$k - \frac{5}{8} = 2$

Apply inverse operations
$k = 2 + \frac{5}{8}$

Form expressions with fractions
$b + \frac{7}{9} \longrightarrow b + \frac{7}{9}$

$\frac{p}{8} + \frac{1}{m}$

Substitution
$\frac{5}{8} + \frac{1}{2}$

Fractions and decimals

$\frac{1}{10}$ = 0.1

$\frac{1}{100}$ = 0.01

Example $\frac{6}{10} + 0.3$ → 0.6 + 0.3

$\frac{6}{10} + \frac{3}{10}$

Remember to use equivalent fractions and common denominators

YEAR 7 — APPLICATION OF NUMBER
Fractions and percentages of amounts

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:
- Find a fraction of a given amount
- Use a given fraction to find the whole or other fractions
- Find the percentage of an amount using mental methods
- Find the percentage of a given amount using a calculator

Keywords

Fraction: how many parts of a whole we have
Equivalent: of equal value
Whole: a number with no fractional or decimal part.
Percentage: parts per 100 (uses the ⁄ symbol)
Place Value: the value of a digit depending on its place in a number. In our decimal number system, each place is 10 times bigger than the place to its right
Convert: change into an equivalent representation, often fraction to decimal to a percentage cycle.

Fraction of a given amount

Find $\frac{2}{5}$ of £205

The bar represents the whole amount

£205

| £41 | £41 | £41 | £41 | £41 |

2 out of the 5 equal parts

2 × £41 = **£82**

£205 ÷ 5 = £41

Each part of the bar model represents £41

90

| 30 | 30 | 30 |

| 15 | 15 | 15 |

45

Use bar models for comparisons

$\frac{1}{3}$ of 90 = 30

$\frac{2}{3}$ of 45 = 30

∴ $\frac{1}{3}$ of 90 = $\frac{2}{3}$ of 45

Use a fraction of amount

$\frac{2}{3}$ of a value is 70. What is the whole number?

70

| 35 | 35 | 35 |

35 × 3 = 105
The whole number is 105

70 ÷ 2 = 35
Each part of the bar model represents 35.

The wording of the question is important to setting up the bar model

63

| 21 | 21 | 21 | 21 |

Find the whole

$\frac{3}{4}$ of a number is 63.

What is $\frac{1}{6}$ of the number?

84

| 14 | 14 | 14 | 14 | 14 | 14 |

= 14

Use the whole to find a given part

Find the percentage of an amount (Mental methods)

The **whole** represents 100%

10% = $\frac{1}{10}$ of the whole

0% 20% 40% 60% 80% 100%

10% = $\frac{1}{10}$ of the whole   50% = $\frac{5}{10}$ = $\frac{1}{2}$ of the whole

20% = $\frac{2}{10}$ = $\frac{1}{5}$ of the whole   5% = $\frac{1}{20}$ of the whole

Find 65% of 80

80

| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

For bigger percentages it is sometimes easier to take away from 100%

Method 1:
65% = 10% × 6 + 5%
= (8 × 6) + 4
= 52

Method 2:
65% = 50% + 10% + 5%
= 40 + 8 + 4
= 52

Find the percentage of an amount (Calculator methods)

Using a multiplier

Find 65% of 80

Fraction, decimal, percentage conversion

65% = $\frac{65}{100}$ = 0.65 ← The multiplier

0.65 × 80 = **52**

Using the percent button

Find 65% of 80

Type 65

Press [SHIFT] [( ] (%)

Press [✗] 80 and then press =

This brings up the ⁄ button on screen
You will see 65⁄

You can also use the calculator to support non calculator methods and find 1% or 10% then add percentages together

"of" can represent 'x' in calculator methods
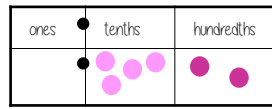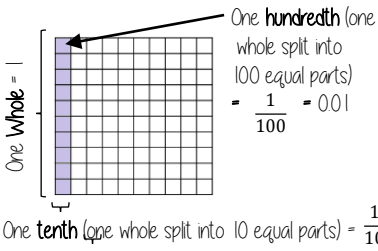
What do I need to be able to do?

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

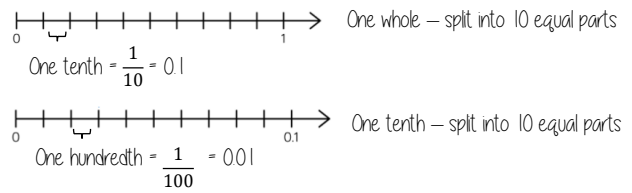- Convert fluently between fractions, decimals & percentages

Keywords

Fraction: how many parts of a whole we have

Decimal: a number with a decimal point used to separate ones, tenths, hundredths etc.

Percentage: a proportion of a whole represented as a number between 0 and 100

Place value: the numerical value that a digit has decided by its position in the number

Placeholder: a number that occupies a position to give value

Interval: a range between two numbers

Tenth: one whole split into 10 equal parts

Hundredth: one whole split into 100 equal parts

Sector: a part of a circle between two radius (often referred to as looking like a piece of pie)

Recurring: a decimal that repeats in a given pattern
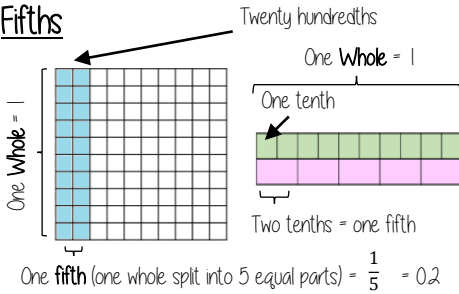
Tenths and hundredths

One **hundredth** (one whole split into 100 equal parts) = $\frac{1}{100}$ = 0.01

One Whole = 1

One **tenth** (one whole split into 10 equal parts) = $\frac{1}{10}$ = 0.1

0 ones, 5 tenth and 2 hundredths

0 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.01 + 0.01
= 0 + 0.5 + 0.02
= 0.52

On a number line

One tenth = $\frac{1}{10}$ = 0.1

One whole – split into 10 equal parts

One hundredth = $\frac{1}{100}$ = 0.01

One tenth – split into 10 equal parts

Fifths

Twenty hundredths

One Whole = 1

One tenth

Two tenths = one fifth

One **fifth** (one whole split into 5 equal parts) = $\frac{1}{5}$ = 0.2

Percentages on a hundred grid

100% = a whole = 100 hundredths

7 hundredths

7 hundredths
7 out of 100
7%

6 tenths

6 tenths and 3 hundredths
63 hundredths
63%

3 hundredths

Quarters

One **quarter** (one whole split into 4 equal parts) = $\frac{1}{4}$ = 0.25

Twenty five hundredths

One Whole = 1

One whole

One half = 0.5

One quarter = 0.25

Simple pie charts

Split into 10 parts = 10% = 36°

Split into 2 parts = 50% = 180°

Split into 5 parts = 20% = 72°
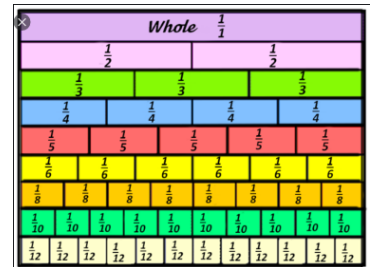
A pie chart has 360° so all FDP calculations are out of 360
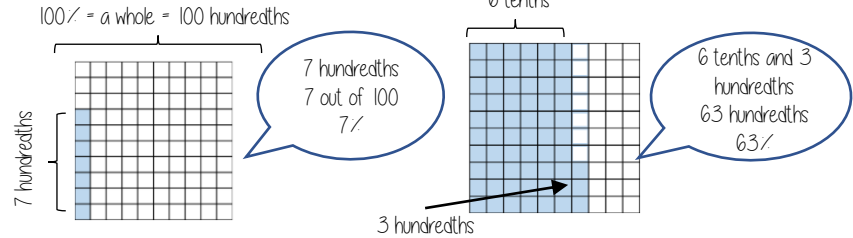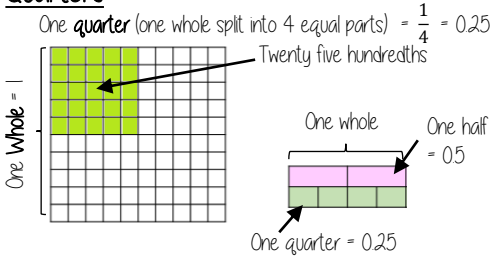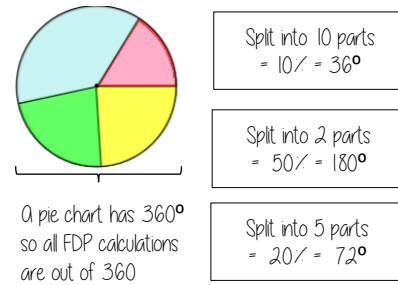
Equivalent fractions

Represent equivalence with fraction walls

Whole	$\frac{1}{1}$
$\frac{1}{2}$	$\frac{1}{2}$
$\frac{1}{3}$ $\frac{1}{3}$	$\frac{1}{3}$
$\frac{1}{4}$ $\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$
$\frac{1}{5}$ $\frac{1}{5}$	$\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$
$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$	$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$
$\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$	$\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$
$\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$	$\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$
$\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$	$\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$

Fractions – on a diagram

The denominator is represented by EQUALLY sized parts – this is split into quarters
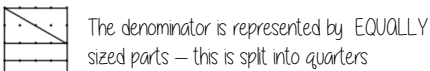
Fractions – on a number line

This point is at the 6th part
6 is the **numerator**

One whole split into 18 equal parts
18 is the **denominator**

$\frac{6}{18}$ ← $\frac{3}{9}$ ← $\frac{1}{3}$

Convert FDP

$\frac{70}{100}$

This also means
70 ÷ 100

70 out of 100 squares
70 "hundredths"
= 7 "tenths"
0.7

70 hundredths
= 70%

Using a calculator

■/□

This will give you the answer in the simplest form

S⇌D   Convert to a decimal

× 100 converts to a percentage
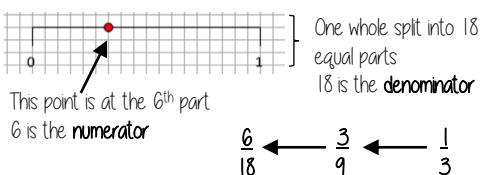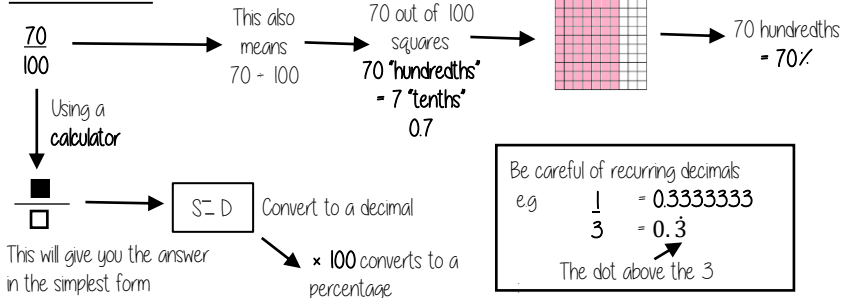
Be careful of recurring decimals
e.g $\frac{1}{3}$ = 0.3333333
$\frac{1}{3}$ = 0.$\dot{3}$
The dot above the 3

Head

To be able to take rest, working and recovery heart rates.

To understand the relationship between test scores and strengths as a performer.

To understand the athletes that would use different training method and the benefits to this

Able to compare own and others work and can state the differences. Use this information to attempt to improve own performance.

Heart (Resilience)

I have worked individually and as part of a group this term.

I have showed good resilience in a range of athletic activities, including both track and field events.

I have shown good resilience when working individually and as a part of a team across a range of field and track events this term.

I have pushed my body and challenged myself to improve across a range of athletic events.
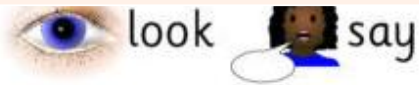
Hands

Push body to challenge physical capacity in lessons

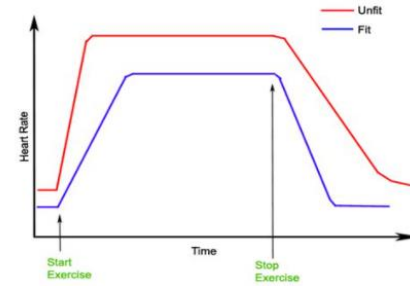To accurately replicate tests for health/skill related fitness.

Apply basic principles of warm up and cool down, using exercises appropriate for the event

To sustain performance in different methods of fitness testing

look say cover write check

Year 9 Fitness

- Increases during exercise to increase blood flow
- More Oxygen to working muscles
- Why would this benefit an athlete?

ORGANIC BALANCE BEAUTY WELLNESS WALK PLANNING REGENERATION LIFESTYLE
CALORIES NATURAL EAT ENERGY MOTIVATION
VITAMIN ASSESSMENT EXERCISE WEIGHT LOSS
FRUIT NUTRITION TRANSFORMATION
ENERGY WORKOUT FOCUS
GOALS RESOLUTION
CARDIO RUN SPORT
ACTIVE MOVE SUCCESS MARATHON
TRAINING FOOD
ENDURANCE HEALTHY BODY POWER ACHIEVE
RESOLUTION FITNESS PERFORMANCE

Health Benefits of Physical Activity for Adults

IMMEDIATE A single bout of moderate-to vigorous physical activity provides immediate benefits for your health.

LONG-TERM Regular physical activity provides important health benefits for chronic disease prevention.

Sleep Improves sleep quality

Less Anxiety Reduces feelings of anxiety

Blood Pressure Reduces blood pressure

Brain Health Reduces risks of developing dementia (including Alzheimer's disease) and reduces risk of depression

Heart Health Lowers risk of heart disease, stroke, and type 2 diabetes

Cancer Prevention Lowers risk of eight cancers: bladder, breast, colon, endometrium, esophagus, kidney, lung, and stomach

Healthy Weight Reduces risk of weight gain

Bone Strength Improves bone health

Balance and Coordination Reduces risks of falls

Emerging research suggests physical activity may also help boost immune function.
Nieman, "The Compelling Link," 201-217. Jones, "Exercise, Immunity, and Illness," 317-344.

CDC

ACTIVE PEOPLE, HEALTHY NATION

Year 9 Trampolining

To understand and appreciate the need to make decisions about choice of movements and refining ideas when unsuccessful.

Understand the principle of aesthetics of performance and body tension when performing trampoline routines.

To develop how to recognize good/poor performance in trampoline routines

To plan a 10 bounce routine involving a number of different movements and combinations.

Heart (Commitment)

To come to lesson with correct equipment and Pe kit

To be prepared to try my best in every lesson this term

To be committed to taking on board verbal feedback from both students and teacher

To be committed to trying new skills and committed to performing the best routine possible.

Hands

I can maintain height and balance during trampoline routines.

I can perform movements with extension of arms and legs showing good body tension.

I can perform a variety of different landings with success staying on the cross (seat, front, back landings)

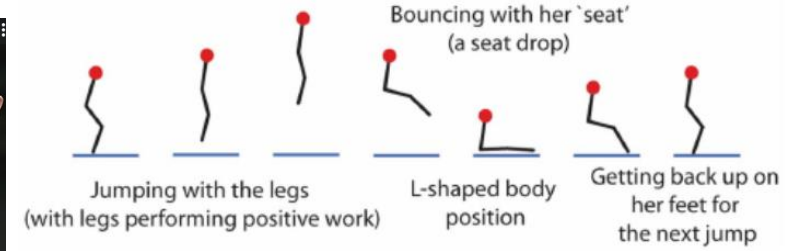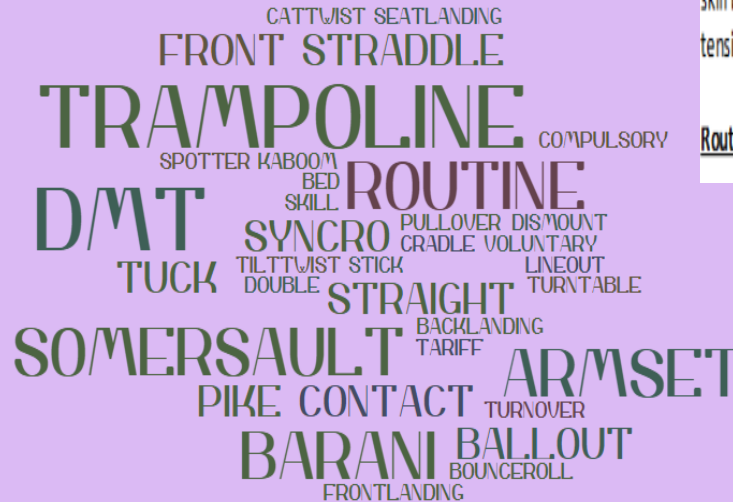I can add combination sequences and rotation into my routines.

Bouncing with her `seat' (a seat drop)

Jumping with the legs (with legs performing positive work) — L-shaped body position — Getting back up on her feet for the next jump
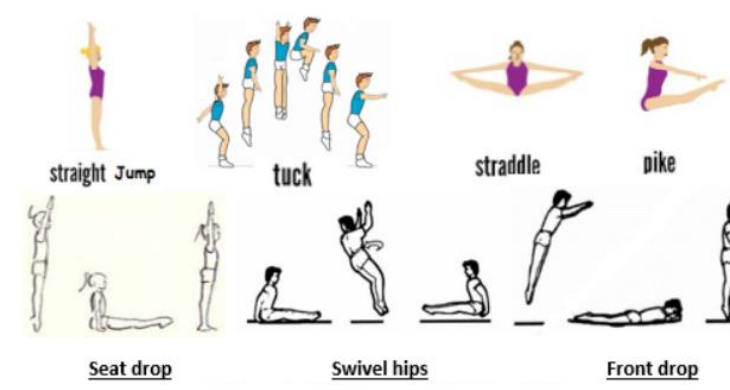
Key words – Definitions

The cross = An 'x' on the centre of the trampoline. This is the part of the trampoline where you bounce. This is the area of the trampoline where every move starts and ends perform all skills.

Spotting = standing around the edge of the trampoline to stop the performer falling off.

Control = Having control when performing shows you can stay on close to the cross, include all of the key points for the skill being performed and polish the performance by point toes, keeping arms and legs straight (extended) and having tension in the muscles.

Routine = a combination of skills performed one after the other on the trampoline connected by a bounce.

CATTWIST SEATLANDING
FRONT STRADDLE
TRAMPOLINE COMPULSORY
SPOTTER KABOOM
BED ROUTINE
SKILL
DMT SYNCRO PULLOVER DISMOUNT
CRADLE VOLUNTARY
TUCK TILTTWIST STICK LINEOUT
DOUBLE STRAIGHT TURNTABLE
BACKLANDING
SOMERSAULT TARIFF
ARMSET
PIKE CONTACT TURNOVER
BARANI BALLOUT
BOUNCEROLL
FRONTLANDING

straight Jump — tuck — straddle — pike

Seat drop — Swivel hips — Front drop

look — say — cover — write — check

Head

In a game situation I have a thorough understanding of tactics and team skills and I are able to take control of a game.

I can consistently communicate effectively with a variety of different 'audience' during complex situations showing extensive knowledge

I can analyse performances. I can implement a variety of strategies for improvement

I can referee a game applying basic rules and conventions

Heart (Team work)

I have successfully worked hard in my lessons working with people who I don't usually work with

I have led a part of a warm up at the start of the lesson which my team has taken part in

I have successfully set up a drill with my team which we have used within the lesson

I have taken part in various roles within a game situation to benefit my team

Hands

I rarely lose possession in a game situation and I have a range of shooting skills executed with a high level of technique.

I can shoot a lay-up with both hands and score consistently in a game

I make few unforced errors and show a good level of skill even under pressure.

My vision is good within a game, I can see passing opportunities and I attack effectively.

Year 9
Basketball

look say cover write check

The Lay-up shot

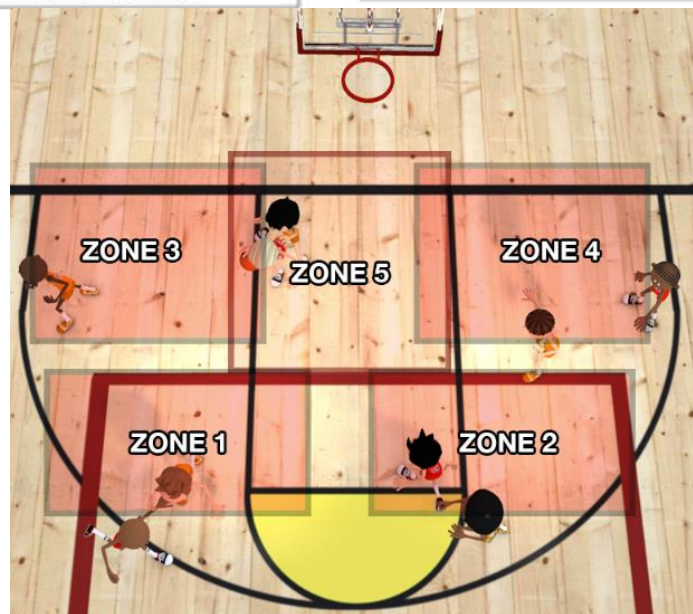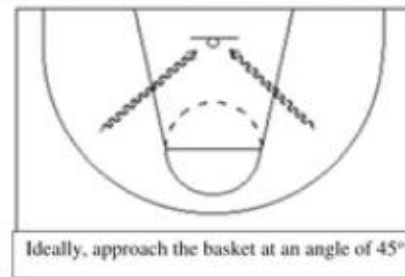Name: ....

What to do

1. Take two strides. Jump up, not forward.
2. Bring the ball up with two hands to the shooting position.
3. Bring your outside knee up.
4. Shoot with the outside hand, using the inside arm to protect the shot.
5. At the height of the jump, shoot the ball softly off the backboard.
6. Aim for the top corner of the black square like a postage stamp.
7. Fingers finish pointing at target.
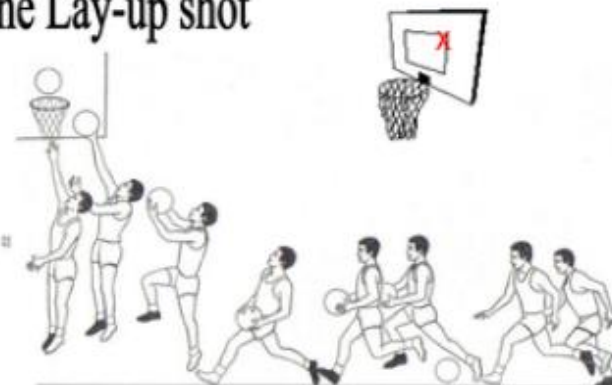
Coaching Questions

Is the performer:

Taking off with their inside foot?

Bringing their knee up?

Using one hand to shoot?

Hitting the top corner of the square on the backboard?

Ex Question ....

Ideally, approach the basket at an angle of 45°

ZONE 3   ZONE 5   ZONE 4

ZONE 1   ZONE 2

PSHE- Knowledge organiser- Y9- Term 2

RSE	Created by God to love and loved by God	• It is in our human nature to love and be loved. • <u>Objectification:</u> the action of degrading someone to the status of a mere object. • We should not always act on our desires, including casual sex, pornography and masturbation. • Pornography and masturbation affect the brain, can become addictive and affect your sexual life. • <u>Love:</u> an intense feeling of deep affection. • <u>Lust:</u> strong sexual desire created by a chemical reaction in the brain. • <u>Contraception:</u> the deliberate use of artificial methods or other techniques to prevent pregnancy as a consequence of sexual intercourse. • <u>Civil marriage:</u> a marriage solemnized as a civil contract without religious ceremony. • <u>Civil partnerships:</u> a legally recognized union with rights similar to those of marriage, created originally for same-sex couples in jurisdictions where they were not legally allowed to marry. • <u>Forced marriage:</u> a marriage in which one or more of the parties is married without their consent or against their will. • <u>Arranged marriage:</u> a marriage planned and agreed by the families or guardians of the couple concerned. • <u>Monogamy:</u> the practice or state of having a sexual relationship with only one partner. • For Catholic Christians, the sacrament of marriage is a public sign that an individual is giving himself or herself totally to another person. • Consent is not just gaining permission for something, but choosing to honour and respect one another as persons with innate dignity. • <u>Sexting</u>: when you send a sexual message, photo or video to someone else. • <u>FGM</u>: female genital mutilation is illegal and has no medical purposes

Remember!

• We will be open and honest, but not discuss directly our own and others personal/ private life.
• Your teacher will not repeat what is said in the room except if she/he is concerned we are at risk.
• It is ok to disagree but we will not judge.
• Taking part is important but we have the right to pass.
• We will not make assumptions and we will listen to others' point of view.
• We know that there are no stupid questions but we will use appropriate language.
• If we need further help or advice, you know you can talk to your teachers, form tutor and SSOs.

Christian Ethics

KEY WORDS

Conscience: The inner core/voice telling humans what is good and right

Imago Dei: Made in the Image of God

Theistic: Related to belief in God

Non-Theistic: Related to a belief in an absence of God

Morality: A system of values. A distinction between what is right and wrong

Divine Law: Rules, ways of living given by God

Free Will: The ability to make our own choices and act freely.

Conscience

The Conscience is described by St Thomas Aquinas to be the Voice of God. Catholics see it as a way that God guides them to help make the right decisions

However non-religious people would argue the conscience is part of our mind and we can use our conscience and its reasoning to help make decisions

Ethics

Ethics is looking at the moral guidance people use before making decisions.

This term you will look at key ethical issues within society and how society, religion and our own moral compass helps people make decisions.
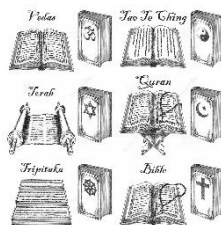
Divine Law

Divine Law is the guidance given by God through prophets, Holy Books and for Christians, Jesus himself. Theists believe God gave Divine Law as a way to guide people to do the right thing

However some people would argue that Divine Law is outdated and cannot be applied to the Ethical Issues we face today.

What people use to make decisions

Holy Books

Jesus' teaching and example
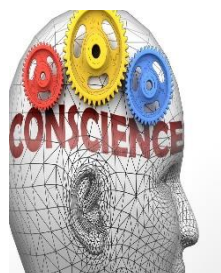
Conscience

Laws of Society

Religious Leaders

Fides et Ratio"=Faith seeking understanding

Ethical Issues
This are the ethical issues looked at this unit

- **Abortion:** The termination of a pregnancy. We explore the arguments of those who are Pro-Life or Pro Choice.

- **IVF:** In vitro fertilisation is a process of fertilisation where an egg is combined with sperm in vitro.

- **Vanity and Faith:** We will evaluate different views on whether plastic surgery for personal gain is ok

- **Animal Testing:** Students will debate whether humans are more important than animal and whether testing on animals is just.

- **Immigration:** Students will debate on the topic of people being able to move around the world freely

Science – Year 9 – Term 2 part 1 – Fundamentals of Physics – How things move

Energy Stores and Systems

Energy Stores	
kinetic	Moving objects have kinetic energy.
thermal	All objects have thermal energy.
chemical	Anything that can release energy during a chemical reaction.
elastic potential	Things that are stretched.
gravitational potential	Anything that is raised.
electrostatic	Charges that attract or repel.
magnetic	Magnets that attract or repel.
nuclear	The nucleus of an atom releases energy.

Energy can be transferred in the following ways:

mechanically – when work is done;

electrically – when moving charge does work;

heating – when energy is transferred from a hotter object to a colder object.

Conduction – when a solid is heated, the particles vibrate and collide more, and the energy is transferred.

Convection – when a liquid or a gas is heated, the particles move faster. This means the liquid or gas becomes less dense. The denser region will rise above the cooler region. This is a convection current.

Conservation of Energy

Energy can never be created or destroyed, just transferred from one form to another. Some energy is transferred usefully and some energy gets transferred into the environment. This is mostly wasted energy.

Investigating Specific Heat Capacity

independent variable – material
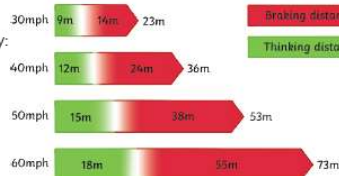
dependent variable – specific heat capacity

control variables – insulating layer, initial temperature, time taken
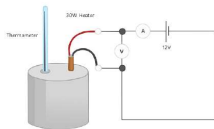
Reaction time is the time taken for the driver to respond to a hazard. It varies from 0.2s to 0.9s between most people.

Reaction time is affected by:

- tiredness
- drugs
- alcohol
- distractions

You can measure human reaction time in the lab using simple equipment: a metre ruler and stopwatch can be used to see how quickly a person reacts and catches the metre ruler. The data collected is quantitative and you should collect repeat readings and calculate an average result.

30mph	9m	14m	23m	
40mph	12m	24m	36m	
50mph	15m	38m	53m	
60mph	18m	55m	73m	

Braking distance
Thinking distance

When an object is moved by a force, the force transfers energy to the object. The amount of energy transferred to the object is the work done.

Forces either push or pull on an object. This is as a result of its interaction with another object.

Forces are categorised into two groups:

Contact forces – the objects are touching e.g. friction, air resistance, tension and contact force.

Non-contact forces – the objects are not touching e.g. gravitational, electrostatic and magnetic forces.

Forces are calculated by the equation: **force (N) = mass (kg) × acceleration (m/s²)**

Forces are another example of a **vector quantity** and so they can also be represented by an **arrow**.

A scalar quantity has **magnitude** only. Examples include temperature or mass.

A vector quantity has both **magnitude** and **direction**. Examples include velocity.

Speed is the scalar magnitude of **velocity**.

A vector quantity can be shown using an **arrow**. The size of the arrow is relative to the magnitude of the quantity and the direction shows the associated direction.

Levers can be used to increase the effect of a force applied, acting as a force multiplier. Some everyday examples include:

spanner   wheelbarrow   pair of scissors

A force multiplier makes it easier to do work because the same force applied at a greater distance from the pivot increases the moment produced.

A gear is a wheel which has 'teeth' around the circumference.

The teeth of different gears lock together and the gear can turn on an axle, turning the other gears it is connected to. Where the teeth meet, they must move in the same direction. This means that the gears rotate in opposite directions. If one gear is turning clockwise, it will turn the connected gear anticlockwise.

Driver Gear
(10 teeth)

Driven Gear
(30 teeth)
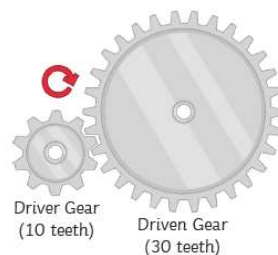
Hooke's Law describes that the extension of an elastic object is **proportional** to the force applied to the object. However, there is a maximum applied force for which the extension will still increase proportionally. If the **limit of proportionality** is exceeded, then the object becomes **permanently deformed** and can no longer return to its original shape.

original length

extension

---
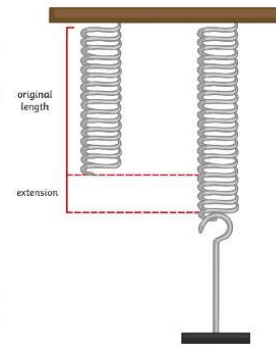
weight = mass × gravitational field strength (g)

work done = force × distance (along the line of action of the force)

force applied to a spring = spring constant × extension

moment of a force = force × distance (normal to the direction of the force)

$$\text{pressure} = \frac{\text{force normal to a surface}}{\text{area of that surface}}$$

distance travelled = speed × time

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time taken}}$$

resultant force = mass × acceleration

momentum = mass × velocity

kinetic energy = 0.5 × mass × (speed)²

gravitational potential energy = mass × gravitational field strength (g) × height

$$\text{power} = \frac{\text{energy transferred}}{\text{time}}$$

$$\text{power} = \frac{\text{work done}}{\text{time}}$$

$$\text{efficiency} = \frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$$

$$\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$$

Newton's Laws of Motion: Newton's First Law	Newton's Laws of Motion: Newton's Second Law
If the resultant force acting on an object is zero… • a stationary object will remain stationary. • a moving object will continue at a steady speed and in the same direction.	The acceleration of an object is proportional to the resultant force acting on it and inversely proportional to the mass of the object resultant force (N) = mass (kg) × acceleration (m/s²) Inertial mass – how difficult it is to change an objects velocity. It is defined as the ratio of force over acceleration.

100N resistance
(friction and air)   100N thrust

Inertia – the tendency of an object to continue in a state of rest or uniform motion (same speed and direction).

Newton's Laws of Motion: Newton's Third Law

When two objects interact, the forces acting on one another are always equal and opposite.

For example, when a book is laid on the table, it experiences a reaction force from the table. The table pushes up on the book. The book also pushes down on the table. These two forces are equal and opposite.

Science – Year 9 – Term 2 part 2 – Fundamentals of Biology – Building organisms

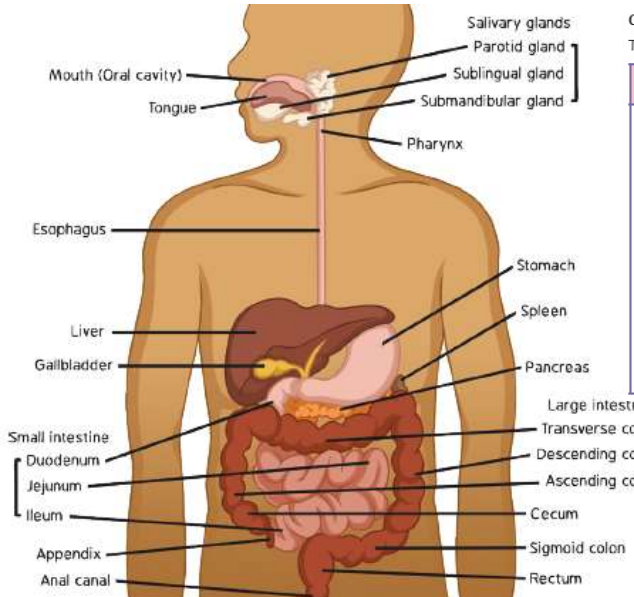| cell	tissue	organ	organ system	organism
Cells are the basic building blocks of all living things.	A group of cells with a similar structure and function is called a tissue.	An organ is a combination of tissues carrying out a specific function.	Organs work together within an organ system.	Organ systems work together to form whole living organisms.

Leaf structure: waxy cuticle, upper epidermis, spongy mesophyll, guard cells, palisade layer, xylem, lower epidermis, stomata

Phloem vessels transport **food** such as dissolved sugars and glucose from photosynthesis. The food is transported around the plant to where growth is occurring (root and shoot tips), as well as to the organs which store the food. The transport occurs in **all directions** throughout the plant. The cells making up the phloem tube are **living**, with small holes in the walls where the cells are joined.


Digestive system diagram with labels: Salivary glands, Parotid gland, Sublingual gland, Submandibular gland, Mouth (Oral cavity), Tongue, Pharynx, Esophagus, Stomach, Spleen, Liver, Gallbladder, Pancreas, Large intestine, Transverse colon, Descending colon, Ascending colon, Small intestine, Duodenum, Jejunum, Ileum, Cecum, Sigmoid colon, Appendix, Rectum, Anal canal

Cancer is the result of **uncontrolled** cell growth and division. The uncontrolled growth of cells is called a **tumour**.

Benign Tumour	Malignant Tumour
• Usually grows slowly. • Usually grows within a membrane and can be easily removed. • Does not normally grow back. • Does not spread around the body. • Can cause damage to organs and be life-threatening.	• cancerous • Usually grows rapidly. • Can spread around the body, via the bloodstream. • Cells can break away and cause secondary tumours to grow in other areas of the body (metastasis).

Plants absorb water by **osmosis** through the root hair cells of the roots. Dissolved in the water are important minerals for the plant's growth and development, which are absorbed by **active transport**.

The **root hair cells** are adapted to their function with the following features:

• Finger-like projection in the membrane increases the **surface area** available for water and minerals to be absorbed across.

• The narrow shape of the projection can squeeze into small spaces between soil particles, bringing it closer and reducing the distance of the **diffusion pathway**.

• The cell has many **mitochondria**, which release energy required for the active transport of some substances.
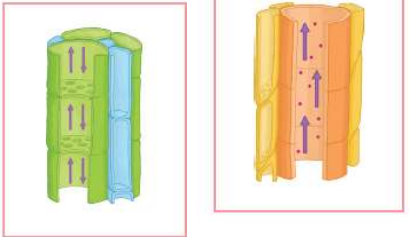
Xylem vessels transport **water** through the plant, from roots to leaves. They are made up of **dead**, lignified cells, which are joined end to end with no walls between them, forming a long central tube down the middle. The movement of the water, and dissolved minerals, along the xylem is in a **transpiration** stream.

Lungs diagram: trachea, bronchus, bronchiole, alveoli, capillary network

Enzymes

An enzyme is a biological **catalyst**; enzymes speed up chemical reactions without being changed or used up.

This happens because the enzyme lowers the **activation energy** required for the reaction to occur. Enzymes are made up of chains of amino acids folded into a globular shape.

vein	artery	capillary

Heart diagram: Sinus node, Right atrium, AV node, Left atrium, Left ventricle, Right ventricle

Health is the state of being free from **illness** or **disease**. It refers to **physical** and **mental** wellbeing.

Disease and lifestyle factors, such as diet, stress, smoking, alcohol consumption and the use of illegal drugs, can all impact the health of a person.

Some conditions are associated with certain lifestyle choices:

• Liver conditions are associated with poor **diet** and prolonged excessive **alcohol** consumption.

• Lung cancer is associated with **smoking**.

• Memory loss, poor physical health and hygiene are associated with the use of illegal or recreational **drugs**.

• Obesity and diabetes are associated with poor diet.

• Anxiety and depression are associated with **stress** and prolonged excessive alcohol consumption.

Transpiration is the loss of water, by **evaporation** and **diffusion**, from the leaves of the plant. Water is a cohesive molecule and as it evaporates, there is less water in the leaf, so water from further back moves up to take its place. This, in turn, draws more water with it. This is the **transpiration stream**.
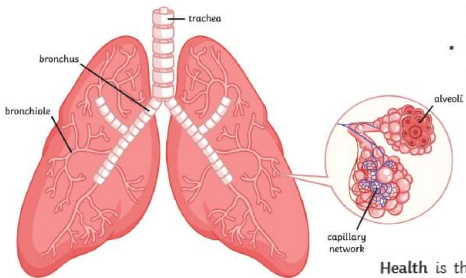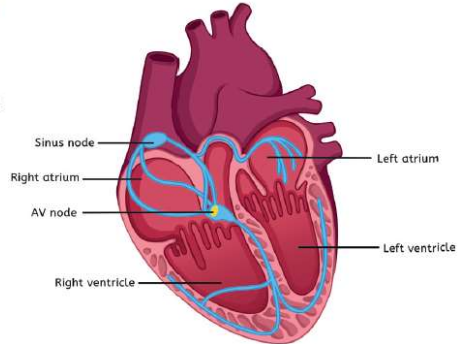
Transpiration occurs naturally as there is a tendency for water to diffuse from the leaves (where the concentration is relatively high) to the air around the plants (where the concentration is relatively low), via the **stomata**.

Coronary heart disease is a condition resulting from **blockages** in the **coronary arteries**. These are the main arteries which supply blood to the heart itself and they can become blocked by build-up of **fatty deposits**.

In the UK and around the world, coronary heart disease is a major cause of many **deaths**.

The main symptoms can include **chest pain**, **heart attack** or **heart failure**. Yet, not all people suffer the same symptoms, if any at all.

Lifestyle factors can increase the risk of a person developing coronary heart disease.