

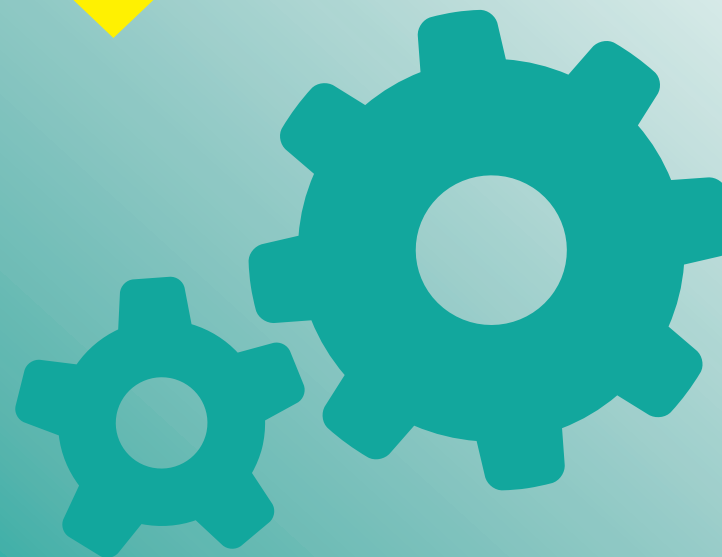


Year 11 Knowledge Organiser

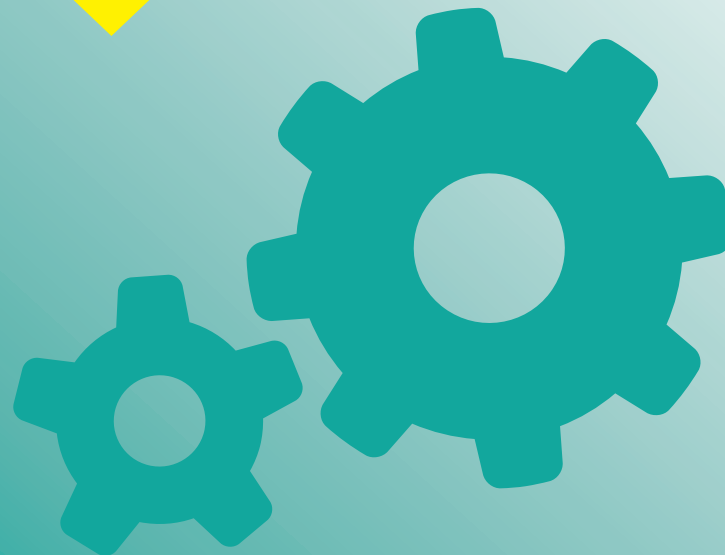


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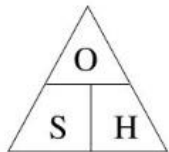
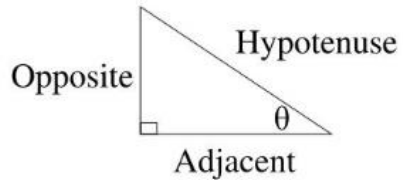


Maths

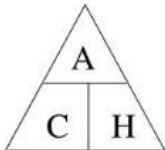




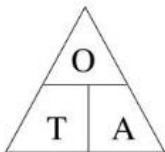
Trigonometry:



$$\sin \theta = \frac{\text{Opp}}{\text{Hyp}}$$



$$\cos \theta = \frac{\text{Adj}}{\text{Hyp}}$$

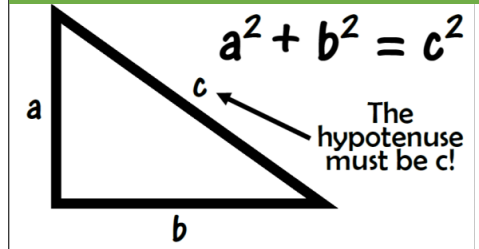


$$\tan \theta = \frac{\text{Opp}}{\text{Adj}}$$

Exact Trig:

| | 0° | 30° | 45° | 60° | 90° |
|-----|----|----------------------|----------------------|----------------------|-----------|
| sin | 0 | $\frac{1}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{\sqrt{3}}{2}$ | 1 |
| cos | 1 | $\frac{\sqrt{3}}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{1}{2}$ | 0 |
| tan | 0 | $\frac{\sqrt{3}}{3}$ | 1 | $\sqrt{3}$ | Undefined |

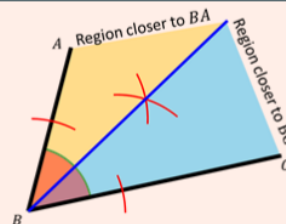
Pythagoras theorem:



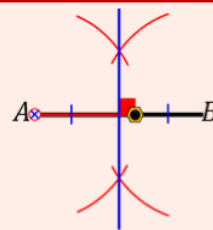
Loci:



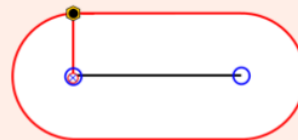
The locus of points from a point is a circle



The locus of points between two lines is the angle bisector



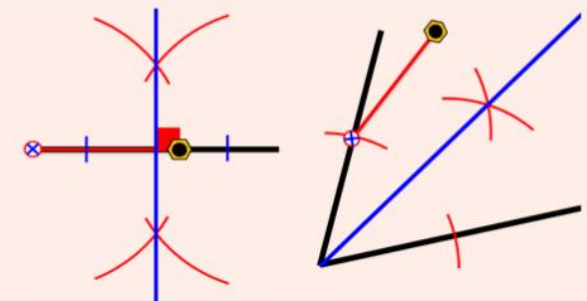
The locus of points between two points is the perpendicular bisector



Notice how the locus of points around a corner is CURVED

A locus is a series of points that satisfy a particular condition. Loci is the plural and will often involve several conditions.

Construction:



Set compass to over halfway

Mark off each line segment

Create arcs above and below the line

Create arcs within the angle

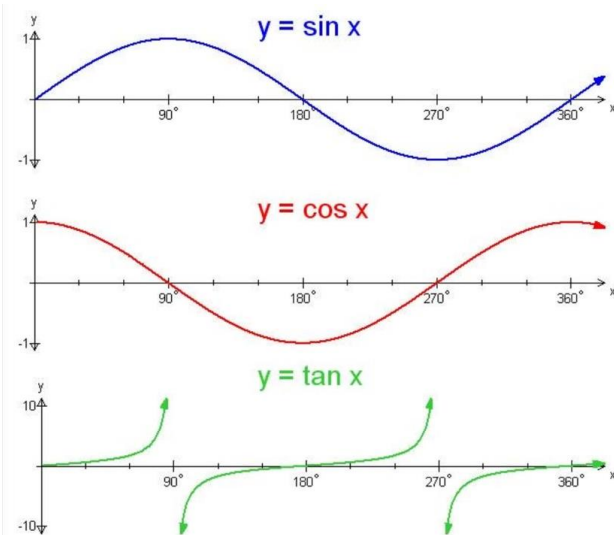
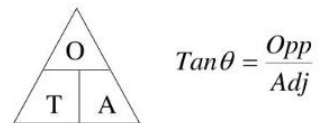
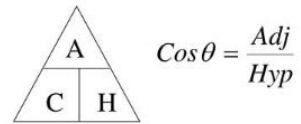
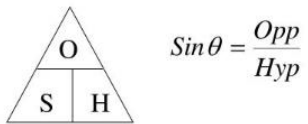
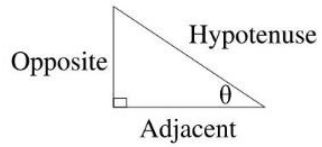
Do not alter the compass at all!

Do not alter the compass at all!

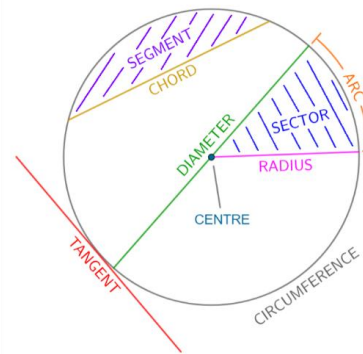
Sometimes you will need to create a separate line segment



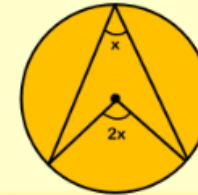
Trigonometry:



Circles:



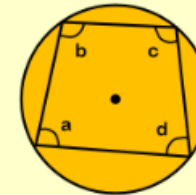
CIRCLE THEOREMS



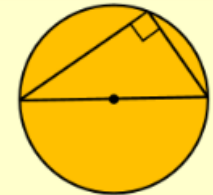
The angle at the centre of the circle is twice the angle at the circumference.



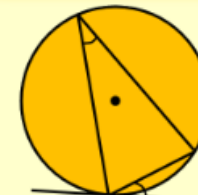
Angles in the same segment that are subtended from the same chord are equal.



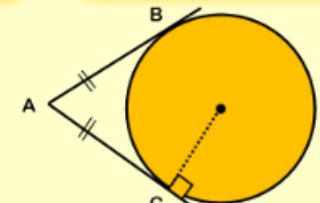
Opposite angles in a cyclic quadrilateral add up to 180° .
 $a + b + c + d = 180^\circ$.



The angle in a semi-circle is always 90° .



The alternate segment theorem states that the angle between the tangent and triangle is equal.



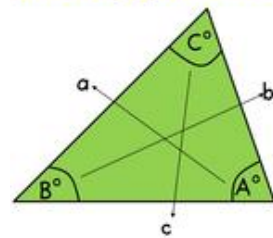
The angle between the tangent and the radius is 90° . $AB = AC$.

Exact Trig:

| | 0° | 30° | 45° | 60° | 90° |
|-----|-----------|----------------------|----------------------|----------------------|------------|
| sin | 0 | $\frac{1}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{\sqrt{3}}{2}$ | 1 |
| cos | 1 | $\frac{\sqrt{3}}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{1}{2}$ | 0 |
| tan | 0 | $\frac{\sqrt{3}}{3}$ | 1 | $\sqrt{3}$ | Undefined |

Trigonometry - Non Right-Angled Triangles

Labelling your triangle



Area of a triangle

$$\frac{1}{2} \times a \times b \times \sin C^\circ$$

Cosine rule

Finding Sides

$$a^2 = b^2 + c^2 - 2bc \cos A$$

To find sides you need:
2 sides and 1 angle

Finding Angles

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

To find angles you need:
3 sides

Sine rule

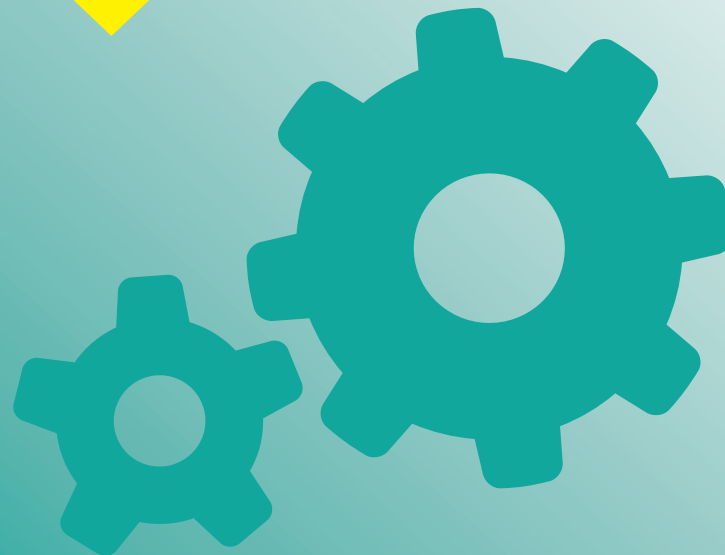
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

To find sides you need:
1 side and 2 angle

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

To find angles you need:
2 sides and 1 angle

English



English Language Paper 1: A Christmas Carol



Literature Paper 1: A Christmas Carol

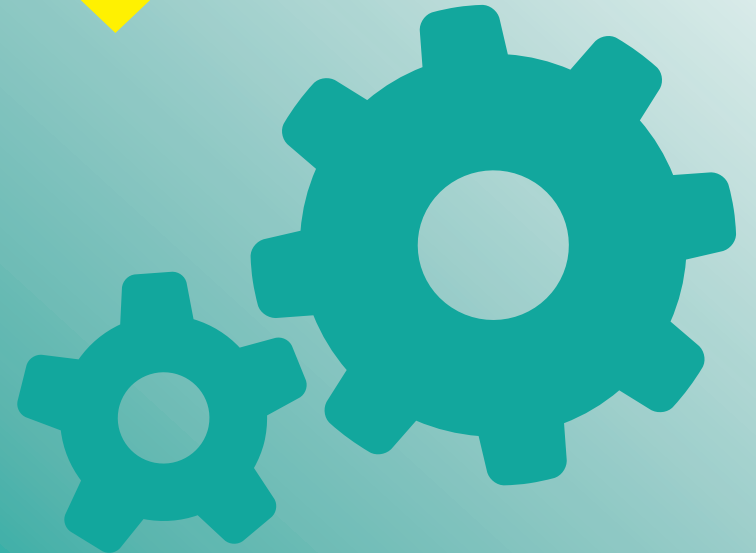
| Context: what was happening when the text was written | |
|--|--|
| <p>Charles Dickens – Charles Dicken was born in 1812 and spent the first years of his life in Kent, England. At 9, he moved to London. At 12, his father was sent to debtors’ prison for racking up huge debts, and Dickens was given a painful job labelling bottles near the prison. He found this period in his life hellish, and it doubtlessly led him to draw readers’ attention to the plight of the poor when he later found success as an author. Many of his works are about social hardships and inequalities.</p> | <p>Class Divides – Despite industrial changes altering the social landscape, there were still relatively distinct social classes in operation: the nobility upper class, the middle class, and the working class. Life was terrible for the poorest: Lack of money resulted in a negligible food supply. For some working families, money was so tight that they required their children to work in order to survive.</p> |
| <p>The Victorian Era– The Victorian era describes the period in which Queen Victoria sat on the English throne – between 1837 and 1901 (most of Dickens’ life). Whilst this was a time of industrial revolution, it was also an extremely harsh time to live, and there was a huge disparity between the lives of the richest and the poorest. The Victorian era was a period of great change. In this time, the population of England doubled – from 16.8 million 1851 to over 30 million in 1901 but the country to struggled to accommodate thus increase and the poor suffered the most.</p> | <p>Health and Medicine –The NHS was not established until much later so healthcare was not accessible for everyone, and medicine was nowhere near as advanced today. Many diseases were rife, and childbirth and poverty were very real dangers to people living in the era. As a result, a middle class person may expect to live to 45 at the time, whereas a working class person would have been fortunate to have lived half that time. In A Christmas Carol, the restrictions in healthcare are evident in Tiny Tim’s continued suffering.</p> |
| <p>Workhouses– A workhouse was a place where a person went if they could not afford to financially support themselves and their families: the most vulnerable in society. Men, women and children (mostly orphans) lived and worked in the workhouses, which were very crowded – making living conditions unhealthy and unpleasant. People slept in dormitories, where disease was easily spread. In A Christmas Carol, Scrooge voices his support for workhouses.</p> | <p>The Poor Law- In 1834 the Poor Law Amendment Act was passed by Parliament. This was designed to reduce the cost of looking after the poor as it stopped money going to poor people except in exceptional circumstances. Now if people wanted help they had to go into a workhouse to get it. The 19th Century consequently saw a growth in the numbers of charities such as The Salvation Army, Dr Barnardo’s children’s homes to help those living in poverty.</p> |

| Language/ Structural Techniques | Definition | Example |
|---------------------------------|--|--|
| Pathetic fallacy | A type of personification where emotions are given to a setting, an object or the weather. | ‘The fog came pouring in at every chink and keyhole, and was so dense without, that although the court was of the narrowest, the houses opposite were mere phantoms.’ |
| Symbolism | When an object represents an idea that is much deeper and more significant. | Marley’s chains are an example of symbolism: they represent the greed and selfishness of mankind. |
| Personification | Describing an inanimate object as having human feelings. | ‘The gruff old bell was always peeping slyly down at Scrooge out of a Gothic window in the wall.’ |
| Metaphor | A descriptive technique that names a person, thing or action as something else. | ‘A frosty rime was on his head, and on his eyebrows, and his wiry chin. <u>He carried his own low temperature always about with him.</u> ’ |
| Simile | A descriptive technique that compares one thing with another, usually using ‘as’ or ‘like’. | ‘As solitary as an oyster.’ |
| Foreshadowing | When the writer hints what is going to happen later on in the text. | “Without their visits, you cannot hope to shun the path I tread.” |
| Superlative | An adjective/ adverb that indicates the most of something. | ‘We’re to be together all the Christmas long, and have the <u>merriest</u> time in all the world.” |
| Intensifier | A word, especially an adverb or adjective, that has little meaning itself but is used to add emphasis to another adjective, verb, or adverb. | ‘Uncle Scrooge had imperceptibly become <u>so</u> gay and light of heart.’ |
| Minimiser | A word that is used to make another adjective, verb or adverb sound lesser. | ‘ <u>Poor</u> Tiny Tim... <u>My little</u> child.’ |
| Imperative | A sentence that is a command. | “Leave me! Take me back. Haunt me no longer!” |
| Exclamatory | A sentence that expresses a heightened emotion. They end with an exclamation mark | “ <u>They are Man’s!</u> ...And they cling to me, appealing from their fathers. This boy is Ignorance. This girl is Want. Beware them both.’ |
| Listing | When the writer includes several words/ phrases/ ideas, one after the other. | ‘(the chain) was long, and wound about him like a tail; and it was made (for Scrooge observed it closely) of <u>cash-boxes, keys, padlocks, ledgers, deeds, and heavy purses wrought in steel.</u> ’ |
| Repetition | When a word/ phrase is noticeably repeated throughout a sentence/ paragraph/ whole text. | ‘My <u>little, little</u> child.’ cried Bob. ‘My <u>little</u> child.’ |
| Imagery | A technique in which the author appeals to the senses i.e. seeing, hearing, touching. | “Every idiot who goes about with ‘Merry Christmas’ on his lips, should be boiled with his own pudding, and buried with a stake of holly through his heart. He should!” |
| Foil | A character that exaggerates the opposing qualities of another character. | Fred’s kind and compassionate character is used as a foil to Scrooge’s egocentric character. |

| Themes: an idea that is explored throughout the text | Ideas |
|--|--|
| Family | Dickens suggests that family is the ultimate key to happiness and fulfilment. Dickens links Scrooge’s decision to be alone to darkness and the cold whilst he links family and companionship to light and warmth. Dickens implies that a successful life is one that is filled with significant relationships with others. |
| Redemption/change/ transformation | Dickens implies that we all have the ability to change and that we should continually reflect on how our behaviour impacts upon others. Dickens suggests that many unfavourable qualities are born out of ignorance and that, by seeking to find out more about the lives of other, we can transform and become better people. |
| Supernatural | Dickens uses the supernatural to encourage self-reflection. Dickens also uses the supernatural to emphasise the idea that, through exploring our past behaviours and considering the impact on our future, we can become more compassionate and kinder people. |
| Greed/ wealth | Dickens implies that concentrating solely on accumulating more money only results in emptiness and dissatisfaction. Dickens suggests that true ‘wealth’ is to have significant relationships with others. |
| Social inequality/ poverty | Dickens suggests that the Victorian society ignored the poverty experienced by many. Dickens also highlights the divide between the rich and the poor and exposes the often inescapable cycle of poverty. Dickens portrays the poor as victims of a cruel society. |
| Forgiveness | Dickens suggests that change, both on an individual and societal level, is only possible through forgiveness. Dickens implies that that to be truly compassionate is to forgive. |
| Christmas/ tradition | Dickens portrays Christmas as being an important time because it is a rare opportunity for kindness and compassion. Dickens also implies that it’s a particularly important tradition because it is something that highlights the extravagance of the rich and the desperation of the poor. |
| Time | Dickens explores the idea that our past has direct implications on our behaviour in the future and that we need to recognise this pattern in order to be better people. Dickens also explores the notion that time is finite and that we should therefore live in the best way we can, all of the time to maximise the time we have. |

| Key Terms | Definition |
|--------------------------|--|
| Morality tale | A story which teaches the reader a lesson about right and wrong. |
| Gothic | A style of writing that is characterised by elements of fear, horror, death, and gloom, as well as Romantic elements, such as nature, individuality, and deep self-reflection. |
| Allegory | A story in which the characters and events represent other things and express a deeper, often moral message. |
| Social inequality | When resources and opportunities are distributed unfairly in society, resulting in a significant difference in the quality of life experienced by the rich and the poor. |

Science





Response to internal and external change

| | | |
|-----------------------------------|------------------------------------|--|
| Controls in the human body | Blood glucose concentration | These automatic control systems may involve nervous responses or chemical responses. |
| | Body temperature | |
| | Water levels | |

The regulation of internal conditions of a cell or organism to maintain optimum conditions for function.

Homeostasis maintains optimal conditions for enzyme action (thermoregulation) and all cell functions (osmoregulation).

Homeostasis

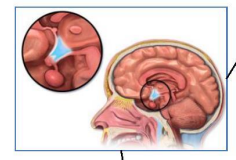
Water and nitrogen balance (Biology only)

| | | |
|---|---|--|
| If body cells lose or gain too much water by osmosis they do no function efficiently. | Uncontrolled water/ion/urea loss | Water exhaled in lungs, water, ions and urea in sweat. |
| | Controlled water/ion/urea loss | Via the kidneys in urine. |

Kidney failure is treated by organ transplant or dialysis.

| | | |
|------------------------|--|---|
| Kidney function | Maintain water balance of the body. | Produce urine by filtration of the blood and selective reabsorption of glucose, ions and water. |
| | ADH | Released by pituitary gland when blood is too concentrated. Water is reabsorbed back into the blood from the kidney tubules (NEGATIVE FEEDBACK). |

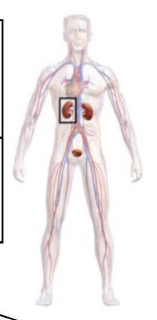
(HT only) digestion of proteins results in excess amino acids. In the liver they are deaminated to form toxic ammonia which is converted to urea



Thermoregulatory centre (hypothalamus)

Control of body temperature (Biology only)

EDEXCEL GCSE BIOLOGY ANIMAL COORDINATION PART 1



Control of blood glucose concentration

| | | |
|------------------------------------|-------------------|--|
| Negative feedback (HT only) | Adrenaline | Produced in adrenal glands, increases breathing/heart rate, blood flow to muscles, stimulates liver to convert glycogen to glucose. Prepares body for 'fight or flight'. |
| | Thyroxine | Produced in the thyroid gland, stimulates the basal metabolic rate. Important in growth and development. |

Increasing thyroxine levels prevent the release of thyroid stimulating hormone which stops the release of thyroxine.

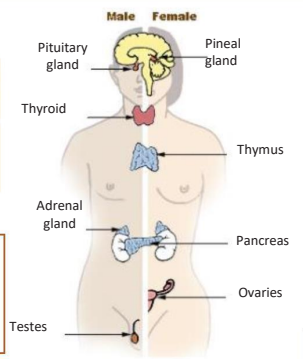
| | | |
|------------------------------------|------------------------------------|--|
| Monitoring body temperature | Thermoregulatory centre | Contains receptors sensitive to the temperature of the blood. |
| | Skin (dermis and epidermis) | Contains temperature receptors, sends nervous impulses to the thermoregulatory centre. |

| | | |
|-------------------------|-----------------|---|
| Body temperature | Too high | Blood vessels dilate (vasodilation), sweat produced from sweat glands. |
| | Too low | Blood vessels constrict (vasoconstriction), sweating stops, muscles contract (shivering). |

(HT) Thermal energy is lost from blood near the surface of the skin, sweat evaporates transferring thermal energy.

(HT) Thermal energy loss at the surface of the skin is reduced, respiring muscles cells transfer chemical to thermal energy.

Human endocrine system



Endocrine system
Composed of glands which secrete chemicals called hormones directly into the bloodstream.
The blood carries the hormone to a target organ where it produces an effect. Compared to the nervous system effects are slower but act for longer.

Pituitary gland
'Master gland'; secretes several hormones into the blood
Stimulates other glands to produce hormones to bring about effects.

| Blood glucose concentration | |
|--|---|
| Monitored and controlled by the pancreas | |
| Too high | (HT only) Too low |
| Pancreas produces the hormone insulin, glucose moves from the blood into the cells. In liver and muscle cells excess glucose is converted to glycogen for storage. | Pancreas produces the hormone glucagon that causes glycogen to be converted into glucose and released into the blood. |

(HT) Rising glucose levels inhibit the release of glucagon in a negative feedback system. Insulin is released to reduce glucose levels and which cause the pancreas to release glucagon

| Diabetes | |
|---|--|
| Type 1 | Type 2 |
| Pancreas fails to produce sufficient insulin leading to uncontrolled blood glucose levels. Normally treated by insulin injection. | Obesity is a risk factor. Body cells no longer respond to insulin. Common treatments include changing by diet and increasing exercise. |



FSH and LH are used as 'fertility drugs' to help someone become pregnant in the normal way

Hormones are used in Assisted Reproductive Technology (ART) to treat infertility

In Vitro Fertilisation (IVF) treatment.

Involves giving a mother FSH and LH to stimulate the maturation of several eggs (clomifene therapy)

The eggs are collected from the mother and fertilised by sperm from the father in a laboratory.

↓

The fertilised eggs develop into embryos.

↓

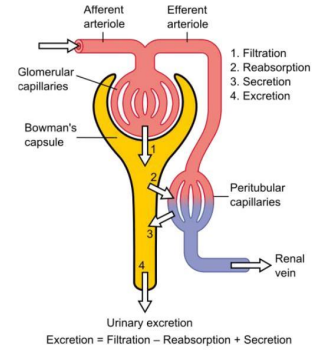
At the stage when they are tiny balls of cells, one or two embryos are inserted into the mother's uterus (womb).

The use of hormone to treat infertility (HT only)

EDEXCEL GCSE BIOLOGY ANIMAL COORDINATION PART 2

| Structure of the urinary system | <i>Renal veins and arteries</i> | Carries blood to and from the kidneys. |
|---------------------------------|---------------------------------|--|
| | <i>Ureter</i> | Carries urine from kidney to bladder. |
| | <i>Bladder</i> | Stores urine |
| | <i>Urethra</i> | Carries urine from bladder to outside of body. |
| | <i>Kidneys</i> | Remove substances from blood to make urine. |

| Structure and function of the nephron in kidney | <i>Glomerulus</i> | Filtration of small molecules e.g. water, urea and glucose into the nephron. |
|---|--|--|
| | <i>Bowman's capsule</i> | |
| | <i>Selective reabsorption of glucose</i> | Active transport of useful substances back into the blood e.g. glucose and mineral ions. |
| | <i>Reabsorption of water</i> | Osmosis moves water back into the blood in the loop of Henle. |



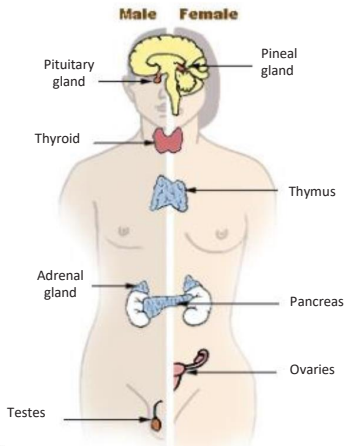
| <i>Potential disadvantages of IVF</i> | Emotional and physical stress. |
|---------------------------------------|--|
| | Success rates are not high. |
| | Multiple births risk to mother and babies. |

Contraception

Hormones in human reproduction

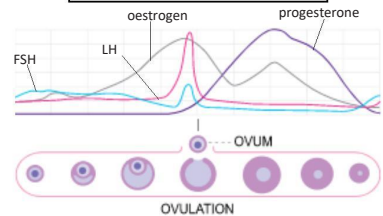
During puberty reproductive hormones cause secondary sexual characteristics to develop

| <i>Oestrogen (main female reproductive hormone)</i> | <i>Testosterone (main male reproductive hormone)</i> |
|---|--|
| Produced in the ovaries. At puberty eggs begin to mature releasing one every 28 days - ovulation . | Produced in the testes stimulating sperm production. |



| Fertility can be controlled by hormonal and non hormonal methods | <i>Oral contraceptives</i> | Contain hormones to inhibit FSH production so that no eggs mature. |
|--|---------------------------------------|---|
| | <i>Injection, implant, skin patch</i> | For slow release of progesterone to inhibit the maturation and release of eggs for months or years. |
| | <i>Barrier methods</i> | Condoms or diaphragms which prevent sperm reaching the egg. |
| | <i>Intrauterine devices</i> | Prevent implantation of an embryo or release a hormone. |
| | <i>Spermicidal agents</i> | Kill or disable sperm. |
| | <i>Surgery</i> | Male or female sterilisation. |

(HT only) a graph of hormone levels over time

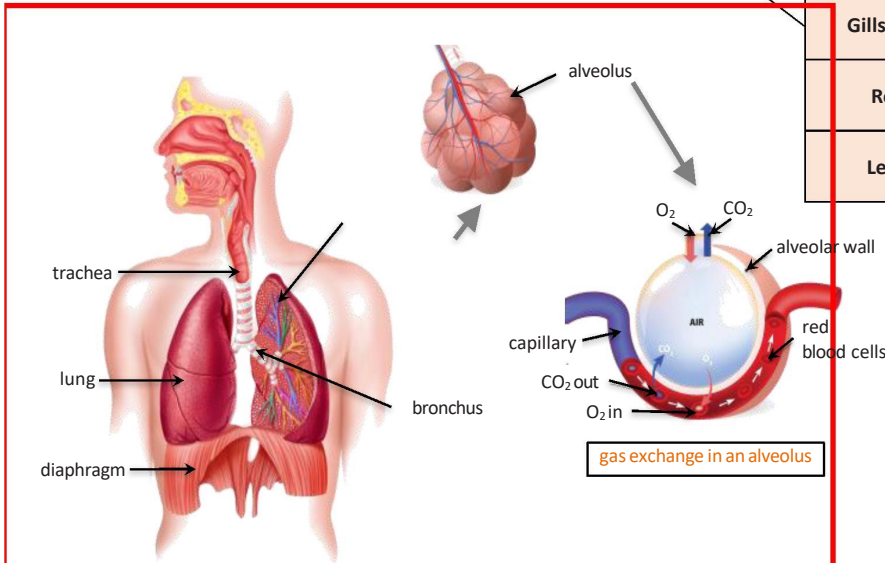


| Menstrual cycle | <i>Follicle stimulating hormone (FSH)</i> | Causes maturation of an egg in the ovary. | (HT) FSH stimulates ovaries to produce oestrogen. |
|-----------------|---|---|---|
| | <i>Luteinising hormone (LH)</i> | Stimulates release of an egg. | (HT) Oestrogen stops FSH production and stimulates LH production in pituitary gland. |
| | <i>Oestrogen and progesterone</i> | Maintain uterus lining. | |



Multicellular organisms require transport systems e.g. capillaries in animals xylem/phloem in plants because distances are too great for diffusion to be effective.

| | |
|------------------|---|
| Small intestines | <i>Villi – increase surface area, Good blood supply – to maintain concentration gradient, Thin membranes – short diffusion distance.</i> |
| Lungs | <i>Alveoli – increase surface area, Good blood supply – to maintain concentration gradient, Thin membranes – short diffusion distance.</i> |
| Gills in fish | <i>Gill filaments and lamella – increase surface area, Good blood supply – to maintain concentration gradient, Thin membranes – short diffusion distance.</i> |
| Roots | <i>Root hair cells - increase surface area.</i> |
| Leaves | <i>Large surface area, thin leaves for short diffusion path, stomata on the lower surface to let O₂ and CO₂ in and out.</i> |



Exchange surfaces and adaptations for diffusion.

Surface area to volume ratio

Large surface areas mean a large surface area to volume ratio is maintained in larger organisms e.g. alveoli in the lungs mean that the surface area is 250 times bigger than the volume.

EDEXCEL GCSE Exchange and Transport in Animals Part 1

Lungs and gas exchange
The heart pumps low oxygen/high carbon dioxide blood to the lungs

| | | |
|-------------|--|---|
| Trachea | <i>Carries air to/from the lungs</i> | Rings of cartilage protect the airway. |
| Bronchioles | <i>Carries air to/from the air sacs (alveoli)</i> | Splits into multiple pathways to reach all the air sacs. |
| Alveoli | <i>Site of gas exchange in the lungs</i> | Maximises surface area for efficient gas exchange. |
| Capillaries | <i>Allows gas exchange between into/out of blood</i> | Oxygen diffuses into the blood and carbon dioxide diffuses out. |

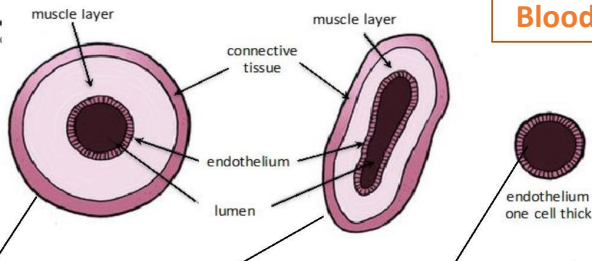
Organisms need to transport substances into and out of their structures and cells e.g. oxygen, carbon dioxide, water, dissolved food molecules, mineral ions and urea.

| Factors affecting rate of diffusion (Biology only) | | |
|---|---|---|
| Surface area | Concentration gradient | Diffusion distance |
| Increased surface area on exchange surface increases diffusion. | Diffusion is from area of high concentration to low concentration. A large difference in concentration will increase rate of diffusion. | The smaller the diffusion distance to faster the rate of diffusion, |

| Fick's law (Biology only) |
|--|
| <i>Calculate the rate of diffusion</i> |
| $\text{Rate} = P \times A \times ((C_1 - C_2) \div T)$ |

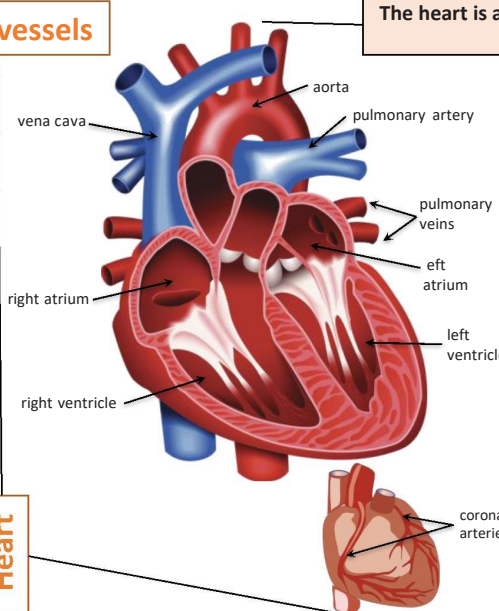


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| Artery | Vein | Capillary |
|---|---|---|
| Carry blood away from the heart | Carry blood to the heart | Connects arteries and veins |
| Thick muscular walls, small lumen, carry blood under high pressure, carry oxygenated blood (except for the pulmonary artery). | Thin walls, large lumen, carry blood under low pressure, have valves to stop flow in the wrong direction, carry deoxygenated blood (except for the pulmonary vein). | One cell thick to allow diffusion, Carry blood under very low pressure. |

Blood vessels



The heart is an organ that pumps blood around the body in a double circulatory system

| Different structure in the heart have different functions | Function |
|---|--|
| Right ventricle | Pumps blood to the lungs where gas exchange takes place. |
| Left ventricle | Pumps blood around the rest of the body. Thicker cardiac muscle in the wall. |
| Pacemaker (in the right atrium) | Controls the natural resting heart rate. Artificial electrical pacemakers can be fitted to correct irregularities. |
| Coronary arteries | Carry oxygenated blood to the cardiac muscle. |
| Heart valves | Prevent blood in the heart from flowing in the wrong direction. |

Heart

Calculate heart rate, stroke volume and cardiac output

Cardiac output = stroke volume x heart rate

Blood

Blood is a tissue consisting of plasma, in which blood cells, white blood cells and platelets are suspended

| | | |
|---|----------------------------------|--|
| Plasma (55%) | Pale yellow fluid | Transports CO ₂ , hormones and waste. |
| Red blood cells (erythrocytes)(45%) | Carries oxygen | Large surface area, no nucleus, full of haemoglobin. |
| White blood cells (phagocytes and lymphocytes)(<1%) | Part of the immune system | Some produce antibodies, others surround and engulf pathogens. |
| Platelets (<1%) | Fragments of cells | Clump together to form blood clots. |

EDEXCEL GCSE Exchange and Transport in Animals Part 2.

Respiration

Cellular respiration is an exothermic reaction which is continuously occurring in all living cells

| Anaerobic respiration |
|--|
| Respiration when oxygen is in short supply. Occurs during intensive exercise |
| During hard exercise, muscle cells are respiring so fast that blood cannot transport enough oxygen to meet their needs. |
| Glucose is partially oxidised to produce lactic acid which builds up in muscle tissue causing them to become painful and fatigued. |
| glucose → lactic acid |

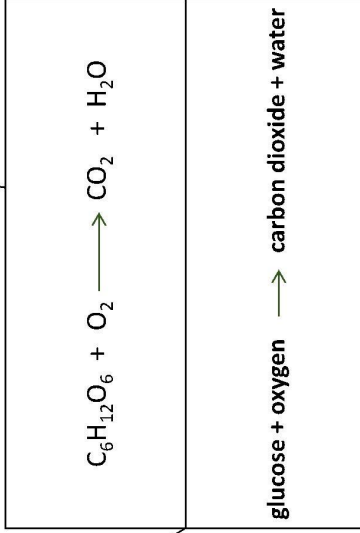
Anaerobic respiration releases a much smaller amount of energy than aerobic respiration.

The incomplete oxidation of glucose causes a build up of lactic acid and creates an oxygen debt

Aerobic respiration

Respiration with oxygen. Occurs inside the mitochondria continuously

Glucose is oxidised by oxygen to transfer the energy the organism needs to perform its functions.



Aerobic respiration releases a large amount of energy from each glucose molecule



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Alkali metals: 1, 2
Transition metals
Halogens: 3, 4, 5, 6, 7
Noble gases: 0

| | | | | | | | | | | | | | | | | | | | | | | | |
|----|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|----|----|
| H | Transition metals | | | | | | | | | | | | | | | | He | | | | | | |
| Li | Be | | | | | | | | | | | | | | | | | B | C | N | O | F | Ne |
| Na | Mg | | | | | | | | | | | | | | | | | Al | Si | P | S | Cl | Ar |
| K | Ca | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr | | | | | | |
| Rb | Sr | Y | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd | In | Sn | Sb | Te | I | Xe | | | | | | |
| Cs | Ba | La | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg | Tl | Pb | Bi | Po | At | Rn | | | | | | |
| Fr | Ra | Ac | Rf | Db | Sg | Bh | Hs | Mt | ? | ? | ? | | | | | | | | | | | | |

Elements arranged in order of atomic number

Elements with similar properties are in columns called groups

Elements in the same group have the same number of outer shell electrons and elements in the same period (row) have the same number of electron shells.

The Periodic table

| | | |
|---------------|---|---|
| Alkali metals | Soft and easily cut | Low melting and boiling points. |
| | Very reactive with oxygen, water and chlorine | Only have one electron in their outer shell. Form +1 ions. |
| | Reactivity increases down the group | Negative outer electron is further away from the positive nucleus so is more easily lost. |

| | | |
|----------|---|---|
| Halogens | Consist of molecules made of a pair of atoms | Have seven electrons in their outer shell. Form -1 ions. |
| | Melting and boiling points increase down the group (gas → liquid → solid) | Increasing atomic mass number. |
| | Reactivity decreases down the group | Increasing proton number means an electron is less easily gained as outer shell is further away from nucleus, therefore the attraction force is weaker. |

EDEXCEL TOPIC
SC 17: Groups in Periodic Table

Group 1

| Metal | Reaction with water | Word equation |
|-----------|--------------------------------------|--|
| Lithium | Fizzing | Lithium + water → lithium hydroxide + hydrogen |
| Sodium | Fizzing more vigorously than lithium | Sodium + water → sodium hydroxide + hydrogen |
| Potassium | Fizzes and burns with a lilac flame | Potassium + water → potassium hydroxide + hydrogen |

| Halogen | Colour at room temperature | State at room temperature |
|----------|----------------------------|---------------------------|
| Chlorine | Yellow-green | Gas |
| Bromine | Red-brown | Liquid |
| Iodine | Dark purple | Solid |

Group 7

Group 0

| | | |
|-------------|--|---|
| Noble gases | Unreactive, do not form molecules | This is due to having full outer shells of electrons. |
| | Boiling points increase down the group | Increasing atomic number. |

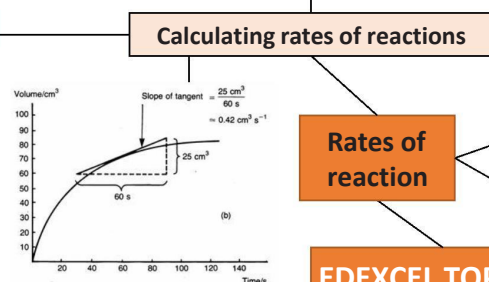
| | | | |
|--|---|--|---|
| With metals | Forms a metal halide | Metal + halogen → metal halide e.g. Sodium + chlorine → sodium chloride | e.g. NaCl metal atom loses outer shell electrons and halogen gains an outer shell electron |
| With hydrogen | Forms a hydrogen halide | Hydrogen + halogen → hydrogen halide e.g. Hydrogen + bromine → hydrogen bromide | Dissolve in water to form acidic solutions. |
| With aqueous solution of a halide salt | A more reactive halogen will displace the less reactive halogen from the salt | Chlorine + potassium bromide → potassium chloride + bromine | (HT) These are redox reactions. The halogen gains electrons and the halide ion from the compound loses electrons. |

| | | |
|--------|------------------------------|---|
| Helium | Used in balloons | Due to being less dense than air, which means balloons will float. |
| Neon | Used in signs | Glows when electricity flows through it. |
| Argon | Used in filament light bulbs | Stops the heated filament reacting with oxygen. Bulbs filled with unreactive argon instead. |



| | | |
|---------------------------|---|---|
| Rate of chemical reaction | <i>This can be calculated by measuring the quantity of reactant used or product formed in a given time.</i> | Rate = $\frac{\text{quantity of reactant used}}{\text{time taken}}$ Rate = $\frac{\text{quantity of product formed}}{\text{time taken}}$ |
|---------------------------|---|---|

| Quantity | Unit |
|------------------|--|
| Mass | Grams (g) |
| Volume | cm ³ |
| Rate of reaction | Grams per cm ³ (g/cm ³) HT: moles per second (mol/s) |



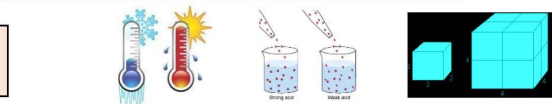
Rates of reaction

EDEXCEL TOPIC SC18-19 Rates & Energy in reactions

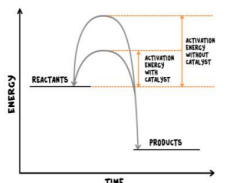
Factors affecting rates

| Factors affecting the rate of reaction | |
|--|---|
| Temperature | <i>The higher the temperature, the quicker the rate of reaction.</i> |
| Concentration | <i>The higher the concentration, the quicker the rate of reaction.</i> |
| Surface area | <i>The larger the surface area of a reactant solid, the quicker the rate of reaction.</i> |
| Pressure (of gases) | <i>When gases react, the higher the pressure upon them, the quicker the rate of reaction.</i> |

Collision theory and activation energy



| | | |
|-------------------|--|---|
| Collision theory | <i>Chemical reactions can only occur when reacting particles collide with each other with sufficient energy.</i> | Increasing the temperature increases the frequency of collisions and makes the collisions more energetic, therefore increasing the rate of reaction. |
| Activation energy | <i>This is the minimum amount of energy colliding particles in a reaction need in order to react.</i> | Increasing the concentration, pressure (gases) and surface area (solids) of reactions increases the frequency of collisions, therefore increasing the rate of reaction. |



Catalysts

| | |
|--------------------------|--|
| Catalyst | A catalyst changes the rate of a chemical reaction but is not used in the reaction. |
| Enzymes | These are biological catalysts. |
| How do they work? | Catalysts provide a different reaction pathway where reactants do not require as much energy to react when they collide. |

If a catalyst is used in a reaction, it is not shown in the word equation.

Heat energy changes in chemical reactions

Bond energy calculation

Calculate the overall energy change for the forward reaction
 $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$

Bond energies (in kJ/mol): H-H 436, H-N 391, N≡N 945

Bond breaking: $945 + (3 \times 436) = 945 + 1308 = 2253 \text{ kJ/mol}$

Bond making: $6 \times 391 = 2346 \text{ kJ/mol}$

Overall energy change = $2253 - 2346 = -93 \text{ kJ/mol}$

Therefore reaction is exothermic overall.

| | |
|------------------------------|---|
| Heat energy changes | Occur in the following: <ul style="list-style-type: none"> - Salts dissolving in water - Neutralisation reactions - Displacement reactions - Precipitation reactions |
| Exothermic reactions | Heat energy is given out as bonds are being formed. |
| Endothermic reactions | Heat energy is taken in as bonds are being broken. |

| | | |
|--------------------|--|--|
| Endothermic | | Products are at a higher energy level than the reactants. As the reactants form products, energy is transferred from the surroundings to the reaction mixture. The temperature of the surroundings decreases because energy is taken in during the reaction. |
| Exothermic | | Products are at a lower energy level than the reactants. When the reactants form products, energy is transferred to the surroundings. The temperature of the surroundings increases because energy is released during the reaction. |

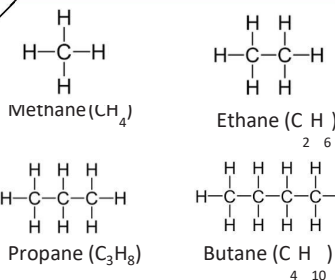


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| | | |
|------------------------------------|---|--|
| Crude oil | <i>A finite resource</i> | Consisting mainly of plankton that was buried in the mud, crude oil is the remains of ancient biomass. |
| Hydrocarbons | <i>These make up the majority of the compounds in crude oil</i> | These compounds are made up of hydrogen and carbon only. |
| General formula for alkanes | C_nH_{2n+2} | For example: C_2H_6 C_6H_{14} |

Crude oil, hydrocarbons and alkanes

Display formula for first four alkanes

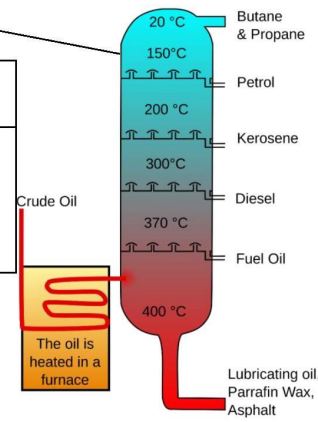


Carbon compounds as fuels and feedstock

EDEXCEL TOPIC SC20: Fuels

Fractional distillation and petrochemicals

| | | |
|---------------------------|---------------|---|
| Hydrocarbon chains | In oil | Hydrocarbon chains in crude oil come in lots of different lengths. |
| Boiling points | | The boiling point of the chain depends on its length. During fractional distillation, they boil and separate at different temperatures due to this. |



| | | |
|-----------------|--|--|
| Cracking | <i>The breaking down of long chain hydrocarbons into smaller, more useful chains</i> | The smaller chains are more useful. Cracking can be done by various methods including catalytic cracking and steam cracking. |
|-----------------|--|--|

| | | |
|---------------------------|--|--|
| Sulfur dioxide | <i>Released from burning hydrocarbons with sulfur impurities in</i> | Sulfur dioxide dissolves in rain water to form acid rain. This damages plant life and can make water habitats acidic. Acid rain can also erode limestone and sandstone structures. |
| Oxides of nitrogen | <i>Oxygen and nitrogen react under high temperatures to form these</i> | As pollutants, oxides of nitrogen can damage the ozone layer and are also classified as greenhouse gases. Can cause respiratory problems. |

Fuels

| | | |
|----------------------|---|---|
| Hydrogen fuel | <i>Hydrogen reacts with oxygen in the engine to power the vehicle</i> | Advantages: <ul style="list-style-type: none"> - Water is the product - No greenhouse gases released - Renewable Disadvantages: <ul style="list-style-type: none"> - Expensive to buy - Difficult to re-fuel |
| Fossil fuels | <i>Crude oil, natural gas and coal</i> | Petrol, kerosene and diesel oil are non-renewable. Methane is found in natural gas and is also non-renewable. |

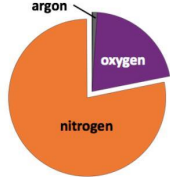
| | | |
|-------------------------------------|---|---|
| Incomplete combustion issues | <i>Carbon monoxide is an odourless, toxic gas that can kill</i> | Soot (carbon) is also produced that builds up in the atmosphere and can cause global dimming. This reduces the amount of sunlight that reaches the Earth and can alter rainfall patterns. |
|-------------------------------------|---|---|

| | |
|------------------------------|--|
| Combustion | During the complete combustion of hydrocarbons, the carbon and hydrogen in the fuels are oxidised, releasing carbon dioxide, water and energy. |
| Incomplete combustion | During the incomplete combustion of hydrocarbons, there is not enough oxygen available for complete combustion. The products of the reaction is carbon monoxide, carbon and water. |

| | |
|---|--|
| Complete combustion of methane: Methane + oxygen → carbon dioxide + water + energy $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$ | |
| Boiling point (temperature at which liquid boils) | <i>As the hydrocarbon chain length increases, boiling point increases.</i> |
| Viscosity (how easily it flows) | <i>As the hydrocarbon chain length increases, viscosity increases.</i> |
| Flammability (how easily it burns) | <i>As the hydrocarbon chain length increases, flammability decreases.</i> |



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| Gas | Percentage |
|----------------|------------|
| Nitrogen | ~80% |
| Oxygen | ~20% |
| Argon | 0.93% |
| Carbon dioxide | 0.04% |

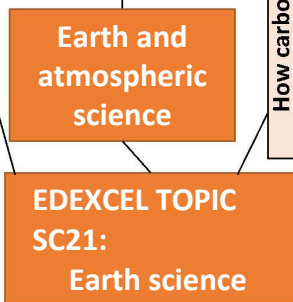
Proportions of gases in the atmosphere

| | | |
|--------------------------|---|--|
| Algae and plants | <i>These produced the oxygen that is now in the atmosphere, through photosynthesis.</i> | carbon dioxide + water → glucose + oxygen $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ |
| Oxygen in the atmosphere | <i>First produced by algae 2.7 billion years ago.</i> | Over the next billion years plants evolved to gradually produce more oxygen. This gradually increased to a level that enabled animals to evolve. |

| | | |
|--|--|---|
| Volcano activity 1 st Billion years | <i>Billions of years ago there was intense volcanic activity</i> | This released gases (mainly CO ₂) that formed to early atmosphere and water vapour that condensed to form the oceans. |
| Other gases | <i>Released from volcanic eruptions</i> | Nitrogen was also released, gradually building up in the atmosphere. Small proportions of ammonia and methane also produced. |
| Reducing carbon dioxide in the atmosphere | <i>When the water vapour condensed, the oceans formed and the carbon dioxide dissolved into it</i> | This formed carbonate precipitates, forming sediments. This reduced the levels of carbon dioxide in the atmosphere. |

The Earth's early atmosphere

How oxygen increased



How carbon dioxide decreased

| | | |
|---|--|---|
| Reducing carbon dioxide in the atmosphere | <i>Algae and plants</i> | These gradually reduced the carbon dioxide levels in the atmosphere by absorbing it for photosynthesis. |
| Formation of sedimentary rocks and fossil fuels | <i>These are made out of the remains of biological matter, formed over millions of years</i> | Remains of biological matter falls to the bottom of oceans. Over millions of years layers of sediment settled on top of them and the huge pressures turned them into coal, oil, natural gas and sedimentary rocks. The sedimentary rocks contain carbon dioxide from the biological matter. |

Greenhouse gases

| | |
|--|---|
| Carbon dioxide, water vapour and methane | <i>Examples of greenhouse gases that maintain temperatures on Earth in order to support life</i> |
| The greenhouse effect | <i>Radiation from the Sun enters the Earth's atmosphere and reflects off of the Earth. Some of this radiation is re-radiated back by the atmosphere (including carbon dioxide, methane and water vapour) to the Earth, warming up the global temperature.</i> |

| | | |
|--------------------|-----------------------|---|
| Testing for oxygen | <i>Glowing splint</i> | Re-lights the splint in the presence of oxygen. |
|--------------------|-----------------------|---|

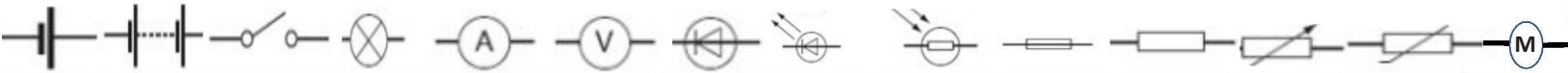
The total amount of greenhouse gases emitted over the full life cycle of a product/event. This can be reduced by reducing emissions of carbon dioxide and methane.

| | | |
|------------------------------|--|--|
| Carbon dioxide concentration | <i>There is a correlation between atmospheric carbon dioxide levels, fossil fuel usage and global temperature change</i> | There are errors with these measurements due to the location they were taken and the historical accuracy before scientific methods became more robust. |
|------------------------------|--|--|

| Effects of climate change |
|--|
| Rising sea levels |
| Extreme weather events such as severe storms |
| Change in amount and distribution of rainfall |
| Changes to distribution of wildlife species with some becoming extinct |

Human activities and greenhouse gases

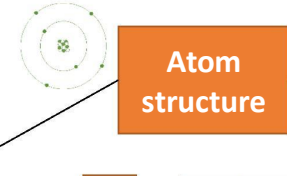
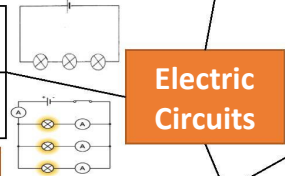
| | |
|----------------|---|
| Carbon dioxide | <i>Human activities that increase carbon dioxide levels include burning fossil fuels and deforestation.</i> |
| Methane | <i>Human activities that increase methane levels include raising livestock (for food) and using landfills (the decay of organic matter released methane).</i> |
| Climate change | <i>There is evidence to suggest that human activities will cause the Earth's atmospheric temperature to increase and cause climate change.</i> |



| | | | | | | | | | | | | | |
|--------------------------|-----------------------------|-------------------------------------|---------------------------|------------------|-------------------------------|-----------------------|--------------------------------|--------------------------------|--------------------------------|-------------------------------------|-----------------------------|-----------------------------|---|
| Cell | Battery | Switch | Lamp | Ammeter | Volt meter | Diode | LED | LDR | Fuse | Resistor | Variable resistor | Thermistor | Motor |
| Store of chemical energy | Two or more cells in series | Breaks circuit, turning current off | Lights when current flows | Measures current | Measures potential difference | Current flows one way | Emits light when current flows | Resistance low in bright light | Melts when current is too high | Affects the size of current flowing | Allows current to be varied | Resistance low at high temp | Converts electrical energy into mechanical energy |

| | | |
|------------|----------------------------------|---|
| Ammeter | Set up in series with components | Measures current in amps in the component |
| Volt meter | Set up parallel to components | Measures p.d. in volts across the component |

| | |
|----------|----------------------------------|
| Series | A circuit with one loop |
| Parallel | A circuit with two or more loops |



| Particle | Charge | Size | Found |
|----------|--------|------|--------------------|
| Proton | + | 1 | In the nucleus |
| Neutron | None | 1 | |
| Electron | - | Tiny | Orbits the nucleus |

| | | |
|----------------------|---|--|
| Potential difference | The energy transferred by a component for every per unit of charge passed | 1 volt = 1 joule per coulomb (1V = 1J/C) |
|----------------------|---|--|

$E = Q \times V$ Energy transferred = Charge moved X potential difference

$Q = I \times t$ Charge = Current X time

Current is conserved at a junction in a circuit.

$V = I \times R$ Potential difference = Current X Resistance

| | | | |
|-----------------------------|---|-------------|---|
| Current | Flow of electrical charge | Ampere (A) | Current in metals is the flow of electrons. |
| Potential difference (p.d.) | How much electrical work is done by a cell | Volt (V) | Current only flows when the circuit is closed and there is a p.d. across a component. |
| Charge | Amount of electricity travelling in a circuit | Coulomb (C) | |

Current in metals is the flow of electrons.

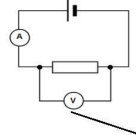
Current only flows when the circuit is closed and there is a p.d. across a component.

Core Practical

Relationship between p.d., current and resistance of a lamp and resistor

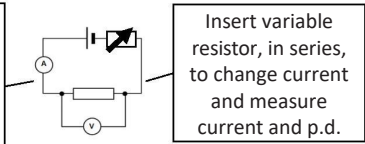
To test series and parallel circuits using resistors and lamps

Circuit set up like standard test circuit.



Standard test circuit

Used to investigate relationship between current, p.d. and resistance of components



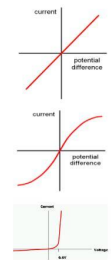
| | |
|--|---|
| Resistance Ohms (Ω) | A measurement of how much current flow is reduced |
| The higher the resistance, the more difficult it is for current to flow. | |
| Increasing resistance, reduces current. | |
| Increasing voltage, increases current. | |

| | |
|----------------------|-------------------|
| Energy transferred | Joules (J) |
| Charge | Coulombs (C) |
| Potential difference | Volts (V) |
| Current | Amps (A) |
| Time | Seconds (s) |
| Resistance | Ohms (Ω) |



| | |
|--|--|
| Thermistor | LDR |
| Resistance varies with temperature | Resistance varies with light intensity |
| Resistance decreases as temperature increases. | Resistance decreases as light increases. |

| | |
|----------------|--|
| Fixed resistor | At a constant temperature, current is directly proportional to the p.d. across the resistor. |
| Filament lamp | As current increases, the resistance increases. The temperature increases as current flows. |
| Diode | Current flows when p.d. flows forward. Very high resistance in reverse. |





| | | | |
|------------|---|---|-----------------------------------|
| 3 pin plug | Live - Brown | Carries p.d from mains supply. | p.d between live and earth = 230V |
| | Neutral - Blue | Completes the circuit. | p.d. = 0V |
| | Earth - Green and Yellow stripes | Only carries current if there is a fault. | p.d. = 0V |

| | | | |
|-----------------|------------------------|---|--|
| Safety features | Fuse | Thin wire inside the plug connected to live wire. | If current exceeds a certain value, the wire melts breaking the circuit. |
| | Circuit breaker | 'Trips' the switch. | Detect change in current and switch off the supply. |
| | Switch | Connected to the live wire. | When turned off, no current goes through the appliance. |
| | Earthing | Earth wire joins the metal case. | Earth wire takes current to the ground instead of conducting in the metal. |

| | | |
|----------------|---|---|
| Electric shock | A connection between the live wire and earth | The live wire carries 230V, your body is at 0V so there is a large potential difference across your body and current flows through you. |
|----------------|---|---|

| | | |
|--------------|---------------------------------------|---|
| Power rating | Power rating measured in watts | The power rating equals the number of joules transferred every second by the device from mans electrical supply to an energy store. |
|--------------|---------------------------------------|---|

| | | |
|-------|--------------------------------------|------------------------|
| Power | Energy transferred per second | Measured in Watts (W). |
|-------|--------------------------------------|------------------------|

| | | |
|---|--|--|
| Power transfer | Depends on p.d. across and current flowing through device | Current equals how much charge passes per unit time. |
| | | p.d. equals how much energy each unit of charge transfers. |
| Both affect the rate of energy transfer and the rate at which energy is transferred to other energy stores. | | |

Power (W) = current X potential difference $P = I \times V$

Power = (current)² X resistance $P = I^2 \times R$

HIGHER ONLY

Reducing unwanted energy transfer

Use low resistance metals in wire. Thicker wires have lower resistance. Resistance can be decreased by cooling wires so the lattice ions do not vibrate as much.

$P = E \div t$
Power = Energy transferred ÷ time

Energy transfer

Electrons flow through lattice of vibrating ions, they collide with ions.

The more collisions, the harder it is for electrons to pass through so higher electrical resistance.

Electrical safety

EDEXCEL TOPIC 10 ELECTRICITY AND CIRCUITS

Transferring energy

| | | |
|-----------------------|--|---|
| Current in a resistor | When current flows circuits warm up | Energy is transferred as work is done against the resistance. |
|-----------------------|--|---|

| Advantages | Disadvantages |
|--|--|
| Used to heat objects | Efficiency is reduced |
| Toasters have a coil of wire with high resistance. Current flows and wire glows red giving off IR radiation. IR radiation transfers energy to bread. | Less energy transferred as useful, more 'wasted' as thermal. |
| | Too hot, components may melt and circuit stops working. |

Lamps and heaters work in the same way.

Transferring energy by electricity



| Alternating current | Direct current |
|--|--|
| p.d. switches direction many times a second, current switches direction | p.d. remains in one direction, current flows the same direction |
| Generator. | Cell or battery. |

| | |
|--------------|-----------------------------|
| Mains supply | Frequency 50Hz, 230V |
|--------------|-----------------------------|

| | | | |
|----------------------|--|--|--|
| Battery operated fan | Energy from the chemical energy store | Electrical energy transferred. | Kinetic energy store of the fan. |
| | | Thermal energy transferred by work done. | Thermal energy store of the wires, motor and surroundings. |

| | | | |
|--------|---|--|--|
| Kettle | Electrical energy from the mains | Thermal energy transferred by work done. | Thermal energy store of the water. |
| | | | Thermal energy store of the kettle and surroundings. |

| | |
|----------------------|--------------------|
| Energy transferred | Joules (J) |
| Potential difference | Volts (V) |
| Power | Watts (W) |
| Current | Amps (A) |
| Time | Seconds (s) |
| Resistance | Ohms (Ω) |



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The further apart the objects, the weaker the force.

A non-contact force.

Electrostatic forces
Two electrically charged objects brought close together exert a force
Force created causes objects to move by electrostatic attraction or repulsion.

| | |
|----------------|----------------|
| Like charges | Repel |
| Unlike charges | Attract |

| | |
|------------------------------|-----------------------|
| Negatively charged materials | Gain electrons |
| Positively charged materials | Lose electrons |



| | | |
|-----------|--|---------------------|
| Conductor | Electrical charge moves easily through a material | EG: metal |
| Insulator | Electrical charge cannot move easily through a material | EG: plastic, rubber |

Insulators can be charged by friction.
Static charge
An electric charge that cannot move
Caused by friction which transfers electrons

Charges and static

Everyday situations
Refuelling petrol stations, aeroplanes or cars
Static builds up as fuel moves along pipes due to friction. Sparks can cause fuel to ignite, causing a fire or explosion.
Aeroplanes flying in air
Friction between the air particles and the plane causes electrons to transfer and static to build up. Communication equipment can be affected.

Static dischargers are used on planes to remove charge.

Earthing
A conductor removes excess electrons by connecting the charged object to the ground.
The metal strip provides an easy route for electrons to travel between the object and the ground. Removing the charge that could make a spark.

Shocks
A spark jumps between a charged object and conductor.
Walking on carpet causes friction. Electrons transfer to the person and charge builds up. When the person touches a metal object, the electrons conduct away, making a spark.

Lightning
A really big spark due to a large p.d. created.
Ice and rain drops bump together inside storm clouds. Friction causes the top of the cloud to become positively charged and the bottom negatively charged. Electrons travel between cloud and ground.

Dangers

EDEXCEL TOPIC 11 – STATIC ELECTRICITY. PHYSICS ONLY

Uses

Charged comb picks up pieces of paper
Attraction between the charged comb and the uncharged pieces of paper due to induction.

Uses of Static
Laser printer, filters in chimneys, electrostatic paint sprayers

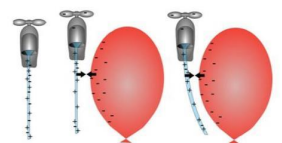
Charged balloon sticks to a wall
Attraction between the charged balloon and the uncharged wall due to induction.

Electrostatic induction
Attraction between a charged and uncharged object.
Charges on the surface of an object can move slightly.

Rubbing a balloon causes transfer of electrons to balloon due to friction.

Balloon is now negatively charged.

Balloon moves towards wall.



Charges in wall separate due to negative charges on balloon repelling negative charges in wall surface.

Leaving positive charges in wall surface attracting negatively charged balloon.

Insecticide sprayers
Attraction between charged insecticide and uncharged plant.
Charges on the surface of the plant move slightly, same charges are repelled opposite charges are attracted by the charged insecticide particles.

Electric fields

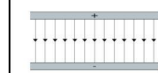
Electric fields
Created around any electrically charged object
A region around a charged object where, if a second charged object is placed inside the region, a force is exerted on both charges.

Electric fields
Help to explain electrostatic events like attraction by induction.
A statically charged object generates an electric field. The field interacts with other electric fields of nearby electrons in other objects.

Shape and direction of electric fields
Always at right angles to a charged object's surface
Electric field lines point away from a positive charge on a positive charge
The closer the lines the stronger the field
Electric field lines point towards a negative charge on a positive charge.

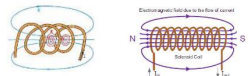


Electric field between parallel plates
Opposite charged plates that are parallel
Field is a uniform field. The strength is evenly spaced and is the same everywhere.





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Fields from individual coils cancel out to give a weaker field outside the solenoid.

Fields from individual coils add together to form an almost uniform field along the centre of solenoid.



Increase strength of magnetic field

- Use larger current
- Use more turns of wire
- Put turns of wire closer together
- Use iron core in middle

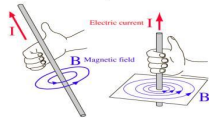
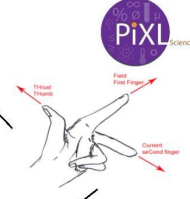
Thumb: Direction of current.
Fingers: Direction of magnetic field.

Solenoid: A long coil of wire. Magnetic field from each loop adds to the next.

Electromagnet: Lots of turns of wire increase the magnetising effect when current flows. Turn current off, magnetism lost.

Fleming's left-hand rule

| | |
|---------------|------------------------------|
| Thumb | Direction of movement. |
| First finger | Direction of magnetic field. |
| Second finger | Direction of current. |



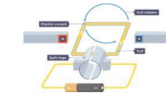
A compass or iron filings placed near the wire, will show the direction of the magnetic field.

When current flows through a wire, a concentric magnetic field is created.

Electromagnetism

EDEXCEL TOPIC 12 MAGNETISM AND THE MOTOR EFFECT

Electric motor: Force on a conductor in a magnetic field causes rotation. A conductor carrying current produces a magnetic field. Put the conductor into another magnetic field and the two magnetic fields interact.



If current and magnetic field are parallel to each other, no force on wire.

Split-ring commutator makes sure current always flows in correct direction to make coil spin.

They exert equal and opposite forces on each other.

Concentric magnetic field: Circles which share the same centre, perpendicular to the wire. The strength of the field depends on:

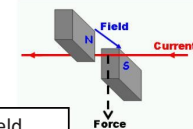
- The size of current
- The distance from the wire

HIGHER ONLY

Magnetic force: Place a wire carrying current near a magnet, a force is exerted. An equal and opposite force acts on the magnet.

Magnetic forces

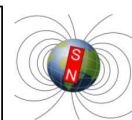
Force on a conductor at right angles to a magnetic field carrying a current = magnetic flux density X current X length.



Magnets and magnetic fields

| | | |
|-----------|---|---|
| Permanent | A bar magnet that produces its own magnetic field | Will repel or attract other magnets and magnetic materials. |
| Induced | A temporary magnet | Becomes magnet when placed in a magnetic field. |

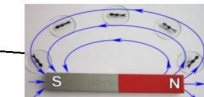
Magnetic elements are Nickel, Iron and Cobalt.



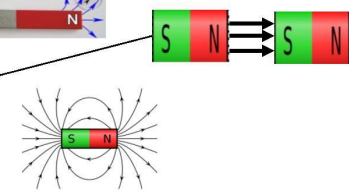
Earth's magnetic field: Plotting compass needle is a tiny magnet. It points north. This behaviour is evidence that the Earth has a magnetic field. The Earth's magnetic field exists because of electric currents in the molten outer core which is made from a mixture of iron and nickel.

| | | |
|--------------------|--------------------------------|--|
| Magnetic | Materials attracted by magnets | Uses non-contact force to attract magnetic materials. |
| North seeking pole | End of magnet pointing north | Compass needle is a bar magnet and points north. |
| South seeking pole | End of magnet pointing south | Like poles (N - N) repel, unlike poles (N - S) attract. |
| Magnetic field | Region of force around magnet | Strong field, force big. Weak field, force small. Field is strongest at the poles. |

Plotting compass: Show the direction of magnetic field lines. Strongest when lines are close together.

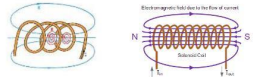


Uniform field: Same strength and direction between two magnets.
Ununiformed field: Direction goes North to South. Field lines stronger closer to magnet.





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Fields from individual coils cancel out to give a weaker field outside the solenoid.

Fields from individual coils add together to form an almost uniform field along the centre of solenoid.

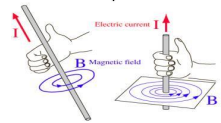


- Use larger current
- Use more turns of wire
- Put turns of wire closer together
- Use iron core in middle

Direction of current.
Direction of magnetic field.

A long coil of wire Magnetic field from each loop adds to the next.

Lots of turns of wire increase the magnetising effect when current flows
Turn current off, magnetism lost.



A compass or iron filings placed near the wire, will show the direction of the magnetic field.

When current flows through a wire, a concentric magnetic field is created.

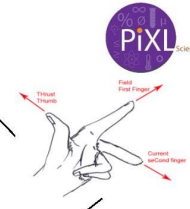
Circles which share the same centre, perpendicular to the wire.
The strength of the field depends on:
• The size of current
• The distance from the wire

Electromagnetism

EDEXCEL TOPIC 12 MAGNETISM AND THE MOTOR EFFECT

To predict the direction a straight conductor moves in a magnetic field.

| | |
|---------------|------------------------------|
| Thumb | Direction of movement. |
| First finger | Direction of magnetic field. |
| Second finger | Direction of current. |



If current and magnetic field are parallel to each other, no force on wire.

Force on a conductor in a magnetic field causes rotation.
A conductor carrying current produces a magnetic field. Put the conductor into another magnetic field and the two magnetic fields interact.

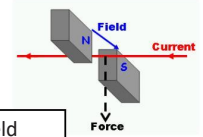
Split-ring commutator makes sure current always flows in correct direction to make coil spin.

They exert equal and opposite forces on each other.

HIGHER ONLY

Place a wire carrying current near a magnetic, a force is exerted.
An equal and opposite force acts on the magnet.

Magnetic forces



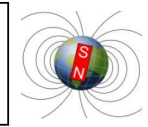
Force on a conductor at right angles to a magnetic field carrying a current = magnetic flux density X current X length.

플 = 플 플 플
플 플

Magnets and magnetic fields

| | |
|--|---|
| A bar magnet that produces its own magnetic field | Will repel or attract other magnets and magnetic materials. |
| A temporary magnet | Becomes magnet when placed in a magnetic field. |

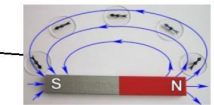
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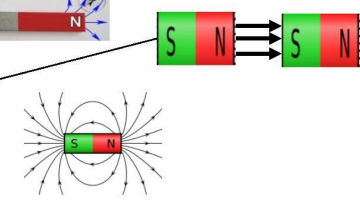
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The Earth's magnetic field exists because of electric currents in the molten outer core which is made from a mixture of iron and nickel.

| | |
|---------------------------------------|--|
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| Region of force around magnet | Strong field, force big. Weak field, force small. Field is strongest at the poles. |

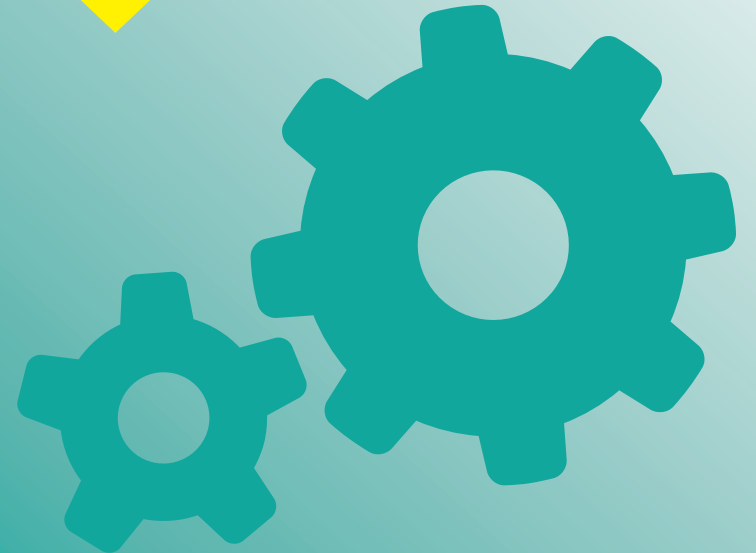
Show the direction of magnetic field lines. Strongest when lines are close together.



Same strength and direction between two magnets
Direction goes North to South. Field lines stronger closer to magnet.



History





- The Pilgrimage of Grace was a serious threat to the rule of Henry VIII.
- Most levels of society were involved – lords, knights as well as commoners – although it has to be said that many people remained loyal to the King.
- It is important to remember it was not solely caused by religious changes – there were other causes too, such as poor harvests, low wages, bad government and rumours of new taxes.
- For a time there were 50,000 armed men in the north of England involved.
- They wanted change, mainly religious change, but they did not want to remove the King.
- It was a conservative movement, seeking to reverse change and return to the old ways of religion. It was fed by rumour and uncertainty in a time of economic stress and strain for people.
- Henry was able to face down the rebels and emerge at the end of the process in a stronger position.
- Of all the rebellions, it is one of the least remembered.

Keywords

- Pilgrimage:
- Grievances:
- Protestant:
- Robert Aske:

Why did Henry VIII break with the Catholic Church?

- 1) Henry resented the power and wealth that the Church held in England.
- 2) He was frustrated when the Pope refused him a divorce from his first wife, Catherine of Aragon.
- 3) Henry stopped paying taxes to the Pope and made himself head of the new Church of England.
- 4) He also closed down monasteries to weaken the power of the Church and steal its wealth

Story of the Pilgrimage

- The rebels took over York, Hull and Pontefract Castle in the North.
- The King's army of the north, led by the Duke of Norfolk, only numbered 5,000 whereas there were over 50,000 rebels.
- When the rebels took over a town they made sure the monks and nuns were returned to their monasteries and nunneries.
- The Duke of Norfolk told the King he had to negotiate.
- A list of grievances was drawn up and sent to the King.
- Henry agreed to some of the rebels demands in order to buy himself some more time including: a pardon for all, a Parliament in York and that no more monasteries would be closed down before Parliament was called.
- After the pardon was read out at Aske's insistence, the rebels agreed to disband and go home.
- Aske was invited to spend Christmas with the King at Windsor.
- When travelling home a new revolt broke out. Henry used this as an excuse to tear up the pardon attack the north.
- Aske was hanged in chains in York.
- 216 people were executed.

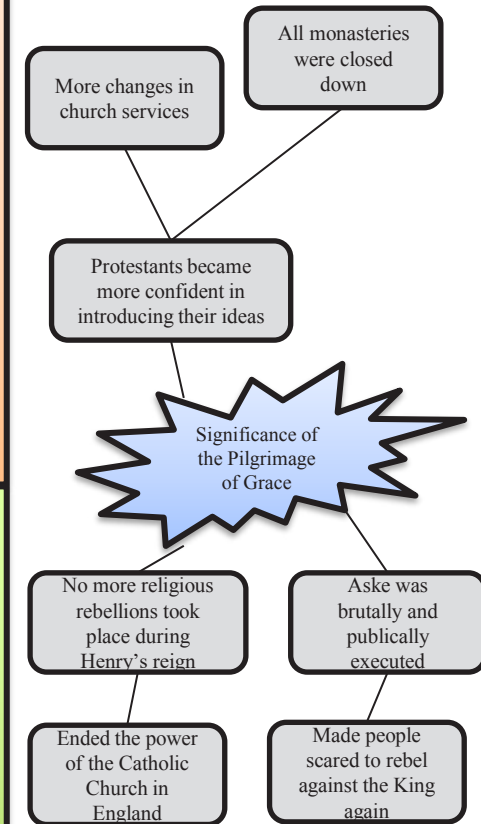
What problems were caused by the religious changes?

| Problem | Explanation |
|-----------|--|
| Social | Church and monasteries were the centre of people's social lives which the King had now taken away. |
| Economic | Henry increased taxes even though he became rich from closing monasteries. |
| Religious | Many people did not like the changes to church services made by the King. |
| Political | Many nobles lost influence due to Henry's divorce whilst other families gained power. |

Why did the Pilgrimage fail?

- The rebels were too ready to accept the promises of the King.
- Could have beaten the King with force, not with diplomacy.
- The leaders did not trust the commons.
- by disbanding their force of 50,000 people they handed over the initiative to Henry.
- The rebels were easily duped by the Duke of Norfolk and his promises in Doncaster.

| Factor | How it affected the Pilgrimage of Grace story |
|------------------------|--|
| Chance | Robert Aske was caught up in the revolt accidentally. He was forced to make an oath of support before he was allowed to continue on his journey to London. Without this the revolt would not have had their leader. |
| Religion | Henry VIII had made changes to the Church in England including the introduction of a new prayer book in 1535. The rebels wanted Henry to reverse these changes. The rebels were also led by priests and monks carrying church banners. |
| Economy | There were rumours of new taxes and there had been poor harvests which drove up food prices. All this made the people frustrated with the King |
| Role of the individual | Aske led the rebels and ordered them to disband after the King's 'promise' which made it easier for Henry to deal with the rebels. |



History - Power and the People, c1170 - Present



Summary

- During this time the nation fought a civil war, executed a king, became a republic, restored the monarchy and replaced the king yet again.
- People in the 1640s talked about a 'world turned upside down'.
- It was a period of strong feelings and dissent in politics, in economics and in religion.
- Families were often divided. Loyalties were tested and big questions asked such as, is it right to rebel against your King?
- The demands of Parliament were met, but those of the poor, and women, were not.
- The reputations of key characters involved – Charles I and Cromwell – are still disputed today.



Keywords

- Oliver Cromwell:
- Divine Right of Kings:
- Ship Tax:
- Rump Parliament:
- New Model Army:
- Lord Protector:
- Puritan:

Challenging Royal Authority: The English Civil War

Causes of the English Civil War

| Religion | Money | Power |
|--|--|--|
| <ul style="list-style-type: none"> • Charles was married to a Catholic and people feared his children were being brought up as Catholics. • Puritans dominated Parliament. • They did not like the Catholic changes to Churches by Archbishop Laud. • The Scots opposed the introduction of a new prayer book and went to war against Charles. | <ul style="list-style-type: none"> • Charles ruled without Parliament for eleven years and raised taxes without Parliament's permission. • Charles introduced ship tax to pay for his failed war against Scotland. • Charles was forced to pay compensation to the Scots but had limited funds. | <ul style="list-style-type: none"> • Charles believed in the Divine Right of Kings – he was appointed by God. • Charles preferred the advice of his favourite ministers to consulting with Parliament. • Charles attempted to arrest the leading members of Parliament. After this failed he fled to Nottingham to wage war against them. |

The New Model Army

- Swung the balance of power in Parliament's favour.
- The first fully professional army created by Oliver Cromwell.
- Soldiers were veterans from other battles and held strong religious views.
- The soldiers believed that God was on their side
- Officers were promoted by merit and not class.
- Soldiers were well paid – 8d per day.
- Many members believed that all men should have the vote.

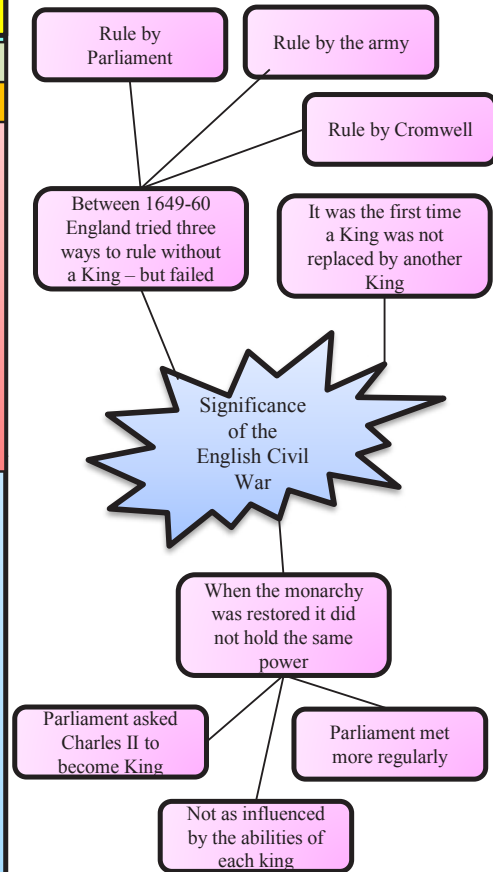
Charles' Execution

- MPs were divide about how to treat the King. The army ejected 300 MPs leaving only a Rump who put the King on trial.
- Charles was found guilty of treason. He refused to plea as he did not recognise the power of the court.
- Charles was executed on 30th January 1649.
- After his execution Parliament abolished the monarchy and the House of Lords.
- England was declared a Commonwealth.

Key events of the Civil War

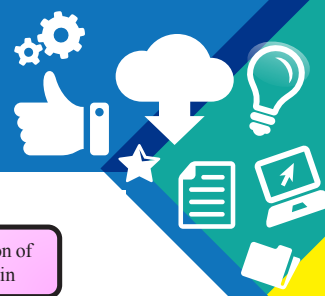
Oliver Cromwell

- The mastermind behind the New Model army which was used to defeat the Royalist army and capture Charles I
- 1649 Cromwell crushed a rebellion in Ireland.
- Groups going against the government were marginalised and their leaders were imprisoned.
- 1653 Cromwell, backed with the army, marched into Parliament and took power as Lord Protector.
- Attempted to create a religious settlement that would appeal to all but his puritan views made him unpopular.
- He closed theatres, banned Christmas and stopped women wearing make up.
- After Cromwell's death Parliament restored the monarchy but it had gained more powers than before the Civil War.



| Factor | How it affected the English Civil War story |
|------------------------|---|
| War | Charles went to war with the Scots to enforce a new prayer book on them. He was defeated and was ordered to pay them compensation. |
| Government | Charles' actions alienated Parliament and led to the start of the Civil War. The 'Rump' Parliament decided that the King should be executed, |
| Religion | The first argument started when Charles attempted to force a new prayer book to Scotland. The Puritan members of Parliament were defending their faith against their 'Catholic' King. |
| Ideas | Parliament believed that the power of the army and the right to end Parliament should be transferred from the King to them. |
| Role of the individual | Cromwell created the New Model Army which defeated the Royalists. After he was pivotal in the execution of Charles I and became the ruler of England. |

History - Power and the People, c1170 - Present



Summary

- In 1776 the thirteen colonies of North America declared their independence from Britain. Most people believed that colonies were unable to exist as a separate country.
- Over the previous 150 years these colonies had been largely self-governing but it was war with France that brought to a head the tensions that led to the American Revolution.
- There are echoes of Magna Carta and other revolts in the words of the Declaration of Independence, words that are still powerful today and which would have a most profound impact on events during the following 200 years.
- The American Revolution and the War of Independence that followed it had important consequences for the way Britain was governed.
- The slogan of the Revolution, 'no taxation without representation', remains a strong political rallying cry today

Keywords

- Independence:
- Revolution:
- Declaration:
- Representation:
- Thomas Paine:
- Loyalist:
- Radical:
- Yorktown:
- Boston Tea Party:
- The Seven Years War:

Challenging Royal Authority: The American War of Independence

Causes of the American War of Independence

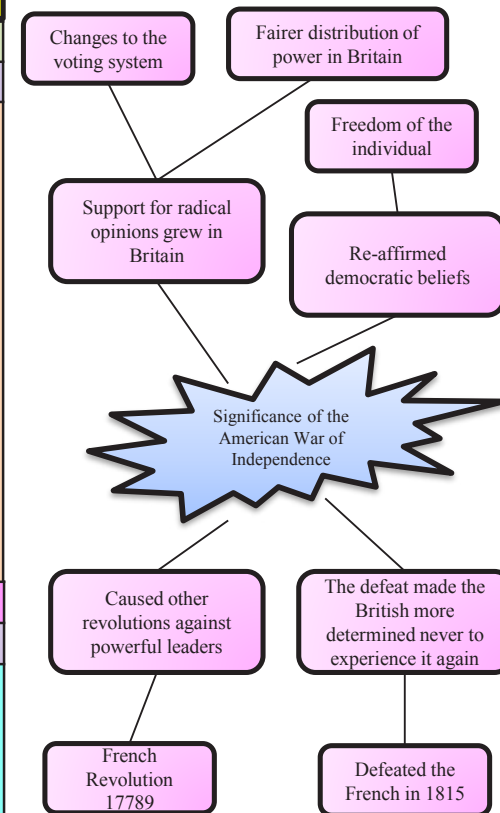
| Taxes and War | Powerful ideas & Strong Individuals |
|---|--|
| <ul style="list-style-type: none"> The Seven Years war with France made Britain introduce new taxes in America. Britain sent troops to defend their 13 American colonies but wanted them to pay for their upkeep. As a result they introduced new taxes on the 13 colonies including the Stamp Act of 1763. There was wide spread opposition to the new taxes as the Americans felt they as they were not represented in the British Parliament then they should not be taxed. This promoted the slogan of the War of Independence, 'No taxation without representation'. 1773 Boston Tea Party: tipped all the tea on a boat going to Britain into the sea as a protest against British rule. The British responded by closing Boston Harbour to all shipping until compensation was paid. This angered the Americans more. | <ul style="list-style-type: none"> There were three groups which had different ideas: <ul style="list-style-type: none"> Moderates: wanted a compromise with the British. Loyalists: wanted to remain part of the British Empire. Radicals: Americans should be represented in any law that taxed them. Thomas Paine was a strong individual: <ul style="list-style-type: none"> Wrote a pamphlet called 'Common Sense' in 1776. The pamphlet urged for American Independence. Sold over 500,000 copies |

Consequences of the American War of Independence

| USA | Great Britain | France | Rest of the World |
|--|--|---|--|
| <ul style="list-style-type: none"> Declared independence – the declaration reflected the Magna Carta. First time a colony rejected the rule of a European country. | <ul style="list-style-type: none"> Trading increased with Canada and India. Led to people wanting change in the voting system and the way power was distributed in England | <ul style="list-style-type: none"> Supported the Americans with troops, ships & money. Erupted into their own revolution six years after. | <ul style="list-style-type: none"> People began questioning about the rights of having an empire. Adam Smith believed that trade was more important in generating wealth than having colonies. |

The British Surrender at Yorktown

- The American's supported by the French surrounded the British army at Yorktown.
- The British commander had no choice but to surrender as he could not bring in reinforcements.
- They were forced to surrender all of their weapons including 214 artillery pieces and thousands of muskets.
- On hearing the surrender the British Government passed a Bill stating that no more attempts to defeat the Americans should be taken.
- Britain did not have the political will to continue the fight.
- The defeat at Yorktown was a humiliating end and defeat for the 'superior' British forces.



| Factor | How it affected the American Civil War story |
|------------------------|---|
| War | The Seven Years war with France resulted in Britain increasing the taxes on the colonies. This forced the American colonies to declare their independence and fight against British rule. |
| Government | The British government decided to introduce new taxes to force the Americans to pay for British troops to defend their country, This caused the Americans to declare their independence. |
| Communication | All of the colonies worked together to battle against British rule. After news spread they were supported by France in their battle for independence. |
| Ideas | There was a widespread belief within America that they colonies should reject British rule. |
| Role of the individual | Thomas Paine and John Adams were key in promoting independence. Adams helped draft the American Constitution. |



History - Power and the People, c1170 - Present



Pilgrimage of Grace

1. Explain why the Pilgrimage of Grace was a threat to Henry VIII's rule.
2. Who was Robert Aske and why was he significant?
3. Explain the importance of economic factors in causing the Pilgrimage of Grace.
4. How far was the Duke of Norfolk's role the main reason for the failure of the Pilgrimage of Grace?
5. How significant was the failure of the Pilgrimage of Grace for future rebellions?



The English Revolution

1. Explain the main cause of the English Civil War
2. Why was this revolution significant for the course of English history?
3. Create a profile on Oliver Cromwell including further research of his career and influence.
4. Explain why the new model army were a successful fighting force.
5. Research: Can you still see the impact of the Civil War on the relationship between the Monarchy and Parliament today?

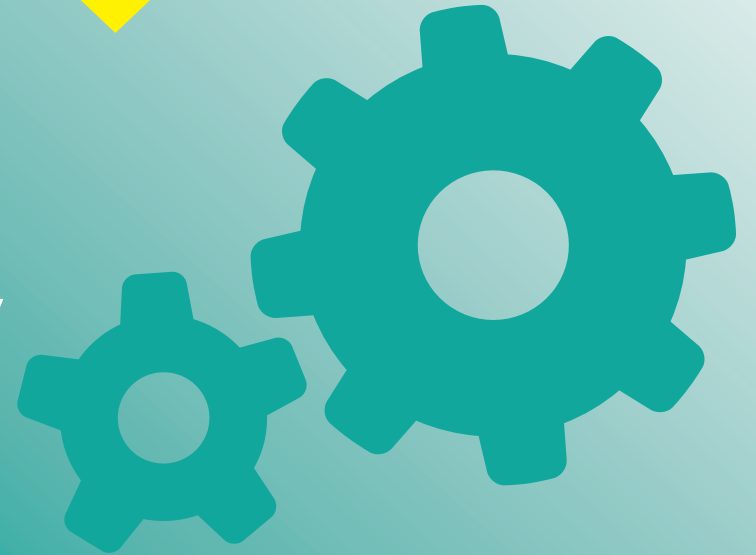


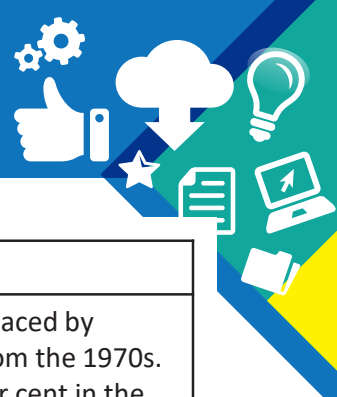
The American War of Independence

1. Explain what was a more important cause of the War of Independence: Taxes or Powerful ideas?
2. Why were the British defeated?
3. Which country saw the biggest consequences of the War of Independence?
4. How did the British react to this defeat?
5. Research: How far has independence benefitted America?



Geography





Economic and Industrial Change in the UK

Key causes of change:

De-industrialisation is the decline of traditional industries such as manufacturing. This has happened because: machines and technology have replaced many people. Other countries e.g. china can produce cheap goods because labour is less expensive.

Globalisation — is the growth and spread of ideas around the world. Many people now work on global brands in the quaternary sector e.g. in IT. Increased world trade and cheaper imported products have contributed to the decline in UK manufacturing.

Government policies — government decisions on investment in new infrastructure and technology and support for businesses (e.g. tax breaks) affect how well the economy grows. Membership in government groups, e.g. World Trade Organisation, make it easier for companies in the UK to operate across the world.

Moving towards a post-industrial economy:

A post-industrial economy is where manufacturing industry declines to be replaced by growth in the service sector and quaternary sector. This happened in the UK from the 1970s.

- By 2015, 78 per cent of UK employment was in the tertiary sector and 10 per cent in the quaternary sector.
- Only 10 per cent of employment was in manufacturing compared to 55 per cent in 1900.

Development of information technology the use of IT is a key factor in the UK's move to a post-industrial economy. Internet access allows people to work from home. Over 1.3 million work in the IT sector. And the UK is one of the world's leading digital economies.

Service industries and finance the UK service sector has grown rapidly since 1970s, today it contributes over 79% of the UK's GDP. Finance is an important part of the service sector the UK is the world's leading centre of financial services Some, like HSBC, have their global headquarters in the UK. The financial services sector accounts for about 10% of the UK's GDP.

Research and development (R&D) is increasing in the UK, making use of the UK's highly skilled university graduates – research employs over 60,000 people. In 2013, nearly £30 billion was spent on R&D in the UK and it is estimated to contribute £3 billion to the UK economy and it one of the UK's economy's main growth areas in the future.

Environmental impacts of Industry on the physical environment

Large-scale extraction industries such as **mining** and **quarrying** can have an impact on the environment. Quarries have been cut out of the countryside and huge waste tips piled up on the edges of mining settlements. They can destroy natural habitats, pollute water courses and scare the landscape.

Modern **manufacturing industries** have an effect on both the landscape and the environment. Manufacturing plants can look very dull and uninteresting and can have a negative visual effect on the landscape. Industrial processes can cause air and water pollution, as well as degrading the soil. The transport of raw materials and manufacturing products is usually by road, which increases levels of air pollution and damage to the environment when roads are widened or new ones built

UK Science and Business Parks

A **science park** is a group of scientific and technical knowledge-based businesses located on a single site. Most are associated with universities, enabling them to use research facilities and employ skilled graduates. Science parks may also include support services such as financial services and marketing. Science parks often have:
Good transport links – close to motorways/ railway / airports.
Excellent links with universities. Attractive location with green areas.

A **business park** is an area of land occupied by a cluster of businesses. Business parks are usually located on the edges of towns because: land tends to be cheaper than in town centres and with more land, it may be possible to extend businesses. Access is also better with less congestion. Businesses can benefit by working together.



How can industrial development be more sustainable?

Today there is a much greater concern about the need for industries to be environmentally sustainable. This can be achieved in a number of ways.

- Technology can be used to reduce harmful emissions from power stations and heavy industry.
- Desulphurisation can remove harmful gases such as sulphur dioxide and nitrogen oxide from power station chimneys.
- Stricter environmental targets put in place for industry on water quality, air pollution and landscape damage.
- Heavy fines imposed when an industrial pollution incident occurs.

Quarrying can be made more sustainable with:

- Strict controls on blasting and removal of dust from roads and landscaping
- Recycling is encouraged
- Companies are expected to restore or improve a quarry after it has been used.

Named Example: Torr Quarry, Somerset

Torr Quarry is an example of how modern industry can be more environmentally sustainable. Torr Quarry is a limestone quarry in the Mendip Hills. It employs over 100 people and contributes more than £15 million towards the local economy each year.

- The quarry is being restored to create wildlife lakes
- 200 acres of the site have already been landscaped
- Regular monitoring of noise, vibration, dust and water quality.
- Rail transport of quarried rock minimises the impact on local roads.

North-South Divide

What is the north-south divide?

It refers to a real of imagined cultural and economic differences between the south of England and the rest of the UK. In general the south enjoys high incomes and longer life expectancy., But the south also has higher house process and more traffic congestion.

Why is there a north-south divide?

- During the Industrial Revolution, the UK's growth was centred on coalfields, heavy industries and engineering in northern England, Wales and Scotland.
- Since 1970s, many industries have declined, reducing prosperity in those areas.
- London and the South East developed rapidly due to a fast-growing service sector.



How can regional strategies address the north-south divide?

Local Enterprise Partnerships (LEPS)

LEPS are voluntary partnerships between local authorities and businesses. Their aim is to identify business needs and encourage companies to invest in order to boost the local economy and create jobs.

Lancashire LEP will: promote new businesses and create 50,000 new jobs by 2023. Improve transport with £20 million investment. Extend superfast broadband across 97% of the region. Create 6,000 high-skilled jobs in Enterprise Zones at Samlesbury and Warton.

Enterprise zones will encourage new businesses and jobs. The government supports businesses in Enterprise Zones by: providing business rate discount, ensuring the provision of superfast broadband, creating simpler planning regulations.

Northern Powerhouse linking northern cities – Liverpool, Leeds, Manchester, Sheffield, Hull and Newcastle to match, rival and compete with the economic power of London. It includes improving transport links e.g. High Speed 2 railway, Mersey Gateway bridge and the Trans-Pennine train route. As well as investing in science and innovation and to devolve the powers of government away from London's parliament to Northern cities. Cities would get more power and spending decision so that they can invest money directly where it is needed locally and also have elected mayors.

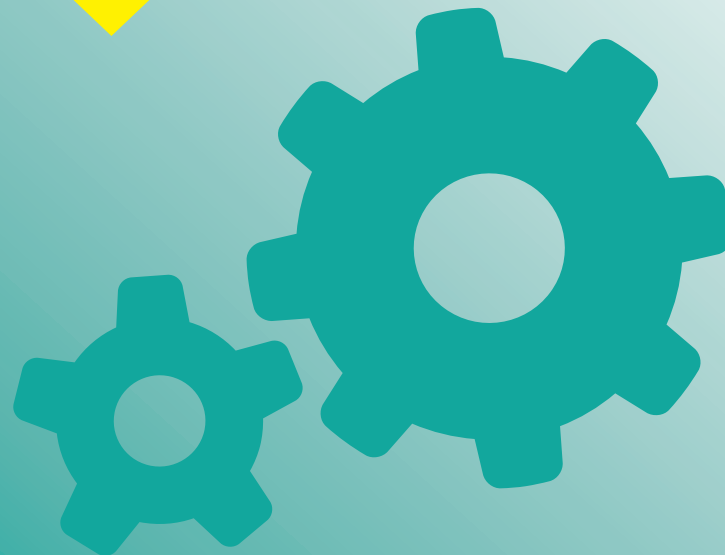


| UK Global Links | |
|----------------------|---|
| Political | <p><u>Commonwealth</u></p> <ul style="list-style-type: none"> • These are 53 states across the world that were part of our colonial history • Many expats live there (Brits who live abroad) • The Queen is head of state in 16 of these countries • promotes democracy, good governance, human rights and economic development as the UK trades with its previous colonies <p><u>EU</u></p> <ul style="list-style-type: none"> • We joined the EU in 1979 and opted to leave in 2016. • About 50% of exports and imports are to the EU • It's now a bit confusing as we go through the Brexit process about what will happen to EU laws that we have. |
| Trade | <ul style="list-style-type: none"> • 49.6% of the UK's exports went to EU countries, and 50.4% went to non-EU countries such as the USA and China, The USA takes the most. • A lot of trade is now finance and communications following deindustrialisation. |
| Transport | <ul style="list-style-type: none"> • More than 750,000 international flights depart from the UK annually to 400 airports in 114 countries • Heathrow is the 4th busiest airport in the world • Eurotunnel (Channel Tunnel) links our island to Europe as well as sea ferries. |
| Culture | <ul style="list-style-type: none"> • English Language has helped us set up strong links • Students abroad can sit British exams • UK TV productions have a global audience e.g. Doctor Who • We are a culture of immigration leading to a unique and multicultural society |
| Technolo | <ul style="list-style-type: none"> • 90% of population has internet – very connected! • We spend more online shopping than anywhere in Europe • 18 million businesses run from home |

| UK Transport Links | | |
|---|---|---|
| Ports | Air | Roads |
| <p>32 million passengers travel through UK ports. Ports employ 120,000 people. Liverpool2 project will double the ports capacity to over 1.5 million containers a year % create thousands of jobs and boost the regional economy.</p> | <p>Airports create vital global links, provide 1000s of jobs and boost economic growth. Heathrow might have a 3rd runway built to expand its capacity, however people living nearby are concerned about noise and air pollution.</p> | <p>Road Investment Strategy includes: 100 new road schemes, 1300 new miles added to motorways. Extra lanes added to motorways to make them smart motorways.</p> |

| Changing rural landscapes in the UK | |
|---|---|
| <p>Growth; South Cambridgeshire The population is increasing due to migration – migrants from Cambridge, other parts of the UK and eastern Europe. Social Effects: 80% car ownership leads to increased traffic on narrow roads. Housing developments on the edges of villages can reduce community spirit. Economic effects: reducing in agricultural employment, lack of affordable housing, high petrol prices, pressure on services due to growing population.</p> | <p>Decline, Outer Hebrides The population has declined by 50% since 1901, people move away due to limited employment opportunities. Social Effects: school closures due to too few children. Ageing population has fewer young people to support them. Economic effects: services are closing, small farms can only provide work for 2 days a week, there has been an increase in tourism, but the infrastructure can support the scale of tourism needed.</p> |

Spanish





Los Problemas Globales

| Los verbos | |
|----------------------|---------------------------|
| Reciclar | To recycle |
| Luchar | To fight |
| Reusar | To reuse |
| Aumentar | To increase |
| Amenazar | To threaten |
| Apagar (la luz) | To switch off (the light) |
| Encender (las luces) | To switch on (the lights) |
| Cerrar el grifo | To turn off the taps |
| Tirar | To throw |
| Dañar | To damage |
| Echar la culpa | To blame |
| Estropear | To spoil/ ruin |
| Malgastar | To waste |
| Separar la basura | To separate the rubbish |
| Ensuciar | To dirty |
| Limpiar | To clean |
| Salvar | To save (lives) |
| Ahorrar | To save (energy) |
| Advertir | To warn |
| Evitar (bañarse) | To avoid |
| Ducharse | To shower |

En vez de

| Sustantivos - Problemas de hoy en día | | | |
|---------------------------------------|---------------------|--------------------------------------|---------------------|
| El paro/el desempleo | unemployment | El hambre | hunger |
| la pobreza | poverty | La riqueza | wealth |
| la deforestación | deforestation | La drogadicción | Drug addiction |
| La salud | health | La obesidad | obesity |
| La crisis económica | The economic crisis | El medio ambiente | The environment |
| Los sin hogar/ los sin techos | The homeless | Los animales en peligro de extinción | Endangered species |
| El calentamiento global | Global warming | La falta de viviendas | Lack of houses |
| La capa de ozono | Ozone layer | El sobrepeso | Overweight |
| Los gases de escape | Exhaust fumes | El tabaquismo | Smoking |
| La basura | Litter/rubbish | La Guerra | War |
| La marea negra | Oil spill | La inmigración ilegal | Illegal Immigration |
| El atasco | Traffic jams | Los refugiados | The refugees |
| La manifestación | Demonstration | El racismo | Racism |
| La huelga | Strike | Las energías renovables | Renueable energies |
| Los residuos | Waste | El botellón | Drinking in parks |

| Sustantivos - Desastres naturales – natural disasters | | | |
|---|------------------|----------------------|---------------|
| La selva | The jungle | Un incendio forestal | A forest fire |
| Un terremoto | An earthquake | Un tornado | A tornado |
| Un malgasto de dinero | A waste of money | Las inundaciones | floods |

| Los Verbos - Soluciones - solutions | |
|---|------------------------------------|
| Se debe / Se debería | You should/ We should |
| Comprar / Trabajar en una tienda benéfica | To buy / To work in a charity shop |
| Donar dinero a las organizaciones benéficas | To donate money to charities |

| Los adjetivos | |
|-------------------|--------------|
| Sano/a | Healthy |
| Malsano/a | Unhealthy |
| Peligroso/a | Dangerous |
| Renovable | Renewable |
| Recargable | Rechargeable |
| Sucio/a | dirty |
| Limpio/a | Clean |
| Nocivo/a Dañino/a | Harmful |
| Asqueroso/a | Disgusting |
| Borracho/a | Drunk |
| Muerto/a | Dead |

| Los Verbos - Soluciones - solutions | |
|-------------------------------------|-------------------------------|
| Cuidar del planeta | To look after the planet |
| Comprar productos verdes | To buy green products |
| Crear oportunidades de trabajo | To create work opportunities |
| Constuir más casas | To build more homes |
| Reciclar la basura más amenudo | To recycle rubbish more often |
| Ser voluntario | To be a volunteer |
| Ayudar en un comedor social | To help in a soup kitchen |
| Participar el comercio justo | To take part in fair trade |
| Ahorrar agua | To save water |
| Consumir menos | To consume less |



Knowledge organiser: El Trabajo y el Futuro

| Los verbos para el trabajo / future | |
|-------------------------------------|----------------|
| Trabajar | To work |
| Conseguir | To achieve |
| Ganar | To earn/gain |
| Continuar | To continue |
| Tomar | To take |
| Buscar | To search |
| Solicitar | To apply |
| Esperar | To hope |
| Desear | To wish |
| Convertirse en | To become |
| Querer | To want |
| Hacer | To do |
| Tener | To have |
| Ir | To go |

| Los sustantivos Post 16 | |
|----------------------------|-----------------|
| Una carrera | A degree |
| Un aprendizaje | Apprenticeship |
| Los conocimientos | Knowledge |
| Las habilidades | The skills |
| Un empleo | A job |
| Un empleo a tiempo parcial | A part time job |
| Las practicas laborales | Work experience |
| La Universidad | University |
| El colegio superior | Colleague |
| Un año sábitico | A gap year |
| Trabajo en equipo | Team work |
| El paro / desempleo | Unemployment |
| El dinero | Money |
| Sueldo | Salary/wages |

| Los sustantivos - Empleos | | | |
|---------------------------|----------------|---------------|--------------------|
| Abogado/a | Lawyer | Albañil | Bricklayer/builder |
| Amo de casa | Housewife | Azafato/A | Flight attendant |
| Hombre de negocio | Business man | Bombero/A | Fireman |
| Mujer de negocios | Business woman | Cocinero/A | Cook |
| Veterinario/A | Vet | Diseñador/A | Designer |
| Camarero/A | Waiter | Enfermero/A | Nurse |
| Escritor/A | Writer | Fontanero/A | Plumber |
| Ingeniero/A | Engineer | Funcionario/A | Civil servant |
| Jardinero/A | Gardener | Mecánico/A | Mechanic |
| Médico/A | Doctor | Soldado | Soldier |
| Peluquero/A | Hairdresser | Periodista | Journalist |
| Policia | Police officer | Recepcionista | Receptionist |
| Cajero/A | Cashier | Canguro/A | Babysitter |
| Encargado/A | Manager | Jefe | Boss |
| Contable | Accountant | Dependiente | Shop assistant |

| Los verbos para ganar dinero de bolsillo | | | |
|--|-----------------------|-------------------------------|-------------------------|
| Para ganar dinero, ayudo en casa | | To earn money, I help at home | |
| Tengo que / Suelo ... | | I have to / I usually ... | |
| Hacer de canguro | To babysit | Cocinar | To cook |
| Pasar la aspiradora | To Hoover | Planchar la ropa | To iron the clothes |
| Pasear el perro | To walk the dog | Cuidar a mis hermanos | Look after my brothers |
| Lavar los platos | To do the dishes | Sacar la basura | To take the rubbish out |
| Limpia el baño | To clean the bathroom | Cocinar | To cook |

| Los adjetivos | |
|---------------------------|-----------------------------------|
| Bien /mal pagado | Well/ badly paid |
| Agotador/cansado-a | Tiring |
| Estresante | Stressful |
| Gratificante | Rewarding |
| Exigente | Demanding |
| Molesto/a | Annoying |
| Variado/a | Varied |
| Estás de pie todo el rato | You are on your feet all the time |



La Importancia de los idiomas

| | |
|---|---|
| Aprender idiomas es importante porque ... | To learn languages is important because... |
| Te abre la mente | It opens your mind |
| Aumenta tu confianza | It increases your confidence |
| Te hace parecer más atractivo | It makes you feel happy |
| Mejora tus prespectivas laborales | It improves your job opportunities |
| Te ayuda a conocer nuevos sitios | It helps you to meet new friends |
| Te permite hacer nuevos amigos | It allows you to make new friends |
| Te permite trabajar en el extranjero | It allows you to work abroad |
| Te permite estudiar en el extranjero | It allows you study abroad |
| Estimula el cerebro | It stimulates the brain |
| Te permite descubrir nuevas culturas | It allows you to discover new cultures |
| Te ayuda a mejorar tu lengua maternal | It allows you to improve your mother tongue |
| Very Important | |
| Saber | To know (knowledge) |
| Sé | I know |
| No sé | I do not know |
| Conocer | To know (people) / To meet |
| Conozco | I know (people) / I meet (people) |

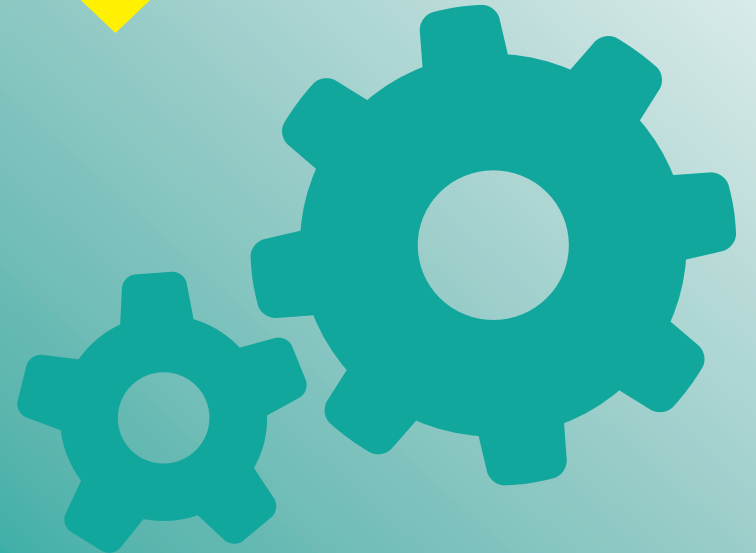
Ir a la Universidad

| | |
|--|--|
| Lo bueno de ir a la universidad es que ... | The good thing is that ... |
| puedes tener más libertad | you can have more freedom |
| aprendes nuevas habilidades | you learn new skills |
| conoces a gente nueva | meet new people |
| puedes un mejor trabajo si vas a la universidad | you can get a better job if you go to university |
| puedes recibir una beca para estudiar en el extranjero | you can receive a grant to study abroad |
| Lo malo de ir a la universidad es que | The bad thing is that ... |
| puede ser cara | it can be expensive |
| echas de menos a tus padres | you miss your family |
| terminas con muchas deudas | you end up with a lot of debts |
| tienes que irte de casa | you have to leave home |

Gramátca

| | |
|--------------------------|------------------------------|
| Este | This (masculine + singular) |
| Esta | This (feminine + singular) |
| Estos | These (masculine + singular) |
| Estas | These (feminine + plural) |
| <u>Be careful</u> | |
| Esta | This |
| Esta | It is |

Religious Studies





Islam Practices

Ten Obligatory Acts (Shi'a) Salah, Zakah, Saum, Hajj + Khums/Jihad/ commanding good/ forbidding evil/ loving good/hating evil

1st Pillar-Shahadah (Belief)

Sunni- *'there is one God Allah and Muhammad is his prophet'* Shi'a add *'...and Ali is the friend of God'*

- Main Muslim belief and foundation of all the pillars
- Whispered to baby when born and person when dying
- Included in call to prayer each day

2nd Pillar-Salah (Prayer)

Sunni- 5x a day/ Shi'a 3x
Always wash before prayer (wudu) and face Makkah
Movements (rak'ah) show submission to Allah e.g. bowing
Jummah prayers take place in mosque on Fridays and they also pray privately (du'a)
Prayer is important because it develops relationship with Allah and reminds them of him through the day: *'prayer is conversation with Allah', 'prayer is the key to paradise'* (Muhammad)

3rd Pillar-Zakah (Giving)

Giving 2.5% of savings to Allah once a year by those who have more than a minimum amount (nisab)
Given to- *poor, needy, those who collect it, recent converts, freeing slaves, those in debt, for cause of Allah, travellers in need* (Qur'an)
Zakah = 'purification'- purifies society by making less divide between rich and poor and individuals by making them less greedy
Muslims can also give sadaqah = voluntary giving and Shi'a give khums =20% of savings to religious leaders

4th Pillar-Sawm (Fasting)

Fast in hours of daylight in month of Ramadan unless exempt due to e.g. health or travelling
Fasting helps them to feel compassion for the poor and to thank Allah for providing for them
The Qur'an was first revealed in Ramadan on the Night of Power so Muslims read as much of the Qur'an as they can. They also try to give up bad habits and pray more which is easier in Ramadan because *'the gates of heaven are opened... and the devils are chained'* (Muhammad)

5th Pillar-Hajj (Pilgrimage)

Muslims who can afford it and are healthy enough go to Makkah for hajj once in their lifetime
Why do they do it? To remember events from the life of Ibrahim such when Allah gave his wife and son water in the desert, to follow example of Muhammad and obey the Qur'an
What do they do? 1. Enter a state of purity (ihram) 2. Circle the ka'aba 7x 3. Walk between two hills to collect water 4. Pray for forgiveness on Arafat (*'hajj is Arafat'* Muhammad) 5. Collect stones to throw at pillars representing the devil 6. Sacrifice animal to celebrate Eid ul Adha

Festivals

Importance of festivals-

- remind Muslims of historical events in faith
- Bring Muslims together ('as 'ummah') to celebrate
- Remind them of what Allah is like
- Give them time to pray and think of Allah

Eid ul Fitr: takes place at the end of Ramadan

- Celebrates the end of fasting
- Thanking Allah for giving them the self-control to fast
- Thanking Allah for giving the Qur'an

How is it celebrated?

e.g. Services, give cards and presents, special meal, forgive any disputes

Eid ul Adha: takes place at the end of Hajj

Remembers *Ibrahim's willingness to sacrifice his son* to obey Allah and celebrates completing Hajj

How is it celebrated?

e.g. sacrifice a sheep to remind them of Ibrahim's obedience, share meat among family, friends and the poor, go to mosque to thank Allah, visit family and give presents

Ashura

Shi'a- remember the martyrdom of Husayn, (Muhammad's grandson) in battle. They take part in public mourning processions, perform plays to remember what happened and they may visit Husayn's tomb in Iraq.

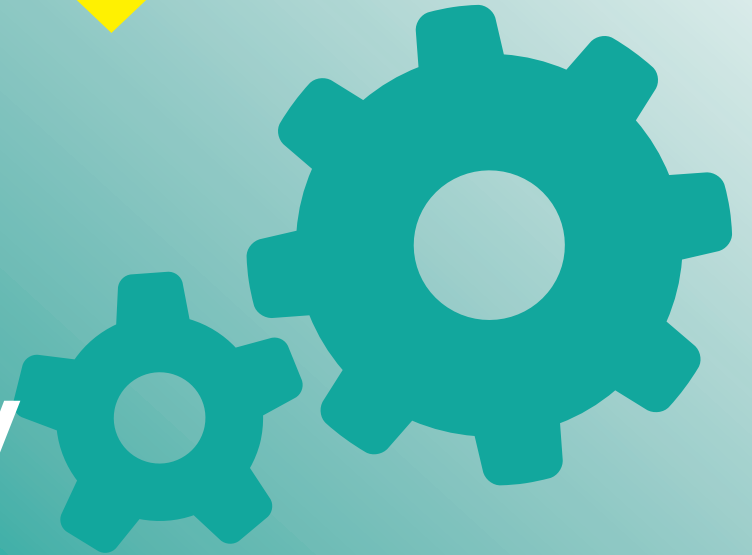
Sunni- known as 'Day of Atonement' which they observe by fasting, giving to charity and being kind to family and the poor.

Jihad ('Struggle')- Greater Jihad is to *'fight the evil within yourself'* (Muhammad); to become a better Muslim by obeying Allah

Lesser Jihad is the struggle to defend the faith. Rules must be followed:

- Started by religious leader
- Just cause for Allah
- Last resort
- Not from aggression or to gain land *'God does not love the aggressor'* (Qur'an)
- Innocent should not suffer
- Environment must be protected

Food Technology





Sensory science

Using our senses

A range of senses are used when eating food:

- sight;
- smell;
- hearing;
- taste;
- touch.



A combination of these senses helps to evaluate a food.

Appearance

The size, shape, colour, temperature and surface texture all play an important part in helping to determine first reactions to a food.

Taste

There are five basic tastes:

- bitter;
- salt;
- sour;
- sweet;
- umami.

Smell (odour or aroma)

The nose detects volatile aromas released from food. An odour may be described by association with a particular food, e.g. herby, cheesy, fishy.

The intensity can also be recorded. Odour and taste work together to produce flavour.

Touch

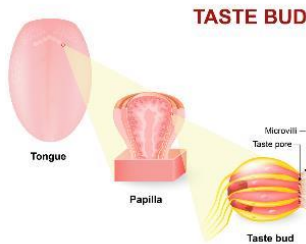
Food texture is the way food is felt by the fingertips, tongue, teeth and palate. When food is placed in the mouth, the surface of the tongue and other sensitive skin reacts to its surface texture. This sensation is known as mouthfeel.

Hearing (sound)

The sounds of food being prepared, cooked, served and eaten all help to influence our preferences. The sound of eating food can alter our perception of how fresh a food is, e.g. crunchy carrots.

Taste receptors

Our tongues are covered with taste buds, which are designed to sense chemicals in the mouth. Most taste buds are located in the top outer edges of the tongue, but there are also receptors at the back of the tongue as well as on the walls of the mouth and at the back of the throat. As we chew food, molecules mix with saliva, enter taste pores and interact with gustatory hairs, also known as taste receptors. This triggers nerve impulses that are transmitted to the brain.



| | Tasting vocabulary (sensory attributes) | | |
|-------|---|----------|----------|
| Sight | Bubbling | Flaky | Opaque |
| | Caramelised | Firm | Smooth |
| | Clear | Heavy | Solid |
| | Coarse | Icy | Steaming |
| Smell | Crumbly | Juicy | Sticky |
| | Dry | Moist | Thick |
| | Acidic | Fresh | Spicy |
| | Aromatic | Meaty | Strong |
| Sound | Bland | Mild | Sweet |
| | Citrus | Pungent | Tart |
| | Earthy | Savoury | Weak |
| | Fragrant | Smoky | Zesty |
| Taste | Brittle | Crisp | Pop |
| | Crackle | Crunch | Sizzle |
| | Bitter | Rich | Strong |
| | Bland | Salty | Sweet |
| Touch | Floury | Savoury | Tangy |
| | Hot | Smoky | Tart |
| | Mild | Sour | Umami |
| | Piquant | Spicy | Zesty |
| | Brittle | Dry | Short |
| | Bubbly | Gooey | Soft |
| | Chewy | Granular | Solid |
| | Close | Greasy | Tacky |
| | Cloying | Moist | Tender |
| | Coarse | Open | Waxy |

Sensory evaluation and tests

Sensory evaluation analyses and measures human responses to food and drink, e.g. appearance, touch, odour, texture, temperature and taste. In order to obtain reliable results, sensory evaluation tests should be set up in a controlled way to ensure fair testing, e.g. no distracting colours, noise or smells; same size portions; coded samples, and water to drink.

Preference tests - these types of tests supply information about people's likes and dislikes of a product. They are not intended to evaluate specific characteristics, such as crunchiness or smoothness. They are subjective tests and include hedonic, paired comparison and scoring.

Discrimination tests - these types of tests aim to evaluate specific attributes, i.e. characteristics of products (crunchiness). They are objective tests and include triangle, duo trio, ranking and paired comparison.

Sample: _____ Date: _____

Hedonic scale

| Sample | 1. Dislike very much | 2. Dislike | 3. Neither like or dislike | 4. Like | 5. Like very much | Comments |
|--------|----------------------|------------|----------------------------|---------|-------------------|----------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Overall conclusions: _____

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Key terms

Fair testing: Ensuring that sensory tests obtain reliable results.

Food texture: The way food is felt by the fingertips, tongue, teeth and palate.

Olfactory system: The sensory system used for olfaction, or the sense of smell.

Senses: Sight, smell, hearing, taste and touch are all used when eating food and drink.

Sensory attributes: Words used to describe the appearance, odour, taste and texture of a food product

Sensory evaluation: Analyses and measures human responses to food and drink.

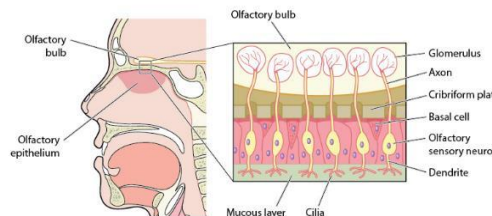
Intensity

Foods may be described by association, e.g. meaty, minty or fruity.

The intensity (low, medium or high) can also be recorded, e.g. garlicky or salty.

Olfactory system

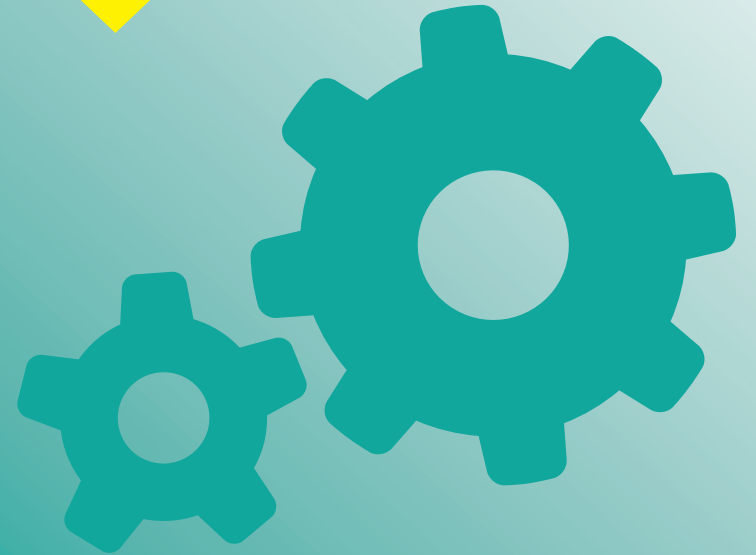
This is the sensory system used for olfaction, or the sense of smell. As we breathe in, the olfactory receptor cells are stimulated by odours and the olfactory membrane sends neural messages up the olfactory nerve to the brain.



Tasks

1. Write a guide to conducting sensory evaluation tests that are fair and reliable.
2. Research umami and make a dish that is rich in the taste of umami.

IT





To be able to import and manipulate data to develop a solution to meet an individual need

Summary

A **database** is a way of storing information in an organised, logical way. **Validation and verification** are two ways to check that the data entered into a computer is correct. Data entered incorrectly is of little use.

There are two main methods of verification:

Double entry - entering the data twice and comparing the two copies. This effectively doubles the workload, and as most people are paid by the hour, it costs more too.

Proofreading data - this method involves someone checking the data entered against the original document. This is also time-consuming and costly.

Validation is an automatic computer check to ensure that the data entered is sensible and reasonable. It does not check the accuracy of data.

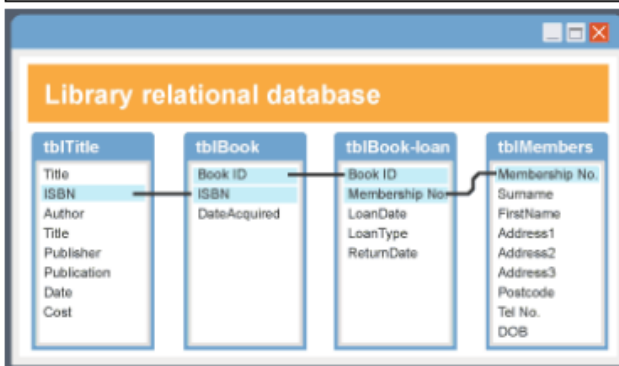
Relational databases

A relational **database** has more than one table and the tables are linked using **key fields**. For example, a library database could have three tables:

Customer - when a customer joins the library a **record** is created. It stores their details such as their first name and surname and includes a unique Customer ID.

Book - each book in the library has a record. It stores details about the book, such as the author and title and includes a unique book ID.

Lending - when a customer borrows a book, the lending table stores the customer's unique ID and the book's unique ID in a record. The record could also include additional information such as when the book was borrowed and when it's due back.



Why use a database?

- ◆ Databases can store very large numbers of records efficiently (they take up little space).
- ◆ It is very quick and easy to find information.
- ◆ It is easy to add new data and to edit or delete old data.
- ◆ Data can be searched easily, e.g. 'find all Ford cars'.
- ◆ Data can be sorted easily, for example into 'date first registered' order.
- ◆ Data can be imported into other applications, for example a mail-merge letter to a customer saying that an MOT test is due.
- ◆ More than one person can access the same database at the same time - multi-access.

Validation

For example, a secondary school student is likely to be aged between 11 and 16. The computer can be programmed only to accept numbers between 11 and 16. This is a **range check**.

Types of validation

There are a number of validation types that can be used to check the data that is being entered.

- ◆ **Lookup table**
- ◆ **Range check**
- ◆ **Spell check**
- ◆ **Format check**
- ◆ **Presence check**
- ◆ **Length check**

Key Vocabulary

| | |
|---------------------------|--|
| Criteria | A set of rules or conditions that must be met. Often used in searches. |
| Database | A data store designed in an organised way, making it easier to search for the information you need. |
| Field | An element of a database record in which one piece of information is stored. For example 'name' in an electronic address book. |
| Front-end | The part of an application seen and used by the end user. |
| Flat-file database | A database in which all the data is stored in a single table is known as a flat file database. |
| Key Field | A unique identifier for a database record or table entry. |
| Multi-Access | A system that can be used by several users simultaneously via a local area network (LAN). |
| Query | A search or question performed inside a database. |
| Record | All of the data relating to one entity in a database. |
| Validation | Checking input data is sensible and in the right format. |
| Verification | Verification is performed to ensure that the data entered exactly matches the original source. |

Data capture

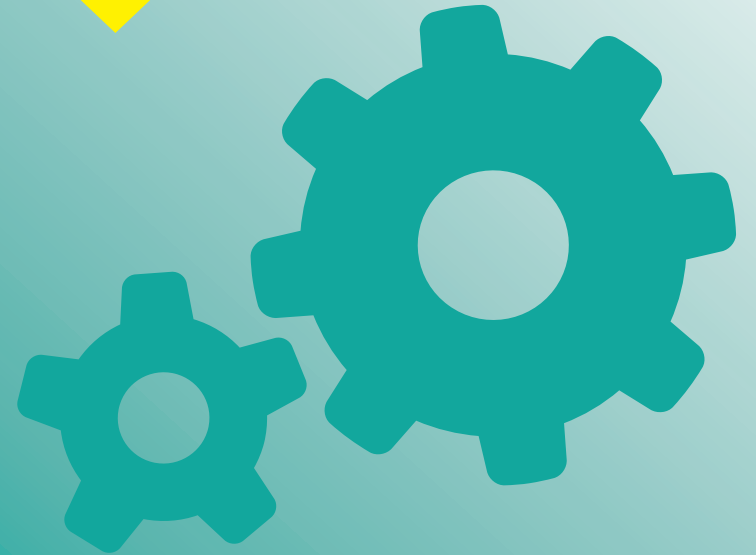
Before setting up a database the data must be collected. This can be done using a data capture form.

A data capture form is designed to collect specific data.

Data capture forms often use **boxes** or a **set amount of spaces** and occasionally provide examples too.

This is to make sure each field is completed correctly.

Computer Science





Computer Science



Wireless and Wired Networks

Key Terms

A network is where devices have been connected together so that they can share data and resources. Networks can be wired (Ethernet) or wireless (Wi-Fi).

| | |
|---------------------------------|---|
| Local Area Network (LAN) | Cover a small geographical area such as an office. Use their own infrastructure. |
| Wide Area Network (WAN) | WANs connect LANs together over a large geographical area and make use of infrastructure from telecommunications companies. |
| Bandwidth | The amount of data that can pass between network devices per second |
| Server | A device that provides services for other devices (e.g. file server or print server) |
| Client | A computer or workstation that receives information from a central server |
| Peer to peer Network | All of the computers in the network are equal. They connect directly to each other. |
| Standalone computers | A computer not connected to a network |

NETWORK HARDWARE

Network Interface Controller (NIC): built in hardware that allows a device to connect to a network.
Switches: connect devices on a LAN
Router: Transmits the data (packets) between the networks (eg: the internet and your LAN)
Wireless Access Point (WAP): a switch that allows devices to connect wirelessly.
Cables: the cables in a network can be twisted pair cables, coaxial cables or fibre optic cables.

NETWORK PERFORMANCE

These factors can impact on network performance:
Bandwidth: The more bandwidth, the more data that can be transferred at a time.
Number of Users: Having a lot of people using a network means lots of data is being transmitted which can slow it down.
Transmission Media: Wired connections are faster than wireless. Fibre optic cables are faster than copper cables.
Wireless Factors: wireless can be affected by walls, distance, signal quality and interference from other devices.
Topology: The layout of a network can impact on its performance.

VIRTUAL NETWORKS

A virtual network is part of a LAN or WAN where only certain devices can “see” and communicate with each other usually connected remotely.

EXAM QUESTIONS

1. Give 3 items of hardware needed for a network
2. Explain the difference between a peer-to-peer network and a client server network.
3. The school’s network has become very slow. Explain two different reasons why this might be.
4. Evaluate the benefits of using a wired connection rather than a wireless one.



Wireless and Wired Networks

NETWORK TOPOLOGIES

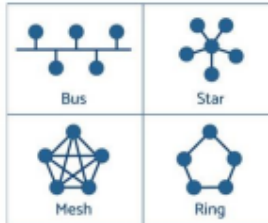
A **topology** is the layout of a network.

Bus: Slow network due to data collisions on the single backbone cable.

Star: If the central switch fails, the whole network fails. If one device fails, the network is fine.

Ring: Data moves in one direction which prevents collisions. Only one device can send data at once.

Mesh: Each device is connected to every other device so they can send data the fastest route. There is no single point where network can fail. Require lots of wire.



PROTOCOLS

Protocols are the rules for how devices communicate and transmit data across a network.

Every device has a **MAC address** so that it can be identified on a network. Eg: 98-1C-B3-09-85-15

IP addresses are used when sending data between networks. They can be static (permanent) or dynamic (different each time the device connects).

TCP/IP: Used to send data between networks in packets.

Transmission Control Protocol (TCP): Splits the data into packets and re-assembles. Checks data is sent correctly.

Internet Protocol (IP): does the packet switching

Hyper Text Transfer Protocol (HTTP): for accessing websites

HTTPS: The secure version of HTTP

File Transfer Protocol (FTP): Moves files between devices

Post Office Protocol (POP3): Retrieves emails from server. Once you download the email the server copy is deleted.

Internet Message Access Protocol (IMAP): Retrieves email from server. Email is kept on server, you see a copy.

Simple Mail Transfer Protocol (SMTP): sends emails.

LAYERS

Network protocols are divided into layers so that protocols with similar functions are grouped together.

Layer 4: Application

- Turn data into applications or websites
- HTTP, FTP, SMTP

Layer 3: Transport

- Control the flow of data
- TCP

Layer 2: Network

- Direct data packets between networks
- IP

Layer 1: Data Link

- Sending data over a physical network
- Ethernet

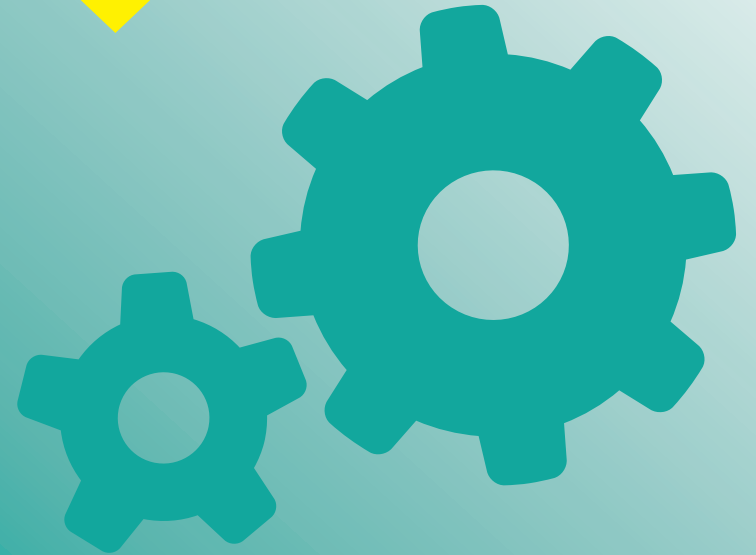
PACKET SWITCHING

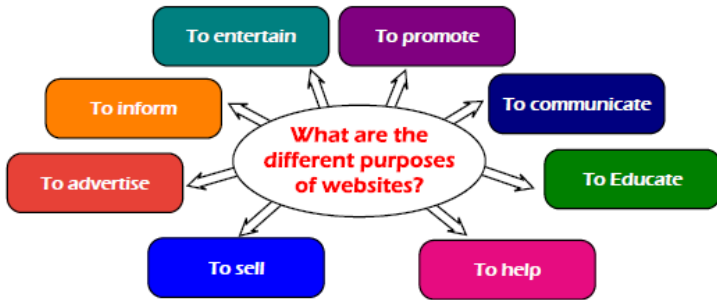
- Data is split into packets and numbered in order.
- Each packet is sent the fastest route across the internet by the routers. This means packets can take different routes and arrive out of order.
- The packet numbers are used to put them in order.
- If packets are missing a timeout message is sent
- Once all have arrived a receipt confirmation is sent to the device that sent them.

EXAM QUESTIONS

1. Explain why protocols are used
2. Describe how packet switching works
3. Evaluate the benefits and drawbacks of a mesh network.
4. Draw topologies for bus, ring and star networks.
5. Explain the difference between HTTP and HTTPS
6. Explain the difference between POP3 and IMAP

Creative iMedia





Which different ways can be used to connect to the Internet?

1. ADSL Broadband over existing phone lines.
2. Cable Broadband -through cables shared by the TV service
3. Fibre Broadband.- High speed fibre optic cables
4. Ethernet - a cable running from a router / network point
5. Wi-fi - wireless signal from a wireless router
6. Mobile Data 3G and 4G

How does the appearance of websites change on different devices?

1. The screen resolution you are using can change the look of a site.
2. The operating system used can change the look of a site.
3. Fewer images may be used on mobile versions.
4. The web browser used may change things.
5. The orientation can change.

Advantages and disadvantages of using the Internet

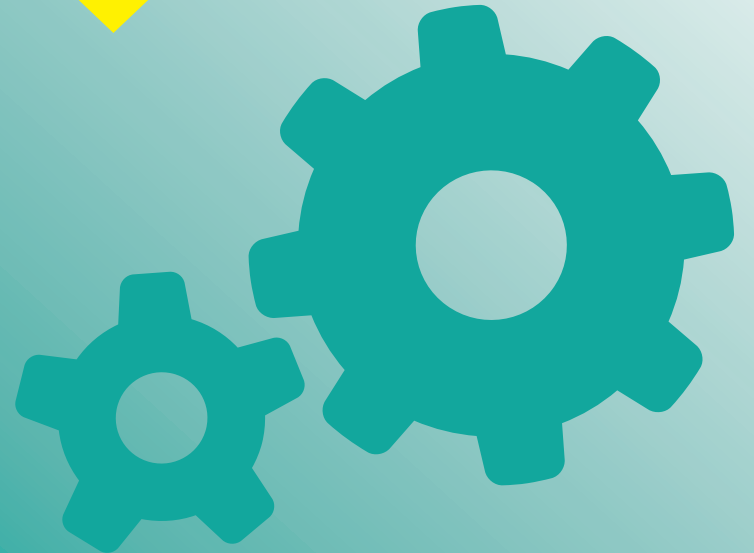
| Advantages | Disadvantages |
|--|---------------------------------------|
| 1. Easy communication across the world | 1. Viruses |
| 2. 24/7 access to information | 2. Cyber-bullying / Trolling |
| 3. Entertainment | 3. Viruses |
| 4. Online Banking | 4. Exposure to inappropriate material |
| 5. Online Shopping | 5. Identity theft |
| 6. Learning Resources and information availability | 6. Leakage of private information |

What are the common features of websites?



Interactive elements: e.g. rollovers, animations, games, adverts, surveys, forums, quizzes, comment boxes, audio files

Art





A04 Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language

RESPONSE

MEANINGFUL

VISUAL LANGUAGE **DEMONSTRATE**

UNDERSTANDING

MAKE CONNECTIONS

CONCLUSION

You need to be able to present a personal response, realising intentions and making informed connections with the work of others.

This final objective looks at all your work as a complete package; the examiner will view all of your preparatory work together with the final piece as an entire unit. They will be looking to see if you have successfully achieved what you set out to do. The examiner should be able to see connections between your own work and the work of the artists you have studied. Whatever you learned through artist research should be put to good practical use and clearly reflected in your own work.



Demonstrate skill
Communicate
Mastery
Respond
Link

Final pieces can be in any Fine art media

- Painting and drawing
- Sculpture
- Printmaking
- Textiles/Fashion

Expectations:

- It is expected that you will complete quite a lot of work for this course through the homework programme, approximately two hours per week
- It is advisable to attend GCSE Art club sessions each week
- You will need to hand in a sketchbook as part of your portfolio component.

Assessment

At the end of each project your work will be formally assessed by you and your teacher. However as your project progresses your teacher will assess your progress both with written and verbal feedback in lessons. This should give you a good indication of how well you have met the success criteria for each assessment objective and whether you are meeting your targets.

Please remember grades are not set in stone and any improvements you make to your work can be re assessed by your teacher.

Design Technology





Identifying & Investigating Design Possibilities

| Mark band | Description |
|-----------|--|
| 9 – 10 | Design possibilities identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities. A user/client has been clearly identified and is entirely relevant in all aspects to the contextual challenge and student has undertaken a comprehensive investigation of their needs and wants, with a clear explanation and justification of all aspects of these. Comprehensive investigation into the work of others that clearly informs ideas. Excellent design focus and full understanding of the impact on society including, economic and social effects. Extensive evidence that investigation of design possibilities has taken place throughout the project with excellent justification and understanding of possibilities identified. |
| 6 – 8 | Design possibilities identified and explored, linked to a contextual challenge demonstrating a good understanding of the problems/opportunities. A user/client has been identified that is mostly relevant to the contextual challenge and student has undertaken an investigation of their needs and wants, with a good explanation and justification of most aspects of these. Detailed investigation into the work of others that has influenced ideas. Good design focus and understanding of the impact on society including, economic and social effects. Evidence of investigation of design possibilities at various stages in the project with good justification and understanding of possibilities identified. |
| 3 – 5 | Design possibilities identified and explored with some link to a contextual challenge demonstrating adequate understanding of the problems/opportunities. A user/client has been identified that is partially relevant to the contextual |

DO:

- Investigate the contexts thoroughly
- Identify and choose a client wisely
- Look at work of others
- Investigate the impact on society with social and economic effects
- Make sure the research helps your designs
- Explain where the sources have come from
- Address a NEED!

DO NOT:

- Investigate research that is irrelevant
- Chose a client that cannot provide feedback
- Ignore existing products
- Design with yourself in mind rather than the client
- Copy information without extraction and analysis
- Forget to tell a story and how the work has influenced your design thinking

Mood Board

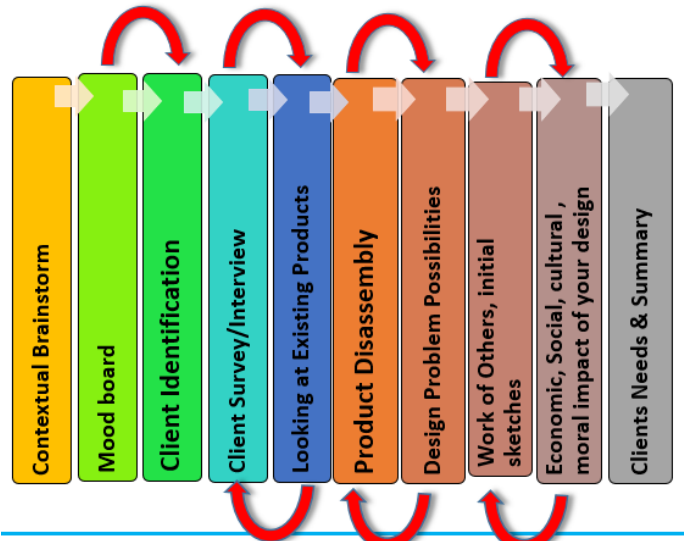
| Just Remember! |
|--|
| Collect images that you think are relevant to the potential problem. |
| Collect images that you think are relevant to the contextual challenge theme. This may inspire you. |
| Highlight and comment on images that inspire you, you find interesting. |
| Pictures can also be products, work of other designers, lifestyle, colours, patterns, graphics, inspiration from nature etc. |

Client Profile – Client Profile – Client Profile

- Who is your user?**
- Who is your target market?**
- What age are they?**
- What are their hobbies?**
- Who is your Client (Primary User)?**
- What is their likely budget?**

| Just Remember! |
|--|
| This cannot be a member of your class or your DT Teacher. |
| Choose someone who can give you constant feedback and you can access/contact easily. |
| Choose someone who is of a relevant age for the product you have in mind. |
| Choose someone who can physically test the product at the end. |

Section A Possible student Pathway



Client Survey

| Just Remember! |
|---|
| Give these questions to your client or selected target market/Users. |
| What do you need to find out? |
| Ask a mixture of open and closed questions? |
| Make the questionnaire is user friendly, easy to follow , simple Q&A. |

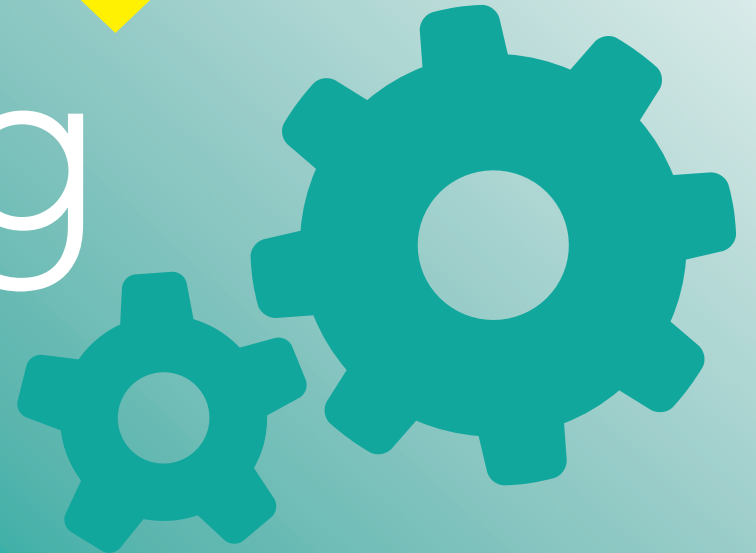
Existing Products

| Just Remember! And |
|---|
| Use the internet and sites such as Google, Amazon and Google shopping. |
| What do you need to find out? |
| Use the table and find out the information shown. |
| Now you have looked at them what have you found out, style, cost, materials, negative and positive reviews? |

SMSC

| Just Remember! |
|--|
| Environmental issues regarding your product are important factors in today's society. |
| Social, cultural and moral issues regarding your product are important factors in today's society. |
| Inclusive design and Design for all regarding your product are important factors in today's society. |

Engineering Design

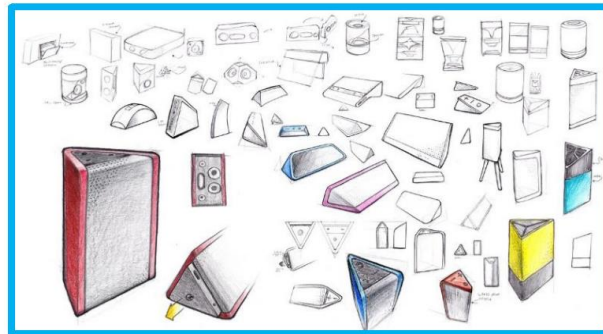
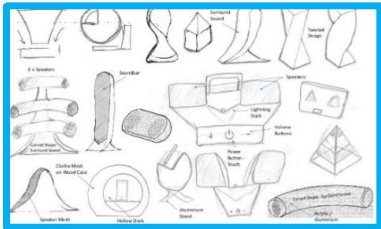




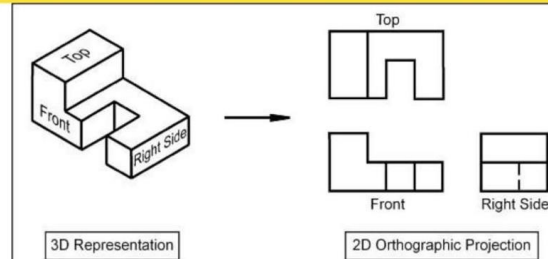
OCR Engineering design - R107: Designing and developing ideas



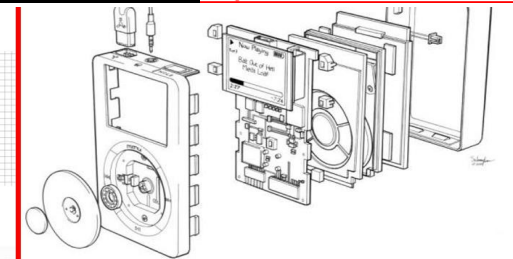
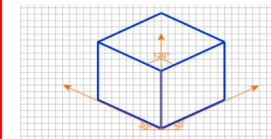
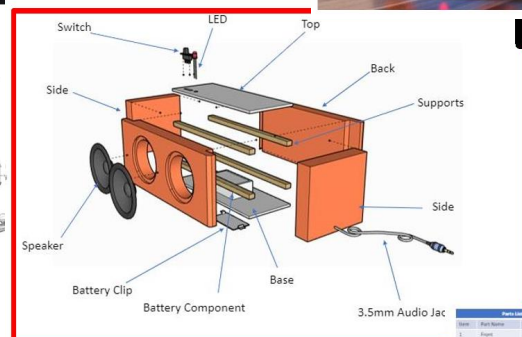
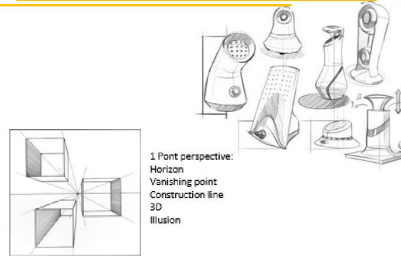
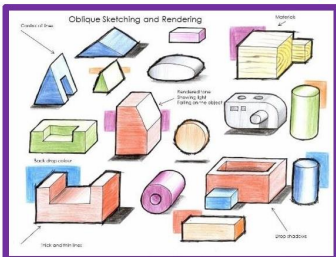
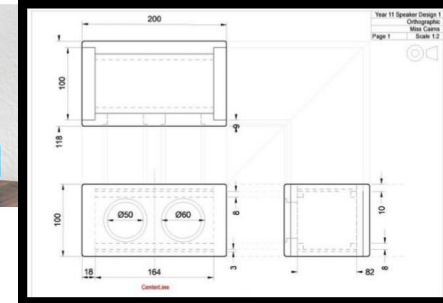
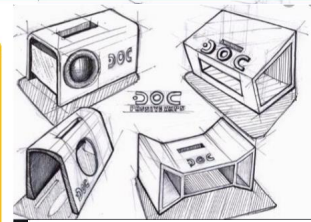
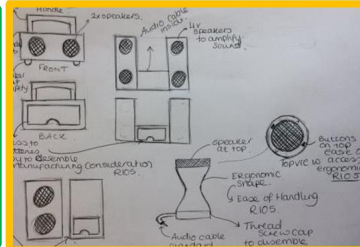
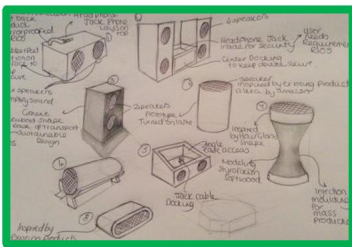
R107: OCR Engineering design Designing and developing Ideas



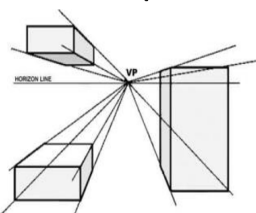
ORTHOGRAPHIC PROJECTION.



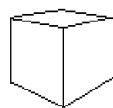
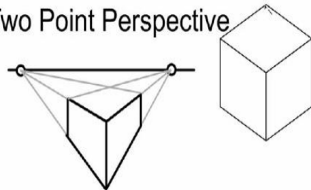
- Key Words:**
- Thumbnail sketch
 - Initial idea
 - Developed idea
 - Working drawing
 - Dimension
 - CAD
 - Standardised
 - Component
 - Oblique
 - One Point Perspective
 - Two point perspective
 - Orographic Projection
 - Freehand
 - Thick and Thin lines
 - Rendering
 - Annotation
 - Two Dimensions
 - Three Dimensions
 - Exploded View



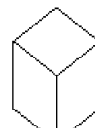
One Point Perspective



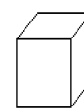
Two Point Perspective



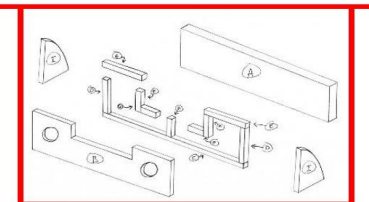
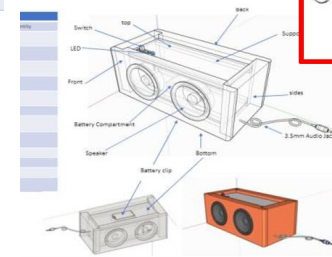
Perspective



Isometric



Oblique



Child Development



LAA - Investigate individual circumstances that may impact on learning and development

Component 3: Supporting children to play, learn and develop

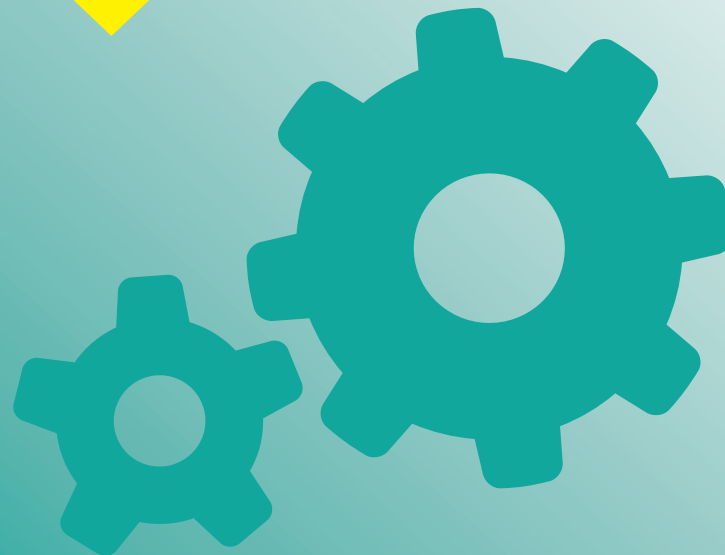
| Positive risk taking | The role of the adult | | Internet Enabled Technology | |
|--|--|-----------------------------|--|--|
| <p>Taking a risk can be dangerous for a child but there is such a thing as 'positive risk taking'. This is where we balance the potential risk of harm against the benefit of children taking part in an activity. For example, we may think that children playing outside can be dangerous. However if they do not do this they will not have access to fresh air and will not get any exercise, which is not good for their development.</p> <p>The role of the adult: There should always be enough adults to enable children to carry out activities safely and it is the role of the adult to support children in their play, whether it is led by adults or initiated by children, to ensure they are safe; however this does not mean we need to make the play less exciting.</p> | Age of children | Adult to child ratio | <p>Children age 0-18 months may be given a phone or tablet to watch a cartoon or listen to soothing music</p> <p>Children age 18 months- 3 years may be starting to play games and use apps.</p> <p>Children age 3-5 years may be chatting online to friends and family</p> | |
| | 0-2 years | 1 adult to 3 children | | <div style="border: 1px solid blue; border-radius: 15px; padding: 10px; text-align: center;"> <p>The benefits</p> <p>Hand-eye co-ordination is developed What else? Problem-solving skills are developed</p> </div> |
| | 2 years | 1 adult to 4 children | | |
| <p>What is adult led play? What is adult initiated play? What is child initiated play?</p> | 3-5 years | 1 adult to 13 children | <div style="border: 1px solid blue; border-radius: 15px; padding: 10px; text-align: center;"> <p>The risks</p> <p>Cyber bullying Online abuse What else?</p> </div> | |
| | <p>Adults can set up parental controls on phones, tablets, games consoles, laptops and computers to keep children safe online.</p> <p>Parental controls will filter what children can see online;</p> <ul style="list-style-type: none"> -Inappropriate language -Sexual content -Violence | | | |

Managing Risks and Hazards



Risk
Likelihood of an environment, activity and/or resource causing harm
Hazard
Potential for an environment, activity and/or resource to cause harm
Risk assessment
A process of evaluating what might cause harm to people (the potential risks) and making sure things are in place to manage the risk and prevent harm.

Music





Music - BTEC Unit 5 - Introducing Music Performance



Learning Aim A: Develop your music performance skills and review your own practice

PERSONAL MANAGEMENT

| |
|--|
| Independent practice Working on your own to learn your musical part. |
| Attendance Being on time and where you need to be. |
| Time management Adhering to rehearsal schedules and ensuring you have enough time to complete things to the best of your ability. |
| Readiness to work Bringing the correct equipment to rehearsals and ensuring you have something to rehearse. |
| Listening to instruction and direction Being prepared to take on feedback from others in your group and your teacher. |
| Observing safe working practice Ensuring that you are careful within the rehearsal/performance environment. |
| Willingness to try something out Having an open mind to do something different and try something new. This could be in genre, technique or stylistic interpretation. |
| Rehearsal discipline Being focused and on task when practicing. |
| Showing sensitivity towards others An awareness of the ability and capability of others and be thoughtful about this. |

REHEARSAL

| |
|---|
| Warm-ups Preparing the body and instrument to perform to its best ability. |
| Physical preparation Ensuring your body is capable of achieving your best performance by stretching and breathing. |
| Musical interaction How you communicate with others whilst you are performing e.g. knowing when each of you start/stop. |
| Constructive feedback Pointers that can help each other, not negative comments that have no solution. |
| Modelling watching an educational video clip and learning from their technique |
| Chunking taking a small section and rehearsing it |
| Repetition repeating until accurate |
| Self assessment watching video footage and logging areas to improve |



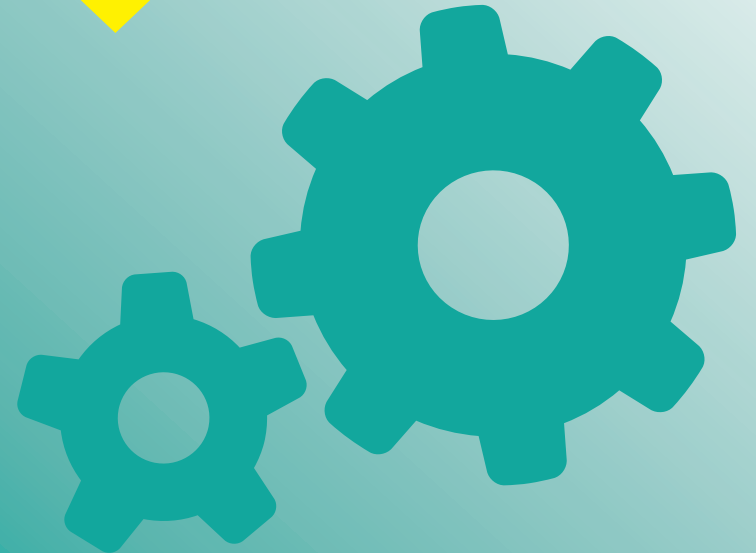
Music - Use your music performance skills within rehearsal and performance



| |
|--|
| Performance Techniques, Interpretative Skills and Stylistic Qualities |
| Accuracy The right notes, the right timing and the right technique. |
| Rhythm and Timing The correct pattern of beats when playing as a soloist or with others. |
| Dynamics The volume of the music. |
| Musicality/sensitivity The quality or state of being musical and having a talent. |
| Technical exercises Scales, arpeggios, chord progressions – anything that prepares you for more difficult technical passages in your playing. |
| Expression The art of playing or singing with a personal response to the music. At a practical level, this means making appropriate use of dynamics, phrasing, timbre and articulation to bring the music to life. |
| Communication Speaking with others in rehearsal or in a performance. |
| Phrasing The manner in which a musician shapes a sequence of notes in a passage of music, in order to express an emotion or impression. |
| Range The lowest and highest note. |
| Sight reading Playing something from music for the first time. |
| Improvisation Playing a melody spontaneously from a set of chords. |
| Breath control Using your diaphragm to fill your lungs with air and then gradually release it. |
| Vibrato A musical effect consisting of a regular, pulsating change of pitch. It is used to add expression to vocal and instrumental music. |

| |
|--|
| Tuning Ensuring that your note has the potential to be in tune so it is not sharp or flat. |
| Awareness of/Following an accompaniment Ensuring that you are aware of the importance of the accompaniment to the melody and how the two need to work together to make an effective performance. |
| Learning repertoire The process of learning different styles and genres of music to develop your performance skills. |
| Musical interaction Ensuring you communicate with your audience by engaging with them in your performance, as well as other musicians you are playing with. |
| Stage Presence The ability to command the attention of a theatre audience by the impressiveness of one's manner or appearance. |
| Emphasis Special importance, value, or prominence given to something. This could be on a note or on a word. |
| Musicality/sensitivity The quality or state of being musical and having a talent. |
| Intonation Accuracy of pitch in playing or singing. |
| Projection A great tool in assisting in bringing greater dynamics to the performance. Being able to successfully increase and decrease volume whilst performing can help enhance your performance and highlight the emotion in the song |
| Confidence The feeling or belief that one can have faith in or rely on someone or something. |
| Focus Being on task and fully committed. |
| Technical control Ensuring you have the correct technique to enable you to perform accurately. |

Sport





Knowledge Organiser

Unit 5 BTEC Sport Level 2



The Sports Performer in Action

P3 - Short-term effects of exercise

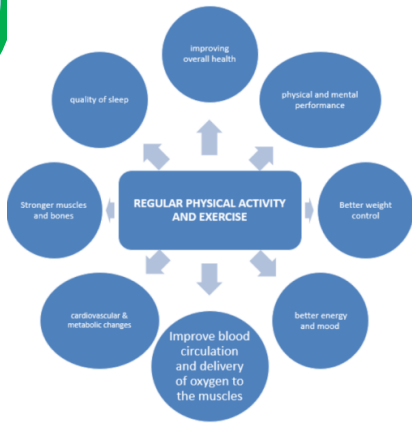
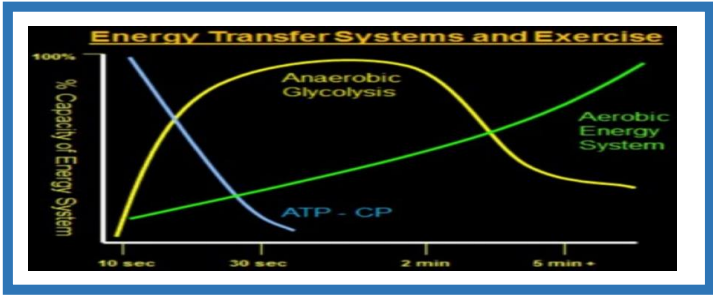
This part of the assignment requires you to explain the short-term effects that your training programme will have on your body!

You need to explain:

| Short-term effects on the MUSCULOSKELETAL system | Short-term effects on the CARDIORESPIRATORY system |
|--|--|
| <p>Increased joint range of movement</p> | <p>Increased heart rate and breathing rate</p> |
| <p>Micro tears in muscle fibres</p> | <p>Increased build-up of lactic acid</p> |



- ### Long term effects of exercise
- Muscular system**
 - Muscular hypertrophy occurs (increase in size)
 - Muscular strength increases
 - Muscular endurance increases
 - Muscular resistance to fatigue increases
 - Strength of tendons increases
 - Increase in capillarisation at the muscles
 - Cardiovascular system**
 - Cardiovascular hypertrophy occurs (increase in size)
 - Heart strength increases
 - Increase in resting stroke volume
 - Increase in resting Cardiac output
 - Decrease in resting heart rate
 - Increase in rate of recovery from exercise
 - Bradycardia occurs (Heart rate below 60 bpm)
 - Reduced risk of heart attacks / CHD
 - Respiratory system**
 - Increase in aerobic capacity
 - Increase in strength of respiratory muscles (Intercostals)
 - Increase in tidal volume during exercise
 - Increase in minute volume during exercise
 - Increase in capillarisation around the alveoli
 - Skeletal system**
 - Increase in bone density



Summary of Energy Systems

- High Intensity Energy Demands are met - ATP-PC system (10s)
- Lactic Acid System (10-3minutes)
- Lower Intensity Exercise (3 minutes and above)- Aerobic Glycolysis
- Energy systems overlap- any intensity lasting more than 10 minutes is fueled increasingly by the aerobic energy system (aerobic glycolysis).

FIT BODY FIT BRAIN

Dance





Stimulus:

- The Doomsday book of animals by David Day
- The design on the sleeve of and album
- The music of Penguin Café Orchestra

Narrative : a variety of endangered species of animals and a warning to mankind to change his ways before it is too late..

Themes: 1920s era

Mood : light-hearted, tense, vibrant, humorous, serious message

FURTHER RESEARCH?

<http://www.bgfl.org>



Meet the choreographer

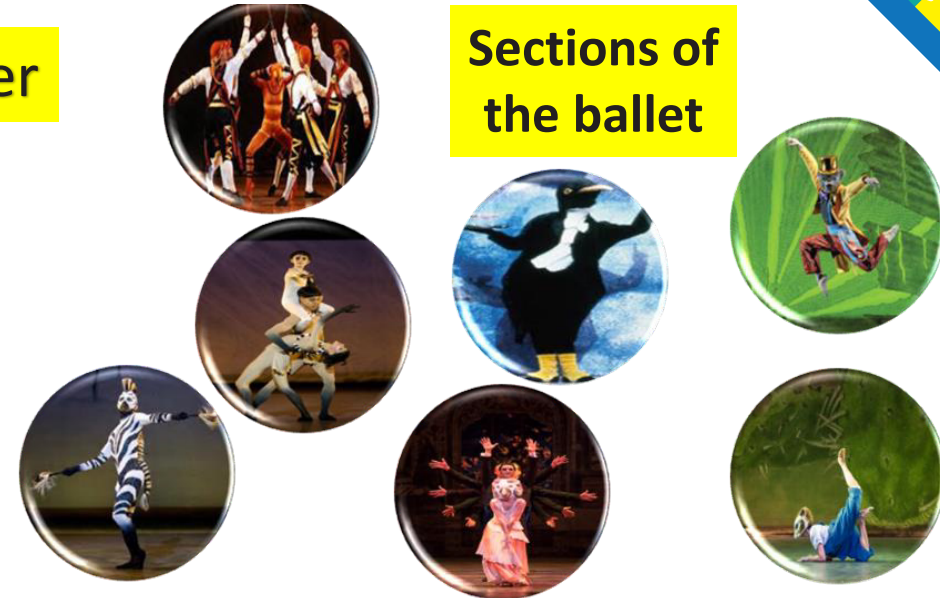
David Bintley

- Born in Huddersfield
- He trained at the Royal Ballet School
- In 1995 he became Artistic Director of Birmingham Royal Ballet.
- He uses traditional British style that develops the rich theatrical heritage.

<https://www.brb.org.uk/profile/david-bintley>



Sections of the ballet



- The Penguin Cafe (musical piece Air à Danser)
- Utah Longhorn Ram (musical piece Prelude and Yodel)
- Texan Kangaroo Rat (musical piece Long Distance, original title Horns of a Bull)
- Humboldt's Hog Nosed Skunk Flea (musical piece The Ecstasy of the Dancing Flea, original title Pythagoras's Trousers)
- Southern Cape Zebra (SCZ)(musical piece White Mischief)
- Rain Forest People (musical piece Now Nothing)
- Brazilian Woolly Monkey (musical piece Music By Numbers)
- Conclusion (musical piece Numbers 1-4)



Film Footage

<https://www.youtube.com/watch?v=kO7wjpijSz4>

The purpose of "Still Life at the Penguin Café"

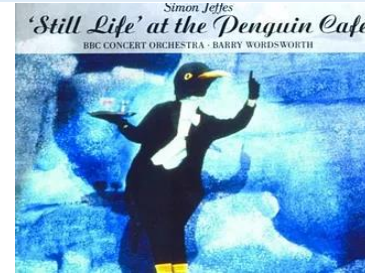
To challenge viewpoints? Animal testing
To educate? The threat of extinction of both animals and humans

Set Design – Hayden Griffin

Each scene has a different set design which sets its location in the world



The Rat – Texas/USA



The Penguin – Polar region



Zebra – African plains

How does the Set Design create scale, shape, location, mood and atmosphere .

Styles of dance

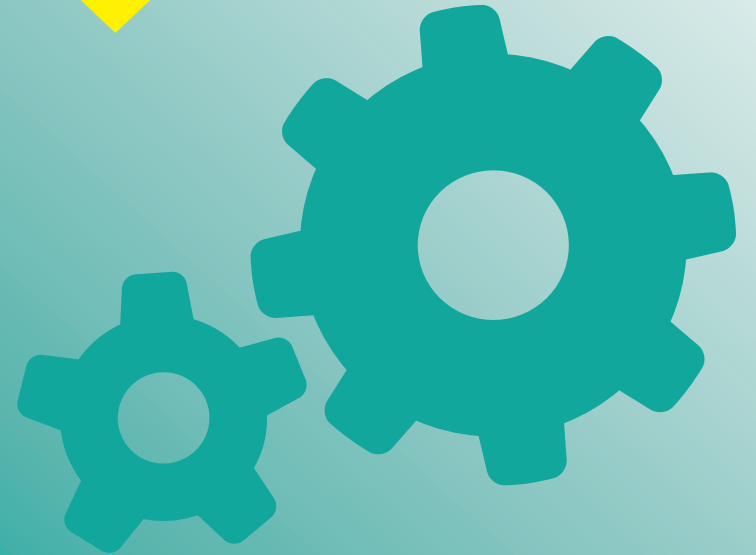
Each section has different dance style:

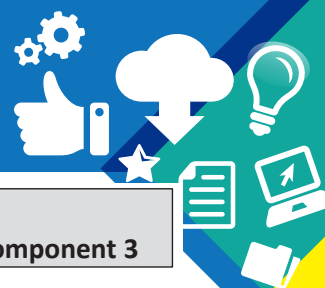
- **Texan Kangaroo Rat** – Hoe down/folk
- **Humboldt's Hog Nosed Skunk Flea** – Morris dancing
- **Southern Cape Zebra**- Contemporary/Ballet

Costume– Hayden Griffin

- costume designs set the **dance in a location**
- In flea dance there is a **contrast** of the flea's costume being very simple compared with the Morris dancers costumes which are very ornate with lots of different things on the costume
- costumes are all **half human half animal**
- **make up** used to enhance the costume design - the models have extreme make up to represent the testing of make up with animals. The first family child has very pale make up and blackened eyes to show they are undernourished.
- **Masks are used throughout**- the dancers have masks to help show their character, they contribute to the half human half animal image.

Health & Social Care





Knowledge Organiser

A1. Factors affecting Health & Wellbeing

Physical & Lifestyle factors

Health & Social Care BTEC Technical Award - Component 3

Health & wellbeing

What you need to know: - definition, factors

Not just the absence of disease but a holistic attitude/the whole person:
 Physical (healthy body, regular exercise, a healthy diet, sleep, shelter & warmth, personal hygiene)
 Intellectual (keeping the brain healthy, concentrate, learn new knowledge/skills, communicate & solve problems)
 Emotional (feeling safe & secure, express emotions, deal with negative emotions, self-concept)
 Social (friendships, relationships with friends and family)



Genetic inheritance

What you need to know:
 - **inherited conditions - predispositions**

Genetic inheritance is a physical factor that can have positive and negative effects
 Genes are inherited from both birth parents

Inherited characteristics

- height, eye colour, hair colour
- This can effect self image (how you see yourself) & self esteem, (how you feel about yourself)

Inherited conditions

Different versions of genes are called alleles.
 Some alleles can be faulty and pass on conditions

Dominant condition

(one parent passes faulty allele on)
 i.e. Huntington's – involuntary movements and loss of intellectual ability

Recessive condition

(both parents pass faulty allele on)
 i.e. Cystic fibrosis – sticky mucus on the lungs

Genetic predisposition

Some people are predisposed (more likely) to develop a condition due to genetic makeup
 i.e. heart disease, cancer, diabetes.
 Whether they end up developing the conditions depends on their lifestyle & environmental factors (e.g. Diet, exercise)



Ill Health

Ill health - a physical factor which can have a negative effect on health & wellbeing



What you need to know:

- **Effects on a persons PIES, difference between acute & chronic**

Chronic

Comes on more slowly, lasts a long time
 Usually treated, not cured
 i.e. diabetes, arthritis, asthma, heart disease

Management:

Address the negative impacts on the person and try to control the symptoms (i.e. use of medication, counselling, schooling in hospital, support groups)

Effect on PIES –

P – growth rates, restricted movements
 I – disrupted learning, difficulties in thinking./problem solving, memory problems
 E – negative self-concept, stress
 S – isolation, loss of independence, difficulties forming relationships

Acute

Starts quickly, lasts for a short period of time. Usually cured
 i.e. bacterial/viral infection, flu, broken bones, pneumonia
Management - Usually with medication

Substance misuse



Alcohol - a lifestyle choice

Men & women should drink <14 units/week
 1 unit = 1 single spirit
 1.5 units = 1 pint, 1 small glass of wine
 Avoid saving units for 'binge'
 Can increase risk of addiction & cancers.

Smoking & Nicotine – a lifestyle choice.

Nicotine is an addictive drug found in tobacco products.
 Cigarette smoke contains nicotine, tar, carbon dioxide & soot which are all harmful.
 People smoke to relieve stress, peer pressure, or are unable to quit. Passive smoking also carries risk to others

Drugs – including legal and illegal.

Prescription misuse - when people take for non medical (recreational use), become addicted to them, take excess, or take someone else's.
 Stimulants – alertness, excitability (i.e. Cocaine, nicotine)
 Depressants – calm, relax (i.e. cannabis, alcohol, heroine)
 Hallucinogens – cause hallucinations i.e. LSD, ketamine

Effect on PIES

P – dependence (alcoholism) damage to organs (mouth, liver, breast), infertility, weight gain
 I – difficulty in decision making, depression, anxiety, stroke & brain damage
 E – poor judgement leading to risky behaviour
 S – relationship breakdown, domestic violence

Effect on PIES

P – increases risk of disease (cancer, stroke, coronary heart disease and others)
 I – addiction leads to irritation, distraction & stress when unable to smoke. Increase chance of anxiety and depression.
 E – poor self concept. May worry about negative impacts on health and costs.
 S – may feel socially excluded when smoking, people may avoid smokers due to smell.

Effect of drug misuses

Addictive drugs are taken to change the mental state, to give an immediate feeling of wellbeing or happiness but they have long term effects. i.e. Paranoia, sleep problems, anxiety, depression, suicidal feelings,

Diet

What you need to know: - amounts, quality, effects of poor diet

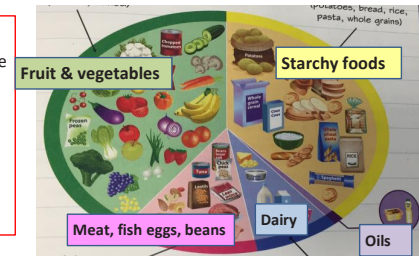
Diet - lifestyle choice. Diet = The balance of foods a person eats (diet doesn't mean weight loss!)

Foods to avoid

Salt – raises blood pressure → heart disease

Saturated fat – raises blood cholesterol → heart disease
 *found in animal fats such as meat, butter

Sugar – rots teeth, high in kcals (energy) → tooth decay & weight gain



| Section | Nutrient | Needed for |
|-------------------------|--------------------------------------|--|
| Starchy | Carbohydrates (& fibre if wholemeal) | Carbohydrates - Provides energy Fibre – Digestive system/prevents constipation |
| Fruit & vegetables | Vitamins Fibre | Vitamins - Keep the body healthy Fibre – Digestive system/prevents constipation |
| Meat, fish, eggs, beans | Protein | Growth and repair of cells and muscles |
| Dairy | Calcium | Strong bones and teeth |
| Oils | Unsaturated fats | Reduces cholesterol, Keeps the body warm, Protects organs |

Other points:

Water is important to stay hydrated
 Control calorie intake to manage weight.
 More energy in (food) than expended in exercise causes weight gain
 Less energy in (food) than expended in exercise causes weight loss



Physical activity

What you need to know:
 - **recommendations**
 - **benefits at each life stage**

Exercise is a lifestyle choice
 - gentle – walking, housework
 - moderate – light jog, steady swim
 - vigorous – spinning, football

How much?

Changes depending on age. Adult:
 approx. 150 mins moderate per week

Why?

P – lower BMI, energy, stamina, strengthen bones & muscle
 I – links to better memory and thinking skills
 E – increases confidence, Relieve stress, concentrate, relax
 S – social interaction, communication, teamwork

Lack of exercise:

Stiff joints
 Poor stamina/strength
 Obesity
 Stroke
 Heart disease
 Osteoporosis
 Poorly formed muscle



Personal hygiene

Good personal hygiene

Prevents spread of infection
 Improves self concept
 -Hand washing
 - Washing
 - Nails clean
 -Tissue for cough/sneeze
 -Brushing and washing hair
 -Brushing teeth
 -Clean clothes
 -Flushing the toilet



The cleanliness of a persons body. Essential for health & wellbeing

Effect on PIES of poor personal hygiene

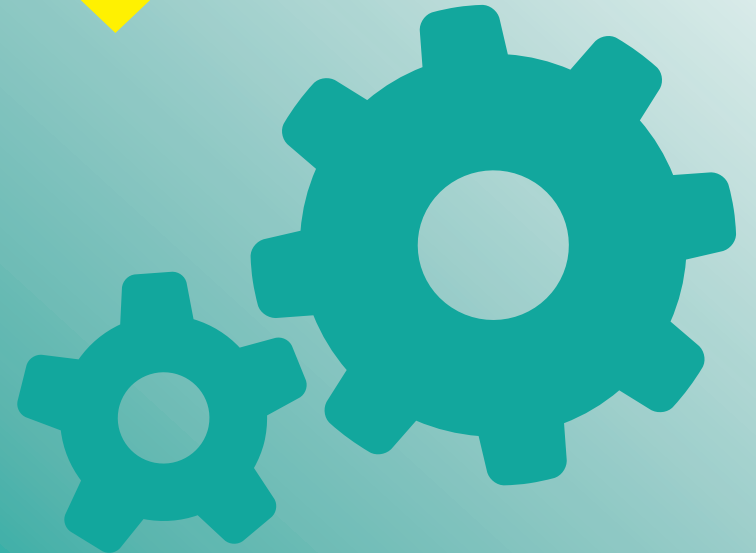
P – Catching & spreading disease
 Poor body odour, bad breath & tooth decay
 Illness such as food poisoning, sore throat, athletes foot.
 I – may reduce chance of job
 E – poor self – concept, bullied
 S – social isolation, loss of friendship.

Key Words



Health & Wellbeing – how physically fit and mentally stable a person is (not just absence of disease)
Genetic Predisposition – more likely to inherit a condition based on genes
Chronic illness – gradual, long term illness, treated not cured. i.e. asthma
Acute illness – illness comes on quickly, short term & curable i.e. cold
Balanced diet - variety of different types of food and providing adequate amounts of the nutrients necessary for good health.
Substance misuse - continued misuse of any mind-altering substance that affects a person's health & wellbeing (drugs, alcohol, smoking)
Hygiene - cleanliness of body and clothing to maintain health & wellbeing.

Business





Calculations

Formulae needed from theme 1

Revenue= Price X Quantity Sold

Variable Costs= Cost per unit X Quantity made/sold

Total Costs= Fixed Cost + Total Variable Costs

Profit= Total Revenue – Total Costs

Percentage Change= $\frac{\text{New Value} - \text{Original Value}}{\text{Original Value}} \times 100$

Always remember to show workings, highlight your final answer and use the correct units.

Quantitative Data

This refers to quantifiable/numerical data that is used to help support, inform and justify decisions. It can be displayed through

- Graphs and Charts- a visual representation of numerical or monetary data. Often good at showing changes.
- Financial data- income statements, balance sheets and cash flow. Often useful for showing patterns, issues and relationships.
- Marketing Data- this is the research and results gained from undertaking market research. Allows businesses to spot trends, gaps in markets and statistics about a market.
- Market Reports often secondary research carried about a group of people in a market. Allows businesses to spot trends, identify demographics and needs within a market.

Profit

Gross Profit

Sales Revenue – Cost of Sales

Looks at the difference between sales and costs of sales

Net Profit

Gross Profit – Expenses

Looks at the difference between profit and expenses not related to sales

Gross Profit Margin %

$\frac{\text{Gross Profit}}{\text{Sales Revenue}} \times 100$

Allows for comparison year to year
Can see if suppliers prices are too high

The higher the % the better
If the outcome is low, it means that the cost of sales are too high and need changing/investigating.

Net Profit Margin %

$\frac{\text{Net profit}}{\text{Sales Revenue}} \times 100$

Allows for comparison year to year
Can see if other expenses not relative to sales are too high

The higher the % the better.
If there is a large difference between net profit margin and gross profit margin, it means expenses are too high.

Investment Appraisal

Average rate of return- calculates whether the return on an investment is worthwhile in terms of profit it will generate.

$\text{ARR\%} = \frac{\text{average annual profit}}{\text{cost of investment}} \times 100$

Average annual profit= total profit/number of years

The higher the ARR value, the more profitable the investment.
ARR figures are forecasts only so are not 100% accurate.
ARR is used to help decide between investment projects and decision making.