Year 10 Art and Design Spring Term Knowledge Organiser

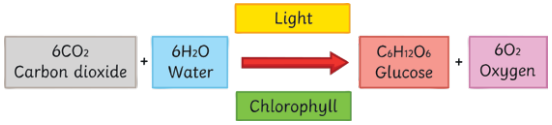
Key Vocabulary:		
1	**The Formal Elements of Art**	The formal elements of art are used to make a piece of artwork. The art elements are line, tone, texture, shape, pattern and colour. They are often used together, and how they are organised in a piece of art determines what the finished piece will look like.
2	**line**	A line is a mark or link between two points.
3	**mark**	Mark making describes the different lines, dots, marks, patterns and textures used to produce a work of art. Artists use gesture to express their feeling and emotions in response to something seen or something felt .
4	**tone**	Tone refers to the light and dark values of an object when drawing. There are three different types of tone: shadows, mid tones and high lights. **Value** in art is essentially how light or dark something is on a scale and refers to tone.
5	**texture**	The texture stimulates two different senses: sight and touch.
6	**shape**	Shape is a flat, enclosed area such as a square or triangle.
7	**form**	A form can refer to a three-dimensional composition or object.
8	**pattern**	A repeated decorative design.
9	**colour**	Colour is the element of art that is produced when light, strikes an object, and is reflected back to the eye. A colour wheel is an illustrative organisation of colour hues around a circle, which shows the relationships between primary colours, secondary colours and tertiary colours.
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.
14	**moodboard**	Collect imagery relevant to the theme. It can be a range of different ideas, not just one. It displays your beginning ideas. You can use a range of sources. For example, internet imagery, magazine cuttings and photography.
15	**Artist Research**	Showing your understanding of an artists work or style and how they have influenced you.
16	**Artist Response**	Showing your understanding of an artists work or style and how they have influenced you.
17	**Critical Understanding**	Ability to analyse others art work. Engaging with ideas, images and identifying how values and meanings are conveyed.

AQA GCSE (Combined Science) Unit 4: Bioenergetics Higher

Photosynthesis

Photosynthesis is a chemical reaction which takes place in plants. It converts **carbon dioxide** and **water** into **glucose** and **oxygen**. It uses **light** energy to power the chemical reaction, which is absorbed by the green pigment **chlorophyll**. This means that photosynthesis is an example of an **endothermic** reaction. The whole reaction takes place inside the **chloroplasts** which are small organelles found in plant cells.

Plants acquire the carbon dioxide via diffusion through the **stomata** of their leaves. The water is absorbed from the soil through the **roots** and transported to the cells carrying out photosynthesis, via the **xylem**.



The glucose made in photosynthesis is used for respiration, stored as starch, fat or oils, used to produce cellulose or used to produce amino acids for protein synthesis.

The Rate of Photosynthesis and Limiting Factors

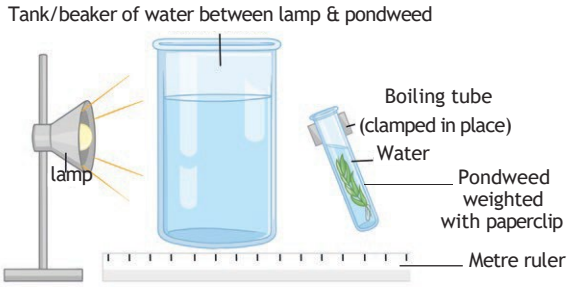
A **limiting factor** is something which stops the photosynthesis reaction from occurring at a faster rate. **Temperature**, **light intensity** and **carbon dioxide** level are all limiting factors.

Increasing the temperature of the surroundings will increase the rate of reaction, but only up to around 45°C. At around this temperature, the enzymes which catalyse the reaction become denatured.

Increasing the light intensity will increase the rate of reaction because there is more energy to carry out more reactions. Increasing the carbon dioxide concentration will also increase the rate of reaction because there are more reactants available.

The Effect of Light Intensity on the Rate of Photosynthesis (RPI)

The amount of light a plant receives affects the rate of photosynthesis. If a plant receives lots of light, lots of photosynthesis will occur. If there is very little or no light, photosynthesis will stop.



Method

1. Measure 20cm^3 of sodium hydrogen carbonate solution and pour into a boiling tube.
2. Collect a 10cm piece of pondweed and gently attach a paper clip to one end.
3. Clamp the boiling tube, ensuring you will be able to shine light onto the pondweed.
4. Place a metre rule next to the clamp stand.
5. Place the lamp 10cm away from the pondweed.
6. Wait two minutes, until the pondweed has started to produce bubbles.
7. Using the stopwatch, count the number of bubbles produced in a minute.
8. Repeat stages 5 to 7, moving the lamp 10cm further away from the pondweed each time until you have five different distances.
9. Now repeat the experiment twice more to ensure you have three readings for each distance.

The **independent** variable was the light intensity.

The **dependent** variable was the amount of bubbles produced. Counting the bubbles is a common method, but you could use a gas syringe instead to more accurately measure the volume of oxygen produced.

The **control** variables were same amount of time and same amount of pondweed. A bench lamp is used to control the light intensity and the water in the test tube containing the pondweed is monitored with a thermometer to monitor and control the temperature.

Interaction of Limiting Factors (HT only)

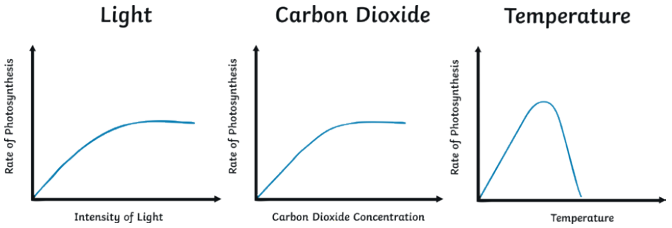
The limiting factor for the reaction will depend on the environmental conditions.

For example:

At night, light intensity is the limiting factor.

In winter, temperature is the limiting factor.

In other conditions, carbon dioxide is usually the limiting factor.



From the graph, you can see that increasing one of the factors will also increase the rate of reaction, but only for so long before it plateaus. This is because another factor will have then become the limiting factor. E.g. you could increase the supply of carbon dioxide, but if there is not enough chlorophyll to absorb the sunlight, then the sunlight will become the limiting factor instead.

Greenhouse Economics (HT only)

To grow plants in the most suitable conditions, a greenhouse can be used.

A greenhouse traps the sun's radiation as heat inside the greenhouse, so that temperature is not a limiting factor for the rate of photosynthesis.

Artificial lighting can be installed in the greenhouse to provide constant light energy and prevent light intensity being a limiting factor.

A paraffin heater can be used in the greenhouse to not only maintain a suitable temperature, but the by-product of the combustion off the paraffin is carbon dioxide.

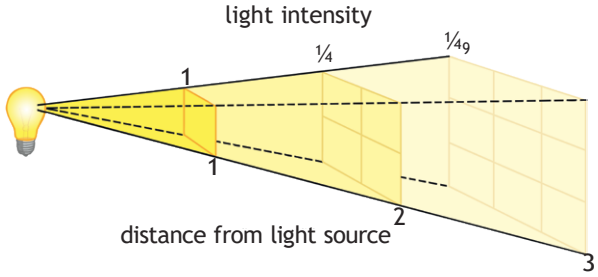
Enclosing the crops in a greenhouse and regulating all the conditions in this way can be expensive; however, it is often outweighed because the harvest of the crop is much healthier, faster-grown crops. Furthermore, the enclosed conditions mean that disease and pests can be easily controlled and prevented.

AQA GCSE (Combined Science) Unit 4: Bioenergetics Higher

Inverse Square Law and Light Intensity

The **inverse square law** is used to describe the light intensity at different distances from the source.

The inverse square law states that: **the intensity of light is inversely proportional to the square distance from the source.**



Light intensity is calculated by the following equation:

$$\text{light intensity} \propto \frac{1}{\text{distance}^2}$$

- The symbol, ∝, means 'is proportional to'.
- Distance is measured in metres, m.

In other words, if an object is moved twice as far away from the light source, the light intensity received is reduced to just one quarter.

Worked example:

If the light source is 10cm from a plant, calculate the light intensity reaching the plant.

$1 \div (\text{distance}^2)$
$1 \div (0.10 \times 0.10)$
$1 \div 0.01$
= 100 arbitrary units

If the light source is moved 25cm from the plant, calculate the light intensity reaching the plant.

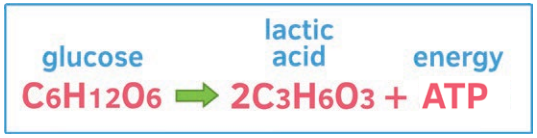
$1 \div (\text{distance}^2)$
$1 \div (0.25 \times 0.25)$
$1 \div 0.0625$
= 16 arbitrary units

Respiration

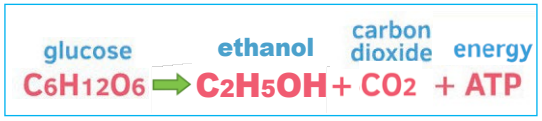
Respiration is the chemical reaction which occurs inside the **mitochondria** of all living cells to release energy for living functions and processes, e.g. movement, warmth and building larger molecules for growth and repair. The reaction is **exothermic**, meaning that energy is released to the surroundings.

Respiration can be either **aerobic** (using oxygen) or **anaerobic** (without using oxygen).

In anaerobic respiration, the glucose is not completely oxidised. This means that there is less energy released than in aerobic respiration.



In plants and yeast, anaerobic respiration makes some different products. The reaction is also called fermentation and is used in bread-making and beer-brewing.



Effect of Exercise

When a person exercises, their body (specifically their **muscles**) need much more energy. To release more energy, the amount of respiration reactions occurring has to increase.
The **heart** pumps faster and the **breathing** rate and breath volume all increase to supply more **oxygen** to the muscles via the bloodstream.

If the muscles are not receiving enough oxygen to keep up the demand needed by the respiration reactions, then **anaerobic** respiration begins to occur. This incomplete oxidation of the glucose produces **lactic acid**, which can build up in the muscles and results in an **oxygen debt**.

After long periods of exercise, the muscles can become fatigued and stop contracting. You might experience a pain commonly called a **stitch**.

Metabolism

Metabolism is the combination of all the reactions in a cell or in the body.

Energy released during respiration is used during metabolic processes to synthesise new molecules:

- Glucose is converted to starch, glycogen and cellulose.
- Glycerol and three fatty acids are joined to form a lipid molecule.
- Glucose and nitrate ions are joined to form amino acids.
- Amino acids are joined to form proteins.
- Excess proteins are broken down and released as urea during excretion.

Respiration itself is also a process which is included in metabolism.

Oxygen Debt (HT only)

During vigorous exercise, the body can begin to carry out **anaerobic respiration** and produces **lactic acid**.

Lactic acid is transported via the bloodstream to the **liver**. The liver converts the lactic acid back into **glucose**. However, **oxygen** is needed to carry out this reaction.

The **oxygen debt** is the amount of the oxygen required by the body to convert the built-up lactic acid back into glucose and remove it from the respiring cells.

AQA GCSE Chemistry (Combined Science) Unit 5.3: Quantitative Chemistry Knowledge Organiser - Foundation

Conservation of Mass

No atoms can be created or made during a chemical reaction, so the mass of the reactants will equal the mass of the product.

Reactions can be shown as a word or symbol equation.

magnesium + oxygen → magnesium oxide

Mg + O → MgO

Symbol equations should also be balanced; they should have the same number of atoms on each side.

$2Mg + O_2 \rightarrow 2MgO$

Relative Formula Mass

The relative formulas mass is the sum of all the relative atomic masses of the atoms in the formula.

Examples:

HCl

A_r of H = 1

A_r of Cl = 35.5

1 + 35.5 = 36.5

H_2SO_4

A_r of H = 1

A_r of S = 32

A_r of O = 16

(1 × 2) + 32 + (16 × 4)

2 + 32 + 64 = 98

Calculating Percentage Mass of an Element in a Compound

percentage mass of an element in a compound =

$$A_r \times \frac{\text{number of atoms of that element}}{M_r \text{ of the compound}}$$

Find the percentage mass of magnesium in magnesium oxide.

A_r of magnesium = 24 A_r of oxygen = 16

M_r of MgO = 24 + 16

= 40

$$\% \text{ mass} = \frac{A_r}{M_r} = \frac{16}{40} = 0.4 \qquad 0.4 \times 100 = 40\%$$

Concentration of Solutions

Concentration is the amount of a substance in a specific volume of a solution. The more substance that is dissolved, then the more concentrated the solution is.

It is possible to calculate the concentration of a solution with the following equation:

concentration (g/dm^3) = mass (g) ÷ volume of solvent (dm^3)

The equation can be rearranged to find the mass of the dissolved substance:

mass (g) = concentration (g/dm^3) × volume (dm^3)

Conservation of Mass

Show that mass is conserved in a reaction.

$2Mg + O_2 \rightarrow 2MgO$

$(2 \times 24) + (2 \times 16) \rightarrow 2(24 + 16)$

$48 + 32 \rightarrow 2 \times 40$

$80 \rightarrow 80$

Total M_r on the left-hand side of the equation is the same as the M_r on the right-hand side.

Calculate the mass of the product.

8g of magnesium reacts with 6g of oxygen:

8 + 6 = 14g of magnesium oxide

During a reaction the mass can change. If one of the reactants is a gas, the mass can go up.

E.g.

magnesium + oxygen → magnesium oxide

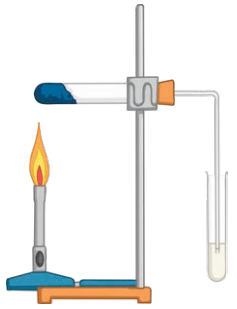
Oxygen from the air is added to the magnesium (making the product) which will be heavier in mass.

If one of the products is a gas, the mass can go down.

E.g.

sodium carbonate → sodium oxide + carbon dioxide

When sodium carbonate is thermally decomposed, carbon dioxide gas is produced and released into the atmosphere.



Inheritance, Variation and Evolution Knowledge Organiser

Keywords

allele - An alternative form of a gene.

asexual reproduction - The production of offspring from a single parent by mitosis. The offspring are clones of the parent.

chromosome - Structures that contain the DNA of an organism and are found in the nucleus.

cystic fibrosis - A disorder of cell membranes that is caused by a recessive allele.

DNA - A polymer that is made up of two strands that form a double helix.

dominant - An allele that is always expressed, even if only one copy is present.

fertilisation - The fusion of male and female gametes.

gamete - Sperm cell and egg cell in animals; pollen and egg cell in plants.

gene - A small section of DNA that codes for a specific protein.

genome - The entire genetic material of an organism.

genotype - The combination of alleles.

heterozygous - A genotype that has two different alleles, one dominant and one recessive.

homozygous - A genotype that has two of the same alleles. Either two dominant alleles or two recessive alleles.

meiosis - The two-stage process of cell division that reduces the chromosome number of the daughter cells. It makes gametes for sexual reproduction.

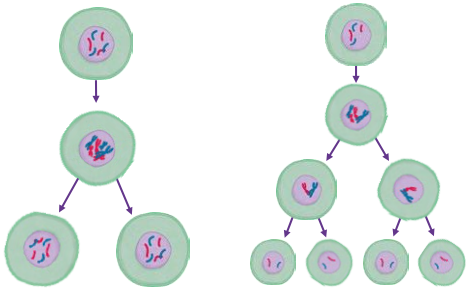
mutation - A change in DNA.

phenotype - The characteristic expressed because of the combination of alleles.

polydactyly - Having extra fingers or toes. It is caused by a dominant allele.

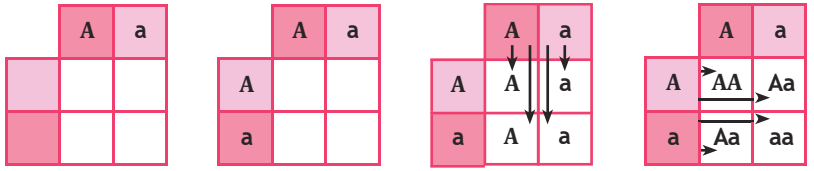
recessive - An allele that is only expressed if two copies of it are present.

sexual reproduction - The production of offspring by combining genetic information from the gametes of two parents. Leads to variation in the offspring.



Mitosis	Meiosis
Produces two daughter cells.	Produces four daughter cells.
Daughter cells are genetically identical.	Daughter cells are not genetically identical.
The cell divides once.	The cell divides twice.
The chromosome number of the daughter cells is the same as the parent cells. In humans, this is 46 chromosomes.	The chromosome number is reduced by half. In humans, this is 23 chromosomes.
Used for growth and repair, and asexual reproduction.	Produces gametes for sexual reproduction.

How to Complete a Punnet Square



Step 1:

Put the two alleles from one parent into the boxes at the top. This parent is a heterozygote. This means they have one dominant and one recessive allele.

Step 2:

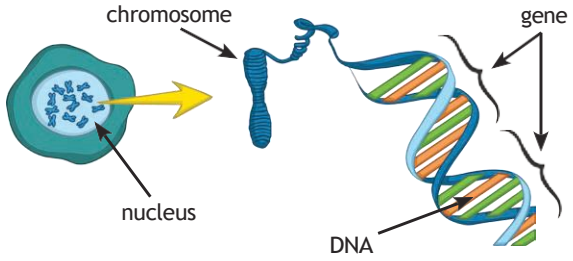
Put the two alleles from the second parent into the boxes on the left. This parent is also a heterozygote.

Step 3:

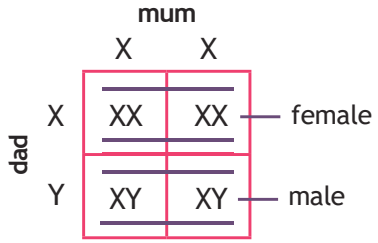
Put the alleles from the first parent into the two boxes underneath them.

Step 4:

Put the alleles from the second parent into the two boxes to the right of them.



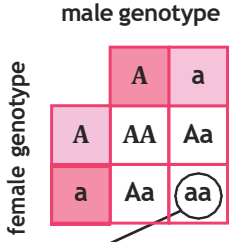
Sex Determination



Females carry two X chromosomes.
Males carry one X and one Y chromosome.

Probability

There are four possible combinations of gametes that offspring can inherit.



One of these four has the genotype aa - that's ¼, 25% or 0.25.

The recessive phenotype has a ratio of 1:3 because only one combination will show the phenotype while the other three will not.

Inheritance, Variation and Evolution Knowledge Organiser

Keywords

embryo screening – Genetic tests carried out on an embryo to see whether it carries a faulty allele.

evolution – A change in the inherited characteristics of a population over time through a process of natural selection.

evolutionary tree – A method used to show how scientists believe organisms are related.

extinction – The permanent loss of all members of a species.

fossils – The remains of organisms from millions of years ago which are found in rocks.

genetic engineering – The process by which scientists manipulate and change the genotype of an organism.

natural selection – The process by which organisms that are better suited to an environment are more likely to survive and reproduce.

selective breeding – Humans selecting animals or plants, that have a required characteristic, for breeding.

speciation – The process by which two species evolve from a single original species by natural selection. The two populations have become so different that they can no longer interbreed to produce fertile offspring.

variation - Differences in characteristics of individuals in a population.

Variation

Variation maybe be due to differences in:

- the genes that have been inherited (genetic causes);
- the conditions in which they have developed (environmental causes);
- a combination of genes and the environment.

Evolution

All species of living things have evolved from simple life forms by natural selection.

- If a variant/characteristic is advantageous in an environment, then the individual will be better able to compete.
- This means they are more likely to survive and reproduce.
- Their offspring will inherit the advantageous allele.

Fossils

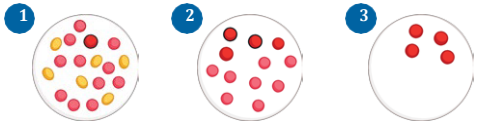
Fossils could be:

- the actual remains of an organism that has not decayed;
- mineralised forms of the harder parts of an organism, such as bones;
- traces of organisms such as footprints or burrows.

Many early life forms were soft-bodied so have left few traces behind.

Fossils help us understand how much or little organisms have changed as life developed on earth.

Resistant Bacteria



There is variation in the bacterial population. One bacterium develops a mutation by chance that means it is resistant to an antibiotic.

The antibiotic kills some of the bacteria, the resistant bacterium survives and reproduces.

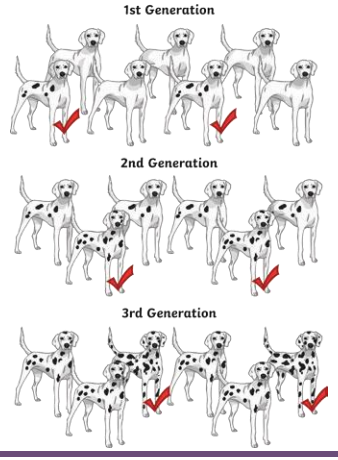
The antibiotic kills the rest of the non-resistant bacteria so the person may start to feel a little better. The resistant bacterium has survived the antibiotic and continues to multiply.

To reduce the rate at which antibiotic-resistant strains appear:

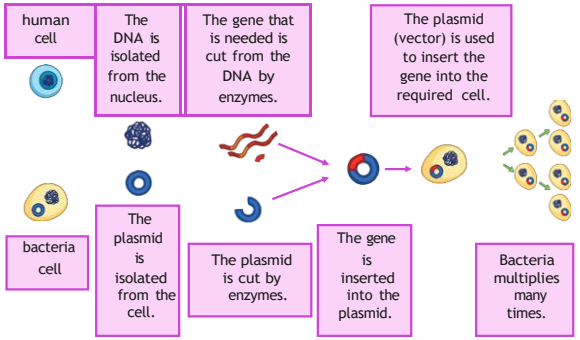
- Antibiotics should only be used when they are really needed, not for treating non-serious or viral infections.
- Patients should complete their courses of antibiotics, even if they start to feel better.
- The agricultural use of antibiotics should be restricted.

Selective Breeding

1. Choose parents who have the desired characteristic.
2. Select the best offspring and breed these to make the next generation.
3. These offspring are then bred again and again, over many generations, until a desired result is achieved.



Genetic Engineering

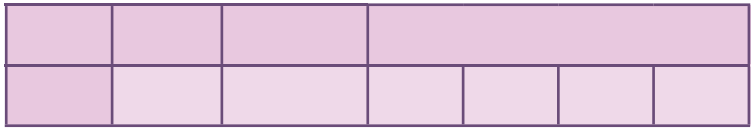


Classification

Linnaeus classified living things into kingdom, phylum, class, order, family, genus and species.

Organisms are named by the binomial system of genus and species.

Due to evidence from chemical analysis, there is now a 'three-domain system' developed by Carl Woese.



AQA GCSE Biology (Combined Science) Unit 5: Homeostasis and Response Knowledge Organiser

Homeostasis

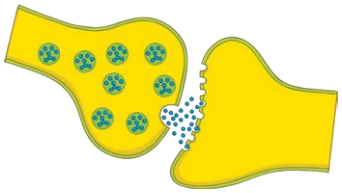
Homeostasis is the regulation of a **constant internal environment**. The conditions are maintained to ensure optimum conditions for metabolism and changes in response to both internal and external fluctuations.

In humans, homeostasis regulates the **blood glucose** (sugar) levels, the body **temperature, CO_2** levels and **water** levels.

The levels are monitored and regulated by automatic control systems which can be either nervous responses (coordinated by the **nervous system**) or chemical responses (coordinated by the **endocrine system**). Information about the environment is called a **stimulus** and is detected by a **receptor**. The information is processed by a **central coordination** system and a response is initiated by an **effector**.

Synapses

A **synapse** is the gap where the ends of two neurons meet.



The information needs to be passed from one neuron to the next, but cannot be passed as an electrical impulse over the synapse (gap). Instead, the message is transmitted by chemical neurotransmitters.

When the electrical impulse arrives at the terminal of the first neuron, it causes a release of neurotransmitter chemicals into the synapse. They travel across the gap and bind to receptor sites on the terminal of the next neuron.

The receptor sites are specific for each type of neurotransmitter. A nerve impulse will only be created in the second neuron when a complimentary chemical binds.

The Nervous Pathway

A stimulus is a change in the environment (internally or externally). In a typical response to stimuli, this information is received by the receptor and sent as an electrical impulse along a sensory neuron towards the central nervous system (CNS). The CNS is comprised of the brain and spinal cord. Here, the impulse is passed through relay neurons and a response to the stimulus is coordinated. This could be consciously or subconsciously. The CNS sends information about the response along a motor neuron as an electrical impulse. The effector receives the impulse and carries out the response.

[stimulus] → receptor → sensory neuron → CNS → motor neuron → effector → [response]

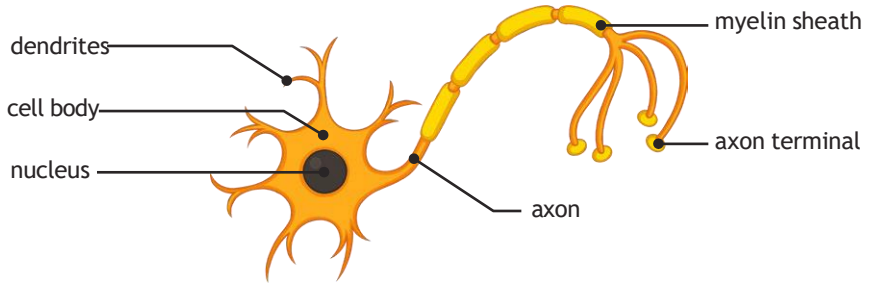
Examples of receptors include rod and cone cells within the eye which respond to light and allow us to see. Or it could be the cells in the skin which respond to pressure or temperature changes allowing us to feel.

An effector could be a muscle or a gland. In response, a muscle might contract to make a movement or a gland releases a chemical into the body.

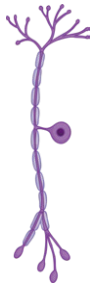
The Human Nervous System

The nervous system allows a fast, short-lived response to a stimulus in the surroundings. The information is received by a receptor, passed along the neurons (nerve cells) as an electrical impulse and results in a response.

You might have to label the parts of a typical neuron:



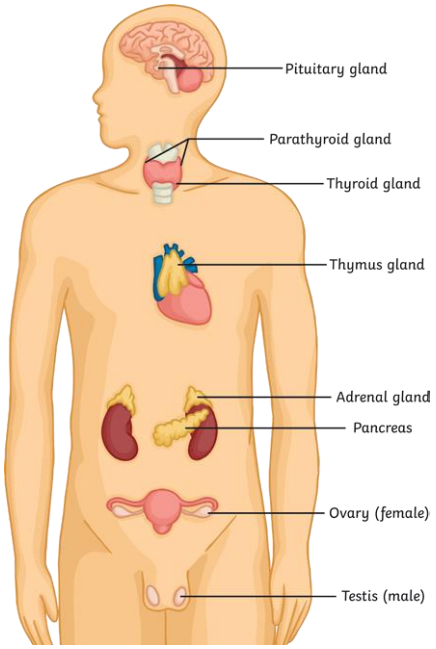
- The axon is the main part of the nerve cell. It is a long, stretched-out fibre of cytoplasm which the electrical impulse will travel along.
- Some axons are surrounded in a layer of fatty cells called the myelin sheath and it helps to insulate the electrical impulse.
- The branched endings, dendrites, connect the neurons together to create a network.

sensory neuron	relay neuron	motor neuron
		

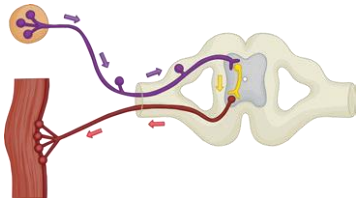
AQA GCSE Biology (Combined Science) Unit 5: Homeostasis and Response Knowledge Organiser

The Endocrine System

You should be able to identify the major glands of the endocrine system, as shown below.



Reflexes



A **reflex** is a fast and automatic response to a particular stimulus which may be harmful to the organism. They are quick because there is no conscious thought or process to deliver the response (they are an **involuntary** action). The pathway which carries the information about a reflex action is called a **reflex arc**.

A **reflex arc** begins with the **stimulus** e.g. a bee sting or a hot object on the skin. The stimulus is detected by the **receptor** cells and an electrical **impulse** is transmitted along the **sensory neuron**. The impulse is passed through **relay neurons** in the spinal cord or the **unconscious** areas of the brain. The response is coordinated **automatically** and sent along the **motor** neuron to the **effector** cells.

Hormones

Hormones are **chemica** messengers transporte c in the **bloodstream** to an effector where they can ac ivate a response. They a e produced and released from glands around the ody which all make up the **endocrine system**. Hormones do a similar ob to the neurons of the nervous system but there are some differences.

	neurons	hormones
speed	fast	slow
duration	short	long
target area	specific	general

The hormones released travel in the blood plas a to their **target cells** and affect only those cer tain cells. Hormones ac on organs or cells where constant adjustments are made to maintain a st able state.

Some examples you shou ld know:

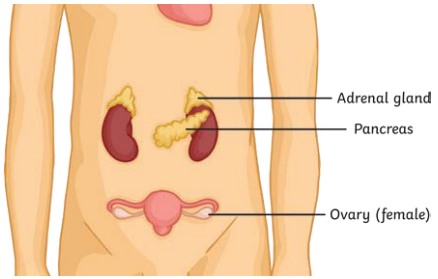
The **pituitary gland** pro uces a range of horm(nes including FSH and LH which help to regula e the menstrual cycle. The pituitary gland acts as a **master gland** beca se many of the hormon(s it releases control and coordinate the release c other hormones from ot her glands in the body.

Diabetes

There are two types of diabetes: type 1 and type 2.

Type 1 diabetes is a disorder affecting the pancreas. In type 1 diabetes, the pancreas does not produce enough insulin to control the blood sugar level and so the levels become higher than normal. Type 1 diabetes is usually treated by injections of insulin.

Type 2 diabetes is a disorder of effector cells which no longer respond to the hormones released from the pancreas. Type 2 diabetes can usually be managed through lifestyle choices such as maintaining a carbohydrate-controlled diet and regular exercise.



The risk of developing type 2 diabetes is higher in people who are obese (have a BMI >30).

Hormones in Human Reproduction

Oestrogen is the main reproductive hormone in females. It is produced in the **ovaries**. During puberty, this hormone increases and it stimulates an egg to be released from an ovary each month. This process is called **ovulation** and happens, on average, every 28 days.

Testosterone is the main reproductive hormone in males. It is produced in the **testes**. This hormone stimulates the production of sperm.

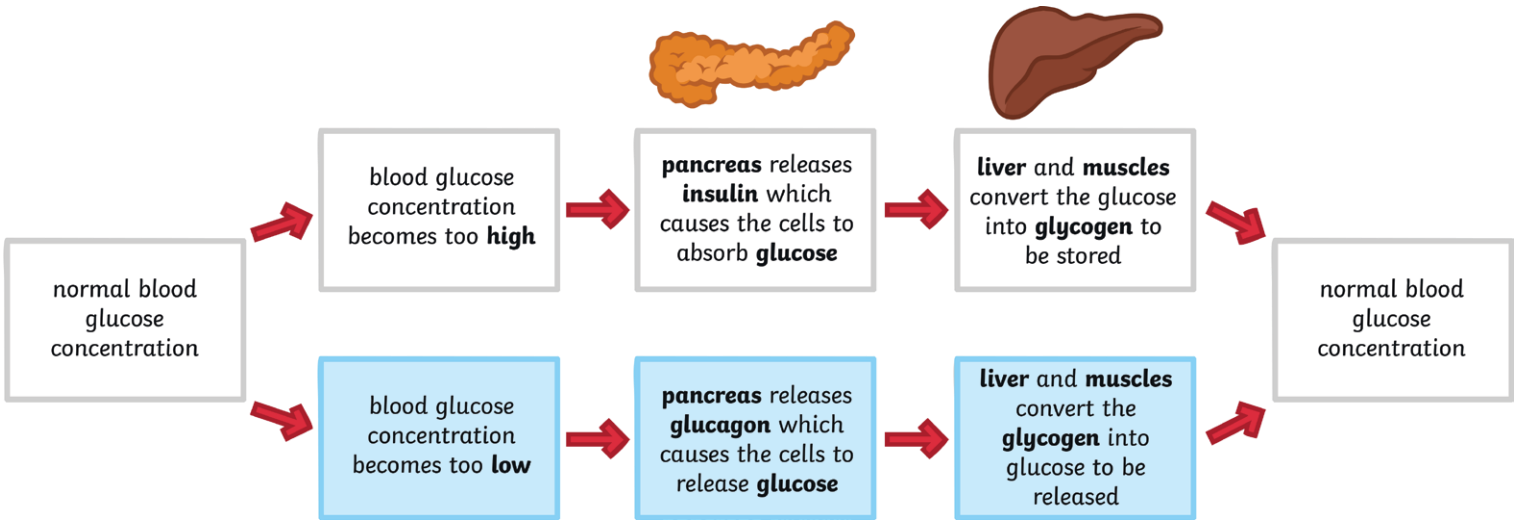
AQA GCSE Biology (Combined Science) Unit 5: Homeostasis and Response Knowledge Organiser

Control of Blood Glucose

The pancreas is the organ and gland which monitors and regulates the blood glucose concentration.

(HT only)

If the blood glucose concentration becomes too low, a negative feedback loop is triggered and the pancreas releases another hormone, **glucagon**, which acts on the liver and muscles to cause the stored **glycogen** to be converted back into **glucose** and released into the bloodstream.

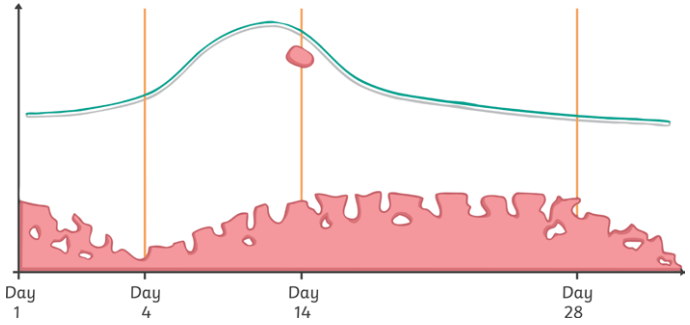


The Menstrual Cycle

The **menstrual cycle** occurs in females, approximately every **28 days**. It is a cyclical process of the building of the lining of the **uterus** and **ovulation**. If the **egg** become fertilised by a sperm, then **pregnancy** follows. If the egg is not fertilised, then the lining of the uterus is shed away and leaves the body as the **menstruation** (or period).

The whole cycle is controlled by four main reproductive hormones:

- **follicle stimulating hormone (FSH)**
- **oestrogen**
- **luteinising hormone (LH)**
- **progesterone**

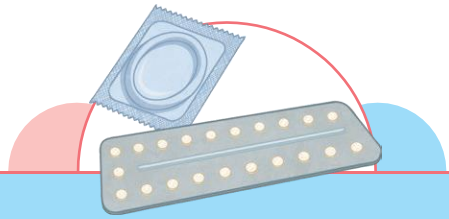


Hormone			
FSH	pituitary gland	An egg to develop in one of the ovaries.	Stimulates the production of oestrogen.
oestrogen	ovaries	The lining of the uterus builds up and thickens.	Stimulates the production of LH. Inhibits the production of FSH.
LH	pituitary gland	Ovulation (at around day 14 of the cycle).	Indirectly stimulates the production of progesterone.
progesterone	ovaries	The uterus lining to maintain.	Inhibits the production of LH.

AQA GCSE Biology (Combined Science) Unit 5: Homeostasis and Response Knowledge Organiser

Contraception

There are many different types of **contraceptive** (or birth control) methods. They are categorised as **hormonal** methods and **non-hormonal** methods.



Method	Hormonal or Non-Hormonal	How It Works	Pros and Cons
oral contraceptives ('the pill')	hormonal	Pill taken which contains hormones to **inhibit FSH** so that an egg does not mature.	🙂 Easily self-administered. Short-term effects. Can easily be reversed. Very reliable. 😕 May have mild side-effects associated. Could lead to pregnancy if missed. Does not protect from STIs.
injection, implant or skin patch	hormonal	Contains **progesterone** which is slowly released to inhibit the release of eggs for months or even years.	🙂 Administered through routine appointment at GP surgery. Requires little to no aftercare or maintenance. Very reliable. 😕 May take some time for effects to be reversed once removed. Does not protect from STIs.
condoms or diaphragm (female condom)	non-hormonal	Creates a **physical barrier** to prevent the sperm from reaching the egg.	🙂 Easy to use. Short-term effects. Very reliable. Provides protection from most STIs. 😕 Can fail.
intrauterine devices (coil)	hormonal	The device is attached to the lining of the uterus and **releases hormones or prevents the implantation** of an embryo.	🙂 Requires little to no aftercare or maintenance. Very reliable. 😕 May take some time for effects to be reversed once removed. Does not protect from STIs.
spermicidal agents	non-hormonal	Contains chemicals to **kill** or **immobilise sperm** cells.	🙂 Easy to use. Short-term effects. 😕 Does not protect from STIs. Less effective when used as the only method.
abstaining from intercourse (around the time of ovulation)	non-hormonal	Avoiding sexual intercourse when there is a likelihood of an egg being present in the oviduct.	🙂 inexpensive 😕 Not always reliable.
surgery	non-hormonal	A surgical procedure carried out in men or women. In males, the vas deferens tubes are sealed or blocked to prevent the passage of sperm from the testes. In females, the fallopian tubes (oviducts) are sealed or blocked to prevent the passage of the egg from the ovaries.	😕 Risks associated with surgery (such as infection). 😕 Difficult to reverse (if at all possible). Can take several months to be reliable.

AQA GCSE Biology (Combined Science) Unit 5: Homeostasis and Response Knowledge Organiser

Infertility (HT Only)

Depending on the reason for the **infertility**, there are different methods of treatment and technologies to help women become pregnant.

The hormones **FSH** and **LH** can be given in a **'fertility drug'** to help stimulate the normal cyclic processes and enable the woman to become **pregnant** naturally.

In Vitro Fertilisation (IVF) is a treatment which involves several stages:

- The woman is given FSH and LH to **stimulate the ovaries** to mature and release several eggs.
- The **eggs** are then collected from the woman and **fertilised** using **sperm** collected from the man. This is done in the lab (in vitro means "outside the living organism").
- The fertilised eggs develop into **embryos**.
- At the early stage of development (blastocyst), one or two embryos are inserted into the woman's **uterus** for **implantation**.
- If successful, the **pregnancy** progresses as normal.

Fertility treatments offer couples the chance to have their own baby. However, the processes are often very stressful and emotional. The success rates are low. The underlying causes of the infertility are not usually being treated. Fertility treatments can carry a higher chance of multiple births (twins, triplets or more), which carries a risk to both the mother and the unborn babies.

Adrenaline and Thyroxine (HT Only)

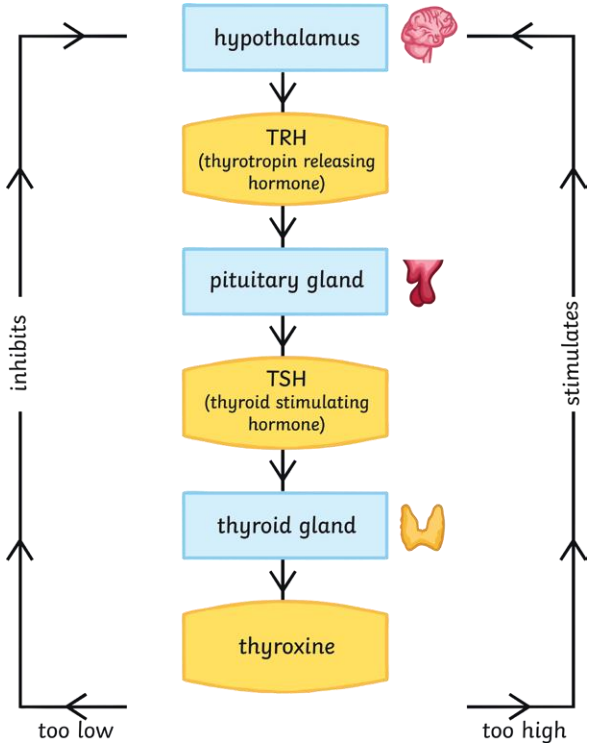
Adrenaline is a hormone produced by the **adrenal glands**. It is released in response to stress or fear. The hormone acts on major organs including the heart and lungs. The effect is to increase the heart rate and breathing rate and cause vasodilation (widening of the blood vessels), in order to supply the brain and muscles with more oxygen and glucose.

This prepares the body for a 'flight or fight' response to the fear or stress.

Thyroxine is a hormone produced by the **thyroid gland**. It stimulates the rate of **metabolism** in the body by controlling how quickly food products and oxygen are reacted, therefore controlling how quickly **energy** is released.

Negative Feedback of Thyroxine

A **negative feedback** system regulates the level of thyroxine in the body.



AQA GCSE Biology (Combined Science) Unit 5: Homeostasis and Response Knowledge Organiser

Required practical activity 7: plan and carry out an investigation into the effect of a factor on human reaction time.

The aim of the investigation is to **investigate out whether reaction times can be reduced with practice.**

Method:

In this experiment you are working with a partner and you are always using the opposite hand to your writing hand.

1. One of the pair sits upright on a chair and places their forearm on the table so that their hand is hanging over the edge of the table.
2. The other partner places a ruler vertically between the person sitting down's thumb and first finger. The thumb and first finger should be as far apart as possible.
3. Ensure the 0cm end of the ruler is pointing downwards.
4. Place the 0cm mark level with the top of the thumb and drop without telling your partner you are going to do it. Do tell them that the aim is for them to catch the ruler as quickly as possible.
5. Reading from the top of the thumb, record how many centimetres it took to catch.
6. Repeat nine more times.
7. Swap roles with your partner.
8. Using the reaction time conversion tables, convert your results from centimetres to reaction times (s).

The **independent variable** is the method for improvement e.g. amount of practice, use of caffeine

The **dependent variable** is the reaction time in seconds (converted from the cm taken to catch the ruler).

Inheritance, Variation and Evolution Knowledge Organiser

Keywords

allele - An alternative form of a gene.

asexual reproduction - The production of offspring from a single parent by mitosis. The offspring are clones of the parent.

chromosome - Structures that contain the DNA of an organism and are found in the nucleus.

cystic fibrosis - A disorder of cell membranes that is caused by a recessive allele.

DNA - A polymer that is made up of two strands that form a double helix.

dominant - An allele that is always expressed, even if only one copy is present.

fertilisation - The fusion of male and female gametes.

gamete - Sperm cell and egg cell in animals; pollen and egg cell in plants.

gene - A small section of DNA that codes for a specific protein.

genome - The entire genetic material of an organism.

genotype - The combination of alleles.

heterozygous - A genotype that has two different alleles, one dominant and one recessive.

homozygous - A genotype that has two of the same alleles. Either two dominant alleles or two recessive alleles.

meiosis - The two-stage process of cell division that reduces the chromosome number of the daughter cells. It makes gametes for sexual reproduction.

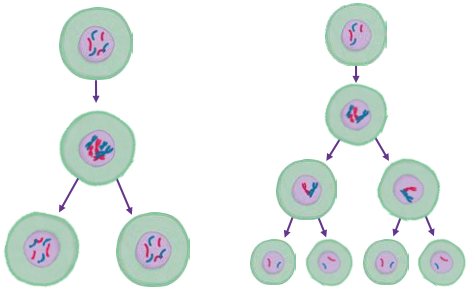
mutation - A change in DNA.

phenotype - The characteristic expressed because of the combination of alleles.

polydactyly - Having extra fingers or toes. It is caused by a dominant allele.

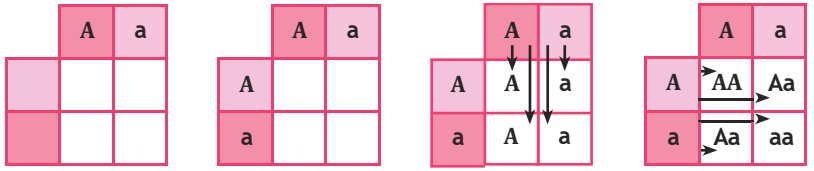
recessive - An allele that is only expressed if two copies of it are present.

sexual reproduction - The production of offspring by combining genetic information from the gametes of two parents. Leads to variation in the offspring.



Mitosis	Meiosis
Produces two daughter cells.	Produces four daughter cells.
Daughter cells are genetically identical.	Daughter cells are not genetically identical.
The cell divides once.	The cell divides twice.
The chromosome number of the daughter cells is the same as the parent cells. In humans, this is 46 chromosomes.	The chromosome number is reduced by half. In humans, this is 23 chromosomes.
Used for growth and repair, and asexual reproduction.	Produces gametes for sexual reproduction.

How to Complete a Punnet Square



Step 1:

Put the two alleles from one parent into the boxes at the top. This parent is a heterozygote. This means they have one dominant and one recessive allele.

Step 2:

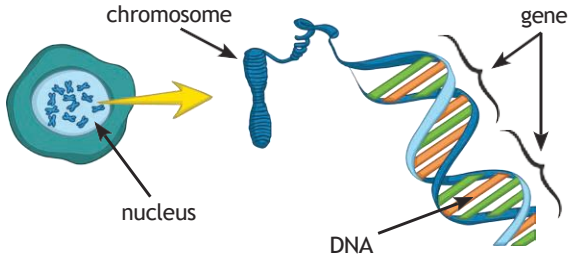
Put the two alleles from the second parent into the boxes on the left. This parent is also a heterozygote.

Step 3:

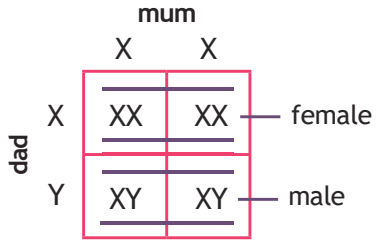
Put the alleles from the first parent into the two boxes underneath them.

Step 4:

Put the alleles from the second parent into the two boxes to the right of them.



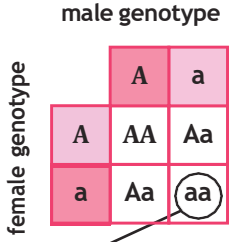
Sex Determination



Females carry two X chromosomes.
Males carry one X and one Y chromosome.

Probability

There are four possible combinations of gametes that offspring can inherit.



One of these four has the genotype aa - that's ¼, 25% or 0.25.

The recessive phenotype has a ratio of 1:3 because only one combination will show the phenotype while the other three will not.

Inheritance, Variation and Evolution Knowledge Organiser

Keywords

embryo screening – Genetic tests carried out on an embryo to see whether it carries a faulty allele.

evolution – A change in the inherited characteristics of a population over time through a process of natural selection.

evolutionary tree – A method used to show how scientists believe organisms are related.

extinction – The permanent loss of all members of a species.

fossils – The remains of organisms from millions of years ago which are found in rocks.

genetic engineering – The process by which scientists manipulate and change the genotype of an organism.

natural selection – The process by which organisms that are better suited to an environment are more likely to survive and reproduce.

selective breeding – Humans selecting animals or plants, that have a required characteristic, for breeding.

speciation – The process by which two species evolve from a single original species by natural selection. The two populations have become so different that they can no longer interbreed to produce fertile offspring.

variation - Differences in characteristics of individuals in a population.

Variation

Variation maybe be due to differences in:

- the genes that have been inherited (genetic causes);
- the conditions in which they have developed (environmental causes);
- a combination of genes and the environment.

Evolution

All species of living things have evolved from simple life forms by natural selection.

- If a variant/characteristic is advantageous in an environment, then the individual will be better able to compete.
- This means they are more likely to survive and reproduce.
- Their offspring will inherit the advantageous allele.

Fossils

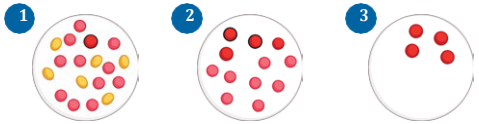
Fossils could be:

- the actual remains of an organism that has not decayed;
- mineralised forms of the harder parts of an organism, such as bones;
- traces of organisms such as footprints or burrows.

Many early life forms were soft-bodied so have left few traces behind.

Fossils help us understand how much or little organisms have changed as life developed on earth.

Resistant Bacteria



There is variation in the bacterial population. One bacterium develops a mutation by chance that means it is resistant to an antibiotic.

The antibiotic kills some of the bacteria, the resistant bacterium survives and reproduces.

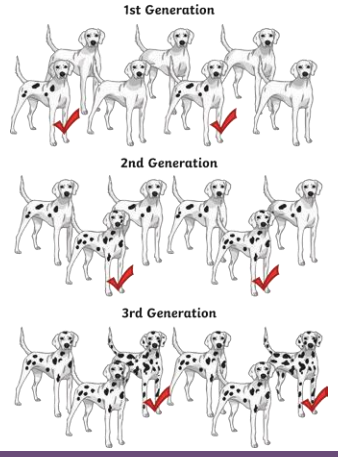
The antibiotic kills the rest of the non-resistant bacteria so the person may start to feel a little better. The resistant bacterium has survived the antibiotic and continues to multiply.

To reduce the rate at which antibiotic-resistant strains appear:

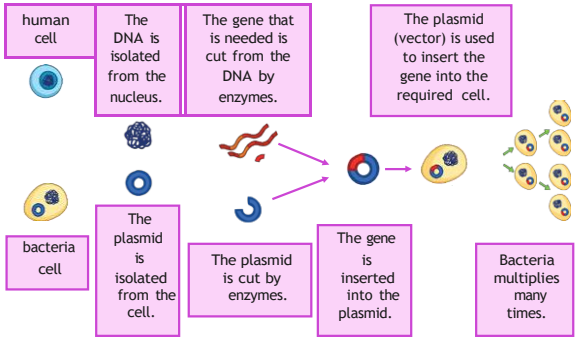
- Antibiotics should only be used when they are really needed, not for treating non-serious or viral infections.
- Patients should complete their courses of antibiotics, even if they start to feel better.
- The agricultural use of antibiotics should be restricted.

Selective Breeding

1. Choose parents who have the desired characteristic.
2. Select the best offspring and breed these to make the next generation.
3. These offspring are then bred again and again, over many generations, until a desired result is achieved.



Genetic Engineering

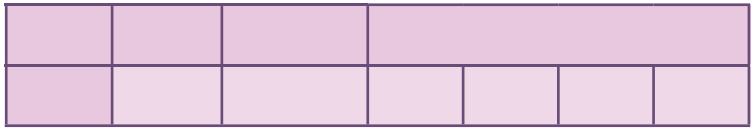


Classification

Linnaeus classified living things into kingdom, phylum, class, order, family, genus and species.

Organisms are named by the binomial system of genus and species.

Due to evidence from chemical analysis, there is now a 'three-domain system' developed by Carl Woese.



AQA Combined Science: Physics Topic 3 Particle Model of Matter

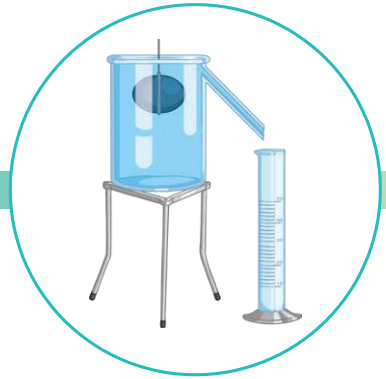
Required Practical

Measuring the density of a regularly shaped object:

- Measure the mass using a balance.
- Measure the length, width and height using a ruler.
- Calculate the volume.
- Use the density (p = m/V) equation to calculate density.

Measuring the density of an irregularly-shaped object:

- Measure the mass using a balance.
- Fill a eureka can with water.
- Place the object in the water - the water displaced by the object will transfer into a measuring cylinder.
- Measure the volume of the water. This equals the volume of the object.
- Use the density (p = m/V) equation to calculate density.



Density

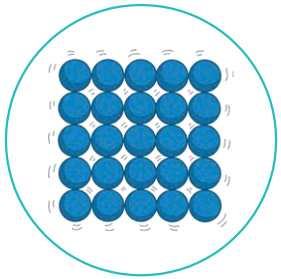
Density is a measure of how much mass there is in a given space.

Density (kg/m^3) = mass (kg) ÷ volume (m^3)

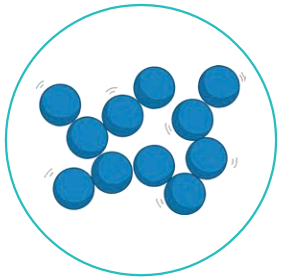
A more dense material will have more particles in the same volume when compared to a less dense material.

Particles

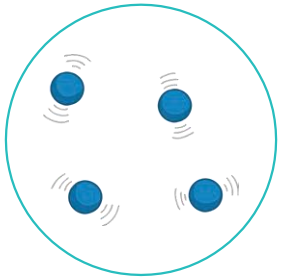
Solids have strong forces of attraction. They are held together very closely in a fixed, regular arrangement. The particles do not have much energy and can only vibrate.



Liquids have weaker forces of attraction. They are close together, but can move past each other. They form irregular arrangements. They have more energy than particles in a solid.



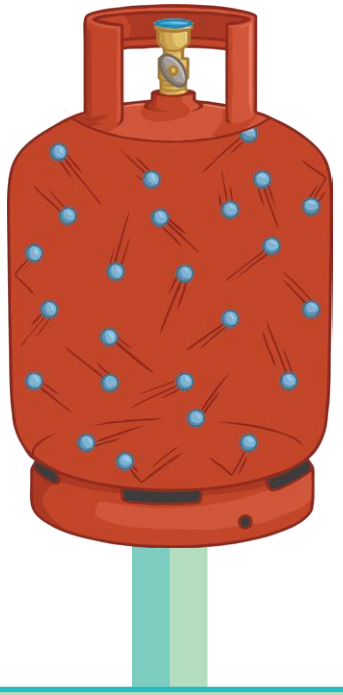
Gases have almost no forces of attraction between the particles. They have the most energy and are free to move in random directions.



Particles

Gas particles can move around freely and will collide with other particles and the walls of the container. This is the pressure of the gas.

If the temperature of the gas increases, then the pressure will also increase. The hotter the temperature, the more kinetic energy the gas particles have. They move faster, colliding with the sides of the container more often.



Density

The density of an object is 8050kg/m^3 and it has a volume of 3.4m^3 - what is its mass in kg?

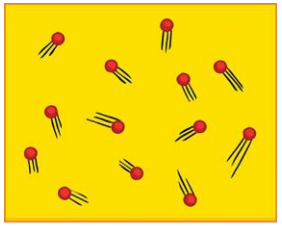
8050 = mass ÷ 3.4

8050 × 3.4 = mass

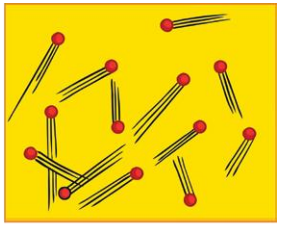
27 370kg

Internal Energy

Particles within a system have kinetic energy when they vibrate or move around. The particles also have a potential energy store. The total internal energy of a system is the kinetic and potential energy stores.



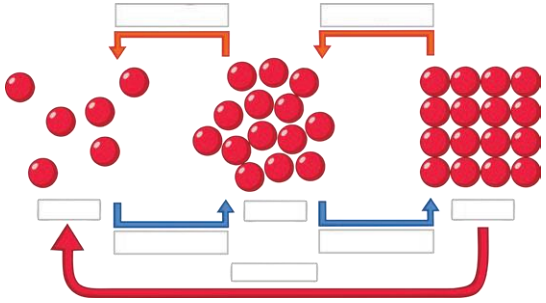
Low Temperature



High Temperature

If the system is heated, the particles will gain more kinetic energy, so increasing the internal energy.

Changing State

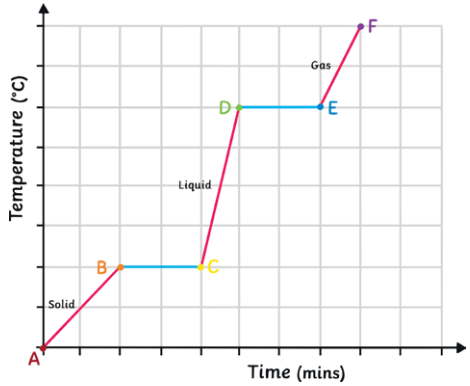


If a system gains more energy, it can lead to a change in temperature or change in state. If the system is heated enough, then there will be enough energy to break bonds.

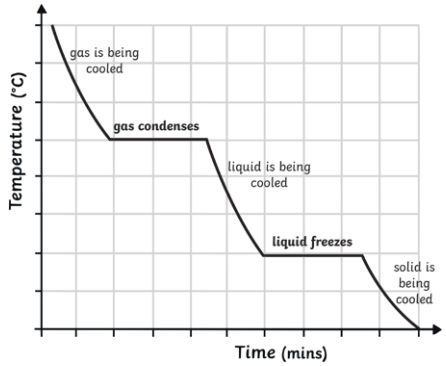
When something changes state, there is no chemical change, only physical. No new substance is formed. The substance will change back to its original form. The number of particles does not change and mass is conserved.

Specific Latent Heat

Energy is being put in during melting and boiling. This increases the amount of internal energy. The energy is being used to break the bonds, so the temperature does not increase. This is shown by the parts of the graph that are flat.



When a substance is condensing or freezing, the energy put in is used to form the bonds. This releases energy. The internal energy decreases, but the temperature does not go down.



The energy needed to change the state of a substance is called the latent heat.

Specific latent heat is the amount of energy needed to change 1kg of a substance from one state to another without changing the temperature. Specific latent heat will be different for different materials.

- solid → liquid - specific latent heat of **fusion**
- liquid → gas - specific latent heat of **vaporisation**

Specific Latent Heat Equation

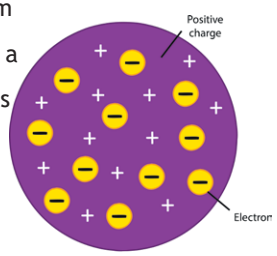
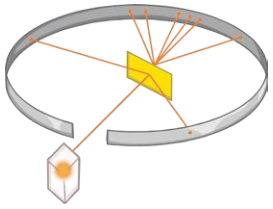
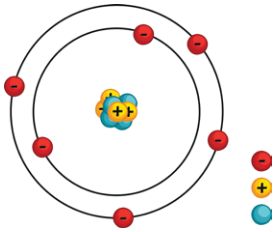
The amount of energy needed/released when a substance of mass changes state.

energy (E) = mass (m) × specific latent heat (L)

$E = mL$

Atomic Structure Knowledge Organiser - Foundation and Higher

Developing the Model of the Atom

John Dalton	Start of 19th century	Atoms were first described as solid spheres.
JJ Thomson	1897	Thomson suggested the plum pudding model - the atom is a ball of charge with electrons scattered within it.  Plum pudding model
Ernest Rutherford	1909	Alpha Scattering experiment - Rutherford discovered that the mass is concentrated at the centre and the nucleus is charged. Most of the mass is in the nucleus. Most atoms are empty space. 
Niels Bohr	Around 1911	Bohr theorised that the electrons were in shells orbiting the nucleus. 
James Chadwick	Around 1940	Chadwick discovered neutrons in the nucleus.

Isotopes

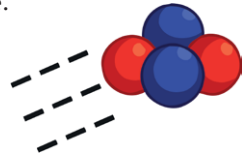
An isotope is an element with the same number of protons but a different number of neutrons. They have the same atomic number, but different mass numbers.

Isotope	Protons	Electrons	Neutrons
$^{1}_{1}H$	1	1	0
$^{2}_{1}H$	1	1	1
$^{3}_{1}H$	1	1	2

Some isotopes are unstable and, as a result, decay and give out radiation. Ionising radiation is radiation that can knock electrons off atoms. Just how ionising this radiation is, depends on how readily it can do that.

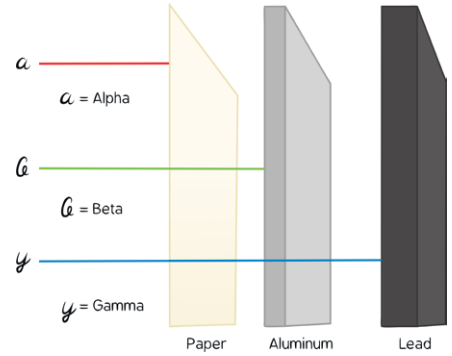
Alpha

Alpha radiation is an alpha particle emitted from the nucleus of a radioactive nuclei. It is made from two protons and two neutrons. They can't travel too far in the air and are the least penetrating - stopped by skin and paper. However, they are highly ionising because of their size.



Beta

Beta radiation is a fast moving electron that can be stopped by a piece of aluminium. Beta radiation is emitted by an atom when a neutron splits into a proton and an electron.



Gamma

A gamma wave is a wave of radiation and is the most penetrating - stopped by thick lead and concrete.

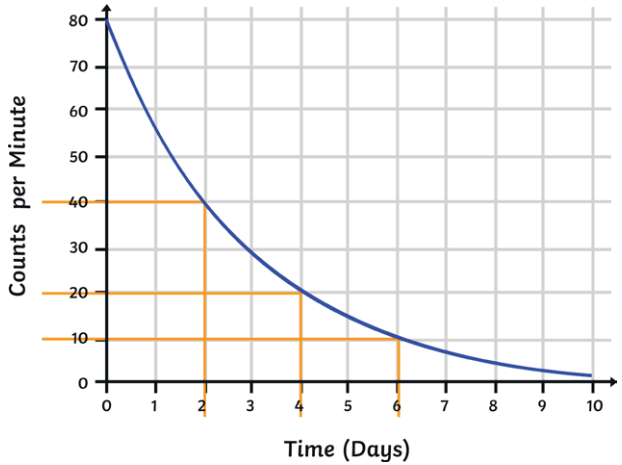
Half-life

The half-life is the time taken for the number of radioactive nuclei in an isotope to halve.

Radioactivity is a random process – you will not know which nuclei will decay. Radioactive decay is measured in becquerels Bq. 1 Bq is one decay per second.

Radioactive substances give out radiation from their nucleus.

A graph of half-life can be used to calculate the half-life of a material and will always have this shape:



Judging from the graph, the radioactive material has a half-life of two days.

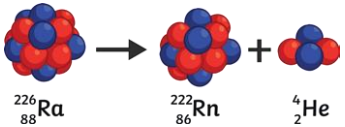
Irradiation

Irradiation occurs when materials are near a radioactive source. The source is sometimes placed inside a lead-lined box to avoid this.

People who work with radioactive sources will sometimes stand behind a lead barrier, be in a different room or use a remote-controlled arm when handling radioactive substances.

Alpha Decay Equations

An alpha particle is made of two protons and two neutrons. The atomic number goes down by two and its mass number decreases by four.



Gamma rays

There is no change to the nucleus when a radioactive source emits gamma radiation. It is the nucleus getting rid of excess energy.

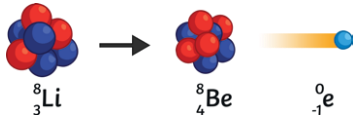
Contamination

When unwanted radioactive atoms get onto an object, it is possible for the radioactive particles to get inside the body.

Protective clothing should be worn when handling radioactive material.

Beta Decay Equations

A neutron turns into a proton and releases a an electron. The mass of the nucleus does not change but the number of protons increases.



Alpha radiation is more dangerous inside the body. It is highly ionising and able to cause a lot of damage. Outside the body it is less dangerous because it cannot penetrate the skin.

Beta radiation is less dangerous inside the body as some of the radiation is able to escape. Outside the body it is more dangerous as it can penetrate the skin.

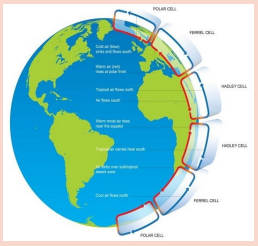
Gamma radiation is the least dangerous inside the body as most will pass out and it is the least ionising. Gamma is more dangerous outside the body as it can penetrate the skin.

Topic 1
Global Hazards

Global pattern of air circulation

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

Hadley cell	Largest cell which extends from the Equator to 30° north & south of the equator
Ferrel cell	Middle cell where air flows poleward between 30° & 60° latitude.
Polar cell	Smallest & weakest cell that occurs from the poles (90° north and south) to the Ferrell cell.



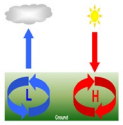
Climate Zones

The global circulation system controls temperatures by influencing precipitation and the prevailing winds. This creates distinctive climate zones.

Temperate Climate	Mid-latitude, 50° - 60° north &south of the Equator. Here air rises and cools to form clouds and therefore frequent rainfall. e.g. UK.
Tropical Climate	Found along the Equatorial belt, this zones experiences heavy rainfall and thunderstorms. E.g. Brazil.
Polar Climate	Within the polar zones cold air sinks causing dry, icy and strong winds. E.g. Antarctica.
Desert Climate	30° north and south of the equator, sinking dry airs leads to high temperatures without conditions for rainfall. E.g. Libya.

High and Low Pressure

High Pressure	Low Pressure
Caused by cold air sinking. Causes clear and calm weather	Caused by hot air rising. Causes stormy, cloudy weather.



What is wind?

Wind is the movement of air from an area of high pressure to one of low pressure.

Types of wind

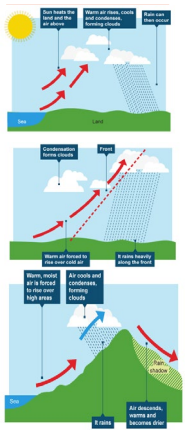
Katabatic Winds	Winds that carry air from the high ground down a slope due to gravity. e.g. Antarctic.
Trade Winds	Wind that blow from high pressure belts to low pressure belts.
Jet Streams	These are winds that are high in the atmosphere travelling at speeds of 225km/h.

What is precipitation?

This is when water vapour is carried by warm air that rises. As it gets higher, the air cools and the water vapour condenses to form a cloud. As water molecule collide and become heavier, the water will fall to Earth as precipitation.

Types of precipitation

Convectional Rainfall	When the land warms up, it heats the air enough to expand and rise. As the air rises it cools and condenses. If this process continues then rain will fall.
Frontal Rainfall	When warm air meets cool air an front is formed. As the warm air rises over the cool air, clouds are produced. Eventually steady rain is produced.
Relief Rainfall	When wind meets mountains, the warm air is forced to rise quickly and cool. This leads condensation and eventually rainfall. When the air descend however, little very rainfall falls, creating a rain shadow.

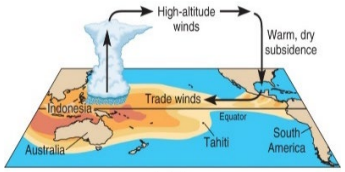


Distribution of Droughts

Drought can occur anywhere throughout the world but they are more frequent between the tropics of Cancer and Capricorn. Many countries in Africa suffer from severe drought, such as Ethiopia but Australia also suffer.

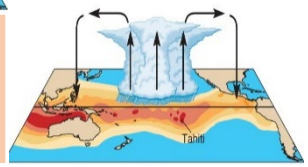
Causes of Drought: El Nino effect

The El Nino effect is also associated with creating dry conditions.



Normally, warm ocean currents off the coast of Australia cause moist warm air to rise and condense causing storms and rain over Australia.

In an El Niño year (every 2-7 years) the cycle reverses. Cooler water off the coast of Australia reverses the wind direction leading to dry, sinking air over Australia causing hot weather and a lack of rainfall.



Extremes in weather conditions

Wellington, New Zealand
Very high wind speeds (248mkm/h) due to the surrounding mountains funnelling wind.

Puerto Lopez
Found along the equator, high temperatures lead to rapid condensation and heavy rainfall.

The Atacama, Chile
The Andes mountains block moist warm travelling any further west. This causes rainfall to the east, but a rain shallow to the west.

Mawsynram, India
This village see a lot of rain each year (11m per yr). This is due to the reversal of air conditions/directions from sea to land. In the summer, this contributes to monsoons.

Changing pattern of these Hazards

Tropical Storms	Scientist believe that global warming is having an impact on the frequency and strength of tropical storms. This may be due to an increase in ocean temperatures.
Droughts	The severity of droughts have increase since the 1940s. This may be due to changing rainfall and evaporation patterns related to gradual climate change.

Distribution of Tropical Storms.

They are known by many names, including hurricanes (North America), cyclones (India) and typhoons (Japan and East Asia). They all occur in a band that lies roughly between the tropics of Cancer and Capricorn and despite varying wind speeds are ferocious storms. Some storms can form just outside of the tropics, but generally the distribution of these storms is controlled by the places where sea temperatures rise above 27°C.

Formation of Tropical Storms

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

Case Study: UK Heat Wave 2003

Causes

The heat wave was caused by an anticyclone (areas of high pressure) that stayed in the area for most of August. This blocked any low pressure systems that normally brings cooler and rainier conditions.,

Effects	Management
• People suffered from heat strokes and dehydration. • 2000 people died from causes linked to heatwave. • Rail network disrupted and crop yields were low.	• The NHS and media gave guidance to the public. • Limitations placed on water use (hose pipe ban). • Speed limits imposed on trains and government created 'heatwave plan'.

Case Study: Typhoon Haiyan 2013

Causes

Started as a tropical depression on 2rd November 2013 and gained strength. Became a Category 5 "super typhoon".

Effects	Management
• Almost 4,000 deaths. • 130,000 homes destroyed • Water and sewerage systems destroyed caused diseases. • Emotional grief for lost ones.	• The UN raised £190m in aid. • USA & UK sent helicopter carrier ships deliver aid remote areas. • Education on typhoon preparedness.

The structure of the Earth

The Crust	Varies in thickness (5-10km beneath the ocean. Made up of serval large plates.
The Mantle	Widest layer (2900km thick). The heat and pressure means the rock is in a liquid state that is in a state of convection.
The Inner and outer Core	Hottest section (5000 degrees). Mostly made of iron and nickel and is 4x denser than the crust. Inner section is solid whereas outer layer is liquid.

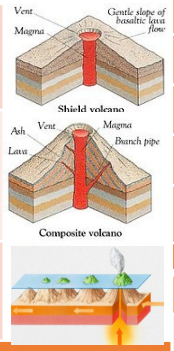
Convection Currents

The Lithosphere is divided into tectonic plates which are moving due to convection currents in the asthenosphere.

1. Radioactive decay of some of the elements in the core and mantle generate a lot of heat.
2. When lower parts asthenosphere heat up they become **less dense** and **slowly rise**.
3. As they move towards the top they cool down, become **more dense** and **slowly sink**.
4. These **circular movements** of semi-molten rock are **convection currents**
5. Convection currents create **drag** on the base of the tectonic plates and this causes them to move.

Types of volcanoes

Shield	Made of basaltic rock and form gently sloping cones from layers of runny lava. Location: hot spots and constructive margins. Eruptions: gentle and predictable
Composite	Most common type found on land. Created by layers of ash and lava. Location: Destructive margins Eruptions: explosive and unpredictable due to the build of pressure within the magma chamber.
Hotspots	These happen away from any plate boundaries. They occur because a **plume of magma rises** to eat into the plate above. Where lava breaks through to the surface, **active volcanoes** can occur above the hot spot. E.g. Hawaii.



CASE STUDY: HAITI EARTHQUAKE 2010 (LIDC)

Causes

- Haiti is on the conservative plate boundary of the Caribbean and North American plate.
- Magnitude 7 earthquake hit Haiti at 16:53 local time.
- Epicentre was 25km west of the capital Port-au-Prince

Effects

Social: Over 220,000 deaths, 300,000 injured. 1.3 million made homeless. Several hospitals destroyed

Economic: 30,000 business buildings collapsed. Total cost was $8.5 billion Airport and port damaged – trade affected.

Environmental: Cholera spread. Drinking water became contaminated.

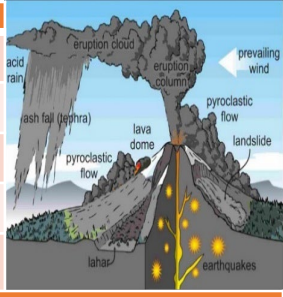
Responses

IMMEDIATE – Dominican republic provide water and medical supplies. ACs such as Iceland sent emergency rescue teams. UN troops were sent to distribute aid and stop looting. 500 makeshift camps were put up.

LONG TERM –US ship docked to make 1.5 million litres of drinking water a day. $330 million given by the world bank. Debt repayments waived for 5 years

Volcanic Hazards

Ash cloud	Small pieces of pulverised rock and glass which are thrown into the atmosphere.
Gas	Sulphur dioxide, water vapour and carbon dioxide come out of the volcano.
Lahar	A volcanic mudflow which usually runs down a valley side on the volcano.
Pyroclastic flow	A fast moving current of super-heated gas and ash (1000ºC). They travel at 450mph.
Volcanic bomb	A thick (viscous) lava fragment that is ejected from the volcano.



Managing Volcanic Eruptions

Warning signs	Monitoring techniques
Small earthquakes are caused as magma rises up.	Seismometers are used to detect earthquakes.
Temperatures around the volcano rise as activity increases.	Thermal imaging and satellite cameras can be used to detect heat around a volcano.
When a volcano is close to erupting it starts to release gases.	Gas samples may be taken and chemical sensors used to measure sulphur levels.

Preparation	
Creating an exclusion zone around the volcano.	Being ready and able to evacuate residents.
Having an emergency supply of basic provisions, such as food	Trained emergency services and a good communication system.

Types of Plate Margins

Destructive Plate Margin

When the **denser plate subducts** beneath the other, **friction** causes it to melt and become molten magma. The magma **forces its ways up** to the surface to form a volcano. This margin is also responsible for **devastating earthquakes.**

Constructive Plate Margin

Here **two plates are moving** apart causing **new magma** to reach the surface through the gap. Volcanoes formed along this crack cause a submarine mountain range such as those in the **Mid Atlantic Ridge**.

Conservative Plate Margin

A conservative plate boundary occurs where **plates slide past each other in opposite directions**, or in **the same direction** but at **different speeds**. This is responsible for **earthquakes** such as the ones happening along the **San Andreas Fault, USA.**

Collision Zones

Collision zones form when **two continental plates collide**. Neither plate is forced under the other, and so **both are forced up** and form **fold mountains**. These zones are responsible for **shallow earthquakes** in the **Himalayas**.

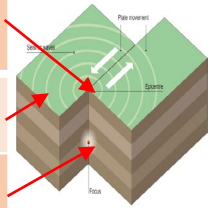
Causes of Earthquakes

Earthquakes are caused when two plates become locked causing friction to build up. From this stress, the pressure will eventually be released, triggering the plates to move into a new position. This movement causes energy in the form of seismic waves, to travel from the focus towards the epicentre. As a result, the crust vibrates triggering an earthquake.

The point directly above the focus, where the seismic waves reach first, is called the **EPICENTRE**.

SEISMIC WAVES (energy waves) travel out from the focus.

The point at which pressure is released is called the **FOCUS**.



Depth of Earthquake

Shallow Focus	Deep Focus
-Usually small and common. -Seismic waves spread and damage wide area.	-Occur on destructive margins. -Damage is localised as seismic waves travel vertically.

How do we measure earthquakes?

Mercalli Scale

- Measures how much damage is caused, based on observations, not scientific instruments.
- Base from 'Instrument' and 'Weak' to 'Extreme' and 'Cataclysmic'.
- Limitations is that its subjective due to it being based on perception.

Richter Scale

- Is a scientific measurement based on the energy released.
- Measured by seismometers using measurement from 1 – 10
- Logarithmic – each point up the scale is 10 times greater than the one before.

Earthquake Management

PREDICTING

Methods include:

- Satellite surveying (tracks changes in the earth's surface)
- Laser reflector (surveys movement across fault lines)
- Radon gas sensor (radon gas is released when plates move so this finds that)
- Seismometer
- Water table level (water levels fluctuate before an earthquake).
- Scientists also use seismic records to predict when the next event will occur.

PROTECTION

You can't stop earthquakes, so earthquake-prone regions follow these three methods to reduce potential damage:

- Building earthquake-resistant buildings
- Raising public awareness
- Improving earthquake prediction

Earthquake proof buildings ideas

1. Counter-weights (tuned mass damper) to the roof to help balance any swaying.	2. Roof made from reinforced cement concrete.
3. Foundations made from reinforced steel pillars, bail-bearings or rubber.	4. Windows fitted with shatter-proof glass to reduce breakage.
5. Lightweight materials that cause minimal damage if fallen during an earthquake.	6. Ensure gas pipes have an automatic shut off to prevent risk of fire.

BTEC Tech Award Health and Social Care Component 1—Learning Aim A

Knowledge Organiser

Understand Human Growth and Development across life stages and the factors that affect it.

This knowledge organiser will help you to understand key words and concepts, as well as how to spell them and define what they mean.

A1: Growth and Development

Life Stages

Infancy 0-2

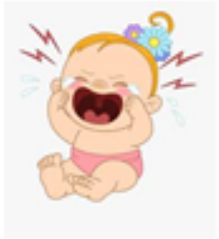
Early Childhood 3-8

Adolescence 9-18

Early Adulthood 19-45

Middle Adulthood 46-65

Later Adulthood 65+



PIES

Physical

Physical growth, muscles, strength, balance, co-ordination, illness/ health.

Intellectual

Development of thinking and language skills, brain development.

Emotional

Development of feelings, emotions, sense of self and understanding of others.

Social

Forming relationships, socialising and communicating with others.

A2: Factors affecting Growth and Development

Physical Factors

Physical factors can affect growth and development such as diet and exercise. This enables a person to be healthy and means they are strong enough to fight off illness.

Economic Factors

Economic factors can affect a person's growth and development. Having a substantial (enough) income can ensure a person has successful growth and development by providing good housing and having enough money for food, water and shelter.

Social and Cultural Factors

Social and Cultural factors include relationships, influence of role models, educational experiences , religion, gender etc. These experiences will help to shape an individual.

Key Words: Physical, Intellectual, Emotional, Social, Adolescence, Culture, Economic, Development, Growth, Isolation, Attachment, Bond, Relationships.

BTEC Tech Award Health and Social Care Component 1—Learning Aim B

Knowledge Organiser

Investigate how individuals deal with life events.

This knowledge organiser will help you to understand key words and concepts, as well as how to spell them and define what they mean.

B1: Different types of Life Event

Physical Events

An event which may cause harm to the individual physically. For example an accident, injury or illness.

Relationship Changes

Relationship changes can take the form of many different types. They include entering into relationships, marriage, divorce, parenthood, bereavement.

Life Circumstances

A life circumstance can sometimes be expected or unexpected. Usually they are unexpected and have a negative impact. For example being excluded from school, being made redundant or being imprisoned.

B2: Coping with change caused by Life Events

When an individual experiences a life event, they may adapt easily or they may require support to help them. People who experience the same life event can have two different ways of coping.

Practical Help: can take the form of financial help, child care and transport. This can be offered by a range of people including informal and formal support networks.

Informal Support: friends, family and partners can offer informal support for individuals. Informal support can offer reassurance, advice and encouragement.

Formal Support: professional services can help people to cope with different types of life event. For example, an individual having a baby will rely on a midwife. A person who has experienced an accident may need the support of a medical professional to treat the injury, and a counsellor to talk through their emotions.

Definitions

Circumstance

A situation which a person may find themselves in.

Adapt

Getting used to a change, making adjustments.

Informal (support)

Casual, relaxed

Formal (support)

Offered by professionals such as GPs.

Key Words: Physical, Relationships, Life Circumstance, Practical, Support, Cope, Change, Life Event.

Year 10 Design and Technology Spring Term Knowledge Organiser

Key Vocabulary

Sustainability

Anthropometrics
Ergonomics
Computer Aided Design (CAD)
Computer Aided Manufacture (CAM)
MDF
Man-made boards
Laser cutting
Profile
Interlocking
Knock-down
Interference Fit
Standard components
Inclusive Design
Stereotype
Traditional
Feature
Nesting
Accuracy
Repeatability
Tolerance
Dimension
Finger joint
Adjustment

DESIGN PROCESS

Evaluating

This should include one from the users and one from the designer.

Think about the following to produce a user questionnaire and your own depth product evaluation.

- Strengths
- Weaknesses
- Matching specification
- Meeting the needs of client
- Materials
- Quality of manufacture
- Overall success of product
- Client product testing and review
- Suggestions for modifying

Health and Safety

Remove any jewellery and tie back long hair. **Wear an apron and roll up your sleeves.** **Walk safely and calmly around the classroom/ workshop.** **Keep your work area and floor area clear.** **Make sure that you are wearing the correct equipment for tasks.** **Report all spillages and clean up properly after yourself**

Year 10 Hospitality and Catering Spring Term Knowledge Organiser 2.1.1 The Importance of Nutrition

Key Vocabulary:

1	**Amino acid**	The basic component of all proteins.
2	**High biological value (HBV) protein**	A protein that contains all of the essential amino acids.
3	**Low biological value (LBV) protein**	A protein that lacks one or more of the essential amino acids.
4	**Sugary foods**	Foods high in sugar, such as jam, cakes, biscuits and ice cream.
5	**Starchy foods**	Foods high in starch, such as pasta, rice, potatoes and bread.
6	**Fat-soluble vitamins**	Vitamins that dissolve in fat; these are vitamins A and D.
7	**Dietary fibre**	A type of carbohydrate found in the cell walls of vegetables, fruits, pulses and cereal grains. It is also known as non-starch polysaccharide (NSP).
8	**Immune system**	The processes of the body that protect against disease.
9	**Fortified cereals**	Cereals with added vitamins and minerals.
10	**Haemoglobin**	Part of the red blood cell that carries oxygen around the body.
11	**High blood pressure**	A higher than normal force of blood pushing against the arteries.
12	**Constipation**	A condition where emptying the bowels is difficult.

Nutrition at different life stages

13 Adults

Early	Growth in regard to height of the body continues to develop until 21 years of age. Therefore, all micro-nutrients and macro-nutrients especially carbohydrates, protein, fats, vitamins, calcium and iron are needed for strength, to avoid diseases and to maintain being healthy.
Middle	The metabolic rate starts to slow down at this stage, and it is very easy to gain weight if the energy intake is unbalanced and there isn't enough physical activity.
Elderly	The body's systems start to slow down with age and a risk of blood pressure can increase as well as decrease in appetite, vision and long-term memory. Because of this, it is essential to keep the body strong and free from disease by continuing to eat a healthy, balanced diet.

14 Children

Babies	All nutrients are essential and important in babies, especially protein as growth and development of the body is very quick at this stage. Vitamins and minerals are also important. You should try to limit the amount of salt and free sugars in the diet.
Toddlers	All nutrients remain very important in the diet at this stage as growth remains. A variety of foods are needed for toddlers to have all the micro-nutrients and macro-nutrients the body needs to develop.
Teenagers	The body grows at a fast pace at different times at this stage as the body develops from a child to an adult, therefore all nutrients are essential within proportions. Girls start their menstruation which can sometimes lead to anaemia due to not having enough iron in the body.

Special dietary needs

The amount of energy the body needs is determined by lifestyles, occupation, age and activity level.

15 Medical conditions

Allergens	Examples of food allergies include milk, eggs, nuts and seafood.
Lactose intolerance	Unable to digest lactose which is mainly found in milk and dairy products.
Gluten intolerance	Follows a gluten free diet and eats alternatives to food containing wheat, barley and rye.
Diabetes (type 2)	High level of glucose in the blood, therefore changes include reducing the amount of fat, salt and sugar in the diet.
Cardiovascular disorder	Needing a balanced, healthy diet with low levels of salt, sugar and fat.
Iron deficiency	Needing to eat more dark green leafy vegetables, fortified cereals and dried fruit.

16 Dietary requirements

Religious beliefs	Different religions have different dietary requirements.
Vegetarian	Avoids eating meats and fish but does eat dairy products and protein alternatives such as quorn and tofu.
Vegan	Avoids all animal foods and products but can eat all plant-based foods and protein alternatives such as tofu and tempeh.
Pescatarian	Follows a vegetarian diet but does eat fish products and seafood.

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 A Christmas Carol Knowledge Organiser

Scrooge
A selfish business man who transforms into a charitable philanthropist. Our protagonist.
"Hard and sharp as flint… As solitary as an oyster" "Are there no prisons…are there no workhouses…"
"I will honour Christmas in my heart. I will live in the Past, the Present, and
the Future. I will not shut out the lessons that they teach."

Fred
Scrooge's nephew whose party invitation he declines. Represents forgiveness and family.
"I have always thought of Christmas as a good time, a kind, forgiving, charitable, pleasant time"
"Scrooge's offences carry their own punishment. Who suffers? Himself!"

Jacob Marley
Scrooge's dead partner who returns to warn Scrooge to change his ways.
"I wear the chain I forged in life"
"The chain was made up of cash boxes.. ledgers.. heavy purses"
"My spirit never roved beyond the narrow limits of our money changing hole"

Bob Cratchitt
Scrooge's clerk. He loves his family and is shown to be happy and morally upright. He has love but not wealth.
"The clerk's fire was so very much smaller that it looked like only one coal" "Tiny Time rode upon his shoulder"
"I'll give you Mr Scrooge, the founder of the feast"
"I think he's walked a little slower than he used to" –

Tiny Tim
Bob's son whose story plays a part in inspiring Scrooge's transformation. Represents the victims of poverty.
"He bore a little crutch, and had his limbs supported by an iron frame!"
"Tiny Tim hoped the people saw him in the church, because he was a cripple, and remember upon Christmas day, who made lame beggars walk, and blind men see."
"God bless us every one"

PLOT STRUCTURE

The Preface
Dickens introduces his 'Ghostly Little Book' and his 'ghost on an idea'. He talks to his reader telling them that he wants if to 'haunt' their memories, so they don't forget why we need to live by Christian values.

Stave One
Scrooge is at work in his counting house. Despite the Christmas Eve cold, he refuses to spend money on coals for the fire. Scrooge's turns down his nephew, Fred's, invitation to his Christmas party and the request of two men who want money for charity. Scrooge is visited by the ghost of his dead partner, Jacob Marley, who tells Scrooge that, due to his greedy life, he has to wander the Earth wearing heavy chains. He tells Scrooge that three spirits will visit him during the next three nights.

Stave Two
He wakes and the Ghost of Christmas Past takes Scrooge into the past. Invisible to those he watches, Scrooge revisits his childhood school days, his apprenticeship with a jolly merchant named Fezziwig, and his engagement to Belle, who leaves Scrooge as he loves money too much to love another human being. Scrooge sheds tears of regret before being returned to his bed.

Stave Three
The Ghost of Christmas Present shows Scrooge Christmas as it will happen that year. Scrooge watches the Cratchit family eat a tiny meal in their little home. He sees Bob Cratchit's son, Tiny Tim, whose kindness and humility warm Scrooge's heart. The spectre shows Scrooge his nephew's Christmas party. Toward the end of the day the ghost shows Scrooge two starved children, Ignorance and Want. He vanishes as Scrooge notices a dark, hooded figure coming.

Stave Four
The Ghost of Christmas Yet to Come takes Scrooge through a sequence of scenes linked to an unnamed man's death. Scrooge, is keen to learn the lesson. He begs to know the name of the dead man. He finds himself in a churchyard with the spirit pointing to a grave.
Scrooge looks at the headstone and is shocked to read his own name. He is desperate to change his fate and promises to change his ways. He suddenly finds himself safely tucked in his bed.

Stave Five
Scrooge rushes out onto the street hoping to share his newfound Christmas spirit. He sends a turkey to the Cratchit house and goes to Fred's party, As the years go by, he continues to celebrate Christmas with all his heart. He treats Tiny Tim as if he were his own child, gives gifts for the poor and is kind, generous and warm.

Key Terms and ideas:
Novella
Ghost Story
Bildungsroman
Transformation
Redemption
Christian Values
1st person narrative voice
3rd person omniscient narrator
Stave
Metaphor, simile, imagery
Senses
Pace
Shifts in time, place, person

Key Concepts and Themes:
Greed
Avarice (an excessive desire for wealth – one of the 7 deadly sins)
Ignorance & Want (lack of knowledge/education & need/poverty)
Redemption (being saved from sin or evil)
Predestination
Free Will
Poverty
Class
Isolation
Transformation
We observe Scrooge observing…
The passage of time
Family
Guilt
Generosity
Social Responsibility
Justice
The supernatural
Christmas
Death

Year 10 GCSE A Christmas Carol Knowledge Organiser

The Ghost of Christmas Past

A strange combination of young and old, wearing white robes and looking like a candle.

"Would you (Scrooge) so soon put out he light I give?"

"A solitary child, neglected by his friends, is left there still – Scrooge sobbed." "Scrooge's heart and soul were in the scene.. he remembered everything, enjoyed everything."

The Ghost of Christmas Present

- A portly, jovial gentleman surrounded by a warm glow. He brings joy to the neediest.

"A jolly giant who bore a glowing torch with a cheery voice and a joyful air" "I see a vacant seat. The child will die"

"They are Man's. This boy is Ignorance. This girl is Want. Beware for I see that written which is Doom."

The Ghost of Christmas Yet To Come

A robed and hooded spirit who confronts Scrooge with his own tombstone.

"It was shrouded in a deep black garment which concealed its head, its face, its form and left nothing visible except one outstretched hand"

"Scrooge crept towards it, trembling, and following the finger, read upon the stone of the neglected grave his own name, Ebenezer Scrooge."

Fezziwig

Scrooge's ex-employer. A representation of a good employer and generosity of spirit.

"Bless his heart; it's Fezziwig alive again!"

"He has the power to render us happy or unhappy; to make our service light or burdensome. The happiness he gives, is as if it cost a fortune"

Belle

- Scrooge's fiancé as a young man.

"Another idol has displaced me.. a golden one"

Fan

- Scrooge's sister. Fred's mother.

"I have come to bring you home dear brother.. home, home, home!"

Year 10 Enterprise & Marketing SPRING Term Knowledge Organiser R068

Market Research

Anything a business does to find out potential customers' wants and needs is called market research.

Primary methods of research generate new data through **surveys**, **focus groups**, **observations** and **interviews**. Data can be expensive to gather, especially if a large amount is needed, but it will be more likely to suit a business's research needs.

Secondary sources of market research, such as **competitor research**, **government publications**, **books** and **newspapers** use data that already exists. Data is cheaper to obtain and quicker as it has already been generated. The data might not be fully applicable to the business's research needs though.

Data generated from research will either be **quantitative** (numbers and percentages) or **qualitative** (written thoughts and opinions).

Sampling

The people a business asks to take part in their research are known as the **sample**. How this sample is selected is known as a **sampling method**.

- **Cluster** – selecting people within a particular group (e.g. age)
- **Convenience** – selecting people who are near and willing
- **Random** – choosing people without thought
- **Quota** – people from each group represent the full population.

Customer Profiles

A Customer Profile is a detailed description of a business's main target customer. They're really specific depictions, so they often include the customer name and picture as well as other key details such as their age, gender, spending habits and lifestyle.

Market Segmentation

Market segmentation is the process of dividing a market into groups – customers are grouped based on key characteristics such as their **age**, **gender**, **occupation**, **income**, **location** or **lifestyle** (e.g. Poundland™ segments by income).

Businesses segment their market so they can tailor products to suit their target audience and so they can aim their marketing efforts at their target customer.

Customer Profile Example

Name: Gary Asher
Age: 39
Occupation: Decorator

Gary lives in Derby with his wife who he married in 2015 and their two children, Izzy and Abbie.

He works full time and, as he has two young children, lives a busy life. He enjoys eating out with his family and plays football at the weekend with a group of friends. He is trying to save as much money as possible to put towards a new house.

R068

KNOWLEDGE ORGANISER

Key Calculations

Revenue:

Selling Price x Number Sold

Total Costs:

Fixed Costs + (Variable Cost for 1 x Number Sold)

Profit or loss:

Revenue – Total Costs

It's a loss if the answer is negative

Break-even:

$$\frac{\text{Fixed Costs}}{\text{Selling Price – Variable Cost per Unit}}$$

The answer is given in units, not pounds

Design Mix Model

This is the combination of what a product does (**function**) with how it looks (**aesthetics**) and how much it costs to make (**economic manufacture**).

New products start as ideas, presented as **mind maps**, **brain shifters**, **mood boards**, **sketches** or **drawings**.

Pricing

When businesses set a price for a product or service, they consider many factors including being able to cover their costs in order to make a **profit**.

Pricing strategies are specific approaches businesses can use when setting their prices and include:

Competitive Pricing – where businesses base their prices on those of their rivals.

Psychological Pricing – where businesses avoid round/whole numbers for their prices.

Price Skimming – where businesses set a high price for a new product and lower this price over time.

Price Penetration – where businesses set a low initial price, later increasing this price.

Risk and Viability

Setting up a new business or launching a new product can be **risky** for a person/business. Market research helps reduce this risk.

Viability refers to how successful a product might be – often based on finances – is the break-even point realistic, for example.

Year 10 Music Spring Term Knowledge Organiser

Key Vocabulary:

1	Genre	Different styles of music throughout history
2	Performance	The process of practicing leading to a final showing/performance of the piece studied
3	Production	Using DAW to create a final recording/track where music is composed/sampled/recorded to a set style
4	Composition	Writing your own music – using DAW but all your own ideas
5	Practice	Choosing a piece of music and learning it fully over time – using techniques to make sure you learn it accurately for performing
6	DAW	Using Garageband/bandlab/other programme to create/process music
7	Synthesizer	1970's early computerizes keyboards – link to computers and can be played as an instrument on its own
8	Instrumentation	Choice of instruments and the way they are played to create effects and change the timbre of the music
9	Texture	The layers of the sound – homophonic – 1 layer of music or all instruments playing the same thing, polyphonic – los of layers of music, contrapuntal
10	Chords	Use of broken chords, triads, arpeggios, major, minor, diminished chords

Component 1

11 Composition and production

Use different starting points, for example:

- **melodic ideas and fragments**
- **rhythmic patterns**
- **chords and chord progressions**
- **harmonic systems**
- **textures**
- **riffs and hooks**
- **sound palettes**
- **improvisation and experimentation**
- **non-musical starting points such as themes , texts and images**

12 Reviewing your progress – every lesson

1. What ideas have you composed/practiced?
2. What techniques did you use to develop your composition or practice?
3. What do you need to improve next time?
4. Are there any techniques you need to add to develop your compositions or practice for performance further?

13 Using DAW

A **digital audio workstation** (**DAW**) is an electronic device or application software used for recording, editing and producing audio files. DAWs come in a wide variety of configurations from a single software program on a laptop, to an integrated stand-alone unit, all the way to a highly complex configuration of numerous components controlled by a central computer. Regardless of configuration, modern DAWs have a central interface that allows the user to alter and mix multiple recordings and tracks into a final produced piece.[1]

DAWs are used for producing and recording music, songs, speech, radio, television, soundtracks , podcasts, sound effects and nearly any other situation where complex recorded audio is needed

Component 1

14 Practising and performing

Practice techniques

Make sure you learn your lyrics/music
Practice performing as much as possible
Sing/play with emotion
Know your audience
Acknowledge other performers
Get physical while on stage – move – use hand gestures to help tell the story etc
Make use of the whole space and get close
Express your emotions
Let the audience see your eyes

Technique: development of a range of physical motor skills; timing; speed and dexterity technical exercises; tone and sound production; dynamics and expression; scales, rhythmic exercises

Structured practice: progressive, realistic and obtainable goals related to defined timescales; set targets and review progress; regular individual practice; taking part in group rehearsals, leading rehearsals, taking direction

15 Performance

Apply in performance: confident physical coordination; fluency; dexterity; accuracy (timing, tone, intonation, dynamics and tempo); rhythmic control

Apply through interpretation: prepare with confidence; authority; musicality; dynamics; expression; phrasing; detail and control of timing and tempo

In[illegible]irers identifying material for repertoire
Creative thinkers improvising within performance
Reflective learners reviewing performance to develop technique
Team workers rehearsing and performing in a group
Self-managers developing technique
Effective participators working as a member of a group

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:

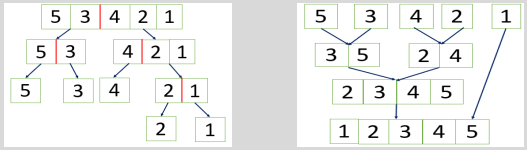
Advantages:
- Simple to code
- Simple to understand
- Not much extra memory is required to run the algorithm

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 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 11 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.
13	Purifying the air	Removing foul smells from the air.
14	Quarantine	Separating sick to stop spread of disease.

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

15. 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.

16. 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.

17 Preventions:

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

18 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).

19 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?

20 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.

21 Did the Church help or hinder medicine?

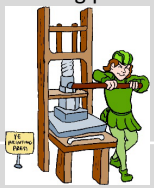
+= Safeguarded all valuable Ancient Greek and Roman texts in monastery libraries
+= Monasteries were hygienically designed
+=The Church funded universities and provided hospitals
-= Banned dissections
-=promoted respect of Galen's ideas
-= Taught that everything in the Bible was true

22 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 11 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

17 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

18 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).

19 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?

20 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.

21 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

22 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.

Year 11 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 11 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?

10. 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.

11. 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.

12 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

13 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.**

14 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

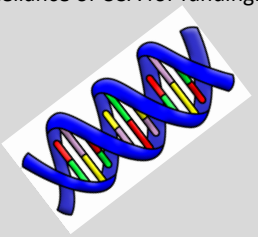
15. Case Study: Fight against Lung Cancer

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?

16 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.



17 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 11 GCSE History Knowledge Organiser The British Sector of the Western Front 1914-1918

Key Vocabulary:

1	**No Man's Land**	Land between Allied and German trenches in WW1 where fighting took place.
2	**Trenches**	A system of long, narrow ditches dug in a zig-zag pattern during WW1, easier to defend than attack.
3	**Ypres Salient**	Area around the town of Ypres where many battles took place in WW1.
4	**Gangrene**	When a body decomposes due to a loss of bloody supply.
5	**Shrapnel:**	A hollow shell filled with steel balls or lead, with gunpowder and a time fuse.
6	**FANY**	First Aid Nursing Yeomanry. Volunteer nurses, who helped the wounded and also drove ambulances.
7	**RAMC**	Royal Army Medical Corps. This organisation organised and provided medical care. It consisted of all ranks from doctors to ambulance drivers and stretcher bearers.
8	**Triage**	A system of splitting the wounded into groups according to who needed the most urgent attention.
9	**Compound Fracture**	Broken bones pierces the skin + increases risk of infection in wound.
10	**Debridement:**	Cutting away of dead and infected tissue from around the wound.
11	**Gas Gangrene**	Infection that produced gas in gangrenous wounds
12	**Radiology department**	Hospital department where X-rays are carried out.

What was the Western Front like?

13 Battles

The Ypres Salient: Germans had the advantage with being on the higher ground. Tunnelling and mines were used by the British at Hill 60. Germans used Chlorine gas for the first time

The Battle of the Somme: July-November 1917. 1st day of battle, 60,000 casualties and 20,000 died. In total, 400,000 Allied casualties and this put pressure on medical services on the Western Front.

Battle of Arras - 1917. Allied soldiers dug tunnels below Arras which led to an underground hospital with electricity, water, 700 beds and operating theatres.

Battle of Cambrai: 1917. 450 tanks used to advance on the German position, however, plan didn't work because there was not enough infantry to support.

14. Impact of the terrain on helping the wounded:

Difficult to move around, + night, communication was difficult. Collecting wounded from No Man's Land was dangerous- shell craters, waterlogged conditions and the danger of enemy snipers so was often done at night. Stretcher bearers found it difficult to move around corners in trenches and transport of the wounded was difficult because of this. If wounded soldier left for long they had the risk of infection from the muddy ground the was used as farm land before the war and contained bacteria and fertilisers

15 Who helped the wounded on the Western Front

Evacuation route: Survival depended on speed of treatment. Care improved as war progressed. 1914 0 motor ambulances but by 1915, 250. Ambulance trains were introduced, as well as, ambulance barges used along River Somme.
Stretcher bearers: Collect wounded, 16 in each battalion + 4 for each stretcher.
Regimental Aid Post: Always close to the front line and staffed by a Medical officer selected those who were lightly wounded/needed more attention.
Field Ambulance and Dressing Station: Emergency treatment for wounded. Could treat 150 soldier for up to a week
Casualty Clearing Station: Large, well equipped station, 10 miles from trenches in schools or factories, injured triaged.
Base Hospitals: On French/Belgian coast, CCS started to do more operations so Base Hospitals used for experimenting with new techniques which could then be used in CCS

What were the diseases and injured and how were they treated?

16 Conditions requiring treatment:

Ill health: Trench fever: caused by body lice and included flu-like symptoms including high temperature. Treatment: Passing electric current through infected area was effective. Prevention: Clothes disinfected and delousing stations were set up. Affected 0.5 million.
Trench foot: caused by soldiers standing in mud/waterlogged trenches. Treatment: soldiers advised to keep clean but worst cases, amputation. Prevention: Changing socks + keeping feet dry and rubbing whale oil into feet. Affected 20,000 in winter of 1914-1915.
Shell-shock: caused by stressful conditions of war and symptoms included tiredness, nightmares, headaches and uncontrollable shacking. Treatment: Not well understood. Prevention: rest and some received treatment in UK. **Weapons of war: Rifles**: fired one at a time/loaded from cartridge case creating rapid fire. **Machine guns**: Fired 500 rounds a minutes. Pierced organs and fracture bones.
Artillery: Bombardments were continuous, Artillery fire caused half of all causalities. **Shrapnel:** Caused maximum damage exploded mid-air above enemy. Killed/injured.
Chlorine and Phosgene Gas: Led to death by suffocation. 1915, gas masks given to all British soldiers.. **Mustard Gas:** Odourless gas, worked in 12 hours. Caused blisters, burn the skin easily

17 Impact of Western Front on medicine

The Thomas Splint: Stopped joints moving and increased survival rates from 20 to 82%. Reduced infection from compound fractures.
X-rays: Developed in 1895, used to diagnose issues before operations. Problems: could not detect all problems, were fragile and overheat. Mobile X-rays: 6 operated on the front line, pictures of a poorer quality. Enabled soldiers to be treated more quickly.
Blood Transfusions: Blood loss = major problem. Blood transfusions used at Base Hospitals by a syringe and tube to transfer blood from patient to donor. Extended to CCS from 1917. **Blood bank at Cambrai:** Adding Sodium Citrate allowed blood to be stored for longer. Stored in glass bottles.
Brain surgery: Harvey Cushing used magnets used to remove metal fragments from the brain and local anaesthetic- 71% survival rate. **Plastic surgery:** Harold Gillies developed new techniques, skin drafts developed for grafts.

Who discovered that Penicillin kills bacteria – and when?	**Which two scientists were responsible for the discovery of DNA?**	**When did Pasteur announce his Germ Theory?**	**Put in order: Aid Post Hospital, Clearing Station and Dressing Station.**
What were the Four Humours?	**What was so important about the 1875 Public Health Act? (Mention two details to support your answer.)**	**What is shrapnel?**	**What did John Snow do to stop Cholera spreading in Soho, London, 1854?**
Name two types of gas used as weapons.	**Give two methods used to reduce deaths from Lung Cancer.**	**Give two ways people used to keep towns clean and healthy in Medieval England.**	**Give two reasons why changes were taking place in medicine by 1700.**
List three ideas people had about the cause of disease in Medieval England.	**Name three different kinds of medieval healers.**	**List three ways in which governments have tried to improve health since 1900.**	**List three kinds of treatments used in the Renaissance England.**
Which three factors were most important in advancing in medicine in Modern Britain?	**Why was Thomas Sydenham's work important?**	**Why were there so many infected wounds on the Western Front?**	**Which three factors were most important in inhibiting change in medicine in Medieval England?**

Year 11 GCSE History Summer Term Knowledge Organiser The Weimar Republic 1918-29

Key Vocabulary:

1	Abdication	When a monarch leaves the throne
2	Republic	A country without a King or a Queen
3	Armistice	An agreement to end war
4	Treaty of Versailles	The peace agreement that Germany was forced to sign at the end of WW1
5	Diktat	An enforced peace
6	Reparations	Money Germany was forced to pay to the Allies as compensation for WW1
7	Ebert	The first President of the Republic
8	Stresemann	The Chancellor of Germany from the Summer of 1923 and Foreign Minister
9	Constitution	This is an agreement about how the country would be ruled
10	Reichstag	German parliament
11	Article 48	A rule in the new constitution that allowed the president to rule on his own without the Reichstag in times of emergency
12	coalition	A government of two or more political parties.
13	Freikorps	Ex military soldiers who wanted to overthrow the Republic
14	Rentenmark	The currency of Germany after November 1923
14	Hyperinflation	When money becomes worthless

Origins and challenges of the Weimar Republic

16 End of the War

Losing the war was a shock for Germany and the Kaiser abdicated. Germany was humiliated, faced psychological problems, political problems, anarchy and poor conditions in Germany due to lack of food. The Weimar Republic was set up but faced much opposition, It was disliked by the left wing who wanted Germany to be like Communist Russia and it was disliked by the right wing who wanted the monarchy back.

17 Stabbed in the Back by the Treaty of Versailles

Germans felt they should have won the war and felt they had been stabbed in the back by their politicians who signed the humiliating Treaty of Versailles. In the Treaty Germany was blamed for WW1 (Article 231), forced to pay reparations of £6.6 billion, reduced their army to 100,000 & lost 13% of land.

18 Weimar Constitution:

Advantages:

- All people over 18 can vote
- 75% of the Reichstag must agree for the constitution to be changed
- Article 48 allows quick actions in a crisis

Disadvantages:

- most governments were formed with a coalition which caused arguments
- Article 48 could be used to make a dictatorship
- Laws were not easily passed as a number of parties had to agree for it to be voted through

19 Challenges to the Republic:

Spartacist Rising 1919: Communist try to take over the country led by Rosa Luxemburg. The army and Freikorps stop it and over 100 workers were killed.

Kapp Putsch 1920: Freikorps try to take over after they are disbanded after the ToV, people go on strike to stop them, they are forced to give up.

20 The Year of Crisis: 1923

Invasion of the Ruhr: France invades as Germany stops paying reparations. In the Ruhr are Germany's iron and coal resources. The German workers strike in protest. German industry is devastated.

Hyperinflation: Germany continues to pay the striking workers which causes hyperinflation, a loaf of bread costs 200,000 billion marks.

Recovery and changes in society

21 Stresemann and the economy

Stresemann solves hyperinflation by destroying the old money and printing the Rentenmark, helps rebuild the economy by getting loans from the US (Dawes Plan 1924) and decreasing the amount of reparations by 20% (Young Plan 1929). However these were short term solutions e.g. Germany became dependant on the USA, unemployment never fell below 1 million people, middle class never recovered their savings

22 Stresemann and international relations:

Stresemann improves relations with other countries by signing the Locarno Pact (1925 agreement to keep borders) and joining the League of Nations (1926) and the Kellogg Briand Pact. (1928 agreement to solve problems peacefully)

23 Changes for workers:

Hourly wages rose every year from 1924 to 1929 and by 10 per cent in 1928 alone. Generous pension, health and unemployment insurance schemes which covered 17 million workers were introduced from 1927. However, some workers, such as farmers missed out on these changes and suffered declining incomes.

24 Changes for women:

Women could vote and become politicians, they increasingly taking white collar jobs such as teachers, lawyers and doctors. The classic image of German women in the 1920s was as the 'New Woman' who was short-haired, wore make up, liberated and having fun. However life for a lot of women, especially outside of Berlin did not change and most women voted conservatively.

25 Change in culture:

Weimar experienced a flourishing of culture, in Berlin especially, that saw developments in architecture, art and the cinema. This expression of culture was greatly helped by the ending of **censorship** in the new republic.

Architecture changed with the **Bauhaus** School founded by Walter Gropius in 1919

Art: Dada and New Objectivity were two new art movements, artists included **Otto Dix and George Grosz.**

Cinema boomed in this time period and one of the most famous directors of the time was **Fritz Lang.**

Not everyone appreciated these cultural changes.

Year 11 GCSE History Summer Term Knowledge Organiser Hitler's Rise to Power 1919-1933

Key Vocabulary:

1	NSDAP	Nazi Party
2	25 Point Programme	The political manifesto of the Nazi Party
3	Swastika	Emblem of the Nazi Party
4	SA or Sturmabteilung	Private army of the Nazi Party headed by Himmler
5	Aryan	Pure German people
6	Anti-Semitism	Hatred of the Jewish people
7	Mein Kampf	Hitler's autobiography
8	Putsch	An attempt to get power illegally
9	Blood Martyrs	16 Nazis who died at the Munich Putsch
10	SS or Schutzstaffel	Hitler's bodyguards
11	KPD	German Communist Party
12	coalition	A government of two or more political parties.
13	Propaganda	Goebbels attempted to make people think in a certain way
14	Hindenburg	The currency of Germany after November 1923
14	Hyperinflation	The President of the Republic from 1925 to 1934

Early development of the Nazi Party and the Lean Years

16 German Workers' Party

1919 – Hitler joined the German Worker's Party (DAP), a right-wing group led by Anton Drexler.
1920: Hitler the leading public speaker/ propagandist.
1920 – Changes name to National Socialist German Workers Party (NSDAP) – or Nazis for short.
1921 – Hitler was elected leader of the Nazis
1923- Nazi Party had 55,000 members

17 Features of the Nazi Party

Key Nazi beliefs contained in the **25 Point Programme:**
A strong Germany - the **Treaty of Versailles** should be **abolished** and all German-speaking people united in one country. **Führer** - the idea that there should be a single leader with complete power rather than a **democracy**. Social Darwinism - the idea that the **Aryan** race was superior and Jews were 'subhuman'. **Autarky** - the idea that Germany should be economically self-sufficient. That Germany was in danger - from **communists** and Jews, who had to be destroyed. **Lebensraum** - the need for 'living space' for the German nation to expand.
SA also very important Their nickname was the **Brownshirts** and their role was to protect party meetings and intimidate political opponents by breaking up their meetings

18 Munich Putsch (1923):

During the Hyperinflation crisis Hitler saw an opportunity to seize power and he also wanted to copy Mussolini. Even though a failure and the Nazi Party banned, Hitler was given a lenient prison sentence, he gained publicity, he wrote Mein Kampf and he realised that if he was to win power, he needed to do this by votes and not by force.

19 The Lean Years (1923-29):

The Nazis lacked working class support (they tended to vote for the communists), it was a time of peace and prosperity (Stresemann had solved many of Germany's problems) and the Nazis ideas were too extreme (SA were very violent). Hitler did take the time to strengthen his authority, he also began building a national party structure to attract members and develop policies and campaign

Growth in Support and how Hitler becomes chancellor

20 The growth in support for the Nazis 1929-32

The Wall Street stock market in America crashed so the US could no longer prop up the German economy and recalled their loans. So the German economy collapsed and Germany entered the **Great Depression** so by Feb 1932 6 million people were unemployed.
Weak opposition: The government's response to the economic crisis was not popular with Germans. For example, unemployment benefits and wages were cut while taxes increased. Everyday life became hard. The government starting using article 48 and became less democratic.
Appeal of the Nazis: Promised to solve the problems of the depression (e.g. create jobs, get rid of ToV), used communists and Jews as scapegoats for all of Germany's problems.
Hitler was a powerful public speaker and was charismatic.
The SA were strong and intimidated the communists which appealed to those who feared the increase in support for the Communists after the Wall Street Crash.
Nazi Propaganda: used new technology such as radio and planes and Joseph Goebbels was the chief of propaganda, used clear simple appealing messaging on their propaganda posters

21 How Hitler becomes Chancellor 1932-33:

1932
April – Presidential election. Hitler (37%) came second to Hindenburg (53%),
May – Brüning resigned as Chancellor. Hindenburg appointed Franz Von Papen, a conservative, as his replacement.
July – Reichstag elections. The Nazis became the largest party with 230 seats. Hitler demanded to be made Chancellor but Papen remained.
November – Reichstag elections called by Von Papen to try to win a majority in parliament. Nazis lost 34 seats but remained the largest party with 196 seats.
December – Von Papen resigned. Hindenburg appointed Kurt Von Schleicher as Chancellor. Von Schleicher tried to split the Nazis by asking a leading Nazi called Gregor Strasser to be his Vice Chancellor. Hitler forced Strasser to decline.
1933
January – Von Papen and Hindenburg turned to Hitler, appointing him as Chancellor with Von Papen as Vice Chancellor. They believed they could control Hitler and get him to do what they wanted

Year 11 GCSE History Summer Term Knowledge Organiser Nazi Control and dictatorship, 1933-39

Key Vocabulary:

1	Marinus van der Lubbe	The Reichstag Fire was blamed on this Dutch Communist
2	Reichstag	German parliament
3	Emergency Decree	Hindenberg is persuaded to pass this after the Reichstag Fire, it restricted civil liberties.
4	Enabling Act	Gave the Nazis full power for the next 4 years
5	Gleichschaltung	Hitler's attempt to bring German society into line with Nazi philosophy
6	German Labour Front (DAF)	Set up to replace Trade Unions
7	Lander	State Parliaments
8	Dachau	First concentration camp
9	Purge	To get rid of opposition
10	Night of the Long Knives	Removal of internal and external opposition to the Nazi Party and Hitler
11	Sicherheitsdienst (SD)	The intelligence body of the Nazi Party
12	Concordat	In July 1933 the Pope agreed to stay out of political matters if the Nazis did not interfere with Catholic affairs
13	Confessional Church	Followed traditional German Protestantism and refused to allow the Nazification of religion. Led by Pastor Martin Niemoller
14	Edelweiss Pirates and Swing Youth	Groups who apposed the Hitler Youth
14	Mit Brennender Sorge (With Burning Concern)	The Pope wrote to priests in Germany about his concerns over the Nazi attempts to control religion

Creation of a dictatorship and the police state

16 Creation of a dictatorship 1933-34

Reichstag Fire Feb 1933: Hitler had become chancellor but needed more power in order to pass the laws he wanted to. He used the Fire to whip up anti-communist feelings and gain emergency powers to round up 4000 communist members and intimidate communist voters

Enabling Act March 1933: In the March 1933 elections, the Nazis gained more seats in the Reichstag but still didn't have an overall majority. He banned the Communist Party so he had enough votes to pass the Enabling Act. With this act he is able to: pass any laws without needing the support of the Reichstag, he banned all trade unions and all political parties apart from the Nazi Party.

Night of the Long Knives 1934: Hitler used the SS to kill Ernst Rohm, the leader of the SA (the Nazis private army) and several hundred other SA members and politicians. This stamped out any opposition to Hitler in the Nazi Party.

Death of Hindenburg: Hindenburg was the President of Germany. When he died, Hitler made himself both Chancellor and President of Germany. He called himself the Fuhrer and reorganised the government so he was in absolute control and made the army swear an oath of loyalty to himself.

17 The police state

Germany became a police state and the Nazis used terror and violence. Himmler was in charge of the Gestapo and the SS who listened into telephone calls, interrogated and arrested people.

Judges had to swear an oath of loyalty to Hitler and make sure their judgements were in line with Nazi ideas. In 1933 the first concentration camp was opened in Germany at Dachau.

18 Nazi Propaganda

The Ministry of Enlightenment and Propaganda, headed by Dr Joseph Goebbels. It aimed to brainwash people into obeying the Nazis and idolising Hitler. It did this by censoring the press, controlling radio broadcasts, holding mass rallies (the biggest one was at Nuremberg each year in August) and using sporting events such as Berlin Olympics of 1936 to showcase the success of the regime and the superiority of the Aryan Race

Opposition, resistance and conformity

19 Extent of support for the Nazis

Exact figures for those who opposed the Nazis are difficult to obtain. However, it is clear that the Nazis were incredibly popular when they came to power and many Germans welcomed the stability and economic growth an **authoritarian** regime brought – something missing with the Weimar democracy. The Nazi regime restored Germany's international prestige through **rearmament** and the dismantling of the **Treaty of Versailles**.

20 Opposition from the Churches

There were approximately 45 million Protestants and 22 million Catholic Christians in Germany in 1933. Hitler saw Christianity as a threat and a potential source of opposition to Nazism because it emphasised peace. The Protestant church was re-organised and fell under Nazi control, in 1936 all Protestant churches merged into the Reich Church and it made a National Socialist version of Christianity. The Pope signed an agreement (the Concordat) with Hitler agreeing to stay out of German politics. There was Little opposition overall but some Church members such as Martin Niemoller (Protestant) and von Galen (Catholic) preached against the Nazis. Niemoller was sent to a concentration camp, but von Galen forced the Nazis to keep their killing of the disabled a secret.

21 Opposition from the young

The main youth opposition group was the Edelweiss Pirates, based in the Rhineland. They reacted to the discipline of the Hitler Youth by daubing anti-Nazi slogans and singing pre-1933 folk songs. In 1942 over 700 of them were arrested and in 1944, the Pirates in Cologne killed the Gestapo chief, so the Nazis publicly hanged 12 of them.

During the war, 'Swing Youth' and 'Jazz Youth' groups were formed. These were young people who rejected Nazi values, drank alcohol and danced to jazz. The Nazis rejected jazz music as **degenerate** and called it Negro music, using their racial ideas against this cultural development. These youths were closely monitored by the Gestapo, who regularly raided illegal jazz clubs.

Year 11 GCSE History Summer Term Knowledge Organiser Life in Nazi Germany 1933-39

Key Vocabulary:

1	Kinder, Kuche, Kirche	Children, Kitchen, Church. This summed up the Nazi ideal of womanhood
2	The Motherhood Cross Award	Given to women for large families. E.g a bronze award for a woman with 4 children.
3	Lebensborn	Where unmarried women were impregnated by SS men.
4	Napola	Schools intended to train the future leaders of Germany
5	Nazi Teachers League	All teachers had to swear an oath of loyalty to the Nazis
6	Reich Labour Service	A scheme to provide young men with manual labour jobs
7	Invisible unemployment	The Nazi unemployment figures did not include women, Jews, opponent and unmarried men under 25
8	Autobahn	Motorway
9	Rearmament	Building up the armed forces in readiness for war
10	Volksgemeinshaft	The Nazi community
11	Strength Through Joy	An attempt to improve the leisure time of German workers
12	Beauty of Labour	Tried to improve working conditions of German workers.
13	Volkswagon	People's car
14	Nuremberg Laws	Jews were stripped of their citizenship rights and marriage between Jews and no Jews was forbidden
14	Kristallnacht (Night of the Broken Glass)	A Nazi sponsored event against the Jewish community

Nazi policies towards Women and the young

16 Nazi policies towards women

The Nazis didn't allow women much freedom. They believed that women should stay at home and look after the family. They were banned from being lawyers in 1936 and they were expected to dress plainly and not wear make-up or smoke. Nazis gave awards to women who had lots of children and encouraged women to marry with marriage loans

17 Successes and failures of these policies

Failure: female labour was cheap and between 1933 and 1939 the number of women in employment actually rose by 2.4 million. Some Nazi policies reversed e.g. women with marriage loans allowed to work (1937)
Success: German Women's Enterprise had 6 million members; birth rate increased to 20 per 1,000 in 1939

18 Nazi Policies towards the young:

Youth groups such as the Hitler Youth taught children Nazi ideas so they would be loyal to the Nazi Party when they grew up. By 1936 boys had to join the Hitler Youth, they went on camping trips and had sports competitions. Girls joined the League of German Maidens where they were trained in domestic skills like cooking.
Schools also indoctrinated young people. All teachers had to join the Nazi Teachers' Association and the curriculum altered: History lesson included the rise of the Nazi Party, a new subject called Race study was introduced and PE was taught 5 times a week

19 Successes and failures of these policies:

Failure: Attendance at Hitler Youth meeting by 1938 was only 25% so by 1939 the authorities made attendance compulsory.
Success: 1939 90 per cent of German boys aged 14 and over were members.

Employment, living standards and persecution of minorities

21 How the Nazis reduced unemployment:

Public Works: Hitler created jobs with the building of autobahns, hospitals, schools and public buildings such as the 1936 Olympic Stadium.
National Service: making any man between 18-24 join the National Labour Service.
Rearmament: Hitler also created more jobs with building tanks and weapons and joining the army.
Invisible unemployment: Not counted by Hitler in his unemployment figures: 1.4 million men in the army and men working on public works schemes, Jews who were sacked and women who had to give up their jobs for men.

22 Did the Nazis improve living standards?

Yes: By 1937, agricultural prices had increased by 20 per cent. Beauty of Labour encouraged factory owners to improve conditions for workers and Strength through Joy gave rewards to workers for their work such as very cheap holidays.
No: Workers couldn't join trade unions or go on strike for campaign for better conditions and the Nazi Labour Front (which had replaced trade unions) nearly always sided with the employers. Wages remained low and the cost of living rose by 25%.

23 Nazi racial beliefs and policies:

Nazis believed certain groups, such as Slavs, gypsies, homosexuals, the disabled and Jews were inferior to and a threat to the Aryan race. Mentally and physically disabled were first sterilized and then between 1939-1941 over 100,000 were euthanatized. Other such as homosexuals, prostitutes, Jehovah's Witnesses and gypsies sent to concentration camps.

24 Jewish persecution:

1933- Boycott of Jewish shops, books by Jewish authors publicly burnt, Jewish teachers, lawyers and civil servants sacked.
1935- Nuremberg Laws- stripped Jews of German citizenship, outlawed marriage between Jews and Germans, took away all civil and political rights
1938,- Jews had to have the name Israel (men) or Sarah (women), Jewish children forbidden to go to school.
Kristallnacht - 9 Nov. The SS organised attacks on Jewish homes, businesses and synagogues in retaliation for the assassination of the German ambassador to France by a Jew.

RSHS KS4 PE 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

8 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.

9 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.

10 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.

11 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).

12 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

13 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.

14 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.

15 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.

Year 10 Spring Term Knowledge Organiser for Maths

Percentages

Increase/Decrease
Non calculator method

Increase/decrease £150 by 11%

10% of £150 = £15.00
1% of £150 = £ 1.50
11% of £150 = £16.50
Increase = £150 + £16.50
Decrease = £150 - £16.50

Repeated Percentage Change - Increase

Alan invests £3000 in a bank that pays 1.5% compound interest. How much will he have after 4 years?

Multiplier:
100% + 1.05% = 101.5% = 1.015
Value:
$3000 \times 1.015^4 = 3184.09$ Answer £3184.09

Repeated Percentage Change – Decrease

Betty buys a car for £17000. It depreciates in value every year by 8%. What will it be worth after 5 years?

Multiplier:
100% - 8% = 92% = 0.92
Value:
$17000 \times 0.92^5 = 11204.39$ Answer = £11204.39

Reverse Percentage

Carter buys a pair of trousers in a sale for £68 after they were reduced by 15%. What was the original cost of the trousers?

Trousers now worth 85% of original price.

÷ 85	85%	= 68	÷ 85
x 100	1%	= 0.8	x 100
	100%	= 80	

Answer = £80

Index Numbers

Laws of Indices

$a^m \times a^n = a^{m+n}$ $2^7 \times 2^3 = 2^{7+3} = 2^{10}$

$a^m \div a^n = a^{m-n}$ $2^7 \div 2^3 = 2^{7-3} = 2^4$

$(a^m)^n = a^{m \times n}$ $(2^7)^3 = 2^{7 \times 3} = 2^{21}$

$a^0 = 1$ $2^0 = 1$

Negative Indices

$$a^{-n} = \frac{1}{a^n}$$

For example…

$$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

Fractional Indices

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

For example…

$$125^{\frac{1}{3}} = \sqrt[3]{125} = 5$$

Standard Form

Standard Form is used to write large and small numbers concisely.

In standard form, numbers are written as

$a \times 10^n$

where $1 \leq a < 10$ and

n is an integer.

Large Numbers

Large numbers are written like this…

$$473\,000 = 4.73 \times 100000$$
$$= 4.73 \times 10^5$$

Small Numbers

Small numbers are written like this…

$$0.000621 = \frac{6.21}{10000}$$
$$= \frac{6.21}{10^4}$$
$$= 6.21 \times 10^{-4}$$

Simplifying, Expanding and Factorising

Simplifying by Collecting Like Terms

Collect terms which are 'alike'. Remember the sign before a term belongs to that term:

4a + 7b − 2a + 4b = 2a + 11b

Expanding Single Brackets

Every term inside the bracket is multiplied by the term outside the bracket:

$$3(x+5) = 3x + 15$$

Expanding Double Brackets

Every term in one bracket is multiplied by every term in another bracket:

$(x+5)(x+3)$

$x^2 + 3x + 5x + 15$

$x^2 + 8x + 15$

	$(x+5)$	
	$+x$	$+5$
$+x$	$+x^2$	$+5x$
$+3$	$+3x$	$+15$

$(x+3)$

Factorising

Taking the highest common factor of terms outside of the bracket:

$6x^2 + 15x$

HCF: $3x$

$3x(2x + 5)$

$6x^2 \div 3x$ $15x \div 3x$

Year 10 Spring Term Knowledge Organiser for Maths

Sequences

Nth Term

Expression for the general rule for a sequence to be able to calculate any term when given the position. Also known as a position to term rule:

-1 | 1 , 3 , 5 , 7 , 9 , … | +2 n -1

Value that would be before the 1st term.

+2 Term-to-term rule

So, the nth term rule is 2n - 1.

26 | 20 , 14 , 8 , 2 , -4 , … | -6 n +26

Value that would be before the 1st term.

-6 Term-to-term rule

So, the nth term rule is -6n +26.

Solving Equations

Solving One Step Equations

Finding the value of an unknown by identifying operations performed and doing the inverse operation:

$x + 6 = 8$ (+6 / -6) $x = 2$

Solving Two Step Equations Finding the value of an unknown by identifying operations performed and doing the inverse operation:

$2x + 1 = 9$ (+1 / -1) $2x = 8$ ($\times 2$ / $\div 2$) $x = 4$

Solving Equations involving Fractions

Finding the value of an unknown. To eliminate a denominator, multiply every term by the denominator:

$\frac{x+3}{2} = 4$ ($\div 2$ / $\times 2$) $x + 3 = 8$ ($+3$ / -3) $x = 5$

Solving Equations with Unknowns on Both Sides

Add/subtract the smallest algebraic term from both sides:

3a - 4 = 7a + 8

(-3a / -3a)

- 4 = 4a + 8

(-8 / -8)

- 12 = 4a

(÷4 / ÷4)

- 3 = a

Forming and Solving Equations

Forming Equations

Many of the situations where an equation is formed uses other areas of maths such as area, perimeter, money, angle facts etc.

Create an expression first using the information in the question and then solve the equation using the balance method.

Forming Equations Example:

James thinks of a number. Kate's number is 14 less than James' number. The sum of their numbers is 212. What is Kate's number?

Let James' number be *n*, this means Kate number $n - 14$.

$n + n - 14 = 212$

$2n - 14 = 212$

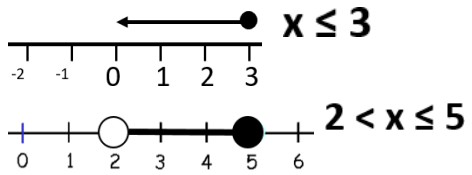
Then solve to find the value of *n*.

$n = 113$, so Kate's number is 99.

Inequalities

Inequalities on a Number Line

If the inequality is 'or equal to' (≤, ≥), the circle is filled in. If it is not (<, >), the circle is not filled in:



Solving Linear Inequalities

Solve like an equation, but replace the = sign with the inequality:

$5x + 2 \leq 17$ (+2 / -2) $5x \leq 15$ ($\times 3$ / $\div 3$) $x \leq 3$

Year 10 Spanish Spring Term HT4 Knowledge Organiser –En mi tiempo libre

Suelo – I tend to
Me encanta – I love
Me mola – I like
Me chifla – I'm crazy about
Prefiero – I prefer
Mi pasión es – my passion is

descansar – relaxing
escuchar música – listening to music
hacer deporte – doing sport
ir al cine – going to the cinema
leer libros/revistas/periódicos – reading books/magazines/papers
salir con mis amigos – going out with friends
quedar con amigos – meeting with friends
ir de compras – going shopping
montar en bici/monopatín – riding my bike/skateboard
usar el ordenador – using the computer
ver la tele – watching tv
jugar con los videojuegos – playing video games
cocinar – cooking

porque – because

ya que – because

dado que – because

es – it is

divertido – fun
relajante – relaxing
sano – healthy
aburrido – boring
malsano – unhealthy
adictivo - addictive

Me encanta escuchar – I love to listen to

Suelo escuchar – I tend to listen to

el soul/el rap/ el dance/ el hip-hop/el pop/el rock/el jazz/

la música clásica/electrónica

la música de… - …'s music

Toco – I play
Toca – he/she plays
Tocan – they play

El teclado – the keyboard
La batería – the drums
La guitarra – the guitar
el piano – the piano
la flauta – the flute
la trompeta – the trumpet

Soy – I am
Era – I was

aficionado/a de – a fan of
hincha de – a fan of
fanático/a de – a ____ fanatic
miembro de un club de… - a member of a _____ club

Random

correr – to run
entrenar – to train
marcar un gol – to score a goal
participar – to participate
un partido – a match
la temporada – the season

Juego - I play

al badminton/fútbol/rugby/tenis/hockey/croquet/béisbol
al balonmano – handball **al baloncesto** – basketball **al voleibol** – volleyball

Hago – I do

judo - judo **karate** – karate **atletismo** – athletics
baile – dance **boxeo** – boxing **ciclismo** – cycling **equitación** – horseriding **escalada** – climbing
gimnasia – gymnastics **natación** – swimming **remo** – rowing
vela – sailing
patinaje sobre hielo – ice skating **tiro con arco** – archery
piragüismo – canoeing

Parallel Text:

1	En mi tiempo libre **suelo descansar**	In my free time **I tend** to **relax**
2.	o, a veces, **quedar con amigos** en el centro	or, sometimes, **meet my friends** in town
3.	para **ir de compras** ya que es **entretenido**.	to **go shopping** because it's **entertaining**.
4.	En mi opinión, **salir con mis amigos me hace reír**	In my opinion, **going out with my friends makes me laugh**
5.	y **me ayuda olvidarme de todo**	and **helps me to forget everything**
6.	sin embargo nunca **monto en bici**	however I never **ride my bike**
7.	**ya que me aburre como una ostra**	**because it bores me to death**
8.	**aunque sé que** es **sano**.	**although I know that** it's **healthy**.
9.	**Además**, me encanta escuchar música y	**Moreover**, I love listening to music and
10.	**suelo** escuchar **la música de Adele**	**I tend** to listen to **Adele's music**
11.	**dado que canta bien** y **me encanta la letra.**	**because she sings well** and **I love the lyrics.**
12.	No toco un instrumento pero en el futuro	I don't play an instrument but in the future
13.	voy a **aprender** tocar la **batería**.	I'm going **to learn** to play the **drums**.

Year 11 Spanish Spring Term HT3 Knowledge Organiser –El medio ambiente

Me preocupa(n) mucho – I'm really worried about

Lo que más me preocupa es (que) – the thing I'm most worried about is (that)

El problema más grave es (que) – the most serious problem is (that)

la deforestación – deforestation
la lluvia ácida – acid rain
las mareas negras – oil spills
la sobrepoblación – overpopulation
los problemas del medio ambiente – environmental problems
las especies amenazadas/en peligro de extinción – threatened/endangered species
la polución de los mares y los ríos – sea and river pollution
la destrucción de los bosques – destruction of woods/forests
los combustibles fósiles se acaban – fossil fuels are running out
hay demasiada basura en las calles – there's too much litter/rubbish in the streets
hay demasiado tráfico – there's too much traffic
el tráfico causa mucho ruido – the noise causes a lot of noise
mucha gente usa el coche todos los días – lots of people use their cars everyday
hay demasiadas fábricas – there are too many factories
no hay espacios verdes – there are no green spaces
la gente no recicla – people don't recycle

causa – it causes
amenezar – to threaten
echar la culpa - to blame
es nocivo – it's harmful
agotar – to use up
una multa – a fine
el vertadero – the tip
provocar – to provoke/cause
contribuir – to contribute
un atasco – a traffic jam
el combustible - fuel
una fábrica – a factory

un terremoto – an earthquake
una tormenta de nieve – a snow storm
un incendio forestal – a forest fire
un huracán – a hurricane **las inundaciones** - floods
un temblor – a tremor
un tornado – a tornado

Para proteger el medio ambiente/ el planeta – to protect the environment/ the planet

(no) se debe – you must(n't)

apagar la luz – turn off the light
ducharse en vez de bañarse – shower instead of having a bath
separar la basura – separate the rubbish
reciclar el plástico y el vidrio – recycle plastic and glass
desenchufar los aparatos eléctricos – unplug electrical appliances
ahorrar energía – save energy
cerrar el grifo – turn off the tap
hacer todo lo posible – do everything possible
malgastar agua – waste water
usar bolsas de plástico – use plastic bags

No corte tantos árboles – Don't cut down so many trees
No tire basura al suelo – don't throw rubbish on the floor
No malgaste energía – Don't waste energy
Plante más bosques y selvas – plant more forests and trees
Use energías renovables – use renewable energy
No construya tantas casas grandes – don't build so many big houses
No vaya en coche si es possible ir a pie – Don't go by car if it's possible to walk
No eche tantos desechos químicos – Don't release so much chemical waste
Reduzca las emisiones de los vehículos – reduce vehicle emissions

No corte tantos árboles – Don't cut down so many trees
No tire basura al suelo – don't throw rubbish on the floor
No malgaste energía – Don't waste energy
Plante más bosques y selvas – plant more forests and trees
Use energías renovables – use renewable energy
No construya tantas casas grandes – don't build so many big houses
No vaya en coche si es possible ir a pie – Don't go by car if it's possible to walk
No eche tantos desechos químicos – Don't release so much chemical waste
Reduzca las emisiones de los vehículos – reduce vehicle emissions

Parallel Text:

1	En mi opinión hay tantos problemas medioambientales	In my opinion there are so many environmental problems
2.	**como la sobrepoblación** y la **deforestación**	**like overpopulation** and **deforestation**
3.	pero **pienso que** el problema más grave es	but **I think that** the most serious problem is
4.	**la contaminación del aire** ya que	**air pollution** because
5.	es **nociva** y causa **el calentamiento global**.	it's **harmful** and causes **global warming**.
6.	**Las fábricas** y **los atascos contribuyen a la contaminación del aire**	**Factories** and **traffic jams contribute to air pollution**
7.	y por eso **es esencial que usemos el transporte público**	and therefore **it's essential that we use public transport**
8.	y que **compremos productos verdes.**	and that **we buy eco-friendly products**.
9.	En el pasado **me preocupaba más la deforestación**	In the past **I was most worried about deforestation**
10.	y **la destrucción de los bosques**	and **the destruction of forests**
11.	**dado que** causa **las especies amenazadas** y	**because** it causes **endangered animals** and
12.	organicé un evento para recaudar dinero.	I organised an event to raise money.
13.	Para proteger el planeta	To protect the planet