Year 10 A Christmas Carol Knowledge Organiser

Key Vocabulary:

1	Allegory	A story with 2 meanings. A surface literal meaning and a deeper hidden meaning.
2	Avaricious	Having or showing extreme greed.
3	Foil	A character whose values contrast with the protagonist
4	Benevolence	The quality of being well meaning and kind.
5	Juxtaposition	Two things being placed closely together with a contrasting effect.
6	Epitome	A person or thing who is the perfect example of a particular quality or type.
7	Misanthropic	Having a dislike for other people.
8	Malthusian	Demonstrating views that poor people should be left to die.
9	Catalyst	A person or thing that triggers an event.

Key Characters

Scrooge	Jacob Marley	The Ghost of Christmas Past
Bob Cratchit	Fezziwig	The Ghost of Christmas Present
Fred	Belle	The Ghost of Christmas Yet To Come
Tiny Tim	Fan	Mrs Cratchit
The Portly Gentlemen		

Key Events:

Stave 1	On a frigid, foggy Christmas Eve in London, a shrewd, mean-spirited cheapskate named Ebenezer Scrooge works meticulously in his counting-house. Suddenly, a ruddy-faced young man bursts into the office offering holiday greetings and an exclamatory, "Merry Christmas!" The young man is Scrooge's jovial nephew Fred who has stopped by to invite Scrooge to Christmas dinner. The grumpy Scrooge responds with a "Bah! Humbug!" refusing to share in Fred's Christmas cheer. After Fred departs, a pair of portly gentlemen enters the office to ask Scrooge for a charitable donation to help the poor. Scrooge angrily replies that prisons and workhouses are the only charities he is willing to support, and the gentlemen leave empty-handed. After returning home, Scrooge hears footsteps thumping up the stairs. A ghostly figure floats through the closed door—Jacob Marley, transparent and bound in chains.
Stave Two	At one o'clock, the curtains of Scrooge's bed are blown aside by a strange, childlike figure emanating an aura of wisdom and a richness of experience. The spectre softly informs Scrooge that he is the Ghost of Christmas Past and orders the mesmerized man to rise and walk with him. The ghost transports Scrooge to the countryside where he was raised. He sees his old school, his childhood mates, and familiar landmarks of his youth. Touched by these memories, Scrooge begins to sob. The ghost takes the weeping man into the school where a solitary boy—a young Ebenezer Scrooge—passes the Christmas holiday all alone. The ghost takes Scrooge on a depressing tour of more Christmases of the past—the boy in the schoolhouse grows older. At last, a little girl, Scrooge's sister Fan, runs into the room, and announces that she has come to take Ebenezer home. Their father is much kinder, she says. He has given his consent to Ebenezer's return. The ghost escorts Scrooge to more Christmases of the past including a merry party thrown by Fezziwig, the merchant with whom Scrooge apprenticed as a young man. Scrooge later sees a slightly older yet still boyish version of himself in conversation with a lovely young woman named Belle. She is breaking off their engagement crying that greed has corrupted the love that used to impassion Scrooge's heart.
Stave Three	A majestic giant clad in green robes, sits atop a throne made of a gourmet feast. In a booming voice, the spirit announces himself as the Ghost of Christmas Present. He tells Scrooge that he has more than 1800 brothers and his lifespan is a mere single day. The spirit takes Scrooge to the meagre home of Bob Cratchit, where Mrs. Cratchit and her children prepare a Christmas goose and savour the few Christmas treats they can afford. The spirit then takes Scrooge to a number of other Christmas gatherings, including the festivities of an isolated community of miners and a party aboard a ship. He also takes Scrooge to Fred's Christmas party, where Scrooge loses himself in the numerous party games and has a wildly entertaining time, though none of the party guests can actually see him.
Stave Four	The phantom, a menacing figure clad in a black hooded robe, approaches Scrooge. Scrooge involuntarily kneels before him and asks if he is the Ghost of Christmas Yet to Come. The phantom does not answer, and Scrooge squirms in terror. The ghost takes Scrooge to a series of strange places: the London Stock Exchange, where a group of businessmen discuss the death of a rich man; a dingy pawn shop in a London slum, where a group of vagabonds and shady characters sell some personal effects stolen from a dead man; the dinner table of a poor family, where a husband and wife express relief at the death of an unforgiving man to whom they owed money; and the Cratchit household, where the family struggles to cope with the death of Tiny Tim. Scrooge begs to know the identity of the dead man, exasperated in his attempts to understand the lesson of the silent ghost. Suddenly, he finds himself in a churchyard where the spirit points him toward a freshly dug grave. Scrooge approaches the grave and reads the inscription on the headstone: EBENEZER SCROOGE.
Stave Five	Scrooge, grateful for a second chance at his life, sings the praises of the spirits and of Jacob Marley. Upon realizing he has been returned to Christmas morning, Scrooge begins shouting "Merry Christmas!" at the top of his lungs. Genuinely overjoyed and bubbling with excitement, Scrooge barely takes time to dress and dances while he shaves. In a blur, Scrooge runs into the street and offers to pay the first boy he meets a huge sum to deliver a great Christmas turkey to Bob Cratchit's. He meets one of the portly gentlemen who earlier sought charity for the poor and apologizes for his previous rudeness, promising to donate huge sums of money to the poor. He attends Fred's Christmas party and radiates such heartfelt bliss that the other guests can hardly manage to swallow their shock at his surprising behaviour.

Year 10 Mathematics – Knowledge Organiser – Simultaneous Equations – Spring Term

Key Vocabulary

1	Simultaneous Equations	Two or more equations that share variables. They are called simultaneous equations because the equations are solved at the same time.
2	Substitute	Replace a variable with a numerical value.
3	Solution	A value we can put in place of a variable that makes an equation true.
4	Verify	When you verify a solution, you are checking that the solution is correct, usually by substituting your answer into the equation.
5	Eliminate	To remove.
6	Variable	A symbol for a number we do not yet know. It is usually a letter like x or y. They are classed as variables because x can have many values.
7	Coefficient	A number used to multiply a variable. For example: $6x$ means 6 times x. The "x" is the variable, so 6 is the coefficient.
8	Multiplier	The number you are multiplying by.
9	Linear	An equation that makes a straight line when it is graphed.
10	Non-linear	An equation that does not make a straight line when graphed.
11	Rearrange	To rearrange an equation so that another variable becomes the subject. This is done by performing the same operation on both sides of the equals sign so that eventually this variable is by itself on one side of the equals sign.

12 Is (x, y) a solution?

x and y represent values that can be substituted into an equation.

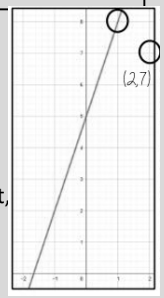
Does the coordinate (1, 8) lie on the line $y = 3x + 5$?

This coordinate represents $x = 1$ and $y = 8$

$y = 3x + 5$

$\mathbf{8} = 3(\mathbf{1}) + 5$

Substitute the values into the equation.



As the substitution makes the equation correct, the coordinate (1, 8) is on the line $y = 3x + 5$

Is (2, 7) on the same line?

$\mathbf{7} \neq 3(\mathbf{2}) + 5$ No, 7 does NOT equal $6 + 5$

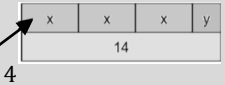
13 Substituting Known Variables

A line has the equation $3x + y = 14$

Example:
Max knows the point $x = 4$ lies on that line. Find the value for y.

$3x + y = 14$ $\quad$ $3(\mathbf{4}) + y = 14$ $\quad$ $12 + y = 14$

-12 $\quad$ -12



$x = 4$ $\quad$ $y = 2$

Remember – two different variables – two solutions.

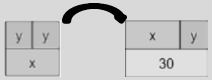
14 Substituting into an Expression

$x = 2y$

$x + y = 30$

Pair of simultaneous equations (two representations)

Substitute $2y$ in the place of the x variable as they represent the same value.



$x = 2y$ $\quad$ $x + y = 30$

$3y = 30$

$\div 3$ $\quad$ $\div 3$

$y = 10$

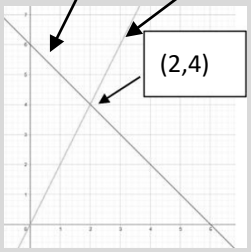
Substitute the answer into the other equation to find the value of x.

$x = 2y$

$x = 20$

15 Solve Graphically

$x + y = 6$ $\quad$ $y = 2x$



Linear equations are straight lines.
The point of intersection provides the x and the y solution for both equations.

Here the lines intersect at (2, 4)
The solution that satisfies both equations is $x = 2$ and $y = 4$

16 Solve by Subtraction

$x = 4$
$y = 3$

$3x + 2y = 18$
$- \quad x + 2y = 10$

$2x = 8$
$\div 2 \quad \div 2$
$x = 4$

$x + 2y = 10$
$(4) + 2y = 10$
$-4 \quad -4$
$2y = 6$
$\div 2 \quad \div 2$
$y = 3$

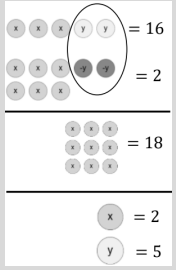
17 Solve by Addition

$3x + 2y = 16$
$+ \ 6x - 2y = \ 2$

$\div 9 \quad 9x = 18 \quad \div 9$
$x = 2$

$3x + 2y = 16$
$3(2) + 2(y) = 16$
$-6 \quad 6 + 2y = 16 \quad -6$
$2y = 10$
$\div 2 \quad \div 2$
$y = 5$

Addition makes zero pairs.



18 Solve by Adjusting

$2x + 3y = 39$
$5x - 2y = -7$

Use the LCM to make equivalent x or y values. Because of the negative values of y, the y variables are made equivalent.

$4x + 6y = 78$
$15x - 6y = -21$

Solve by addition: this will make zero pairs and remove y.

Year 10 Mathematics – Knowledge Organiser – Angles and Bearings – Spring Term

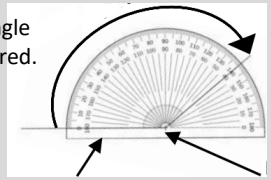
Key Vocabulary

1	Cardinal Directions	The four main compass directions: north, south, east and west.
2	Angle	The amount of turn between two lines around their common point.
3	Bearing	The angle in degrees measured clockwise from North.
4	Perpendicular	Where two lines meet at 90˚. The angle formed between two perpendicular lines is a right-angle.
5	Parallel	Parallel lines are straight lines that are always the same distance apart and never touch. They have the same gradient.
6	Clockwise	Moving in the direction of the hands on a clock.
7	Construct	To draw accurately using a compass, protractor and/or ruler or straight edge.
8	Scale	The ratio of the length if a drawing to the length of the real thing.
9	Protractor	An instrument used in measuring or drawing angles.

10 Measure Angles to 180˚

Read from 0˚ on the base line. Remember to use your understanding of angles to check that you are correct. This is an obtuse angle because it is between 90˚ and 180˚.

This is the angle being measured.



The base line of the protractor follows the line segment.

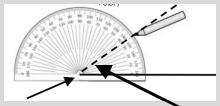
Make sure the cross is at the point the two lines meet.

11 Draw Angles up to 180˚

Draw a 35˚ angle.

Make a mark at 35˚ with a pencil and join to the angle point.

Remember to use a ruler!

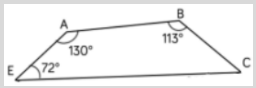


Make sure the cross is at the end of the line (where you want the angle.)

The angle.

12 Angle Notation

The letter in the middle is the angle of interest. The order of the letters tell you the direction to take. The 'hat' or the arc represents the part of the angle.



$A\hat{B}C$ when using three letters, this refers to the angle at B. Here this is 113˚

There are two different types of angle notation that can be used.

$\angle ABC$ is also used to represent the angle at B.

13 Scale Drawings

If the scale given is 1 : 20

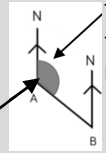
This means that for every 1 cm on the model/drawing there are 20 cm in real life.

Remember: Scale drawing ONLY change lengths and distances – angles remain the same.

14 Understand and Represent Bearings

- A bearing is always measured from NORTH.
- It is measured in a CLOCKWISE directions.
- It is always given as THREE figures.

The bearing of B from A is calculated by measuring the highlighted angle.

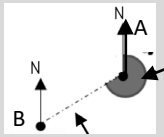


The angle indicated starts from the North line at A and joins the path connecting A and B.

The angle shows the bearing of B from A.

The sentence… "Bearing of _ _ _ from _ _ _ " is really important in identifying the bearing being represented.

15 Measure and Read Bearings



The auxiliary line is drawn to help you measure and draw the angle that is measured to represent the bearing.

Find the bearing of B from A.

This angle is measured from NORTH.

It is measured in a clockwise direction.

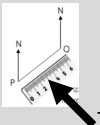
Using estimation indicates that the angle is between 180˚ and 270˚.

Use a protractor to measure accurately.

Remember bearings are given as three figures.

16 Scale Drawings using Bearings

Remember – angles DO NOT change size in scaled drawings.



The bearing measurements do not change from "real life" to images.

The scale may need to be calculated from the image.

This represents 30km from P to Q

The units in the ratio scale are the same.

6cm = 30km

6 : 3,000,000

17 Bearings with Angle Rules

Because the two North lines are PARALLEL…

They form corresponding angles and therefore are the same size.

They form co-interior angles and add up to 180˚.

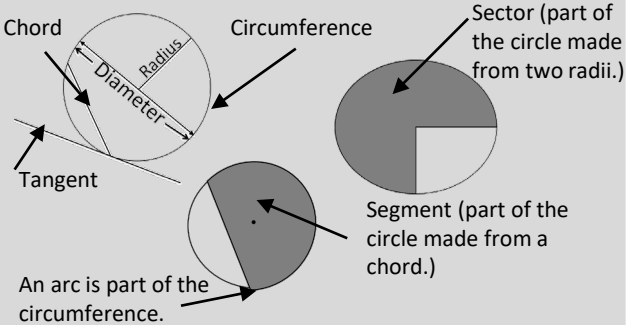
They form alternate angles and therefore are the same size.

Year 10 Mathematics – Knowledge Organiser – Working with Circles – Spring Term

Key Vocabulary

1	Circumference	The length around the outside of the circle – the perimeter.
2	Area	The size of the 2D shape.
3	Diameter	The distance from one side of a circle to another which goes through the centre of the circle.
4	Radius	The distance from the centre of the circle to the circumference of the circle.
5	Tangent	A straight line that touches the circumference of a circle.
6	Chord	A line segment connecting two points on the circumference.
7	Frustrum	A pyramid or a cone with the top cut off.
8	Hemisphere	Half a sphere.
9	Surface Area	The total area of the surface of a 3D shape.
10	Sector	A part of a circle which is the area between two radiuses and the connecting arc of a circle.
11	Segment	A part of a circle which is the area between a chord and the connecting arc of a circle.
12	Arc	Part of the circumference of a circle.

13 Parts of a Circle



14 Fractional Parts of a Circle

Formula to remember:

$Area\ of\ a\ circle = \boldsymbol{\pi r^2}$

$Circumference\ of\ a\ circle = \boldsymbol{\pi d}\ or\ \boldsymbol{2\pi r}$

The angles in a circle add up to 360˚.

30˚ represents $\frac{30}{360}$ of a full circle. $\frac{30}{360} = \frac{1}{12}$

$\frac{270}{360}$ of a full circle (in degrees)

$\frac{6}{8}$ of a full circle (equal parts)

$\frac{3}{4}$ of a circle.

The fraction of a circle is as $\frac{\theta}{360}$

θ represents the degrees in a sector.

15 Arc Length

Remember an arc is part of the circumference.

Circumference of the whole circle $= \pi d = \pi \times 9 = 9\pi$

Arc length = $\frac{\theta}{360} \times circumference$

$= \frac{240}{360} \times 9\pi$

$= \frac{2}{3} \times 9\pi$

$= 6\pi$

Perimeter

Perimeter is the length around the outside of the shape. This includes the arc length and the radii that encloses the shape.

Perimeter = $\frac{\theta}{360} \times circumference + 2r$

$= 6\pi + 9$

16 Sector Area

Remember a sector is part of a circle.

Area of the whole circle $= \pi r^2 = \pi \times 6^2 = 36\pi$

Sector area= $\frac{\theta}{360} \times area\ of\ circle$

$= \frac{120}{360} \times 36\pi$

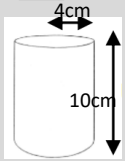
$= \frac{1}{3} \times 36\pi$

$= 12\pi$

17 Volume of a Cone and a Cylinder

$Volume\ cylinder = \pi r^2 h$

A cylinder is a prism – cross section is a circle.



$V = \pi r^2 h$

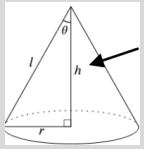
$V = \pi \times 4^2 \times 10$

$V = \pi \times 160$

$V = 160\pi cm^3$

$Volume\ cone = \frac{1}{3}\pi r^2 h$

A cone is a pyramid with a circular base.

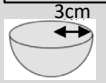


The height of a cone is the perpendicular height from the vertex to the base.

Look out for trigonometry or Pythagoras' theorem – the radius forms the base of a right-angled triangle.

18 Volume of a Sphere

$Volume\ sphere = \frac{4}{3}\pi r^3$



$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3} \times \pi \times 3^3$

$V = \frac{4}{3} \times \pi \times 27$

$V = 36\pi cm^3$

A hemisphere is half the volume of the overall sphere = $36\pi \div 2 = 18\pi$

19 Surface Area of a Sphere

$Surface\ area\ sphere = 4\pi r^2$

Radius = 5cm

$SA = 4\pi r^2$

$SA = 4 \times \pi \times 5^2$

$SA = 4 \times \pi \times 25$

$SA = 100\pi cm^2$

The curved surface area of a sphere.

A hemisphere has the curved surface area AND a flat circular face.

$= 100\pi \div 2 = 50\pi$

$= 50\pi + \pi \times 5^2$

$SA\ hemisphere = 75\pi cm^2$

20 Surface Area of Cones and Cylinders

$Surface\ area\ cylinder = 2\pi r^2 + \pi dh$

The area of two circles (top and bottom face) + the area of the curved face.

The length of B is the circumference of the circles.

Curved $Surface\ area\ cone = 2\pi r^2 + \pi dh$

Total surface area = curved face + circle face (area of base.)

Year 10 Mathematics – Knowledge Organiser – Vectors – Spring Term

Key Vocabulary

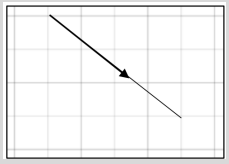
1	Direction	The direction of a vector describes the direction of a line segment. This is sometimes shown as an arrowhead on the line which points to the direction of the vector.
2	Magnitude	The magnitude of a vector refers to the length or the size of the vector.
3	Scalar	A single number used to represent the multiplier when working with vectors.
4	Column Vector	A matrix of one column that is used to describe the movement from a point.
5	Resultant	The vector that is the sum of two or more other vectors.
6	Parallel	Straight lines that never meet. They have the same gradient.

7 Understand and Represent Vectors

Vectors show both direction and magnitude.

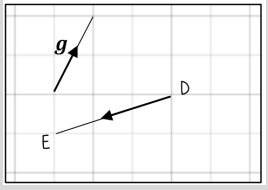
Column vectors have been seen in translations to describe movement of one image onto another.

Movement along the x-axis. Movement along the y-axis. $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$



The arrow is pointing in the direction from the starting point to end point of the vector.	The direction is important to correctly write the vector.
The magnitude is the length of the vector. (This is calculated using Pythagoras' theorem and forming a right-angled triangle using auxiliary lines.)	The magnitude stays the same even if the direction changes.

8 Understand and Represent Vectors



Vector notation $\overrightarrow{DE}$ is another way to represent the vector joining the point D to the point E.

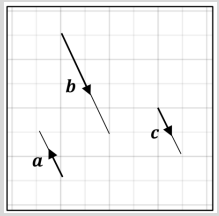
$$\overrightarrow{DE} = \begin{pmatrix} -3 \\ -1 \end{pmatrix}$$

The arrow also indicates the direction from point D to point E.

Vectors can also be written in bold lower case so $\boldsymbol{g}$ represents the vector: $\boldsymbol{g} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

9 Vectors Multiplied by a Scalar

Parallel vectors are scalar multiples of each other.



$a = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ $b = \begin{pmatrix} 2 \\ -4 \end{pmatrix}$ $c = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$

$\boldsymbol{b} = 2 \times \boldsymbol{c} = 2\boldsymbol{c}$

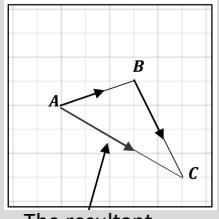
Multiply $\boldsymbol{c}$ by 2 this becomes $\boldsymbol{b}$. The two lines are parallel.

$\boldsymbol{a} = -1 \times \boldsymbol{c} = -\boldsymbol{c}$

The vectors $\boldsymbol{a}$ and $\boldsymbol{c}$ are also parallel. A negative scalar causes the vector to reverse direction.

$\boldsymbol{b} = -2 \times \boldsymbol{a} = -2\boldsymbol{a}$

10 Addition of Vectors



The resultant

$\overrightarrow{AB} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ $\overrightarrow{BC} = \begin{pmatrix} 2 \\ -4 \end{pmatrix}$

$\overrightarrow{AB} + \overrightarrow{BC}$

$= \begin{pmatrix} 3 \\ 1 \end{pmatrix} + \begin{pmatrix} 2 \\ -4 \end{pmatrix}$

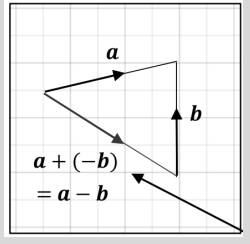
$= \begin{pmatrix} 3 + 2 \\ 1 + -4 \end{pmatrix}$

$\overrightarrow{AC} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$

Look how this addition compares to the vector $\overrightarrow{AC}$.

$\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AC} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$

11 Addition and Subtraction of Vectors



$\boldsymbol{a} = \begin{pmatrix} 5 \\ 1 \end{pmatrix}$ $\boldsymbol{b} = \begin{pmatrix} 0 \\ 4 \end{pmatrix}$

$\boldsymbol{a} + (-\boldsymbol{b}) = \begin{pmatrix} 5 + -0 \\ 1 + -4 \end{pmatrix} = \begin{pmatrix} 5 \\ -4 \end{pmatrix}$

The resultant is $\boldsymbol{a} - \boldsymbol{b}$ because the vector is in the opposite direction to **b** which needs a scalar of -1.

Year 10 Science Knowledge Organiser – Extracting Metals 1

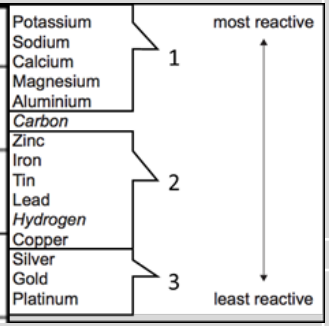
Key Vocabulary:

1	**Metal oxide**	A compound formed when a metal ionically bonds to oxygen
2	**Reactivity series**	The order of elements in terms of their reactivity
3	**Displacement Reaction**	A reaction in which a more reactive element takes the place of a less reactive element in one of its compounds or in solution.
4	**Acid**	A substance that releases H^+ ions and has a pH below 7
5	**Base**	A substance that neutralises an Acid and has a pH above 7
6	**Alkali**	A type of soluble base. A metal hydroxide. Releases OH^- ions
7	**Neutralisation**	When an acid reacts with a base to produce a salt and water
8	**Carbonates**	Ionic compounds containing Carbon and oxygen
9	**Salt**	Ionic compound formed when acid and base react
10	**Soluble**	A substance that dissolves
11	**Insoluble**	A substance that does not dissolve
12	**Indicator**	A substance that changes colour when pH changes
13	**Metal Ore**	A rock that contains enough of a metal or metal compound which is worth extracting the metal.

Chemical Changes

14 The Reactivity Series

	Category	Extracted by
1	Highly reactive metals	Electrolysis
2	Base metals	Smelting: heating with carbon
3	Native metals	Found as nuggets of pure metal



Metal + water → metal hydroxide

You can place metals in order of reactivity by looking at their reactions with water.

Most metals do not react vigorously with water.

Metal + acid → metal salt + hydrogen

You can place the metals that do not react with water in dilute acid to order their reactivity.

Acid used	Second part of salt's name
Hydrochloric acid	chloride
Sulfuric acid	sulfate
Nitric acid	nitrate

Metal Carbonate + Acid → Salt + water + carbon dioxide

Metal + oxygen → metal oxide

When a metal reacts with oxygen, we can say it has been oxidised as it has had oxygen added to it.

When the metal oxide has the oxygen removed, we can say it has undergone reduction.

15 Displacement Reactions

In a displacement reaction, a more reactive metal will displace a less reactive metal from an aqueous solution of one of its salts.

For example

Magnesium + copper sulfate → magnesium sulfate + copper

In this case, magnesium is more reactive than copper. Therefore the copper ions will be displaced from solution to form copper metal and the magnesium metal forms aqueous magnesium ions and dissolves into solution.

Chemical Changes

16 Oxidation and Reduction Half Equations (HIGHER ONLY)

Oxidation is the loss of electrons and Reduction is the gain of electrons (OILRIG).

Ionic Equation: (SO4 2- spectator ions)

Mg (s) + Cu 2+ (aq) → Cu (s) + Mg 2+ (aq)

Oxidation Half Equation:

Mg (s) → Mg 2+ (aq) + 2e-

Reduction Half Equation:

Cu 2+ (aq) + 2e- → Cu (s)

17 Extracting Metals

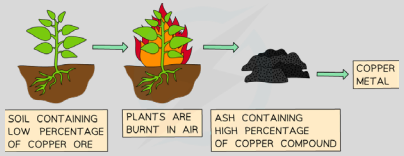
Extracting metal processes can produce large amounts of waste and may have major impacts on the environment.

Whether it is worth extracting a particular metal depends on:

- How easy it is to extract the metal from its ore
- How much metal the ore contains
- Changing demand for the metal

Metals can be extracted from compounds using displacement reactions.

- Extraction of metal ores from the ground is only economically viable when the ore contains sufficiently high proportions of the useful metal, such as iron ores and aluminium ores.
- Phytoextraction and bioleaching (bacterial) are two relatively new methods of extracting metals that rely on biological processes.
- Phytomining



- Bioleaching is a technique that makes use of bacteria to extract metals from metal ores.
- Some strains of bacteria are capable of breaking down ores to form acidic solutions containing metals ions such as copper(II).
- Although bioleaching does not require high temperatures, it does produce toxic substances which need to be treated so they don't contaminate the environment

Year 10 Science Knowledge Organiser – Extracting Metals 2

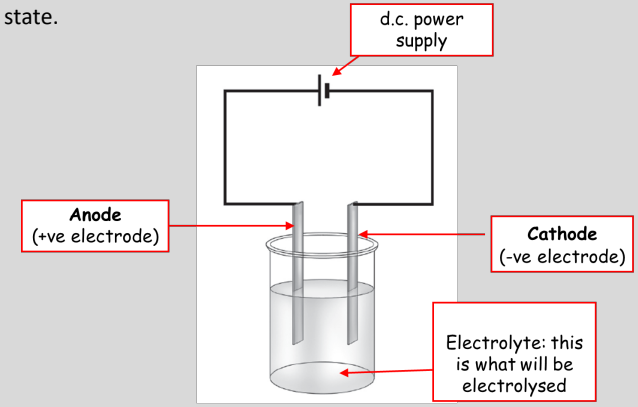
Key Vocabulary:

1	**Anion**	A negatively charged particle.
2	**Anode**	The positive electrode.
3	**Aqueous Solution**	An aqueous solution forms when a substance dissolves in water.
4	**Cathode**	The negative electrode.
5	**Cation**	A positively charged particle.
6	**Cell**	The container in which an electrochemical reaction takes place.
7	**Electrode**	The terminal at which electricity enters or leaves the electrolyte.
8	**Electrolysis**	The breakdown of a substance containing ions by electricity.
9	**Electrolyte**	A liquid, containing free moving ions, which is broken down by the process of electrolysis.
10	**Electrical (chemical) cell**	Contain chemicals that react to produce electricity.
11	**Ion**	A charged particle produced by the loss or gain of electrons.
12	**Inert**	Unreactive.

Electrolysis

13 Electrolysis Introduction

When electrolysis passes through a molten ionic compound or a solution containing ions, electrolysis takes place.
Electrolysis can not take place if the ionic compound is in solid state.



The electrical circuit has two electrode that must make contact with the electrolyte.
The electrodes are made of an inert substance that does not react with the products.
PANIC – Positive is Anode, Negative Is Cathode.
During electrolysis, the positively charged ions move to the cathode and the negative ions move to the anode, because opposites attract.
When the ions reach the electrodes, they lose their charge and become atoms or molecules (by losing or gaining electrons, depending on their charges).
When electrolysed, metals are formed at the cathode and non-metals are formed at the anode.

14 Electrolysis Half Equations (HIGHER ONLY)

When positively charged ions reach the negative (cathode) electrode, they **gain electrons** to become neutral atoms.
At the positive (anode) electrode, the negatively charged ions **lose electrons** to become neutral ions.

You can represent changes at the electrodes by half equations.
The half equations for lead bromide are:

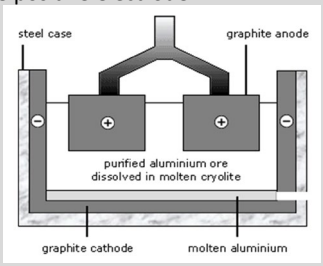
At the cathode: $Pb^{2+} + 2e^- \rightarrow Pb$

At the anode: $2Br^- \rightarrow Br_2 + 2e^-$

Electrolysis .

15 Extracting Aluminium

You get aluminium from the ore bauxite, which is mainly aluminium oxide.
Aluminium is more reactive than carbon, so must be extracted using electrolysis.
The extraction of aluminium oxide requires large amounts of energy as it's melting point is over 2000°C. To lower it's melting point, cryolite is added to the mixture and it lowers to 850°C
Aluminium metal is produced at the negative electrode and oxygen gas at the positive electrode.



The overall reaction in the electrolysis cell is:

Aluminium oxide → aluminium + oxygen

The oxygen that forms at the hot carbon anodes (negative electrodes) reacts to produce carbon dioxide gas. This means that the carbon electrodes gradually burn away and have to be replaced regularly.

16 Electrolysis of Aqueous Solutions

In the electrolyte, if there is more than two free ions it will effect the products formed at the electrodes
A solution will have more than two ions if the salt is dissolved in water (H^+ and OH^-)

Rules for formation at the Anode (Positive)

- OH- and the non metal ions are attracted to this electrode.
- If OH- and halide ions (Cl-, Br-, I-) the halogens always form.
- If there are no halogens then oxygen will form .

Rules for formation at the Cathode (Negative)

- H+ and the metal ion are attracted to this electrode.
- If the metal ions are less reactive than hydrogen then the metal ions form at the negative electrode, if not then the hydrogen ions form.
- The least reactive element will form.

Year 10 Science – Energy Conservation 1

Key Vocabulary:

1	Kinetic energy (KE)	The energy an object has because it is moving
2	Gravitational potential energy (GPE)	The energy an object has because of its position
3	Elastic potential energy	The energy stored in a springy object when you stretch or squash it
4	Thermal energy	The energy a substance has because of its temperature
5	Chemical energy	The energy stored in fuels, food, and batteries
6	Conservation of energy	Energy cannot be created or destroyed only transferred.
7	Work done	The energy transferred by a force
8	Dissipation	The process of energy being transferred or lost to the surroundings
9	Friction	A force that opposes movement
10	System	An object or group of objects
11	Closed system	An isolated system where no energy transfers take place into or out of the energy stores in the system.
12	Useful energy	Energy in the place it is wanted in the form that it is needed in
13	Wasted energy	Energy that is not usefully transferred, usually as thermal.

14 Calculating Efficiency

$$\text{1. Efficiency} = \frac{\text{Useful output energy transferred by the device}}{\text{Total input energy supplied to the device}}$$

$$\text{2. Efficiency} = \frac{\text{Useful power out}}{\text{Total power in}}$$

3. No device can be more than 100% efficient.

4. Machines waste energy because of friction between their moving parts, air resistance, electrical resistance, and noise.

15 Equations to recall and apply

Work done, W (joules, J) = **force applied, F** (newtons, N) x **distanced moved, s** (metres, m)

Change in objects gravitational potential energy store, ΔE_p (joules, J) = **mass, m** (kilograms, kg) x **Gravitational field strength, g** (newtons per kilogram, N/kg) x **Change of height, Δh** (metres, m)

Elastic potential energy, E_e (joules, J) = ½ x **spring constant, k** (newtons per metre, N/m) x **extension^2, e^2** (metres, m)

Kinetic energy, E_k (joules, J) = ½ x **mass, m** (kilograms, kg) x **speed^2, v^2** (metres per second, m/s)

16 Power

1. The more powerful an appliance, the faster the rate at which it transfers energy

$$\text{2. Power, P (watts, W)} = \frac{\text{Energy transferred to appliance, E (joules, J)}}{\text{Time taken for energy to be transferred, t (seconds, s)}}$$

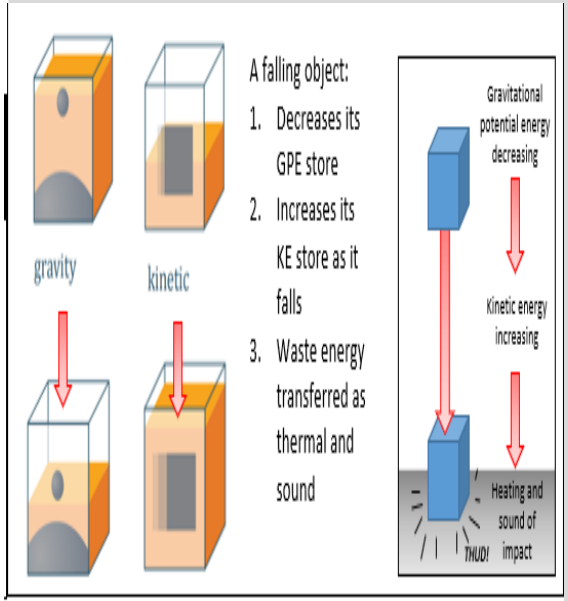
3. The power wasted by an appliance = total power input - useful power output

17 Transfer of Energy

Energy is transferred by:

- Heating
- Waves
- Electric Current
- Force when it moves an object

16 Conservation of energy in action



Year 10 Science – Energy Conservation 2

Key Vocabulary:

1	Nuclear fuel	Substances used in nuclear reactors that release energy due to nuclear fission.
2	Renewable Energy	Energy from natural sources that is always being replenished so it never runs out.
3	Non-Renewable Energy	A non-renewable energy resource is one with a finite amount. It will eventually run out when all reserves have been used up.
4	Carbon Neutral	A biofuel from a living organism that takes in as much carbon dioxide from the atmosphere as is released when the fuel is burned.
5	Decommissioned	When a nuclear power station is closed down and dismantled safely.
6	Fossil Fuels	fuels such as oil, coal and gas. These natural resources are formed from the remains of plants and animals that died millions of years ago
7	Greenhouse gases	Gases such as water vapour, carbon dioxide, and methane in the Earth's atmosphere that trap heat.
8	Global Warming	Global warming is the unusually fast increase in the Earth's average surface temperature and is caused by greenhouse gases like carbon dioxide and methane being released into the atmosphere, known as emissions.

9 Renewable or Non-Renewable

Renewable resources are replenished either by:

- human action, e.g. trees cut down for bio-fuel are replaced by planting new trees
- natural processes, e.g. water let through a dam for hydroelectricity is replaced through the water cycle

A non-renewable energy resource is one with a finite amount. It will eventually run out when all reserves have been used up.

10 Energy Demands

Energy demands are met mostly by burning oil, coal and gas. Nuclear power, biofuels (methane and ethanol) and renewable resources provide energy to generate some of the energy you use.
Uranium and plutonium is the fuel in nuclear power stations; much more energy is released per kg from these than fossil fuels.

11 Energy from wind and water

Wind turbines are an electricity generator on top of a tall tower.

- Waves generate electricity by turning a floating generator.
- Hydroelectricity generators are turned by water running downhill
- Tidal power station traps each high tide and uses it to turn a generator

12 Power from the Sun and Earth

Solar cells are flat solid cells and they use the Sun's energy to generate electricity.

- Solar heating panels use the Sun's energy to heat water directly.
- Geothermal energy comes from the energy transferred by radioactive substances deep inside the Earth.
- Water pumped into hot rocks underground produces steam to drive turbines at the Earth's surface that generate electricity.

13 Energy and the environment

Fossil fuels produce increased levels of greenhouse gases, which cause global warming. Nuclear fuel produces radioactive waste.
Renewable energy resources will never run out, they do not produce harmful waste products, and they can be used in remote places. Different energy resources can be evaluated in terms of reliability, environmental effects, pollution and waste.

14 Energy Resources

Energy resource	Energy store	Renewable?	Uses	Power output	Environmental impact
Fossil fuels (oil, coal and natural gases)	Chemical	Non-renewable	Transport, heating, electricity generation	High	Releases CO_2 (causes global warming)
Nuclear fuels	Nuclear	Non-renewable	Electricity generation	Very high	Radioactive waste (needs to be disposed of safely)
Bio-fuel	Chemical	Renewable	Transport, heating, electricity generation	Medium	'Carbon neutral', so low impact
Wind	Kinetic	Renewable	Electricity generation	Very low	Takes up large areas that could be used for forming, some people say windmills spoil the view
Hydroelectricity	Gravitational potential	Renewable	Electricity generation	Medium	Local habitats are affected by the large areas that need to be flooded to build dams
Geothermal	Internal (thermal)	Renewable	Electricity generation, heating	Medium	Very low
Tides	Kinetic	Renewable	Electricity generation	Potentially very high, but hard to harness	Tidal barrages can block sewage which needs to go out to sea
Sun	Nuclear	Renewable	Electricity generation, heating	Dependent on the weather and only available during daylight	Very little
Water waves	Kinetic	Renewable	Electricity generation	Low	Very low

15 Big Energy Issues

Gas fired power stations and pumped storage stations can meet variations in demand.
Nuclear power stations are expensive to build, run and decommission.
Carbon capture of fossil fuels emissions is expensive.
Renewable resources are cheap to run but expensive to install.

Year 10 Science Spring Term Knowledge Organiser

Key Vocabulary:

1	**Health**	Health can be defined as 'complete physical, mental and social wellbeing and not only the absence of illness or infirmity'
2	**Disease**	Diseases are abnormal conditions that affect an organism's body, organs, tissues or cells. Some are caused by pathogens, and organisms have defences to them.
3	**Pathogen**	Microorganisms that cause disease.
4	**Culture medium**	A liquid or gel used to support the growth of microorganism or other cultures, often containing specific nutrients.
5	**Virus**	Viruses are infective agents made up of genetic material - DNA or RNA - surrounded by a protein coat.
6	**Bacteria**	Single celled prokaryotic organisms.
7	**Fungus**	Fungi can be unicellular or multicellular. Fungi include organisms like mushrooms, which are multicellular, and yeast, which are unicellular.
8	**Immunity**	The immune system protects the body from pathogens. If a pathogen gets past the first line of defence (the non-specific defences), the immune system works to neutralise or destroy the pathogen, preventing or minimising infection. White blood cells are an important part of the immune system.

9

Pathogens may be viruses, bacteria, protists and fungi; they microorganisms that cause infectious disease

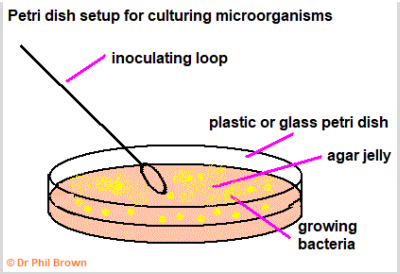
They can infect both plants and animals

- Bacteria – reproduce rapidly and can affect the host by releasing toxins, these damage tissues and make us feel unwell
- Viruses – need a host to survive and reproduce
- Fungi – grow on living tissue, some are single-celled and others have a body made of hyphae
- Protists – eukaryotic organisms some of them are parasit that live on or inside the host organism. They are often transferred by vectors, (see Protists)

10

Type	Examples
Direct contact	This can be sexual contact during intercourse or non-sexual contact, like shaking hands.
Water	Dirty water can transmit many diseases, such as the cholera bacterium.
Air	When a person who is infected by the common cold sneezes, they can spray thousands of tiny droplets containing virus particles to infect others.
Unhygienic food preparation	Undercooked or reheated food can cause bacterial diseases like Escherichia coli which is a cause of food poisoning.
Vector	Any organism that can spread a disease is called a vector. Many farmers think tuberculosis in their cattle can be spread by badgers.

11 Culturing Bacteria



12 Hygiene

- Handwashing
- Using disinfectants
- Keeping raw meat away from food that is eaten uncooke prevent the spread of pathogens/
- Coughing or sneezing into a handkerchief.
- Maintaining the hygiene of people and agricultural machinery to help prevent the spread of plant diseases.

Diseases

13 Bacterial Diseases

1. Bacteria	Large microbe Living  Divide by splitting in two May produce toxins to make us ill Cause: • Salmonella – food poisoning • Gonorrhoea – sexually transmitted disease (STD)

14 Viral Diseases

2. Viruses	Smallest microbe Not alive  Live and reproduce inside cells Cause: • Measles – can be fatal • HIV – can turn into AIDS • Tobacco mosaic virus (TMV) affects photosynthesis in plants

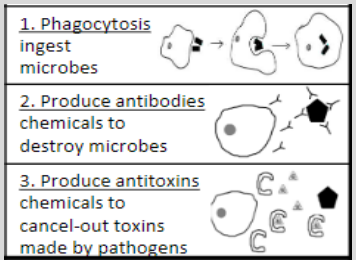
15 Fungal Disease

3. Fungi	The other type of microbe. Living Cause: • Rose black spot – affects photosynthesis in plants

16 Defences

1.Skinbarrier -covers your body
2.Nose -hair and mucus act as trap
3.Trachea and bronchi –covered in cilia and mucus
4.Stomach -makes acid to destroy
5.Immune system –white blood cells defend us in three ways

White Blood Cells



Year 10 Science – Health and Disease 1

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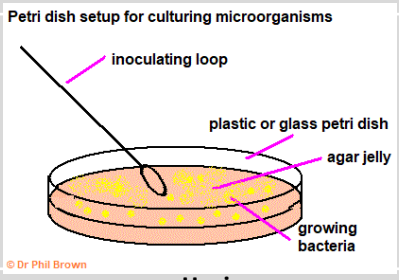

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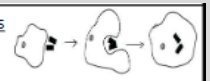
White Blood Cells

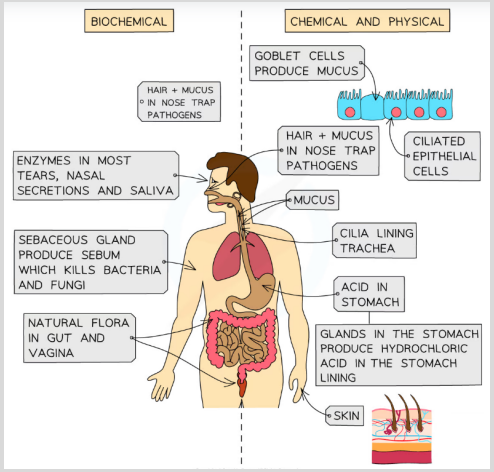
1. Phagocytosis ingest microbes 
2. Produce antibodies chemicals to destroy microbes 
3. Produce antitoxins chemicals to cancel-out toxins made by pathogens 

Year 10 Science – Health and Disease 2

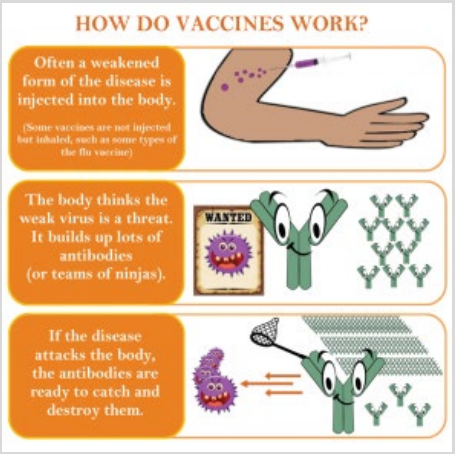
Key Vocabulary:

1	**Vaccine**	Dead or inactive pathogenic material used in vaccination to develop immunity to a disease in a healthy person.
2	**Antibiotics**	Antibiotics, such as penicillin, are medicines that help to cure bacterial disease by killing infective bacteria inside the body.
3	**Painkiller**	When you take a pain reliever like ibuprofen, it keeps injured or damaged cells from making and releasing prostaglandin. When the cells don't release this chemical, it means that the brain won't get the pain message as quickly or clearly.
4	**Double Blind Trial**	In blind trials only, the doctor knows which patients have been given the drug and which have been given the placebo. in double blind trials , neither the doctor nor the patient knows who has been given the drug or placebo.
5	**Monoclonal Antibody (HT)**	Monoclonal antibodies can be used to detect particular antigens in patient samples of blood or tissue.
6	**Toxicity**	Toxicity is a measurement of the dosage needed of a particular substance to damage a living organism.
7	**Antibody**	An antibody is a protein produced by your immune system to attack and fight off these antigens.
8	**Antigen**	An antigen is a foreign substance that enters your body. This can include bacteria, viruses, fungi, allergens, venom and other various toxins.

9 Defence Systems



10 Vaccines



11 Drugs

•**Painkillers are used to relieve symptoms.** They do not get rid of infection. Examples include ibuprofen and paracetamol.

•**Antibiotics reduce bacterial growth and can stop its spread.** Therefore they actually reduce the number of pathogens a treat the underlying problem, rather than just treating the sympto like painkillers.

Discovery of Drugs

12 Examples of Plant Drug Discoveries

•**Digitalis** – digitalis is extracted from foxglove plant leaves. It contains digoxin, which is used to stimulate heart muscle and increase heart rate.

•**Aspirin** – aspirin is another example of a plant based drug which originates from Willow. Willow was used since Ancient Greece, in order to help with aches and pains. Scientists then discovered that salicylic acid was present in willow.

This **salicylic acid** is the main ingredient in aspirin. It was then extracted and used to create aspirin. **Aspirin** is taken in the form of a tablet, and is used to reduce pain and inflammation.

13 Example of Microorganism Drug Discovery

•**Penicillin** – penicillin was actually discovered by accident by Alexander Fleming. A mould grew in his lab due to poor hygiene, but Fleming found that the penicillin could be used to make an amazing antibiotic.

14 Development of Drugs

1.Dosage – it is important to work out the **optimum dosage** for a drug. Too low a dose will mean that the drug is ineffective, but too high a dose can lead to dangerous side effects and toxicity.

2.Toxicity – it is important to check for toxic **side effects** of the drug. For example, some drugs might lead to mutations and increase risk of cancer, whilst other drugs have unpleasant side effects such as stomach aches. We need to check for both short and long term side effects.

3.Efficacy – it is important to actually test how **effective** the drug is against the disease. Launching a drug is an expensive process, so it needs to have a significant benefit in treating patients before it can be approved.

15 Clinical Trials

Clinical trials are research studies which are used to investigate scientific theories. Many drugs enter clinical trials to test for safety and efficacy, and only a small proportion actually get approved for national use.

Some trials are **double blind**. In double-blind trials, some of the patients are given a **placebo**, a sugar pill, so they do not know that they are not getting the medication, in order to compare against those who are getting the medication. In these trials, the scientists do not know either who is getting what treatment as the groups are randomised

Year 10 Science Knowledge Organiser-Quantitative Chemistry Combined Only

Key Vocabulary:

1	**Atom**	The smallest part of an element that can exist independently.
2	**Atomic Number**	The number of protons in an atom of an element. This is he smallest number of the two numbers provided for each element on the periodic table.
3	**Chemical Formula**	A series of chemical symbols showing the number of atoms of each element in a compound.
4	**Compound**	A substance made up of two or more different elements chemically bonded together.
5	**Concentration**	The mass of solute dissolved in a given volume of solvent.
6	**Conservation of Mass**	The law of conservation of mass states that the total mass of reactants in any chemical reaction equals the total mass of product.
7	**Element**	A substance made of only one type of atom.
8	**Mass Number**	The total number of protons and neutrons in the nucleus of an atom. It is the larger of the two numbers beside each element in the periodic table.
9	**Balanced equation**	When the sum of the Mr on the left equals the sum of the Mr on the right
10	**Molecule**	A small group of non-metal atoms chemically bonded together.
11	**Relative Atomic Mass**	The relative atomic mass of an element is the relative mass of its atoms compared to the mass of a carbon-12 atom. The relative atomic masses for each element are given in the Periodic Table.
12	**Relative Formula Mass (Mr)**	The relative formula mass of a substance is the sum of the relative atomic masses of its atoms, in the numbers shown in it's chemical formula.

13 Chemical Reactions

Chemical reactions always involve the formation of one or more new substances.

- Chemical reactions often involve a temperature change.
- Formulae are used to show the elements bonded together in a compound e.g. H_2O contains 2 hydrogen atoms and one oxygen atom.
- Compounds can only be separated into their elements by a chemical reaction e.g. $2H_2O \rightarrow 2H_2 + O_2$
- In chemical equations the three states of matter are shown as: solid = (s); liquid = (l) and gas = (g) aqueous solutions are shown as (aq)
    - e.g. $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$
- An aqueous solution is a substance dissolved in water.

14 Relative Formula Mass

- The relative atomic mass (A_r) is the average mass of the atoms of an element compared to the mass of carbon-12.
- The relative formula mass (Mr) of s substance is the sum of the A_r of all the atoms in the formula.
- e.g. What is the M_r of water (H_2O)?
    - (A_r H = 1.0; O = 16.0)
- There are 2 x H and 1 x O in the formula
    - (2 x 1.0) + (1 x 16.0) = 18.0
- A_r and M_r have no units as they are relative masses.
- In a balanced chemical equation:
- sum M_r reactants = sum M_r products
    - e.g. $2H_2O_2 \rightarrow 2H_2O + O_2$
- Mr reactants = 2 x 34 = 68
- Mr products = (2 x 18) + 32 = 68
- The percentage mass of an element in a compound can be calculated using the relative atomic mass and the relative formula mass.

15 Conservation of Mass & Balancing Equations

- No atoms are lost or made during a chemical reaction.
- mass of products = mass of reactants
- Chemical reactions can be represented by symbol equations which are balanced.
- This means the number of atoms of each element is balanced e.g. $2Mg + O_2 \rightarrow 2MgO$
- there are 2 magnesium atoms on each side of the equation.
- During the reaction hydrogen gas is produced. If the gas is free to leave the reaction container then the measured mass will decrease.
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16 Uncertainty

- Scientific uncertainty means there is a range of possible values within which the true value of a measurement lies.
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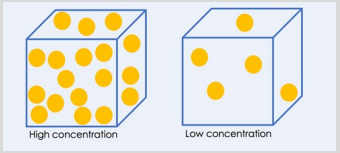
17 Concentration

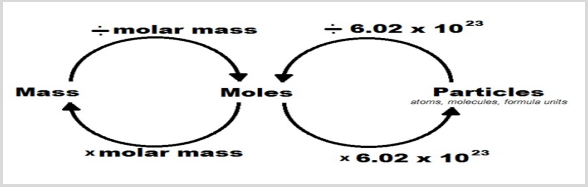
- Many chemical reactions take place in solutions.



- The more concentrated a solution the more particles it contains in a given volume.
- The concentration of a solution can be measured in mass per given volume of solution e.g. grams per dm^3 (g/dm^3).
    - mass of solute = concentration
    - volume of solution
- Volumes need to be in dm^3
- 1 dm^3 = 1000 cm^3

18 Moles HT ONLY

- Mole- The number of particles needed to make the mass equal the atomic mass
- Avogadro Constant-6.022x1023 particles in 1 mole



$$C = \frac{m}{V}$$

C	Concentration	g/dm^3
m	mole	
V	volume	dm^3 (litres)

Year 10 Science Knowledge Organiser - Quantitative Chemistry

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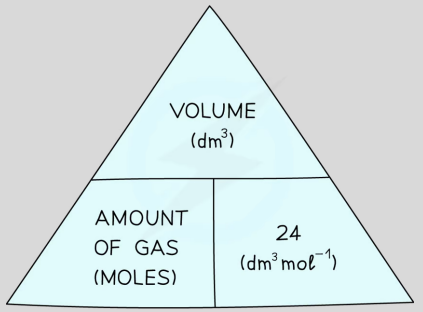
19 Actual and Theoretical Yield

- The actual yield is the recorded amount of product obtained
- The theoretical yield is the amount of product that would be obtained under perfect practical and chemical conditions
- The percentage yield compares the actual yield to the theoretical yield

$$percentage\ yield = \frac{actual\ yield}{theoretical\ yield} \times 100$$

20 Calculating Gas Volumes



Year 10 Science Knowledge Organiser – Chemical Changes

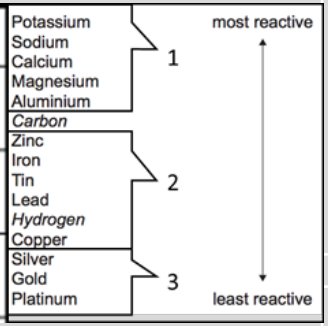
Key Vocabulary:

1	**Metal oxide**	A compound formed when a metal ionically bonds to oxygen
2	**Reactivity series**	The order of elements in terms of their reactivity
3	**Displacement Reaction**	A reaction in which a more reactive element takes the place of a less reactive element in one of its compounds or in solution.
4	**Acid**	A substance that releases H^+ ions and has a pH below 7
5	**Base**	A substance that neutralises an Acid and has a pH above 7
6	**Alkali**	A type of soluble base. A metal hydroxide. Releases OH^- ions
7	**Neutralisation**	When an acid reacts with a base to produce a salt and water
8	**Carbonates**	Ionic compounds containing Carbon and oxygen
9	**Salt**	Ionic compound formed when acid and base react
10	**Soluble**	A substance that dissolves
11	**Insoluble**	A substance that does not dissolve
12	**Indicator**	A substance that changes colour when pH changes
13	**Metal Ore**	A rock that contains enough of a metal or metal compound which is worth extracting the metal.

Chemical Changes

14 The Reactivity Series

	Category	Extracted by
1	Highly reactive metals	Electrolysis
2	Base metals	Smelting: heating with carbon
3	Native metals	Found as nuggets of pure metal



Metal + water → metal hydroxide

You can place metals in order of reactivity by looking at their reactions with water.

Most metals do not react vigorously with water.

Metal + acid → metal salt + hydrogen

You can place the metals that do not react with water in dilute acid to order their reactivity.

Acid used	Second part of salt's name
Hydrochloric acid	chloride
Sulfuric acid	sulfate
Nitric acid	nitrate

Metal Carbonate + Acid → Salt + water + carbon dioxide

Metal + oxygen → metal oxide

When a metal reacts with oxygen, we can say it has been oxidised as it has had oxygen added to it.

When the metal oxide has the oxygen removed, we can say it has undergone reduction.

15 Displacement Reactions

In a displacement reaction, a more reactive metal will displace a less reactive metal from an aqueous solution of one of its salts.

For example

Magnesium + copper sulfate → magnesium sulfate + copper

In this case, magnesium is more reactive than copper. Therefore the copper ions will be displaced from solution to form copper metal and the magnesium metal forms aqueous magnesium ions and dissolves into solution.

Chemical Changes

16 Oxidation and Reduction Half Equations (HIGHER ONLY)

Oxidation is the loss of electrons and Reduction is the gain of electrons (OILRIG).

Ionic Equation: (SO4 2- spectator ions)

Mg (s) + Cu 2+ (aq) → Cu (s) + Mg 2+ (aq)

Oxidation Half Equation:

Mg (s) → Mg 2+ (aq) + 2e-

Reduction Half Equation:

Cu 2+ (aq) + 2e- → Cu (s)

17 Extracting Metals

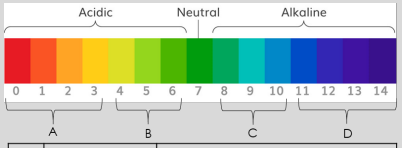
Extracting metal processes can produce large amounts of waste and may have major impacts on the environment.

Whether it is worth extracting a particular metal depends on:

- How easy it is to extract the metal from its ore
- How much metal the ore contains
- Changing demand for the metal

Metals can be extracted from compounds using displacement reactions.

18 Neutralisation and the pH Scale



	Name	Level of ionisation in water
A	Strong acid	Fully
B	Weak acid	Partially
C	Weak base	Partially
D	Strong base	Fully

Equation for all neutralisations is

H+ (aq) + OH- (aq) → H_2O (l)

19 Strong and Weak Acids (HIGHER ONLY)

In aqueous solutions, hydrochloric acid ionises completely to hydrogen ions and chloride ions.

HCl (aq) → H^+ (aq) + Cl^- (aq)

Acids that ionise completely in aqueous solutions are known as strong acids.

When ethanoic acid dissolves in water, it does not ionise completely and some of the ethanoic acid molecules remain as molecules in the solution.

$CH_3COOH(aq) \rightleftharpoons CH_3COO^-(aq) + H^+(aq)$

Acids that do not ionise completely in aqueous solutions are known as weak acids.

Year Science Term Knowledge Organiser. Forces in motion. Combined Science.

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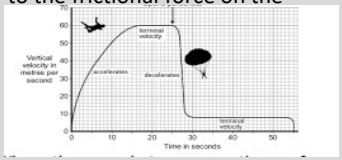
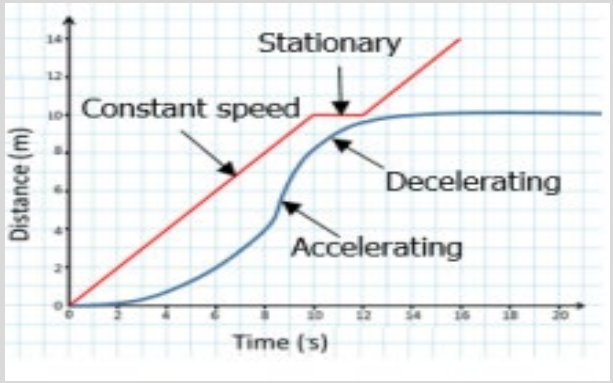
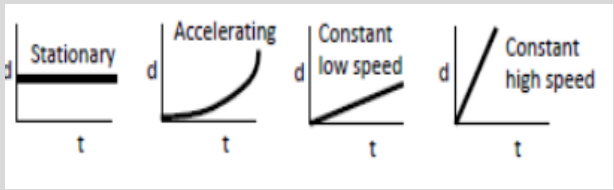


11 Speed, distance, time.

Distance is how far an object moves. It does not include an associated direction, so distance is a **scalar** quantity.
Speed is the **rate of change** of distance - it is the distance travelled per unit time. Like distance, speed does not have an associated direction, so it is a scalar quantity.
Calculations involving speed, distance and time
The distance travelled by an object moving at constant speed can be calculated using the equation:
distance travelled = speed × time
This is when:
distance travelled (*s*) is measured in metres (m)
speed (*v*) is measured in metres per second (m/s)
time (*t*) is measured in seconds (s)

The movement of objects can be described using motion graphs and numerical values. These are both used to help in the design of faster and more efficient vehicles.



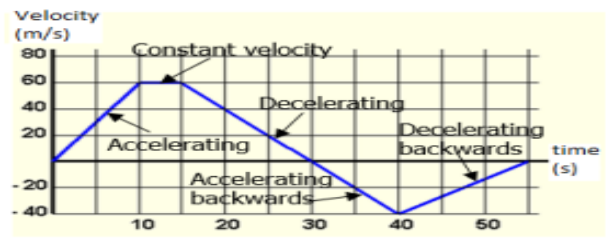


12 Stopping distance

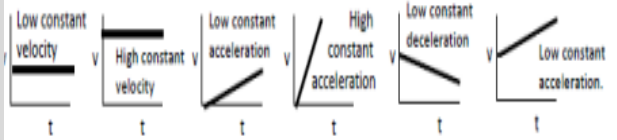
The sum of the thinking distance and braking distance.

13 Velocity- time graph

If an object moves along a straight line, its motion can be represented by a velocity-time graph. The gradient of the line is equal to the **acceleration** of the object

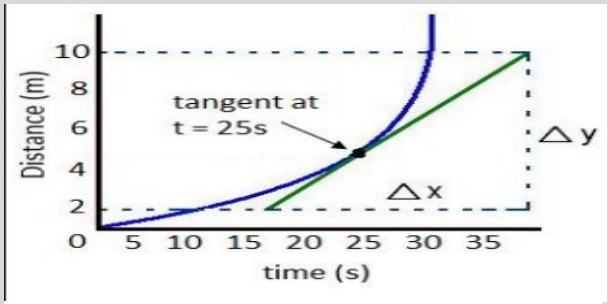


Velocity-time graph



14 Calculating the gradient

The distance-time graph for an object moving at changing speed is a curve. To find the speed at a particular instant in time, draw a tangent to the line at that instant and determine the gradient of the tangent.



Calculating the gradient:

$$\text{slope} = \frac{\Delta y}{\Delta x}$$

or

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

Year Science Term Knowledge Organiser. Forces in motion. Triple Science (Part 1.)

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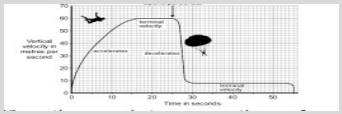

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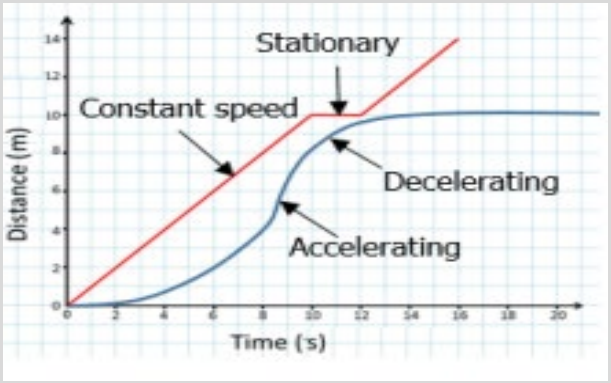

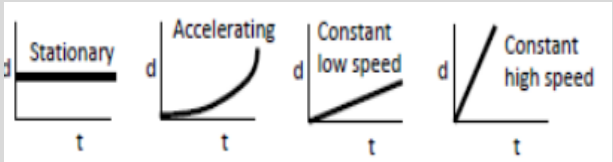

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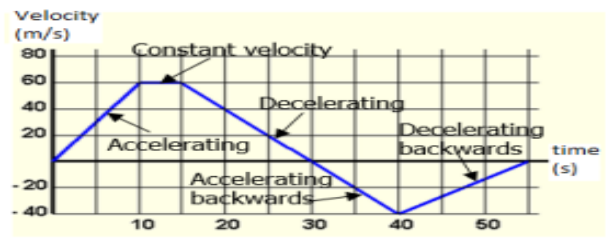

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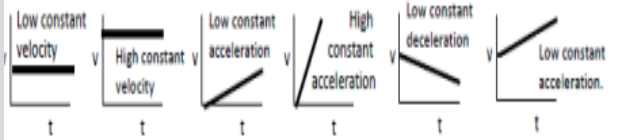

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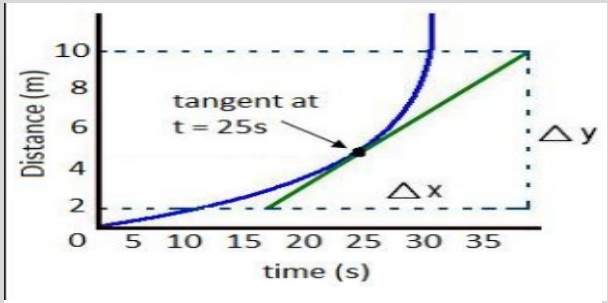

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Year Science Knowledge Organiser . Forces and motion Triple(part 2)

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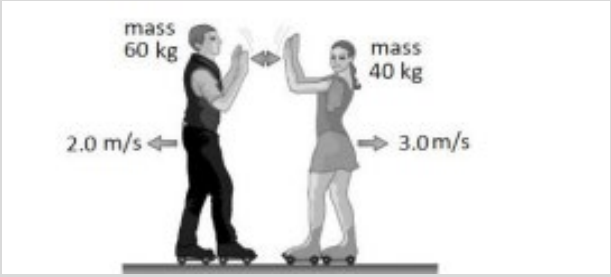
11 Using conservation of momentum

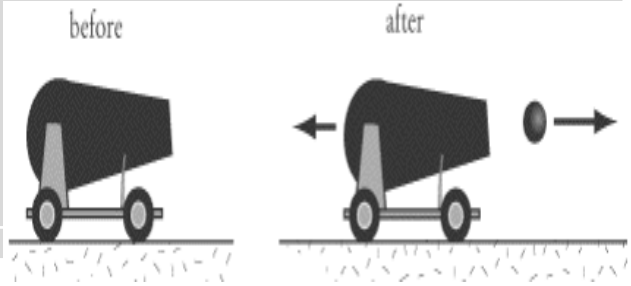
When two objects push each other apart, they move with different speeds if they have unequal masses and with equal and opposite momentum, so their total momentum is zero. This means that the momentum lost by one of the objects will be gained by the other object. Hence whenever two objects collide or interact, momentum is conserved.
Momentum = mass x velocity p = m x v

Two roller skaters, a girl and a boy stand facing each other on flat level ground. When one of the roller skaters pushes the other one away, they move away in opposite directions at different velocities because they have different masses



Momentum of boy = 60 x 2 = 120 Kg m/s Momentum of girl = -40 x 3 = -120 Kg m/s Total momentum = 120 – 120 = 0 Kg m/s
The minus sign tells you that the momentum of the girl is in the opposite direction to the momentum of the boy.

Explosions
Total momentum after an explosion is the same as before the explosion. The total momentum after the explosion is zero.
Momentum before = Momentum after



12 Impact forces

When two vehicles collide, the force of the impact depends on the mass, change of velocity and length of the impact time.
- They exert equal and opposite forces on each other
- Their total momentum is unchanged.

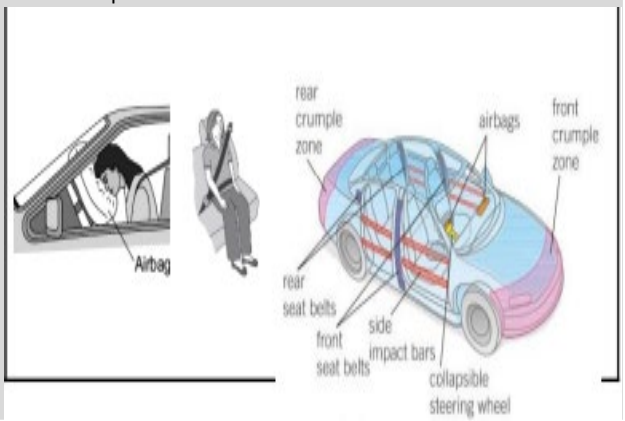
Longer the impact time, the more the impact force is reduced.

$$\text{Impact force} = \frac{\text{change in momentum}}{\text{time taken}} \qquad F = \frac{m\Delta v}{\Delta t}$$

Force	F	Newtons, N
$m\Delta v$	Change in momentum	Kg m/s
Δt	Time taken	s

13 Car safety

When you are driving in a car or riding a bike you want to feel safe if you crash. Different safety features have been designed to increase the impact time and hence decrease the rate of change in momentum
Reduce impact forces by increasing impact time.
Seat belts & air bags
Spread force across chest and increase impact time. Hence reduces impact force on head.



Year 10 Art and Design Spring Term Knowledge Organiser

Key Vocabulary:

1	**The Formal Elements of Art**	The formal elements of art are used to make a piece of artwork. The art elements are line, tone, texture, shape, pattern and colour. They are often used together, and how they are organised in a piece of art determines what the finished piece will look like.
2	**A01**	Development of ideas and understanding of different artists. This could include artist research, and analysis work, moodboards, reproductions of artists' work or use of these ideas in their own work.
3	**A02**	Refinement of skills and experimentation using materials and media. This could include drawing, painting, mixed media work, 3D work, edited photography and combination of materials together.
4	**A03**	Recording of skills using drawing, photography and annotation. This could include observational drawings, realistic photography and mind maps.
5	**A04**	Present a personal or final response/s. This is usually a final piece. This could include a final piece or concluded pieces of work in their preparatory work. The work must link to artists researched or on a chosen starting point.
6	**Artist Research**	Showing your understanding of an artist/s work or style and how they have influenced you.
7	**Critical Understanding**	Ability to analyse others artwork. Engaging with ideas, images and identifying how values and meanings are conveyed.
8	**Annotation**	Writing notes and descriptions besides work in order to understand what has been created, why and how work has progressed.
9	**Artist Response**	Showing your understanding of an artists work or style and how they have influenced you.
10	**scale**	The scale of something is its size. To scale something is to enlarge it. To scale down is to do a smaller version or reduction.
11	**balance**	If a picture or piece of art work has balance then each part of it works well together in a whole piece.
12	**composition**	The arrangement of elements in a piece of art.
13	**media**	Different materials.
14	**contrast**	Created by using opposites near or beside one another, such as a light object next to a dark object or a rough texture next to a smooth texture.
15	**perspective**	Creates the feeling of depth using lines that make your image appear to be three dimensional. The closer the image is, the more detailed it will appear, and the larger it will be.
16	**reflect**	Looking back at your work and deciding how you could improve something.

Year 10 BTEC Tech Award Child Development: Component 1 – Children's Growth and Development
A – Understand the principles of growth and development

Key Vocabulary:

1	Growth	Changes to physical size, the skeleton, muscles and the brain, children's height, weight and head circumference.
2	Ultrasound Scan	A high frequency sound wave that creates an image on a screen of inside the body.
3	Gestation	The period of time during which the baby develops in the womb.
4	Caesarean Section	Birth through an incision made in the abdomen.
5	Neglect	The failure to care for a child properly
6	Development	The gaining of skills and knowledge over time.
7	Milestone	A stage or event in a process.
8	Average	A number showing the typical value in a set of data, in particular the mode, median or most commonly the mean.
9	Mean	An average worked out by adding all the numbers up and dividing by the number of numbers.
10	Babbling	The stream of sounds babies make before they can say actual words.

A1
Understand how and why growth is measured

11 **How growth is measured and recorded:**
- Personal Child Health Record (PCHR) 'Red Book' tracks progress/records immunisations
- Centile charts track height and weight
- Parents'/carers' own records
- Two-year-old health check
- National Child Measurement Programme (NCMP) for 4–5-year-old children.

Roles and responsibilities of health professionals involved in measuring and monitoring:
- Health professionals – midwives, health visitors, General Practitioner (GP)
- Social care – social workers, family support workers
- Early years educators – childminder, nursery manager, key person
- Parents/carers.

A2
The Principles of Development

12 Skills and knowledge gained over time

Can happen at different rates for different children

Milestones – Developmental norms -These are often separated into stages according to the age at which they are most likely to happen.

A3
Development across ages of birth to 18 months

13 **Physical development** – gross motor skills: large movement of limbs; fine motor skills: movement of fingers, developing hand-eye coordination.
Cognitive and intellectual development – thinking and learning development of information processing, memory, problem-solving skills.
Communication and language development – speaking, listening and understanding, for example, speech sounds and language, listening and attention, social skills.
Social development – development of secure, positive relationships with others. For example, 3 months – responds with pleasure to loving attention, enjoys being held.
Emotional development – developing trust, independence and emotional resilience. For example, caregivers by crying, turning their head, smiling and giggling as their needs are met, babies develop a bond of trust with their carer.

A4
Development across ages of 18 months to three years

14 **Physical development** – locomotion and hand-eye coordination, for example, 18 months – walks steadily and stops safely, climbs stairs with hand held, can ride a balance bike and sit-and-ride toys.
Cognitive and intellectual development – thinking and learning, for example, 2 years – recognises pictures in a book, enjoys simple make-believe play.
Communication and language development – speaking, listening and Understanding, for example, says words, gestures, understands more, repeats what adults say.
Social development – development of secure, positive relationships with others, for example, 2 years, 6 months – eats with a spoon, plays with other children, not sharing toys.
Emotional development – developing trust, independence and emotional resilience, for example, 18 months – mood swings from dependence to independence, beginning to show empathy.

A5
Development across ages of three to five years

15 **Physical development** – developing locomotion and balance, for example, 3 years – walks on tip-toe, balances on one foot, rides a tricycle using pedals, throws, catches a ball with arms stretched out and kicks a large ball with control, holds a pencil between thumb and two fingers, cuts paper with scissors.
Communication and language development – speaking, listening and Understanding, for example, 4 years - counts up to 10, repeats songs and nursery rhymes, some simple problem solving with toys and games.
Communication and language development – speaking, listening and Understanding, for example, 5 years – fluent speech, grammatically correct, can understand a wider range of vocabulary, can understand complex instructions.
Social development – development of positive relationships with others outside the family, for example, 3 years - plays with other children, beginning to take turns and share toys.
Emotional development – developing trust, independence and emotional resilience, for example, 5 years – close friendships, learns to cope with emotions and bounce back when Disappointed, understands social rules but may need an adult to sort out conflicts.

Year 10 BTEC Tech Award Child Development: Component 1 – Children's Growth and Development

B – Understand how factors impact on children's overall development

Key Vocabulary:

1	Foetus	Means offspring and is what a human baby in the womb is called after 8 weeks.
2	Congenital	A condition that a child is born with.
3	Chronic	Long lasting (used about a health condition)
4	Stable	Secure, even and well balanced.
5	Prescription Drugs	Medication that is prescribed for a person by a medical professional.
6	Illegal Drugs	Drugs that are not prescribed and have no benefit for health.
7	Regress	Return to an earlier state or stage of development.
8	Rivalry	Competitiveness over the same objective or over someone's attention.
9	Food Bank	A charity that provides food for free to people in need.
10	General Anaesthetic	A state of being unconscious controlled by a medical professional.

B1 Physical Factors

11

- Factors in pregnancy affecting child – prenatal and maternal nutrition/exercise, effects of parental smoking, drug or alcohol use, premature/low birth weight.
- Disabilities/additional needs – hearing impairment, visual impairment, cerebral palsy, Down's syndrome.
- Health status – chronic illness (asthma, eczema), repeated short-term illness (colds, ear infections, vomiting and diarrhoea), obesity.
- Benefits of healthy balanced diet, effects of nutritional deficiencies (vitamins, minerals), effects of unhealthy diet.
- Amount of exercise.



B2 Environmental Factors

12

- Housing – positive aspects of housing (warm, dry, own space); experiencing housing needs (damp housing, overcrowding), temporary accommodation, access to garden, space to play.
- Home environment – stable support from parents, contact with extended family, living with parental conflict, parents' mental or physical health, effects of drugs, alcohol or smoking.


B3 Social Factors

13

- Effects of discrimination (disability, race, home situation).
- Effects of relationships with primary carers (parents/carers, early years practitioners), quality of warmth, affection and attention received.
- Effects of siblings – new baby, number of siblings, no siblings, step-siblings.
- Effects of relationships with extended family and friends – grandparents, step-relatives, aunts and uncles, close friends.

B4 Financial Factors

14

- Low income – poverty, unemployed families, more contact with parents, food banks, free school meals, funding for childcare (vouchers).
- High income – parental pressure of work, less contact with parents, extra resources and toys, extra opportunities, experience of travel.
- Access to services – health services (dentist, health visitor), early years education (preschool, nursery) and experiences (parent and baby singing groups, sports clubs, parent and tots groups).



Year 10 GCSE Computer Science Spring Term Knowledge Organiser Algorithms

Key Vocabulary:

1	Algorithm	A sequence of ordered instructions that are followed step-by-step to solve a problem. This does not need to be on a computer.
2	Decomposition	Breaking down a complex problem into smaller more manageable problems that are easier to solve.
3	Abstraction	The removal of unnecessary detail from a problem leaving us with only the relevant parts of a problem thereby making it easier to solve.
4	Algorithm Efficiency	More than one algorithm can be used to solve the same problem. Normally we use the algorithm that solves the problem in the quickest time with the fewest operations or makes use of the least amount of memory.
5	Trace Tables	Dry run testing is carried out using trace tables. The purpose of the trace tables is for the programmer to track the value of the variables and outputs at each step of the program and to track how they change throughout the running of the program.
6	Flowcharts	Algorithms represented by a diagram that shows the breakdown of a task or system into all the necessary steps.
7	Pseudocode	A text-based way of setting out an algorithm

Searching Algorithms

8 What are they?

Searching algorithms are used to search for a specific piece of information within a group of data items (called a data set)
There are two search algorithms: Linear Search algorithm and Binary Search algorithm

9 Linear Search Algorithms:

Linear search algorithms search for an item within a data set by starting with the first item in the set and comparing it to the search criteria. If no match is found, then the next one is compared. If no match is found or the end of the set is reached.

10 Advantages and disadvantages:

Advantages:
- Simple to code
- Data set does not need to be in any type of order
- Works well with small and medium data sets
- It doe not break if new items are inserted in to the data set

Disadvantages:
- Can be slow to process large data sets
- If the item being search is last in the data set the search has to run through the entire list to find it.

11 Binary Search Algorithms:

Binary searches work by splitting a list in two and working out which half of the list the search target might be in. Then splitting that section in half again and continuing to do so until the search target is found.
To run a binary search, the values in the list have to be **ordered**. Either alphabetically, numerically, etc. Binary searches do not work on unordered or randomised list

12 Advantages and disadvantages:

Advantages:
- Very good for searching large amounts of data

Disadvantages:
- The data being searched has to be ordered in some way.
- More complicated to code.
- If it is a constantly updated list of data, the list will need o be re-ordered every time which may slow down the process.

Sorting Algorithms

13 What are they?

Sorting algorithms are used to sort data into some kind of logical order eg text data may be sorted alphabetically.
There are two sorting algorithms: Bubble Sort algorithm and Merge Sort algorithm

14 Bubble Sort Algorithms:

A bubble sort is a very simple algorithm used to sort a list of data into ascending or descending order.
The algorithm works its way through the list, making comparisons between a pair of adjacent items. Any items found to be in the wrong order are then exchanged. It keeps doing this over and over until all items in the list are eventually sorted into the correct order.

15 Advantages and disadvantages:

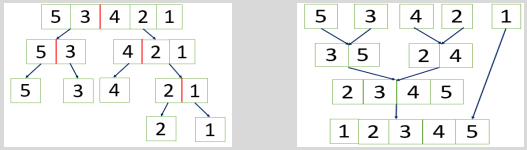
Advantages:
- Simple to code
- Simple to understand
- Not much extra memory is required to run the algorithm

Disadvantages:
- One of the slowest ways to sort a list of data.

16 Merge Sort Algorithms:

The merge sort was developed to handle the sorting of large lists. It does this by breaking them down into multiple smaller lists, quickly sorting them, and then merging them back together into one larger list.
Merge sort is an example of a 'divide-and-conquer' algorithm because it splits down a larger problem into a number of smaller ones which are then solved.

Step 1: Divide **Step 2: Combine**



17 Advantages and disadvantages:

Advantages:
- It is fast at sorting large amounts of data

Disadvantages:
- More complicated to code
- Uses more memory when running the algorithm

Year 10 GCSE Computer Science Spring Term Knowledge Organiser Computer Networks

Key Vocabulary:

1	Computer Network	Two or more devices connected together in order to share information and resources.
2	Topology	The layout of a computer network.
3	Network protocol	A set of rules for how devices communicate and how data is communicated across a network.
4	Authentication	A process for checking the identity of the user.
5	Encryption	Coding data so that it can only be decoded with the correct key.
6	Firewall	Software or hardware that examines all data entering or leaving a network and blocks any unwanted data.
7	MAC address	A unique identifier assigned to a device that cannot be changed.
8	MAC address filtering	A way of keeping networks secure by blocking devices from accessing the network unless their unique identification (MAC address) is known and trusted.
9	Malware	Malicious software, designed to cause damage or illegal access to a computer system.

Computer Networks

10 Advantages and Disadvantages:

Advantages of computer networks:
- Sharing files is easier
- Hardware can be shared eg printers
- Software can be installed or updated on all computers at once

Disadvantages of computer networks:
- Can be expensive to set up and manage
- Can be vulnerable to hacking and malware
- If the network crashes it can be disruptive for people trying to use the network

Computer Networks continued…

11 Types of Computer Networks:

- **Personal Area Network (PAN)** – Connects devices over a very short range. Only Bluetooth needs to be considered.
- **Local Area Network (LAN)** – Covers a small geographical area located on a single site. Often owned and controlled/managed by a single person/organization. Often find LANS in businesses, schools and universities.
- **Wide Area Network (WAN**) – Connect LANs that are in different geographical locations. Often under collective or distributed ownership. The internet is the biggest WAN.

12 Wired and Wireless Networks:

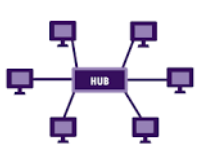
Networks can be wired or wireless. Wired networks can use different types of cable such as fibre and copper.

Advantages of Wireless Networks:
- Convenient due to automatic connection and ability to move around
- Cheaper and better for the environment
- Easy to add more users

Disadvantages of Wireless Network:
- Less secure
- There is a limit on how far a wireless network can reach
- Generally have lower bandwidth and are less reliable

13 Common LAN Topologies:

Star Topology:
All the devices are connected to a central switch or server that controls the network. An advantage is that if a device fails or a cable is disconnected the rest of the network is unaffected. A disadvantage is if there is a problem with the switch or server the whole network is affected.



Bus Topology:
Uses a single "backbone" cable, called a bus, to connect all the devices. An advantage is that it is relatively cheap to set up. A disadvantage is that it is unsuitable for larger networks as adding more devices can slow the network down.

Computer Networks continued…

14 Common Network Protocols/4 Layer TCP/IP model

Network protocols are divided into layers. A layer is a group of protocols which have a similar function. Each layer is self contained and the protocols in each layer do their job without needing to know what is happening in the other layer. The four layers of the TCP/IP model are shown below:

Layer 4 – Application Layer – Provides networking services to applications – eg turning data into websites;
- HTTP (Hyper Text Transfer Protocol
- HTTPS (HTTP Secure)
- FTP (File Transfer Protocol)
- Email protocols: IMAP (Internet Message Access Protocol) and SMTP – (Simple Message Transfer Protocol)

Layer 3 – Transport Layer – Sets up the communication between the two devices, splitting data into packets and checking packets are correctly sent and delivered;
- TCP (Transmission Control Protocol
- UDP (User Datagram Protocol)

Layer 2 – Internet Layer – Adding IP addresses to data packets, directing them between devices and handling traffic. Used by routers;
- IP (Internet Protocol)

Layer 1 - Link Layer – Passing data over the physical network. Responsible for how data is sent as electronical signals over cables, wireless and other hardware and for interpreting signals using device drivers;
- WI-FI – A family of protocols, Wi-Fi is a trademark the generic term for wireless networks of this nature is WLAN (Wireless LAN)
- Ethernet – A family of related protocols, specifically for wired connections

15 Network Security

Organisations must keep their networks secure from hackers in order to protect sensitive information and comply with data protection laws. Methods to protect a network include;
- **Authentication** eg passwords, biometric measures (fingerprint, facial recognition), e-mail confirmation, CAPTCHA used to tell Humans and Computers apart
- **Encryption**
- **Firewall**
- **MAC address filtering**

Year 10 GCSE Computer Science Spring Term Knowledge Organiser Data Representation

Key Vocabulary:

1	Number base	A counting system.
2	Decimal	Number base also referred to as base 10 or Denary.
3	Binary	Number base also referred to as base 2. Computers use binary to represent all data and instructions.
4	Hexadecimal	Number base also referred to as base 16. Used regularly in programming.
5	bit	The fundamental unit of information. Either a 0 or a 1. b represents a bit.
6	Byte	A group of 8 bits. B represents byte.
7	Character set	A group of characters that a computer recognises from their binary representation.
8	pixel	Short for picture element. Small dots that make up a bitmap image.
9	Data compression	The process of making the size of a file smaller.

Units of Information

10 Units of data

Name	Size
Bit (b)	A single binary digit (1 or 0)
Nibble	4 bits
Byte (B)	8 bits
Kilobyte (Kb)	1000 bytes
Megabyte (MB)	1000 kilobytes
Gigabyte (GB)	1000 megabytes
Terabyte (TB)	1000 gigabytes

Character encoding

11 Character sets:

Different character sets can have different amounts of characters. The number of characters in a character set determines how many bits are needed for the character sets encoding.

7-bit ACSII: A character set used to represent characters in the English language. Each ASCII character is given a 7-bit binary code, this means it can represent a total of 128 different characters, including all the letters, numbers, symbols and commands.

Extended ASCII: A character set using 8-bit binary codes to represent 256 characters. The first 128 are the same as the 7-bit ASCII but with a 0 in front. The others are used for maths symbols and characters in other languages like French and German.

Unicode: A character set using 16 bits to cover every possible letter or symbol that might be written, it comes in several different forms. The first 128 are the same as the 7-bit ASCII. An advantage is it can represent all languages in the world. A disadvantage is that it take up more storage on the computer.

Representing images

12 Storing bitmap images:

A bitmap represents an image using pixels and colour depth. Pixels can impact the way images are displayed in terms of image size and colour depth:

Image size:

The size of a bitmap image is measured in pixels. It is calculate using the following method:

(width of image in pixels X height of image in pixels)

Image depth:

Colour depth is the number of bits used to represent each pixel.

File size:

The higher the numbers of pixels and higher colour depths can affect file sizes. File size is calculated using the following methods:

Size = (bits) = W X H X D

Size = (bytes) (W X H X D)/8

W = image width

H = image height

D = colour depth in bits

Representing sound

13 Storing Sound:

Sound is analogue and must be converted to a digital form for storage and processing in a computer.

Analogue signals are sampled to create a digital version of sound.

A **sample** is a measure of amplitude at a point in time.

The **sampling rate** is the number of samples taken in a second and is usually measured in hertz (1 hertz = 1 sample per second).

The **sample resolution** is the number of bits per sample.

File size:

Sound files sizes can be calculates based on the sampling rate and sample resolution:

File size (bits) = rate X res X secs

rate = sampling rate

res = sample resolution

secs = number of seconds

Data compression

14 Types and methods of compression

It is common for data to be compressed to reduce storage space, stream/download files quickly, allow webpages to load more quickly and send attachments via e-mail.

Types of compression:

Lossy – works by permanently removing data from the file this limits the number of bits the file needs so reduces its size.

Lossless – makes the file smaller temporarily removing data to store the file, then restores it to its original size when its opened.

Methods of compression:

Run Length Encoding (RLE) – a form of lossless compression. It looks for consecutive repeating data in a file, called a run. Instead of storing each piece of repeated data separately, it just stores the number of times it repeats, and one copy of the data.

Huffman Coding:

Each data value in a file often takes up the same amount of space, but this can be inefficient. Huffman coding gives each data value a unique binary code but the codes vary in length. It gives a shorter binary code to the data values that appear more frequently. Codes are represented in a diagram called a Huffman tree.

Year 10 DT Knowledge Organiser Theory - Spring Term

Key Vocabulary:

1	Energy Generation	The process of generating electric power from sources of primary energy. Electricity generated from fossil fuels, nuclear power plants, hydro power plants (excluding pumped storage), geothermal systems, solar panels, biofuels, wind, etc.
2	Energy Storage	The capture of energy produced at one time for use at a later time to reduce imbalances between energy demand and energy production.
3	Modern Materials	Material that has been engineered to have improved properties.
4	Smart Materials	Materials that sense and react to environmental conditions or stimuli by changing their characteristics and/or properties.
5	Mechanical Devices	A mechanical device has parts that move when it is working, often using power from an engine or from electricity.
6	Wood and Timber	Timber most commonly refers to the wood of trees that can or will be used for building material. Timber is classed as either softwood or hardwood, depending on the type of tree the timber comes from. Timber from hardwoods tends to be more dense than softwoods, though there are exceptions. Softwoods come from coniferous trees such as pine, fir, spruce and larch.

Key Concepts

7. **NEA practice project - Storage Tray**

A high street store has asked you to produce a wooden storage tray for their Home Department. It is your task to produce a prototype wooden storage tray that can be shown to the company and the board of directors.
The prototype should be fully functional, and be manufactured to the highest quality. You must make your storage tray unique, creative and apply a surface finish.

1. Task Analysis; Task analysis is one of the tools that you can use during the "define" stage of the Design Thinking process. The most frequent deliverable of a task analysis activity is a diagram explaining the steps that a user must take in order to complete a goal. This includes writing your own Design Brief and Product Specifications.
2. Design ideas for your product making sure you use your specification ACCESS FM to help you.

8. **CAD/CAM**

CAD (Computer Aided Design) is the use of a computer to help you visualise the product. CAD allows us to change the design quickly and allows the design to shared easily via email etc. Multiple people can be working on the same design and the same time making the process very efficient.
CAM (Computer Aided Manufacturing) It is important to remember that CAD can happen on its own because its just a design, but for CAM to occur, CAD must be involved. CAM is when machines (such as the laser cutter) produces the work that you have created using CAM. The process is to send your CAD design to the CAM machine, and with a few simple instructions the CAM machine will make the product or part.

9. **Evaluation**

The evaluation of your product often is left to the end, but you should evaluate your product at every stage in order to make alterations and corrections as you go.
It is useful to use a structure when evaluation such as a **SWOT analysis**. Using a SWOT analysis tool allows you to check all the main aspects of your product have been considered.
A good evaluation DOES NOT only focus on the good parts of your product, but makes honest judgements that all you to make improvements next time, or as you go.

Y10 SPRING Knowledge Organiser Enterprise R068 TASK 3 AND Task 4

1. What is a the Design Mix?
These design factors - function, cost and aesthetics - are mixed together in different ways in order to appeal to different target markets close target market

2. Economic Manufacture
How much is costs to make the product.

3. Aesthetics
What the product looks like

4. Function
What the product does

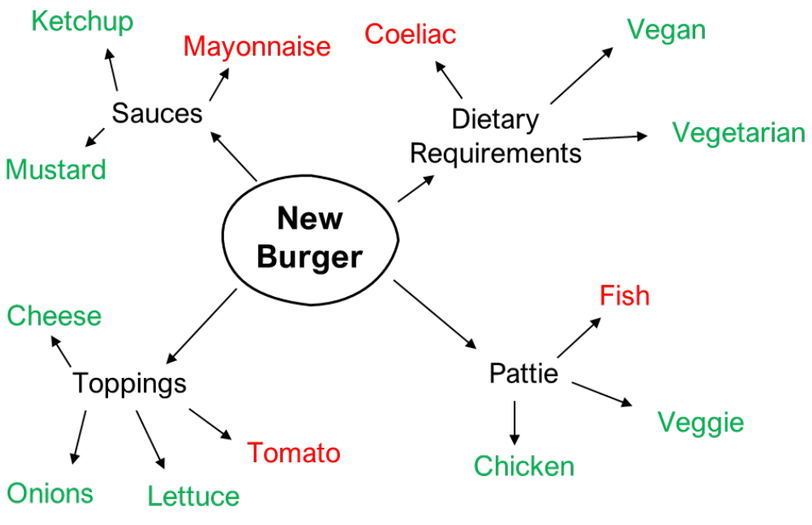
Business Scenario
Class Designs is a small business producing t-shirts. The business has been trading as a partnership for three years and is run by two partners. It produces and sells the t-shirts from a unit on a local business park. The business uses word-of-mouth and social media advertising to promote the t-shirts.

Class Designs is currently selling to customers in the local area only. The partners would like to increase brand awareness and sell the t-shirts nationwide. To grow the business a new website has been created that will accept online orders.

To help support the launch of the new website, Class Designs want to create a new range of t-shirt designs that they can sell on their new website. You have been asked to carry out market research to see what t-shirt designs customers would like. Using this information, they would like you to create a new t-shirt design.

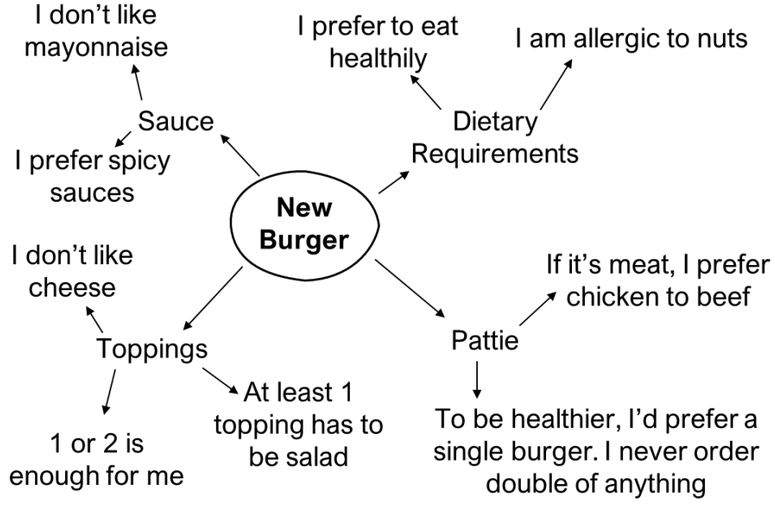
5. What are Creative Techniques?
Ways to plan and think to allow the design to generate different ideas.

6. Mind Map
Use their market research outcomes to show the most and least popular options.



7. Mood board
A collection of images, materials, pieces of text and colours. Linked to project a particular style or concept.

8. Brain shifter
The product developer has produced a mind map as if they were their customer profile.



Year 10 GCSE Geography Spring Term Knowledge Organiser Changing Economic World Part 2

Key Vocabulary:

1	Economic	This is progress in economic growth through levels of industrialisation and use of technology.
2	Social	This is an improvement in people's standard of living. For example, clean water and electricity.
3	Environmental	This involves advances in the management and protection of the environment.
4	Gross Domestic Product per capita	This is the total value of goods and services produced in a country per person, per year.
5	Infant mortality	The number of children who die before reaching 1 per 1000 babies born.
6	Human Development Index (HDI)	A number that uses life expectancy, education level and income per person.
7	LICs	Poorest countries in the world. GNI per capita is low and most citizens have a low standard of living.
8	NEEs	These countries are getting richer as their economy is progressing from the primary industry to the secondary industry. Greater exports leads to better wages.
9	HICs	These countries are wealthy with a high GNI per capita and standards of living. These countries can spend money on services.

Consequences, ways of reducing economic gap and case studies

10 Consequences of Uneven Development

Levels of development are different in different countries. This uneven development has consequences for countries, especially in wealth, health and migration.

- **Wealth**: People in more developed countries have higher incomes than less developed countries.
- **Health**: Better healthcare means that people in more developed countries live longer than those in less developed countries.
- **Migration**: If nearby countries have higher levels of development or are secure, people will move to seek better opportunities and standard of living.

11 Case Study: Economic Development in Nigeria

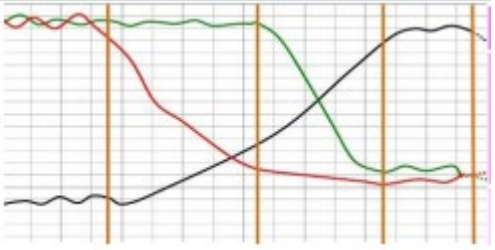
Location & Importance: Nigeria is a NEE in West Africa. Nigeria is just north of the Equator and experiences a range of environments. Nigeria is the most populous and economically powerful country in Africa. Economic growth has been base on oil exports.

12 Influences upon Nigeria's development

- **Political**: Suffered instability with a civil war between 1967-1970. From 1999, the country became stable with free and fair elections. Stability has encouraged global investment from China and USA.
- **Social**: Nigeria is a multi-cultural, multifaith society. Although mostly a strength, diversity has caused regional conflicts from groups such as the Boko Haram terrorists.
- **Cultural:** Nigeria's diversity has created rich and varied artistic culture. The country has a rich music, literacy and film industry (i.e. Nollywood). A successful national football side.
- **Industrial Structures**: Once mainly based on agriculture, 50% of its economy is now manufacturing and services. A thriving manufacturing industry is increasing foreign investment and employment opportunities
- **The role of TNCs**: TNCs such as Shell have played an important role in its economy. + Investment has increased employment and income. - Profits move to HICs. - Many oil spills have damaged fragile environments.
- **Changing Relationships**: Nigeria plays a leading role with the African Union and UN. Growing links with China with huge investment in infrastructure. Main import includes petrol from the EU, cars from Brazil and phones from China.
- **Environmental Impacts**: The 2008/09 oil spills devastated swamps and its ecosystems. Industry has caused toxic chemicals to be discharged in open sewers - risking human health. 80% of forest have been cut down. This also increases CO^2 emissions.
- **Aid & Debt relief**: + Receives $5billion per year in aid. + Aid groups (ActionAid) have improved health centres, provided anti-mosquito nets and helped to protect people against AIDS/HIV. - Some aid fails to reach the people who need it due to corruption
- **Effects of Economic Development**: Life expectancy has increased from 46 to 53 years. 64% have access to safe water. Typical schooling years has increased from 7 to 9.

The Demographic Transition Model

13 Reducing the Global Development Gap



The demographic transition model (DTM) shows population change over time. It studies how birth rate and death rate affect the total population of a country

STAGE 1 High DR High BR Steady e.g. Tribes

STAGE 2 BR Low Declining DR Very High e.g. Kenya

STAGE 3 Rapidly falling DR Low BR High e.g. India

STAGE 4 Low DR Low BR Zero e.g. UK

STAGE 5 Slowly Falling DR Low BR Negative e.g. Japan

14 Economic change in the UK

The UK has one of the largest economies in the world. The UK has huge political, economic and cultural influences. The UK is highly regarded for its fairness and tolerance. The UK has global transport links i.e. Heathrow and the Eurostar.

- **Causes of Economic Change**: De-industrialisation and the decline of the UK's industrial base. Globalisation has meant many industries have moved overseas, where labour costs are lower. Government investing in supporting vital businesses
- **Towards Post-Industrial**: The quaternary industry has increased, whilst secondary has decreased. Numbers in primary and tertiary industry has stayed the steady. Big increase in professional and technical jobs.
- Development of Science Parks
- North-South Divide
- Improvements to transport

Year 10 GCSE Geography Spring Term Knowledge Organiser Changing Economic World

Key Vocabulary:

1	Economic	This is progress in economic growth through levels of industrialisation and use of technology.
2	Social	This is an improvement in people's standard of living. For example, clean water and electricity.
3	Environmental	This involves advances in the management and protection of the environment.
4	Gross Domestic Product per capita	This is the total value of goods and services produced in a country per person, per year.
5	Infant mortality	The number of children who die before reaching 1 per 1000 babies born.
6	Human Development Index (HDI)	A number that uses life expectancy, education level and income per person.
7	LICs	Poorest countries in the world. GNI per capita is low and most citizens have a low standard of living.
8	NEEs	These countries are getting richer as their economy is progressing from the primary industry to the secondary industry. Greater exports leads to better wages.
9	HICs	These countries are wealthy with a high GNI per capita and standards of living. These countries can spend money on services.

Causes of uneven development

10 What are they?

Development is globally uneven with most HICs located in Europe, North America and Oceania. Most NEEs are in Asia and South America, whilst most LICs are in Africa. Remember, development can also vary within countries too.

11 Physical factors affecting uneven development:

- **Natural resources**: Fuel sources such as oil. • Minerals and metals for fuel. • Availability for timber. • Access to safe water.
- **Natural Hazards**: Risk of tectonic hazards. • Benefits from volcanic material and floodwater. • Frequent hazards undermines redevelopment.
- **Climate**: Reliability of rainfall to benefit farming. • Extreme climates limit industry and affects health. • Climate can attract tourists.
- **Location/terrain**: Landlocked countries may find trade difficulties. • Mountainous terrain makes farming difficult. • Scenery attracts tourists

12 Human factors affecting uneven development:

- **Aid**: Aid can help some countries develop key projects for infrastructure faster. • Aid can improve services such as schools, hospitals and roads. • Too much reliance on aid might stop other trade links becoming established.
- **Trade**: Countries that export more than they import have a trade surplus. This can improve the national economy. • Having good trade relationships. • Trading goods and services is more profitable than raw materials.
- **Education**: Education creates a skilled workforce meaning more goods and services are produced. • Educated people earn more money, meaning they also pay more taxes. This money can help develop the country in the future.
- **Health**: Lack of clean water and poor healthcare means a large number of people suffer from diseases. • People who are ill cannot work so there is little contribution to the economy. • More money on healthcare means less spent on development.
- **Politics**: Corruption in local and national governments. • The stability of the government can effect the country's ability to trade. • Ability of the country to invest into services and infrastructure.
- **History**: Colonialism has helped Europe develop, but slowed down development in many other countries. • Countries that went through industrialisation a while ago, have now develop further.

Consequences, ways of reducing economic gap and case studies

13 Reducing the Global Development Gap

- **Microfinance Loans**: This involves people in LICs receiving smalls loans from traditional banks. + Loans enable people to begin their own businesses - Its not clear they can reduce poverty at a large scale.
- **Foreign-direct investment**: This is when one country buys property or infrastructure in another country. + Leads to better access to finance, technology & expertise. - Investment can come with strings attached that country's will need to comply with
- **Aid**: This is given by one country to another as money or resources. + Improve literacy rates, building dams, improving agriculture. - Can be wasted by corrupt governments or they can become too reliant on aid.
- **Debt relief**: This is when a country's debt is cancelled or interest rates are lowered. + Means more money can be spent on development. - Locals might not always get a say. Some aid can be tied under condition from donor country.
- **Fair trade**: This is a movement where farmers get a fair price for the goods produced. + Paid fairly so they can develop schools & health centres. -Only a tiny proportion of the extra money reaches producers.
- **Technology**: Includes tools, machines and affordable equipment that improve quality of life. + Renewable energy is less expensive and polluting. - Requires initial investment and skills in operating technology

14 CS: Reducing the Development Gap In Jamaica

Location and Background: Jamaica is a LIC island nation part of the Caribbean. Location makes Jamaica an attractive place for visitors to explore the tropical blue seas, skies and palm filled sandy beaches

Tourist economy: -In 2015, 2.12 million visited. -Tourism contributes 27% of GDP and will increase to 38% by 2025. -130,000 jobs rely on tourism. -Global recession 2008 caused a decline in tourism. Now tourism is beginning to recover.

Multiplier effect: -Jobs from tourism have meant more money has been spent in shops and other businesses. -Government has invested in infrastructure to support tourism. -New sewage treatment plants have reduced pollution.

Developmental problems: Tourists do not always spend much money outside their resorts. - Infrastructure improvements have not spread to the whole island. - Many people in Jamaica still live in poor quality housing and lack basic services such as healthcare.

Year 10 GCSE History Knowledge Organiser Industrial Revolution Medicine in Britain 1750-1900

Key Vocabulary:

1	**Enlightenment**	A period between the 18th and 19th centuries where the main attitude was one of the use and celebration of reason, the power by which humans understand the universe and improve their own condition.
2	**Microbes**	Living organism that can only be seen under a microscope.
3	**Spontaneous Generation Theory**	Belief that microbes are released when things decay, rather than being the cause and that they are spread by miasma.
4	**Anaesthetic**	Used to make someone unconscious.
5	**Antiseptic**	Killing bacteria before operations or treatment.
6	**Aseptic**	Operation that takes place in a strictly controlled germ-free environment.
7	**Inoculation**	Deliberately infecting a patient with a disease in order to become immune to it.
8	**Vaccination**	Injection of weakened organisms to give body resistance against disease.
9	**Laissez-Faire**	Government's attitude that it should not interfere with matters relating to Public Health.

What were the causes treatments, preventions and healers of the time period?

10. Causes

Continuities: Miasma Theory, influence of Church during epidemics and that supernatural beliefs.
Changes: Germ Theory (1861) disproved Spontaneous Generation Theory and believed that germs cause disease in human body. Pasteur/Koch.

11. Diagnosis/Treatments:

There were no new treatments in this time period as most people by 1900 accepted that germs caused disease but there was not a lot of understanding about the best was to remove germs so old herbal remedies continued to be popular. Anaesthetics were used for the first time in surgery.

12 Preventions:

The biggest changes were to prevention with both the willingness of the government and population to take steps to prevent diseases from spreading. Widespread use of the smallpox vaccination, Public Health Act 1875 and the building of sewers by Bazalgette

13 Healers and Hospitals

Only the rich or the 'deserving poor' who went to hospitals would see a doctor. Most people continued to be treated at home.
Hospital Care: c18 Hospitals were dirty, overcrowded and in poor conditions. Florence Nightingale changed this and Lister/Simpson improved surgery.

14 Case Study: Cholera (1854)

Epidemics in 1831, 1848-9 and 1854. John Snow
+ = Concluded it caused by dirty drinking water by using population statistics, removed the handle from the Broad Street pump and saved lives.
- = Government unwilling to pay for improvements at the time, Snow couldn't prove why dirty water cause cholera.

15. Case Study: Smallpox Vaccination (1798)

Edward Jenner: Vaccination.
+ = Discovered vaccination for Smallpox, by observing milkmaids who caught the mild cowpox but not the deadly smallpox, tested his vaccination on James Phipps. Smallpox practically eradicated by 1900
- = Vaccination not compulsory until 1852 by state and vaccination was opposed by inoculators.

Who were the key individuals and key themes?

16 Individuals

Louis Pasteur: Germ Theory (1861).
+ = Identified that germs cause disease and illnesses.
MISHAPS VET to remember impacts
- = Unable to identify specific germs.
Robert Koch: Microbes (1867).
+ = Discovered microbes cause specific illnesses.
- = Took time for his work to be widely accepted.
Florence Nightingale: *'Notes on Nursing' (1859)*.
+ = Improved conditions in hospitals and professionalised nursing.
James Simpson: Chloroform as an anaesthetic (1847).
+ = Provided safer alternative to Laughing Gas + Ether.
- = Difficultly in gauging correct dose to be used.
Joseph Lister: Carbolic Acid as an antiseptic (1865).
+ = Antiseptic surgery – killing germs from wounds.
- = Opposed because of poor knowledge Germ Theory.
Joseph Bazalgette: Introduced Sewer system (1865).
+ = Built over 1300 sewers in London.
- = Size of project took time until completed in 1875

17 Why did the government's attitude to public health change?

Public Health Act - 1848: Not compulsory + no change.
Public Health Act: 1875: Compulsory and forced authorities to provide clean drinking water, build public toilets and dispose of sewage to avoid pollution.
Changes due to: Germ theory (1861), Great Stink-1858, John Snow (1854), changes in voting (most working class men could now vote)

18 Why were there so many breakthroughs?

Change in attitudes: This was the period of the Enlightenment and the government changed its laissez faire attitude to public health
War: The Crimean war gave Florence Nightingale the opportunity to car for sic soldiers- she reduced the death rate in the hospital in Scutari from 40% to 2%
Individuals: Pasteur, Koch, Jenner, Snow, Nightingale, Simpson, Lister.
Technology: improvements in technology such as better microscopes to be able to see germs.
Germ Theory: First scientifically proven cause of disease.

Year 10 GCSE History Knowledge Organiser Medieval Medicine in Britain c.1250-1500

Key Vocabulary:

1	**Diagnosis**	Identify illness based on symptoms.
2	Miasma	Bad air that believed to cause diseases.
3	Physician	Qualified person to practice medicine.
4	Rational	Idea based on logic and evidence.
5	Supernatural	Ideas not explained by science/nature.
6	Bloodletting	Drawing blood from the sick in order to rebalance the humours.
7	Herbal remedy	Medicine made from plants/herbs.
8	Pilgrimage	Journey to sacred place.
9	Purging	Removing humours from the body by bring sick.
10	Regimen sanitatis	Instructions created by Hippocrates on how to keep healthy
11	Flagellants	People who whipped themselves to ask for God's forgiveness to avoid plague.
12	Purifying the air	Removing foul smells from the air.
13	Quarantine	Separating sick to stop spread of disease.

What were the causes treatments, preventions and healers of the time period?

14. Causes

Religious: Belief that **God** caused illnesses.
Supernatural: **Astrology** also used to help diagnose illnesses.
Rational: **Four Humours** Theory: Body made of four liquids (blood, phlegm, black and yellow bile). Imbalance of these humours can cause illness and disease. Hippocrates
Miasma: Belief that **bad air** was harmful and cause illnesses.

15. Diagnosis/Treatments:

Diagnosis was either based on urine analysis
Religious/supernatural treatments: praying, fasting, using star charts to determine treatment.
Rational treatments: herbal remedies, bloodletting, leeches and purging.

16 Preventions:

Religious/supernatural treatments: praying, fasting, lighting a candle in a Church,, pilgrimage
Rational preventions: Lighting a fire, smelling sweet herbs, ringing bells

17 Healers

Physician: Diagnosed illnesses and suggested treatments. Studied patients' blood and urine. Trained at university for 7 years, approximately 100 in the country
Apothecary: Mixed herbal remedies.
Barber Surgeon: Performed simple surgery.
Hospitals: Owned and run by the Church. Monks and nuns provided shelter and food for the sick and poor elderly and prayed for them
Home: Majority of sick cared for at home (women).

18 Case Study: Black Death (1348)

The Black Death caused the death of between 1/3 to ½ of the entire population. While it was caused by bacteria fleas, it was spread to humans by fleas jumping from rats onto humans.
Causes: Sent by God as punishment, bad air that corrupted the body's four humours.
Treatment: Prayer, charms, bleeding and purging, sniffing strong herbs, and fires lit to remove bad air.
Prevention: Pray to God, Flagellants + streets cleaned, newcomers to a town were quarantined for 40 days, run away from the disease.

Who were the key individuals and key themes?

19 Individuals

Hippocrates: Four Humours Theory.
+ = Observed patients/recorded symptoms + Hippocratic Oath.
- = Ideas on causes of disease were wrong.
Galen: Theory of Opposites.
+ = Wrote over 250 books on medicine.
- = Made mistakes – Jaw bone made of 1 bone not 2.

20 Did the Church help or hinder medicine?

+= Safeguarded all valuable Ancient Greek and Roman texts in monastery libraries
+= Monasteries were hygienically designed
+=The Church funded universities and provided hospitals
-= Banned dissections
-=promoted respect of Galen's ideas
-= Taught that everything in the Bible was true

21 Why did medicine not progress in the Medieval period?

The Church: The was the most powerful institution in Medieval society, there was a priest in every village, funded education in universities promoted the Bible and Galen had all of the answers, imprisoned those who went against their teachings such as Roger Bacon in 1270.
Attitudes: Everyone was taught to respect tradition, taught that Galen had discovered everything there was to know about medicine and had written it down in his books. Not taught to experiment and improve
Government: The government was weak in Medieval society and it's job was to keep law and order and defend against invasion, it's job was not to invest in medical research
Education: Doctors trained for 7years at university and were taught to respect tradition, read books produced by monks copying by hand, read the books of Galen and watched dissections with the aim of proving Galen correct

Year 10 GCSE History Knowledge Organiser Modern Medicine in Britain 1900-present

Key Vocabulary:

1	**DNA**	Carries genetic information about a living organism.
2	**Genome**	Each human being has a unique DNA.
3	**Human Genome Project**	Scientists worked to decode and map out the human genome.
4	**Hereditary diseases**	Diseases that are passed down from one generation to another.
5	**Magic Bullet**	Chemical that kills specific bacteria in the body.
6	**Antibiotic**	Medicine that destroys the growth of bacteria inside the body.
7	**D-Day**	Allied forces in WW2 invade northern France.
8	**General Practitioner**	Community-based doctor who treats minor illnesses.

What were the causes treatments, preventions and healers of the time period?

9. Causes

By 1900, scientists realised not all diseases were caused by microbes. Discovery of **DNA** (1953) meant scientists understood how hereditary diseases were caused. E.g. Down's Syndrome. **Crick and Watson.**
Lifestyle choices impact on health: smoking, poor diet, alcohol, sharing of bodily fluids and exposure to excessive amounts of sun.

10. Diagnosis/Treatments:

Improvements in diagnosis which was not based on observing symptoms now but on medical testing: X-ray, CT/MRI scans, ultrasound, Blood testing and pressure monitor.
Magic Bullets: Salvarson 606. Paul Ehrlich.
Antibiotics: Penicillin discovered in 1928 by Alexander Fleming developed by Florey and Chain. Mass produced for D-Day in 1944.
High-tech medical/surgical treatment: Dialysis, Prosthetic limbs, Keyhole surgery, ECG, Endoscope.

11 Preventions:

Government lifestyle campaigns: *Change4life* + campaigns warning of dangers of drug/binge drinking.
Genetic screening and gene therapy: women who have the gene for breast cancer can prevent the disease by getting a mastectomy

12 Doctors and Hospitals

NHS created in 1948- before this 8 million people had never seen a doctor before. People can now visit a **GP** and stay in hospital for free with universal healthcare. Also other healthcare professionals such as **dentists, ambulance services + health visitors.**

13 Case Study: Penicillin

Alexander Fleming started his search for a treatment for infection due to the number of soldiers dying in WW1 . He discovered penicillin in 1928 when he noticed a 'white mould' which killed bacteria. He was unable to fund any further research and went no further. Florey and Chain went on to test penicillin on humans (Albert Alexander) and gained funding to mass produce it

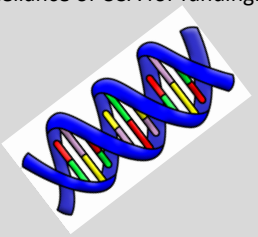
14. Case Study: Fight against Lung Cancer

Diagnosis: Difficult to diagnose early on.
Treatment: Transplants, radio/chemotherapy.
Prevention: Smoking banned in public places, raising age of buying cigarettes and stop smoking campaigns.

Who were the key individuals and key themes?

15 Individuals

Crick and Watson: Discovered DNA (1953).
+ = Scientists explore causes of hereditary diseases.
- = Doctors still unable to treat genetic conditions.
Paul Ehrlich: Created first Magic Bullet (1909).
+ = Discovered Salvarson 606 to treat Syphilis.
- = Magic Bullet can only treat one specific disease.
Alex Fleming: Discovered Penicillin (1928).
+ = Noticed 'white mould' killed bacteria - Penicillin.
- = Unable to fund further research + went no further.
Florey and Chain: Mass produced Penicillin (1944).
+ = Developed Penicillin and mass produced it.
- = Reliance of USA for funding.



16 Why were there so much rapid change?

Change in attitudes: The government was taking much more responsibility for health with the creation of the NHS
War: WW1 causes thousands of soldiers to die of infection which started Fleming's research and WW2 gave governments motivation to fund mass production and research into penicillin to treat infection. In WW2 people were shocked by the health and hygiene of some refugees and was one of the reasons for the creation of the NHS
Individuals: See above
Technology: advances in microscopes and the ability to produce higher powered images enabled scientists to identify DNA. Better technology has improved diagnosis, technology has enabled the mass production of drugs, development of capsules (easier way to take drugs), hypodermic needles for injections and insulin pumps.
Teamwork: The Human Genome Project involved thousands of scientists from around the world. Hata retested Ehrlich's work to find Salvarson 606

Year 10 GCSE History Knowledge Organiser Renaissance Medicine in Britain 1500-1750

Key Vocabulary:

1	**Epidemic**	Disease that spreads quickly e.g the plague in 1665
2	Printing press 	Created by Johannes Gutenberg in the 1440s- a machine for printing text/pictures
3	Renaissance	Means Re-birth- a time period of renewed interest in revival of ideas
4	Royal Society	Set up in 1660 with Charles II as it's patron. An organisation to discuss and share new ideas in medicine and sciences. Sponsored scientists and published it's findings.
5	Human anatomy	Knowledge of the working of the body
6	Pomander	Ball containing perfumed substances 
7	Transference	Belief that an illness can be transferred (or passed) to something else by touch e.g. rub an object n a boil it would transfer the disease from the person to the object
8	Pest House	A hospital that specialised in one disease (the plague)
9	Dissection	The scientific internal study of a corpse.

What were the causes treatments, preventions and healers of the time period?

10 Causes

Continuities: Miasma Theory, influence of Church during epidemics and that supernatural beliefs.
Changes: Most accepted that illnesses were not sent by God, decline of importance regarding the Four Humours Theory and analysis of urine. A new idea developed that little animals (animalcules) could be the causes of disease
There was a move away from old ideas about the causes of illness but they had not been replaced!

11 Diagnosis/Treatments:

Diagnosis: Thomas Sydenham emphasised the need to observe a patients symptoms, decline of analysis of urine
Religious/supernatural treatments: praying, fasting, Rational treatments: herbal remedies (with new ingredients), bloodletting, leeches and purging. People were also starting to look for chemical cures for diseases

12 Preventions:

Religious/supernatural treatments: praying, fasting, lighting a candle in a Church
Rational preventions: Lighting a fire, smelling sweet herbs by carrying a pomander all removing bad air

13 Healers

Physician: Diagnosed illnesses and suggested treatments. Trained at university for 7 years, could now do dissections although difficult to get supply of fresh corpses. Would now visit hospitals
Apothecary: Mixed herbal remedies with new ingredients- would now also visit hospitals.
Surgeon: Performed surgery- better educated as wars were fought with new technology which led to new wounds.
Hospitals: now funded by the wealthy or charities
Home: Majority of sick cared for at home (women).

14 Case Study: Great Plague (1665)

Causes: Unusual alignment of the plants, sent by God as punishment, imbalance of Four Humours + Miasma.
Treatment: Prayer, fasting, + Plague Doctors, go to a Pest Hospital
Prevention: quarantine, smoking tobacco to ward off miasma Local governments tried the following: banning public meetings, closing theatres, sweeping the streets, burring barrels of tar and sweet smelling herbs to ward off miasma, killing cats and dogs, quarantining victims in their own homes for 28 days with a red cross and 'Lord have mercy upon us' painted on the door, watchmen outside to stop victims leaving.

Who were the key individuals and key themes?

15 Individuals

Thomas Sydenham: *'English Hippocrates'*.
+ = Placed importance on observing a patient, wrote the book *Observationes Medicae* which was used by doctors for two centuries.
- = Doctors/physicians still reliant on Galen's work.
Andreas Vesalius: *'On the Fabric of the Human Body'* (1543).
+ = Corrected 300 mistakes by Galen on anatomy, lower jaw has one bone, not two, breastbone has three parts, not seven
- = Caused controversy by challenging Galen's work.
William Harvey: Circulation of the blood.
+ = Proved that arteries and vein were linked together, heart is a pump (1628).
- = Considered to be mad as challenged Galen's work and did not have a powerful enough microscope to prove capillaries existed.

16 What factors encouraged change?

Technology: The printing press and improved microscopes.
The Royal Society: helped develop new ideas as scientists and physicians could read each other's work.
Reformation: Loss of control of education by the Church, legalisation of dissection.
Individuals: Improved knowledge of anatomy, published books for others to learn from, encouraged others to carry out dissections themselves

17 What factors encouraged continuity?

Individuals: Traditional physicians continued to reply on Galen, Vesalius and Harvey's discoveries had little practical use in medical treatment.
Attitudes: While doctors were being encouraged by the work of Vesalius, Harvey and Sydenham to experiment and not rely on Galen, it was very difficult to change this attitude and ordinary people continued to believe in and use the theory of opposites long after Galen had been discredited.
Technology: While there was new technology such as the printing press and microscopes, the microscopes were not powerful enough to prove certain things about the body- e.g. that capillaries exist or germs cause disease
Lack of knowledge: None of the discoveries made during the Renaissance were about the causes of disease therefore little could change in treatments and preventions.

Spring Term Year 10 Music Component 1 Examples of assessment

Key Vocabulary:

1	Harmony	The chords or accompaniment supporting the melody
2	Sonic Features	The parts of the music (melody/rhythm) that make the piece able to be identified as a certain style
3	Leitmotif	a short musical idea that represents a particular location/ character
4	Motif	a short musical idea
5	Theme tune	memorable piece of music that represents a TV series, film, video game.
6	Conjunct	a melody built upon notes that are close together
7	Disjunct	a melody built upon notes that are far apart
8	Diegetic	music & sounds that are part of the production that are heard by the characters
9	Non-diegetic	music & sounds only heard by the audience
10	Stop time	when a few notes/ chords are played that are separated by silence
11	12-bar Blues	a song structure built on twelve bars of music that uses chords I, IV and V.

Music for Film

12 Style and facts

- **Music for media has gained popularity during the last century, with music becoming an integral part of film, TV and video games.**
- **From the early 1900s, music has been used in various sources of media to accompany the on-screen action, create atmosphere and establish mood.**
- **Music for media is composed with the intention of enhancing a product or production. It is not written specifically for direct sale to the public, which is where it differs from commercial music.**

13 Analysis

- Interstellar – the Cornfield = Hans Zimmer
- **The piece is in the minimalism style**
- **There is a prominent disjunct motif melody heard throughout, performed using 'bell chimes' percussion.**
- **The original motif is exposed at the beginning and there are variations to this melody throughout the piece.**
- **There are time signature changes throughout, with a mix of regular and irregular beats per measure e.g. 3/4 to 5/8.**
- **The tonality is a major key**
- **The melodies become more complex as the piece develops**
- **There is a dynamic 'crescendo' throughout**
- **There is a tempo 'accelerando', going from moderato to presto**

The Delta Blues

14 Style and Facts

Delta Blues is one of the earliest-known styles of Blues music.

It originated in the Mississippi Delta in the USA

Some of the earliest Delta Blues recordings date back to the late 1920s (though it was likely being played before the turn of the century), when record companies realised the potential African-American market for 'race' records.

The Delta Blues 'sound' is predominantly a single performer with vocals and acoustic guitar but live performances include an upright bass and drums

15 Analysis

Crossroads – Robert Johnson

- **The lyrics follow the typical delta blues AAB structure over the traditional 12-bar blues.**
- **The song has a homophonic texture (melody and guitar accompaniment).**
- **The guitar rhythm is a typical blues shuffle in F major, in which 8th note triplets are performed for an authentic delta blues groove.**
- **Power chords are used in the main guitar harmony.**
- **The F blues scale is used to perform the guitar riffs heard in this song.**
- **The song also contains typical blues riffs of descending semitones in the guitar melody/ 7th chords- this is known as a chromatic run.**
- **The guitar melody uses hammer-ons to decorate (ornamentation) the guitar melody.**

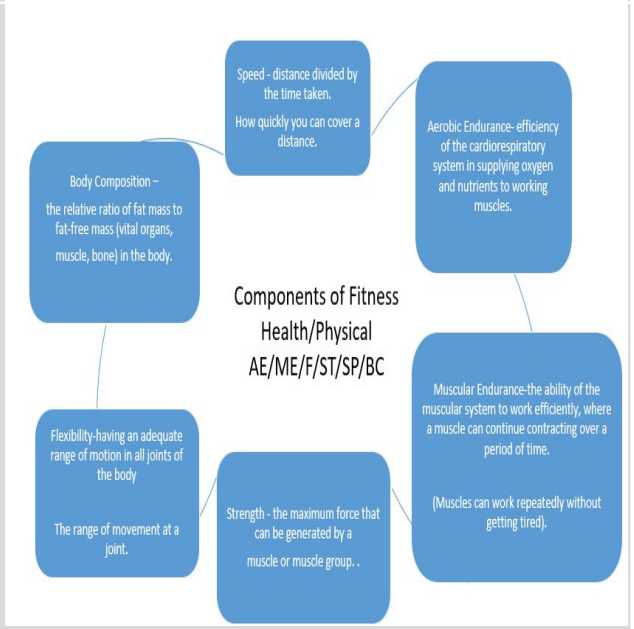
KS4 Physical Education Spring Term Knowledge Organiser

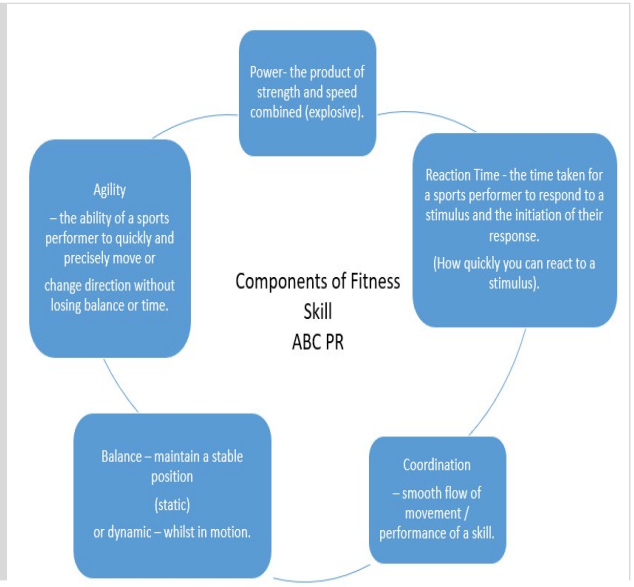
Key Vocabulary:

1	Methods of training	Different ways you can exercise the body to improve you health and well-being
2	Muscular system	The muscular system is an organ system consisting of skeletal, smooth, and cardiac muscle
3	Principles	Principles of training means exercising regularly to improve skills and fitness.
4	Cardio-respiratory system	The parts of the body that allow us to breathe and circulate oxygen.
5	Acceleration	Acceleration describes how quickly you can increase your velocity towards maximum speed.
6	Reps and sets	**Rep** = repetition of an exercise. E.G. perform 6 repetitions of an exercise before resting. **Set** = a group of repetitions (or reps) of that exercise
7	Body composition	Body composition is a method of describing what the body is made up of. Ratio of fat and fat free mass (bone / muscle).

Physiology - The human body

8 Muscular system





Body components

9 Methods of training

Aerobic Endurance Training
Continuous - a steady pace, moderate intensity 30mins+
Interval – periods of higher and lower intensity
Fartlek - form of continuous training where intensity is changed by running at different speeds or different terrains.

Circuit Training - circuit training involves a series of different activities performed at stations.

Speed Training
Interval - Work high intensity and rest
Hollow - Fast slow fast
Acceleration - Increase speed through zones

Weight Training – using free weights or resistance machines. It involves using ratios (high, medium or low) of weights, reps and sets to improve either strength, endurance or power.

Flexibility Training
Static stretches – no movement and active or passive
Dynamic – involve movement (e.g. heel flicks)

Plyometrics – exercises performed quickly to improve power

10 Careers

Developing – name sporting careers

Advancing – Describe key qualities needed in different sporting careers

Mastering – Explain sporting careers and how you can access them

Year 10 Drama Spring Term Knowledge Organiser

Key Vocabulary:

1	Stage Levels	To show power, status or just different locations for the scenes.
2	Genre	Comedy, Thriller, Melo drama
3	Creative Intentions	What was the director/ writer/ creator thinking about? Themes / issues / response to stimulus / style/genre / contextual influences / collaboration with other practitioners / influences by other practitioners.
4	Purpose	Why was it made? to educate / to inform / to entertain to provoke/ to challenge viewpoints / to raise awareness / to celebrate…
5	Theme	The topic of the performance e.g. Conflict, Family
6	Stylistic Qualities	How a performance is structured – Musical, Inclusivity, Epic theatre - storytelling
7	Processes used in development, rehearsal and performance	Responding to stimulus to generate ideas for performance material / exploring and developing ideas to develop material / discussion with performers / setting tasks for performers / sharing ideas and intentions / teaching material to performers / developing performance material / organising and running rehearsals / refining and adjusting material to make improvements / providing notes and/or feedback on improvements.

Component 1- Learning Aim A
Professional performance material, influences and creative purpose

8 **A1**

Styles of performance:

Realism – Konstantin Stanislavski:
The System;
These are the 7 Stanislavski techniques;
Who am I? imagination. ...
Where am I? ...
What time is it? ...
What do I want? ...
Why do I want it? ...
How will I get what I want? ...
What must I overcome to get what I want?

Epic Theatre – Bertolt Brecht
Brecht's epic theatre was when the audience was persuaded—by staging methods and naturalistic acting—to believe that the action onstage was "real"

9 **A2**

Roles and Responsibilities

ACTOR: The role of the actor is to learn their character in depth and become the character as they perform. In Billy Elliot, this is shown as the actors feel like they are the characters and are able to portray them and their emotions well.

They are responsible for attending casting calls and auditions, as well as following a rehearsal schedule.

They also need to learn their character in depth, through research and improvisation. They also need to be aware of their character's relationships with others to ensure effective acting.

Also, they should be able to take opportunities that may not be appealing so they can get experience.

DIRECTOR: The role of the director is to oversee the creative process and the overall vision of the performance. They need a thorough understanding of the script therefore, need to carry out extensive research. They need to supervise all creative aspects of the performance and make changes, if necessary, that may be critical to the performance**.**

They are responsible for the full creative process therefore are required to arrange and attend casting calls and auditions, as well as organise the rehearsal schedule, where full staging and blocking takes place. A directors responsibility **is** to select the best choice of actors for the roles and cleverly consider the abilities of each individual. They also need to direct the actors during rehearsal or filming.

They need to communicate effectively with the production team to ensure the whole performance is effective.

Component 1 – Learning Aim B
Demonstrating understanding of skills, techniques and approaches used by professionals to create a performance

10 **B1**
Processes used in rehearsal

- Responding to a stimulus
- Exploring and developing ideas
- Sharing ideas and intentions
- Teaching material to performers
- Refining and adjusting material

11 **B2**
Production process

Processes such as;

- Rehearsal – Practising your work
- Production – How the set, costume, staging comes together.
- Technical Rehearsal – Lighting and sound
- Performance – Final presentation of ideas to a target audience
- Post performance evaluation/review – How ell did we do? What could be improved? How do we know?

Year 10 GCSE Religious Studies Spring Term Knowledge Organiser: Christian Practices

Key Vocabulary:

1	Liturgical	A church service which follows a set structure or ritual.
2	Non-liturgical	A service which does not follow a set text or ritual; sometimes spontaneous or charismatic
3	Sacrament	The outward and visible sign of an invisible and spiritual grace. (e.g. Baptism and the Eucharist are recognised as sacraments by most Christians).
4	Baptism	The sacrament through which people become members of the Church. It involves the use of water as a symbol of the washing away of sin.
5	Eucharist	Literally 'thanksgiving'; a sacrament in which the death and resurrection of Jesus are celebrated, using bread and wine.
6	Pilgrimage	A religious journey to a holy site/sacred place, it is an act of worship and devotion.
7	Street Pastors	A Christian organisation involving people working, mainly at night, on city streets giving care to those who need it
8	Evangelism	Preaching the gospel (the good news about God) to convert people to the Christian faith.
9	Reconciliation	Making up and rebuilding relationships between two groups/sides after disagreement.

Key Christian Practices

1 Different forms of worship

There are no rules in Christianity about how or when to worship, and many different denominations choose to worship in different ways. Liturgical worship **follows** set structures, and includes worship like saying the Lord's Prayer or taking part in the Eucharist. Non-liturgical worship is often private and spontaneous.

2 Role and Meaning of Sacraments

There are two main sacraments:

1) Baptism. This is when people join the church. Some Christians think this should happen as a baby, called infant baptism, so you can be raised as a Christian. Others think it should happen when you are old enough to understand, this is called Believers' Baptism.
2) Eucharist. This takes lots of different forms but is the practice of Christians remembering Jesus' sacrifice and death through consuming bread and wine.

3 Role and Importance of Pilgrimage

Christians do not have to go on a pilgrimage, but many think it is a good way of getting closer to God and even to access miracles. Catholic Christians believe that sites like Lourdes carry spiritual significance because of events that have happened there, and believe that visiting can help cure people of illnesses. Others believe sites like Iona in Scotland are important because they allow us to feel closer to God and deepen our understanding of religion.

4 Role and Importance of Festivals

Christians celebrate two major festivals:

1) Christmas. This is the celebration of Jesus' birth and reminds Christians of the doctrine of the incarnation. Christmas is preceded by the 4 weeks of Advent.
2) Easter. This is the celebration of Jesus' crucifixion and resurrection. Easter is preceded by the 6 weeks of Lent.

Key Christian Practices

5 Role of the Church in the local community

Christians believe it is their duty to 'love your neighbour'. This means that many Churches are involved in supporting the local community. Organisations like the Trussell Trust help run food banks for people experiencing financial difficulty, and street pastors go onto the streets at night to support people who might need it.

6 Place of Mission and Evangelism

Jesus told his disciples to spread the message he had shared with them, and many Christians believe it is their duty to continue sharing the message. Evangelising, or preaching the message of God, is important to lots of denominations as they believe that only Christians can go to Heaven, so everybody needs to hear the message of the gospel.

7 Work of the Church for reconciliation

Worldwide conflict has affected Christian communities for many years, and lots of Christian organisations try to bring people back together. The Corrymeela Community is a Christian organisation that works in Northern Ireland, and did lots of work to bring Catholic and Protestant communities back together after the Troubles.

8 How churches respond to persecution

Christians are the most persecuted religious group worldwide. Persecution is when people are treated badly, and in some cases even killed, for practising their faith. Many Christian groups have been set up to support Christians facing persecution. They do this by providing Bibles and resources to underground churches, offering loans and financial support to people facing persecution and by working with those who have escaped persecution to support with their futures.

9 The work of Christian charities

We will look at the work of CAFOD (Catholic Agency for Overseas Development), Christian Aid and Tearfund. These organisations work to support people around the world who are facing poverty, persecution, discrimination and other hardships. They include programmes that support with development, such as education and skills training, as well as charitable donations and financial support.

Year 10 Spanish Spring Term Knowledge Organiser – De costumbre

1. las comidas / Meals

El desayuno - breakfast
La comida / el almuerzo - lunch
La merienda - tea (meal)
La cena - dinner / evening meal
Desayunar - to have breakfast / to have … for breakfast
Comer / almorzar - to have lunch / to have … for lunch
Merendar - to have tea / to have … for tea
Cenar - to have dinner / to have … for dinner
Tomar - to have (food / drink)
Beber - to drink
Entre semana… - during the week…
Los fines de semana… - at weekends…
Desayuno a las ocho - I have breakfast at eight o'clock
Desayuno / Como – for breakfast / lunch I have…
Meriendo / Ceno… - for tea / dinner I have…
…un huevo - an egg …un yogur - a yogurt
…un pastel - a cake …un bocadillo - a sandwich
…una hamburguesa - a hamburger
…un café / (el) té - coffee / tea
…un Cola Cao - Cola Cao (Spanish chocolate drink)
…(el) marisco – seafood …(el) pescado - fish
…(el) pollo – chicken …(el) zumo de naranja - orange juice
…(la) carne – meat …(la) ensalada - salad
…(la) fruta – fruit …(la) leche - milk
…(la) sopa – soup …(la) tortilla - omelette
…(los) cereals – cereals …(los) churros - doughnut sticks
…(las) galletas – biscuits …(las) patatas fritas - chips
…(las) tostadas – toast …(las) verduras - vegetables
…algo dulce/ligero/rápido - something sweet/light/ quick
Ser goloso/a - to have a sweet tooth

2.Un festival de música / A music festival

Me fascina(n)… - …fascinate(s) me
Admiro… - I admire…
No aguanto / no soporto… - I can't stand…
…su actitud / talento - his/her attitude / talent
…su comportamiento - his/her behaviour
…su determinación - his/her determination
…su estilo – his/her style
…su forma de vestir - his/her way of dressing
…su música / voz - his/her music / voice
…sus canciones - his/her songs
…sus coreografías – his/her choreography
…sus ideas - his/her ideas
…sus letras – his/her lyrics
atrevido/a(s) - daring
imaginativo/a(s) - imaginative
precioso/a(s) - beautiful
repetitivo/a(s) - repetitive
original(es) - original
triste(s) - sad
Me/Te hace(n) falta… - I/You need…
…crema solar - sun cream
…el pasaporte / DNI - your passport / national ID card
…un sombrero / una gorra - a hat / cap

3.Mi rutina diaria / My daily routine

Me despierto - I wake up
Me levanto - I get up
Me ducho - I have a shower
Me peino - I brush my hair
Me aliso el pelo – I straighten my hair
Me maquillo – I put make up on
Me afeito - I have a shave
Me visto - I get dressed
Me lavo los dientes - I clean my teeth
Me acuesto - I go to bed
Salgo de casa - I leave home
Vuelvo a casa - I return home
Temprano / tarde - Early / late
Enseguida - straight away
Me bañé - I had a bath
Me vestí - I got dressed
Me desperté - I woke up
Me maquillé - I put on make up
Me cepillé el pelo - I brushed my hair

6.un día especial / A special day

Abrimos los regalos - We open presents
Buscamos huevos de chocolate - We look for chocolate eggs
Cantamos villancicos - We sing Christmas carols
Cenamos bacalao - We have cod for dinner
Comemos dulces navideños - We eat Christmas sweets
Comemos doce uvas / pavo – We eat twelve grapes / turkey
Nos acostamos muy tarde - We go to bed very late
Nos levantamos muy temprano - We get up very early
Rezamos - We pray
Vamos a la mezquita / iglesia - We go to the mosque / church
Ayer fue… - Yesterday was…
…el baile de fin de curso - the school prom
…el Día de Navidad - Christmas Day
…(el) Domingo de Pascua - Easter Sunday
…(la) Nochebuena - Christmas Eve
…(la) Nochevieja - New Year's Eve

4.Las fiestas / Festivals
5.Un día especial / A special day

la fiesta de… - the festival of…
esta tradición antigua… - this old tradition…
se caracteriza por… - is characterised by…
se celebra en… - is celebrated in…
se repite… - is repeated…
se queman figuras de madera - wooden figures are burnt
se construyen hogueras - bonfires are built
se disparan fuegos artificiales - fireworks are set off
se lanzan huevos - eggs are thrown
las calles se llenan de… - the streets are filled with…
los niños / los jóvenes… - children / young people…
los familiares / las familias… - relatives / families…
comen manzanas de caramelo - eat toffee apples
decoran las casas / las tumbas - decorate houses / graves
con flores / velas - with flowers / candles
preparan linternas / altares - prepare lanterns / altars
se disfrazan de brujas/fantasmas - dress up as witches/ghosts
se disfrazan de fantasmas – dress up as ghosts
ven desfiles - (they) watch processions

7.Whats the matter?

No me encuentro bien - I don't feel well
Me siento fatal - I feel awful
Estoy enfermo/a – I am ill
Estoy cansado/a - I am tired
Tengo calor / frío - I am hot / cold
Tengo catarro - I have a cold
Tengo diarrea - I have diarrhoea
Tengo dolor de cabeza - I have a headache
Tengo fiebre - I have a fever / temperature

Year 10 Spanish Spring Term Knowledge Organiser – De costumbre

8.¿Qué va a tomar? / What are you going to have?

¿Qué va a tomar? / What are you going to have?
¿Qué va a tomar? - What are you going to have?
…de primer plato… - for starter / main course…
…de segundo plato – for main…
de postre… - for dessert…
…voy a tomar… - I'm going to have…
(el) bistec - steak
(el) filete de cerdo - pork fillet
(el) flan – crème caramel
(el) jamón serrano - serrano ham
(la) merluza en salsa verde - hake in parsley and wine sauce
(la) sopa de fideos - noodle soup
(la) tortilla de espinacas - spinach omelette
(la) trucha a la plancha - grilled trout
(los) calamares - squid
(las) albóndigas - meatballs
(las) chuletas de cordero asadas - roast lamb chops
(las) croquetas caseras - homemade croquettes
(las) gambas - prawns
(las) natillas - custard
¿Qué me recomienda? - What do you recommend?
el menú del día - the set menu
la especialidad de la casa - the house speciality
está buenísimo/a – it's extremely good
Está riquísimo/a – it's extremely tasty
¡Que aproveche! - Enjoy your meal!
¿Algo más? - Anything else?
Nada más, gracias - Nothing else, thank you
¿Me trae la cuenta, por favor? - Can you bring me the bill, please?
No tengo cuchillo – I don't have a knife
No tengo tenedor – I don't have a spoon
No tengo cuchara - I don't have a spoon
No hay aceite – There's no oil
No hay sal – There's no salt
No hay vinagre - There's no vinegar
El plato está sucio – The plate is dirty
El vaso está sucio – The glass is dirty
El mantel está sucio - The table cloth is dirty
El vino está malo - The wine is bad / off
La carne está fría - The meat is cold

9.Whats the matter?-Part 1

Me he quemado… - I've burnt my…
- Me he roto… - I've broken my…
- Me he torcido… - I've twisted my…
- el brazo / el estómago - arm / stomach
- el pie / el tobillo - foot / ankle
- la boca / la cabeza - mouth / head
- la espalda / la garganta - back / throat
- la mano / la nariz - hand / nose
- la pierna / la rodilla - leg / knee
- los dientes / las muelas - teeth
- los oídos / las orejas - ears
- los ojos - eyes
- ¿Desde hace cuánto tiempo? - How long for?
- desde hace… - for…
- un día / un mes - a day / a month
- una hora / una semana - an hour / a week
- ¿Desde cuándo? - Since when?
- desde ayer - since yesterday
- desde anteayer - since the day before yesterday

10.PART II: ¿Qué le pasa? / What's the matter?

- No se preocupe - Don't worry
- ¡Qué mala suerte! - What bad luck!
- Tiene(s) que / Hay que… - You have to…
- …beber mucha agua - drink lots of water
- …descansar - rest
- …ir al hospital / médico – go to the hospital / doctor
- …ir al dentista - go to the dentist
- …tomar aspirinas… - take aspirins
- …tomar este jarabe – take this syrup
- …tomar estas pastillas - take these tablets
- …usar esta crema - use this cream

11.Reflexive Verbs

REFLEXIVE VERBS
They are verbs that include a reflexive pronoun.
They describe actions we do to ourselves.
Some verbs for daily routine and describing relationships are reflexive in Spanish.
The infinitive form of a reflexive verb always have "se" attached to it. (Levantarse – to get up)
They conjugate as normal verbs, you just need to add the pronoun.

REFLEXIVE VERBS IN THE PRETERITE TENSE
Reflexive verbs in the preterite tense work in the same way as any other verb in this tense, you just need to add the reflexive pronoun.

12.HE ABSOLUTE SUPERLATIVE
The absolute superlative marks the quality of something in the highest or lowest degree. For example, when you say that something is really (nice) or extremely (beautiful). In order to form the absolute superlative in Spanish, we add –ísimo to the last letter or the last consonant of an adjective. For example:
Esta camiseta es carísima.
This t-shirt is extremely expensive.
Este examen es facilísimo.
This exam is really easy.

EXPRESSIONS + THE INFINITIVE
To enhance your writing, you can use a range of expressions that are followed by the infinitive:

13.Los alimentos
Food products

Los alimentos / Food products
Los alimentos - Food products
El aceite de oliva - Olive oil
El agua - Water
El ajo - Garlic
El arroz - Rice
El atún - Tuna
El azúcar - Sugar
El chorizo - Spicy sausage
El maíz - Corn
El pan - Bread
El queso - Cheese
La cerveza - Beer
La carne de cerdo – Pork
La carne de Cordero – Lamb
La carne de ternera - Beef
La coliflor - Cauliflower
La harina - Flour
La mantequilla - Butter
La mermelada - Jam
Los albaricoques - Apricots
¿Has probado…? - Have you tried…?
…el gazpacho - gazpacho (chilled vegetable soup)
…la ensaladilla rusa – Potato and mayonnaise salad
…la fabada - stew of beans and pork
Es un plato caliente / frío - It's a hot / cold dish
Es un tipo de bebida/postre - It's a type of drink/dessert
Contiene(n)… - It contains / They contain…
Fue inventado/a – It was invented…
Fue introducido/a… - It was introduced…

Spring Term - Knowledge Organiser BTEC Tech Award in Sport
Component 1: Preparing Participants to Take Part in Sport and Physical Activity

Key Vocabulary:

1	**Sport**	Competitive activities that involve physical exertion, have rules and regulations and a National Governing Body. These can be team or individual sports.
2	**Physical Activity**	An activity involving movement that results in energy expenditure but without competition against another person or team.
3	**Benefits**	Benefits of taking part in sport – improve fitness, meet new people, develop leadership skills, learn team work skills, resilience and self confidence from competition.
4	**Barriers**	Barriers to participation that can prevent some types of participant from taking part in regular sport and physical activity.
5	**Provision**	Places that provide sporting opportunities for the public sector include local authorities and school. Private sector – provided by organisations who aim to make a profit. Voluntary sectors – activities provided by volunteers who have a common interest in the sport /activity.
6	**Participants**	The characteristics of different types of participant and how this affects their different physical, social and mental health needs.

Types of sport and physical activity providers

7 Sports – team/individual

A team sport includes playing sports with other people such as volleyball, rugby and cricket.

Individual sports includes sports where you play alone such as golf, tennis and archery.

8 Outdoor activities

Outdoor activities – activities carried out outdoors or in recreation areas that are adventurous.
Examples include rock climbing, kayaking, wind surfing, pot holing, hiking, paragliding and hang gliding.
Benefits of taking part in outdoor activities – positive risk taking activities, improved self confidence and self esteem, meet new people, learn new skills, time away from life stresses and electronic devices.

9 Physical Fitness activities

Physical fitness activities – activities to increase fitness such as weight training, Zumba, spinning, boxercise and yoga classes.
Benefits of taking part in physical activities – meet new people, set fitness goals, improve confidence, improve body composition, improve physical health.

10 Types and needs of sport and physical activity participants

Understanding the characteristics of different types of participant and how this affects their different physical, social and mental health needs.
Types of participants – including those of different ages, with disabilities and long-term health conditions.
Government recommended guidelines for types, frequency and intensity of physical activity for different types of participant (physical, social mental health needs).

11 Barriers to participation in sport and physical activity Methods to address barriers to participation

Barriers to participation such as cost, access, time, personal and cultural. **Methods** to address barriers such as discounts, increased local provision, creche facilities, opening hours and targeted group sessions (women only).

Equipment, technology and preparing participants

12 Types of technology in sport

To improve performance and participant experience
Clothing to increase performance and experience – improved thermoregulation, clothing designed to improve aerodynamics.
Footwear – sport-specific new designs or materials; improve grip; rebound.
Sport-specific equipment – new materials for lightness and strength to include composite materials (racquet), safety and disability sport.
Facilities – surfaces to reduce the risk of injury.
Officiating – computer assisted systems; video assisted decision making.

13 Limitations of using technology

Limitations that technology can have for sport and physical activity participation.
Time – setting up, using equipment, compiling date, giving feedback to participant.
Access to technology – equality and unfair advantages as not all participants have access to technology.
Cost of technology – initial cost and follow-up maintenance of equipment.
Accuracy of data - provided by equipment.
Usability – specific training required.

14 Planning and delivering a warming up

Warm-ups should be safe, effective and appropriate.
Planning a warm-up – Types and structure (3 part)
Pulse raiser – activities that gradually increase in intensity to increase the heart rate.
Stretching and mobilising – muscles and joints
Responses of the body systems – cardiovascular & musculoskeletal
Increase HR, blood flow (oxygen supply), body temperature, muscle elasticity and range of movement.
Delivering a warm-up – consider size of space/areas used, equipment, organisation of participants, timing and positioning when demonstrating.
Supporting participants as they take part in the warm-up; observing participants, providing instructions teaching points and feedback to participants.