Year 10 Art and Design Summer Term Knowledge Organiser

Key Vocabulary:

1	**The Formal Elements of Art**	The formal elements of art are used to make a piece of artwork. The art elements are line, tone, texture, shape, pattern and colour. They are often used together, and how they are organised in a piece of art determines what the finished piece will look like.
2	**A01**	Development of ideas and understanding of different artists. This could include artist research, and analysis work, moodboards, reproductions of artists' work or use of these ideas in their own work.
3	**A02**	Refinement of skills and experimentation using materials and media. This could include drawing, painting, mixed media work, 3D work, edited photography and combination of materials together.
4	**A03**	Recording of skills using drawing, photography and annotation. This could include observational drawings, realistic photography and mind maps.
5	**A04**	Present a personal or final response/s. This is usually a final piece. This could include a final piece or concluded pieces of work in their preparatory work. The work must link to artists researched or on a chosen starting point.
6	**Artist Research**	Showing your understanding of an artist/s work or style and how they have influenced you.
7	**Critical Understanding**	Ability to analyse others artwork. Engaging with ideas, images and identifying how values and meanings are conveyed.
8	**Annotation**	Writing notes and descriptions besides work in order to understand what has been created, why and how work has progressed.
9	**Artist Response**	Showing your understanding of an artists work or style and how they have influenced you.

10	**Scale**	The scale of something is its size. To scale something is to enlarge it. To scale down is to do a smaller version or reduction.
11	**Balance**	If a picture or piece of art work has balance then each part of it works well together in a whole piece.
12	**Composition**	The arrangement of elements in a piece of art.
14	**Media**	Different materials.
15	**Contrast**	Created by using opposites near or beside one another, such as a light object next to a dark object or a rough texture next to a smooth texture.
16	**Perspective**	Creates the feeling of depth using lines that make your image appear to be three dimensional. The closer the image is, the more detailed it will appear, and the larger it will be.
17	**Reflect**	Looking back at your work and deciding how you could improve something.

Key Vocabulary:

1	Repetition	Repeating chord patterns/melody lines
2	Sequence	A melody that moves up and down in pitch but the pattern of the notes stays the same – for example, CDEFG – DEF#GA
3	Instrumentation	Choice of instruments and the way they are played to create effects and change the timbre of the music
4	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
5	Modulation	Changing key during the second section of your piece – major to minor, C major to G major etc
6	Intonation	The pitch and accuracy of a musician or musical instrument
7	Dynamics	The volume
8	Metronome	A timing device used for marking rhythm
9	Phrasing	The shaping of a sequence of notes to show expression
10	Articulation	How you say or play the notes or words

Music Theory

11   Composing

- 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 composition – every lesson

1. What ideas have you composed?
2. What techniques did you use to develop your composition?
3. What sections of music have you added to your composition?
4. What do you need to improve next time?
5. Are there any techniques you need to add to develop your compositions further?

13   Performing techniques checklist

1. Are you presenting accuracy of pitch/intonation when practicing on your instrument?
2. Is your rhythm and timing correct?
3. Are you warming up properly before each practice session?
4. Are you demonstrating good use of dynamics and musical expression?
5. Is your musical phrasing good?
4. Is your breath control good?
5. Are you communicating to the audience with confidence?
6. Are you following the accompaniment accurately?
7. Are your pieces showing your performance skills at their best?

Music Theory

14   Reviewing your progress

1. What part of your practice went well?
2. What techniques did you use to develop your performance skills?
3. What was your musical focus for today's practice?
4. What do you need to improve on next time?
5. Are there any techniques you need to work on further?

15   Performance Skills

Confidence
Fluency
Accuracy (timing, tone, intonation, dynamics and tempo);
Rhythmic control

Musicality
Dynamics
Expression
Phrasing

16   Life skills through music

Independent enquirers

Creative thinkers

Reflective learners – reviewing progress continually

Team workers – being part of the group

Self-managers – working to deadlines

Effective participators – having your voice in a group

AQA GCSE Chemistry (Combined Science) Unit 6: The Rate and Extent of Chemical Change

Calculating Rates of Reactions

Reactions happen at **varying rates**. For example, a firework exploding is a fast reaction whereas a piece of iron rusting would take place over a longer period of time.

The **rate of a chemical reaction** tells us how quickly a **product is formed** or how quickly a **reactant is used up**.

For a chemical reaction to occur, the reactant particles must collide with enough energy. Those collisions that produce a chemical reaction are called successful collisions.

$$\text{mean rate of reaction} = \frac{\text{quantity of reactant used}}{\text{time taken}}$$

$$\text{mean rate of reaction} = \frac{\text{quantity of product formed}}{\text{time taken}}$$

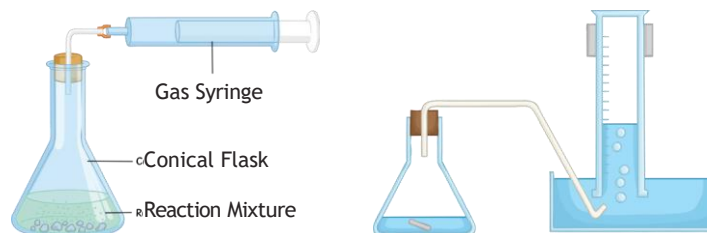## Measuring the Mass of a Reaction Mixture

The changing mass of a reaction mixture can be measured during a reaction. This method is particularly useful when gases, such as carbon dioxide, are given off. **Gas escapes during the reaction and the mass of the reaction mixture decreases.** The mass can be measured at regular time intervals.
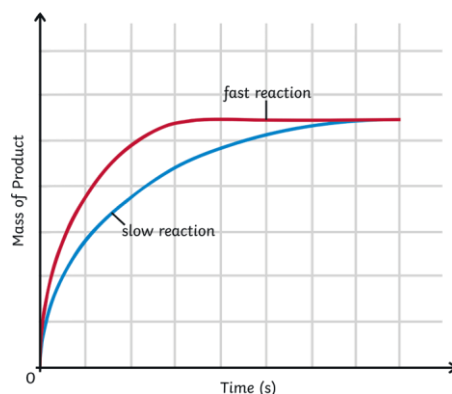
Cotton Wool

Hydrochloric Acid

Marble Chips

Electric Scale

0g
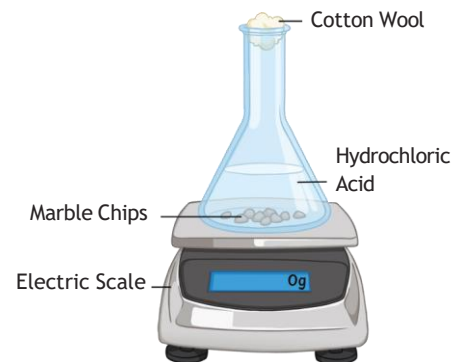
units = g/s or g/min

Measuring the Volume of a Reaction Mixture

The changing volume of a reaction mixture can be measured during a reaction. This method is particularly useful when gases, such as carbon dioxide, are given off. The gas can be collected and its volume measured at regular time intervals. Different types of measuring equipment can be used to collect the gas such as a gas syringe, measuring cylinder or upside-down burette.

Gas Syringe

Conical Flask

Reaction Mixture

units = cm³/s or cm³/min

Mass of Product

fast reaction

slow reaction

0   Time (s)

Graphs are a useful way to **analyse** the results from a rate of reaction investigation. The graph above shows two lines, one red and one blue.
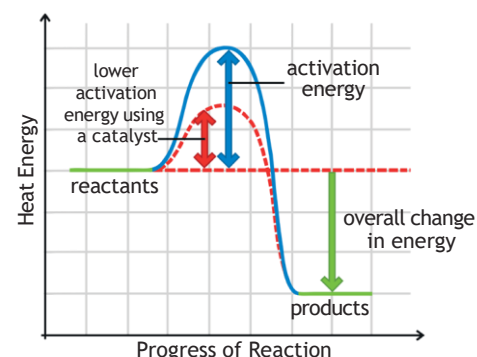
The red line represents a fast reaction and the blue line a slow reaction. We know the fast reaction occurs at a much faster rate as the line is steep. The fast reaction finishes before the slow reaction as the line plateaus sooner.

Factors Affecting the Rate of a Chemical Reaction

- concentration and pressure
- catalyst
- surface area
- temperature

The rate of a chemical reaction will be increased if there are more frequent successful collisions between reactant particles.

Catalyst

Heat Energy

lower activation energy using a catalyst

activation energy

reactants

overall change in energy

products

Progress of Reaction

A catalyst is a **substance** that speeds up a chemical reaction without getting used up itself. Catalysts are able to offer an **alternative pathway** at a **lower activation energy**.

Biological catalysts are called **enzymes**.

When a catalyst is used in a chemical reaction (not all reactions have a catalyst that is suitable to use), the **frequency of collisions** is **unchanged**. More **particles** are able to react. The particles have **energy greater** than that of the **activation energy**. Consequently, there is in an **increase** in the **rate successful of collisions**.

Concentration and Pressure

If the **number of reactant particles** in a given space is **doubled**, there will be **more frequent successful collisions** between reactant particles, therefore, **increasing** the **rate of reaction**.

reactant particles

increased concentration or pressure
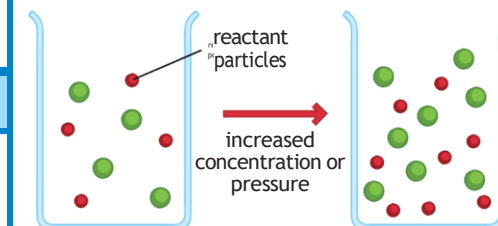
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AQA GCSE Chemistry (Combined Science) Unit 6: The Rate and Extent of Chemical Change

Temperature

When the temperature of the reaction mixture is increased, the reactant particles **gain kinetic energy** and move much more quickly. This results in **more frequent successful collisions** between the reactant particles, therefore, **increasing the rate of the reaction**.

increasing temperature

2˚C   50˚C
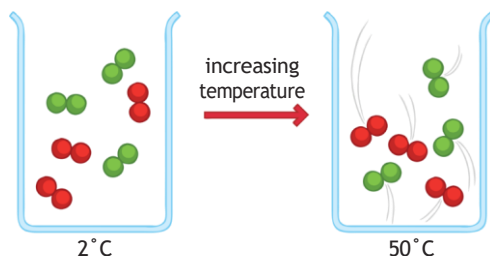
Surface Area

Large lumps of a solid have a **small surface area to volume ratio**. If the solid is broken up into smaller lumps or crushed into a powder, this will increase the surface area to volume ratio.
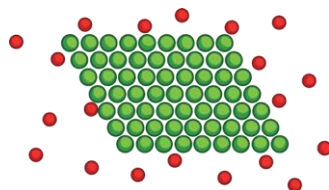
A larger area of the solid is now exposed to other reactant particles. This increases the frequency of successful collisions thus increasing the rate of reaction.

Calculating Gradient (Higher Tier Only) gradient = $\frac{y}{x}$

On the graph, draw construction lines on the part of the graph that has a straight line. Measure the values of x and y.

10.4g

2 min

Time of Reaction

Amount of Product
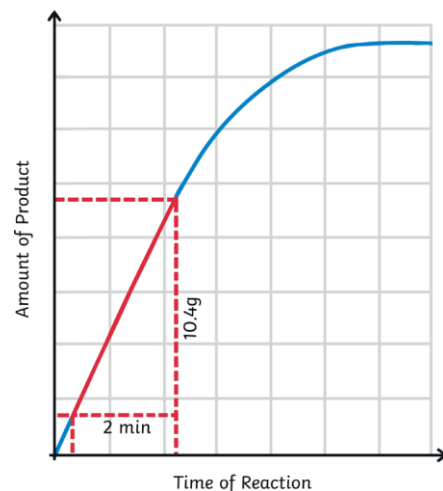
In the graph below, the gradient of the first line is much steeper than the second line. This indicates that a faster reaction is taking place. Remember, the steeper the line, the faster the reaction.

To calculate the reaction rate at a specific time period, construction lines must first be drawn on the straightest part of the graph.

Volume of Hydrogen Collected (cm³)
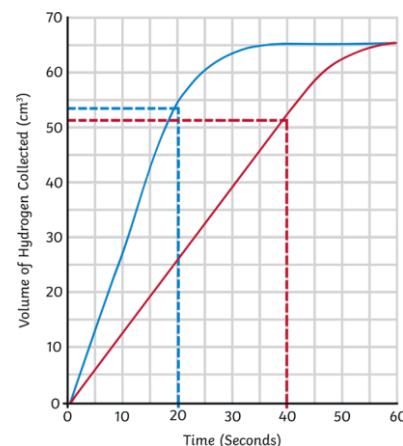
Time (Seconds)

For the first line, what is the rate of reaction at 20 seconds?

$54 ÷ 20 = 2.7 cm^3/s$

For the second line, what is the rate of reaction at 40 seconds?

$52 ÷ 40 = 1.3 cm^3/s$

Dynamic Equilibrium

In a **closed system** (this means nothing can get in or out), a reversible reaction can reach **dynamic equilibrium**. This is where the **forward** and **reverse reactions** are occurring at the **same rate** and the **concentrations** of all the substances that are reacting remain constant.

Changing Conditions and the Effect on the Position of Equilibrium (Higher Tier Only)

The reaction between nitrogen and hydrogen to make ammonia is an industrial process called the Haber process. It requires a high temperature, high pressure and an iron catalyst.

The symbol equation for the reaction is as follows:

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
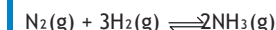
According to **Le Chatelier's Principle**, the position of equilibrium can be altered by changing the conditions of the reaction i.e. the pressure, concentration and/or the temperature. The **position** of the **equilibrium** will shift to **counteract** any changes made.

Increasing the **temperature** of the reaction in the forward direction (exothermic) will result in the equilibrium shifting in favour of the reverse direction (endothermic) to reduce the temperature.

From the equation, it is clear that on the **left-hand side,** there are **four molecules** and on the **right-hand side,** there are **two molecules**. If the **pressure** in the system were **increased**, the equilibrium **position would shift to the right** as there are fewer molecules. If the pressure in the system were **decreased**, the equilibrium **position would shift to the left** as there are a larger number of molecules.

If the **concentration** of one of the **reactants were increased**, then the equilibrium position would move in **favour of the products**. This would result in more product being produced. If the concentration of the **products were decreased**, equilibrium would shift to **favour the products**. More reactants would react until equilibrium is reached.

AQA GCSE Chemistry (Combined Science) Unit 6: The Rate and Extent of Chemical Change
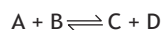
Reversible Reactions

A reversible reaction is one in which the **reactants form products**. The products are then able to react together to **reform the reactants**.

For example:
A reacts with B to form C and D.
C and D are able to react to form A and B.

The equation would be as follows (where the **double arrow symbol** represents a **reversible reaction** is taking place):

$$A + B \rightleftharpoons C + D$$

The **forward reaction** goes to the **left** and the **backwards reaction** goes to the **right**. For example, if the forward reaction is exothermic then the backward reaction will be endothermic. The amount of energy that is transferred is the same for both the forward and reverse reaction.

Hydrated copper sulfate is a blue substance. We say that the copper sulfate is hydrated as it **contains water**. The copper sulfate is heated and the water evaporates leaving a white substance known as **anhydrous** copper sulfate. Anhydrous meaning **no water**.

The word equation for the reaction is as follows:

hydrated copper sulfate $\rightleftharpoons$ anhydrous copper sulfate + water

$$CuSO_4.5H_2O(s) \rightleftharpoons CuSO_4(s) + H_2O(l)$$
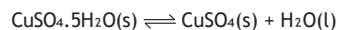
The reaction can be reversed when water is added to the anhydrous copper sulfate.

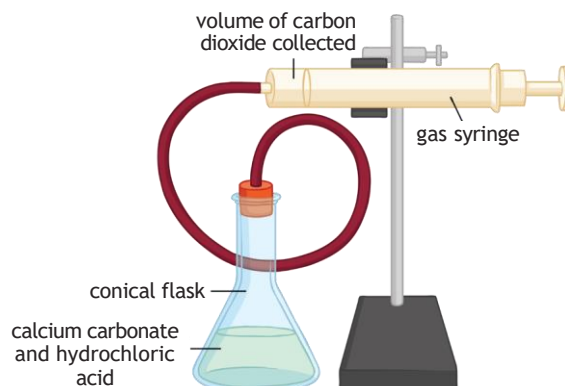## Required Practical 5: Measuring the Production of a Gas

This method outlines one way to carry out an investigation to collect a gas from a chemical reaction.

The practical involves changing the concentration of hydrochloric acid and measuring the volume of carbon dioxide gas produced when the acid reacts with calcium carbonate.

The word equation for the reaction is as follows:

calcium carbonate + hydrochloric acid $\rightarrow$ calcium chloride + water + carbon dioxide

The symbol equation for the reaction is:

$$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$$

volume of carbon dioxide collected

gas syringe

conical flask

calcium carbonate and hydrochloric acid

Method

Step 1 – Clamp a gas syringe to a retort stand using a boss and clamp. Ensure the syringe is a quarter of the way from the top of the stand. Place the delivery tube to the end of the gas syringe.

Step 2 – Measure out 50ml of hydrochloric acid using a measuring cylinder and pour into a conical flask.

Step 3 – Using a top pan balance, measure out 0.5g of powdered calcium carbonate and place in the conical flask.

Step 4 – Immediately connect the bung and delivery tube to the conical flask. Start the stopwatch.

Step 5 – Record the volume of carbon dioxide gas produced every 10 seconds.

Step 6 – When the reaction has finished and there are no more bubbles of gas being produced, clean the equipment and repeat using four other different concentrations of hydrochloric acid.

When analysing the results from the practical investigation, plot a graph of Time (s) against Volume of Gas Produced (cm³). Draw a curve of best fit through the points. A graph should be plotted for each concentration of acid.

Calculate the mean rate of reaction (cm³/s) for each concentration of acid used. This can be calculated by dividing the total mass of gas produced (cm³) by the reaction time (s).

Required Practical 5: Investigating a Change in Colour
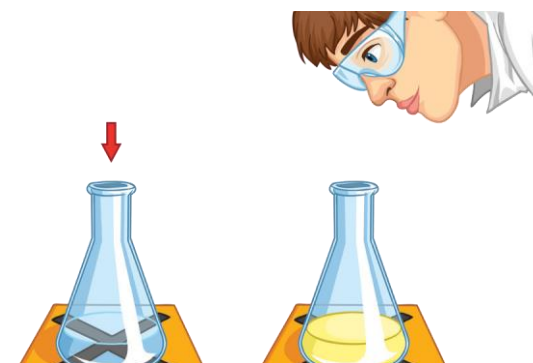
This method outlines one way to carry out an investigation into the effect of increased temperature on the rate of a reaction.

The word equation for this reaction is as follows:

sodium thiosulfate + hydrochloric acid $\rightarrow$ sodium chloride + water + sulfur dioxide + sulfur

The symbol equation for this reaction is:

$$Na_2S_2O_3 + 2HCl \rightarrow 2NaCl + H_2O + SO_2 + S$$

The reaction between sodium thiosulfate and hydrochloric acid produces a **precipitate**. **Sulfur** is responsible for the formation of the precipitate. A precipitate is a **solid** that is formed in a solution. It is the formation of this precipitate that causes the reaction mixture to become **cloudy**; the cloudiness is a way to measure the **reaction time**.

Method

Sodium thiosulfate from three different temperatures may be used, for example, ice cold, room temperature and hot.

Step 1 – Place a black cross on a white tile.

Step 2 – Using the first temperature, measure out $35cm^3$ of sodium thiosulfate using a measuring cylinder. Place the liquid in a conical flask and position over the black cross on the white tile.

Step 3 – Measure out $5cm^3$ of water and $10cm^3$ of hydrochloric acid in separate measuring cylinders.

Step 4 – Pour the water and acid into the conical flask.

Step 5 – Pour the measured amount of sodium thiosulfate into the conical flask and immediately start the stopwatch.
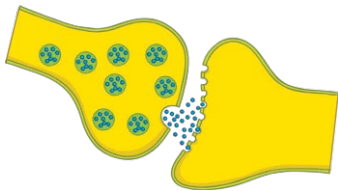
Step 6 – Look down through the conical flask to the black cross below. When the black cross is no longer visible, stop the stopwatch and record the results in a table.

Step 7 – Repeat the steps with the remaining temperatures of sodium thiosulfate.

Science

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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.

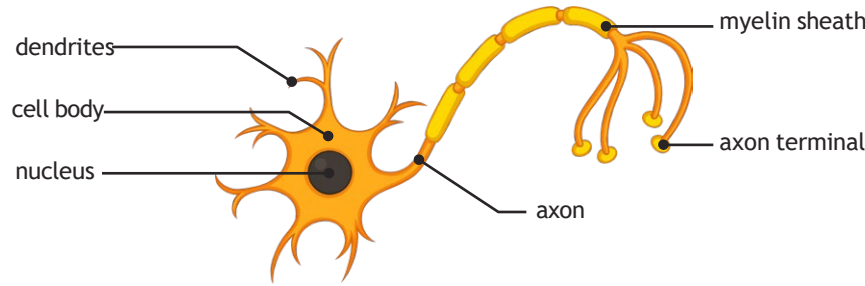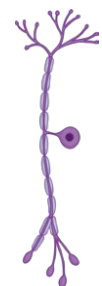In humans, homeostasis regulates the **blood glucose** (sugar) levels, the body **temperature, CO₂** levels and **water** levels.

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 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

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.

Science

# 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.

Pituitary gland
Parathyroid gland
Thyroid gland
Thymus gland
Adrenal gland
Pancreas
Ovary (female)
Testis (male)
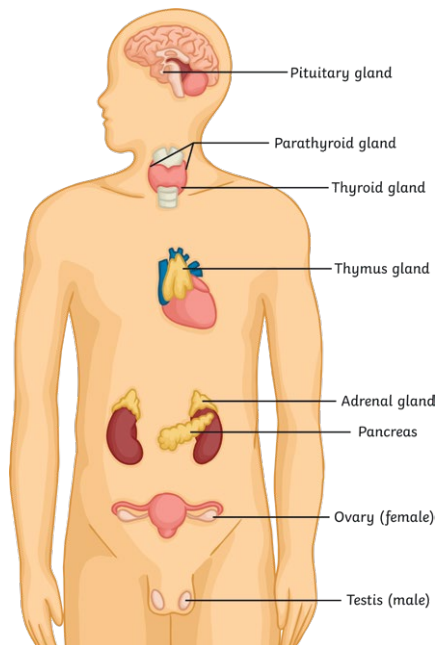
Reflexes

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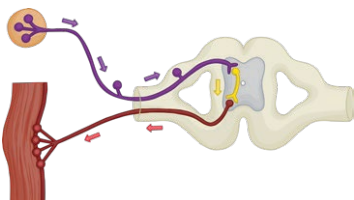
A **reflex arc** begins with the **stimulus** e.g. a bee sting or a hot object on the skin. The stimulus is detected by the **receptor** cells and an electrical **impulse** is transmitted along the **sensory neuron**. The impulse is passed through **relay neurons** in the spinal cord or the **unconscious**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

Hormones

Hormones are **chemical** messengers transported in the **bloodstream** to an effector where they can activate a response. They are produced and released from glands around the body which all make up the **endocrine system**. Hormones do a similar job 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 plasma to their **target cells** and affect only those certain cells. Hormones act on organs or cells where constant adjustments are made to maintain a stable state.

Some examples you should know:

The **pituitary gland** produces a range of hormones including FSH and LH which help to regulate the menstrual cycle. The pituitary gland acts as a **master gland** because many of the hormones it releases control and coordinate the release of other hormones from other 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.

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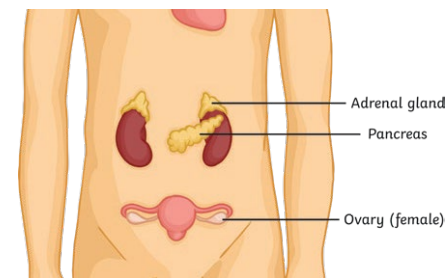
The risk of developing type 2 diabetes is higher in people who are obese (have a BMI >30).

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.
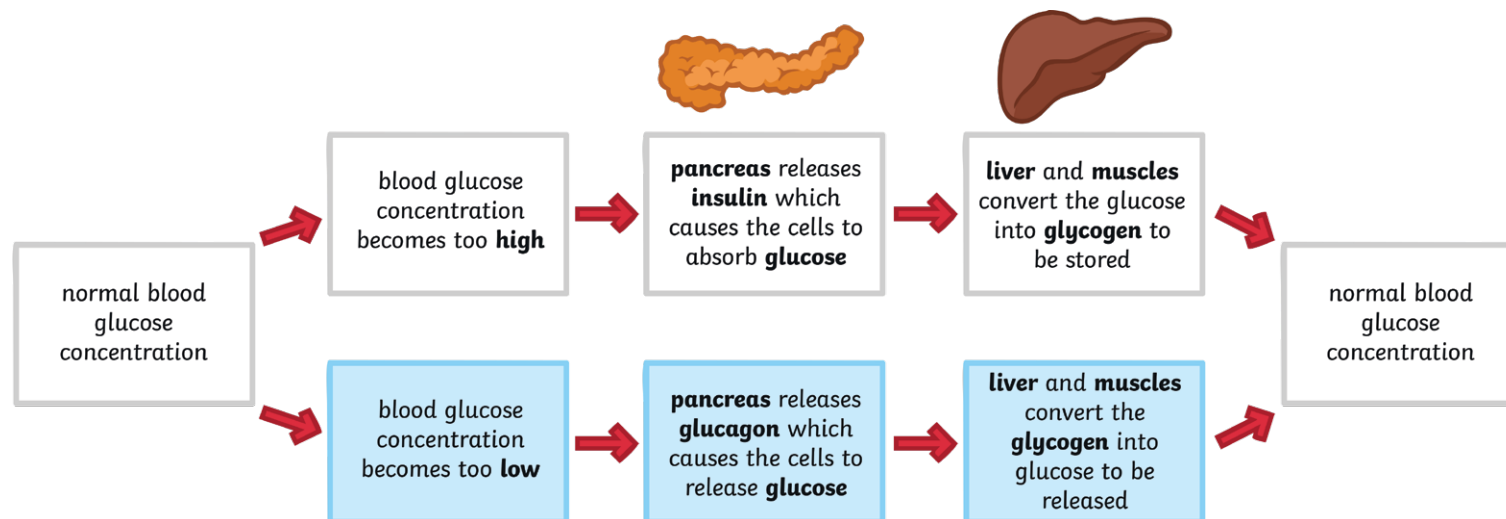

Control of Blood Glucose

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.

normal blood glucose concentration

blood glucose concentration becomes too **high** → **pancreas** releases **insulin** which causes the cells to absorb **glucose** → **liver** and **muscles** convert the glucose into **glycogen** to be stored →

blood glucose concentration becomes too **low** → **pancreas** releases **glucagon** which causes the cells to release **glucose** → **liver** and **muscles** convert the **glycogen** into glucose to be released →

normal blood glucose concentration

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**

Day 1   Day 4   Day 14   Day 28
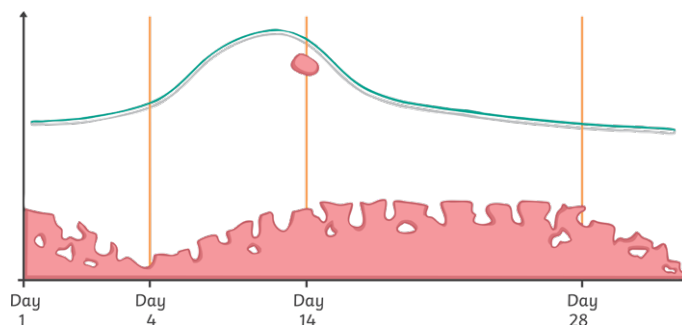
Hormone			
FSH	pituitary gland	An egg to develop in one of the ovaries.	Stimulates the production of oestrogen.
oestrogen	ovaries	The lining of the uterus builds up and thickens.	Stimulates the production of LH. Inhibits the production of FSH.
LH	pituitary gland	Ovulation (at around day 14 of the cycle).	Indirectly stimulates the production of progesterone.
progesterone	ovaries	The uterus lining to maintain.	Inhibits the production of LH.

Contraception

There are many different types of **contraceptive** (or birth control) methods. They are categorised as **hormonal** methods and **non-hormonal** methods.
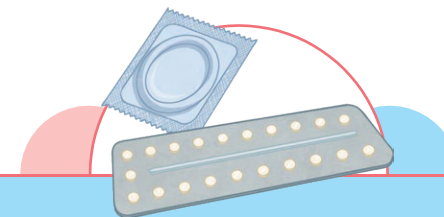
Method	Hormonal or Non-Hormonal	How It Works	Pros and Cons
oral contraceptives ('the pill')	hormonal	Pill taken which contains hormones to **inhibit FSH** so that an egg does not mature.	🙂 Easily self-administered. Short-term effects. Can easily be reversed. Very reliable. 🙁 May have mild side-effects 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.

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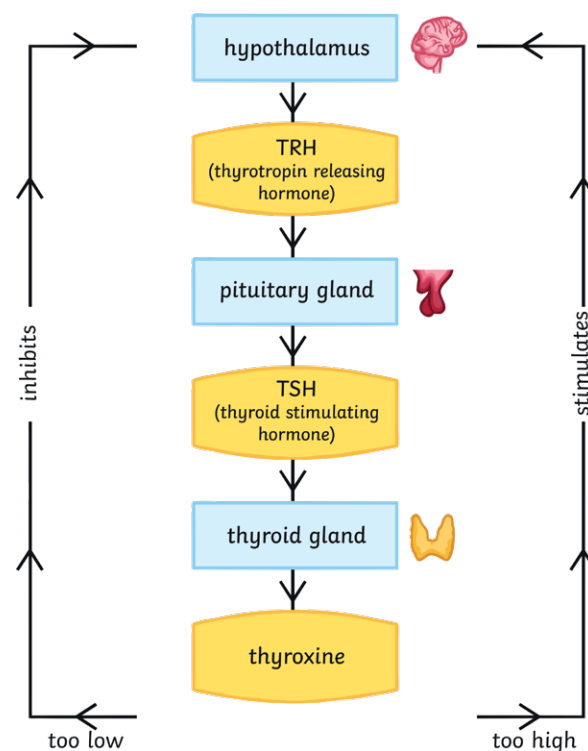
Required practical activity 7: plan and carry out an investigation into the effect of a factor on human reaction time.

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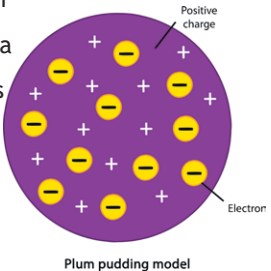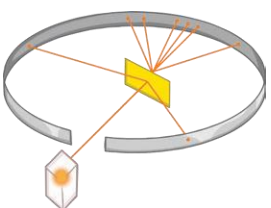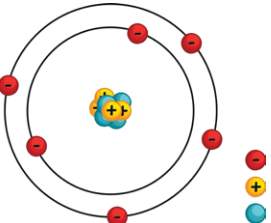
The **dependent variable** is the reaction time in seconds (converted from the cm taken to catch the ruler).

Science

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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.
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.

Plum pudding model

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.
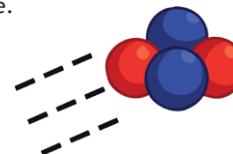
Beta

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.

$$^{0}_{-1}e$$

α = Alpha

β = Beta

γ = Gamma

Paper   Aluminum   Lead
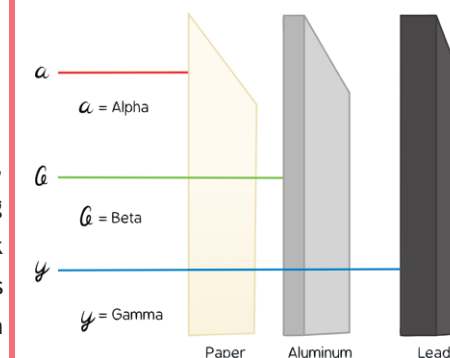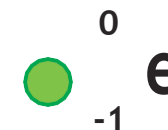
Gamma

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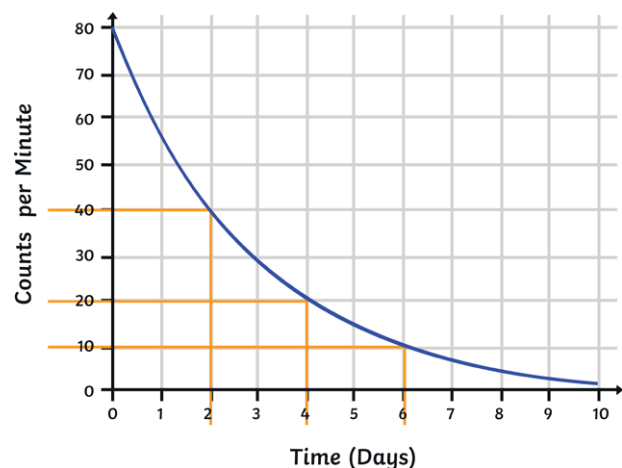
Judging from the graph, the radioactive material has a half-life of two days.

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.

$$^{226}_{88}Ra \rightarrow\ ^{222}_{86}Rn\ +\ ^{4}_{2}He$$
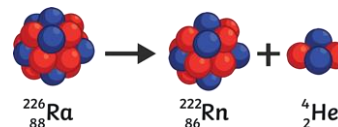
Gamma rays

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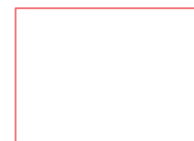
Contamination

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.

$$^{8}_{3}Li \rightarrow\ ^{8}_{4}Be\ +\ ^{0}_{-1}e$$
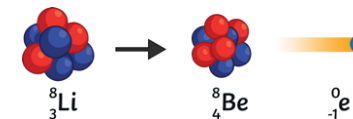
Alpha radiation is more dangerous inside the body. It is highly ionising and able to cause a lot of damage. Outside the body it is less dangerous because it cannot penetrate the skin.

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.

1. What is Market Segmentation?
Market segmentation is the process of grouping potential customers together based on different factors. It is basically the method used by businesses to identify their target customer/market. Markets can be segmented in different ways and some businesses choose to use more than one characteristic to specifically segment their market.

2. How can markets be segmented?

☐ **Age** – This is basically how old the customer is. Businesses tend to segment their market into age brackets. Toys, for example, are aimed at younger audiences, potentially between ages 3 and 13.

☐ **Gender** – This is whether the target customers are typically going to be male or female. Make-up, for example, is targeted at females – this doesn't mean that males cannot buy it, it is just who the business is targeting!

☐ **Occupation** – Occupation means the job or career that the people within the target market may have. This could be a specific job, for example Screwfix™ aiming their products and marketing at people who work in manual trades such as plumbers, electricians etc.

☐ **Income** – Some businesses segment their market based on how much money their potential customers make. Luxury branded items, for example, will be targeted at customers with more disposable (spare) income.

☐ **Geographic** – This is when businesses segment their market by their location. A local newspaper, for example, will segment their market to include only those in the area in which the newspaper reports.

☐ **Lifestyle** – Businesses could segment their market based on what their customers' lifestyle is like; this is basically their hobbies, their routines and their habits. Some people enjoy going on holiday abroad each year, this is their lifestyle.

3. What are the benefits of Market Segmentation?

By segmenting their market, businesses are:
- Able to focus on the wants and needs of specific customers and more likely to meet these wants and needs.
- More likely to make sales because they've focused on specific groups of people (if they segment successfully).
- More able to focus their advertising and other marketing at the right groups of customers – if their market is segmented to include female customers, then the business could choose to advertise in magazines aimed at females, for example.
- Able to tailor their products and services to suit their customers; they will know what people in their segment typically prefer.

4. How do customers vary (how are they different)?

Customers' needs vary because of:
- The amount of money they are **able** to spend
- The amount of money they are **willing** to spend (some customers have more money, but may not be willing to spend this money)
- The **quantity** of products or services they require
- The **quality** of products or services they require
- The **location** in which they want to or can purchase items
- The **time** at which they want to or can purchase items.

5. What Customer Feedback Techniques are available for business start-ups?

Customer Feedback Techniques are the methods a business uses to allow customers to tell them what they think about their products or services and can include:

- Social Media / Online Communities
- Websites with reviews
- Online surveys
- Customer comment cards
- Comments made to staff members
- Telephone/email surveys
- Email contact forms

6. Why are Customer Feedback Techniques useful for new business start-ups?

If things aren't going well for a business, customer feedback will give them the reasons why. Taking action could improve sales and help businesses meet customer requirements better. Customer feedback also makes customers feel they are being listened to.

7. What is Market Research?

Market research is the process of finding out what customers want and what they need. Businesses typically carry out market research before developing a new product as well as during the testing of the product to get the opinions of their potential customers.

8. What is the purpose of Market Research?

The purpose of market research is to find out what customers want and need – this helps businesses develop products that are more likely to be successful. Research also helps understand customers' tastes and opinions and can change the design or specification of products. Finally, market research can also be used to gauge what products are already on the market and what competitors are doing.

9. What is Primary (Field) Market Research?

Primary research, also known as field research, is when businesses gather their own data and information. This can be done through surveys, questionnaires, focus groups, observations and consumer trails. The data gathered is unique to the business and does not already exist.

10. What are the benefits of Primary (Field) Research?

Carrying out primary research means that the results are exactly what the business wants to find out, because this research has been tailor made for their own specific needs. Data generated from primary research will also be up-to-date.

11. What are the drawbacks of Primary (Field) Research?

Primary research is usually more expensive to carry out than secondary research because the business is creating and analysing everything from scratch. This also means that primary research is more time consuming to carry out.

12. What is Secondary (Desk) Market Research?

Secondary research, sometimes called desk research, is when the business uses data or information that already exists. This is not tailor made for the business. Methods of secondary research include internal data, books, newspapers and data already collected by competitors, the Government or other sources of statistics.

13. What are the benefits of Secondary (Desk) Market Research?

Secondary research is quicker to complete, because the data has already been collected and, in some cases, analysed.
Secondary Research is also cheaper to carry out – looking in newspapers for information on competitors is clearly cheaper than preparing, carrying out and analysing a questionnaire, for example.

14. What are the drawbacks of Secondary (Desk) Market Research?

The data that is collected from secondary research is not unique and not specific to the business's needs, unlike when primary research is carried out. Data from secondary research is also widely available, which means competitors will also have access to it.

1. What are Costs?

Costs are the things businesses have to pay for in order to produce a product or provide a service.

2. What are Fixed Costs?

Fixed costs are things a business pays for that do not change depending on the amount of a product a business makes – so these costs stay the same no matter how many products a business produces.

3. Examples of Fixed Costs for a Cake Shop…

Rent for the shop would be a fixed cost because the cost will stay the same no matter how many cupcakes are produced and sold. The shop's insurance, staff salaries and phone bill will also be examples of fixed costs.

4. What are Variable Costs?

Variable costs are the costs a business pays that change depending on how many products a business produces – these costs increase when more products are made.

5. Examples of Variable Costs for a Cake Shop…

The ingredients used in the cakes would be an example of a variable cost because this cost will increase if more cakes are made. The packaging for the cakes will also be a variable cost, if more cakes are made and sold then more packaging will be required.

6. How are Total Costs calculated?

Total cost is just the fixed costs plus the variable costs. You will, however, need to account for the number of products made when including variable costs.

For example, if the cake shop's fixed costs are £1,000 and their variable costs are £0.20 per cupcake, their total costs when they produce 500 cupcakes will be:

Fixed Costs + (Variable Cost Per Unit x Units Produced)

£1,000 + (£0.20 x 500)

£1,000 + £100 = **£1,100 Total Costs**

7. How to calculate Total Costs for 400 cupcakes when Fixed Costs are £2000 and Variable Costs are £0.45 per unit…

£2,000 + (£0.45 x 400)

£2,000 + £180 = **£2,180 Total Costs**

8. What is Revenue?

Revenue is the money generated from selling products or services. **It is not profit**, but the money coming into a business from sales.

9. How is Total Revenue calculated?

Total Revenue is calculated by:

Selling Price x Number of Products Sold

10. What is Profit?

Profit is the money left over from revenue once costs have been paid – it's the money a business makes once all costs have been covered.

11. How is Total Profit calculated?

Total Profit is calculated by:

Total Revenue – Total Costs

12. What is Profit per Unit? How is it calculated?

Profit per Unit is the amount of profit a business makes on just one item sold.

Profit per Unit is calculated by:

Selling Price per Unit – Total Costs per Unit

13. Example calculations…

Selling Price = £1.20 per cake
Fixed Costs = £350
Variable Costs = £0.20 per cake

- Total Costs for 500 cakes = 350 + (0.20 x 500) = £450

- Revenue for 500 cakes = 500 x 1.20 = £600

- Profit per Unit = 1.20 – (450 ÷ 500) = £0.30

14. What is Break-even?

Break-even is the point at which a business does not make a profit or a loss; its revenue from sales and its total costs are equal. **The number of products** that must be produced/sold to reach this point is called the Break-even Point.

15. How is Break-even calculated?

The formula for Break-even is:

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

16 A labelled Break-even graph…
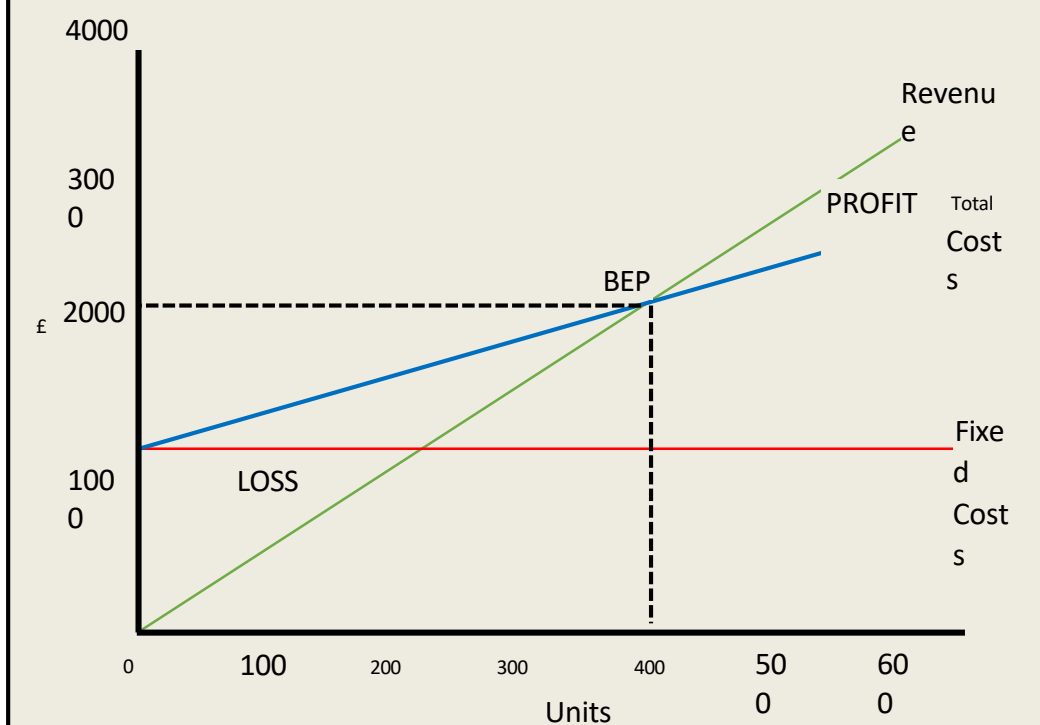
This business's Break-even Point is 400 Units.

17. Why is Break-even information useful for a business?

Businesses who calculate their Break-even point know what output they need in order to be profitable; so, they know how many products to produce to break-even and can generate a sales target in order for them to make a profit.

18. What does increasing selling prices do to the Break-even Point?

Increasing selling prices will lower a business's Break-even Point, they will need to produce/sell less in order to Break-even.

19. What impact does increased costs have on the Break-even Point?

An increase in either Fixed or Variable Costs (or both) will result in a higher Break-even Point for a business; they will need to produce/sell more in order to Break-even.

Health and Social Care Knowledge Organiser: Component 1 Human Lifespan Development

Learning Aim A: Understand human growth and development across life stages and the factors that affect it

A1 Human growth and development across life stages		A2 Factors affecting growth and development		

A1 Human growth and development across life stages

Life stages
Infancy
(0 – 2 years)
Early childhood
(3 – 8 years)
Adolescence
(9 – 18 years)
Early adulthood
(19 – 45 years)
Middle adulthood
(46 – 65 years)
Later adulthood
(65+ years)

Areas of Development
1. **Physical development –** Physical growth in height or weight
2. **Intellectual development –** Developing thinking, memory and language skills
3. **Emotional development –** Developing feelings about self and other, self-esteem
4. **Social development –** Forming relationships, socialisation and isolation

A2 Factors affecting growth and development

Physical factors
- Inherited conditions
-Illness & disease
- Mental ill health
- Physical ill health
- Disabilities
- Sensory impairments

Lifestyle factors
-Nutrition
- Physical activity
- Smoking
- Alcohol
- Substance use

Emotional factors
-Fear
-Anxiety/ worry
-Upset/ sadness
-Grief/ bereavement
-Happiness/ contentment
-Security
-Attachment

Social factors
- Supportive and unsupportive relationships
- Social inclusion and exclusion
- Bullying
- Discrimination

Cultural factors
-Religion
-Gender roles
-Gender identity
-Sexual orientation
-Community
-Race

Environmental factors
-Housing
-Home environment
-Pollution

Economic factors
-Employment situation
-Financial resources

Learning Aim B: Understand how individuals deal with life events

B1 Different types of life event			B2 Coping with change caused by life events		

B1 Different types of life event

Health and wellbeing events
-Accident/ injury
-Physical illness
-Mental and emotional health and wellbeing

Relationship changes
-New relationships
-Marriage and civil partnerships
-Divorce and separation
-Parenthood
-Bereavement

Life circumstances
-Moving house, school or job
-Exclusion
-Redundancy
-Imprisonment
-Changes to living standards
-Retirement

B2 Coping with change caused by life events

Character traits that influence how to cope with life events
-Resilience
-Self esteem
-Emotional intelligence
-Disposition

Sources of support
-Family
-Friends
-Partners
-Community groups
-Multi-disciplinary and agencies

Types of support
-Emotional
-Information and advice
-Practical help

Health and Social Care Knowledge Organiser: Component 2 Health and Social Care Services and Values

Learning Aim A: Understand the Different Types of Health and Social Care Services and Barriers to Accessing Them

A1: Health Care Services

Health Conditions
- Arthritis
- Cardiovascular Conditions
- Type 2 Diabetes
- Dementia
- Obesity
- Respiratory Conditions
- Additional needs

Health Services
- Primary Care
- Secondary Care
- Tertiary Care
- Allied Health Professions
- Multidisciplinary Team Working

A2: Social Care Services

Social Care
Social Care Services
- Children and Young People
- Adults and/or Children with Specific Needs
- Older Adults

Additional Care
- Informal care
- Voluntary Care

A3: Barriers to Accessing Services

Type of Barrier
1. Physical
2. Sensory Disability
3. Social and Cultural
4. People who speak English as a Second Language and/or Speech and Language Impairments
5. Geographical
6. Learning Disabilities
7. Financial

How They Can Overcome by the Service Providers or Users
1. Ramp, wider doorways, accessible toilets/rooms, stair lifts, hoists
2. Hearing aids, BSL interpreters, larger print, braille, extra staff
3. Awareness campaigns, posters/ leaflets, clinics for men and women, choice of service provider, collaboration with community and faith groups
4. Writings in accessible languages, face-to-face and telephone interpretation assistance, health and wellbeing meetings, longer appointments, advocates, staff training, staff awareness
5. Local transport links for elderly and/or disabled. Home visits, community clinics, tele-health schemes
6. Health passports, use of Learning Disability Nurses (LDNS's), support workers, longer appointments, quiet waiting zones, adhering to the accessible Information Standard, easy read leaflets
7. NHS :exemption certificates, low income scheme, vouchers for eye tests; glasses and lenses, healthcare travel costs scheme, Charity schemes: community transport

Learning Aim B: Understand the Skills, Attributes and Values Required to Give Care

B1: Skills and Attributes in Health and Social Care

Skills
- Problem solving
- Observation
- Dealing with Difficult Situations
- Organisation

Attributes
- Empathy
- Patience
- Trustworthiness
- Honesty

B2: Values in Health and Social Care

The 6 Cs
- Care
- Compassion
- Competence
- Communication
- Courage
- Commitment

B3: The Obstacles Individuals Requiring Care May Face

Potential Obstacles
1. Emotional/ Psychological
2. Time Constraints
3. Availability of Resources
4. Unachievable Targets
5. Lack of Support
6. Specific to the Individual

The Impact
1. Lack of motivation, low self-esteem acceptance of current state, anxiety and stress
2. Work and family commitments
3. Financial, equipment and amenities
4. Unachievable, unrealistic timescale
5. Family and Friends
6. Ability/ disability, health, addiction

B4: The Benefits to Individuals of the Skills, Attributes and Values in Health and Social Care Practice

People Will:
- Be supported to overcome their personal barriers
- Receive high quality care
- Receive person-centred care based on the individuals needs
- Be treated with respect
- Not be discriminated against
- Be empowered and have independence
- Be involved in care decisions
- Be protected from harm
- Feel comfortable to raise complaints
- Have their dignity and privacy protected
- Have their confidentiality protected
- Have their rights promoted
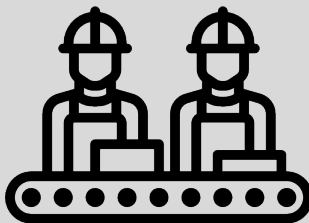
Year 10 Design and Technology Summer Term Knowledge Organiser

Key Vocabulary:

#	Term	Definition
1	The Product Lifecycle	When created, every product has a lifecycle. It is important for designers to understand this lifecycle and design responsibly to ensure there is minimal damage to the environment (to limit the impact of their decisions).
2	Life Cycle Analysis	The engineering design process can have a major impact on each of the processes listed. Engineers, therefore, have a huge responsibility in looking after the environment.
3	Properties of Materials	Materials are mainly chosen to perform a task based on their PROPERTIES. The property of a material dictates how it will perform and react to the environment it is in and how it will react to the job you have asked it to do (e.g. Steel for Bridge structures = good, Chocolate for a kettle = bad).
4	Elasticity	Ability to regain it original shape (e.g. Rubber).
5	Ductility	Ability to be stretched without breaking (e.g. Copper).
6	Malleability	Ability to pressed, spread-out or hammered (e.g. Lead).
7	Hardness	ability to resist scratching, cutting or wear-and-tear (e.g. High Carbon Steel).
8	Toughness	resistant to breaking & bending (e.g. Cast Iron or Urea Formaldehyde Polymer).
9	Tensile Strength	retains strength when stretched (e.g. some Aluminium Alloys).
10	Compressive Strength	very strong under pressure (e.g. Concrete).
11	Corrosive Resistance	will it corrode in the environment it is working in (e.g. Iron rusts).

Energy, Material, System and Devices

#	Term	Definition
12	Energy Generation	Power is generated from fossil and nuclear fuels. Be aware of the arguments for and against the selection of fossil fuels, renewable energy and nuclear power and how power is generated from renewable energy sources such as: wind, solar, tidal, hydroelectric and biomass.
13	Energy Storage	Energy is the capacity to do work What is meant by 'work'? Energy comes in different forms and can be stored. Forms of energy: Potential energy (stored) and Kinetic energy (motion).
14	Modern Materials	Modern materials are new inventions or one that has been relatively recently discovered A material or element may also be used or combined in a way that is different from its normal function.
15	Smart Materials	Smart materials react to an external stimulus by changing their characteristics and/or properties.
16	Composite Materials and Technical Textiles	Materials can be processed to create alternative outcomes and their uses.
17	System Approach to Designing	To understand how electronic systems work, the principles behind their functions and where they are used.
18	Electronic System Processing	To understand and recognise electronic systems, components and their functions.
19	Mechanical Devices	Movement and motion is the action of something being moved. Levers help provide mechanical advantage (MA).
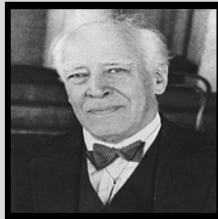
NEA practice project

20 Homeware

A new home ware company are looking to develop a new range of products. They have approached your design business and asked for a prototype product that would be suitable for people moving into their first home.
The product need to be based around a shaped sustainable plastic using The Six Rs knowledge learnt.

1. Task Analysis; Task analysis is one of the tools that you can use during the "define" stage of the Design Thinking process. The most frequent deliverable of a task analysis activity is a diagram explaining the steps that a user must take in order to complete a goal.
2. Design ideas for your product making sure you use your specification ACCESS FM to help you.
3. CAD; Computer Aided Design to help improving accuracy.
4. CAM; Computer Aided Manufacture.

21 Manufacture - What is it?

Use specialist tools techniques processes equipment and machinery precisely and use a wider more complex range of materials components taking into account their properties.

22 Evaluation

Designers evaluate their finished products to test whether they work well and if design can be corrected or improved. It is important to evaluate your work constantly during the project to see if it is on track and so that improvements can be built-in throughout the design process, not just at the end.

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.

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?

Macbeth Knowledge Organiser

Act One	The play opens with three witches chanting on 'the heath'. In the next scene we hear a battle report in which a soldier Macbeth bravely fought in a battle to defend Scotland. On the return from battle, Macbeth and Banquo meet the three witches. The witches prophesy that Macbeth will be promoted twice: to Thane of Cawdor and King of Scotland. Banquo's descendants will be kings, but Banquo isn't promised any kingdom himself *'lesser than Macbeth and greater'*.. Soon afterwards, King Duncan names Macbeth Thane of Cawdor as a reward for his success in the recent battles. The promotion seems to support the prophecy. The King then proposes to make a visit to Macbeth's castle. Lady Macbeth receives news from her husband about the prophecy and his new title. Lady Macbeth vows to help him become king.
Act Two	Macbeth returns to his castle, followed almost immediately by King Duncan. Macbeth and Lady Macbeth discuss a plot to kill Duncan, we see lots of conflict in their relationship here as Lady Macbeth begins to manipulate Macbeth. Once they have agreed to kill the king, Lady Macbeth gives the guards drugged wine so Macbeth can enter and kill the King. Macbeth regrets this almost immediately, but his wife reassures him. She leaves the bloody daggers by the dead king just before Macduff arrives. Macduff, the Thane of Fife, discovers the murder 'O horror, horror, horror…'. Macbeth kills the drunken guards in a show of rage and retribution. Duncan's sons, Malcolm and Donalbain, flee, fearing for their own lives.
Act Three	Macbeth becomes King of Scotland but starts to become consumed with feelings of guilt and doubt. He remembers the prophecy that Banquo's descendants will inherit the throne and grows paranoid about Banquo. He arranges for Banquo and his son Fleance to be killed. Banquo is murdered, but his son escapes the assassins. At his state banquet that night, Macbeth sees the ghost of Banquo, a symbol of his guilt, and worries the courtiers with his mad response. Lady Macbeth dismisses the court and tries to calm her husband but is unsuccessful.
Act Four	Macbeth returns to find the witches as he begins to feel more uncertain about his future. The witches say that he will be safe until a local wood, Birnam Wood, marches into battle against him. He also need not fear anyone born of woman. They also prophesy that the Scottish succession will still come from Banquo's son. Macbeth embarks on a reign of terror, killing many, including Macduff's family. Macduff had gone to seek Malcolm (one of Duncan's sons who fled) at the court of the English king. Macduff persuades Malcolm to lead an army against Macbeth.
Act Five	Macbeth is in his remote castle at Dunsinane, where he feels safe, until he is told that Birnam Wood is moving towards him. Malcolm's army carrying branches from the forest as camouflage for their assault on Macbeth. Meanwhile, an overwrought and guilty Lady Macbeth begins to sleepwalk and tells her secrets to her doctor. She commits suicide. The final battle commences. Macbeth begins to realise that he will not win, and in the midst of a losing battle, Macduff challenges Macbeth. Macbeth learns Macduff is the child of a caesarean birth and submits to his enemy. Macduff triumphs and brings the head of the traitor Macbeth to Malcolm. Malcolm declares peace and goes to Scone to be crowned king.

Macbeth Knowledge Organiser
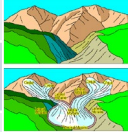
Macbeth: Main protagonist, tragic hero, brave in battle, ambitious, easily manipulated, tyrannical, guilt driven, insecure.

Macbeth is the main protagonist who begins the play as a hero in battle but is easily manipulated with the fatal flaw od ambition. He slowly descends into madness and desperation as he becomes obsessed with the witches prophecies of power.

Lady Macbeth: Ambitious, lust for power, manipulative, controlling, emasculating, duplicitous, subvert stereotypes of Jacobean women,

Lady Macbeth is Macbeth's wife. She controls Macbeth use her influence over him to drive him into making the decision to kill Duncan. At the end of the play, she cannot escape the consequences of her actions and dies as a result of her guilt.

Banquo: brave, noble, loyal, father, friend to Macbeth at the beginning, later returns to haunt Macbeth as a symbol of guilt.

Banquo is a loyal, noble character who is a soldier in the play like Macbeth, At the beginning of the play we see Macbeth and Banquo together, as heroes and equal. After the witches prophecies they both begin to take different paths with Banquo choosing to ignore the witches prophecies. Banquo is murdered by Macbeth and later returns to haunt him at the state banquet.

Duncan: Rightful king, beloved, compassionate, mentor, trusting, some argued flawed.

Duncan is the rightful king of Scotland. He awards Macbeth the honour of Thane of Cawdor after his heroics in battle. Duncan is murdered by Macbeth.

Macduff: loyal to the rightful king, dubious and hostile towards Macbeth, noble.

Macduff becomes suspicious of Macbeth and goes to England to persuade Malcolm to bring an army to fight Macbeth. While away, Macduff's wife and child are killed on Macbeth's orders. Macduff returns with Malcolm and the army to kill Macbeth.

The Witches: Ruthless, Suspicious, untrustworthy, manipulative.

The witches prophecies are the catalyst of the events in the play. They directly influence Macbeth with the temptation of a powerful future which sparks his ambition. Macbeth later returns to the witches for further prediction.

Themes:		
Ambition	**Guilt**	**Power**
The Supernatural	**Appearance vs Reality**	**Kingship**

Context		
Jacobean Era	**The Divine Right of Kings**	**The Gunpowder Plot**
Attitude to the Supernatural	**Jacobean Women**	**Religion**

What is a landscape?

A landscape has visible features that make up the surface of the land. Landscapes can be broken down into four 'elements'.

Landscape Elements

Physical
- Mountains
- Coastlines
- Rivers

Biological
- Vegetation
- Habitats
- Wildlife

Human
- Buildings
- Infrastructure
- Structures

Variable
- Weather
- Smells
- Sounds/Sights

Relief of the UK

Relief of the UK can be divided into uplands and lowlands. Each have their own characteristics.

Key

Lowlands

Uplands

Areas +600m: Peaks and ridges cold, misty and snow common. i.e. Scotland

Areas - 200m: Flat or rolling hills. Warmer weather. i.e. Fens

Erosion

The break down and transport of rocks – smooth, round and sorted.

Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolved rocks.
Abrasion	Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action	Water enters cracks in the cliff, air compresses, causing the crack to expand.

Transportation

A natural process by which eroded material is carried/transported.

Solution	Minerals dissolve in water and are carried along.
Suspension	Sediment is carried along in the flow of the water.
Saltation	Pebbles that bounce along the sea/river bed.
Traction	Boulders that roll along a river/sea bed by the force of the flowing water.

Glaciation in the UK

Over many thousands of years, glaciation has made an impression on the UK's landscape. Today, much of upland Britain is covered in u-shaped valleys and eroded steep mountain peaks.

During the ice age

Ice covered areas eroded and weathered landscapes to create dramatic mountain scenery.

After the ice age

Deep valleys and deposition of sediment revealed

Geology of the UK

The UK is made from a variation of different rock types. The varied resistance of these rocks influences the landscape above.

Igneous Rock
Volcanic/molten rock brought up to the Earth's surface and cooled into solid rock.

Sedimentary Rock
Made from broken fragments of rock worn down by weathering on Earth's surface.

Metamorphic Rock
Rock that is folded and distorted by heat and pressure.

Soil & Landscape

- Soils are created from weathered rocks, organic material and water. Rock types have influence over fertility of soil.
- Low-laying areas such as the Cambridgeshire Fens have deep soil whereas uplands have thin soil.
- Deep soil is more often associated with deciduous woodland rather than coniferous woodlands.

Human activity on Landscape

Farming has changed the vegetation which grows there.	Much of the rural landscape has been replaced by urban sprawls.	Infrastructure such as roads and pylons cover most of the UK.
Over thousands of years, much of the UK's woodlands have gone.	Increasing population of the UK means more houses are needed.	UK's marshes and moorlands are heavily managed by people.

Topic 3
Distinctive Landscapes

Climate and Weather in the UK

The variations of climate and weather means there are different influences on the UK's landscape.

Climate

The rainfall map of the UK shows variations in average rain.
- **Less** precipitation occurs in low land areas. East England
- **Most** precipitation occurs in upland areas. Scotland.

These differences mean…
Uplands experience more weathering, erosion and mass movement.

Weathering

Mechanical
Caused by the physical action of rain, frost and wind.

Chemical
Action of chemicals within rain dissolving the rock.

Biological
Rocks that have been broken down by living organisms.

Average rainfall in the UK

Precipitation (mm) % of 1961-1990 Average

% of Average
> 350
300 to 350
250 to 300
200 to 250
150 to 200
125 to 150
75 to 125
< 75

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Freeze-thaw weathering

Stage One
Water seeps into cracks and fractures in the rock.

Stage Two
When the water freezes, it expands about 9%. This wedges apart the rock.

Stage Three
With repeated freeze-thaw cycles, the rock breaks off.

Mass Movement

A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.

1	Rain saturates the permeable rock above the impermeable rock making it heavy.
2	Waves or a river will erode the base of the slope making it unstable.
3	Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
4	The debris at the base of the cliff is then removed and transported by waves or river.

Original position

Slumped mass
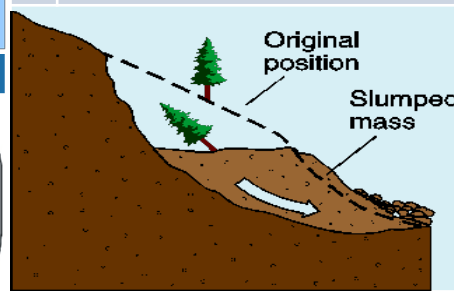
Deposition

When the sea or river loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.

Formation of Coastal Stack
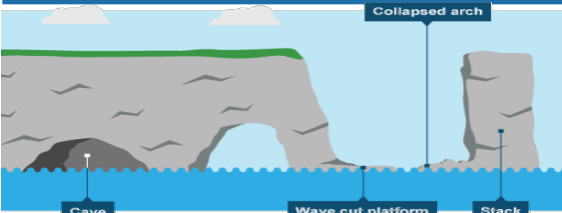
Example: Old Harry Rocks, Dorset

1) Hydraulic action widens cracks in the cliff face over time.
2) Abrasion forms a wave cut notch between HT and LT.
3) Further abrasion widens the wave cut notch to from a cave.
4) Caves from both sides of the headland break through to form an arch.
5) Weather above/erosion below –arch collapses leaving stack.
6) Further weathering and erosion eaves a stump.

Coastal Defences

Hard Engineering Defences

Groynes	Wood barriers prevent longshore drift, so the beach can build up.	✓ Beach still accessible. ✗ No deposition further down coast = erodes faster.
Sea Walls	Concrete walls break up the energy of the wave . Has a lip to stop waves going over.	✓ Long life span ✓ Protects from flooding ✗ Curved shape encourages erosion of beach deposits.
Gabions or Rip Rap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	✓ Cheap ✓ Local material can be used to look less strange. ✗ Will need replacing.

Soft Engineering Defences

Beach Nourishment	Beaches built up with sand, so waves have to travel further before eroding cliffs.	✓ Cheap ✓ Beach for tourists. ✗ Storms = need replacing. ✗ Offshore dredging damages seabed.
Managed Retreat	Low value areas of the coast are left to flood and erode naturally.	✓ Reduce flood risk ✓ Creates wildlife habitats. ✗ Compensation for land.

Formation of Bays and Headlands

1) Waves attack the coastline.
2) Softer rock is eroded by the sea quicker forming a bay, calm area cases deposition.
3) More resistant rock is left jutting out into the sea. This is a headland and is now more vulnerable to erosion.

Formation of Coastal Spits - Deposition

Example: Spurn Head, Holderness Coast

1) Swash moves up the beach at the angle of the prevailing wind.
2) Backwash moves down the beach at 90° to coastline, due to gravity.
3) Zigzag movement (Longshore Drift) transports material along beach.
4) Deposition causes beach to extend, until reaching a river estuary.
5) Change in prevailing wind direction forms a hook.
6) Sheltered area behind spit encourages deposition, salt marsh forms.

Upper Course of a River

Near the source, the river is flows over steep gradient from the hill/mountains. This gives the river a lot of energy, so it will erode the riverbed vertically to form narrow valleys.

Formation of a Waterfall

1) River flows over alternative types of rocks.

2) River erodes soft rock faster creating a step.

3) Further hydraulic action and abrasion form a plunge pool beneath.

4) Hard rock above is undercut leaving cap rock which collapses providing more material for erosion.

5) Waterfall retreats leaving steep sided gorge.

Middle Course of a River

Here the gradient get gentler, so the water has less energy and moves more slowly. The river will begin to erode laterally making the river wider.

Formation of Ox-bow Lakes

Step 1
Erosion of outer bank forms river cliff. Deposition inner bank forms slip off slope.

Step 2
Further hydraulic action and abrasion of outer banks, neck gets smaller.

Step 3
Erosion breaks through neck, so river takes the fastest route, redirecting flow
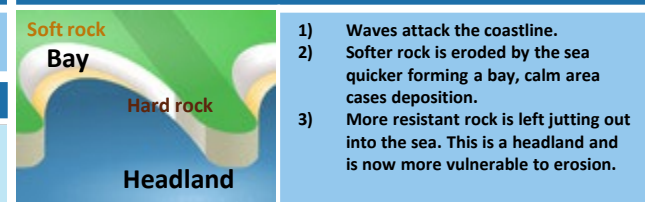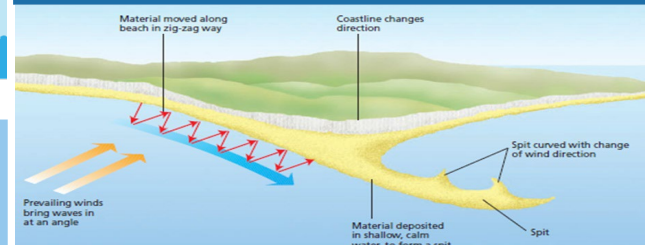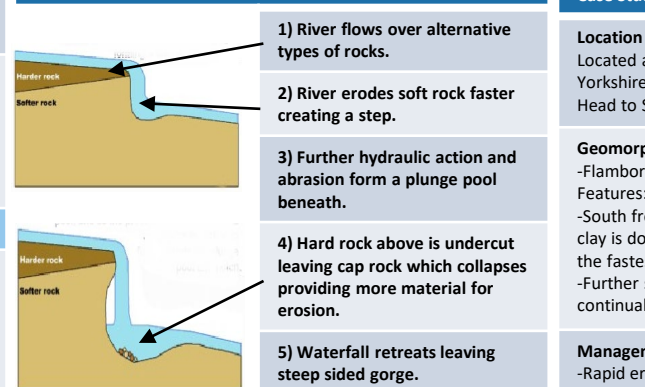
Step 4
Evaporation and deposition cuts off main channel leaving an oxbow lake.
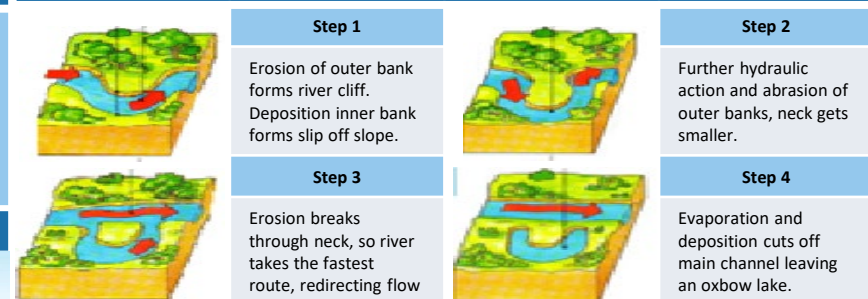
Lower Course of a River

Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited.

Formation of Floodplains and levees

When a river floods, fine silt/alluvium is deposited on the valley floor. Closer to the river's banks, the heavier materials build up to form natural levees.

✓ Nutrient rich soil makes it ideal for farming.
✓ Flat land for building houses.
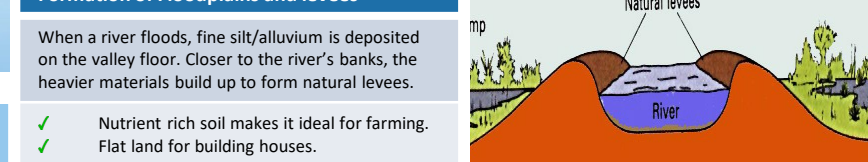
River Management Schemes

Soft Engineering	Hard Engineering
Afforestation – plant trees to soak up rainwater, reduces flood risk. **Demountable Flood Barriers** put in place when warning raised. **Managed Flooding** – naturally let areas flood, protect settlements.	**Straightening Channel** – increases velocity to remove flood water. **Artificial Levees** – heightens river so flood water is contained. **Deepening or widening river** to increase capacity for a flood.

Case Study: The Holderness Coast

Location and Background
Located along the North-East coast in the county of Yorkshire. The coast extends 50km from Flamborough Head to Spurn Head.

Geomorphic Processes
-Flamborough Head is made from more resistant chalk. Features: wave-cut platforms, caves and stacks
-South from Flamborough Head the less resistant boulder clay is dominate. This coasts erodes 1.8m per year and is the fastest in Europe. Cliff slumping can be evident.
-Further south, Spurn Head is a coastal spit created by continual deposition from LSD that extents out to sea.

Management
-Rapid erosion means there are a number of different management schemes from soft to hard engineering.
-High population centres such as Withersea and Horsea are protected by 'hold the line' defence measures such as sea walls, groynes & heavy beach nourishment.
-Underpopulated & economic centres, such as farmland, are under 'managed retreat' schemes.

Case Study: The River Tees

Location and Background
Located in the North of England flows 137km from the Pennines to the North Sea at Red Car.

Geomorphic Processes
Upper – Features include V-Shaped valley, rapids and waterfalls. Highforce Waterfall drops 21m and is made from harder Whinstone and softer limestone rocks. Gradually a gorge has been formed.
Middle – Features include meanders and ox-bow lakes. The meander near Yarm encloses the town.
Lower – Greater lateral erosion creates features such as floodplains & levees. Mudflats at the river's estuary.

Management
-Towns such as Yarm and Middleborough are economically and socially important due to houses and jobs that are located there.
-Dams and reservoirs in the upper course, controls river's flow during high & low rainfall.
- Better flood warning systems, more flood zoning and river dredging reduce impact from flooding.

Key Vocabulary:

1	Nobility	Belonging to the aristocracy. E.g. a Lord or Lady
2	Gentry	People of a high social class.
3	Yeomen	Men who held a small amount of land or an estate.
4	Tennant farmers	Farmed rented land usually owned by yeomen or gentry.
5	Merchants	Traders.
6	Craftsmen	Skilled employees.
7	Militia	A military force of ordinary people, rather than soldiers, raised in an emergency.
8	Privy Council	Advisors to Elizabeth.
9	Justices of the Peace	Large landowners who kept law and order.
10	Secretary of State	Elizabeth's most important Privy Counsellor.
11	Divine Right	Belief that the monarchs right to rule came from God
12	Succession	The issue of who was going to succeed the throne after the existing monarch died.
13	Legitimate	Being born in wedlock when the existing king and queen were married.
14	Auld Alliance	A Friendship between France and Scotland
15	Puritans	Radical/extreme protestants
16	Papacy	The system of church government ruled by the Pope.
17	heretics	People who refused to follow the religion of the monarch.
18	Excommu nicated	Expulsion from the Catholic Church.

The situation on Elizabeth's accession

8 Society and Government:

90% of English population lived in the countryside
Social hierarchy: monarch at the top, then the nobility (Lords and Ladies), gentry , Yeomen, tenant farmers, labouring poor and the homeless and vagrants at the bottom
The Court was made up of the nobility and were the monarch's key advisors and friends.
The Privy Council advised the monarch on government policy and oversaw law and order and security in England
Parliament was made up of the House of Lords and the House of Commons and could only be called and dismissed by the monarch. It passed laws and advised the monarch

9 The Virgin Queen:

Elizabeth's accession caused controversy as her gender; legitimacy religion were questioned. Women were seen as weak, and the property of their husband's and Christian religion taught that women should be under the authority of men. Elizabeth's legitimacy was in doubt because of how her father (Henry VIII) divorced his first wife, Catherine of Aragon, in order to marry Elizabeth's mother, Anne Boleyn.

10 Challenges at home and abroad:

England had financial weakness: England had fought costly wars before Elizabeth came to the throne (and lost) and was £300,000 in debt. There had been a series of bad harvests which increased poverty.
The French threat: France was wealthier and had a larger population. They were an ally of Scotland another enemy of England (The Auld Alliance). The French port of Calais had been in English control since 1347 but was lost when England went to war with France during Mary I's reign
Mary Queen of Scots was Elizabeth's cousin (granddaughter of Henry VIII's sister), had a strong claim to the throne, was half French and married to Francis, the heir to the French throne and declared herself the legitimate Catholic claimant to the English throne. She also had a son, James.
Religious problems: The reformation began in 1532 and since then it had flip flopped between Protestant (Edward VI) and Catholic (Mary I).
Spain was a powerful catholic country who's king, Phillip II had been married to Mary I and wanted to marry Elizabeth.

How settled is religion?

13 The Religious Settlement

Catholic Church: The Pope in Rome is the head of the church, the bible and church services should be in Latin, priests are special and should wear special vestments and not marry. Transubstantiation happens (a miracle when the bread and wine becomes the body and blood of Christ)
Protestantism: there should be no pope, the bible and church services should be in English, sins can only be forgiven by God (not priests), priests are not special and should not wear special clothing and can get married, churches should be plain and simple so not to distract people from worshipping god.
The Elizabethan Settlement happened in 1559 and was Elizabeth's attempt to solve the religious problems and establish a form of Protestantism that Catholics could accept.
The Act of Supremacy: Elizabeth supreme governor and all clergy had to swear an oath of loyalty to her
The Act of Uniformity introduced a protestant Common Prayer Book that all churches had to use, the services and bible had to be in English but the meaning of the bread and wine taken in church was left open.
The settlement was largely successful 8,000 priests took the oath of supremacy, she replaced the catholic bishops that refused to take the oath, the majority of the public accepted it as the new Prayer Book kept the interpretation of beliefs open.

14 Catholic challenge

1/3 of English nobility were Catholic especially those in the north of England. They disliked Elizabeth's favourites such as Robert Dudley ad Sir William Cecil.
In 1566 the pope issued an instruction to English Catholics should not attend Church of England services. However although there were punishments for those that didn't follow the settlement these were generally not enforced as Elizabeth didn't want to create martyrs and the majority of Catholics stayed loyal to Elizabeth.

15 Puritan challenge:

The Puritans had two issues 1.) crucifixes (Puritans thought they were idols and wanted to get rid of them) 2.) vestments (Puritans thought priests did not need any special clothing at all.) Although they had support in London and several powerful and influential supporters at court (Robert Dudley, the Earl of Leicester and Sir Francis Walsingham) they did not enjoy widespread support amongst the country.

Key Vocabulary:

1	New World	North and South America
2	Thomas Howard, Duke of Norfolk	One of England's most senior nobles and had strong catholic sympathies despite being a protestant.
3	Council of the North	Used to implement Elizabeth's laws and authority in the North of England.
4	Sir Francis Walsingham	Elizabeth's Secretary of State and chief spymaster
5	Privateers/ sea dogs	Individuals with their own armed ships that capture other ships for their cargo, often with the support and authorisation of the government
6	Francis Drake	Elizabeth hired him as a privateer.
7	Circumnavigate	To travel all the way around the world.
8	Spanish Fury	The Spanish rampaged through Dutch provinces as they left
9	Pacification of Ghent 1576	Spanish troops expelled from Netherlands, political autonomy to be returned and end of religious persecution.
10	Treaty of Joinville 1584	The King of France and the King of Spain became allies against Protestantism.
11	Treaty of Nonsuch 1585	Effectively put England and Spain at war as Elizabeth agrees to help the Dutch with money and soldiers.
12	Singeing of the King of Spain's beard 1587	Drake sailed into Cadiz harbour, Spain's most important Atlantic port, and over 3 days destroyed 30 ships.

Plots and revolts at home

13 Revolt of the Northern Earls (1569):

The aim with the support of the Spanish, replace Elizabeth with MQS and marry her to the Duke of Norfolk.
The Earls marched to Durham and celebrated a catholic mass in the cathedral. Headed south but Spanish troops never arrived and Elizabeth raised an army of 14000 men. 450 rebels executed. The Earl of Westmoreland escaped and the Earl of Northumberland executed.
Political/power reasons for the plot: under Mary I, the Earls had been very influential but not as influential under Elizabeth. Job of looking after the borders with Scotland given to Sir John Foster. Lost the rights to a valuable, copper mine found on his land to the queen in 1567. The northern earls resented the influence favourites like William Cecil and Robert Dudley had over the queen. Religious reasons for the plot: The Earls were catholic, the bishop of Durham (James Pilkington) was a committed and unpopular protestant.
The revolt was significant as 1.) it was the most serious rebellion by English Catholics 2.) It prompted harsher treatment of Catholics and widened the definition of treason to include calling Elizabeth a heretic 3.) It encouraged the pope to excommunicate Elizabeth in 1570.

14 Other Catholic Plots:

Ridolfi Plot (1571) Plan to murder Elizabeth, launch a Spanish attack and put Mary Queen of Scots on the throne.
Throckmorton Plot (1583) Planned for the French Duke of Guise to invade England, free Mary , overthrow Elizabeth and restore Catholicism in England.
Babington Plot (1586) The Duke of Guise would invade England and put Mary on the throne.

15 Why Mary, Queen of Scots was executed:

Plots at home: fours plots planned to overthrow Elizabeth
Foreign Threats: Phillip II of Spain was a devout Catholic and disliked Elizabeth supporting the Dutch rebels
Mary Queen of Scots herself: She had been involved in all plots, was a legitimate Catholic heir to the throne, had links to France and claimed to be the rightful queen of England
Elizabeth's parliament and advisers: Act for the Preservation of the Queen's Safety (1585) stated that Mary could be killed if she had been involved in a plot, Sir Francis Walsingham had a network of spies and gathered evidence against Mary, her advisers were Protestant.

Spain and the Spanish Armada

16 Why was there tension between England and Spain?

Commercial rivalry: England wanted new markets to trade with and make money but Spain controlled the Netherlands (England's main route into the European markets and the wool trade) and Spain controlled much of the New World
Piracy- in 1572 Elizabeth hired Francis Drake as a privateer- he went to Panama and captured £40,000 of Spanish silver and in 1577 Elizabeth gave Drake secret instructions to attack Spain's colonies in the New World.
Marriage:- Elizabeth rejected Philip's marriage proposal
Religious reasons- Phillip II was a strict Catholic and opposed Elizabeth's religious settlement and in 1571 the Pope had excommunicated Elizabeth and Elizabeth had executed MQS in 1587.
The Netherlands:- In the 1570s Elizabeth increasingly supported the Dutch rebels. Sent a loan of £100,000 to the Dutch rebels and a future promise of an armed force to enforce the Pacification of Ghent.

17 Spanish Armada 1588

After being delayed by the Singeing of the King of Spain's Beard the Armada set sail in 1588. With 130 ships and 30,000 men under the command of the Duke of Medina-Sidonia was to sail along the English Channel to the Netherlands, pick up the Duke of Parma and his army of 27,000 men before invading England and impose a Catholic government in England.

18 Why the Armada failed:

1.) English strengths: the English ships were Galleons and were faster and more manoeuvrable, they could also fire more cannon balls than the Spanish ships but they only had 24 when the armada invaded. 2.) English tactics- Elizabeth left key decisions to her commanders (including Sir Francis Drake) and they used fire ships on 6th August which did little damage but panicked and scattered the Spanish ships. 3.) Spanish weaknesses- their supplies (the food was rotting and they didn't have enough cannon balls) and Phillip II didn't listen to the advice of his commanders. They also had communication problems which meant that Medina-Sidonia couldn't collect the Duke of Parma before the English attacked 4.) Chance- after the Battle of Gravelines the Armada headed north and thousands of them lost their lives in shipwrecks caused by storms.

Key Vocabulary:

1	Social mobility	Being able to change your position in society.
2	Grammar schools	Private schools set up for boys considered bright who largely came from well off families in towns.
3	Corporal punishment	Punishment which causes physical pain.
4	Apprentice	Someone learning a trade or a skill.
5	Petty and dame schools	Set up in a teacher's home, for boys (Petty) ad girls (dame)
6	galleons	Ships that were much larger than traditional trading ships.
7	Mystery plays	Plays based on the Bible and saints' stories.
8	The Globe	Shakespeare's theatre.
9	Poor relief	Financial help for those in poverty paid for with taxes.
10	Vagabonds	Homeless people without jobs who roamed the countryside begging for money or perhaps committing crimes in order to survive.
11	Enclosure	The process of replacing large, open fields that were farmed by villages with individual fields belonging to one person.
12	Deserving poor	People unable to work because of illness or old age.
13	Idle poor/ sturdy beggars	People who were fit to work but didn't.
14	Astrolabe	Used by sailors to help with navigation at sea
15	Colonies	Land under the control or influence of another country.

Elizabethan society

16 Education:

Education expanded during Elizabeth's reign, but this expansion was limited. Of those that got education, most were boys. Literacy rates improved by 10% for men but not at all for women. Education was not based on social mobility but on preparing you for the life you were expected to live. The large majority of people were illiterate (70% of men and 90% of women). There was not a lot of difference in the academic education of noble girls and boys. They learnt foreign languages, Latin and Greek, History, Philosophy and Government.**. Every town in England had a grammar school by 1577.** This was the greatest change in Elizabethan education- there were more schools than ever before. Boys went to grammar school at 8yrs-14 yrs and the focus of the curriculum was on Latin and there was a great emphasis on memorising huge quantities of text.

17 Leisure:

Wrestling, tennis, football, music and dancing, but sport was much more violent e.g. it was known for men to be killed during matches and bear baiting and cock-fighting were popular. Theatre thrived in Elizabethan times: there were many new plays and purpose built theatres (the Red Lion in 1567 and the Rose in 1587) and was popular with all classes in Elizabethan England.

18 Why poverty increased:

1.) Population growth -it grew as much as 35% 2.) rising prices- food especially 3.) enclosure sheep farming was very profitable in this era as the demand for woollen cloth had grown 4.) rack renting Landowners were charging farmers more to rent land. 5.) closure of monasteries the Church used to help the poor. 6.) bad series of harvest especially in the 1560s and 1570s 7.) wages increasing slowly

19 How the Elizabethans dealt with poverty:

1572 Vagabonds Act : aim: to deter vagrancy (old thinking) so vagrants should be whipped and have a hold drilled in their ear (old) and it established the national poor rate which was a tax to help the deserving poor (new thinking).
1576 Poor Relief Act aimed to distinguish between abled bodied and deserving poor (old) and to help the able bodied poor to find work (new thinking). So JPs provided the able-bodied with wool and raw materials to make things to sell and those who refused to work were sent to a special prison known as the house of correction.

Spain and the Spanish Armada

20 Why was there more and more exploration

1.) Expanding trade- the conflict with Spain and the Netherlands hit the traditional wool and cloth trade hard, reports from the Americas suggested there were many valuable crops, animal skins and gold and silver. The triangular trade was beginning and was making huge profits already. 2.) New technology- navigation became easier due to the use of astrolabes and quadrants and more accurate maps such as the Mercator map. 3.) Improved ship design- Galleons were much larger than traditional trading ships and more stable in heavy seas, they were also more manoeuvrable due to improved sail design

21 Significance of Sir Francis Drake's circumnavigation

Why ? 1.) Wanted to be the first Englishman to do so. 2.) Wanted revenge on the Spanish 3.)Economic reasons- he returned to England with an estimate treasure haul of £500,000,000 in today's money!
Why so significant? 1.) It's a boost to English morale and established the reputation of English ships and sailors. 2.) Encouraged explorations: They may have gone as far north as Vancouver and their logs of their journeys were written up and shared. 3.) established Nova Albion: 1579 Drake landed in California and declared an area of it for England. 4.) Encouraged colonies in America. 5.) Damaged Anglo-Spanish Relations: Drake had attacked Spanish colonies in America and Elizabeth had knighted him- made Phillip II angry.

22 The Virginia colonies:

Why the 1st attempt to colonise Virginia failed. 1.) The voyage they left to late in the year to plant crops in Virginia, the biggest ship *The Tiger*, got damaged and all the food and seeds were ruined. 2.) the Colonists were unsuitable Not enough farmers and the others were not prepared for the hard work of surviving in an inhospitable place. The soldiers were undisciplined. 3.) Bad relations with the Native Americans- The chief, WIngina, got tired of the English asking for food, they carried new diseases that killed many native Americans The colonists left in July 1586. Another attempt was made to colonise in 1587. There were attempts to improve on the first expedition by bringing colonists who were prepared to work hard, the leader of the expedition (John White) was experienced, having gone on the 1st attempt. When John White returned to the colony in 1590 after going back to England the colony had disappeared and no trace of them has been found.

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

Key Vocabulary:

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

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

10 Causes

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

11 Diagnosis/Treatments:

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

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?
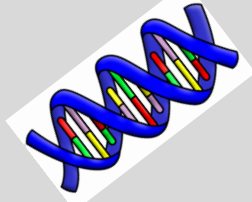
20 Individuals

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

Key Vocabulary:

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

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

10. Causes

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

11. Diagnosis/Treatments:

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

12 Preventions:

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

13 Healers and Hospitals

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

14 Case Study: Cholera (1854)

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

15. Case Study: Smallpox Vaccination (1798)

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

Who were the key individuals and key themes?

16 Individuals

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

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

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

18 Why were there so many breakthroughs?

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

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

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?

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 10 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

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 10 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.

Year 10 GCSE Computer Science Summer Term Knowledge Organiser Cyber Security

Key Vocabulary:

1	Cyber Security	The processes, practices and technologies designed to protect networks, computers, programs and data from attack, damage or unauthorised access.
2	Social engineering	The art of manipulating people so they give up confidential information.
3	Malware	Malicious code. An umbrella term used to refer to a variety of forms of hostile or intrusive software.
4	Pharming	A cyber attack intended to redirect a website's traffic to a fake website.
5	Penetration Testing	The process of attempting to gain access to resources without knowledge of usernames, passwords and other normal means of access.
6	Blagging	The act of creating and using an invented scenario to engage a targeted victim in a manner that increases the chance the victim will divulge information or perform actions that would be unlikely in ordinary circumstances.
7	Phishing	A technique of fraudulently obtaining private information, often using email or SMS.
8	Shouldering	Observing a person's private information over their shoulder eg cashpoint machine PIN numbers.
9.	Viruses	Attach by copying themselves to certain files. Users spread them by copying infected files and activate them by opening infected files.
10.	Worms	Are like viruses but they self-replicate without any user help, meaning they can spread very quickly.
11.	Trojans	Malware disguised as legitimate software. Unlike viruses and worms trojans don't replicate themselves – users install them not realising they have a hidden purpose.

Key Vocabulary continued…

12	Ransomware	A type of Malware that encrypts all files on a computer. The user receives a message demanding a large sum of money be paid in exchange for a decryption key.
13	Adware	A type of malware that can cause pop-up ads that cannot be closed.
14	Spyware	A type of malware that secretly tracks actions like key presses and sends information to the hacker, who may be able to work out passwords/bank details etc.
15	Rootkits	Malware that can be give hackers administrator –level access to devices.
16	Encryption	Coding (encrypting) data so that it can only be decoded (decrypted) with the correct key.
17	MAC Address Filtering	A way of keeping networks secure by blocking devices from accessing the network unless their unique identification (MAC address) is known and trusted.
18	CAPTCHA	A test to tell Humans and Computers apart.

Cyber Security Threats

19 Cyber Security Threats:

Threats to **Cyber Security** include:
- **Social Engineering** Techniques:
  - **Blagging**
  - **Phishing**
  - **Shouldering**
- Malicious Code (**Malware**) – It is often installed on a device without the knowledge or consent of the user Eg. Downloads or removeable media. Once on a device it can delete, modify files, Lock files (**Ransomware**), display unwanted adverts (**Adware**), monitor the user (**Spyware**) and alter permissions (**Rootkits**).
- **Pharming**
- Weak and default passwords
- Misconfigured access rights
- Removeable media – eg USB drive or SD card
- Unpatched and/or outdated software

Cyber Security Threats continued…

20 Penetration Testing:

There are two types of **penetration testing**:
- When the person or team testing the system has some knowledge of the system, simulating an attack from inside the system. (a malicious insider).
- When a person or team testing the system has no knowledge of the system, simulating an attack from outside the system (an external attack).

21 Social Engineering:

Social engineering is a way of gaining sensitive information or illegal access to networks by influencing people. Social engineering methods include:
- **Blagging** – Eg a potential attacker could e-mail someone pretending to be one of their friends, saying they are stuck in a foreign country and them to send some money.
- **Phishing** – Eg E-mails or texts sent to people, claiming to be from a well-known business. Normally they contain poor grammar or spelling mistakes
- **Shouldering** – Eg Spying on someone entering their pin number at a cash machine. Users should always cover the keyboard when entering pin numbers.

22 Malicious code (malware):

Examples of malware include:
- Computer **viruses**
- **Worms**
- **Trojans**
- **Spyware**

To protect from malware networks can use one or more of the following;
Encryption, Anti-malware software, automatic software updates, user access levels and **MAC address filtering**.

Methods to detect and prevent cyber security threats

23 Security Measures:

The following security measures can be used to protect networks from cyber threats:
- Biometrics – Eg fingerprint, face scan
- Password Systems
- **CAPTCHA**
- Using e-mail confirmations to confirm a users identity
- Automatic software updates

Year 10 GCSE Computer Science Summer 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.

En la ciudad – In the city

1. **En mi ciudad/pueblo hay**… - In my city/town there is…

Mi ciudad/pueblo tiene… - My city/town has…

un ayuntamiento – a town hall	**una pista de hielo** – an ice rink	
un bar/muchos bares – a bar/lots of bars	**un puerto** – a port/harbour	
un castillo (en ruinas) - a (ruined) castle	**una oficina de correos** – a post office	
un cine – a cinema	**un restaurante** – a restaurant	
un mercado – a market	**una bolera** – a bowling alley	
una piscina – a swimming pool	**un teatro** – a theatre	
un supermercado – a supermarket	**una iglesia** – a church	
una playa – a beach	**una biblioteca** – a library	
un museo – a museum	**una comisería** – a police station	
una plaza mayor – a town square	**una estación de trenes/autobuses** – a train/bus station	
un parque – a park	**un gran almacén** – a department store	
una plaza de toros – a bull ring	**un centro comercial** – a shopping centre	
un polideportivo – a sports centre	**muchos lugares de interés** – lots of sights	

Es una ciudad/un pueblo_____ - It's a ____ city/town

histórico/a – historic
moderno/a – modern
tranquilo/a – calm/quiet
ruidoso/a – noisy
animado/a – lively
aburrido/a – boring
turístico – touristy
industrial – industrial
famoso/a – famous
conocido/a por… - known for…

Está situado – it's situated…

al lado del río – next to the river
está rodeado de… - it's surrounded by

Tiene unos impresionantes paisajes naturales – it has some amazing natural landscapes
Tiene varios influencias culturales – it has various cultural influences
Tiene el bullicio de la ciudad – it has the hustle and bustle of the city
Es mi ciudad natal – it's my home town
Hay mucho que hacer/hay mucha marcha – there's lots to do
No hay nada que hacer – there's nothing to do
Hay una zona peatonal – there's a pedestrian zone

Actividades - activities

2. **Se puede(n)**… - you can

estar mucho tiempo al aire libre – spend a lot of time in the open air
subir la torre – go up the tower
hacer un recorrido en autobús – do a bus tour
disfrutar de las vistas – enjoy the views
apreciar la arquitectura variada – appreciate the variety of the architecture
aprovechar del buen tiempo – make the most of the good weather
probar platos típicos – try local dishes
practicar deportes acuáticos – do water sports
practicar senderismo – go hiking/trekking
ir de compras – go shopping

Tiendas - Shops

3. **Un estanco** – a tobacconist's
Un banco – a bank

Una papelería – a stationery shop
Una pastelería – a cake shop
Una peluquería – a hairdresser's
Una pescadería – a fishmonger's
Una tienda de ropa – a clothes shop
Una zapatería – a shoe shop
Una juguetería – a toy shop
Una tienda de comestibles – a grocery store/supermarket

Una cafeteria – a café
Una carnicería – a butcher's
Una farmacia – a pharmacy/chemist's
Una frutería – a greengrocer's
Una joyería – a jeweller's
Una librería – a bookshop
Una panadería – a bakery

4. Parallel Text:

1	**Lo mejor** de vivir en la ciudad es que	**The best thing** about living in the city is that
2	es **tan fácil desplazarse** ya que	it's **so easy to get around**
3	hay **una red de transporte público muy fiable**.	because there is **a really reliable public transport network**.
4	Además, **merece la pena madrugar** porque	Moreover, **it's worth getting up early** because
5	hay mucho que hacer.	There's a lot to do.
6	Hay **cines**, **tiendas** y **boleras** y	There are **cinemas**, **shops** and **bowling alleys** and
7	**mucha gente dice que la vida es más interesante**.	**lots of people say that life is more interesting**.
8	En mi opinión, se lleva una vida tan frenética en la ciudad	In my opinion life is so hectic in the city
9	y por eso, **preferiría vivir** en el campo.	therefore **I would prefer to live** in the countryside.
10	**Me parece que** hay **bastante desempleo**	**It seems that** there is **a lot of unemployment**
11	sin embargo la vida es **más tranquila** y	however life **is calmer** and
12	se puede aprovechar del aire libre.	you can enjoy the fresh air.
13	**Si fuera posible** cambiaría muchas cosas de mi ciudad.	**If it were possible** I would change a lot of things in my city.
14	Por ejemplo **reduciría la contaminación** y	For example I would **reduce pollution** and
15	**plantaría más árboles** ya que	**plant more trees** because
16	en el pasado era muy **industrial**.	in the past it was very **industrial**.

Las ventajas y las desventajas – the advantages and disadavntages

1.

Lo mejor de vivir en la ciudad es que… - the best thing about living in the city is that…

- **es tan fácil desplazarse** – it's so easy to get around
- **hay una red de transporte público** – there's a public transport network
- **hay tantas diversiones** – there's so much to do
- **hay muchas posibilidades de trabajo** – there are lots of job opportunities
- **la vida es más interesante** – life is more interesting

Lo peor que que… - the worst thing is that…

- **el centro es tan ruidoso** – the centre is so noisy
- **hay tanto tráfico** – there's so much traffic
- **se lleva una vida tan frenética** – life is so hectic
- **la gente no se conoce** – people don't know each other
- **hay demasiado contaminación** – there's too much pollution

En el campo… - in the countryside

- **el transporte público no es fiable** – the public transport isn't reliable
- **hay bastante desempleo** – there's quite a lot of unemployment
- **yo conozco a todos mis vecinos** – I know all of my neighbours
- **se puede aprovechar del aire libre** – you can enjoy the fresh air
- **la vida es más tranquila** – life is calmer
- **la vida es más aburrida** – life is more boring

Cambios - changes

2.

Si fuera posible – if it were possible

- **introduciría transporte público gratis** – I would introduce free public transport
- **renovaría los edificios viejos** – I would renovate the old buildings
- **mejoraría el sistema de transporte público** – I would improve the public transport system
- **crearía más trabajos** – I would create more jobs
- **crearía más espacios verdes** – I would create more green spaces
- **invertiría en la educación** – I would invest in education
- **plantaría más árboles** – I would plant more trees
- **constuiría más tiendas en el centro** – I would build more shops in the centre
- **reduciría la contaminación** – I would reduce pollution
- **prohibiría los coches** – I would ban cars

Mi ciudad en el pasado – my city in the past

3.

En el pasado – in the past
Hace (10) años – 10 years ago
En los años sesenta – in the 60s
Mis padres/mis abuelos dicen que – my parents/grandparents say that…

la ciudad era – the city was
había – there was
tenía – it had

más/menos que hacer – more/less to do
mucho despempleo – there was a lot of unemployment
más/menos pobreza – more/less poverty
más/menos industrial – more/less industrial
un puerto importante – an important port

los Beatles se volvían famosos – the Beatles became famous
Liverpool era la capital de cultura durante el año dos mil ocho (2008) – Liverpool was the Capital of Culture in 2008
la ciudad ha cambiado a lo largo de los siglos – the city has changed throughout the centuries

padrastro – stepdad
madrastra - stepmum
hermanastro/a – stepbrother/sister
tío – uncle   **tía** – aunty
primo – cousin (m)   **prima** – cousin (f)
bisabuelo – great-grandad   **bisabuela** – great-nan
sobrino – nephew   **sobrina** – niece
hijo – son   **hija** – daughter
nieto – grandson   **nieta** – granddaughter
novio – boyfriend   **novia** - girlfriend
marido – husband   **mujer** – wife
mis parientes – my relatives

la **Un buen amigo es alguien que…** - a good friend is someone who…

te apoya – supports you
te escucha – listens to you
te conoce bien – knows you well
te acepta como eres – accepts you as you are
te quiere mucho – loves you a lot
te da consejos – gives you advice
te hace reír – makes you laugh

Pienso que soy un buen amigo/una buena amiga porque… - I think I a good friend because…

Soy – I am
Es – he/she is
Son – they are
calvo – bald   **alto** – tall   **bajo** – short   **gordo** – fat   **delgado** - sli

Tengo – I have
Tiene – he/she has
Tienen - they have
- eyes

| **Los ojos** - eyes | **azules** – blue   **marrones** – brown   **verdes** - green |
| **El pelo** - hair | **moreno** – dark brown   **rubio** – blonde   **castaño** – brown
rojo – red   **rizado** – curly   **liso** – straight
ondulado – wavy
corto – short   **largo** – long   **fino** – fine
de punta – spiky |

Me llevo bien con… - I get on well with
Me divierto con… – I have fun with
Echo de menos a… - I miss

Me apoya(n) – he/she supports me
Me acepta(n) como soy – he/she accepts me as I am
Me hace(n) reír – he/she makes me laugh
Me conoce(n) bien – he/she knows me well
Nunca me critica(n) – he/she never criticises me
Guarda(n) todos mis secretos – he/she keeps all my secrets
Tenemos mucho en común – we have a lot in common
Me da(n) consejos – he/she gives me advice
Me dice(n) la verdad – he/she tells me the truth

Me juzga(n) – he/she judges me
Me trata(n) como un niño/una niña – he/she treats me like a c
No me deja(n) salir – he/she doesn't let me go out
No me da(n) libertad – he/she doesn't give me freedom
Me critica(n) – he/she criticises me

No me llevo bien con… - I don't get on well with
Me peleo con… - I argue with
Estoy harto de… - I am fed up of

Ojalá tuviera un hermano/una hermana – If only I had a brother/sister
Nos peleamos como el perro y el gato – we fight like cat and dog
Somos uña y carne – we're inseparable
Lo que más me gusta es (que)… - the thing I like the most is (that)…
Lo que menos me gusta es (que)… - the thing I like the least is (that)…

Parallel Text:

1	Me llamo María y tengo **quince** años.	My name is Maria and I am **15**.
2.	Tengo el pelo **largo** y **rubio** y no soy ni **alto** ni **bajo**.	I have **long blond** hair and I'm neither **tall** nor **short**.
3.	**Si tuviera la opción**, quisiera tener **un tatuaje** pero **lo haré cuando sea mayor**.	**If I had the option** I would like to have **a tattoo** but **I will do it when I'm older**.
4.	En mi familia somos **cinco**.	In my family there are **five** people.
5.	En general **diría que** me llevo bien con **mis padres aunque** sean **estrictos** a veces.	In general **I would say that** I get on well with my **parents even though they are strict** sometimes.
6.	Yo **me parezco mucho** a **mi madre**. Las dos tenemos el pelo **castaño**.	**I look a lot like my mum**. We both have **brown** hair.
7.	También nos llevamos superbien ya que **tenemos mucho en común** y siempre **me apoya**.	Also, we get on really well because **we have a lot in common** and **she** always **supports me.**
	Antes adoraba a **mi hermana menor** pero ahora **la encuentro molesta** y **nunca guarda mis secretos**.	Before I loved my **little sister** but now **I find her annoying** and **she never keeps my secrets**.
	Para mí un buen amigo **debe ser comprensivo** y creo que **es importante que tengamos intereses en común**, por ejemplo **la música**	For me a good friend **should be understanding** and I believe that **it's important that we have common interests**, for example **music**.
10.	**Creo que** soy una buen amiga ya que siempre **apoyo** a mis amigos y **doy consejos buenos**.	**I believe that** I am a good friend because I always **support** my friends and **I give good advice**.

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.
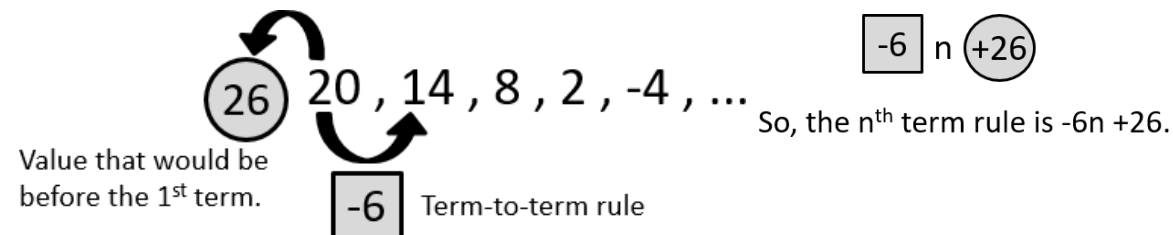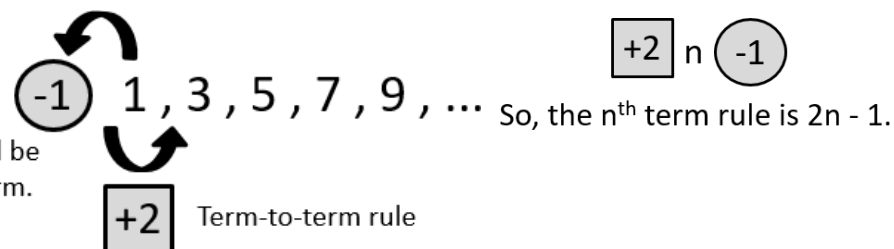
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Sequences

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:

$1, 3, 5, 7, 9, \ldots$ So, the nth term rule is $2n - 1$.

Value that would be before the 1st term.

$+2$ Term-to-term rule

$20, 14, 8, 2, -4, \ldots$ So, the nth term rule is $-6n + 26$.

Value that would be before the 1st term.

-6 Term-to-term rule

Solving Equations

Solving One Step Equations

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

$x + 6 = 8$
$+6 \quad -6$
$x = 2$

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

$2x + 1 = 9$
$+1 \quad -1$
$2x = 8$
$\times 2 \quad \div 2$
$x = 4$

Solving Equations involving Fractions

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

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

Solving Equations with Unknowns on Both Sides

Add/subtract the smallest algebraic term from both sides:

$3a - 4 = 7a + 8$
$-3a \quad -3a$
$-4 = 4a + 8$
$-8 \quad -8$
$-12 = 4a$
$\div 4 \quad \div 4$
$-3 = a$

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 is $n - 14$.
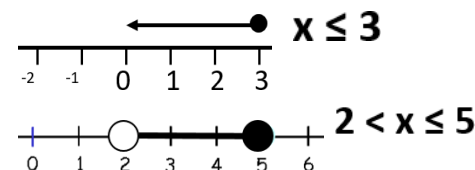$n + n - 14 = 212$
$2n - 14 = 212$
Then solve to find the value of n.
$n = 113$, so Kate's number is 99.

Inequalities

Inequalities on a Number Line

If the inequality is 'or equal to' ($\leq$, $\geq$), the circle is filled in. If it is not ($<$, $>$), the circle is not filled in:

$x \leq 3$

-2 -1 0 1 2 3

$2 < x \leq 5$

0 1 2 3 4 5 6

Solving Linear Inequalities

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

$5x + 2 \leq 17$
$+2 \quad -2$
$5x \leq 15$
$\times 3 \quad \div 3$
$x \leq 3$

Factorising

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

$$6x^2 + 15x$$

HCF: $3x$

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

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

Factorising Quadratics
To factorise an expression in the form $x^2 + bx + c$ find two numbers which add up to b, and which multiply to make c.

$$x^2 + 5x + 6$$

Factors of 5 are: 1 x 6   and   2 x 3
                        1 + 6 = 7 and   2 + 3 = 5

Therefore correct factors to use are 2 and 3

$$(x + 2)(x + 3)$$

Factorising Quadratics with Negative Terms

$$x^2 - 7x + 10$$

Factors of 10: 1x10, 1x –10, 2 x 5, –2x –5
Choose the pair that sum to –7
–2 + – 5 = – 2 – 5 = – 7
Correct factors to use are – 2 and – 5

$$(x - 2)(x - 5)$$

Difference of two squares
Factorise $x^2 - 16$
Here both terms are square numbers. As there is no x term, the two numbers which are factors of 16, must sum to 0.

4 x – 4 = – 16
4 + – 4 = 0   which will give no x term.

$$(x + 4)(x - 4)$$

Indices

Laws of Indices

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

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

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

$$a^0 = 1 \qquad 2^0 = 1$$

Negative Indices

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

Fractional Indices

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

Standard Form

Standard Form
Used to write large and small numbers concisely. In standard form, numbers are written as

$$a \times 10^h$$

Where $1 \le a < 10$ and n is an integer.

Large Numbers
Large numbers are written like this…

473 000 = 4.73
= 4.72 $\times 10^5$

Small Numbers
Small numbers are written like this…
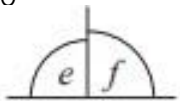
$$0.000537 = \frac{537}{10\,000}$$
$$= 5.37 \times 10^{-4}$$
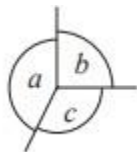
Angle Facts

Angles at a Point on a Straight Line
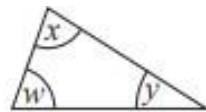Always add up to 180°

$$e + f = 180°$$

Angles around a Point
Always add up to 360°

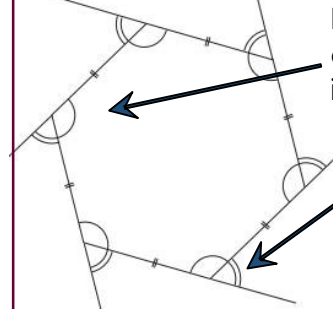$$a + b + c = 360°$$

Angles in a Triangle
Always add up to 180°

$$x + y + z = 180°$$

Angles in Polygons

Interior and Exterior Angles

Interior angles are on the inside.

Exterior angles are on the outside.

The Sum of Interior and Exterior Angles
Interior and exterior angles always add up to 180⁰
Remember angles on a straight line add up to 180°

The Sum of all Interior Angles
Sum of Interior Angles = (n – 2) x 180
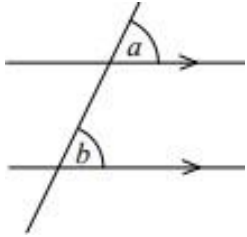Where n is the number of sides.

The Sum of all Exterior Angles
Sum of Exterior Angles = 360°

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Angles in Parallel Lines

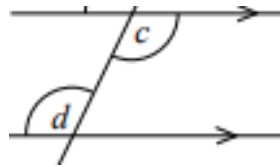**Corresponding**
Corresponding angles are equal, a = b.

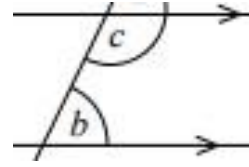**Alternate**
Alternate angles are equal, c = d.
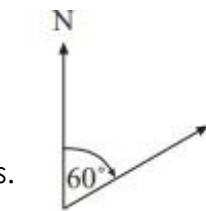
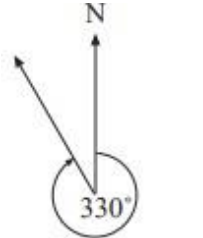**Co-Interior**
Co-interior angles add up to 180.

$b + c = 180^0$.

Bearings

Bearings
Start at North.
Go clockwise.
Have 3 figures.

Bearing 060 °

Bearing 330 °

Linear Graphs

Drawing Linear Graphs

To draw the graph $y = 2x - 1$ use a table of values.

This rule tells us the y-coordinate is the x- coordinate x 2 then -1.

x	-2	-1	0	1	2	3
y	-5	-3	-1	1	3	5

This gives us coordinates to plot:
(-2, -5), (-1, -3), (0, -1), (1, 1), (2, 3) and (3, 5)
…to plot and draw a straight line through (see right.)

Drawing Linear Graphs – Gradient and Intercept
We can see from the graph of $y = 2x - 1$ that the y-intercept is -1 and the gradient is 2. Remember, the gradient shows us how steep the line is.
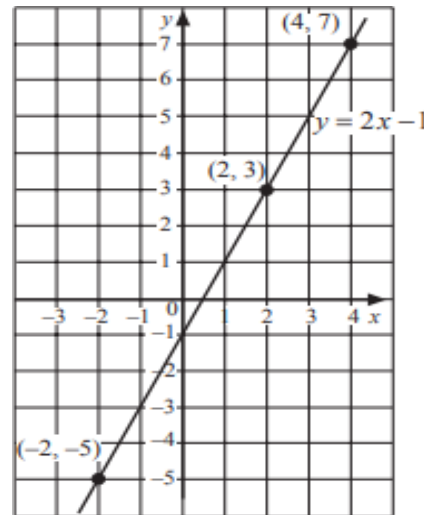
For a graph in the form $y = mx + c$
- The 'm' will be the gradient
- The 'c' will be the y-intercept

The gradient can also be calculated using
<u>Change in y</u>   or   <u>Rise</u>
Change in x   Run

Linear Graphs

Quadratic Graphs

Quadratic Graphs – Drawing and Finding Solutions.

To draw a quadratic graph, use a table (see below)
Write down your steps, as you can see for $x = -1$ and $x = 1$

$$y = x^2 - x - 2$$

x	-3	-2	-1	0	1	2	3
y	10	4	0	-2	-2	0	4

$x^2 = 1$
$- x = 1$
$- 2 = -2$

$x^2 = 1$
$- x = -1$
$- 2 = -2$

$1 + 1 - 2 = 0$

$1 - 1 - 2 = -2$

The <u>Solutions or Roots</u> are where $y = 0$, at the points (-1,0) and (2,0)

Quadratic Graphs

$y = (x - 2)(x + 1)$