

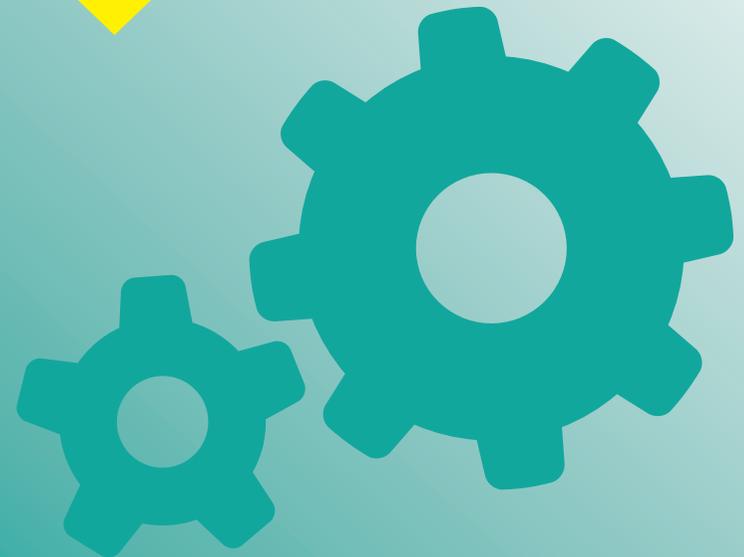
Year 9 Knowledge Organiser

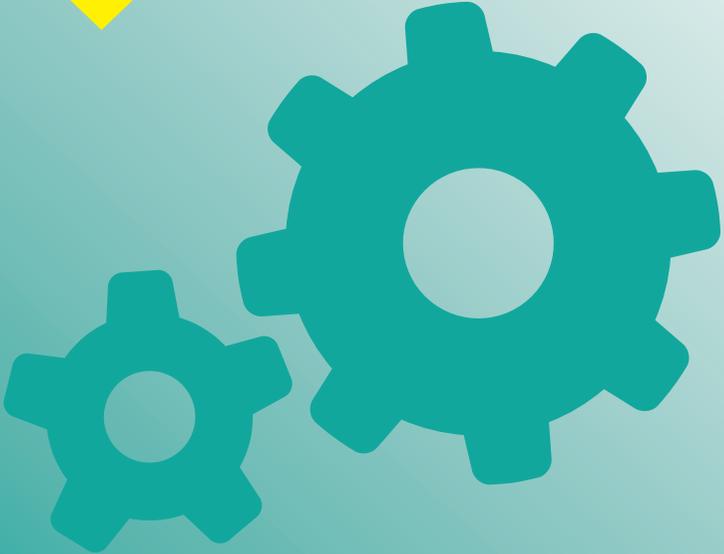
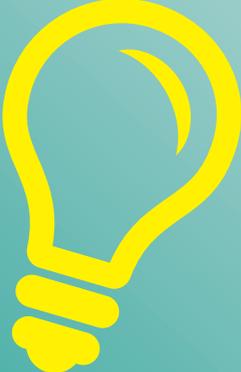
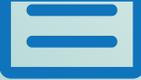
Student's name:



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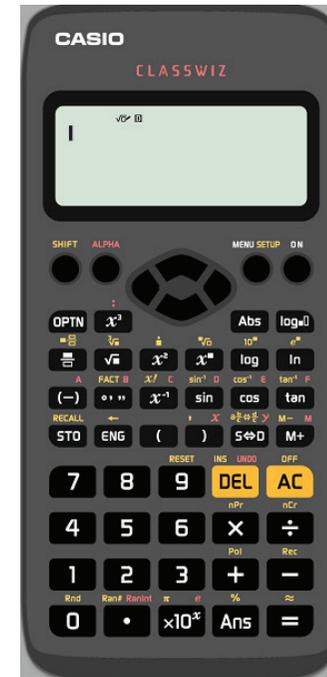


Maths



	Algebra notation
a	Letters are used to represent a number, the letter "a" has a value, we just don't know what it is. We call it "an unknown"
a + b 2a + 3b + 4a	Algebraic expression , where "a" has a numerical value and "b" has a numerical value. Terms are how many components there are to an expression, the 1 st expression has 2 terms, the 2 nd expression has 3 terms
3a	Means 3 times the value of "a"
a ²	Means a times a (a x a)
$\frac{a}{b}$	Means a divided by b (a ÷ b)
a ³	Means a x a x a
d - 2 = 7	Equations are similar to expressions, but they have an equals sign.
Solve d - 2 = 7	Solve in a question means "find the value of". Here the value of s is 9 (9 - 2 = 7 so d must have a value of 9)
≠	This sign represents "does not equal" 12 + 2 ≠ 15 - 5
$A = \pi r^2$ $a^2 + b^2 = c^2$	Formulas also have an equal sign like an equation, we need to Substitute the values of some "unknowns" to use it
Simplifying 1) a + a + a 2) b ² + b ² 3) a + 2a + b 4) a ² + a ³ + b ² + a ³	Collecting like terms means simplifying an expression 1) Becomes 3a (all the 3 terms are all alike, collect them together) 2) Becomes 2b ² (we have two b's that are squared) 3) Becomes 3a + b (a and b are not alike, don't collect together) 4) Becomes a ² + 2a ³ + b ² To be alike, terms need to have the same letter AND power a ² + a ³ can not be simplified as they have different powers

Useful buttons for algebra



- Power 2 or square
- Square root (opposite of power 2)
- Powers bigger than 2
Eg cube / power 3
- Open and close brackets
- Fraction button

Substitution	becomes						
When a = 4	<table border="1"> <tr> <td>a + 7</td> <td>4 + 7 = 11</td> </tr> <tr> <td>3a - 3</td> <td>(3 x 4) + 7 = 19</td> </tr> <tr> <td>a² - 7</td> <td>(4 x 4) - 7 = 9</td> </tr> </table>	a + 7	4 + 7 = 11	3a - 3	(3 x 4) + 7 = 19	a ² - 7	(4 x 4) - 7 = 9
a + 7	4 + 7 = 11						
3a - 3	(3 x 4) + 7 = 19						
a ² - 7	(4 x 4) - 7 = 9						
When a = 3 and b = -5	<table border="1"> <tr> <td>a + b</td> <td>3 + -5 = -2</td> </tr> <tr> <td>2a - b</td> <td>(2 x 3) - -5 = 11</td> </tr> <tr> <td>a² + b²</td> <td>(3 x 3) + (-5 x -5) 9 + 25 = 34</td> </tr> </table>	a + b	3 + -5 = -2	2a - b	(2 x 3) - -5 = 11	a ² + b ²	(3 x 3) + (-5 x -5) 9 + 25 = 34
a + b	3 + -5 = -2						
2a - b	(2 x 3) - -5 = 11						
a ² + b ²	(3 x 3) + (-5 x -5) 9 + 25 = 34						



	Averages
Learn this!	HEY DIDDLE DIDDLE, THE MEDIANS THE MIDDLE. YOU ADD THEN DIVIDE FOR THE MEAN. THE MODE IS THE ONE THAT YOU SEE THE MOST. AND THE RANGE IS THE DIFFERENCE BETWEEN
1 5 6 6 7 Middle number is 6	. MEDIAN The median is the middle number in a list of numbers 1) The numbers must be in numerical order 2) If there are two numbers in the middle, then the median is the midpoint of the two numbers
1+5+6+6+7 1) Add up to 25 2) Divide by 5 numbers Mean is 5	MEAN The Mean is the most common form of average used 1) Add all the numbers together 2) Divide by the number of numbers
1 5 6 6 7 Mode is 6	MODE The number / piece of data that appears the most often.
1 5 6 6 7 7 - 1 Range is 6	RANGE Subtract the lowest number from the biggest number.

Charts

Pictogram

- Shows the frequency of events using pictures.
- The pictures are often shown as half or quarter to represent 1 person
- A **key is needed** to show what each picture is worth

Bar charts

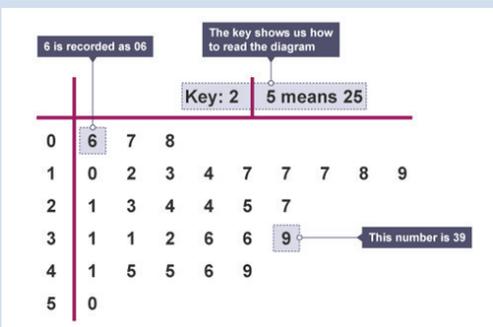
- The height of the bar is the frequency.
- The x axis needs to label the different categories of data
- Bars have gaps between them

Comparative bar charts

- Used to compare data.
- A key showing which bar represents which data is needed.
- The Boys and Girls data is "stacked" on top of each other

Stem and Leaf Diagram

- Data is split into two parts. Eg tens and units.
- The tens form the 'stem' and the units form the 'leaves'.
- A key is given to show how data is displayed
- The data is always in numerical order



	No pets	1 pet	2 pets	3 or more pets
Boys	2	4	2	3
Girls	3	3	2	1



Area of triangle = $\frac{1}{2}bh$

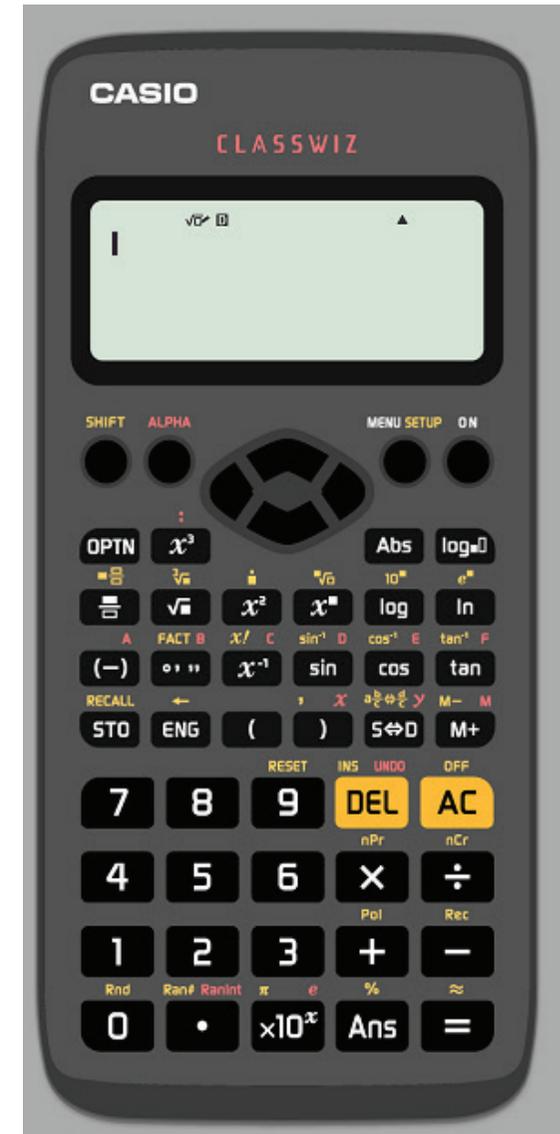
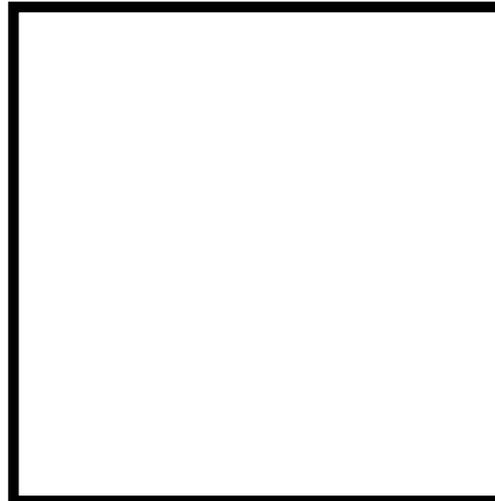
Area of parallelogram = bh

Circumference of circle = $\pi d = 2\pi r$
Area of circle = πr^2

Area of trapezium = $\frac{1}{2}(a + b)h$

Volume of cuboids = length × width × height

Volume of prisms = length × area of cross section





Transformations

Keywords

Quadrant: refers to the four quarters of the coordinate plane.

Coordinate: a pair of numbers: the first number shows the distance along, and the second number shows the distance up or down.

Transformation: movement of objects in the coordinate plane.

Translate: moves a shape up, down or from side to side but it does not change its appearance in any other way.

Reflect: a transformation where each point in a shape appears at an equal distance on the opposite side of a given line - the line of reflection.

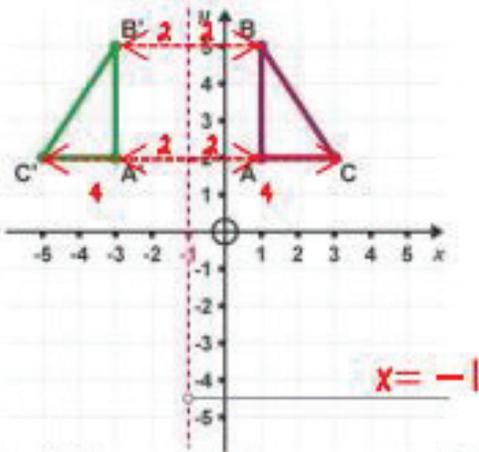
Rotate: a transformation that turns a figure about a fixed point called the centre of rotation.

Enlarge: a type of transformation that involves making a shape larger or smaller by a scale factor.

Reflection

You will need to draw in the line given in the question as described above.

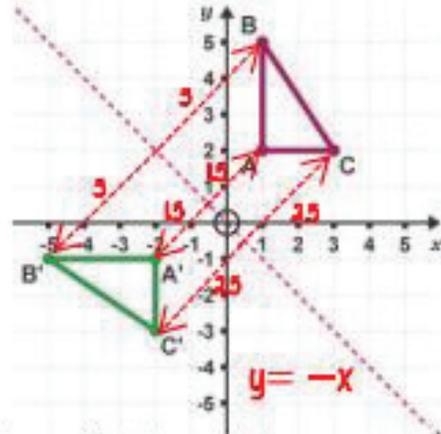
Reflect triangle ABC in $x = -1$



$x = -1$

The reflection is exactly the same number of squares from the mirror line as the image.

Reflect triangle ABC in $y = -x$



$y = -x$

You may find it easier to turn your page for this type of reflection. This time we count the diagonal steps.

Translation

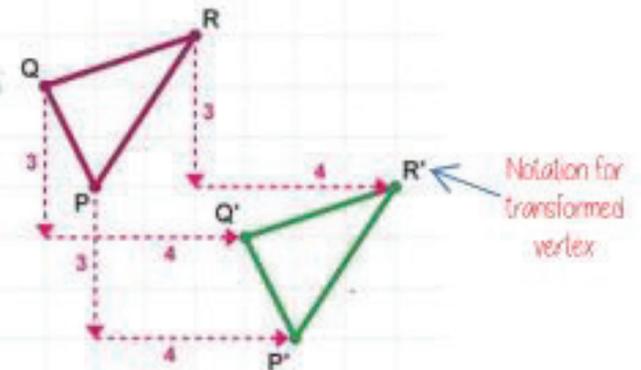
We need to be able to read vectors when we work with translations.

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} \text{movement right (+) and left (-)} \\ \text{movement up (+) and down (-)} \end{pmatrix}$$

Translate triangle PQR by

$$\begin{pmatrix} 4 \\ -3 \end{pmatrix} = \begin{pmatrix} 4 \text{ right} \\ 3 \text{ down} \end{pmatrix}$$

All vertices are translated in the same way. The transformed shape is congruent to the original.





Rotation

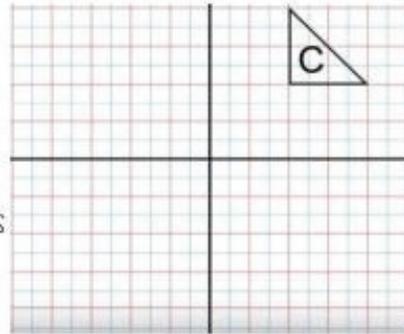
You will need to plot the centre of rotation as described in the coordinates section

There are 3 steps to rotations:

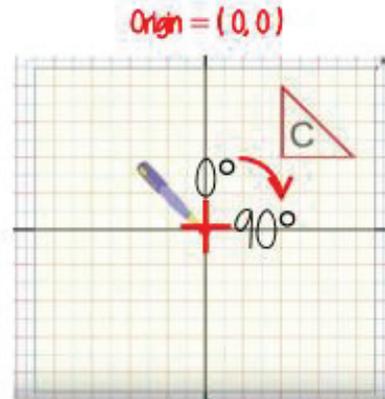
- 1 Angle of rotation
- 2 Direction of rotation
- 3 Centre of rotation

These will either be given as instructions or you will be expected to describe a rotation and include all 3 steps in the description

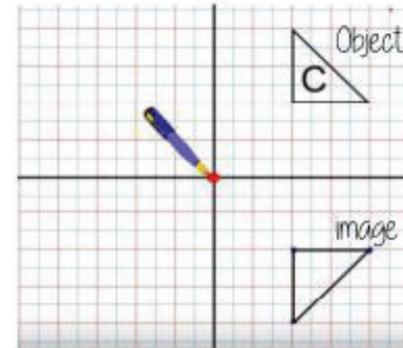
Rotate the triangle 90° clockwise about the origin



Step 1 — Read the instructions carefully and underline key parts



Step 2 — Trace the image and mark the centre of rotation. Mark at the centre to help with the rotation



Step 3 — Rotate the tracing paper and mark out the image location under the tracing paper

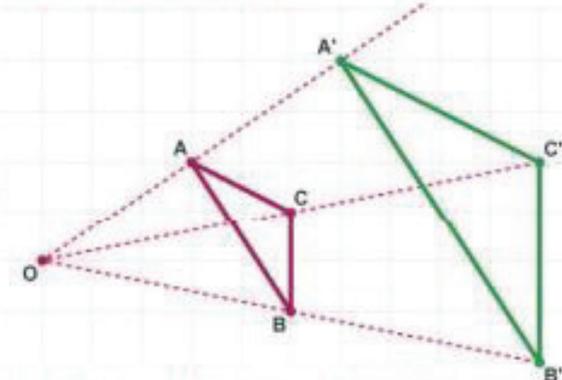
Enlargement

Enlarge the following shape by a scale factor of 2 about O.

This will double the size of every side



Step 1 — First, draw ray lines from O to each corner of the triangle and extend them



Step 2 — measure the distance from O to each corner of ABC. Multiply this distance by the SF and plot the points A', B', and C'. Join the point A', B', and C'



Indices & Roots

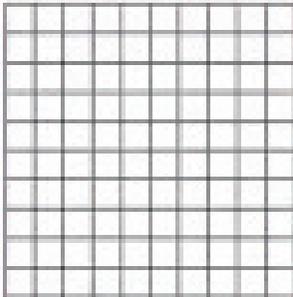
Keywords

- Standard (index) Form:** A system of writing very big or very small numbers
- Commutative:** an operation is commutative if changing the order does not change the result
- Base:** The number that gets multiplied by a power
- Power:** The exponent – or the number that tells you how many times to use the number in multiplication
- Exponent:** The power – or the number that tells you how many times to use the number in multiplication
- Indices:** The power or the exponent
- Negative:** A value below zero
- Coefficient:** The number used to multiply a variable

Square Numbers

1^2	$1 \times 1 = 1$	$= 1$
2^2	$2 \times 2 = 4$	$= 4$
3^2	$3 \times 3 = 9$	$= 9$
4^2	$4 \times 4 = 16$	$= 16$
5^2	$5 \times 5 = 25$	$= 25$
6^2	$6 \times 6 = 36$	$= 36$
7^2	$7 \times 7 = 49$	$= 49$
8^2	$8 \times 8 = 64$	$= 64$
9^2	$9 \times 9 = 81$	$= 81$
10^2	$10 \times 10 = 100$	$= 100$
11^2	$11 \times 11 = 121$	$= 121$
12^2	$12 \times 12 = 144$	$= 144$
13^2	$13 \times 13 = 169$	$= 169$
14^2	$14 \times 14 = 196$	$= 196$
15^2	$15 \times 15 = 225$	$= 225$

The product of a number multiplied by itself.
e.g. $20 \times 20 = 400$
which can be shown as:
 $20^2 = 400$
 $10 \text{ squared} = 100$
 $10 \times 10 = 100$



Cube Numbers

1^3	$1 \times 1 \times 1 = 1$
2^3	$2 \times 2 \times 2 = 8$
3^3	$3 \times 3 \times 3 = 27$
4^3	$4 \times 4 \times 4 = 64$
5^3	$5 \times 5 \times 5 = 125$
6^3	$6 \times 6 \times 6 = 216$
7^3	$7 \times 7 \times 7 = 343$
8^3	$8 \times 8 \times 8 = 512$
9^3	$9 \times 9 \times 9 = 729$
10^3	$10 \times 10 \times 10 = 1000$
11^3	$11 \times 11 \times 11 = 1331$
12^3	$12 \times 12 \times 12 = 1728$
13^3	$13 \times 13 \times 13 = 2197$
14^3	$14 \times 14 \times 14 = 2744$
15^3	$15 \times 15 \times 15 = 3375$

Formed by multiplying a digit by itself 3 times.
e.g. $10 \times 10 \times 10 = 1000$
which can be shown as:
 $10^3 = 1000$
 $10 \text{ cubed} = 1000$
 $10 \times 10 \times 10 \text{ cube}$





Addition/ Subtraction Laws

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

Powers of powers

$$(x^a)^b = x^{ab}$$

$$(2^3)^4 = \underbrace{2^3 \times 2^3 \times 2^3 \times 2^3}$$

The same base and power is repeated Use the addition law for indices

$$(2^3)^4 = 2^{12} \leftarrow a \times b = 3 \times 4 = 12$$

NOTICE the difference

$$(2x^3)^4 = \underbrace{2x^3 \times 2x^3 \times 2x^3 \times 2x^3}$$

The addition law applies ONLY to the powers
The integers still need to be multiplied

$$(2x^3)^4 = 16x^{12}$$

Zero and negative indices

$$x^0 = 1$$

Any number
divided by
itself = 1

$$\frac{a^6}{a^6} = a^6 \div a^6$$

$$= a^{6-6} = a^0 = 1$$

Negative indices do not indicate
negative solutions

$$2^2 = 4$$

$$2^1 = 2$$

$$2^0 = 1$$

$$2^{-1} = \frac{1}{2}$$

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

Looking at the sequence
can help to understand
negative powers



Standard form

Any number
between 1 and
less than 10

$$A \times 10^n$$

Any integer

0.001

$$1 \times \frac{1}{1000}$$

$$1 \times 10^{-3}$$

10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
10^1	10^0	10^{-1}	10^{-2}	10^{-3}
10	1	0.1	0.01	0.001

Any value to the power 0 always = 1

Numbers in standard form with negative powers will be less than 1

$$3.2 \times 10^{-4} = 3.2 \times \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} = 0.00032$$

Negative powers do not indicate negative solutions

Example

$$\begin{aligned} &3.2 \times 10^4 \\ &= 3.2 \times 10 \times 10 \times 10 \times 10 \\ &= 32000 \end{aligned}$$

Non-example

$$\begin{aligned} &0.8 \times 10^4 \\ &5.3 \times 10^{07} \end{aligned}$$

Standard form calculations

Addition and Subtraction

Tip: Convert into ordinary numbers first and back to standard form at the end

$$6 \times 10^5 + 8 \times 10^5$$

Method 1

$$\begin{aligned} &= 600000 + 800000 \\ &= 1400000 \\ &= \underline{1.4 \times 10^6} \end{aligned}$$

Method 2

$$\begin{aligned} &= (6 + 8) \times 10^5 \\ &= 14 \times 10^5 \\ &= 14 \times 10^1 \times 10^4 \\ &= \underline{1.4 \times 10^6} \end{aligned}$$

This is not the final answer

Multiplication and division

$$\frac{1.5 \times 10^5}{0.3 \times 10^3}$$

$$0.3 \times 10^3$$

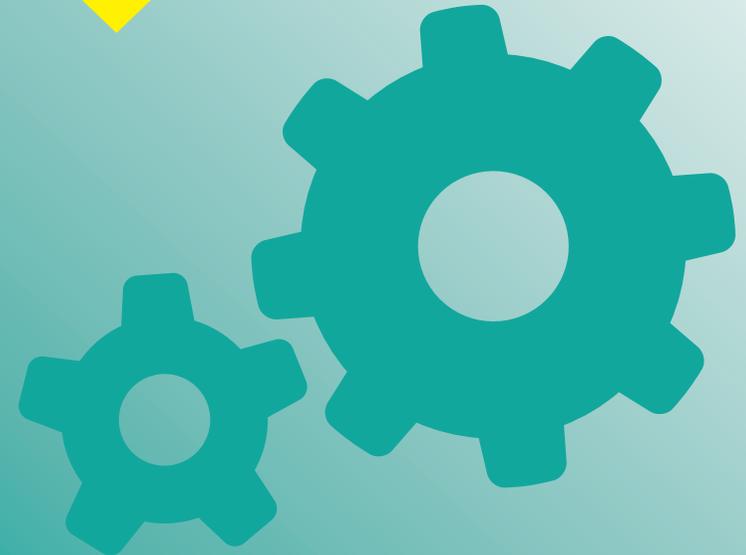
Division questions can look like this

$$(1.5 \times 10^5) \div (0.3 \times 10^3)$$

$$15 \div 0.3 \times 10^5 \div 10^3$$

$$= 5 \times 10^2$$

For multiplication and division you can look at the values for **A** and the powers of 10 as two separate calculations



English



Quote Explosion – Example

AO1: knowledge of character & plot

- First time we meet Lennie
- Suggests immediately that he is child-like

“Lennie dabbled his big paw in the water”

AO2: writer’s methods (language and structure)

- “dabbled” – verb – implies that Lennie is being playful, finding joy in the simple things
- “big paw” – noun phrase – zoomorphism, showing that Lennie behaves like an animal and acts instinctively

AO3: Historical Context

- Steinbeck makes consistent references to Lennie as an animal, perhaps attempting to reflect how society viewed and misunderstood those with differences

What/How/Why	Key Vocabulary		Historical Context
<p>The three key questions in English:</p> <p>What is the writer doing?</p> <ul style="list-style-type: none"> • In this extract, the writer presents... <p>How is the writer doing this?</p> <ul style="list-style-type: none"> • This is shown through the quote “_____” • This quote suggests... • The word “_____” implies... <p>Why is the writer doing this?</p> <ul style="list-style-type: none"> • Steinbeck does this to represent... • This could link to... • This creates an impression of... 	Patriarchy	A male –dominated society	<p>Key information about when a text was written which provides us with a greater knowledge of a writer’s intentions</p> <ul style="list-style-type: none"> • Written during The Great Depression • Addresses the inequalities of the era (racial, gender, disabilities etc.) • Challenges the ideals of the American Dream
	Oppressed	Subject to harsh and unfair treatment	
	Discrimination	The unjust treatment of people based on their differences	
	Prejudice	Preconceived opinion that is not based on reason	
	Inequality	Difference in size, degree, circumstance etc.	



- John Steinbeck was born in Salinas, California in 1902. Although his family was wealthy, he was interested in the lives of the farm labourers and spent time working with them. He used his experiences as material for his writing.
- On October 29 1929, millions of dollars were wiped out in the Wall Street Crash. It led to the People losing their life savings and a third of America's population became unemployed.
- A series of droughts in southern mid-western states like Kansas, Oklahoma and Texas led to failed harvests and dried-up land. Farmers were forced to move off their land: they could not repay the bank-loans which had helped buy the farms and had to sell what they owned to pay their debts.
- Racism/sexism were common, especially in Southern states due to economic climate, & history of slavery.



- Steinbeck encourages us to empathise with **the plight of migrant workers** during the **Great Depression**.
- **The American Dream** is shown to be impossible: **reality** defeats **idealism**.
- The novella explores the human need for **companionship** and the tragedy of **loneliness**.
- Steinbeck reveals the **predatory nature of mankind**: the **powerless** are targeted by the **powerful**.
- Steinbeck explores the tension between the **inevitability of fate** and the **fragility of human dreams**.
- Steinbeck explores **the contrasts of Nature Vs Man**.
- The novella is an **indictment** of the way **society** treats the **dispossessed**.

- George – C1: “Guys like us...that work on ranches, are the loneliest guys in the world. They got no family. They don’t belong no place...”
- Lennie – C1: “Slowly, like a terrier who doesn’t want to bring a ball to its master, Lennie approached, drew back, approached again.”
- Slim – C2: “Aint many guys travel around together, he mused. I don’t know why. Maybe ever’body in the whole damn world is scared of each other.”
- Candy – C3: “I ought to of shot that dog myself, George. I shouldn’t of ought to let no stranger shoot my dog.”
- George – C3: “We wouldn’t ask nobody if we could. Jus’ say, ‘We’ll go to her,’ an’ we would”.
- Crooks – C4: “Ever’body wants a little piece of lan’. I read plenty of books out here. Nobody never gets to heaven, and nobody gets no land.”
- Crooks – C4: “A guy needs somebody to be near him. He whined, a guy goes nuts if he aint got nobody”.
- Curley’s wife – C5: And the meanness and the plannings and the discontent and the ache for attention were all gone from her face. She was very pretty and simple, and her face was sweet and young.”
- Chapter 6 – A silent head and beak lanced down and plucked it out by the head, and the beak swallowed the little snake while its tail waved frantically.



Subject – Verb – Object

Sentences in English generally follow a set order – **subject** → **verb** → **object**

Subject: The person or thing (noun/noun phrase) which is carrying out the verb	Verb: What the subject does	Object: The person/thing (noun/noun phrase) being acted upon
Lennie	walked	with George.
George	cooked	the beans.

All sentences must have a **subject** and a **verb**, but not all sentences need an **object** – this is determined by the type of **verb** the sentence has

Transitive Verbs (verbs that require an object)

- I **made** a cake.
- She **sent** a letter.
- They **took** the last slice.

Intransitive Verbs (verbs that **don't** require an object)

- It **rained**.
- I **walked**.
- They **sang**.

Word Classes

Noun	Identifies a person, place or thing	<i>Ryan, Chester, sky</i>
Verb	Describes an action	<i>run, cook, sing</i>
Adjective	Describes a noun	<i>big, red, beautiful</i>
Adverb	Describes the way a verb is carried out	<i>quickly, carefully</i>
Pronoun	Replaces a noun	<i>he, she, they, it</i>
Preposition	Expresses relation between words	<i>on, in, before, after</i>
Conjunction	Connects phrases, clauses and sentences	<i>and, but, because</i>
Determiner	Introduces a noun	<i>the, a, that, this</i>

Clauses

Main Clause
Sentence that makes sense on its own
Lennie walked with George

Subordinate Clause
Part of a sentence that **doesn't** make sense on its own
*Lennie walked with George **as they walked to the ranch.***

Homophones

There
He is stood over **there**

They're
They're best friends

Their
It is **their** favourite TV show



Science

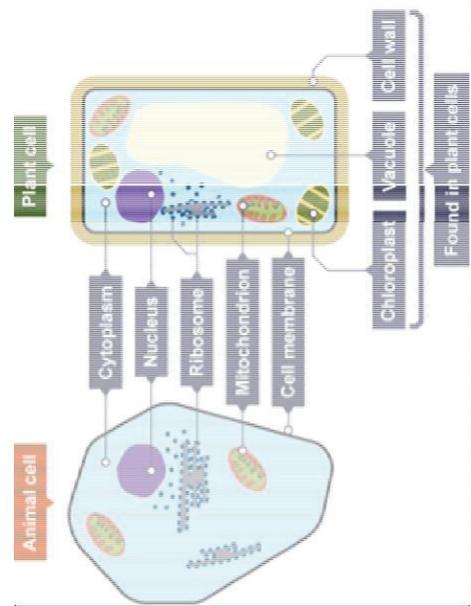


B1: Biology key concepts	
Lesson sequence	
<ol style="list-style-type: none"> 1. Microscopes 2. Plant and animal cells 3. Measuring cells 4. Core practical: using microscopes 5. Specialised cells 6. Bacterial cells 7. Digestive enzymes 8. How enzymes work 9. Factors affecting enzymes 10. Core practical: enzymes and pH 11. Cell transport 12. Core practical: osmosis in potatoes 	

1. Microscopes	
Magnification	The number of times bigger something appears under a microscope.
Eyepiece lens	The lens on a microscope that you look through.
Objective lens	The lens at the bottom of a microscope. There are normally three you can choose from.
Total magnification	Eyepiece lens x objective lens.
Resolution	The smallest distance between two points so that they can still be seen as two separate points.
Stains	Dyes added to microscope slides to show the details more clearly.
Milli	Thousandth, 1×10^{-3} (a millimetre is a thousandth of a metre).
Micro	Millionth, 1×10^{-6} (a micrometre is a millionth of a metre).
Nano	Billionth, 1×10^{-9} (a nanometre is a billionth of a metre).
Pico	Trillionth, 1×10^{-12} (a picometre is a trillionth of a metre).



2. Plant and animal cells	
Cell	The basic structural unit of all living things (the building blocks of life).
Parts of an animal cell	Cell membrane, cytoplasm, nucleus, ribosomes, mitochondria.
Parts of a plant cell	Cell membrane, cytoplasm, nucleus, ribosomes, mitochondria, cell wall, permanent vacuole, chloroplasts.
Cell membrane	Controls what enters and leaves the cell.
Cytoplasm	A jelly-like substance where chemical reactions take place.
Nucleus	Contains DNA and controls the cell.
Ribosome	Produces proteins.
Mitochondria	Releases energy by aerobic respiration.
Cell wall	Protects and supports the cell, made of cellulose.
Permanent vacuole	Stores sap and helps to support the cell.
Chloroplast	Where photosynthesis happens, contains chlorophyll.



3. Measuring cells	
Micrograph	A picture produced by a microscope.
Light microscope	A microscope that uses light, can magnify up to 1500 times.
Electron microscope	A microscope that uses electrons to produce an image, can magnify up to 1,000,000 times.
Actual size of a cell	Actual size = measured size / magnification
Convert mm to μm	Micrometres (μm) = millimetres (mm) x 1000

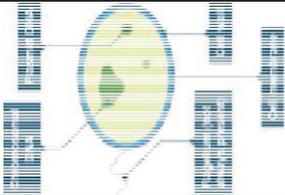
4. Core practical – using microscopes (CP1)	
CP1 – key question	What do cells look like under a light microscope?
CP1 – Prepare	Collect the cells you are studying and place them on the slide. Add a drop of stain and cover with a cover slip.
CP1 – Select lens	Choose between the 4x, 10x and 40x objective lenses.
CP1 – Place slide in microscope	Place slide on microscope stage, adjust the coarse focus until the lens is just touching the slide.

CP1 – Rough focus	Looking through the eyepiece, slowly adjust the coarse focus until you see a rough image.
CP1 – Fine focus	Looking through the eyepiece, slowly adjust the fine focus until you see a sharply focussed image.
CP1 – Record the image	Draw what you see, label any cell parts you can recognise and repeat with different objective lenses.
CP1 - Results	As you increase the magnification of the objective lens, the cells appear larger and more detailed.

5. Specialised cells	
Small intestine cell	Job: To absorb small food molecules produced during digestion. Adaptations: Tiny folds called microvilli that increase their surface area.
Sperm cell	Job: Fertilise an egg and deliver male DNA. Adaptations: A tail to swim, mitochondria to give energy for swimming, an acrosome to break through the egg's jelly coat, haploid nucleus with only half the total DNA.
Egg cell	Job: To be fertilised by a sperm and then develop into an embryo. Adaptations: Jelly coat to protect the cell, many mitochondria and nutrients to provide energy for growth, haploid nucleus with only half the total DNA.
Ciliated epithelial cell	Job: To clear mucus out of your lungs (and other internal surfaces). Adaptations: Small hairs on the surface – called cilia – which wave to sweep mucus along.



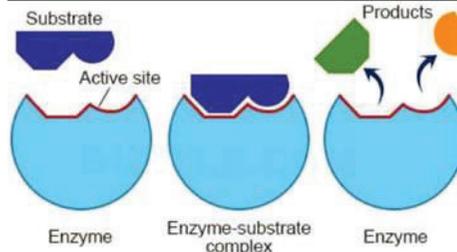
6. Bacterial cells	
Parts of a bacterial cell	All bacteria: Cell membrane, cell wall, cytoplasm, ribosomes, chromosomal DNA, plasmid DNA Some bacteria: flagellum.
Chromosomal DNA	Large piece of DNA containing most genes.
Plasmid DNA	Small loops of DNA containing a few genes.
Flagellum	A tail used for movement.
Eukaryotic cells	Cells with a nucleus.
Prokaryotic cells	Cells without a nucleus.
Standard form	A way of writing numbers in terms of powers of ten. E.g. $0.015 = 1.5 \times 10^{-2}$ $0.000458 = 4.56 \times 10^{-4}$ The index of ten (the 'minus' number) tell you which decimal point to start on.



7. Digestive enzymes	
Digestion	Breaking large food molecules down into ones small enough to be absorbed by the small intestine.
Catalyst	A substance that speeds up a chemical reaction without being used up.
Enzyme	A protein that works as a catalyst to speed up the reactions in our cells.
Digestive enzymes	Enzymes that break large food molecules down into smaller ones.

Amylase	Where found: saliva, small intestine What it does: breaks down starch into simple sugars such as maltose
Lipase	Where found: small intestine What it does: breaks down fats into fatty acids and glycerol
Protease	Where found: stomach (pepsin), small intestine (trypsin) What it does: breaks down proteins into amino acids

8. How enzymes work	
Substrate	The chemical(s) that an enzyme works on.
Active site	An area of an enzyme with the same shape as the substrate.
Lock and key mechanism	The substrate moves into the active site and reacts to form the products. The products leave the active site so another substrate can then enter and so on.
Specificity	Each enzyme can only work on one substrate because the shape of the active site has to match.
Denature	When the shape of the active site changes shape so the enzyme stops working.



9. Factor affecting enzymes	
Optimum temperature	The temperature when an enzyme works fastest (about 37 ^o for human enzymes). Changing the increasing to optimum: rate increases because particles move faster
Increasing past optimum	rate decreases as enzyme denatures

Optimum pH	The pH when enzymes work fastest (around pH 6-8 for most human enzymes)
Changing pH	Rate decreases as you move away from the optimum because the enzyme denatures.
Increasing substrate then concentration	At first the rate increases, but it levels out as the enzyme is working as fast as possible.
10. Core practical – enzymes and pH (CP2)	
CP2 – key question	How does the rate that amylase works change as you change the pH?
CP2 – Prepare your reactants	Place starch solution, amylase solution and pH 7 buffer into separate test tubes and warm them in a water bath at 40 ^o C
CP2 – Prepare your dropping tile	Place a few drops of iodine solution into each well of a spotting tile.
CP2 – Start the reaction	Mix reactants together, start the stop watch and keep the mixture warm in the water bath.
CP2 – Test for starch	Remove a small amount of mixture and place in a well on the spotting tile.
CP2 – Record your results	Repeat the test until the mixture does not go black (no starch). Record the time.
CP2 – Vary the pH	Repeat with different pH buffers from pH 3 to pH 10
CP2 – Results	The amylase works fastest around pH 7 and more slowly at pH high or lower than this.

11. Cell transport	
Concentration	The number of particles in a given volume (the strength of a solution).
Concentration gradient	The difference in concentration between two neighbouring areas.
Diffusion	The movement of particles from high to low concentration (down a concentration gradient).

Diffusion examples	Lungs: oxygen into blood, carbon dioxide out of blood Leaf: carbon dioxide into leaf, oxygen out of leaf.
Partially permeable membrane	A membrane that allows some molecules but not others to pass through it (like a cell membrane).
Osmosis	The movement of water across a partially permeable membrane from high water/low solute conc to low water/high solute conc.
Osmosis examples	Water into plant roots, water in/out of any cells.
Active transport	Using energy to move substances from low to high concentration (up a concentration gradient).
Active transport examples	Minerals being absorbed into plant roots.

12. Core practical – osmosis in potatoes (CP3)	
CP3 – Prepare potatoes	Cut six similar pieces of potato, blot them dry and weigh them. CP3 –
Run the experiment	Place each potato piece in a test tube with sucrose (sugar) solutions with concentrations from 0% to 50%
CP3 – Record results	Blot each potato piece dry and re-weigh it.
CP3 – Calculate percentage mass change	% change = (final value – starting value) / starting value x 100
CP3 – Results	Potato in weaker sucrose solutions gain mass because water enters potatoes by osmosis, those in stronger solutions lose mass as water leaves by osmosis.



B2: Cells and control

- ### Lesson sequence
1. Mitosis
 2. Animal growth
 3. Plant growth
 4. Stem cells
 5. Nervous system
 6. Neurotransmission
 7. Controlling movement

1. Mitosis

Cell cycle	The life of a cell comprising interphase and mitosis.
Interphase	Preparation for mitosis in which extra cell parts are made and DNA chromosomes are replicated (copied).
Mitosis	When one cell divides into two genetically identical daughter cells.
(I)PMATC	The stages of mitosis: interphase (not mitosis), prophase, metaphase, anaphase, telophase, cytokinesis.
Prophase	The membrane of the nucleus breaks down and spindle fibres start to form.
Metaphase	Spindle fibres fully form and chromosomes line up across the middle of the cell.
Anaphase	Chromosome copies separate and move to each end of the cell.
Telophase	A new membrane forms around each set of chromosomes to form two nuclei.
Cytokinesis	The two new cells fully separate.
Cancer	When mitosis happens out of control forming large lumps of cells called tumours.

2. Animal growth

Growth	Increase in size due to increased numbers of cells.
Percentile	A measure of the growth of a child that compares them to other children of the same age.

90th percentile	A child is taller than 90% of children of the same age.
50th percentile	Average for height/mass for the age.
Percentile graphs	Graphs showing how height/mass change with age with different lines for each percentile.
Cell differentiation	When a cell divides by mitosis to produce two different types of cell (not two identical ones).
Specialised cell	A cell special features designed for a specific job.
Importance of differentiation in animals	To produce all the different types of cell the body needs such as red blood cells, fat cells, nerve cells and muscle cells.

3. Plant growth

Plant growth	Cell division creates more cells, elongation makes these cells get bigger.
Meristems	Areas just behind the tips of roots and shoots where cell division and differentiation happens.
Importance of differentiation in plants	To produce all the different types of cell a plant needs such as root hair cells and xylem cells.
Calculating % change	$\text{change} = (\text{final value} - \text{starting value}) / \text{starting value} \times 100$

4. Stem cells

Stem cell	A cell that can differentiate when it divides, to produce two different cells.
Embryonic stem cell	A stem cell that can become any kind of cell. Found in developing embryos.
Adult stem cell	A stem cell that can only become a few types of cell. Found in animals after birth.
Stem cells in medicine	It is hoped they can be used to replace damaged cells in diseases like type 1 diabetes or leukaemia, or to grow new organs for transplant.

Problems with stem cells They may potentially cause cancer, stem cells can only be used in the person they have come from.

5. Nervous system

Nervous system	All the nerves in your body working together to gather information, make decisions and control responses.
Central nervous system	The brain and spinal cord – makes decisions (aka CNS).
Peripheral nervous system	All your other nerves – gathers information from your sense and carries messages from the CNS to your muscles.
Neurone	A nerve cell
Impulse	Electrical message carried by a neuron.
Cell body	The central part of a nerve cell containing its nucleus.
Dendron and axon	The long parts of a nerve cell carrying impulses towards the cell body (dendron) and away from it (axon)
Myelin sheath	A fatty layer around the axon and dendron that insulates it to prevent the impulse from escaping and speeds the impulse up.

6. Neurotransmission

Neurotransmission	The travelling of an impulse along a neuron and into another.
Dendrites	Branches at the beginning of a dendron that connect to receptor cells or another neuron.
Axon terminals	Branches at the end of an axon that connect to a muscle or another neuron.
Synapse	Small gap between two neurons where the axon terminals of one meet the dendrites of another.

Chemicals released by terminals that diffuse across the synapse to trigger a new impulse the dendrite of another neuron.	Neurotransmitter
Sensory neuron	Nerve cell that carries impulses from sense organs to the CNS. Has a long dendron and a long axon.
Relay neuron	Nerve cell in the CNS that makes decisions. Dendrites join onto cell body, short axon.
Motor neuron	Nerve cell that carries impulses from the CNS to muscles. Dendrites join onto cell body, long axon.

7. Controlling movement Stimulus

A piece of information detected by the nervous system.	Receptor
Cells that detect a stimulus.	Response The action that the nervous system makes happen.
The body part that produces the response, often a muscle.	Effector
A stimulus is detected by a receptor, causing an impulse to be carried by a sensory neuron to the brain. Relay neurones in the brain decide what to do and send another impulse down a motor neuron to the effector (muscle) to cause a response.	Voluntary movement
Automatic responses that happen very quickly without conscious thought to keep the body safe.	Reflexes
Movement is caused in the same way as for voluntary movement, except the spinal cord makes the decision without needing the brain to think.	Reflex arc



SP1 - Motion



- 38 What is the force that pulls us towards the Earth?
- 39 What is 'drag' another name for?
- 40 What are balanced forces?
- 41 What do we call the forwards force produced by an aeroplane's engine or propeller?
- 42 What word describes both the speed and direction of movement of an object?
- 43 What is the name for a single force on an object with the same effect as all the forces combined?
- 44 How do we describe the forces on an object when the force in one direction is bigger than the force in the other?
- 45 Two forces on an object are in the same direction. How do we calculate the resultant force?
- 46 Two forces on an object are in opposite directions. How do we calculate the resultant force?
- 47 What are the units for force?
- 48 What is acceleration?
- 49 What does the length of a force arrow on a diagram represent?
- 50 What is the direction of the resultant force on a car that is speeding up?
- 51 What is the direction of the resultant force on a bicycle that is slowing down?
- 52 How does a sideways resultant force affect the velocity of a moving object?
- 53 How can the pilot of an aeroplane make the plane gain speed upwards?
- 54 How do balanced forces affect the velocity of a moving car?
- 55 An aeroplane has thrust of 2000 N and drag of 1800 N. What is the resultant?
- 56 Air resistance on a cyclist is 20 N and friction is 5 N. What is the total force trying to slow the cyclist down?
- 57 What is the name of the force that makes objects move in a circular path?
- 58 What provides the centripetal force for a car going around a roundabout?
- 59 What are the forces on a moon orbiting around a planet?
- 60 In which direction does centripetal force act?
- 61 Name a force that accelerates objects downwards.
- 62 Name two factors that affect the acceleration of an object.
- 63 For the same force, how does reducing the mass of an object affect its acceleration?
- 64 For the same mass, how does increasing the force affect the acceleration?
- 65 What is the equation linking force, mass and acceleration?
- 66 An object is moving at a constant velocity. What can you say about the forces on it?
- 67 A stationary object has a 100 N force on it in one direction. What other force acts on it?
- 68 What force stops your foot slipping on the ground when you walk?
- 69 What is inertial mass?
- 70 How are the values for the mass and the inertial mass of an object different?
- 71 What type of force is used to slow down a moving vehicle?
- 72 Where is the force applied in order to slow down a moving vehicle?
- 73 Why is a wet road more slippery than a dry one?
- 74 How does the mass of a moving object affect its acceleration?
- 75 How does the force applied to an object affect its acceleration?
- 76 An object has a negative acceleration. What does this mean?
- 77 What effect does drinking alcohol have on human reaction times?
- 78 How will being tired affect reaction time?
- 79 What does braking distance mean?
- 80 What does thinking distance mean?
- 81 How does speed affect the thinking distance?
- 82 How does speed affect the braking distance?
- 83 How does the force needed for an acceleration depend on the size of the acceleration?
- 84 What factors affect the momentum of a moving object?
- 85 How does the mass affect momentum?
- 86 How does the velocity affect momentum?
- 87 What does 'momentum is conserved' mean?

SP2 - Forces and Motion



Each Kg has a gravitational pull of 9.8N.

Gravitational field strength: Gravity exerted around an object. Earth's gfs = 9.8N/kg.

$W = m \times g$

Weight = mass X gravitational field strength

Weight	Force acting upon an object due to gravity	Newton (N)
Mass	How much matter	Kilograms (Kg)

Core Practical

Investigate force, mass and acceleration

Vary mass added to trolley.

Acceleration is proportional to resultant force.

Acceleration is inversely proportional to mass.

Frictional forces decelerate a moving object and bring it to rest.

Force = mass X acceleration. $F = m \times a$

Conservation of momentum: When two objects collide, the momentum they have before the collision = the momentum they have after the collision. Closed system = no external forces acting on it.

$F = (mv - mu) \div t$

Is a vector.

Force = change in momentum ÷ time.

Momentum = mass X velocity. $p = m \times v$

Crumple zones

Changes in momentum: Force is applied to stop momentum. If momentum changes slowly, the force applied is small so less damage.

Car travelling around a bend: Constant speed, direction changes.

Satellite orbiting the Earth: Constant speed, direction changes.

An object travelling in a circle at a constant speed, is constantly changing direction so it is constantly changing velocity which means it is accelerating.

There must be a resultant force acting upon the object.

Centripetal force: This force acts towards the centre of the circle.

Changing velocity: Objects in a circular motion, change direction but keep a constant speed.

HIGHER ONLY

When objects continue in the same state of motion: Speed or direction only changes if a resultant force acts on the object.

Inertia

HIGHER ONLY

Newton's Laws and Momentum

Newton's first Law	Balanced forces	When the resultant force on a still object = 0, the object is stationary. When the resultant force on a moving object = 0, the object is at a constant speed.
Newton's second Law	Unbalanced forces	When the resultant force is greater than 0, the object accelerates. It could speed up, slow down or change direction.
Newton's third Law	Equal and opposite forces	When two objects interact the forces exerted are equal and in an opposite direction.

Momentum

HIGHER ONLY

Inertial mass	How difficult it is to change the velocity of an object	If the mass is large, to change velocity a big force is needed.
Inertial mass = force ÷ acceleration.		

If speed doubles, braking distance increases by a factor of four (2^2).

Work done to bring a vehicle to rest = its initial kinetic energy

Force	Push or pull	Stretch, squash, turn.
Contact force	Exerted between two objects when they touch	Friction, air resistance, tension.
Non-contact force	Exerted between two objects without touching	Gravity, electrostatic forces, magnetic forces.

An arrow can be used to show vectors. Length of arrow = magnitude of vector. Direction of arrow = direction of vector.

Object moves left with a force of 5N.

Free body diagram: Show magnitude and direction of all forces upon an object.

Weight	Newton (N)
Mass	Kilograms (kg)
Gravitational field strength	Newton per kilogram (N/kg)
Force	Newton (N)
Acceleration	Kilogram metre per second (Kg m/s)
Momentum	Joules (J)
Velocity	Metre per second (m/s)
Time	Second (s)

Frictional forces decelerate a moving object and bring it to rest.

An alert driver has a reaction time of 1s.

Speed affects both thinking and braking distances.

Thinking distance	Distance travelled whilst the driver reacts
Braking distance	Distance travelled whilst the car is stopped by the brakes
Stopping distance	Total thinking and braking distances

Factors affecting stopping distances:

Drivers reaction times	Drinking alcohol, taking drugs, tired.
Braking distances	Weather conditions, worn brakes or tyres, road surface, size of braking force.

Braking and kinetic energy: Work done by braking force, reduces kinetic energy. Kinetic energy decreases, temperature of brakes increases due to frictional forces.

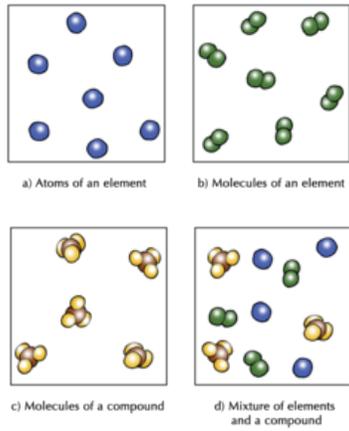


Atoms, elements and compounds

All substances are made of **atoms** that cannot be chemically broken down. It is the smallest part of an **element**.

Elements are made of only one type of atom. Each element has its own **symbol**.
e.g. Na is sodium.

Compounds contain more than one type of atom.
Naming compounds-
Two elements = **ide**
e.g. Na₂S Sodium sulphide
Two or more including oxygen = **ate**
e.g. Na₂SO₄ = sodium sulphate



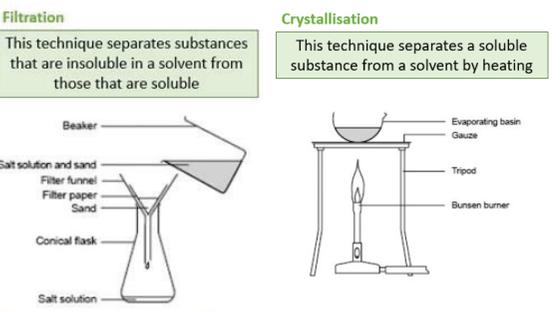
There are two elements here - Magnesium and chlorine
magnesium — **MgCl₂** — 2 x chlorine
Magnesium chloride

There are 3 atoms. 1 x Mg and 2 x Cl

Small numbers (subscripts) after symbols tell you how many of the element BEFORE the number.

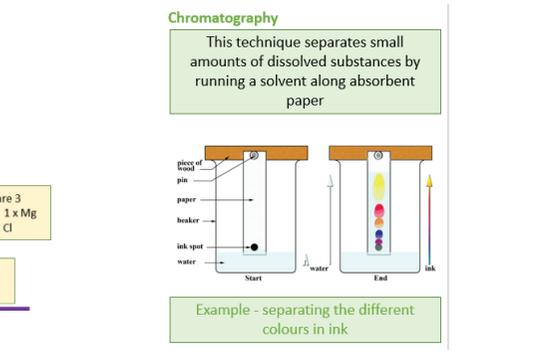
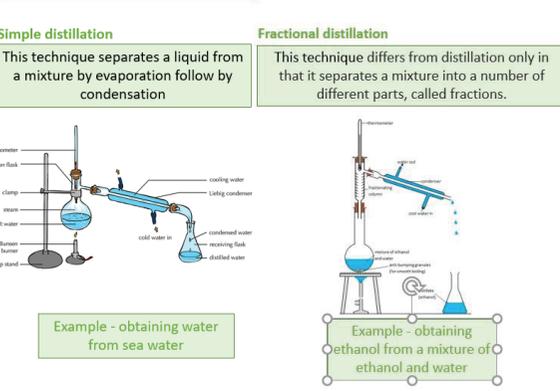
Methods of Separating Substances

A mixture consists of **two or more** elements or compounds **not** chemically combined together.



Example - filtering a mixture of sand, salt and water to collect the sand

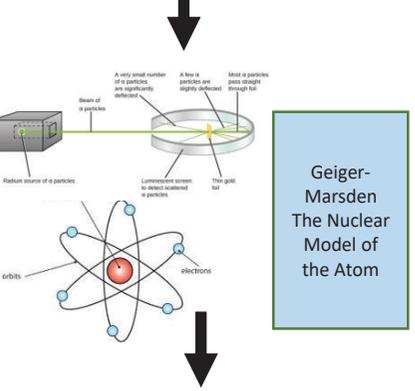
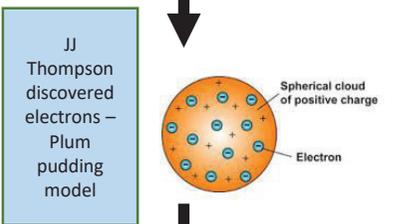
Example - crystallisation of sodium chloride from salt solution



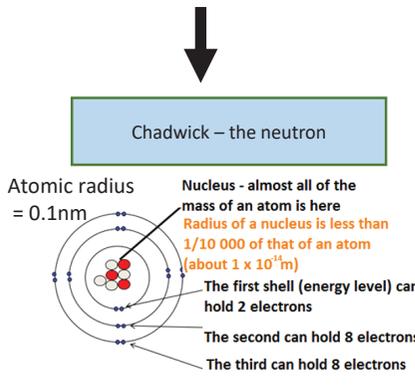
SC1, SC2 & SC3

Atomic Structure

Dalton – atoms can't be divided



Bohr – electrons in shells



	Mass	Charge	Location
Proton	1	+	nucleus
Neutron	1	0	nucleus
Electron	Very small	-	shells

Mass number = Number of protons and neutrons → ⁷Li

Atomic number = Number of protons → ₃

Number of protons(+) = Number of electrons (-)

Number of neutrons = mass number – atomic number

⁷Li
3

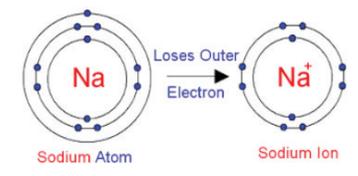
Protons = 3
Electrons = 3
Neutrons = 4

Isotopes → Different mass numbers

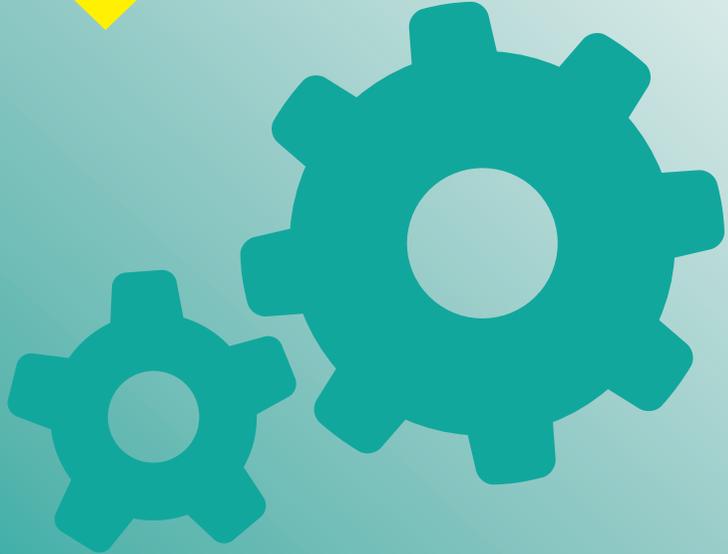
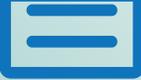
¹²₆C ¹³₆C ¹⁴₆C

Same atomic number

Atoms lose or gain electrons to form ions



1nm = 1x10⁻⁹m



History



Unit One: Germany and the growth of democracy

Timeline Of Key Events	
1888	Kaiser Wilhelm II becomes the Emperor of Germany. This is an autocracy.
1898	First Naval Law , this is introduced to make Germany build 7 more battleship over the next 3 years. Further Naval Laws are introduced up until 1912.
1912	The SPD have become the biggest party in the Reichstag.
1913	Germany are producing as much coal and more iron than Britain.
1914	Outbreak of WWI and start of the British Blockade.
1917	Turnip Winter - German people are surviving only on turnips and bread.
1918	End of WWI and the Kaiser abdicates. Germany sign the armistice.
1919	Spartacist Uprising. An attempt by the Communists to take power, however it fails and is put down by the army and Freikorps.
1919	Germany sign the Treaty of Versailles. This takes away land, enforces reparations, reduces their army and gives them the blame for WWI.
1919	The Weimar Republic are formed. They are a democracy.
1920	The Kapp Putsch. A right wing group led by Wolfgang Kapp and the Freikorps. They seize Berlin, however they fail as the workers go on strike.
1922	Germany declare bankruptcy and say they cannot pay back their loans.
1923	France and Belgium invade the Ruhr. German workers go on strike.
1923	Hyperinflation occurs as the German currency becomes worthless due to the continued printing of more and more money.
1923	The Munich Putsch. Hitler and the Nazis storm into a beer hall in Munich to try and lead a revolution. It fails due to lack of support.
1924	Gustav Stresemann is named foreign minister. He replaces the old currency with the Rentenmark to end hyperinflation.
1924	Dawes Plan is agreed. The USA lend Germany 800 million gold marks.
1925	Locarno Pact agrees that Germany, Britain, France and Belgium will not invade each other.
1926	Germany joins the League of Nations
1928	Kellogg-Briand Pact. Countries agree to settle disputes peacefully.
1929	The Young Plan lowers the amount of reparations Germany have to pay.

Key Words	
Autocracy	A government in which one person has uncontrolled or unlimited power.
Reichstag	The German parliament, members are voted for by the people.
Democracy	A system of government where the citizens exercise power by voting.
Bundesrat	A council of members from the states of Germany.
SPD	The Social Democratic Party, a left-wing group popular with workers.
Kaiser	The King of Germany.
Industrialisation	The process of developing a countries industry.
Constitution	Laid out the methods for which Germany would be governed after 1919.
Proportional Representation	Electoral system where seats are assigned by the percentage of votes gained.
Coalition	A government that is formed by two (or more) political parties as nobody has a majority.
Treaty of Versailles	A treaty signed by Germany after WWI which created much anger within the country.
Diktat	Dictated peace.
Inflation	Where there is an increase in prices and the amount of money produced, this may lead to hyperinflation.
Golden Age	A period in the 1920s of Germany where there were developments in music, cinema, the arts, etc

Key People/Groups	
Kaiser Wilhelm II	The emperor of Germany. He was autocratic and nationalistic.
Liebknecht & Luxembour	The two leaders of the Spartacist Uprising.
Friedrich Ebert	Leader of the SPD party and the first President of the Weimar Republic.
Wolfgang Kapp	Leader of the Kapp Putsch, a right-wing politician.
Freikorps	Ex-soldiers who were right wing. Kept hold of their weapons after the WWI.
Gustav Stresemann	Chancellor and then foreign minister. Credited with saving Germany and restoring it onto the world stage.



Unit Two: Germany and the Depression

Timeline Of Key Events	
1924	Hitler is released from jail after 9 months. He decides to rebuild the Nazi Party and takes a new approach 'ballot not bullet'.
1928	The Nazis only gain 2% of the vote (12 seats) in the Reichstag elections.
1929	Death of Stresseman.
1929	Wall Street Crash in the USA. American banks begin to recall their loans, which hits Germany hard. As a result The Great Depression occurs leading to businesses collapsing and unemployment rapidly increasing.
1930	The Nazis increase their seats from 12 to 107 in the Reichstag elections.
1932	Chancellor Bruning resigns due to a lack of support for his method, the Nazis gain 230 seats and are the most popular party.
1932	President Hindenburg appoints Von Papen as Chancellor. However he lacks support and is removed.
1932	Von Schleicher is now appointed as Chancellor. Again he lacks support and is removed.
1933	Hitler and Von Papen make a secret deal to make Hitler Chancellor. Hindenburg agrees, but only allows Hitler and two other Nazis into the cabinet. Hitler is appointed Chancellor.
1933	Reichstag Fire in February. A Dutch Communist is blamed and Hitler uses this to have Hindenburg pass an emergency protection law. This allows Hitler to hold new elections, earning 44% of the vote and also bans Communists and newspapers.
1933	Enabling Act in March. This gives Hitler the power to pass laws for the next 4 years without asking the Reichstag. The law is passed by 444 votes to 94.
1933	The first Concentration Camps are set up.
1933	All Trade Unions are banned by the Nazis.
1933	Other political parties are banned and no new parties can be formed.
1934	Night of the Long Knives. Hitler has Ernst Rohm, members of the SA and political opponents arrested and murdered.
1934	President Hindenburg dies and Hitler is named Fuhrer. The army swears an oath of loyalty to him.

Key Words	
Great Depression	Economic crisis caused by the collapse of the American stock market. This crippled numerous countries financially including Germany.
Trade Unions	An organisation that has been formed by workers to protect their rights.
Concentration Camps	A place where large numbers of people are detained or confined under armed guard. Used by the Nazis to deal with opponents.
Propaganda	A method used to control/persuade people into your way of thinking. Examples include newspapers, rallies, posters, speeches, etc
Elections	Methods used to decide the new government and president.
Voters	Different groups. Nazi voters included women, farmers, young people, businessmen and the middle class.
Fuhrer	German word for leader.
Dictatorship	A country or government in which absolute power is exercised by an individual.

Key People/Groups	
Adolf Hitler	Leader of the Nazi Party. Becomes Chancellor in 1933, before being named Der Fuhrer in 1934.
SA	Stormtroopers. The Nazis own private army. They would use violent and intimidation to deal with opposition. Their uniform of brown shirts also gave the idea of discipline.
Communists	Left wing group. Enemies of the Nazis, second biggest party in the Reichstag at the start of the 1930s.
Joseph Goebbels	Head of Nazi Propaganda.
Ernst Rohm	Leader of the SA. Hitler viewed him as a threat and had him murdered.
Franz von Papen	Former Chancellor of Germany. Made a deal with Hitler, believing that he would be able to control him.
President Hindenburg	President of Germany who disliked Hitler. Eventually persuaded to name him Chancellor. His death led to Hitler becoming Fuhrer.
Kurt von Schleicher	Appointed Chancellor by Hindenburg. Betrayed von Papen. Believed he could control the Reichstag, but failed. Resigned and replaced by Hitler.
Heinrich Bruning	Chancellor who failed to win over the Weimar Republic. Resigned in 1932.



Unit Two: The experiences of Germans under the Nazis

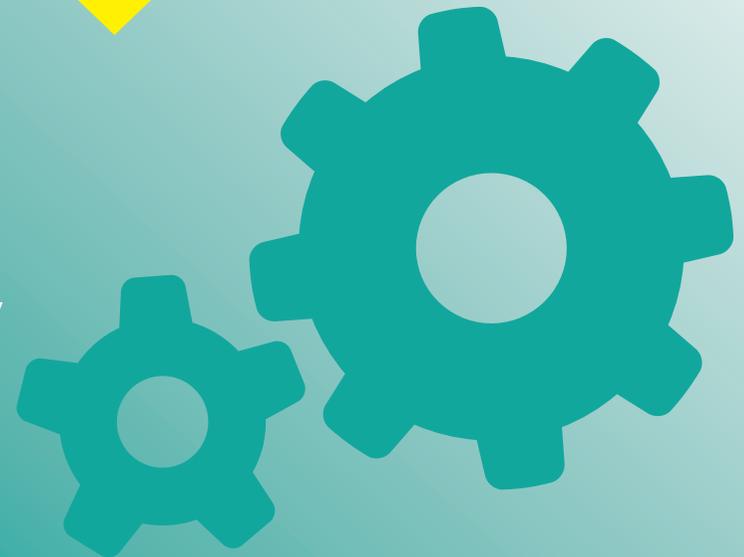
Timeline Of Key Events	
1933	Boycotts of Jewish shops and businesses begins.
1933	The Concordat is signed between the Nazis and the Catholic Church. The Nazis and the Catholics agree not to interfere with one another.
1935	Nuremberg Laws are introduced. This removes German citizenship from Jews and bans marriage between Jews and Germans.
1936	Berlin Olympics are held.
1936	The Four Year Plan is introduced by Goering. This is designed to increase military production and eventually make Germany self sufficient.
1938	Kristallnacht (Night of the Broken Glass) occurred on the 9 th and 10 th November. Germans, led by the SS, smashed Jewish homes, businesses and synagogues. 100 Jews were killed and 20,000 sent to concentration camps..
1939	Start of WWII when the Nazis invade Poland.
1939	Unemployment drops to around 400,000 the lowest it has been since the Depression.
1941	Operation Barbarossa. Germany invades the Soviet Union and now controls the majority of Europe.
1942	The Final Solution is designed. The decision is made to exterminate the Jewish race in Europe.
1943	Bombing of German cities by British and American forces causes damage and death.
1944	Von Stauffenburg Bomb Plot. Members of the army try to assassinate Hitler, however this failed.
1945	End of War in Europe. Hitler shoots himself and Germany surrender.

Key Words	
DAF	German Labour Front. This replaced trade unions and was set up for workers to join.
Strength Through Joy	KDF. They organised leisure activities to encourage hard work e.g. holidays, tickets, etc
Beauty of Labour	Tried to improve workplaces with better equipment and facilities.
RAD	The National Labour Service. It was compulsory for all men aged 19-25 to do this for 6 months.
Rearmament	The Nazis decision to build up their army and munitions to prepare for WWII.
Rationing	Restricting the amount of food available to citizens. This came into force in 1939.
Education	Controlled by the Nazis through the curriculum, textbooks and teachers.
The Three K's	Kinder, Kirche and Küche (Children, church and cooking) This is what women in Nazi Germany had to follow.
Self Sufficient	The Nazis wanted to be able to produce all materials and goods themselves.
Propaganda	Information that is not objective and is used primarily to influence an audience and further an agenda.
Aryan	Deemed by the Nazis to be the master race (the pure German race) – blonde hair, blue eyes.
Arts and Culture	Cultural activities that were set up to show Nazi beliefs e.g. cinema, music, sports, etc.

Key People/Groups	
SS	Hitler's personal bodyguard. Used to enforce law and ran concentration/death camps.
Gestapo	The Nazi secret police. Used informers and could imprison without trial.
Hjalmar Schacht	Minister of Economics. Was sacked as Germany were too reliant on foreign trade.
Hermann Goerring	Placed in charge of the economy and responsible for the Four Year Plan and Rearmament.
Hitler Youth	Youth group designed to control young people. Made compulsory in 1939.
Martin Niemoller	Criticised the Church and Nazis. Sent to a concentration camp.
Dietrich Bonhoffer	Spoke out against the Nazis interference in the church. Executed in 1945.
Heinrich Himmler	Head of terror. Controlled the SS, Gestapo and concentration/death camps.
Jews	A group targeted by the Nazis. 6 million were killed in the Holocaust.
White Rose Group	Led by Hans and Sophie Scholl. Distributed anti-Nazi propaganda, however were caught and executed.
Edelweiss Pirates	Teenagers who resisted the Nazis. They would drink, vandalise and beat up the Hitler Youth.



Geography





Global pattern of air circulation

Atmospheric circulation is the large-scale movement of air by which heat is distributed on the surface of the Earth.

Hadley cell

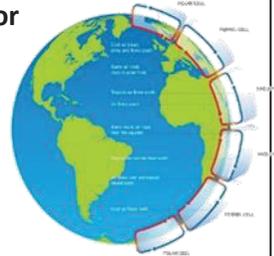
Largest cell which extends from the Equator to between 30° to 40° north & south.

Ferrel cell

Middle cell where air flows poleward between 60° & 70° latitude.

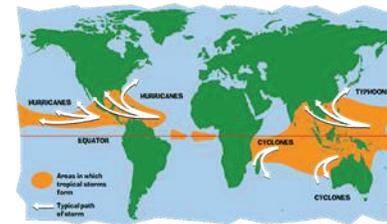
Polar cell

Smallest & weakness cell that occurs from the poles to the Ferrel cell.



Distribution of Tropical storms

They are known by many names, including hurricanes (North America), cyclones (India) and typhoons (Japan and East Asia). They all occur in a band that lies roughly 5-15° either side of the Equator.



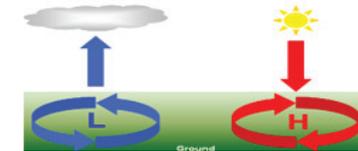
High and low pressure

LOW PRESSURE

.Caused by hot air rising. Causes stormy, cloudy weather.

HIGH PRESSURE

Caused by cold air sinking. Causes clear and calm weather



Formation of Tropical Storms

- 1 The sun's rays heats large areas of ocean in the summer and autumn. This causes **warm, moist air** to rise over the particular spots
- 2 Once the **temperature is 27°**, the rising warm moist air leads to a **low pressure**. This eventually turns into a thunderstorm. This causes air to be sucked in from the **trade winds**.
- 3 With trade winds blowing in the opposite direction and the rotation of earth involved (Coriolis effect), the thunderstorm will eventually start to **spin**.
- 4 When the storm begins to **spin faster than 74mph**, a tropical storm (such as a hurricane) is officially born.
- 5 With the tropical storm growing in power, **more cool air sinks** in the centre of the storm, creating calm, clear condition called the **eye of the storm**.
- 6 When the tropical storm hits land, it **loses its energy source** (the warm ocean) and it begins to lose strength. Eventually it will 'blow itself out'.

Changing pattern of Tropical Storms

Scientists believe that global warming is having an impact on the frequency and strength of tropical storms. This may be due to an increase in ocean temperatures.

Primary Effects of Tropical Storms

- The intense winds of tropical storms can destroy whole **communities, buildings** and **communication networks**.
- As well as their own destructive energy, the winds can generate abnormally high waves called **storm surges**.

Sometimes the most destructive elements of a storm are these subsequent **high seas and flooding** they cause to coastal area

Secondary Effects of Tropical Storms

- People are **left homeless**, which can cause distress, poverty and ill health due to lack of shelter.
- **Shortage of clean water** and **lack of proper sanitation** makes it easier for diseases to spread.
- **Businesses are damaged** or destroyed causing employment.
- Shortage of food as **crops are damaged**.

Management of Tropical Storms

- Protection** Preparing for a tropical storm may involve construction projects that will improve protection.
- Aid** Aid involves assisting after the storm, commonly in LIDs.
- Development** The scale of the impacts depends on the whether the country has the resources cope with the storm.
- Planning** Involves getting people and the emergency services ready to deal with the impacts
- Prediction** Constant monitoring can help to give advanced warning of a tropical storm
- Education** Teaching people about what to do in a tropical storm.

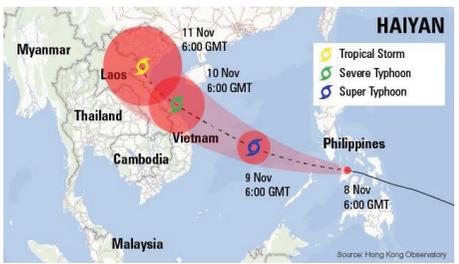


Case Study: Typhoon Haiyan 2013

Causes
Started as a tropical depression on 2nd November 2013 and gained strength. Became a Category 5 “**super typhoon**” and made landfall on the Pacific islands of the Philippines.



- Key facts:**
- One of the strongest category storms ever recorded
 - Very low air pressure caused 5m storm surges swept on shore by 170mph winds
 - Coastal devastation including 90% of Tacloban destroyed by the storm surge



The track of the storm meant that the Philippines was in the path as the storm reached its peak

- Effects of the storm**
- PRIMARY**
- ❑ 6300 killed most in the storm surge
 - ❑ 600,000 displaced
 - ❑ 40,000 homes destroyed
 - ❑ Wind damage to homes and power lines
 - ❑ Over 400mm of rain caused widespread flooding
- SECONDARY**
- ❖ 14 million people affected and 6 million jobs lost
 - ❖ Flooding caused landslides and blocked roads
 - ❖ Shortages of power water and food lead to disease
 - ❖ Looting and violence in Tacloban



Monitoring and prediction
Developments in satellites allows storms to be tracked and flights with specialist planes into the storm can take readings to establish the strength. If the path and strength of the storm is known people can be warned and evacuated.

Protection
Sea walls can be built
Strong buildings with shutters and reinforced walls.
Cyclone shelters can be built

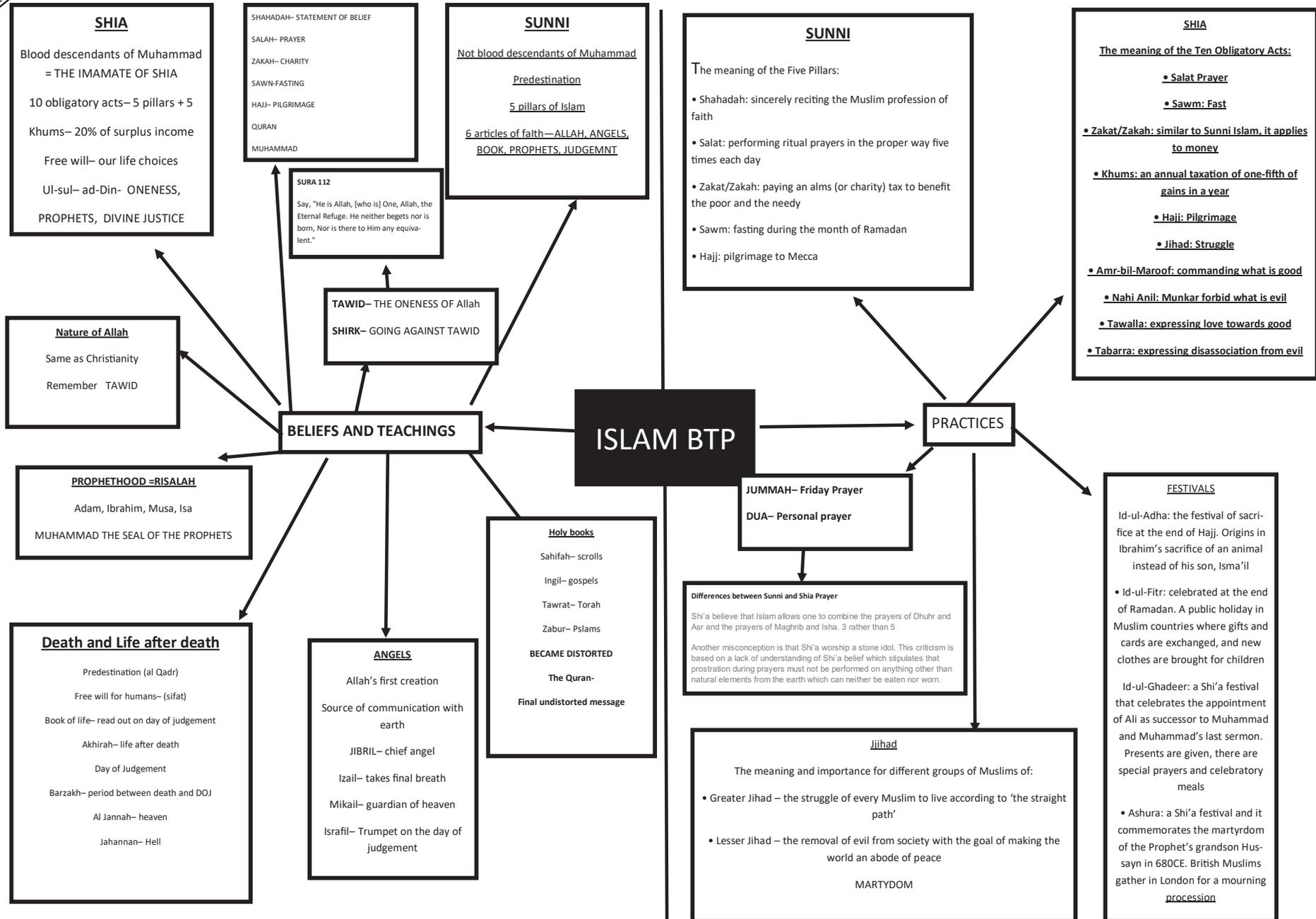
Planning
Being prepared is important by being educated on how to stay safe and packing an emergency survival pack . Media campaigns can also be used to remind people of what to do

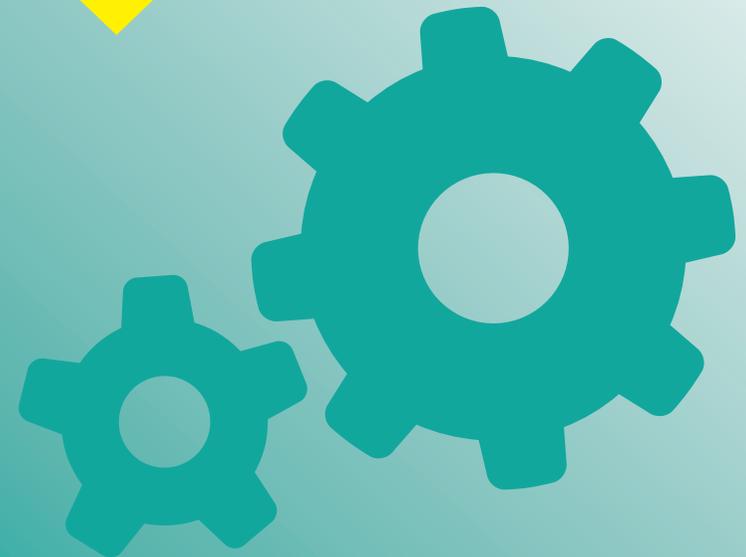


- Responses to the storm**
- IMMEDIATE**
- Rapid overseas aid
 - US helicopters used for search and rescue and deliver aid
 - Field hospitals for the injured
 - Over 120 evacuation centres
- LONG TERM**
- ❖ UN aid and medical supplies continue to be sent in
 - ❖ Rebuilding of infrastructure
 - ❖ Rice farming and fishing established
 - ❖ Homes rebuilt in safe places
 - ❖ More cyclone shelters built



Religious Studies





Spanish



Los Trabajos	Jobs
¿En qué trabajas?	What's your job?
Soy...	I am...
camarero/a	a waiter
cocinero/a	a cook
dependiente/a	a shop assistant
jardinero/a	a gardener
limpiador(a)	a cleaner
peluquero/a	a hairdresser
recepcionista	a receptionist

¿Qué tienes que hacer?	What do you have to do?
Tengo que...	I have to...
ayudar a los clientes	help customers
cortar el pelo a los clientes	cut customers' hair
hablar por teléfono	speak on the phone
limpiar habitaciones	clean rooms
preparar comida	prepare food
servir en el restaurante	serve in the restaurant
vender productos en la tienda	sell products in the shop

¿Cómo es un día típico?	What is a typical day like?
Escribo correos (electrónicos).	I write emails.
Hago reservas.	I make reservations.
Hago entrevistas.	I do interviews.
Organizo excursiones.	I organise excursions.
Preparo el programa.	I prepare the programme.
Salgo con los grupos.	I go out with the groups.
Trabajo con mi equipo.	I work with my team.
Viajo mucho.	I travel a lot.
Voy a la oficina.	I go to the office.
Me encanta mi trabajo porque...	I love my job because...
es muy práctico	it's very practical
es muy variado	it's very varied

En mi opinión, soy...	In my opinion, I am...
Creo que soy...	I believe I am...
muy / bastante...	very / quite...
ambicioso/a	ambitious
hablador(a)	talkative
independiente	independent
inteligente	intelligent
organizado/a	organised
práctico/a	practical
trabajador(a)	hard-working

¿Te gusta tu trabajo?	Do you like your job?
(No) Me gusta (nada) mi trabajo porque es...	I (don't) like my job (at all) because it is...
creativo	creative
estresante	stressful
fácil	easy
interesante	interesting
monótono	monotonous
repetitivo	repetitive
Mi jefe/a es severo/a.	My boss is strict.
Los clientes (no) son simpáticos.	The customers are (not) nice.
Los clientes son horriblos.	The customers are awful

Me gustaría...	I would like...
No me gustaría (nada)...	I wouldn't like... (at all)
trabajar al aire libre	to work in the open air
trabajar con animales	to work with animals
trabajar con niños	to work with children
trabajar en equipo	to work in a team
trabajar en una oficina	to work in an office
trabajar solo/a	to work alone
hacer un trabajo creativo	to do a creative job
hacer un trabajo manual	to do a manual job
Por eso me gustaría ser...	Therefore I would like to be...
cantante	a singer
diseñador(a)	a designer
enfermero/a	a nurse
periodista	a journalist
policía	a police officer
profesor(a)	a teacher

HIGH FREQUENCY WORDS	
mi/mis	my
tu/tus	your
bastante	quite
muy	very
un poco	a bit
¿qué?	what?
¿por qué?	why?
porque	because
por eso	so / therefore

Ayer...	Yesterday...
en la hora de comer	At lunch time
conocí a...	I met...
hablé con...	I spoke to...
bebí una botella de cola	I drank a bottle of cola
comí una hamburguesa	I ate a hamburger
dormí un poco	I slept for a bit
escuché música	I listened to music
escribí SMS a mis amigos	I wrote text messages to my friends
hablé por Skype™	I talked on Skype™
jugué a un videojuego	I played a video game
llegué tarde al trabajo	I arrived late for work
perdí mi trabajo	I lost my job



Adjectives and nouns in Spanish have to agree. Therefore, we have the following version of adjectives

Adjectives ending	Masculine singular	Feminine singular	Masculine plural	Feminine plural
o/a	creativo	creativa	creativos	creativas
e	sociable	sociable	sociables	sociables
a consonant	fácil	fácil	fáciles	fáciles
dor	trabajador	trabajadora	trabajadores	trabajadoras

Preterite Tense Take off the verb ending AR/ER/IR and add the following endings for each person

	AR	ER	IR
Yo (I)	É	Í	Í
Tu (You)	ASTE	ISTE	ISTE
El/Ella (he/she)	Ó	IÓ	IÓ
Nosotros (we)	AMOS	IMOS	IMOS
Vosotros (you all)	ASTEIS	ITEIS	ITEIS
Ellos (they)	ARON	IERON	IERON

ME GUSTA jugar	I LIKE to play
ME GUSTARÍA ser	I WOULD LIKE to be
VOY A trabajar	I AM GOING to work

Tener que	I have to	Any infinitive
Tengo que	I had to	limpiar
Tienes que	You had to	ayudar
Tiene que	He/She/It had to	cortar
Tenemos que	We had to	repartir
Tenéis que	You all had to	cocinar
Tienen que	They had to	caminar



Los empleos / Los trabajos = Jobs

Soy = I am
 Me gustaría ser = I would like to be
 camarero/a = waiter / waitress
 cocinero / a = chef
 dependiente /a = shop assistant
 esteticista = beautician
 jardinero /a = gardener
 limpiador /a = cleaner
 peluquero /a = hair dresser
 recepcionista = receptionist

Las Tareas / Tasks

Tengo que... = I have to...
 contestar al teléfono = answer the telephone
 ayudar a los clientes = help customers
 cortar el pelo a los clients = cut customers' hair
 cuidar las plantas = look after the plants
 hacer manicuras = do manicures
 limpiar habitaciones = clean rooms
 preparar comida = prepare food
 servir la comida en el restaurante = serve food in the restaurant
 vender productos en la tienda = sell products in the shop

**Me gusta / no me gusta mi trabajo porque es...
 I like / don't like my job because it is...**

difícil = difficult
 estimulante = stimulating
 monótono = monotonous

duro = hard
 estresante = stressful
 repetitivo = repetitive

¿Cómo es tu jefe? = What is your boss like?

Mi jefe es muy educado / a = my boss is polite
 Mi jefe es mal educado/a = my boss is rude
 ¿Cómo son los clientes? = What are the customers like?
 Los clientes son exigentes = the customers are demanding
 Los clientes son mal educados = the customers are rude
 Mis compañeros son simpáticos = my colleagues are nice

¿Cómo eres? = What are you like?

En mi opinion soy... = In my opinion I am...
 Creo que soy ... = I believe I am...
 Pienso que soy ... = I think I am ...
 muy = very
 bastante = quite
 ambicioso/a = ambitious
 creativo /a = creative
 independiente = independent
 inteligente = intelligent
 organizado/a = organised
 paciente = patient
 práctico / a = practical
 serio /a = serious
 sociable = sociable

Me gustaría... = I would like...

No me gustaría nada... = I wouldn't like...

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 trabajar con niños = to work with children
 trabajar en equipo = to work in a team
 trabajar en una oficina = to work in an office
 trabajar solo/a = to work alone
 hacer un trabajo creativo = to do a creative job
 hacer un trabajo manual = to do a manual job

En el futuro = In the future

Voy a ... = I'm going to...
 ganar mucho dinero = earn lots of money
 hacer un trabajo interesante = do an interesting job
 ir a la universidad = go to university
 ser famoso/a = be famous
 ser voluntario/a = be a volunteer
 tener hijos = have children
 viajar (mucho) = travel (a lot)
 estudiar ... = study
 vivir en el extranjero = live abroad
 va a ser muy interesante = it is going to be very interesting

High Frequency Words

mi / mis = my
 tu / tus = your
 además = in addition
 más = more
 a veces = sometimes
 luego = then
 también = also
 a ver/ bueno / pues = well
 por eso = so / therefore
 así que = so / therefore
 primer



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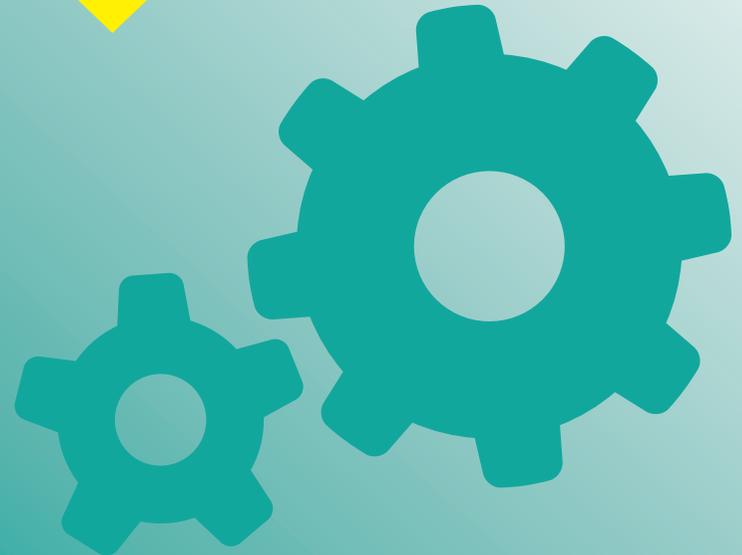
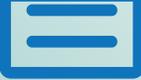
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Tenemos que	We had to	repartir
Tenéis que	You all had to	cocinar
Tienen que	They had to	caminar



IT



Programming

Programming is a set of instructions a computer uses to work and run correctly and efficiently. Without Programming most technology wouldn't exist!

Python is a high level programming language



We are going to continue using an IDE to write and produce code in IT this term.

Data Types

Data Type	Definition
String	Text eg: "Hello"
Integer	Whole number eg: 32
Float/Real	Decimal number eg: 1.2
Boolean	Two values eg: true or false
Character	A single character eg: b

Debugging

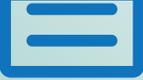


If you have a syntax error look for errors in your:

- Spelling
- Punctuation
- Capitals
- Indentation
- Use of functions

Key terms

IDE	Integrated development environment
Debugging	Getting rid of an error within a programme.
Algorithm	A method of planning a programme either using Pseudocode or a flowchart.
Flowchart	A combination of shapes and arrows to demonstrate a process within a programme
Pseudocode	A planning method used to write code where both English and short script code is used. It is basically "fake code"
While Loop	A programme that repeats while the condition being tested is true.
Iteration	Where something repeats several times. This occurs within a loop.
Syntax error	The most common error in python where the programme doesn't understand the code and can therefore not run it.
Logic Error	Logic errors in a program are mistakes in the algorithm you have devised to perform the required task
Counter	Counter variable to say how many times the user attempted the question
Compiler	A compiler or interpreter to translate your program into machine code
Error diagnostics	Used to point out syntax errors
Searching	A process used in python to find a specific piece of data.
Sorting	Where you organise data in a way that allows the user to search/find information easier.



Art



Artist Lee Dixon: Lee Dixon is an graphic artist and illustrator.



Independent study:

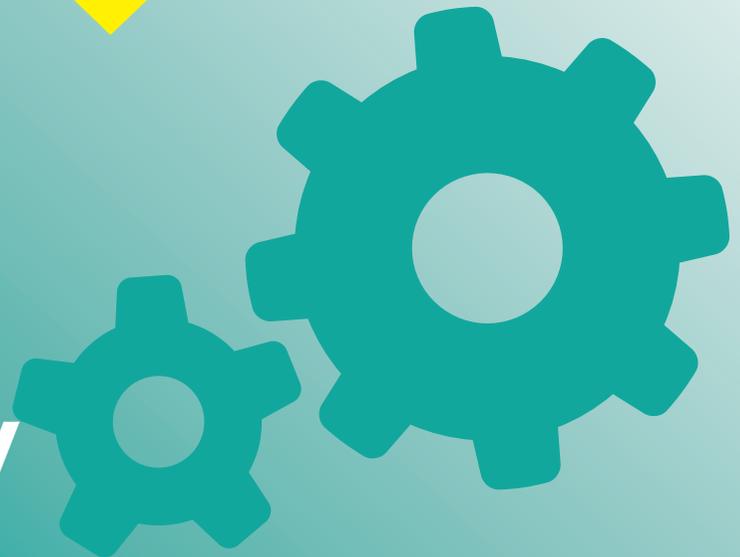
You will be studying the work of Lee Dixon in depth, tasks will be set weekly by your teacher.

- Present all work on an A3 sheet
- Make copies of the artist's work showing an understanding of how he has used materials and techniques.
- Complete annotation sheets and make written notes about the artist, giving your own opinions.
- Make a copy of an eye in the style of Lee Dixon.
- Make a mark making grid showing some of the marks and lines you can use to define the face.
- Think about how you can present your work creatively. Your teacher will share some ideas with you.



Key Vocabulary: Line, Proportion, Tone, Thick line, Thin lines, cross hatching, monochromatic, Dots, Dashes, Texture, Stylised, Contour, Creative, Presentation.





Design Technology



Design & Technology Knowledge Organiser - Y9 Control

An iconic design is usually a design that is 'ground breaking' and one that sets new standards in its field. It is a design that other designers and manufacturers follow, as it becomes a bench mark for other similar products. Furthermore, an iconic design is one that stands up to the test of time, remaining a good design, despite the passing of years, decades and even centuries.



ART NOUVEAU

Art Nouveau was the dominant style from the 1870s to 1920s, for the rich, not the working class. It involved the use of elaborate decorative detail. Examples include wrought iron scroll work, highly skilful jewellery, prominent architecture and elaborate interior design. Art Nouveau designs were manufactured by highly skilled workers, in factories / workshops. They were either 'one off' or small batch.



THE BAUHAUS (GERMANY)
1919 - 1930s

A Design and Architecture School called Bauhaus was established in 1919. Its name is still regarded as a mark of quality of design. It developed into an international arts / design movement and its influence on design has been considerable.

The Bauhaus encouraged designers, to design and develop products that were stylish and aesthetically interesting and mass produced.

The Bauhaus has influenced architecture, furniture design, interior and exterior design. There is even a Bauhaus font / writing style.

BAUHAUS

CHARACTERISTICS OF BAUHAUS DESIGNS

Bauhaus approached product design in a fresh way. They moved away from traditional skills and fashion to new ideas and ways of manufacturing on an industrial scale.

Bauhaus design characteristics

- PRODUCTS MASS PRODUCED
- NEW MATERIALS APPLIED TO PRODUCTS
- SIMPLICITY, FUNCTION AND AESTHETICS
- INNOVATIVE DESIGNS
- NEW MANUFACTURING TECHNIQUES
- AFFORDABLE PRODUCTS
- PRODUCTS FOR THE GENERAL PUBLIC



THE ARTS AND CRAFTS MOVEMENT
1880 to 1910



The Arts and Crafts Movement was one of the most influential design movements of all. During the industrial revolution, skilled craftsmen saw the increased use of machines, replacing their skills.

Before the industrial revolution, craftsmen trained for many years, perfecting their skills and this was reflected in the products they made. The industrial revolution changed all this.

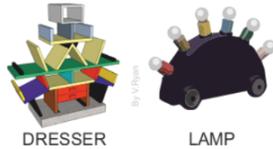
Members of the Arts and Crafts Movement, saw the industrial revolution removing craft skills from the manufacturing process, making workers less creative.

SAMPLE ARTS AND CRAFTS PRODUCTS

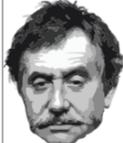
THE MEMPHIS GROUP

Established in the 1980s. Composed of designers based in Italy. Memphis designers, regarded aesthetics as the most important aspect of a product, not its function. Memphis designs/products can be regarded as pieces of art or exhibition pieces, not useable, practical items.

The best known 'Memphis' designer was, Ettore Sottsass.



ETTORE SOTTASS



Ettore Sottsass led the Memphis design group. He designed products that were unusual, with bright colour schemes, producing imaginary designs for everyday objects.

His designs were controversial and unusual.

This Ceramic Totem was designed by Sottsass, as part of the Memphis Group. 171cm in height. The ceramic finish is coated in polychrome glazes, producing a colourful reflective surface.



WHAT IS POP ART ?

Pop Art was originally an Art Movement, with artists such as Andy Warhol and David Hockney producing colourful screen prints.

Every day objects were often painted and reproduced as cheap prints and sold to the general public. These include coke tins, dollar bills and comic strips.

Pop Art has been applied to product design - e.g. furniture.



Warhol produced his art work 'Campbell's Soup' in 1962.

Pop Artwork like this is regarded as an Iconic drawing of the 1960s.

CHARACTERISTICS OF POP ART



Images stand for popular culture.

The images are often consumer products - e.g. soup cans and coke bottles.

Pop Art is colourful and distinctive.

Multiple copies printed and sold to the general public.

Comic strips are popular.

Multiple images often used in art work (see above).

ART DECO 1924 - 1940



Art Deco is an international decorative arts movement, popular between the years 1924 - 1940. Art Deco is usually associated with the architecture of the 1930s and speed and luxury. Recently it has seen a revival.

It is a style, that relies on bold designs, clear lines, vibrant colours and patterns. Geometric shapes and intense colour schemes are prominent.

KEY FEATURES

- BOLD DESIGNS
- GEOMETRIC SHAPES AND PATTERNS
- VIBRANT COLOUR SCHEME
- SYMMETRICAL DESIGNS
- ELEGANT
- STYLISH
- STREAMLINED

ART DECO - SHAPES AND FORMS - 1



Design & Technology Knowledge Organiser - Y9 Resistant Materials

2. Plastics

Acrylic		Hard wearing Shatterproof Can be coloured
Polypropylene		High impact strength Softens @ 150 C Flex without breaking
High Impact Polystyrene (HIPS)		Light but strong Widely available in sheets Used for casing for electronics
Polythene (LDPE)		Weaker & softer than HDPE Lightweight Used for carrier bags & squeeze bottles
Polythene (HDPE)		Stiff strong plastic Used for pipes & bowls Used for buckets
Urea formaldehyde		Thermoset plastic Colourless Can't be recycled High temperature resistance

1. CAD – Computer Aided Design

Advantages of CAD	Disadvantages of CAD
Designs can be created, saved and edited easily, saving time	CAD software is complex to learn
Designs or parts of designs can be easily copied or repeated	Software can be very expensive
Designs can be worked on by remote teams simultaneously	Compatibility issues with software
Designs can be rendered to look photo-realistic to gather public opinion in a range of finishes	Security issues - Risk of data being corrupted or hacked
CAD is very accurate	 CAD Software
CAD software can process complex stress testing	

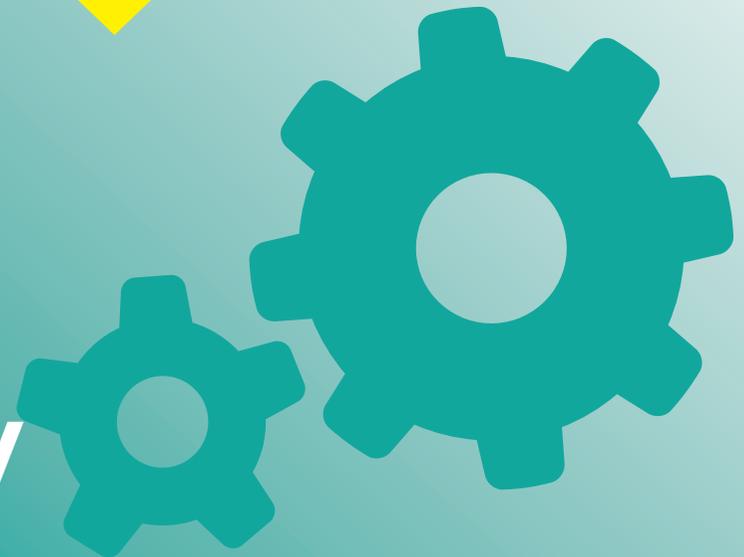
2. CAM – Computer Aided Manufacturing

Advantages of CAM	Disadvantages of CAM
Quick – Speed of production can be increased.	Training is required to operate CAM.
Consistency – All parts manufactures are all the same.	High initial outlay for machines.
Accuracy – Accuracy can be greatly improved using CAM.	Production stoppage – If the machines break down, the production would stop.
Less Mistakes – There is no human error unless pre programmed.	Social issues . Areas can decline as human jobs are taken.
Cost Savings – Workforce can be reduced.	

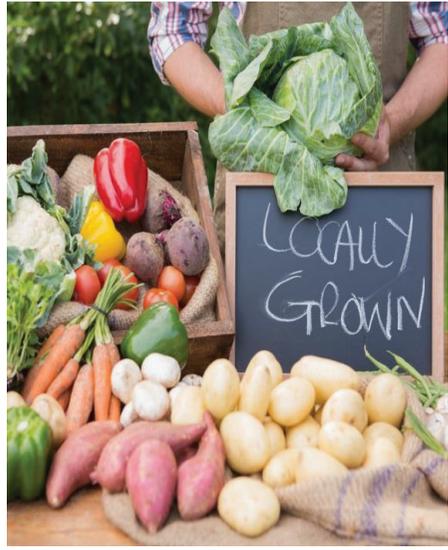


THE 6 R'S OF SUSTAINABILITY

<p>Can we repair what we may throw away? How nutrients help as to repair our bodies. What can we do to repair the UK diet?</p> <p>Repair</p>	<p>Try to reduce our food intake. Reduce food miles and the consumption of processed foods. Reduce packaging.</p> <p>Reduce</p>	<p>Say no to something. For example choose free range instead of battery. Refuse products high in fats/salt/sugar. Refuse foods which contain additives/fertilisers/pesticides</p> <p>Refuse</p>
<p>Rethink and make a better choice about something. For example rethink your lifestyle in relation to diet, food miles, seasonal, local, animal cruelty and sustainability</p> <p>Rethink</p>	<p>Reuse packaging for another purpose. Reuse leftover ingredients. This normally doesn't involve any further processing</p> <p>Reuse</p>	<p>Reuse a product – this normally requires further processing, eg. from a coke can into another coke can.</p> <p>Recycle</p>



Food Technology



Food Provenance: Where your food originally comes from

Grown Food includes fruits & vegetables + cereals: e.g. wheat, rice etc. 2 methods of farming: **Intensive**



Organic



Reared Food are animals raised by humans for their meat and other products: **Chickens= eggs.**



Cows= Milk



Caught Food applies to seafood. **Wild/caught** fish come from seas, rivers, & other bodies of water.



Foods from around the world

Indian cuisine very popular in the UK



Italians are famous for pizzas and pasta



Chinese noodles are a favourite takeaway meal around the world



South American foods use corn as the main ingredient



African meals are often based around rice



French Pastries are famous the world over.



Genetically Modified (GM) foods have had their genes altered to give it useful characteristics, such as improving its growth or changing its colour. **Disadvantages:** long term health effects aren't known. Also modified genes could affect other non GM crops. GM can't be sold everywhere. The EU restricts the import of some GM foods



Special Dietary Needs:



In **sports**, dietary needs can differ widely. Some need lots of protein to build muscle for strength, others focus more on carbs for endurance.



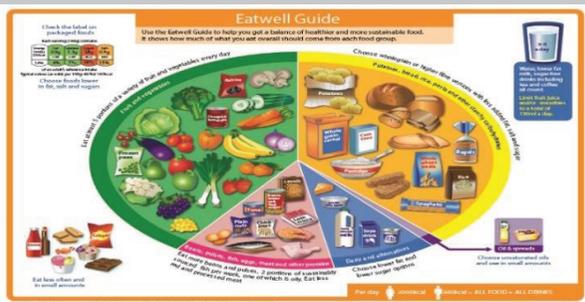
Diets also vary widely between different **religions**. Some eat meat, whilst for others it may be totally forbidden or need to be prepared in a particular way.



People can choose a plant based diet for different reasons. Some for health benefits, for **ethical reason**: e.g. animal right etc.



Allergies and **medical** issues can often lead to individuals requiring a special diet. E.g. coeliac's need to avoid food with gluten.



When **planning meals** for special dietary needs it is essential that you first have a good understanding of what a **balanced diet** should include. And what you should avoid.



See FoodTech 101 for all KS3 practicals



Diet-Related Health Problems

In many cases, making a few small changes in our foods choices can have a massive effect on our long term health & well-being.



Obesity is very common. It affects roughly one in every four adults in the UK.



Coronary Heart Disease is when the arteries which supply the heart with blood narrow due to fatty deposits



Type 2 Diabetes is a disorder where blood glucose levels stay too high because the pancreas can't produce enough insulin.



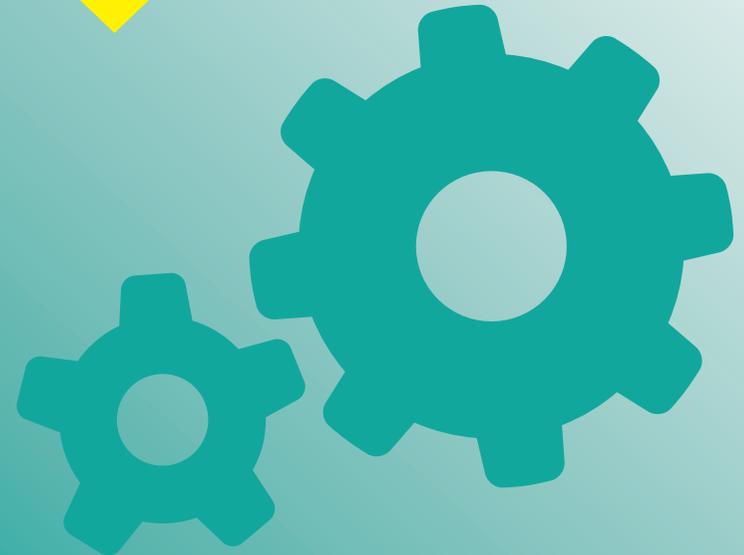
Poor Diet can affect the skeleton too! Your bones & teeth can become diseased if you don't get the right amount of nutrients



Food Ethics

Do animals have rights, even the tasty ones?
What principles govern or determine the foods you eat?

- Customs
- Culture
- Where you're from
- education
- travelling
- necessity



Music



PARK LIFE by BLUR

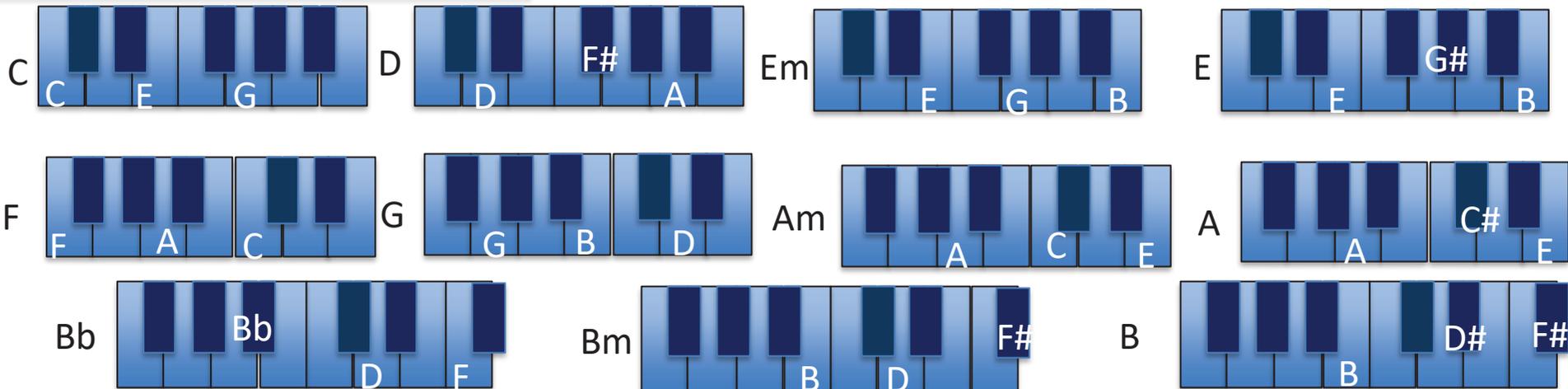
E Esus4 E Esus4
 E B E B
 All the people – so many
 people
 G Bm/F# Em D
 They all go hand in hand
 C Em A
 Hand in hand through their
 Bb B
 Park life

DON'T LOOK BACK IN ANGER by OASIS

C G Am
 Slip inside the eye of your mind
 E7 F G
 Don't you know you might find
 C Am G
 A better place to play
 C G Am
 You said that you'd never been
 E7 F G
 But all the things that you've seen
 C Am G
 Slowly fade away

Sit Down by James

E
 I sing myself to sleep
 A B
 A song from the darkest hour
(keep repeating chord structure until chorus)
 E
 Oh sit down Oh sit down
 Oh sit down
 A B
 Sit down next to me
 E
 Sit down down down down down
 A B
 in sympathy





EVALUATING MUSICIANSHIP

- 60s and 70s**
Beatles, Monkeys, Abba, Queen
 1960s
- Basic chord structures moving to more complex chord structures
 - Simple drum patterns
 - Typical band lead guitar, rhythm guitar, drums and vocals
- 1970s
- Synthesisers
 - Distortion guitar
- 80s and 90s**
Wham, Kylie Minogue, Madonna, Spice Girls, U2, Nirvana, Oasis
- Drum machines
 - Pre-programmed loops
 - Guitar anthems – iconic melody lines
 - 60s characteristics with orchestral extras
 - Europop – mixing a drumloop with iconic pieces of music.
- 00s**
Greenday, Snow Patrol, Eminem, Panic! At the Disco, One Direction, Ed Sheeran
- All of the above
 - Live loops
 - Mainstream rap
 - The use of sound effects in mainstream pop
 - Experimenting with instrumentation – electronic instruments mixed with orchestral instruments

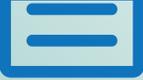
Areas you felt were successful	Areas to be improved
<p>TIMING</p> <ul style="list-style-type: none"> • Everyone was in time with each other BECAUSE • INSTRUMENT and INSTRUMENT were in time with each other <p>ACCURACY</p> <ul style="list-style-type: none"> • INSTRUMENT played the part exactly the same as it was heard on the original <p>ARRANGEMENT</p> <ul style="list-style-type: none"> • The drum came in first this helped BECAUSE 	<p>TIMING</p> <ul style="list-style-type: none"> • INSTRUMENT was out of time. The INSTRUMENT now needs to • We were all out of time. We need to <p>ACCURACY</p> <ul style="list-style-type: none"> • INSTRUMENT needs to work on accuracy of notes. To do this INSTRUMENT could <p>ARRANGEMENT</p> <ul style="list-style-type: none"> • To make it sound less like the original we need to

Develop your learning

Ask music staff about learning a musical instrument.

Join an extra curriculum club

- Extra Information**
- Composing Music**
- BBC Bitesize Music
 - Audacity – free recording and editing software
 - Virtual DJ – free mixing software
 - Garage Band – on apple devices
 - Bandlab - create music
 - Noteflight – used to notate music



Sport



Passing – there are a number of different passes such as, the push pass and the slap pass/hit

Stage one- maintaining correct hockey posture of straight back and bent knees, stand sideways on to the ball with your right foot inline with the ball and your left pointing in the direction the ball will be passed. The stick and ball remain in contact until the release point which is in line with the left foot .

Stage two- complete a push pass whilst dribbling with the ball on open stick, still keeping contact with the stick and ball until release point - this time the direction of the ball can be changed by pushing the ball across your body whilst dribbling but still releasing the ball on the left foot.

Stage three – releasing the ball off the right foot, whilst dribbling the ball can be pushed passed off the right foot, this pass will be disguised , there will be limited contact time with the stick and the ball before release

Dribbling – this enables us to run with the ball

Stage one - maintaining the correct hockey position of straight back and bent knees. Keep the ball on the open stick side, you can use a clock reference e.g. dribble with the ball at 2 o'clock. The ball should remain on the right hand side of the participant and pushed out away from their feet so that they can move easily without kicking the ball .

Stage two- open to reverse stick dribbling, the ball will now move between 1 and 11 o'clock on the clock face reference (side to side), whilst keeping contact with the ball on the flat side of the stick, the left hand at the top of the stick will do the turning , and the right hand will act as a guide and will allow the stick to turn.

Stage three- v-drag elimination- using the previous 2 stages, the participants will dribble the ball towards their opponents stick side and engage the defender, they will then drag the ball back (bottom point of the V) and drive with the ball towards the defenders non stick side

Tackling- this is how we win possession of the ball

Stage one - block tackle pick up. Participants will lead with their left hand at the top of the stick, they will keep their stick parallel to the ground , they will squeeze the ball between them and their partners stick and pick up the ball (flat side of the stick)

Stage two - participant A will dribble straight with the ball, whilst Participant B will perform a block tackle, they will get low to the ground , they will lead with their left foot followed by their left hand, keeping their stick parallel to the ground. Their right hand remains on the stick and will provide the strength in the tackle.

Stage three - the participant with possession of the ball will dribble open to reverse stick , the tackling participant will need to track the ball and time their tackle to maintain good contact with the ball and not to make contact with the oppositions stick.

Tick List

Passing:

- Sideways on
- Low to the ground
- Left foot pointing in the direction of the pass
- Stick and ball contact unit release
- Passing off both left and right feet

Dribbling

- Correct hockey posture
- Contact with the flat side of the stick
- Open stick ball positioning – 2 o'clock
- Open to reverse stick dribbling
- Elimination skills finding the none stick side

Tackling

- Stick parallel to the ground
- Leading with left foot
- Right hand provided the strength in the tackle



Sport - Football- Short/Long Pass, Control, Block Tackle, Throw In & Heading



Short pass

A short side foot pass enables a team to quickly pass a ball and help maintain possession. It is used for accuracy.

- Move parallel to the ball and place your non-kicking foot to the side of the ball.
- Keep your eye on the ball until you have it under your control.
- Look up to see where is the best place to pass it.
- On selection of your pass, maintain a strong body position.
- Swing your kicking foot through and strike the ball with the inside of your foot.
- Aim to hit the middle of the ball to ensure it stays close to the ground.
- Keep looking at your target.
- Follow your kicking leg through towards the intended target.
- The speed of the kicking leg will direct how hard you kick the ball.

Long pass

A long pass is an attacking skill that allows players to switch the direction of the attack very quickly to create space, find a teammate or to catch out the opposition.

- Move parallel to the ball and place your non-kicking foot to the side of the ball.
- Keep your eye on the ball until you have it under your control.
- Look up to see where is the best place to pass the ball.
- On selection of your pass, maintain a strong body position.
- Explosively bring your kicking foot through and strike the ball with laces of your football boot.
- Aim to hit the middle of the ball to ensure it stays close to the ground or the lower half of the ball if you want to lift it over opposition players.
- Keep looking at your target.
- Follow your kicking leg through towards the intended target and your body over the ball.
- The speed of the kicking leg will direct how hard you kick the ball.

Control

Good control of the football is an essential skill to maintain possession of the ball from the opposition and, if done accurately, gives the player more time to make the correct next decision.

- Keep your eye on the ball at all times.
- On contact with the ball, withdraw the foot slightly to take the momentum out of the ball (this is known as "cushioning").
- Aim to contact the middle of the ball to ensure that it stays close to the ground and does not bounce up.
- Once under control, move the ball out of your feet to allow the next decision to be made.

Block tackle

The block tackle is an essential skill for winning the ball back in football. It is mainly used when confronting an opponent head on and it is important to complete it with good timing and technique to prevent injury or fouls.

- Close down your opponent quickly but do not rush uncontrolled at them.
- Try to reduce any space around you and monitor for passing options.
- Stay on the balls of your feet, arms slightly out to jockey your opponent.
- Keep your eye on the ball and wait for a clear view of the ball.
- When you can see most of the ball, transfer your weight from your back to front foot and move the inside of your foot towards the ball.
- Maintain a strong body position.

Throw-in

The throw-in is the legal way to restart the game if the ball has gone out of play from either of the side-lines.

- Hold the ball with both hands and ensure that the thumbs are behind the ball and fingers are spread.
- Hold the ball behind the head with relaxed arms and elbows bent.
- Keep your feet shoulder-width apart.
- Face your target.
- Lean back with both feet in contact with the ground.
- Slightly bend your knees and arch your head, neck, shoulders and trunk.
- When ready, propel yourself forward and release the ball just as it passes your head.
- Once the ball is released, bring your strongest leg forward and out in front of you for balance.

Heading

The header can be an attacking or defensive skill and is used to try and win the ball when it is in the air.

- Keep your eyes on the ball.
- Use your forehead to make contact with the bottom of the ball for a defensive header or the top of the ball for an attacking header.
- For a defensive header it is important to get good height and distance but for an attacking header you need power and accuracy.
- You can also use flick headers to pass to a team mate.



Key Components of Fitness for Gymnasts

A gymnast requires **flexibility** at the joints to allow for a larger range of motion around a joint.

A gymnast requires **muscular strength** to be able to balance on certain body parts. This is exerting their body against a given force.

A gymnast requires **power** in their arms and legs, which is speed x strength.

A gymnast requires **agility** to change direction at speed.

A gymnast requires **muscular endurance** to keep using the same muscle groups over and over again when performing a skill such as a forward roll.

A gymnast requires a certain levels of **speed** as they slow down their speed and increase their speed depending on the sequence they are performing.

Gymnastics Key Terms

Apparatus The equipment used in gymnastics.

Balance Position A static position, holding a distinct shape.

Dismount To leave an apparatus at the end of a routine.

Equilateral Triangle A triangle in which all three sides have equal length.

Jeté A move where the gymnast springs from one foot to the other.

Pike Body position where the body is bent forward 90 degrees at the waist with the legs kept straight.

Pivot A turn on the ball of the foot.

Plié Feet angled at 90 degrees.

Routine A combination of moves and sequences performed on one apparatus.

Spotting Spotting a landing before take off.

Supporting When a second person assists the gymnast through a move and prepares to cushion them to avoid injury in the event of a fall.

Tuck A position where the knees are bent into the chest, with the body folded at the waist.

Walkovers A move where a gymnast transfers from a standing position to a handstand to a standing position.

Gymnastics Chronology

2000 BC Gymnastics activities are depicted on Egyptian artefacts

1804 The Crown Prince of Denmark believes gymnastics to be useful for military training and creates the Military Gymnastic Institute in 1804.

1928 The first women's Olympic competition (synchronised calisthenics) is held in Amsterdam.

1964 The first Trampoline World Championships are held in London, Uk.

1984 Rhythmic gymnastics is introduced as an Olympic sport in Los Angeles, USA.

2001 The traditional vaulting horse is replaced with a new apparatus, known as a tongue or table, which is ultimately more stable and therefore safer.

2008 Louis Smith is the first British Individual gymnastics medalist in a century, at the 2008 Beijing Olympics, claiming bronze in the pommel horse final.

<https://www.livestrong.com/article/497802-5-components-of-fitness-in-gymnastics/>



Sport - Gymnastics

Travelling, Jump, Roll, Weight on Hands, Balance & Vault



Travelling

Travelling in floor gymnastics is being able to move around the mat using different movements such as rolls, steps, turns, jumps, cartwheels, walkovers, handsprings, and being as creative as possible.

Standing Upward Jump

Bending your legs slightly, jump up while raising your arms forwards and upwards above your head. Keep your arms slightly in front of your body. As you land, it is important to keep your arms raised above your head, and place your feet slightly apart in the 'plie' position at an angle of 45 degrees, with your knees bent. As you make contact with the floor continue to bend the knees to absorb the downward force of landing. Bring your arms down sideways to stabilise the landing, without taking a step.

Forward Roll

From standing, crouch down. Place your hands on the floor in front of you, shoulder-width apart with your fingers facing forwards, while simultaneously placing your chin on your chest. This will ensure your hips are raised high enough and your spine is rounded so you can roll on to your back. Bend your arms as you place your neck on the floor, slightly extending the legs and pushing on the floor with your feet until the roll commences and you roll on to your back. Try to keep your legs straight as you commence the roll forwards. In the last part of the roll, bend your legs tightly so that your heels are close to your bottom. At the point where your feet contact the floor, stretch forwards with your arms so that your head and chest move over your feet. Once your body weight is in a position of balance you will be able to stand.

Cartwheel

Raise your hands above your head and place your leading leg forward. Reach forward to place the first hand (the hand on the same side as the leading leg) on the floor by bending your front leg and bending at the waist. When the first hand contacts the floor, straighten your front leg while kicking upward with your back leg over your head. Continue the movement by rocking over from your first to your second hand (which is still extended above your head). To do this, push strongly against the floor with your first hand, keeping your arms stretched up over your head. As your body rocks over your second hand, bring your second leg down to the ground and place it close to your second hand.

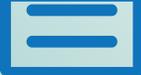
Headstand

Crouch down and place your hands and forehand on the floor to form an equilateral triangle. Your head should be approximately 30cm in front of your hands and your arms bent at an angle of 90 degrees. Extend your legs so that your pointed toes are resting on the floor. By pressing with your hands, slowly move your bottom over your forehead into a balanced position. Maintain the equilibrium by continually pressing with your hands. By exerting more pressure you will reach a point at which you can lift your feet from the floor. Continue to raise your legs above your head by pressing constantly against the floor with your hands. Make sure that your back is kept straight at all times by tightening your bottom and stomach muscles.

Headspring

To obtain the necessary height and rotation, a fast but controlled approached run is required. On take-off, drive your arms upwards and extend the body. Think of the lower body rotating over the upper body. You must still be moving upwards at the point when your hands strike the vault. In the strike phase, the angle of the body and the vault should be between 60 and 80 degrees to the vertical. Your hands should leave the box just before your body reaches the vertical. To achieve this the strike phase must be short and extremely powerful. During post-flight, keep the body as straight as possible. Just before landing, bend the knees.

<https://gymnasticshq.com/gymnastics-skills-list-floor/>



Dance



A motif can be a single movement or a phrase of movement (for pupils in school, short phrases are often more helpful as they provide greater scope for development)

A motif contains 'the essence' of the dance; a dominant feature that is repeated, like a reoccurring theme throughout a dance

A motif is usually introduced at the start of a dance, then once established is developed and varied

An entire dance can be built around the development and variation of a few contrasting motifs.

CREATING A DANCE MOTIF

A motif is the main, often recurring theme or element in a movement sequence.

When creating a dance motif always consider:

ACTION	SPACE
DYNAMICS	RELATIONSHIPS

Motifs can be created through the use of **5** basic actions:

- 1

TRAVELLING

Includes stepping, transferring body weight and sliding.
- 2

JUMPING

There are various ways of jumping: 2 feet to 2 feet, 2 feet to 1 foot etc.
- 3

TURNS

1/4, 1/2, 1/3 or full turns. Turns can be performed as a jump.
- 4

GESTURES

A body movement that portrays a concept or mood.
- 5

STILLNESS

A motionless pose during the dance sequence.