A blue dashed border surrounds the entire page. In the center, there is a solid blue rectangular box containing the text.

Fowey River Academy  
Year 10 Knowledge Organiser

Winter Quadmester



An ecosystem is a system in which organisms interact with each other and with their environment.

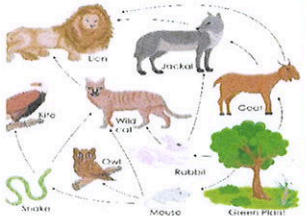
**ecosystem's Components**

**Abiotic** These are **non-living**, such as air, water, heat and rock.

**Biotic** These are **living**, such as plants, insects, and animals.

**Flora** **Plant life** occurring in a particular region or time.

**Fauna** **Animal life** of any particular region or time.

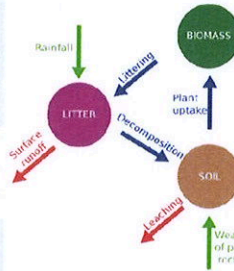


**Food Web and Chains**

Simple **food chains** are useful in explaining the basic principles behind ecosystems. They show only one species at a particular trophic level. **Food webs** however consists of a network of many food chains interconnected together.

**Nutrient cycle**

Plants take in **nutrients** to build into new organic matter. Nutrients are taken up when animals eat plants and then returned to the soil when animals die and the body is broken down by **decomposers**.

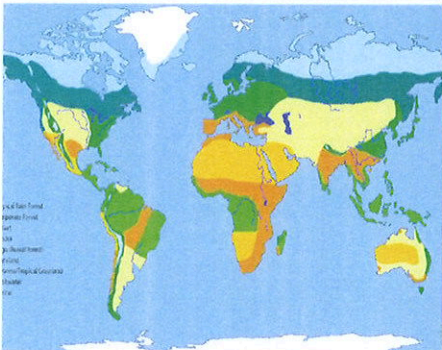


**Litter** This is the **surface layer** of vegetation, which over time breaks down to become **humus**.

**Biomass** The total mass of **living organisms** per unit area.

**Biomes**

A **biome** is a **large geographical area of distinctive plant and animal groups**, which are adapted to that particular environment. The climate and geography of a region determines what type of biome can exist in that region.



- Coniferous forest
- Deciduous forest
- Tropical rainforests
- Tundra
- Temperate grasslands
- Tropical grasslands
- Hot deserts.

The **most productive biomes** – which have the greatest biomass – grow in climates that are **hot and wet**.

**Unit 1b**

AQA Edited from TES website

**The Living World**

**Tropical Rainforest Biome**

Tropical rainforest cover about **2 per cent** of the Earth's surface yet they are home to **over half of the world's plant and animals**.

**Interdependence in the rainforest**

A rainforest works through **interdependence**. This is where the plants and animals **depend on each other** for survival. If one component changes, there can be **serious knock-up effects** for the entire ecosystem.



**Distribution of Tropical Rainforests**

Tropical rainforests are **centred along the Equator** between the Tropic of Cancer and Capricorn. Rainforests can be found in South America, central Africa and South-East Asia. **The Amazon** is the world's largest rainforest and takes up the majority of northern South America, encompassing countries such as Brazil and Peru.

**CASE STUDY: UK Ecosystem: Epping Forest, Essex**



This is a typical English lowland deciduous woodland. **70% of the area** is designated as a **Site of Special Scientific Interest (SSI)** for its biological interest, with **66%** designated as a **Special Area of Conservation (SAC)**.

**Components & Interrelationships**

Season	Components & Interrelationships
Spring	<b>Flowering plants</b> (producers) such as bluebells store nutrients to be eaten by consumers later.
Summer	Broad tree leaves grow quickly to <b>maximise photosynthesis</b> .
Autumn	Trees shed leaves to <b>conserve energy</b> due to sunlight hours decreasing.
Winter	Bacteria <b>decompose</b> the leaf litter, releasing the nutrients into the soil.

**Management**

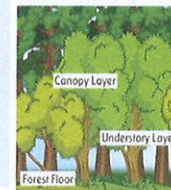
- Epping has been managed for centuries. - Currently now used for **recreation and conservation**.
- Visitors **pick fruit and berries**, helping to **disperse seeds**.
- Trees cut down to encourage **new growth for timber**.

**Rainforest nutrient cycle**

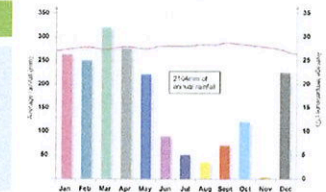
The **hot, damp conditions** on the forest floor allow for the **rapid decomposition** of dead plant material. This provides plentiful nutrients that are easily absorbed by plant roots. However, as these nutrients are in high demand from the many fast-growing plants, they do not remain in the soil for long and stay close to the surface. If vegetation is removed, the soils quickly become **infertile**.

**Climate of Tropical Rainforests**

- Evening temperatures rarely fall below **22°C**.
- Due to the **presence of clouds**, temperatures rarely rise above **32°C**.
- Most afternoons have heavy showers.
- At night with no clouds insulating, temperature drops.



Layer	Description
Emergent	Highest layer with trees reaching 60 metres.
Canopy	80% of life is found here as it receives <b>most of the sunlight and rainfall</b> .
U-Canopy	Consists of trees that reach <b>20 metres high</b> .
Shrub Layer	Lowest layer with <b>small trees</b> that have adapted to living in the <b>shade</b> .





# Ecosystems

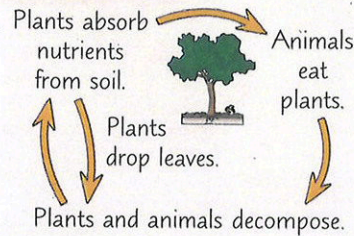
## Key Definitions

**ECOSYSTEM** — All the biotic (living) and abiotic (non-living) parts of an area.

- **PRODUCERS** produce food from sunlight.
- **CONSUMERS** eat other organisms for energy.
- **DECOMPOSERS** break down dead material for energy.



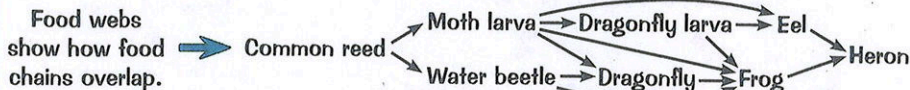
## Nutrient Cycle



## Small-scale Ecosystem — Slapton Ley Reed Beds, UK



Food chains show what eats what. → Common reed → Moth larva → Eel → Heron



Changes can affect interdependent organisms, e.g.



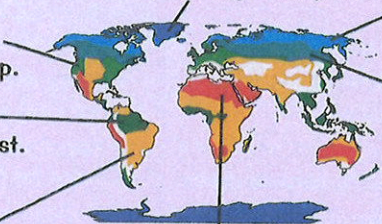
## Global Ecosystems

**Temperate Deciduous Forest** — Four distinct seasons. Mild and damp.

**Tropical Rainforest** — Hot and wet. Lush forest.

**Grassland** — Savannah (wet and dry seasons) or temperate (dry).

**Polar** — Cold and dry. Few plants.



**Tundra** — Cold winters and brief summers. Moss and grass.

**Boreal Forest** — Cold, dry winters. Mild, wet summers. Coniferous trees.

**Hot Desert** — Very dry. Large temperature range. Sparse plants.

# Tropical Rainforests

## Characteristics

<b>Climate</b>	No definite seasons. Sun directly overhead → Hot. High daily rainfall.
<b>Plants</b>	Evergreen plants take advantage of continual growing season. Tall trees and dense vegetation → dark forest floor. Epiphytes grow on other plants.
<b>Soil</b>	Rain washes nutrients away → Not very fertile. Fallen leaves decay quickly.
<b>People</b>	Indigenous people have adapted → hunt, fish, forage and farm.
<b>Animals</b>	More species than any other ecosystem.

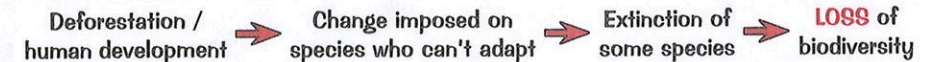
Rainforest animals: sloths, jaguars, anacondas, gorillas, tree frogs.

## Biodiversity

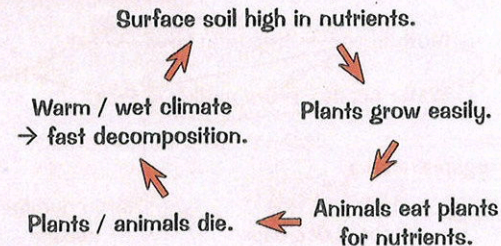
**BIODIVERSITY** — the variety of organisms living in a particular area.



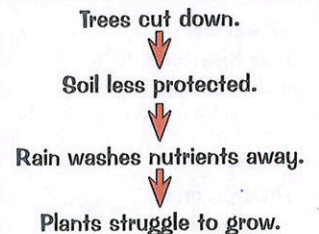
But:



## Interdependence



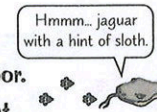
Human activity affects ecosystem:



## Adaptations

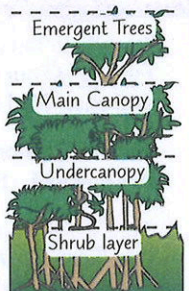
### ANIMALS

- Sharp sense of smell to cope with dark forest floor.
- Nocturnal animals feed at night to save energy.
- Short wings help birds fly between trees.
- Many animals can swim to cross rivers.
- Camouflage to hide from predators.



### PLANTS

- Trees are tall to reach sunlight.
- Waxy drip-tips for easy runoff.
- Lianas climb trees for light.
- Buttress roots support tall trees.





# Tropical Rainforests — Deforestation



## Causes of Deforestation in The Amazon

**Commercial Farming** 250 000 km<sup>2</sup> cleared to produce soy.  
200 million cattle on 450 000 km<sup>2</sup> of pasture.

**Subsistence Farming** Small-scale farmers grow crops for family.

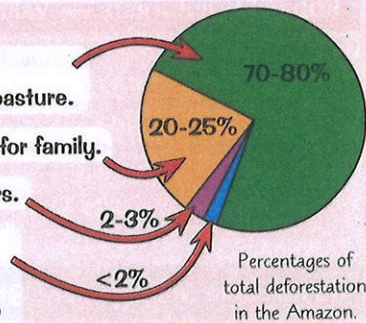
**Logging** Hardwood trees tempt legal and illegal loggers.

**Mineral Extraction**  
Mining gold, iron ore and copper boosts development.  
Explosives used.

**Population Growth**  
Land offered to poor people from overcrowded cities.

**Road Building**  
Trans-Amazonian Highway threatens to open up remote areas.

**Energy Development**  
Balbina Dam flooded 2400 km<sup>2</sup> of forest.



Almost 18 million hectares of forest were lost between 2001 and 2012.

## Three Impacts of Deforestation in the Amazon

**1 CLIMATE CHANGE:** 140 billion tonnes of carbon stored in the Amazon → Felling trees releases some of this as CO<sub>2</sub> → Global warming

**2 SOIL EROSION:** Fewer trees → Less rain absorbed / intercepted → More nutrients wash away  
Farmers clear more land ← Reduced soil fertility

**3 ECONOMIC CHANGE:**  
 • Loss of rubber trees → Brazilian rubber tappers lose jobs.  
 • Buenaventura mining company (Peru) → 8000 employees.  
 • Brazil exported \$600 million of beef in March 2018.

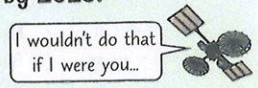
Wealth and jobs boost development but can destroy resources.

## Changing Rates of Deforestation

Global rates of deforestation are high and generally increasing, but some countries (e.g. Brazil) are trying to reduce this:

- Increased global awareness reduces demand for products from deforested areas.
- Paris Agreement — Brazil pledged to reduce emissions 37% by 2025.
- Satellite imagery prevents large-scale illegal logging.
- Funding now protects 44% of the Amazon.

Deforestation in Brazil reduced by 80% from 2004 to 2012.



# Tropical Rainforests and Sustainability

## Tropical Rainforests — Value

- Source of many products and medicines — some may still be undiscovered.
- Sustainable development → long-term economic benefits (e.g. ecotourism).
- Rainforests may reduce the greenhouse effect (trees absorb CO<sub>2</sub>).
- Regulation of climate and water cycle → deforestation increases risk of drought or flooding.



Deforestation could affect all countries (e.g. climate change) not just deforested areas.

## Sustainable Management Strategies

**SUSTAINABLE MANAGEMENT** — getting the resources we need today without damaging the environment so that resources aren't available in the future.

**Replanting**  
 • New trees (of the same type) replace felled ones.  
 • A legal requirement for logging companies in certain countries.

**Selective Logging**  
 • Some trees felled but most remain.  
 • Forest can regenerate. → Malaysia — helicopter logging.

**Ecotourism**  
 • Small groups of tourists follow strict environmental rules.  
 • Locals hired → less need for them to mine, farm or log for income.  
 • Incentive to conserve environment. → 21% of Costa Rica protected from development for ecotourism.

**Education**  
 • Encourages sustainable product use.  
 • Teaches locals to make money in an environmentally-friendly way. → Rainforest Alliance teaches communities in Guatemala about sustainable living.

**Conservation**  
 • National parks / nature reserves restrict damaging activities.  
 • Countries can set up funds for overseas investors to donate to. → 2018 — Norway paid \$70m into Brazil's Amazon Fund.

**Reducing Debt**  
 • Debt can be cancelled — countries don't have to log, farm or mine to repay it.  
 • Conservation swaps → country's debt paid off if conservation is guaranteed. → 2011 — USA reduced Indonesia's debt by \$29m.

**International Hardwood Agreements**  
 • Prevent illegal logging.  
 • Promote the use of hardwood from sustainably-managed forests. → Forest Stewardship Council® mark on sustainably-sourced timber.



# Hot Deserts

## Characteristics

Deserts get less than 250 mm of rain per year.

<b>Climate</b>	Very little rainfall. Few clouds → extreme heat (day) and extreme cold (night).
<b>Plants</b>	Low rainfall → few plants. Plants don't need much water, e.g. cacti. Plants are usually short. Short life cycles → quick growth after rain.
<b>Soil</b>	Lack of leaf fall → low fertility. Low rainfall → dry. Shallow and gravelly.
<b>People</b>	Live near water sources to grow crops. Nomadic → travel for food / water.
<b>Animals</b>	Adapted to harsh environment. Most mammals are small and nocturnal. Most birds leave during harshest conditions.

## Biodiversity

Low biodiversity overall.



People threaten biodiversity:

- Desertification.
- Over-use and contamination of water supplies.
- Roads divide habitats → migrating animals threatened.
- Global warming makes deserts hotter and drier → species migrate or risk decline and extinction.

Deserts contain biodiversity hotspots — places with high proportions of endemic species at risk of extinction.

## Adaptations

### PLANTS

- Long roots reach deep water supplies.
- Wide roots absorb rainwater.
- Succulents store water in large fleshy stems.
- Small leaves, spines and waxy skin reduce transpiration.
- Some seeds only germinate after rain.

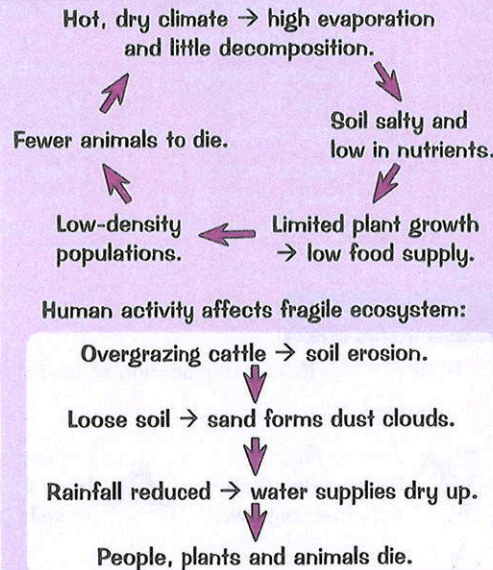


### ANIMALS

- Nocturnal → avoid hottest temps.
- Long limbs and large ears increase surface area → helps heat loss.
- Underground burrows → cooler.
- Camels store water in fat (humps).
- Minimised water loss → kangaroo rats don't sweat.

## Interdependence

Hot deserts are often served with custard.

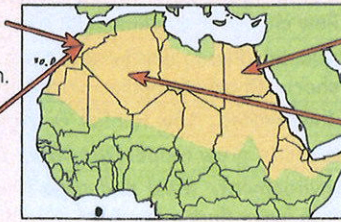


# The Sahara and Desertification

## Opportunities and Challenges in the Sahara



Small-scale tourism in desert. Many visit outskirts, e.g. Marrakesh.



Morocco extracts many minerals, e.g. phosphate.

Aswan Dam (Egypt) provides water for agriculture all year.

94% Algeria's exports from oil and gas industries.

12+ hours of sun → ideal for generating solar power.

Challenges to Development	Extreme Temperatures	Limited Water Supply	Inaccessibility
	<ul style="list-style-type: none"> <li>• Extreme heat and cold is dangerous.</li> <li>• Seasonal tourism → few tourists in hot season.</li> <li>• Physical work (e.g. farming / mining) at high temps is difficult.</li> </ul>	<ul style="list-style-type: none"> <li>• Low, variable rainfall → providing water for industry is difficult.</li> <li>• Water pipes are expensive to build.</li> <li>• Deep boreholes extract water unsustainably.</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to provide services to remote communities.</li> <li>• Oil and gas pipelines are expensive to build.</li> <li>• Few roads / long distances to drive → air travel required.</li> </ul>

## Desertification

Areas on the edge of deserts are at risk of desertification.

**DESERTIFICATION** — degradation of land making it drier and less productive.

### CAUSES:



**Overgrazing**  
Plants eaten faster than they regrow.



**Removal of fuel wood**  
Trees felled for fuel → soil exposed.



**Population growth**  
Land under pressure → impacts intensify.



**Over-cultivation**  
Continually planting crops in the same area depletes nutrients and erodes soil.

**Climate change**  
Rising temps increase evaporation and decrease rainfall → plants die.



### REDUCING DESERTIFICATION RISK

Water management	Tree planting	Soil management	Appropriate technology
<ul style="list-style-type: none"> <li>• Grow crops that don't need much water, e.g. olives.</li> <li>• Drip irrigation stops erosion.</li> </ul>	<ul style="list-style-type: none"> <li>• Trees act as windbreaks, shade crops and stabilise sand.</li> </ul>	<ul style="list-style-type: none"> <li>• Rest land between grazing / planting to replenish nutrients.</li> <li>• Rotate crops so different nutrients are removed.</li> <li>• Add nutrients with compost.</li> </ul>	<ul style="list-style-type: none"> <li>• Use cheap, sustainable, local materials, e.g. sand fences.</li> </ul>



## Knowledge Organiser: Knowledge Organiser: Medieval Medicine (c1250-c1500)

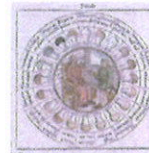
There was little scientific knowledge in medieval England as medicine was dominated by the Church, who used the ancient texts of Hippocrates and Galen to explain why people caught diseases. People believed God could send disease as a punishment for sinful behaviour. Only in times of terrible disease such as during the Black Death, did people start to question the authority of the Church on matters of medicine.

### Summarise your learning

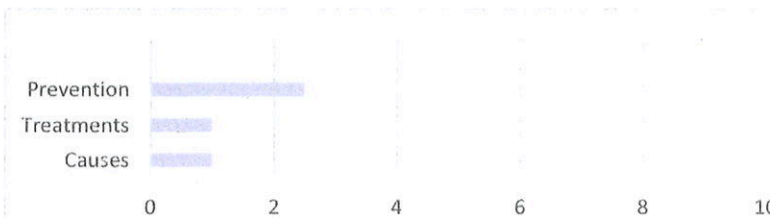
<b>Causes</b>	<ul style="list-style-type: none"> <li>God's punishment for sin</li> <li>An imbalance of the four humours</li> <li>Astrology - – the movement of the stars and planets</li> <li>Miasma – bad air</li> </ul>
<b>Diagnosis</b>	<ul style="list-style-type: none"> <li>Uroscopy (using urine charts to test for disease)</li> <li>Astrology charts to diagnose and time treatments.</li> <li>Observation – relating to the four humours</li> </ul>
<b>Prevention</b>	<p>Superstitious/religious methods:</p> <ul style="list-style-type: none"> <li>Living a good Christian life – prayer, going to church</li> <li>Flagellation (whipping of the human body as a punishment for committing sins)</li> <li>Carrying charms or sweet smelling herbs</li> </ul> <p>Logical methods:</p> <ul style="list-style-type: none"> <li>Blood-letting</li> <li>Cleaning the air/streets</li> <li>Exercise</li> </ul>
<b>Treatments</b>	<p>Superstitious/religious methods:</p> <ul style="list-style-type: none"> <li>Prayer and fasting</li> <li>Pilgrimage – visiting a holy place</li> <li>Superstition – e.g. a magpie's beak around your neck to cure toothache</li> </ul> <p>Logical methods:</p> <ul style="list-style-type: none"> <li>Blood-letting and purging</li> <li>Barber surgeons</li> <li>Traditional remedies like foods to rebalance humours, or ointments applied to the skin</li> </ul>

Chronology: what happened on these dates?	
<b>1348</b>	The Black Death arrives in England and kills 40% of the population.
<b>1400</b>	There were 500 hospitals in Britain.
<b>1440</b>	Johannes Gutenberg creates the world's first printing press.

Who were these people?	
<b>Hippocrates</b>	Ancient Greek physician who created the Theory of the Four Humours (the theory that ill health is caused by an imbalance of the Four Humours in the body (blood, phlegm, black bile and yellow bile).
<b>Galen</b>	Physician in ancient Rome who developed Hippocrates' theories further and wrote more than 350 books about medicine. His teachings were promoted by the Church because they fitted with Christian ideology.



Change and Continuity	
Change	Continuity
<ul style="list-style-type: none"> <li>There was some progress in surgery because it relied on practical experience and was outside the control of the Church.</li> </ul>	<ul style="list-style-type: none"> <li>The work of Hippocrates and Galen on the Theory of the Four Humours was still followed, including the Theory of Opposites and blood-letting.</li> </ul>



Vocabulary: define these words	
<b>Apothecary</b>	A pharmacist or chemist.
<b>Astrology</b>	The study of planets and how they might influence the lives of people.
<b>Superstitious</b>	Unreasonable belief based on ignorance and sometimes fear.
<b>Flagellants</b>	People who whip themselves to show God they had repented their sins and asked God to be merciful.
<b>Miasma</b>	Smells from decomposing material were believed to cause disease.
<b>Uroscopy</b>	Study of urine samples to diagnose disease.
<b>Purging</b>	Vomiting or using laxatives to re-balance the four humours.
<b>Bloodletting</b>	Opening a vein or applying leeches to draw blood from a patient.
<b>Plague</b>	Killer disease which became a pandemic throughout Europe.
<b>Four Humours</b>	Based on the idea that every individual has humours (blood, phlegm, yellow bile, black bile). Illness occurs when these humours are out of balance because of diet, lifestyle or environment



## Knowledge Organiser: Renaissance Medicine (c1500-c1700)

People who fell ill during the Renaissance period were likely to believe the same things about the cause of their illness as their medieval ancestors. Very little really changed in the practice of medicine during this period. However, new ideas were slowly breaking down old beliefs and rethinking the way the world worked.

### Summarise your learning

<b>Causes</b>	<ul style="list-style-type: none"> <li>An <b>imbalance of the humours</b> – e.g. King Charles II had blood removed and was purged</li> <li>Theory of <b>Miasma</b> (bad smells)</li> <li><b>Person to person</b> contact – Great Plague</li> <li>Thomas Sydenham believed that different diseases had different causes. He identified a new disease – St Vitus Dance. He said that ‘<b>atmospheres</b>’ could affect your humours and make you ill.</li> </ul>
<b>Diagnosis</b>	<ul style="list-style-type: none"> <li>More direct observations and examinations of patients (Sydenham recorded symptoms in detail)</li> <li>Less use of urine/astrology charts</li> </ul>
<b>Prevention</b>	<p>Superstitious/religious methods:</p> <ul style="list-style-type: none"> <li>Living a good Christian life – prayer, going to church</li> </ul> <p>Logical methods:</p> <ul style="list-style-type: none"> <li>Blood-letting</li> <li>More emphasis on removing miasma through removing sewage and rubbish</li> <li>Healthy living and keeping clean</li> </ul> <p>Response to Great Plague – Quarantine, closing pubs and theatres, burying dead at night</p>
<b>Treatments</b>	<p>Superstitious/religious methods:</p> <ul style="list-style-type: none"> <li>Prayer and fasting</li> <li>Superstition – e.g. a magpie’s beak around your neck to cure toothache</li> </ul> <p>Logical methods:</p> <ul style="list-style-type: none"> <li>Blood-letting and purging</li> <li>Traditional herbal remedies</li> <li>New herbal remedies from other countries such as Peruvian tree</li> </ul>

### Chronology: what happened on these dates?

<b>1440</b>	Johannes Gutenberg creates the world’s first printing press.
<b>1536</b>	The dissolution of the monasteries in England dramatically changed the availability of hospital care.
<b>1543</b>	Vesalius published <i>On the Fabric of the Human Body</i> .
<b>1662</b>	The Royal Society received its royal charter from Charles II, who had taken a keen interest in science.
<b>1665</b>	Outbreak of the Great Plague, which peaked in September when 7,000 deaths from the disease were recorded in one week.

### Who were these people?

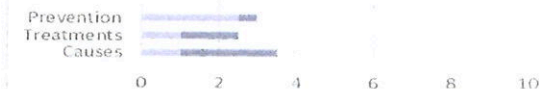
<b>Thomas Sydenham</b>	Sydenham refused to rely on medical books when diagnosing a patient’s illness. Instead, he made a point of closely observing the symptoms and treating the disease causing them.
<b>Andreas Vesalius</b>	Vesalius noted that Galen had made some errors in his original theory on the human body. He put this down to the fact that Galen dissected animals instead of people. In all Vesalius found 300 mistakes in Galen’s original work on anatomy – e.g. the human lower jaw was in one part, not two. Vesalius also encouraged other doctors to base their work on dissection.
<b>William Harvey</b>	Harvey suggested that blood circulated around the body instead of being made in the liver, as taught by Galen. His theory was that blood must pass from arteries to veins through tiny passages that were invisible to the naked eye. Harvey proved that the heart acted as a pump.
<b>Royal Society</b>	Its aim was to promote and carry out experiments to further the understanding of science. They also heavily promoted the sharing of scientific knowledge and encouraged argument over new theories.

### Change and Continuity

Change	Continuity
<ul style="list-style-type: none"> <li>Church had less control over medicine as they lost their power in the Reformation.</li> <li>Fewer people believed in supernatural causes of disease</li> <li>The Printing Press – allowed copies of medical texts to be printed quickly and shared knowledge.</li> <li>Diagnosis – more based on direct observation of patients</li> <li>The Royal Society</li> <li>Greater government action – quarantine</li> <li>Ideas – Vesalius – corrected Galen on the anatomy of the body - and Harvey – proved the circulation of the blood</li> <li>The Royal Society was set up to further scientific understanding – it sponsored scientists to carry out research and make new discoveries, and published a journal</li> </ul>	<ul style="list-style-type: none"> <li>Theory of Four Humours</li> <li>Theory of Miasma</li> <li>Superstition</li> <li>Prayer and fasting</li> <li>Ideas were slow to change despite key new discoveries so there was little actual change in medical treatment.</li> </ul>

### Vocabulary: define these words

<b>Renaissance</b>	A French word that means rebirth. New ideas were beginning to influence medicine.
<b>Humanism</b>	A renewed love of learning and scholarship.
<b>Dissection</b>	The process of cutting apart or separating tissue.
<b>Anatomy</b>	A study of the structure or internal workings of the body.
<b>Circulatory System</b>	The system that circulates blood through the body, consisting of the heart and blood vessels.
<b>Printing Press</b>	A machine for printing text or pictures. It had movable letters so that many copies of the same text could be printed.
<b>Royal Society</b>	An influential group of scientists formed in 1660. Its members shared experimnts and promoted scientific ideas. It was given a Royal Charter by Charless II in 1662 which gave them more credibility.
<b>Reformation</b>	Henry VIII split from the Catholic Church in 1533 and created the Church of England. In 1536, he dissolved religious institutions, such as monasteries and convents, and confiscated their land. This reduced the Church’s influence over medical ideas and treatment.
<b>Alchemy</b>	This was an early form of chemistry. Alchemists tried to turn one material into another: mostly, they were trying to discover a way of making gold.
<b>Transference</b>	The theory that disease could be transferred to something else.
<b>Quack</b>	Somebody who did not have any medical qualifications, but who sold their services as a doctor or apothecary.





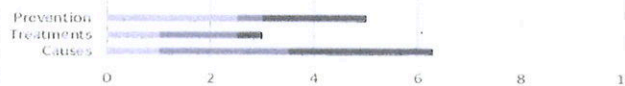
## Knowledge Organiser: 18<sup>th</sup> and 19<sup>th</sup> century Medicine (c1700-c1900)

In 1700, many people no longer believed that God was responsible for causing disease. Instead they focused on developing scientific explanations. By 1900, germs had been discovered, and there was ongoing work to create vaccines for diseases caused by them. The cleanliness of hospitals improved and surgery became less dangerous through the development of anaesthetics and antiseptics.

Summarise your learning	
<b>Causes</b>	<ul style="list-style-type: none"> <li>• <b>Miasma</b> ('bad air')</li> <li>• <b>Spontaneous generation</b> – (that germs were produced by decaying things.)</li> <li>• Diseases could be spread through <b>water</b> – Cholera 1854 – John Snow</li> <li>• <b>Germs</b> cause disease – the germ theory created in 1861 by Pasteur with experiments on wine – slow to be accepted.</li> <li>• Koch followed this be <b>identifying germs</b> like TB, cholera by using dyes</li> </ul>
<b>Diagnosis</b>	<ul style="list-style-type: none"> <li>• Observations and examinations of patients</li> </ul>
<b>Prevention</b>	<ul style="list-style-type: none"> <li>• Breakthrough with <b>vaccinations</b> – Jenner did the first for small pox using cowpox. Pasteur followed with Chicken Cholera, Anthrax and Rabies.</li> <li>• <b>Cleanliness</b> – Nightingale lowered the death rate from 40% to 2% in Scutari in the Crimean war by cleaning hospitals. This was then brought to hospitals in England and nurses were trained.</li> <li>• Government action to improve the sanitary conditions of towns - <b>Public Health Act</b>– 1875 – Inspired by Pasteur's germ theory and Snow's work on cholera. City authorities must provide clean water, sewers and public toilets – better than 1848 Act which was not compulsory</li> </ul>
<b>Treatments</b>	<ul style="list-style-type: none"> <li>• Very little change from before except in surgery. <b>Many herbal remedies and quack potions.</b></li> <li>• Knowledge of germs causing disease did not lead to new treatments at this point – problem of infection still to be solved</li> <li>• Better hospitals and nursing</li> <li>• Improvements in <b>surgical treatment</b>:             <ul style="list-style-type: none"> <li>○ <b>Anaesthetics</b> – ease pain in operations - Laughing gas, Ether then Chloroform used by James Simpson – made popular by Queen Victoria. Led to 1850 Black Period – more deaths after operations due to infection and new surgery that had not been possible before when patients were awake.</li> <li>○ <b>Antiseptics</b> – kill germs – Carbolic acid used by Joseph Lister to spray room patients and clean instruments</li> <li>○ <b>Aseptics</b> – keep germs away - by 1900 sterilised instruments and clothing – Halsted first to use rubber gloves</li> <li>○ Blood loss still a problem</li> </ul> </li> </ul>

Chronology: what happened on these dates?	
<b>1796</b>	Jenner discovered the vaccination for smallpox.
<b>1847</b>	James Simpson discovered chloroform.
<b>1848</b>	First Public Health Act
<b>1854</b>	John Snow discovered the cause of Cholera.
<b>1861</b>	Pasteur identified that microbes (germs) cause disease (Germ Theory).
<b>1865</b>	Joseph Lister discovered carbolic acid.
<b>1872</b>	Smallpox Vaccine made compulsory in England
<b>1875</b>	The Second Public Health Act. City authorities had to provide clean water, dispose of sewage and employ a public office of health to monitor outbreaks of disease.

Who were these people?	
<b>Edward Jenner</b>	Developed the vaccination to prevent smallpox through using cowpox, which became compulsory in 1872.
<b>Louis Pasteur</b>	Pasteur's Germ Theory claimed that microbes that spread through the air caused decay. This disproved the idea of spontaneous generation.
<b>Robert Koch</b>	Koch used industrial dyes to stain and grow bacteria in a Petri dish. He was able to find which bacteria caused Anthrax (1876), septicaemia (1878), TB (1882) and cholera (1883).
<b>Florence Nightingale</b>	Following Nightingale's experience in the Crimean War she Improved hospital care in Britain in two different ways: the way hospitals were designed and the training for nurses.
<b>Joseph Lister</b>	Discovered the antiseptic carbolic acid, which surgeons used to spray the operating theatre, wash their hands and clean their instruments.
<b>James Simpson</b>	Discovered chloroform, the first effective anaesthetic. Queen Victoria used chloroform during the birth of her eighth child.
<b>Edwin Chadwick</b>	In 1842, Chadwick published his <i>Report on the Sanitary Conditions of the Labouring Classes</i> , which argued that disease was the main reason for poverty, and that preventing disease would reduce the poor rates.
<b>John Snow</b>	Snow discovered that cholera was transmitted by dirty drinking water.



Vocabulary: define these words	
<b>Germ</b>	Any living organism that is too small to see without a microscope, e.g. bacteria.
<b>Vaccination</b>	A substance used to stimulate the production of antibodies and provide immunity against a disease.
<b>Inoculation</b>	Deliberately infecting oneself with a disease, in order to avoid a more severe case of it later on.
<b>Antiseptic</b>	A substance that makes things free from or cleaned of germs and other microorganisms.
<b>Anaesthetic</b>	A substance that makes you unable to feel pain.
<b>Aseptic surgery</b>	Surgery where microbes are prevented from getting into a wound in the first place, as opposed to being killed off with an antiseptic.
<b>Laissez-faire</b>	This French term means 'leave be'. It is used to describe governments who do not get involved in the day-to-day lives of their population.
<b>Cholera</b>	An infectious disease characterized by profuse diarrhoea, vomiting, cramps, etc.
<b>Legislation</b>	The act of making or enacting laws.
<b>Chloroform</b>	A colourless, sweet-smelling liquid used as an anaesthetic.

Change and Continuity	
Change	Continuity
<ul style="list-style-type: none"> <li>• New technology - microscope</li> <li>• Germ Theory</li> <li>• Anaesthetics and Antiseptics</li> <li>• Greater government action – compulsory vaccinations and Public Health Acts</li> </ul>	<ul style="list-style-type: none"> <li>• Miasma (but was becoming less popular)</li> <li>• Spontaneous generation (early 18<sup>th</sup> century)</li> <li>• Germ theory does not lead to new treatments for disease yet</li> </ul>



## Knowledge Organiser: Knowledge Organiser: Modern Medicine (c1900-Present)

Scientists began to investigate causes of disease that were not related to microbes. Genetics and lifestyle factors were investigated as other potential factors. Chemical treatments were developed to target specific diseases, while antibiotics were discovered that could treat a range of illnesses. Advances in surgical techniques made available life-saving treatments. The government also developed a new attitude towards its role in the nation's health. Free medical care was provided for all through the NHS. However, diseases such as cancer continue to puzzle scientists, who struggle to understand their cause or develop treatments for them. Lifestyle factors have also created new challenges for medicine to tackle.

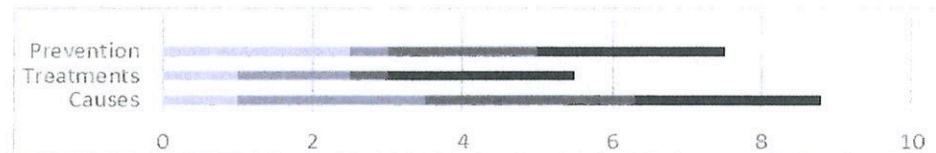
### Summarise your learning

<b>Causes</b>	<ul style="list-style-type: none"> <li>• Pasteur's Germ Theory</li> <li>• Genetics (DNA)</li> <li>• Lifestyle factors</li> </ul>
<b>Diagnosis</b>	<ul style="list-style-type: none"> <li>• Electron Microscopes – to view tiny details inside the body, e.g. early infections</li> <li>• Radioactive elements – injected into the bloodstream to track changes in the body</li> <li>• Endoscopes – tiny cameras inserted into the body</li> <li>• Scans:                             <ul style="list-style-type: none"> <li>- X-rays for broken bones</li> <li>- CT scans for soft tissue problems like head injuries</li> </ul> </li> </ul>
<b>Prevention</b>	<ul style="list-style-type: none"> <li>• Liberal Reforms began bringing in more government measures to keep people healthy – Old Age pensions, Free School Meals, National Insurance</li> <li>• NHS – GP, hospitals, health visitors</li> <li>• Vaccinations – give immunity</li> <li>• Lifestyle campaigns - help people to understand what lifestyle choices have a negative impact like smoking and which have a positive impact like exercise</li> <li>• Laws – e.g. no smoking in public places</li> </ul>
<b>Treatments</b>	<ul style="list-style-type: none"> <li>• Magic bullets</li> <li>• Penicillin</li> <li>• Keyhole and Micro-surgery – surgeons can operate without cutting open a patient which improves recovery time</li> </ul>

Chronology: what happened on these dates?	
<b>1909</b>	Paul Ehrlich discovered the first magic bullet, Salvarsan 606.
<b>1928</b>	Alexander Fleming discovered penicillin.
<b>1942</b>	First immunisation campaign against Diphtheria started.
<b>1948</b>	The creation of the National Health Service (NHS).
<b>1954</b>	Watson and Crick discovered the double helix structure of DNA.
<b>1990</b>	The Human Genome Project was launched to decode and map the human genome. This made it possible for scientists to look for mistakes or mismatches in the DNA of people suffering with hereditary diseases.

Who were these people?	
<b>Paul Ehrlich</b>	Ehrlich led the way in finding magic bullets to attack the microbes in the body causing disease, whilst at the same time leaving the body unharmed. In 1909 he discovered the first magic bullet, Salvarsan 606, which cured syphilis. This was followed by Domagk's discovery of Prontosil in 1932.
<b>Alexander Fleming</b>	In 1928, Fleming noticed that mould growing in his petri dishes killed off the harmful staphylococcus bacteria that had been growing in the dish. He tested the mould and identified it as penicillin. However, Fleming did not believe that penicillin could work to kill bacteria in living people.
<b>Howard Florey &amp; Ernst Chain</b>	In 1940, Florey and Chain tested penicillin on infected mice (4/8 were given penicillin and survived). However, it was difficult to produce penicillin in large quantities. In 1941, Florey and Chain tested penicillin on a policeman who had developed septicaemia. The policeman showed signs of recovery but they ran out of penicillin and the patient died. Florey convinced the USA to mass produce penicillin.
<b>James Watson &amp; Francis Crick</b>	Crick and Watson identified the structure of DNA. They discovered that it was shaped as a double helix, which could 'unzip' itself to make copies. Understanding the shape of DNA meant that they could now begin to look at its structure and identify the parts that caused hereditary diseases, such as cystic fibrosis and Down's syndrome.

Change and Continuity	
Change	Continuity
<ul style="list-style-type: none"> <li>• Infections – this is now radically reduced, but many are becoming resistant to antibiotics (MRSA)</li> <li>• Link between genetics and disease</li> <li>• CT scans, radiotherapy and chemotherapy (lung cancer)</li> <li>• Government intervention</li> <li>• Creation of the NHS</li> </ul>	<ul style="list-style-type: none"> <li>• Pasteur and Koch's work with germs led the way for the work on magic bullets and antibiotics</li> <li>• X-rays were discovered by Rontgen in 1895 (not used until C20th)</li> <li>• Jenner's initial work on vaccines led to the understanding that a vaccine could eradicate a disease</li> </ul>



Vocabulary: define these words	
<b>DNA</b>	Carries the genetic information from one living thing to another. DNA information determines characteristics like hair and eye colour.
<b>Genetics</b>	The study of heredity conditions and DNA to identify the purpose of every gene in the human body.
<b>Antibiotic</b>	A medicine that inhibits the growth of or destroys microorganisms
<b>Magic Bullet</b>	A medicine with advanced or highly specific properties that can fight infection.
<b>Genome</b>	The complete set of DNA containing all the information needed to build a particular organism.
<b>Penicillin</b>	An antibiotic produced naturally by certain blue moulds.
<b>NHS</b>	The National Health Service which provides free healthcare which helps people stay healthy – visits to the GP, hospitals, health visitors.
<b>MRI Scan</b>	Uses powerful magnets, radio waves, and a computer to make detailed pictures inside your body.
<b>Chemotherapy</b>	The treatment of disease by the use of chemical substances, especially the treatment of cancer.
<b>Radiotherapy</b>	The treatment of disease, especially cancer, using X-rays or similar forms of radiation.



## Knowledge Organiser: The British Sector on the Western Front, 1914-1918

### Key Battles

#### The First Battle of Ypres (Oct-Nov 1914)

Ypres was a salient – an area surrounded on 3 sides by the enemy. The British lost over 50,000 troops during this battle, but crucially kept control of the important English Channel ports.

#### Hill 60 (April 1915)

Hill 60 was a man-made hill near Ypres that was captured by the Germans in December 1914. Its height gave them a strategic advantage. In April 1915, the British tunnelled under the hill, placed five mines under it, then blew the top off to recapture it.

#### The Second Battle of Ypres (April-May 1915)

The Germans used chlorine gas for the first time. British soldiers were unprepared for gas and often used urine-soaked cloths as makeshift gas masks. The British lost 59,000 men and the Germans moved 2 miles closer to Ypres.

#### The Battle of the Somme (July-Nov 1916)

Around 20,000 British soldiers died on the first day alone. The British tried out two new tactics:

- The creeping barrage: This was where artillery was launched from the trenches just ahead of the British troops as they advanced forwards.
- Tanks: These were unsuccessful because of their low speed and unreliability.

In total, the Somme cost the British over 400,000 lives.

#### The Battle of the Arras (April-May 1917)

Tunnelling companies from Britain and New Zealand dug a network of underground caves at Arras, where the ground was chalky and soft. In April 1917 24,000 men attacked from the tunnels.

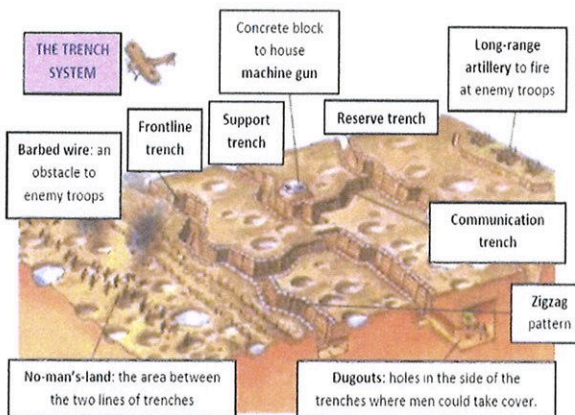
The British advanced 8 miles, but their progress slowed and by the end of the battle there were nearly 160,000 British and Canadian casualties.

#### The Battle of Passchendaele (Third Battle of Ypres) (July-Nov 1917)

The aim of this battle was for the British to break out of the Ypres Salient. Bad weather made the ground waterlogged and many men drowned in the mud. By the end the British had regained about 7 miles, at a cost of about 245,000 casualties.

#### The Battle of Cambrai (Nov-Dec 1917)

Cambrai saw the first successful large-scale use of tanks – nearly 500 were used. They could move easily over the barbed wire and their machine guns were very effective.



### Treatments & Surgery

- Dealing with infection:
  - Debridement
  - The Carrel-Dakin method
  - Amputation
- Thomas Splint
- Mobile X-Ray units
- Blood transfusions
- Blood banks
- Brain surgery
- Plastic surgery

### RAMC and FANY

Medical treatment was mainly provided by the Royal Army Medical Corps (RAMC), the branch of the army responsible for medical care.

The First Aid Nursing Yeomanry (FANY) was an organisation which sent women volunteers to help out on the Western Front. The first six FANY nurses arrived in France in October 1914.



FANYs provided emergency first aid and from 1916 they also drove ambulance wagons. There were never more than 450 FANYs in France, but they opened the way for more women (e.g. the Voluntary Aid Detachments [VAD]) to take part in the war.

### Medical Conditions on the Western Front

Below are some of the common medical conditions experienced by soldiers on the Western Front.



#### Trench fever

Caused by: Body lice, which thrived in the dirty trench conditions

Symptoms: Flu-like (high temperature, headache, aching muscles)

Solutions: Delousing stations were set up



#### Trench foot

Caused by: Standing in cold water or mud for long periods of time

Symptoms: Painful swelling of the feet, eventually leading to gangrene (decomposition)

Solutions: Rubbing whale oil on the feet, keeping dry and changing socks regularly. Once gangrene set in amputation was the only solution.



#### Shellshock

Caused by: Psychological damage as a result of the horrific war environment

Symptoms: Tiredness, nightmares, headaches, loss of speech, shaking, mental breakdown

Solutions: In some cases, men were treated back in Britain. Generally, shellshock was misunderstood and sufferers were often accused of cowardice

#### Gas gangrene

Caused by: Open wounds infected by bacteria from soil

Symptoms: Dead tissue and a build-up of gas in the wound

Solutions: Amputation of infected areas was the only way to stop it spreading



#### Gas injuries

Caused by: Chlorine, phosgene and mustard gas. First used by the Germans at the Second Battle of Ypres, April 1915

Symptoms: Burning skin, internal and external blisters, death by suffocation. Massive psychological impact – fear and panic

Solutions: Gas masks were given from July 1915 onwards, but before then soldiers would use urine-soaked cloths to cover their faces

#### Shrapnel and bullet injuries

Caused by: Being hit by bullets or shrapnel from rifles/explosions. 58% of wounds were caused by shells and shrapnel; 39% were caused by bullets. Head injuries were a major problem at the start of the war, because soldiers only wore soft caps

Symptoms: Pieces of metal would penetrate the body, taking with them dirt and pieces of uniform

Solutions: Steel Brodie helmets were introduced in 1915





# Knowledge Organiser: The British Sector on the Western Front, 1914-1918

## Exam Questions

### 1. Describe two features of... (4 marks)


P - Identify a feature/point	P - Identify another feature/point
E - Supporting detail/evidence	E - Supporting detail/evidence


P - One feature of ..... was.....  
 E - For example.....

P - A second feature of ..... was.....  
 E - For example.....

### 2. Study Sources A and B in the Sources Booklet.

How useful are Sources A and B for an enquiry into .....?  
 Explain your answer, using Sources A and B and your knowledge of the historical context. (8 marks)

How useful are Sources A and B for an enquiry into... (8 marks) 

  
 S  
N  
A  
P  
Chat

**S - SAY/SHOW** - What does the source say? What does the source show? What useful information does the source tell me? What facts does it give? What views or opinions does it give?

**N - NATURE** - What is the source? A photo, a speech, a cartoon, a letter, a diary. Does this affect its reliability? Is it likely to give honest views, be complete, be one-sided?

**A - AUTHOR** - Who wrote/created it? Does this affect its reliability? Do they know what they are talking about? Will they have a complete picture? If there is not author, is that a problem? Why?

**P - PURPOSE** - Why was it made? Does this affect its reliability? Are they trying to gain support? Are they trying to influence others? Are they writing to inform?

**CHAT** - Talk about each aspect using your own knowledge.

*The source is useful because it tells/shows me...*  
*The source is useful because it is....*  
*It's was written by.... This means...*  
*It's purpose was.... This means that...*

### 3. How could you follow up Source B to find out more about..... (4 marks)

1. Find a detail related to the topic of the question – it could be a **problem or an event** that has no reason given for it or something which has changed with no explanation.
2. Think of a **question** to ask which would give you that reason or explanation.
3. Think of **one** specific source to use that should give you an answer
  - If the answer is going to be a **number** – specific records – **Hospital records** about...
  - If it is about a **medical problem or development** – **British medical Journal** where doctors tell each other about issues they are facing and steps forward.
  - If it is a **personal experience** – **diaries and journals** that tell personal stories
4. Explain why this type of source would be useful – what would it tell you? Or – would you expect the source to be reliable?

*Detail in Source B that I would follow up: .....*

*Question I would ask: .....*

*What type of source I could use:.....*

*How this might help answer my question: .....*

.....



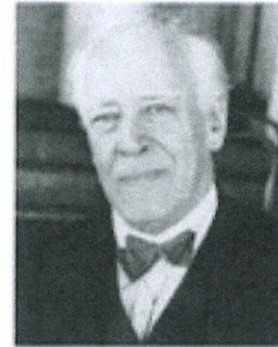
Year 10 Drama Winter

Introduction to  
Stanislavski



Developed acting method "THE SYSTEM" which later evolved to "METHOD ACTING"

"SENSE MEMORY"  
Train sense memory to have real reactions on stage



CONSTANTIN  
STANISLAVSKI  
1863 - 1938

Unwanted tension must be released or it will block "PURE EXPRESSION"

"THE MAGIC IF"  
Actors question themselves and their character to achieve truthful pursuit of characters' emotions

The audience should connect "EMOTIONALLY" with the characters

The aim of Naturalistic Theatre is for the actors & audience to "CONNECT" with the characters

"EMOTIONAL MEMORY"  
Relate the actors' own emotional experiences to their character

To create a "REAL WORLD" experience, theatre should have realistic sets and costumes and scene changes should be hidden

Actors should understand character "OBJECTIVES", "SUBTEXT" & "GIVEN CIRCUMSTANCE"

Founded Moscow Art Theatre

*Remember there are no small parts, only small actors'*

"SPIRITUAL REALISM"  
Theatre of Living Experience

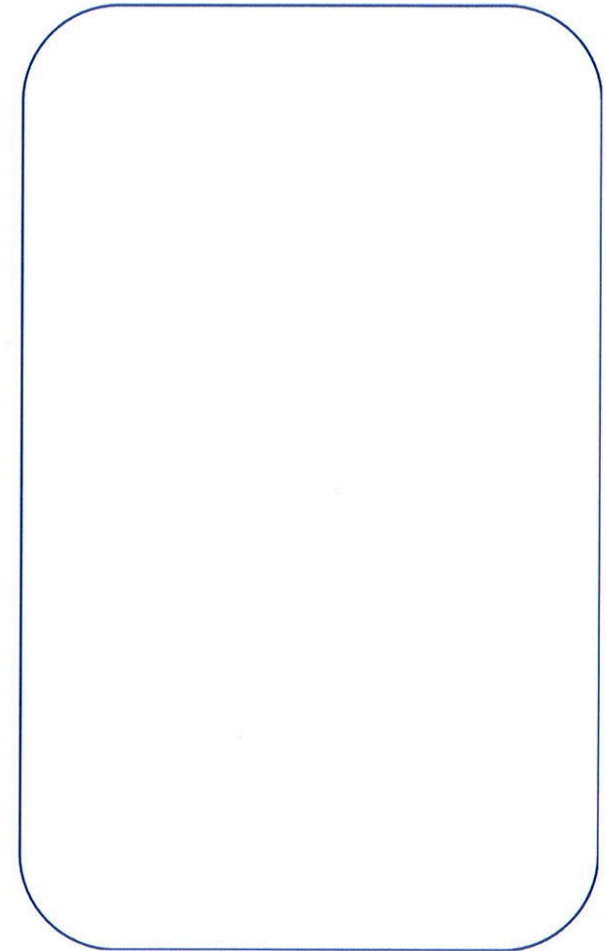
# NATURALISM



## Year 10 Sports Studies - Outdoor adventurous Activities

<b>2.1 Types of equipment to be used for participation</b>	
<b>2.1.1 The categories of equipment should include:</b> <input type="checkbox"/> Safety equipment <input type="checkbox"/> Specialist equipment	Examples of categories as illustrated below, may include: <ul style="list-style-type: none"> <li>• Safety equipment – lifejacket buoyancy aid for kayaking, helmet and harness for rock climbing</li> <li>• Specialist equipment – canoe and paddle for canoeing or a compass for orienteering</li> </ul>

<b>2.2. Types of clothing to be used for participation</b>	
<b>2.2.1 The categories of clothing types:</b> <input type="checkbox"/> Safety clothing <input type="checkbox"/> Specialist clothing <input type="checkbox"/> General items of clothing  <b>2.2.2 These categories of clothing include:</b> <input type="checkbox"/> Wetsuit/dry suit <input type="checkbox"/> Footwear <input type="checkbox"/> Gloves <input type="checkbox"/> Hat <input type="checkbox"/> Windproof jacket <input type="checkbox"/> Jacket – waterproof, windproof <input type="checkbox"/> Trousers – waterproof, windproof <input type="checkbox"/> Wicking top <input type="checkbox"/> Fleece <input type="checkbox"/> Thermal clothing	Examples of categories as illustrated below, may include: <ul style="list-style-type: none"> <li>• Safety clothing – specialist footwear (such as walking boots and rock shoes), as required for the activity to meet safety requirements</li> <li>• Specialist clothing – examples of the use of specialist clothing could include:             <ul style="list-style-type: none"> <li>○ Water sports – appropriate use of wetsuits</li> <li>○ Snow sports – appropriate use of snowshoes or skis, helmet</li> </ul> </li> <li>• General clothing – that the participant could provide themselves such as wellington boots for use when gorge walking, sports clothing for assault course participation or trainers for certain water sports, as well clothing such as windproof/ waterproof jackets</li> </ul>





## Year 10 Sports Studies - Outdoor adventurous Activities

### 2.3 Types of technology that can enhance participation or safety

#### 2.3.1 Different categories of technology include:

- GPS and signalling devices
- Light weight equipment and clothing
- Waterproof technology

Examples may include:

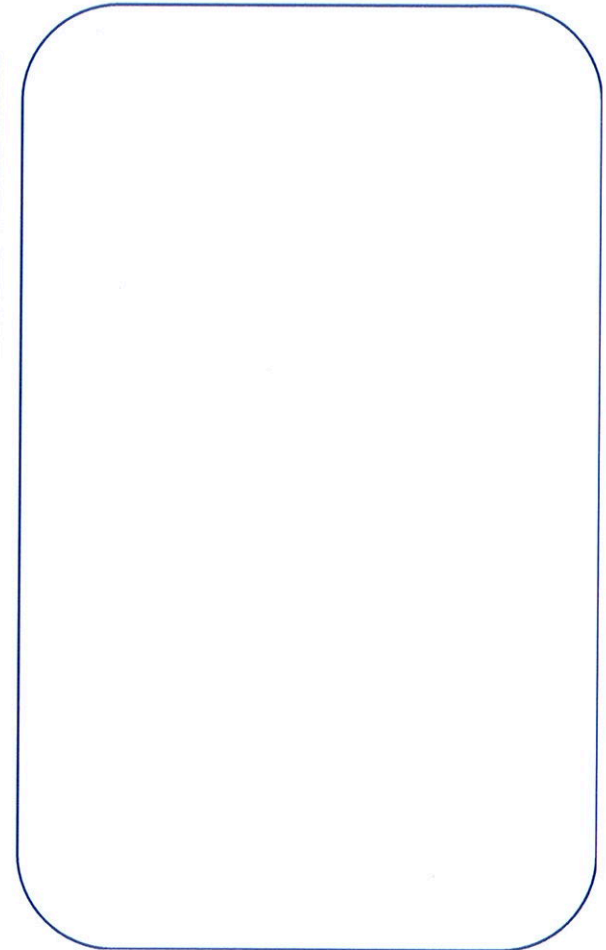
- GPS and signalling devices – electronic maps, personal beacons, emergency position radio beacons
- Transport – snow mobiles, over land vehicles
- Waterproof technology – communication devices, casing for technology; watch or Activity Tracker

#### 2.3.2 The role of technology in terms of:

- Access and transportation
- Comfort
- Safety
- Communication
- Information

Different types of technology and their safety purpose for participants, examples may include:

- Comfort - reduced weight of equipment and properties of clothing which minimises the risks of exhaustion
- Safety - to include information on how technology can keep participants safe, this can include rescue scenarios and contacting emergency services
- Communication – signalling devices
- Information – weather reports, location information and maps





## Year 10 Sports Studies - Performance Lessons

Unit R185: Performance and leadership in sports activities	
Topic Area 1: Key components of performance	
Teaching content	Exemplification
<b>1.1 Performance in two selected activities</b>	
<b>1.1.1 Performance of skills and techniques</b>	
<p><b>1.2 Participating in your activities</b></p> <p><b>1.2.1 Appropriate use of:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Tactics</li> <li><input type="checkbox"/> Strategies</li> <li><input type="checkbox"/> Compositional ideas</li> <li><input type="checkbox"/> Use of creativity in performance</li> </ul>	<p>Examples of skills and techniques may include:</p> <ul style="list-style-type: none"> <li>• Front somersault in trampolining (individual)</li> <li>• Backhand smash in badminton (individual/team)</li> <li>• Spin pass in rugby (team)</li> <li>• Reverse hitting in hockey (team)</li> </ul> <p>Examples may include:</p> <ul style="list-style-type: none"> <li>• Tactics - using a drop shot against a baseline player in tennis</li> <li>• Strategies - when to bowl a bouncer in cricket, when to break away from the pack in running or cycling</li> <li>• Compositional ideas - acceleration and deceleration of movements in dance</li> <li>• Creativity - communicating a theme to an audience through performance of a ballet dance or feint to pass, then dribble in basketball</li> </ul>
<b>1.3 Decision-making during performance</b>	
<p><b>1.3.1 Appropriate and timely decisions</b></p>	<p>To include decisions such as:</p> <ul style="list-style-type: none"> <li>• Shot selection from different lies in golf</li> <li>• Choice of pass, kick or run in rugby union</li> </ul>
<b>1.4 Managing and maintaining performance in individual activities</b>	
<p><b>1.4.1 Ability to manage and maintain own performance (individual activities only):</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Continuing to perform when under pressure</li> <li><input type="checkbox"/> Maintaining focus</li> </ul>	<p>To include aspects such as:</p> <ul style="list-style-type: none"> <li>• Staying composed after two illegal jumps in triple jump</li> <li>• Managing to serve 'in' after several 'outs'</li> </ul>
<b>1.5 Your role and contribution to team activities</b>	
<p><b>1.5.1 Awareness of role and contribution to the team (team activities only):</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Performing a specific role during a game</li> <li><input type="checkbox"/> Adapting role in different situations</li> </ul>	<p>To include aspects such as:</p> <ul style="list-style-type: none"> <li>• Covering for a team mate who is out of position in football</li> <li>• Acting in a different role to cover someone who is in the 'sin bin' in a game of rugby</li> </ul>

### Some of the approved sports:

Football - Netball - Rugby - Basketball -  
Swimming - Tennis Badminton - Rowing -  
Athletics

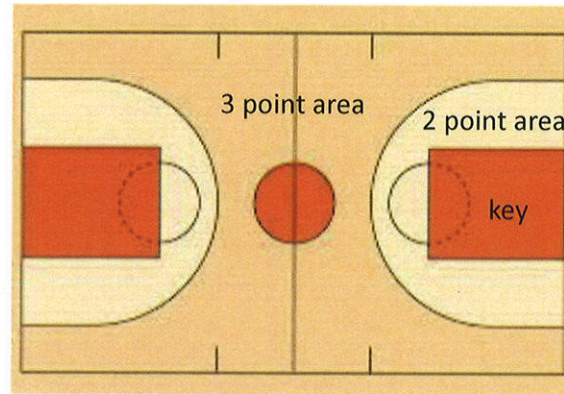


## Year 10/11 Knowledge Organiser- BASKETBALL

### Rules and regulations

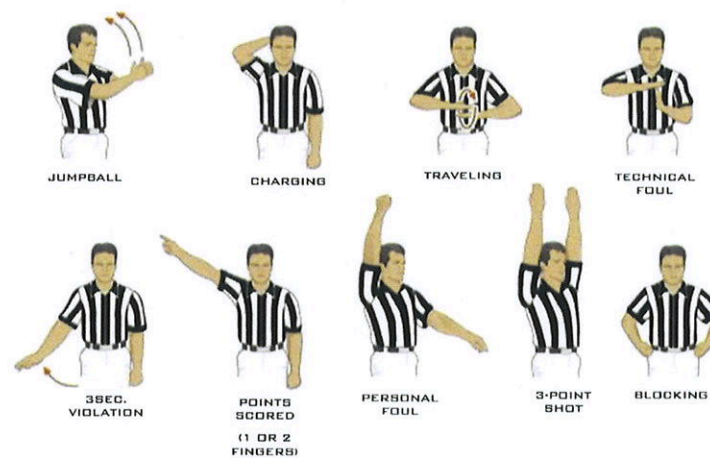
- 2 teams of 5 players
- **3 in the key** - cannot be in the key area for longer than 3 seconds before leaving and re-entering
- **Scoring** : 2 points if you score (ball goes through the net) inside the arc  
3 points if you score outside the arc/three-point line
- **Tip-off**: The game starts by two players jumping to compete a ball that is thrown straight up by the referee
- **Contact**: you must not interfere with play by touching, or pushing an opponent.
- **Travelling**: You must not move your landing foot or take 3 steps whilst in possession of the ball
- **Double Dribble**: Once you stop dribbling the ball you cannot restart.  
You cannot bounce the ball with two hands at the same time

### The Court



### Refereeing

#### BASKETBALL REFEREE HAND SIGNALS



Techniques:  
 Cross-over Dribble  
 Rebounds  
 L-Drive  
 V-Cut  
 Chest Pass  
 Bounce Pass  
 Jump Stop  
 Set Shot  
 Lay-up  
 Pivot  
 Man-to-man Defence

Block/Screen

The Importance of being Active in Core PE:

De-stress  
 Maintain physical fitness  
 Develop social skills - working with others  
 Be competitive  
 Challenge yourself



# WINTER Year 10F Knowledge Organiser

## STANDARD FORM

### Key Concepts

We use standard form to write a very large or a very small number in scientific form.

Must be  $\times 10$   
 $b$  is an integer

$$a \times 10^b$$

Must be  $1 \leq a < 10$

**Links**  
 Science

**Key Words**  
 Standard form  
 Base 10

### Examples

Write the following in standard form:

- 1)  $3000 = 3 \times 10^3$
- 2)  $4580000 = 4.58 \times 10^6$
- 3)  $0.0006 = 6 \times 10^{-4}$
- 4)  $0.00845 = 8.45 \times 10^{-3}$

Calculate the following, write your answer in standard form:

- 1)  $(3 \times 10^3) \times (5 \times 10^2)$   

$$\left. \begin{array}{l} 3 \times 5 = 15 \\ 10^3 \times 10^2 = 10^5 \end{array} \right\} \begin{array}{l} 15 \times 10^5 \\ = 1.5 \times 10^6 \end{array}$$
- 2)  $(8 \times 10^7) \div (16 \times 10^3)$   

$$\left. \begin{array}{l} 8 \div 16 = 0.5 \\ 10^7 \div 10^3 = 10^4 \end{array} \right\} \begin{array}{l} 0.5 \times 10^4 \\ = 5 \times 10^3 \end{array}$$

- A) Write the following in standard form:  
 1) 74 000    2) 1 042 000    3) 0.009    4) 0.000 001 24  
 B) Work out:  
 1)  $(5 \times 10^2) \times (2 \times 10^5)$     2)  $(4 \times 10^3) \times (3 \times 10^8)$   
 3)  $(8 \times 10^6) \div (2 \times 10^5)$     4)  $(4.8 \times 10^2) \div (3 \times 10^4)$

ANSWERS: A1)  $7.4 \times 10^4$  2)  $1.042 \times 10^6$  3)  $9 \times 10^{-3}$  4)  $1.24 \times 10^{-6}$   
 B1)  $1 \times 10^7$  2)  $1.2 \times 10^{12}$  3)  $4 \times 10^4$  4)  $1.6 \times 10^{-2}$



# WINTER Year 10F Knowledge Organiser

## AVERAGES FROM A TABLE

### Key Concepts

#### Modal class (mode)

Group with the highest frequency.

#### Median group

The median lies in the group which holds the  $\frac{\text{total frequency}+1}{2}$  position.

Once identified, use the cumulative frequency to identify which group the median belongs from the table.

#### Estimate the mean

For grouped data, the mean can only be an estimate as we do not know the exact values in each group. To estimate, we use the midpoints of each group and to calculate the mean we find  $\frac{\text{total } fx}{\text{total } f}$ .

### Examples

	Frequency (f)	Midpoint (x)	f x
	10	5	10 x 5 = 50
	15	15	15 x 15 = 225
	23	25	23 x 25 = 575
	7	35	7 x 35 = 245
Total	55		1095

- a) Estimate the mean of this data.  
 step 1: calculate the total frequency  
 step 2: find the midpoint of each group  
 step 3: calculate  $f \times x$   
 step 4: calculate the mean shown below

$$\frac{\text{Total } fx}{\text{Total } f} = \frac{1095}{55} = 19.9\text{cm}$$

- b) Identify the modal class from this data set. "the group that has the highest frequency"  
 Modal class is  $20 < x \leq 30$

- c) Identify the group in which the median would lie.  $\text{Median} = \frac{\text{Total frequency}+1}{2} = \frac{56}{2} = 28\text{th value}$   
 "add the frequency column until you reach the 28<sup>th</sup> value" Median is in the group  $20 < x \leq 30$

**Key Words**  
 Midpoint  
 Mean  
 Median  
 Modal

Cost (f.C)	Frequency	Midpoint
$0 < C \leq 4$	2	
$4 < C \leq 8$	3	
$8 < C \leq 12$	5	
$12 < C \leq 16$	12	
$16 < C \leq 20$	3	

From the data:

- a) Identify the modal class.  
 b) Identify the group which holds the median.  
 c) Estimate the mean.

ANSWERS: a)  $12 < C \leq 16$  b)  $\frac{25+1}{2} = 13\text{th value}$  is in the group  $12 < C \leq 16$  c)  $\frac{224}{25} = £11.76$




# WINTER Year 10F Knowledge Organiser PIE CHARTS AND SCATTER-GRAPHS

**Key Concepts**

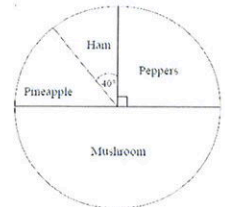
Pie charts use angles to represent proportionally the quantity of each group involved.

Pie charts can only be compared to one another when populations are given.

Scatter-graphs show the relationship between two variables. This relationship is called the **correlation**.



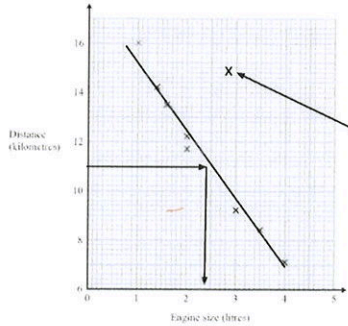
**Key Words**  
Pie chart  
Scatter-graph  
Correlation  
Outlier  
Variable



Topping	Frequency	Angle of Sector
Peppers	18	90°
Mushroom	36	180°
Pineapple	10	50°
Ham	8	40°
<b>Total</b>	<b>72</b>	<b>360°</b>

$\frac{360}{72} = 5$  → ×5

**Examples**



A scatter-graph is drawn to show the relationship between the engine size of a car and how far it can travel.

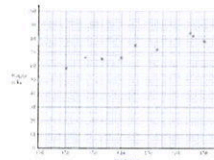
It shows negative correlation.

This is an outlier.

We draw a line of best fit through the middle of the data points to read from to estimate readings. For example, estimating the engine size of a car that can travel 11km would be 2.5 litres.

1) Calculate the angle for each category:

Region	Frequency
Southern England	9
London	23
Midlands	16
Northern England	12
Total	60



2a) What type of correlation is shown?  
b) Using a line of best fit estimate the weight when the height is 135cm.

ANSWERS: 1) 54, 138, 96, 72 2) a) positive b) 64kg-66kg



# WINTER Year 10F Knowledge Organiser

## TYPES OF DATA AND GRAPHS

### Key Concepts

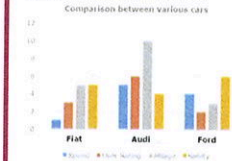
**Discrete data:** data that can be categorised into a classification, there are a finite number of classifications.  
E.g. Hair colour, shoe size, number of children in a class.

**Continuous data:** data that can take any value. Data that is measured.  
E.g. Height, weight, time.

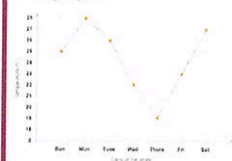
**Qualitative data:** data that describes something.  
E.g. Race, ethnicity.

**Quantitative data:** data that is in numerical form.  
E.g. Statistics, percentages, time.

### Comparative bar charts



### Line graphs



### Examples

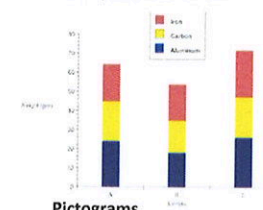
#### Tally charts

Colour	Tally	Frequency
Red		15
Blue		9
White		24
Black		12
Other		9

#### Pie charts



### Composite bar charts



### Pictograms



**Key Words**  
Data  
Discrete  
Continuous  
Qualitative  
Quantitative  
Graph

What types of data is each of the following?

- Number of goals scored in a match
- Eye colour
- Time it takes to run 100m
- Length of a car
- Number of pets a person owns

ANSWERS: 1) Discrete, quantitative 2) Discrete, qualitative 3) Continuous, quantitative 4) Continuous, quantitative 5) Discrete, qualitative



# WINTER Year 10F Knowledge Organiser

## PRESENTING AND INTERPRETTING DATA

### Key Concept Pie Charts

There are 360 degrees in a pie chart. So you need angles that add to 360°.

Eye colour	F	
r		× 4 = 60
Blue	15	× 4 = 172
Brown	43	× 4 = 128

$$\frac{360}{90} = 4 \quad \text{= 360} \quad = 360$$

### Key Words

**Frequency:** Total.  
**Mean:** Total of data divided by the number of pieces of data.  
**Mode:** The value that occurs most frequently.  
**Median:** Middle number when they are in order.  
**Range:** Difference between the largest and smallest values.

### Tips

- There can be more than one mode.
- Range is a measure of spread, not an average.
- Bar charts have gaps between the bars.

### Examples

5, 9, 9, 9, 11, 12, 13, 15, 16

#### Averages

$$\text{Mean} = \frac{5 + 9 + 9 + 9 + 11 + 12 + 13 + 15 + 16}{9} = \frac{99}{9} = 11$$

Median = 11 (The middle number shown above)

Mode = 9 (This number occurs most often)

#### Measure of Spread

$$\text{Range} = 16 - 5 = 11$$

(A bigger range means the data is more spread out)

### Questions

- Find the mean, mode, median and range of:
  - 3, 12, 4, 6, 8, 5, 4
  - 12, 1, 10, 1, 9, 3, 4, 9, 7, 9
- For the table:
 

	Age	Frequency
a)	11	17
b)	12	11
c)	13	8

ANSWERS: 1) a) Mean = 6, Median = 4, Mode = 5, Range = 9  
 b) Mean = 6.5, Mode = 9, Median = 11, Range = 8  
 2) a) Angles 170°, 110°, 80°  
 b) Mean = 9, Range = 5, Median = 5, Mode = 9  
 c) 11.75



# WINTER Year 10 Higher VELOCITY-TIME GRAPHS

## Key Concepts

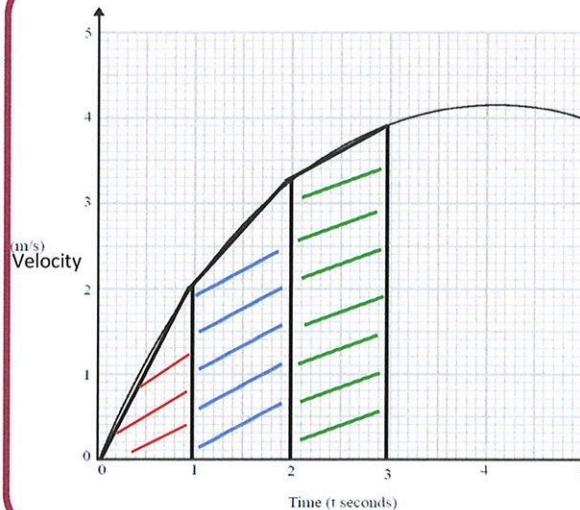
A **velocity-time** graph (or speed-time graph) is a way of visually expressing a journey. With speed or velocity on the  $y$ -axis and time on the  $x$ -axis.

A velocity-time graph tells us **how someone's speed has changed over a period of time**.

The **distance** completed in the journey can be calculated from the **area underneath the curve**.

## Key Words

Velocity  
Speed  
Distance  
Area



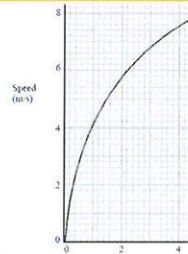
## Examples

Use 3 strips of equal width to find an estimate of the distance travelled in the first 3 seconds.

The strips will either be triangles or trapeziums. You will calculate the area of each section separately and combine the answers for the complete distance.

$$\left(\frac{1 \times 2}{2}\right) + \left(\frac{(2 + 3.2) \times 1}{2}\right) + \left(\frac{(3.2 + 3.9) \times 1}{2}\right)$$

$\Rightarrow 7.15m$



Use 2 strips of equal width to find an estimate of the distance travelled in the first 4 seconds.



# WINTER Year 10 Higher DISTANCE-TIME GRAPHS

## Key Concepts

A **distance-time** graph, plots time against the distance away from a starting point.

**Speed** can be calculated from these graphs by finding the gradient of the graph.

Horizontal lines are sections where the object is stationary.

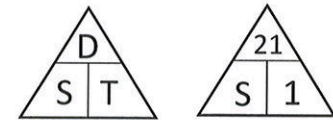
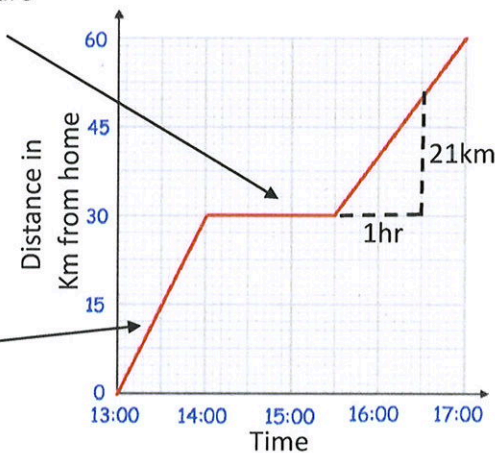
## Key Words

**Distance**  
**Time**  
**Speed**  
**Gradient**  
**Stationary**

## Examples

Horizontal sections are where the object is stationary

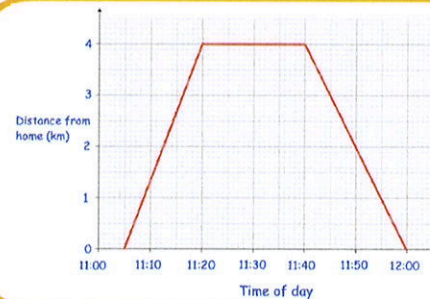
Diagonal lines show the object moving away from home or moving closer to home



$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{Speed} = \frac{21}{1}$$

$$\text{Speed} = 21\text{km/h}$$



A distance-time graph shows the journey of someone from home to the shop and back again.

- 1) How long were they at the shop for?
- 2) How far away from home is the shop?
- 3) How far did they travel in total?
- 4) What speed did they travel on the way to the shop in km/h?

ANSWERS: 1) 20 minutes 2) 4km 3) 8km 4) 16km/h



# WINTER Year 10 Higher BOUNDARIES

## Key Concepts

The boundaries of a number derive from **rounding**.

E.g. State the boundaries of 360 when it has been rounded to 2 significant figures:

$$355 \leq x < 365$$

E.g. State the boundaries of 4.5 when it has been rounded to 2 decimal place:

$$4.45 \leq x < 4.55$$

These boundaries can also be called the **error interval** of a number.

	+	-	×	÷
<b>Upper bound answer</b>	$UB_1 + UB_2$	$UB_1 - LB_2$	$UB_1 \times UB_2$	$UB_1 \div LB_2$
<b>Lower bound answer</b>	$LB_1 + LB_2$	$LB_1 - UB_2$	$LB_1 \times LB_2$	$LB_1 \div UB_2$

A restaurant provides a cuboid stick of butter to each table. The dimensions are 30mm by 30mm by 80mm, correct to the nearest 5mm. Calculate the upper and lower bounds of the volume of the butter.

$$\text{Volume} = l \times w \times h$$

$$\begin{aligned} \text{Upper bound} &= 32.5 \times 82.5 \times 32.5 \\ &= 87140.63 \text{mm}^3 \end{aligned}$$

$$\begin{aligned} \text{Lower bound} &= 27.5 \times 77.5 \times 27.5 \\ &= 58609.38 \text{mm}^3 \end{aligned}$$

## Examples

When completing calculations involving boundaries we are aiming to find the greatest or smallest answer.

$$D = \frac{x}{y}$$

$x = 99.7$  correct to 1 decimal place.  
 $y = 67$  correct to 2 significant figures.

Work out an upper and lower bounds for  $D$ .

$$\text{Upper bound } D = \frac{99.75}{66.5} = 1.5$$

$$\text{Lower bound } D = \frac{99.65}{67.5} = 1.48$$

**Key Words**  
Bound  
Upper  
Lower  
Accuracy  
Rounding

1) Jada has 100 litres of oil, correct to the nearest litre.

The oil is poured into tins of volume 1.5 litres, correct to one decimal place.

Calculate the upper and lower bounds for the number of tins that can be filled.

2) There are 110 identical marbles in a bag. A marble is taken and weighed as 15.6 g to the nearest tenth of a gram. Find the upper and lower bounds for the weight of all the marbles.

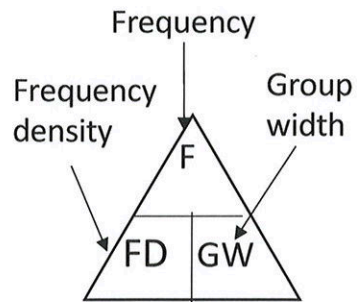
ANSWERS: 1) LB = 69.3 ≈ 69 UB = 64.2 ≈ 64 2) LB = 1710.5 g UB = 1721.5 g



# WINTER Year 10 Higher HISTOGRAMS

## Key Concepts

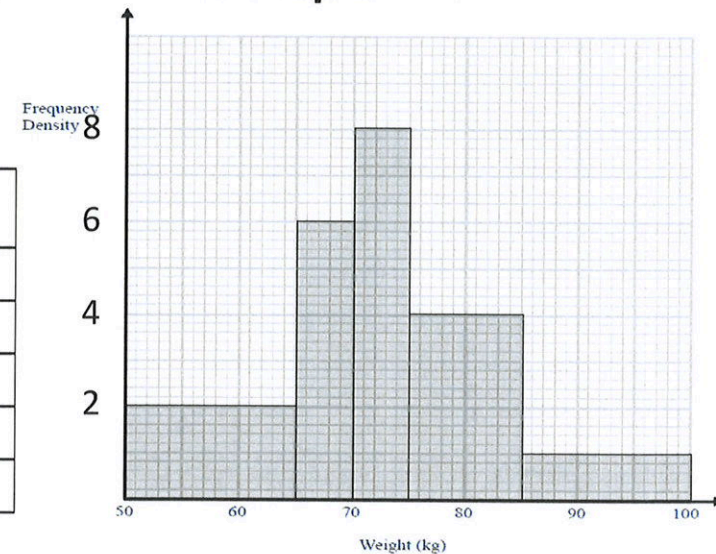
A **Histogram** is a graphical representation of data consisting of rectangles whose **area is proportional to the frequency** of a variable and whose **width is equal to the group width**.



A group of people are weighed and their results recorded. Below is their data. A histogram is used to represent this data.

Weight	Frequency	Frequency density
$50 < w \leq 65$	30	$30 \div 15 = 2$
$65 < w \leq 70$	30	$30 \div 5 = 6$
$70 < w \leq 75$	40	$40 \div 5 = 8$
$75 < w \leq 85$	40	$40 \div 10 = 4$
$85 < w \leq 100$	15	$15 \div 15 = 1$

## Example



**Key Words**  
Histogram  
Frequency density  
Group width  
Median

Speed (mph)	Frequency
$40 < s \leq 55$	6
$55 < s \leq 60$	10
$60 < s \leq 65$	46
$65 < s \leq 75$	48
$75 < s \leq 90$	6

Calculate the frequency density for this table of information.

On a separate set of axes, draw your histogram.

ANSWERS: Frequency densities = 0.4, 2, 9.2, 4.8, 0.4



# WINTER Year 10 Higher CUMULATIVE FREQUENCY AND BOX PLOTS

## Key Concepts

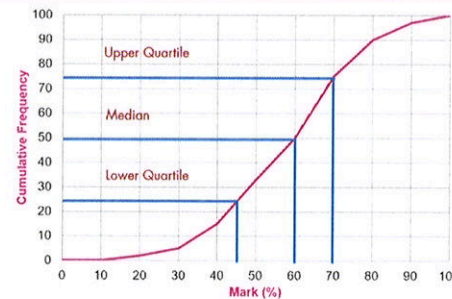
A **cumulative frequency** graph shows a running total of frequency.

We can read the **median** and the **interquartile range** from this graph.

A **box plot** shows the distribution of data using **minimum, maximum, median and quartiles**.

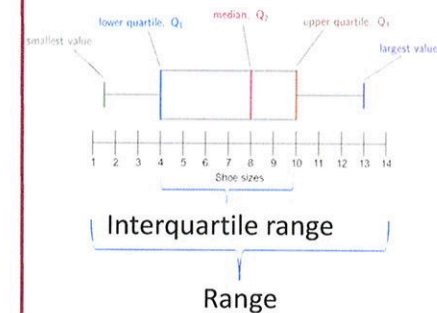
Mark	Freq	CF
$0 < x \leq 10$	0	0
$10 < x \leq 20$	4	4
$20 < x \leq 30$	1	5
$30 < x \leq 40$	10	15
$40 < x \leq 50$	17	32
$50 < x \leq 60$	18	50
$60 < x \leq 70$	24	74
$70 < x \leq 80$	16	90
$80 < x \leq 90$	6	96
$90 < x \leq 100$	4	100

Plot at the upper bound

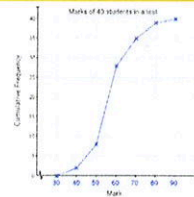


Median and quartiles are found from the y axis:  
**Lower quartile** = 25% of the way through the data  
 = 45  
**Median** = 50% of the way through the data  
 = 60  
**Upper quartile** = 75% of the way through the data  
 = 70  
**Interquartile range** = UQ - LQ  
 = 70 - 45  
 = 25

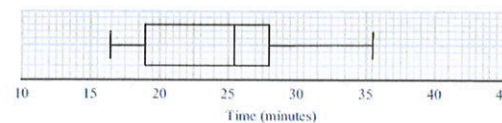
## Examples



1) Read from the cumulative frequency graph to find the median and the interquartile range.



2) Read from the box plot the median, range and interquartile range.



ANSWERS: 1) Median = 56, Interquartile range = 64 - 52 = 12 2) Median = 26, Range = 35.5 - 16.5 = 19, Interquartile range = 28 - 19 = 9

**Key Words**  
 Cumulative frequency  
 Box plot  
 Range  
 Interquartile range  
 Median  
 Quartiles  
 Minimum/maximum values



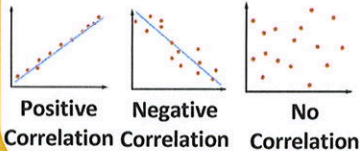
# WINTER Year 10 Higher STATISTICAL DIAGRAMS

## Key Concepts

A **frequency polygon** is a line graph which connects the midpoints of grouped data.

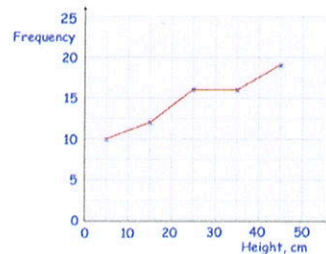
A **pie chart** represents data into proportional sections.

A **scatter-graph** shows the relationship between two variables. **Correlation** is used to describe the relationships.



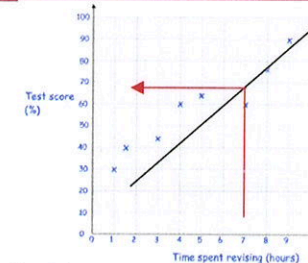
## Plot at the midpoint

Length, cm	frequency
$0 < x \leq 10$	10
$10 < x \leq 20$	12
$20 < x \leq 30$	16
$30 < x \leq 40$	16
$40 < x \leq 50$	19



## Examples

Answer	Frequency	Angle
Yes	60	240
No	10	40
Maybe	20	80
Total	90	360



a) What type of correlation is shown?  
**Positive correlation**

b) Another student spent 6 hours revising for the test. Find an estimate of their test score.  
**Draw a line of best fit and read from it - 68%**

c) Explain why it might not be sensible to use the scatter graph to estimate the score for a student that spent 15 hours revising.  
**It is out of the data range.**

**Key Words**  
Midpoint  
Frequency polygon  
Pie chart  
Degrees  
Scatter graph  
Correlation  
Line of best fit

1) Draw a frequency polygon using this data.

Marks	Frequency
$0 < m \leq 10$	8
$10 < m \leq 20$	11
$20 < m \leq 30$	23
$30 < m \leq 40$	19
$40 < m \leq 50$	15

2) Draw a pie chart using this data.

Make	Frequency
Ford	8
Mazda	14
Volkswagen	21
Fiat	20
Honda	9



3a) What type of correlation is shown?

b) The distance from London of a house is 22km. What is an estimate of the rent it will cost?

ANSWERS: 2) Angles - 40, 70, 105, 100, 45 3a) Negative correlation b) Between £1200 and £1300



# WINTER Year 10 Higher AVERAGES FROM A TABLE

## Key Concepts

### Modal group (mode)

Group with the highest frequency

### Median group

Find the cumulative frequency of the frequency. The median lies in the group which holds the  $\frac{\text{Total frequency} + 1}{2}$  number

### Estimate the mean

From grouped data the mean can only be an estimate as we do not know where the data lies in each group.

$$\frac{\text{Total } fx}{\text{Total } f}$$

### Key Words

Midpoint  
Mean  
Median  
Modal

## Examples

	Frequency ( $f$ )	Midpoint ( $x$ )	$fx$
$0 < x \leq 10$	10	5	50
$10 < x \leq 20$	15	15	225
$20 < x \leq 30$	23	25	575
$30 < x \leq 40$	7	35	245
Total	55		1095

- a) Identify the modal group from this data set.

$$20 < x \leq 30$$

- b) Identify the group in which the median would lie.

$$\frac{\text{Total frequency} + 1}{2} = \frac{56}{2} = 28^{\text{th}}$$

Using the cumulative frequency of the groups the 28<sup>th</sup> lies in the groups  $20 < x \leq 30$

- c) Estimate the mean of this data:

$$\frac{\text{Total } fx}{\text{Total } f} = \frac{1095}{55} = 19.9$$

Cost	Frequency	Midpoint
$0 < c \leq 4$	2	
$4 < c \leq 8$	3	
$8 < c \leq 12$	5	
$12 < c \leq 16$	12	
$16 < c \leq 20$	3	

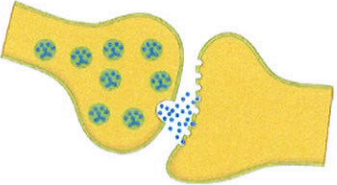
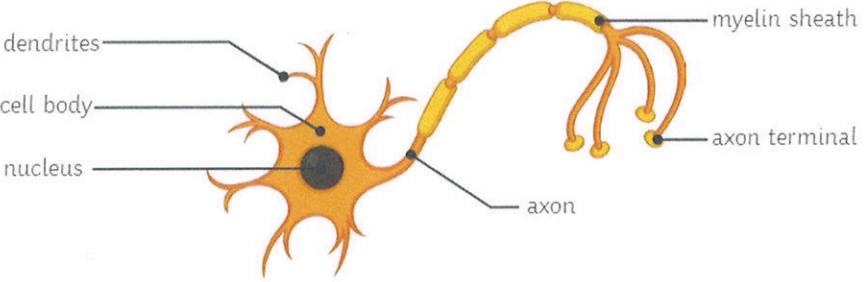









From the data:

- Identify the modal group
- Identify the group which holds the median
- Estimate the mean

ANSWERS: a)  $12 < c \leq 16$  b) 13<sup>th</sup> value is in the group  $12 < c \leq 16$  c)  $\frac{294}{25} = 11.76$



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

Homeostasis	Synapses	The Human Nervous System						
<p><b>Homeostasis</b> is the regulation of a <b>constant internal environment</b>. The conditions are maintained to ensure optimum conditions for metabolism and changes in response to both internal and external fluctuations.</p> <p>In humans, homeostasis regulates the <b>blood glucose</b> (sugar) levels, the body <b>temperature</b>, <b>CO<sub>2</sub></b> levels and <b>water</b> levels.</p> <p>The levels are monitored and regulated by automatic control systems which can be either nervous responses (coordinated by the <b>nervous system</b>) or chemical responses (coordinated by the <b>endocrine system</b>). Information about the environment is called a <b>stimulus</b> and is detected by a <b>receptor</b>. The information is processed by a <b>central coordination</b> system and a response is initiated by an <b>effector</b>.</p>	<p>A <b>synapse</b> is the gap where the ends of two neurons meet.</p>  <p>The information needs to be passed from one neuron to the next, but cannot be passed as an electrical impulse over the synapse (gap). Instead, the message is transmitted by chemical neurotransmitters.</p> <p>When the electrical impulse arrives at the terminal of the first neuron, it causes a release of neurotransmitter chemicals into the synapse. They travel across the gap and bind to receptor sites on the terminal of the next neuron.</p> <p>The receptor sites are specific for each type of neurotransmitter. A nerve impulse will only be created in the second neuron when a complimentary chemical binds.</p>	<p>The nervous system allows a fast, short-lived response to a stimulus in the surroundings. The information is received by a receptor, passed along the neurons (nerve cells) as an electrical impulse and results in a response.</p> <p>You might have to label the parts of a typical neuron:</p>  <ul style="list-style-type: none"> <li>The axon is the main part of the nerve cell. It is a long, stretched-out fibre of cytoplasm which the electrical impulse will travel along.</li> <li>Some axons are surrounded in a layer of fatty cells called the myelin sheath and it helps to insulate the electrical impulse.</li> <li>The branched endings, dendrites, connect the neurons together to create a network.</li> </ul>						
<h2>The Nervous Pathway</h2>								
<p>A stimulus is a change in the environment (internally or externally). In a typical response to stimuli, this information is received by the receptor and sent as an electrical impulse along a sensory neuron towards the central nervous system (CNS). The CNS is comprised of the brain and spinal cord. Here, the impulse is passed through relay neurons and a response to the stimulus is coordinated. This could be consciously or subconsciously. The CNS sends information about the response along a motor neuron as an electrical impulse. The effector receives the impulse and carries out the response.</p> <p><b>[stimulus] → receptor → sensory neuron → CNS → motor neuron → effector → [response]</b></p> <p>Examples of receptors include rod and cone cells within the eye which respond to light and allow us to see. Or it could be the cells in the skin which respond to pressure or temperature changes allowing us to feel.</p> <p>An effector could be a muscle or a gland. In response, a muscle might contract to make a movement or a gland releases a chemical into the body.</p> <table border="1" data-bbox="1146 986 2150 1391"> <thead> <tr> <th data-bbox="1146 986 1482 1040">sensory neuron</th> <th data-bbox="1482 986 1818 1040">relay neuron</th> <th data-bbox="1818 986 2150 1040">motor neuron</th> </tr> </thead> <tbody> <tr> <td data-bbox="1146 1040 1482 1391">  </td> <td data-bbox="1482 1040 1818 1391">  </td> <td data-bbox="1818 1040 2150 1391">  </td> </tr> </tbody> </table>			sensory neuron	relay neuron	motor neuron			
sensory neuron	relay neuron	motor neuron						
								



# AQA GCSE Chemistry (Separate Science) Unit 4: Chemical Changes

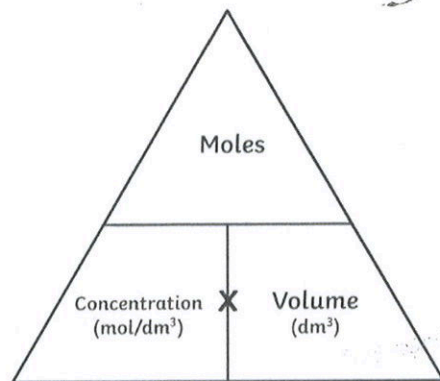
## Titration Method (Chemistry Only)

- Using the pipette and pipette filler, measure  $25\text{cm}^3$  sodium hydroxide solution and pour into a conical flask.
- Add several drops of phenolphthalein to the sodium hydroxide solution.
- Swirl the flask and the mixture should be pink.
- Place the conical flask on a white tile.
- Place the burette into its stand, ensuring the tap is closed. Using the funnel, fill the burette with sulfuric acid to the  $0\text{cm}^3$  line. Should you go above this line, open the tap and allow the excess to run off into a beaker.
- Once the burette is correctly filled, place over the conical flask.
- Carefully open the tap so the acid flows slowly into the conical flask. Swirl the flask and look for the indicator changing from pink to colourless.
- Continue adding the acid to the flask until the indicator is permanently colourless.
- Record the total volume of acid added to the sodium hydroxide in the results table.
- Repeat the experiment twice more.

## Titration Method (Chemistry Only)

Using the results from a titration experiment, it is possible to calculate the concentration of a solution or the volume of solution required to neutralise an acid or alkali.

### Worked Example



In a titration,  $20\text{cm}^3$  of  $1.0\text{mol/dm}^3$  sulfuric acid reacted with  $25\text{cm}^3$  of sodium hydroxide. What was the concentration of sodium hydroxide?

Write out the symbol equation for the reaction.



Check that the equation is balanced.



To convert  $\text{cm}^3$  to  $\text{dm}^3$ , just divide by 1000.

Draw a table like the one below and fill it in with the information that you know from the question.

	Acid ( $\text{H}_2\text{SO}_4$ )	Alkali ( $\text{NaOH}$ )
number of moles		
concentration $\text{mol/dm}^3$	1.0	
volume ( $\text{dm}^3$ )	0.02	0.025

As the values for the **concentration** and **volume** of the acid are known, it is possible to now work out the **number of moles** of  $\text{H}_2\text{SO}_4$ .

**number of moles = concentration  $\times$  volume**

$$\text{number of moles} = 1.0 \times 0.02 = \mathbf{0.02 \text{ moles}}$$

**From the balanced symbol equation, we know that there is double the amount of  $\text{NaOH}$  compared to  $\text{H}_2\text{SO}_4$ , therefore to calculate the number of moles of the alkali, we double the number of moles of the acid.**

$$0.02 \times 2 = \mathbf{0.04 \text{ moles}}$$

	Acid ( $\text{H}_2\text{SO}_4$ )	Alkali ( $\text{NaOH}$ )
number of moles	0.02	0.04
concentration $\text{mol/dm}^3$	1.0	
volume ( $\text{dm}^3$ )	0.02	0.025

The question asks you to calculate the **concentration** of sodium hydroxide. As the number of moles and volume is now known, it is possible to calculate the concentration.

**concentration = number of moles  $\div$  volume**

$$\text{concentration} = 0.04 \div 0.025$$

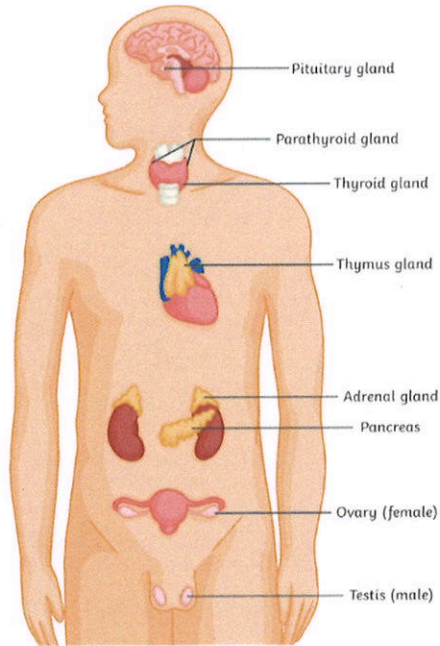
$$\text{concentration} = \mathbf{1.6\text{mol/dm}^3}$$





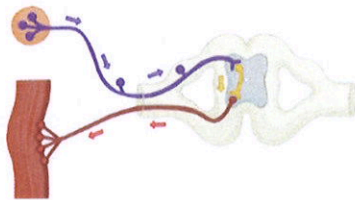
## The Endocrine System

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



## Reflexes

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



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

## Hormones

**Hormones** are **chemical** messengers transported in the **bloodstream** to an effector where they can activate a response. They are produced and released from glands around the body which all make up the **endocrine system**. Hormones do a similar job to the neurons of the nervous system but there are some differences.

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

The hormones released travel in the blood plasma to their **target cells** and affect only those certain cells. Hormones act on organs or cells where constant adjustments are made to maintain a stable state.

Some examples you should know:

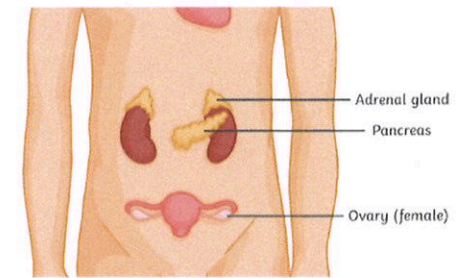
The **pituitary gland** produces a range of hormones including FSH and LH which help to regulate the menstrual cycle. The pituitary gland acts as a **master gland** because many of the hormones it releases control and coordinate the release of other hormones from other glands in the body.

## Diabetes

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

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

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



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

## Hormones in Human Reproduction

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

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

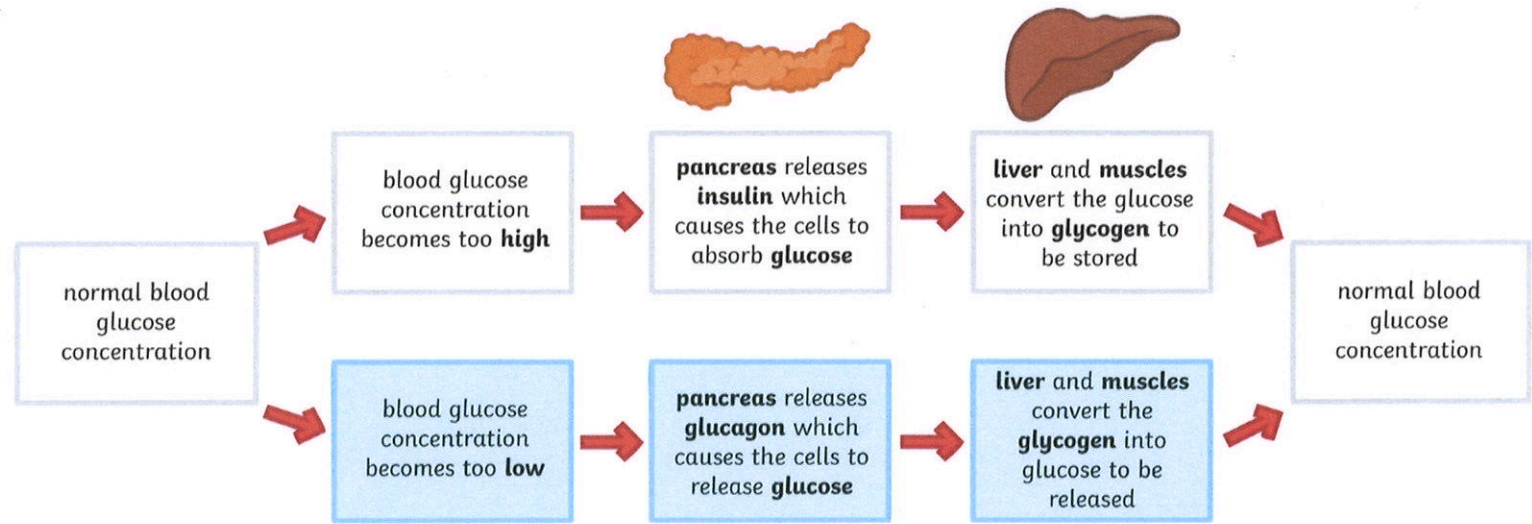


Control of Blood Glucose

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

(HT only)

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

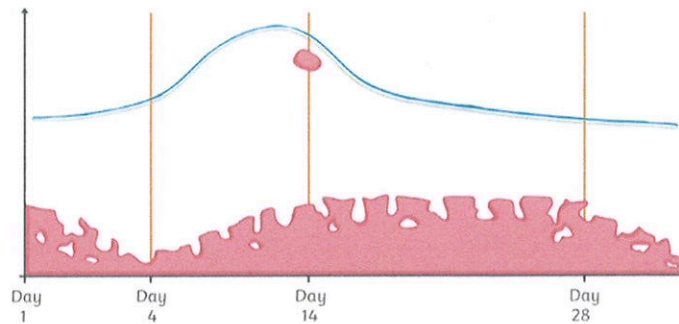


The Menstrual Cycle

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

The whole cycle is controlled by four main reproductive hormones:

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



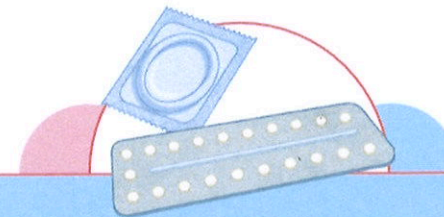
Hormone	Where It Is Produced	Response Caused	Interaction with Other Hormones (HT only)
FSH	pituitary gland	An egg to develop in one of the ovaries.	Stimulates the production of oestrogen.
oestrogen	ovaries	The lining of the uterus builds up and thickens.	Stimulates the production of LH. Inhibits the production of FSH.
LH	pituitary gland	Ovulation (at around day 14 of the cycle).	Indirectly stimulates the production of progesterone.
progesterone	ovaries	The uterus lining to maintain.	Inhibits the production of LH.



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

## Contraception

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



Method	Hormonal or Non-Hormonal	How It Works	Pros and Cons
oral contraceptives ('the pill')	hormonal	Pill taken which contains hormones to <b>inhibit FSH</b> so that an egg does not mature.	<ul style="list-style-type: none"> <li>☺ Easily self-administered. Short-term effects. Can easily be reversed. Very reliable.</li> <li>☹ May have mild side-effects associated. Could lead to pregnancy if missed. Does not protect from STIs.</li> </ul>
injection, implant or skin patch	hormonal	Contains <b>progesterone</b> which is slowly released to inhibit the release of eggs for months or even years.	<ul style="list-style-type: none"> <li>☺ Administered through routine appointment at GP surgery. Requires little to no aftercare or maintenance. Very reliable.</li> <li>☹ May take some time for effects to be reversed once removed. Does not protect from STIs.</li> </ul>
condoms or diaphragm (female condom)	non-hormonal	Creates a <b>physical barrier</b> to prevent the sperm from reaching the egg.	<ul style="list-style-type: none"> <li>☺ Easy to use. Short-term effects. Very reliable. Provides protection from most STIs.</li> <li>☹ Can fail.</li> </ul>
intrauterine devices (coil)	hormonal	The device is attached to the lining of the uterus and <b>releases hormones or prevents the implantation</b> of an embryo.	<ul style="list-style-type: none"> <li>☺ Requires little to no aftercare or maintenance. Very reliable.</li> <li>☹ May take some time for effects to be reversed once removed. Does not protect from STIs.</li> </ul>
spermicidal agents	non-hormonal	Contains chemicals to <b>kill or immobilise sperm</b> cells.	<ul style="list-style-type: none"> <li>☺ Easy to use. Short-term effects.</li> <li>☹ Does not protect from STIs. Less effective when used as the only method.</li> </ul>
abstaining from intercourse (around the time of ovulation)	non-hormonal	Avoiding sexual intercourse when there is a likelihood of an egg being present in the oviduct.	<ul style="list-style-type: none"> <li>☺ inexpensive</li> <li>☹ Not always reliable.</li> </ul>
surgery	non-hormonal	A surgical procedure carried out in men or women. In males, the vas deferens tubes are sealed or blocked to prevent the passage of sperm from the testes. In females, the fallopian tubes (oviducts) are sealed or blocked to prevent the passage of the egg from the ovaries.	<ul style="list-style-type: none"> <li>☹ Risks associated with surgery (such as infection).</li> <li>☹ Difficult to reverse (if at all possible). Can take several months to be reliable.</li> </ul>





## Infertility (HT Only)

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

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

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

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

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

## Adrenaline and Thyroxine (HT Only)

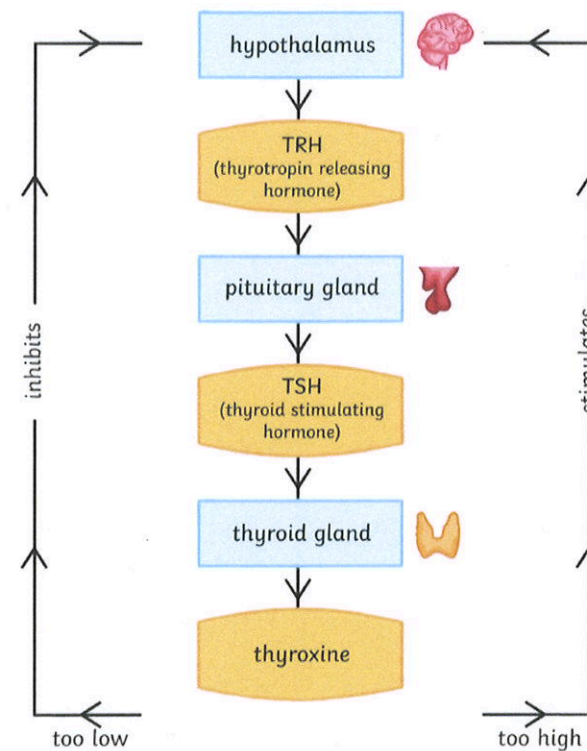
**Adrenaline** is a hormone produced by the **adrenal glands**. It is released in response to stress or fear. The hormone acts on major organs including the heart and lungs. The effect is to increase the heart rate and breathing rate and cause vasodilation (widening of the blood vessels), in order to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

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

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

### Negative Feedback of Thyroxine

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





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

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

#### Method:

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

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

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

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





## AQA GCSE Chemistry (Combined) Unit 5 Energy Changes Knowledge Organiser

### Exothermic and Endothermic Reactions

When a chemical reaction takes place, **energy** is involved. Energy is transferred when chemical **bonds are broken** and when new **bonds are made**.

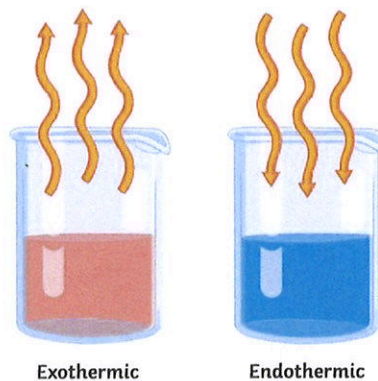
**Exothermic reactions** are those which involve the transfer of energy **from the reacting chemicals to the surroundings**. During a practical investigation, an exothermic reaction would show an **increase in temperature** as the reaction takes place.

Examples of exothermic reactions include **combustion, respiration and neutralisation** reactions. Hand-warmers and self-heating cans are examples of everyday exothermic reactions.

**Endothermic reactions** are those which involve the transfer of energy **from the surroundings to the reacting chemicals**. During a practical investigation, an endothermic reaction would show a **decrease in temperature** as the reaction takes place.

Examples of endothermic reactions include the **thermal decomposition** of calcium carbonate.

Eating **sherbet** is an everyday example of an endothermic reaction. When the sherbet dissolves in the saliva in your mouth, it produces a cooling effect. Another example is **instant ice packs** that are used to treat sporting injuries.



**Activation Energy** – the minimum amount of energy required for a chemical reaction to take place.

**Catalysts** – increase the rate of a reaction. Catalysts provide an alternative pathway for a chemical reaction to take place by **lowering** the activation energy.

### Bond Making and Bond Breaking

In an **endothermic** reaction, energy is needed to break chemical bonds. The **energy change ( $\Delta H$ )** in an endothermic reaction is **positive**.

You may also find, in some textbooks,  $\Delta H$  referred to as the **enthalpy change**.

In an **exothermic** reaction, energy is needed to form chemical bonds. The **energy change ( $\Delta H$ )** in an exothermic reaction is **negative**.

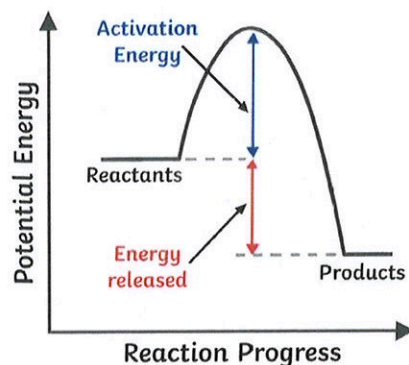
Bond energies are measured in **kJ/mol**.

### Reaction Profiles – Exothermic

Energy level diagrams show us what is happening in a particular chemical reaction. The diagram shows us the **difference in energy** between the reactants and the products.

In an exothermic reaction, the **reactants** are at a **higher energy level** than the products.

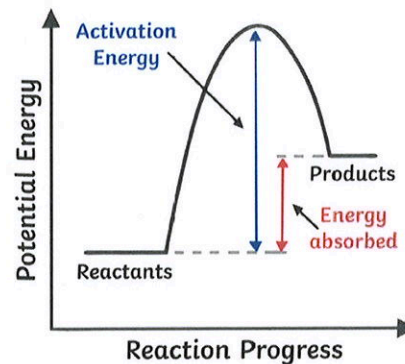
In an **exothermic** reaction, the difference in energy is **released** to the surroundings and so the **temperature** of the surroundings **increases**.



### Reaction Profiles – Endothermic

In an **endothermic** reaction, the **reactants** are at a **lower energy level** than the products.

In an **endothermic** reaction, the difference in energy is **absorbed** from the surroundings and so the **temperature** of the surroundings **decreases**.





**Calculations Using Bond Energies (Higher Tier Only)**

Bond energies are used to calculate the change in energy of a chemical reaction.

Calculate the change in energy for the reaction:  $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$

The first step is to write the symbol equation for the reaction.

Once you have done this, work out the bonds that are breaking and the ones that are being made.



Bond	Bond Energy kJ/mol
H-O	464
O-O	146
O=O	498

On the **left-hand side** of the equation, the **bonds are breaking**.

There are two **O-H** bonds and one **O-O** bond.

$$\text{So } 464 + 146 + 464 = 1074$$

There are two moles of  $\text{H}_2\text{O}_2$  therefore the answer needs to be multiplied by two.

$$\text{So } 1074 \times 2 = 2148$$

On the **right-hand side** of the equation, the **bonds are made**.

There are two **H-O** bonds

$$\text{So } 464 + 464 = 928$$

Two moles of  $\text{H}_2\text{O}$  are made therefore the answer needs to be multiplied by two.

$$\text{So } 928 \times 2 = 1856$$

There is also one **O=O** bond with a bond energy of 498

$$\text{So } 1856 + 498 = 2354$$

$$\Delta H = \text{sum (bonds broken)} - \text{sum (bonds made)}$$

$$\Delta H = 2148 - 2354 = -206 \text{ kJ/mol}$$

The reaction is exothermic as  $\Delta H$  is negative.

**Required Practical****Aim**

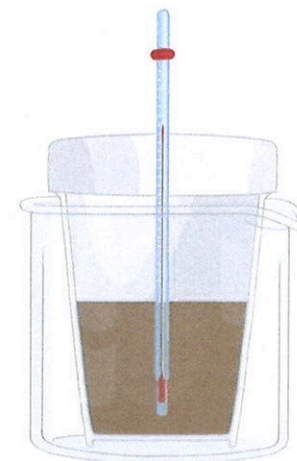
To investigate the variables that affect temperature changes in reacting solutions, e.g. acid plus metals, acid plus carbonates, neutralisations and displacement of metals.

**Equipment**

- polystyrene cup
- measuring cylinder
- thermometer
- 250cm<sup>3</sup> glass beaker
- measuring cylinder
- top pan balance

**Method**

1. Gather the equipment.
2. Place the polystyrene cup inside the beaker. This will prevent the cup from falling over.
3. Using a measuring cylinder, measure out 30cm<sup>3</sup> of the acid. Different acids such as hydrochloric or sulfuric acid may be used. Pour this into the polystyrene cup.
4. Record the temperature of the acid using a thermometer.
5. Using a top pan balance, measure out an appropriate amount of the solid (for example, 10g) or use one strip of a metal such as magnesium.
6. Add the solid to the acid and record the temperature. You may choose to record the temperature of the acid and metal every minute for 10 minutes.



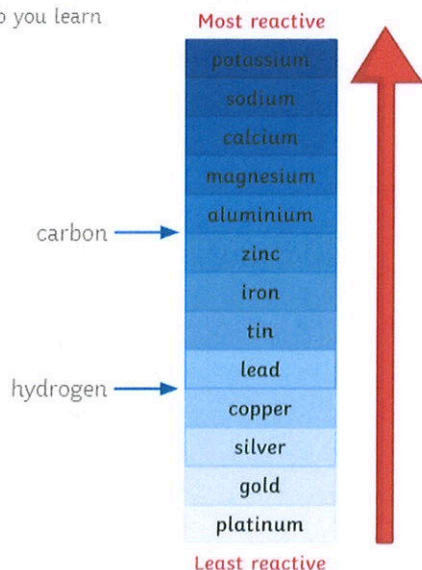


# AQA GCSE Chemistry (Separate Science) Unit 4: Chemical Changes

## The Reactivity Series

Here's a **mnemonic** to help you learn the order:

purple (potassium)  
 slime (sodium)  
 can (calcium)  
 make (magnesium)  
 a (aluminium)  
 careless (carbon)  
 zebra (zinc)  
 insane (iron)  
 try (tin)  
 learning (lead)  
 how (hydrogen)  
 camels (copper)  
 surprise (silver)  
 gorillas (gold)



The reactivity series is a league table for metals. The **more reactive** metals are near the **top** of the table with the **least reactive** near the **bottom**. In chemical reactions, a more reactive metal will displace a less reactive metal.

### Reactions of Metals with Water

Metals, when reacted with water, produce a metal hydroxide and hydrogen.

lithium + water → lithium hydroxide + hydrogen



The more reactive a metal is the faster the reaction.

### Reactions of Metals with Dilute Acid

Metals, when reacted with acids, produce a **salt** and **hydrogen**.

Sodium + hydrochloric acid → sodium chloride + hydrogen



Metals that are below hydrogen in the reactivity series **do not** react with dilute acids.

## Reactions of Acids

The general formula for the reaction between an acid and a metal is:



For example: hydrochloric acid + sodium → sodium chloride + hydrogen



When an acid reacts with an alkali, a neutralisation reaction takes place and a salt and water are produced.

The general formula for this kind of reaction is acid + alkali → salt + water

hydrochloric acid + sodium hydroxide → sodium chloride + water



### Naming Salts

The first part comes from the metal in the metal carbonate, oxide or hydroxide. The second part of the name comes from the acid that was used to make it.

Acid Used	Salt Produced
hydrochloric	chloride
nitric	nitrate
sulfuric	sulfate

For example, sodium chloride.

### Redox Reactions (Higher Tier Only)

When metals react with acids, they undergo a redox reaction. A **redox reaction** occurs when both **oxidation** and **reduction** take place at the **same time**.

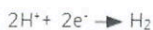
For example:



The ionic equation can be further split into two half equations.



Oxidation is loss of electrons.



Reduction is gaining of electrons.

## Reactions with Bases

The general formula for the reaction between an acid and a metal oxide is:



sulfuric acid + copper oxide → copper sulfate + water



### Reactions with Carbonates

The general formula for the reaction between an acid and a carbonate is:



hydrochloric acid + calcium carbonate → calcium chloride + water + carbon dioxide

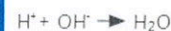
### pH Scale



In aqueous solutions, acids produce  $\text{H}^+$  ions and alkalis produce  $\text{OH}^-$  ions.

Neutral solutions are pH7 and are neither acids nor alkalis.

For example, in neutralisation reactions, hydrogen ions from an acid react with hydroxide ions from an alkali to produce water:

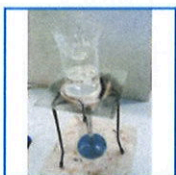
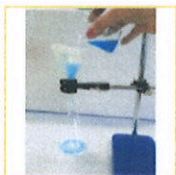
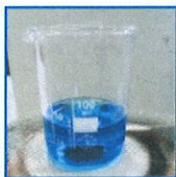




# AQA GCSE Chemistry (Separate Science) Unit 4: Chemical Changes

## Making Soluble Salts

1. Make a saturated solution by stirring copper oxide into the sulfuric acid until no more will dissolve.
2. Filter the solution to remove the excess copper oxide solid.
3. Half fill a beaker with water and set this over a Bunsen burner to heat the water. Place an evaporating dish on top of the beaker.
4. Add some of the solution to the evaporating basin and heat until crystals begin to form.
5. Once cooled, pour the remaining liquid into a crystallising dish and leave to cool for 24 hours.
6. Remove the crystals with a spatula and pat dry between paper towels.



## Strong and Weak Acids (Higher Tier Only)

A **strong** acid **completely dissociates** in a solution. For example:  $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$

Hydrochloric acid is able to completely dissociate in solution to form hydrogen and chloride ions.

Examples of strong acids include nitric acid ( $\text{HNO}_3$ ) and sulfuric acid ( $\text{H}_2\text{SO}_4$ ).

**Weak** acids in comparison only **partially dissociate**.

For example, acetic acid partially dissociates to form a hydrogen and acetate ion.



The **double arrow** symbol indicates that the reaction is **reversible**.

## The Process of Electrolysis

**Electrolysis** is the **splitting up** of an ionic substance using **electricity**.

On setting up an electrical circuit for electrolysis, two **electrodes** are required to be placed in the electrolyte. The electrodes are **conducting rods**. One of the rods is connected to the **positive** terminal and the other to the **negative** terminal.

The **electrodes** are **inert** (this means they do not react in the reaction) and are often made from **graphite** or platinum.

During the process of electrolysis, **opposites attract**. The positively-charged ions will be attracted toward the negative electrode. The negatively-charged ions will be attracted towards the positive electrode.

When ions reach the electrodes, the charges are lost and they become elements.

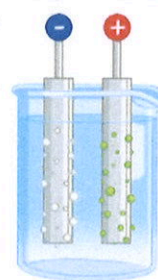
The **positive** electrode is called the **anode**.

The **negative** electrode is called the **cathode**.

## Electrolysis of Aqueous Solutions

Gases may be given off or metals deposited at the electrodes. This is dependent on the reactivity of the elements involved.

If the metal is **more reactive** than **hydrogen** in the reactivity series, then **hydrogen** will be **produced** at the **negative cathode**. At the **positive anode**, negatively charged ions **lose** electrons. This is called **oxidation** and you say that the ions have been oxidised.



## Using Electrolysis to Extract Metals

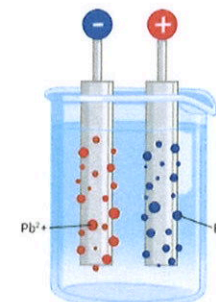
Metals are extracted by electrolysis if the metal in question reacts with carbon or if it is too reactive to be extracted by reduction with carbon. During the extraction process, large quantities of energy are used to melt the compounds.

Aluminium is manufactured by the process of electrolysis. Aluminium oxide has a high melting point and melting it would use large amounts of energy and increase the cost of the process. Therefore, molten **cryolite** is added to aluminium oxide to lower the melting point and thus reduce the cost.

## Electrolysis of Molten Ionic Compounds - Lead Bromide

**Lead bromide** is an **ionic** substance. Ionic substances, when solid, are **not** able to conduct electricity. When molten or in solution, the ions are free to move and are able to carry a charge.

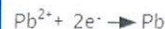
The **positive lead** ions are attracted toward the **negative cathode** at the same time as the **negative bromide** ions are attracted toward the **positive anode**.



Oxidation is the loss of electrons and reduction is the gaining of electrons. **OIL RIG (Higher Tier Only)**.

We represent what is happening at the electrodes by using **half equations (Higher Tier Only)**.

The lead ions are attracted towards the negative electrode. When the **lead ions** ( $\text{Pb}^{2+}$ ) reach the cathode, each ion **gains two electrons** and becomes a neutral atom. We say that the lead ions have been **reduced**.



The bromide ions are attracted towards the positive electrode. When the **bromide ions** ( $\text{Br}^-$ ) reach the anode, each ion **loses one electron** to become a neutral atom. Two bromine atoms are then able to bond together to form the **covalent** molecule  $\text{Br}_2$ .





**¿En qué trabajas?**

Soy... / Es...  
 Me gustaría ser...  
 abogado/a  
 albañil  
 amo/a de casa  
 azafato/a  
 bailarín(a)  
 bombero/a  
 camarero/a  
 cantante  
 cocinero/a  
 contable  
 dependiente/a  
 diseñador(a)  
 electricista  
 enfermero/a  
 escritor(a)  
 fontanero/a  
 fotógrafo/a  
 funcionario/a  
 guía turístico/a  
 ingeniero/a  
 jardinero/a  
 mecánico/a  
 médico/a  
 músico/a  
 peluquero/a  
 periodista  
 policía

**What is your job?**

I am... / He/She is...  
 I would like to be...  
 lawyer  
 bricklayer / builder  
 housewife / househusband  
 flight attendant  
 dancer  
 firefighter  
 waiter / waitress  
 singer  
 cook  
 accountant  
 shop assistant  
 designer  
 electrician  
 nurse  
 writer  
 plumber  
 photographer  
 civil servant  
 tour guide  
 engineer  
 gardener  
 mechanic  
 doctor  
 musician  
 hairdresser  
 journalist  
 police officer

profesor(a) teacher  
 recepcionista receptionist  
 socorrista lifeguard  
 soldado soldier  
 veterinario/a vet  
 Es un trabajo... It's a ... job  
 artístico / emocionante artistic / exciting  
 exigente / importante demanding / important  
 fácil / difícil easy / difficult  
 manual / monótono manual / monotonous  
 variado / repetitivo varied / repetitive  
 con responsabilidad with responsibility  
 con buenas perspectivas with good prospects  
 con un buen sueldo with a good salary  
 Tengo que... / Suelo... I have to... / I tend to...  
 cuidar a los clientes / pacientes / look after the customers / patients /  
 pasajeros passengers  
 contestar llamadas telefónicas answer telephone calls  
 cuidar las plantas y las flores look after the plants and flowers  
 enseñar / vigilar a los niños teach / supervise the children  
 hacer entrevistas do interviews  
 preparar platos distintos prepare different dishes  
 reparar coches repair cars  
 servir comida y bebida serve food and drink  
 trabajar en un taller / en un hospital / work in a workshop / in a hospital /  
 en una tienda / a bordo de un avión in a shop / aboard a plane  
 vender ropa de marca sell designer clothing  
 viajar por todo el mundo travel the world

**¿Qué tipo de persona eres?**

Creo que soy...  
 ambicioso/a  
 comprensivo/a  
 creativo/a  
 extrovertido/a  
 fuerte  
 inteligente

**What type of person are you?**

I think I'm...  
 ambitious  
 understanding  
 creative  
 extroverted / outgoing  
 strong  
 intelligent

organizado/a organised  
 paciente patient  
 práctico/a practical  
 serio/a serious  
 trabajador(a) hardworking  
 valiente brave

**¿Qué haces para ganar dinero?**

¿Tienes un trabajo a tiempo parcial?  
 Reparto periódicos.  
 Hago de canguro.  
 Trabajo de cajero/a.  
 Ayudo con las tareas domésticas.  
 Cocino.  
 Lavo los platos.  
 Paso la aspiradora.  
 Plancho la ropa.  
 Pongo y quito la mesa.  
 Paseo al perro.  
 Corto el césped.  
 Lo hago...

**What do you do to earn money?**

Do you have a part-time job?  
 I deliver newspapers.  
 I babysit.  
 I work as a cashier.  
 I help with the housework.  
 I cook.  
 I wash the dishes.  
 I do the vacuuming.  
 I iron the clothes.  
 I lay and clear the table.  
 I walk the dog.  
 I cut the lawn.  
 I do it...

los sábados on Saturdays  
 antes / después del insti before / after school  
 cuando necesito dinero when I need money  
 cuando mi madre está trabajando when my mum is working  
 cuando me necesitan when they need me  
 cada mañana each / every morning  
 una vez / dos veces a la semana once / twice a week  
 Gano ... euros / libras a la hora / I earn ... euros / pounds per hour /  
 al día / a la semana. day / week.  
 Me llevo bien con mis compañeros. I get on well with my colleagues.  
 Mi jefe/a es amable. My boss is nice.  
 El horario es flexible. The hours are flexible.

**Mis prácticas laborales**

Hice mis prácticas laborales en...  
 Pasé quince días trabajando en...  
 un polideportivo  
 una agencia de viajes / una granja  
 una escuela / una oficina  
 una fábrica de juguetes  
 una tienda benéfica / solidaria  
 la empresa de mi madre  
 El primer / último día conocí a /  
 llegué...  
 Cada día / Todos los días...  
 archivaba documentos  
 ayudaba...  
 cogía el autobús / el metro  
 empezaba / terminaba a las ...  
 hacía una variedad de tareas

**Work experience**

I did my work experience in...  
 I spent a fortnight working in...  
 a sports centre  
 a travel agency / a farm  
 a school / an office  
 a toy factory  
 a charity shop  
 my mum's company  
 On the first / last day I met / I arrived...  
 Each / Every day...  
 I filed documents  
 I helped...  
 cogía el autobús / underground  
 I started / finished at...  
 I did a variety of tasks

iba en transporte público I went by public transport  
 llevaba ropa elegante I wore smart clothes  
 ponía folletos en los estantes I put brochures on the shelves  
 sacaba fotocopias I did photocopying  
 Mi jefe/a era... My boss was...  
 Mis compañeros eran... My colleagues were...  
 Los clientes eran... The customers were ...  
 alegre(s) cheerful  
 (des)agradable(s) (un)pleasant  
 (mal) educado/a(s) polite (rude)  
 El trabajo era duro. The job was hard.  
 Aprendí... I learned  
 muchas nuevas habilidades lots of new skills  
 a trabajar en equipo to work in a team  
 a usar... to use...  
 No aprendí nada nuevo. I didn't learn anything new.



## Winter term: Mi trabajo

### ¿Por qué aprender idiomas?

Aumenta tu confianza.  
Estimula el cerebro.  
Mejora tus perspectivas laborales.  
Te abre la mente.  
Te hace parecer más atractivo.  
Te ayuda a...  
Te permite...  
apreciar la vida cultural de otros países  
conocer a mucha gente distinta  
conocer nuevos sitios

### Why learn languages?

It increases your confidence.  
It stimulates the brain.  
It improves your job prospects.  
It opens your mind.  
It makes you appear more attractive.  
It helps you to...  
It allows you to...  
appreciate the cultural life of other countries  
meet lots of different people  
get to know new places

encontrar un trabajo  
descubrir nuevas culturas  
establecer buenas relaciones  
hacer nuevos amigos  
mejorar tu lengua materna  
solucionar problemas  
trabajar o estudiar en el extranjero  
Me hace falta saber hablar idiomas extranjeros.  
(No) Domino el inglés.  
Hablo un poco de ruso.

find a job  
discover new cultures  
establish good relationships  
make new friends  
improve your first language  
solve problems  
work or study abroad  
I need to know how to speak foreign languages.  
I (don't) speak English fluently.  
I speak a bit of Russian.

### Solicitando un trabajo

Se busca / Se requiere...  
(No) Hace falta experiencia.  
Muy señor mío  
Le escribo para solicitar el puesto de...  
Le adjunto mi curriculum vitae.  
Le agradezco su amable atención.  
Atentamente  
Me apetece trabajar en...

### Applying for a job

... required.  
Experience (not) needed.  
Dear Sir  
I'm writing to apply for the post of...  
I'm enclosing my CV.  
Thank you for your kind attention.  
Yours sincerely/faithfully  
Working in... appeals to me.

(No) Tengo experiencia previa.  
He estudiado / trabajado...  
He hecho un curso de...  
Tengo...  
buen sentido del humor  
buenas capacidades de comunicación / resolución de problemas  
buenas habilidades lingüísticas

I (don't) have previous experience.  
I've studied / worked...  
I've done a course in...  
I have...  
a good sense of humour  
good communication / problem-solving skills  
good language skills

### Un año sabático

Si pudiera tomarme un año sabático...  
Si tuviera bastante dinero...  
apoyaría un proyecto medioambiental  
aprendería a esquiar  
ayudaría a construir un colegio  
buscaría un trabajo  
enseñaría inglés

### A gap year

If I could take a gap year...  
If I had enough money...  
I would support an environmental project  
I would learn to ski  
I would help to build a school  
I would look for a job  
I would teach English

ganaría mucho dinero  
haría un viaje en Interrail  
iría a España, donde...  
mejoraría mi nivel de español  
nunca olvidaría la experiencia  
pasaría un año en...  
trabajaría en un orfanato  
viajaría con mochila por el mundo

I would earn a lot of money  
I would go Interrailing  
I would go to Spain, where...  
I would improve my level of Spanish  
I would never forget the experience  
I would spend a year in...  
I would work in an orphanage  
I would go backpacking around the world

### ¿Cómo viajarías?

Cogería el / Viajaría en autobús / autocar / avión / tren.  
Es más barato / cómodo / rápido.  
Puedes...  
ver vídeos mientras viajas  
dejar tu maleta en la consigna

### How would you travel?

I would catch the / travel by bus / coach / plane / train.  
It's cheaper / more comfortable / quicker.  
You can...  
watch videos whilst you travel  
leave your suitcase in the left-luggage office

Hay muchos / pocos atascos / retrasos...  
en las autopistas / las carreteras  
Los billetes son carísimos.  
Los conductores están en huelga.  
Odio esperar en la parada de autobús.  
Tengo miedo a volar.

There are lots of / few traffic jams / delays...  
...on the motorways / roads  
The tickets are extremely expensive.  
The drivers are on strike.  
I hate waiting at the bus stop.  
I'm scared of flying.

### Viajando en tren

El tren con destino a...  
efectuará su salida...  
de la vía / del andén dos  
el (tren) AVE  
la taquilla

### Travelling by train

The train to...  
will leave / depart...  
from platform two  
high-speed train  
the ticket office

Quisiera un billete de ida a...  
Quisiera un billete de ida y vuelta a...  
¿De qué andén sale?  
¿A qué hora sale / llega?  
¿Es directo o hay que cambiar?

I would like a single ticket to...  
I would like a return ticket to...  
From which platform does it leave?  
What time does it leave / arrive?  
Is it direct or do I have to change?

### El futuro

Me interesa(n)...  
Me importa(n)...  
Me preocupa(n)...  
el desempleo / el paro  
el dinero / el éxito  
el fracaso / el matrimonio  
la responsabilidad  
la independencia / la pobreza  
los niños / las notas  
Espero...  
Me gustaría...  
Pienso...  
Quiero...  
Tengo la intención de...  
Voy a...  
aprender a conducir  
aprobar mis exámenes  
casarme  
conseguir un buen empleo/trabajo  
estudiar una carrera universitaria  
montar mi propio negocio  
sacar buenas notas

### The future

...interest(s) me.  
...matter(s) to me.  
...worry/worries me.  
unemployment  
money / success  
failure / marriage  
responsibility  
independence / poverty  
children / marks  
I hope to...  
I would like to...  
I plan to/intend to...  
I want to...  
I intend to...  
I am going to...  
learn to drive  
pass my exams  
get married  
get a good job  
study a university course  
set up my own business  
get good marks

ser feliz  
tener hijos  
trabajar como voluntario/a  
Cuando...  
gane bastante dinero...  
me enamore...  
sea mayor...  
tenga ... años...  
vaya a la universidad...  
termine este curso / el bachillerato / la formación profesional / la licenciatura...  
buscaré un trabajo  
compartiré piso con...  
compraré un coche / una casa  
iré a otro insti / a la universidad  
me casaré  
me iré de casa  
seguiré estudiando en mi insti  
seré famoso/a  
me tomaré un año sabático  
trabajaré como...

be happy  
have children  
work as a volunteer  
When...  
I earn enough money...  
I fall in love...  
I'm older...  
I'm ... years old...  
I go to university...  
I finish this course / my A Levels / my vocational course / my degree  
I will look for a job  
I will share a flat with...  
I will buy a car / house  
I will go to another school / to university  
I will get married  
I will leave home  
I will carry on studying at my school  
I will be famous  
I will take a gap year  
I will work as...



## Command Words and Instructions

Lisez l'article.	Read the article.	Écoutez la discussion.	Listen to the discussion.
Décidez si les phrases sont vraies ou fausses.	Decide if the phrases are true or false.	Mentionnez quatre choses.	Mention four things.
Trouvez les quatre phrases varies.	Find the four correct statements.	Décrivez votre chanteur préféré.	Describe your favourite singer.
Écrivez la bonne lettre dans les cases.	Write the correct letter in the boxes.	Répondez à la question.	Answer the question.
Complétez les phrases en français.	Complete the phrases in French.	Parlez en français.	Speak in French.
Choisissez la bonne réponse	Choose the correct answer.	Discutez avec un ami.	Discuss with a friend.

## Idioms and Flash French

Je suis sage comme une image.	I am as good as gold.
J'en ai ras le bol.	I am fed up with it.
Ça marche.	That works for me / It's fine/ OK.
Pas de problème.	No worries.
Il fait un froid de canard.	It's freezing.
Revenons à nos moutons.	Anyway, as I was saying.....
J'ai le cafard.	I've got the blues / I'm down.

## Modules / Themes

- o 1 Me, my family and friends
- o 2 Technology and media
- o 3 Hobbies, food and festivals
- o 4 Home, town and region
- o 5 Travel and tourism
- o 6 Education and social issues
- o 7 Career and life choices
- o 8 Social and global issues

## Literacy Mat: Key Stage 4 French

### Time Frames and Verbs

Past	Hier La semaine dernière L'année dernière Le weekend dernier Il y deux jours Dans le passé Hier soir	je suis allé(e) j'ai joué j'ai visité j'ai logé j'ai mangé j'étais	je suis parti(e) j'ai regardé j'ai pris j'ai compris j'ai bu j'avais	je suis arrivé(e) j'ai acheté j'ai écrit j'ai fini je devais je pouvais	j'ai fait j'ai trouvé j'ai nagé je me suis levé(e) je voulais
Present	Aujourd'hui Cette semaine Cette année Le weekend Le matin Tous les jours D'habitude	je vais je joue je visite je loge je mange je suis	je pars je regarde je prends je comprends je bois j'ai	j'arrive j'achète j'écris je finis je dors je dois je peux	je fais je trouve je nage je me lève je veux
Future	Demain La semaine prochaine L'année prochaine Le weekend prochain Dans l'avenir Demain soir	je vais aller je vais jouer je vais visiter je vais loger je vais manger je serai	je vais partir je vais regarder je vais prendre je vais comprendre je vais boire j'aurai	je vais arriver je vais acheter je vais écrire je vais finir je vais dormir je devrai je pourrai	je vais faire je vais trouver je vais nager je vais me lever je voudrai

### Opinions and Reasons

J'adore .....	parce que / qu' car	je trouve que c'est	intéressant. utile. délicieux. sympa. drôle. ennuyeux. agaçant. difficile. énervant. passionnant.
Je préfère.....		je pense que c'est	
J'aime.....		je le / la trouve	
J'aime assez.....		à mon avis c'est	
Je n'aime pas		d'après moi c'est	
Je déteste.....		selon moi c'est	
Je n'aime pas			
J'ai horreur (de)....			
Je ne supporte pas			
bien que ça soit			

### Conjunctions

et	and
mais	but
quand	when
cependant	however
qui	who/ which
néanmoins	nevertheless
puis	then
ensuite	next
si	if
donc	so / therefore
alors	then / so
par contre	on the other hand
d'un côté...	on one hand
et de l'autre.....	on the other hand

### Adverbs

heureusement	fortunately
malheureusement	unfortunately
d'abord	first of all
normalement	normally
d'habitude	usually
généralement	generally
souvent	often
ensuite	next
de temps en temps	from time to time
finalemt	finally
parfois	sometimes
jamais	never
régulièrement	regularly

## Grammar Terms

Proper noun	A name eg: Paris	Subject	The person or thing doing the action eg I walked
Common noun	A thing eg: une ville	Direct object	The person or thing directly affected by the action eg: I walked <b>the dog</b>
Pronoun	Replaces a noun eg: il / elle	Indirect object	The person or thing indirectly affected by the action eg: I gave a bone to <b>the dog</b>
Adjective	Describes a noun eg: bleu	Negative	Usually to make a verb negative. eg: Je n'aime pas le chocolat
Verb	A doing word for an action or state eg: jouer, être	Comparative	To say something is bigger / smaller than something else. eg: plus grand / petit. que
Adverb	Describes an action eg: rapidement, régulièrement	Superlative	To say something is the biggest / smallest eg: le plus grand
Infinitive	The name of a verb eg: jouer, être, finir, vendre	Possessive pronoun	My / your / his / her etc mon ma mes ton ta tes son sa ses
Tense	A change in the verb to show when the action is happening eg: j'ai joué, - I played	Subordinate clause	A part of a sentence which is dependent on another, main clause. eg: I would buy a boat if I <b>were</b> rich.
Conjugate	To make the verb fit the subject - eg. je joue/ tu joues	Demonstrative pronoun	How to say, this, that these and those etc Eg: ce livre / cette femme / ces enfants
Paradigm	The pattern of a whole verb in a given tense. eg: je joue tu joues il / elle/ on joue nous jouons vous jouez ils / elle jouent	Conjunction	A word used to join two clauses in a sentence. Eg: J'aime les chats <b>parce qu'ils</b> sont mignons.
		Faux ami	A word that looks or sounds like English but does not mean the same. Eg. Bonne <b>journée</b> . = Have a good day

## Punctuation

Full stop	.	Hyphen	-	Accents	
Comma	,	Inverted Commas	"	Acute accent	é
Colon	:	Brackets	()	Grave accent	à è ì ò ù
Semi-colon	;	Apostrophe	'	Circumflex Accent	â ê î ô û
Question mark	?	A new paragraph is used when you change <b>Time, Place, Tonic</b> or <b>Person</b>		Cedilla	ç
Exclamation mark	!			Umlaut / tréma	ä T ü

## Describing a Picture

Sur la photo	il y a	une parade.
À gauche		des spectateurs.
À droite		un groupe de gens / filles / garçons / musiciens.
Au centre		un groupe d'enfants.
Ils/Elles sont	dans la rue. en ville.	
Ils/Elles	marchent / dansent / jouent d'un instrument.	
Ils/Elles portent des vêtements	traditionnels / colorés / bizarres / incroyables. blancs / bleus / noirs / ...	
Ils/Elles	portent des drapeaux.	