Knowledge Organisers
Year 9
Summer 2024

Knowledge Organisers

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*Some subjects have Knowledge Organisers which last two terms or a year, therefore it will be the same as in past booklets.

An Introduction to Knowledge Organisers

What is a Knowledge Organiser?
A knowledge organiser is a document, usually one side of A4, occasionally two, that contains key facts and information that children need to have a basic knowledge and understanding of a topic, or in some cases a series of topics.

Students are expected to bring their Knowledge Organiser Booklet to school every day. Students will be issued with a new booklet to bring each term. However, it is import they keep the old booklets to help with revision for end of year exams.

What are the benefits of knowledge organisers?
The main benefit of knowledge organisers is that they give students and parents the 'bigger picture' of a topic or subject area. Some topics can be complicated, so having the essential knowledge, clear diagrams, explanations and key terms on one document can be really helpful.

Research shows that our brains remember things more efficiently when we know the 'bigger picture' and can see the way that nuggets of knowledge within that subject area link together. Making links, essentially, helps information move into our long-term memory.

How can the students use them?
As mentioned earlier, students are expected to bring their Knowledge Organiser Booklet to school everyday. In lessons they can be used in a number of ways, for example, to look up the meaning of key words, spell words correctly and do some additional work if they have finished classwork.

At home knowledge organisers can be used to support homework, independent work and revise for tests and exams. Two quick and easy ways to do this are:

1. <u>Look, cover write, check</u> – look at <u>part</u> of the knowledge organiser, cover it, write as much as you can remember and then check it
2. <u>Word up</u> – Pick out any words you don't understand. Use a dictionary or thesaurus to find the meaning. If they don't help as your teacher.

The more often you do this the better. YouTube has some clips on them; search 'Mr Garner look, cover, write, and check 'and 'Mr Garner word up'

How can parents use them?
- Read through the organiser with your son/daughter – if you don't understand the content then ask them to explain it to you – 'teaching' you helps them to reinforce their learning.
- Test them regularly on the spellings of key words until they are perfect. Get them to make a glossary (list) of key words with definitions or a list of formulae.
- Read sections out to them, missing out key words or phrases that they have to fill in. Miss out more and more until they are word perfect.

How the booklet is organised
The knowledge organisers are in alphabetical order by subject.

Year 9 Knowledge Organiser Term 2&3

Art Nouveau Lino Printing

Project outline

Throughout this project you will learn about the Art Nouveau movement.

You will :
- Take inspiration from Art Nouveau movement
- Understand the Style of Art Nouveau
- Design your own Art Nouveau rotational pattern

For your final piece you will:
- Develop your pattern into a 3 colour lino print

Skills

Develop a range of drawing techniques and mark making skills whilst still showing formal elements & observation

Take inspiration from Art Nouveau Artists and craftspeople

--Understand the movement and the style of Art Nouveau

-Apply ideas and techniques of the artist/MOVEMENT

Develop repeated patterns

Learn how to produce a 3 colour lino print
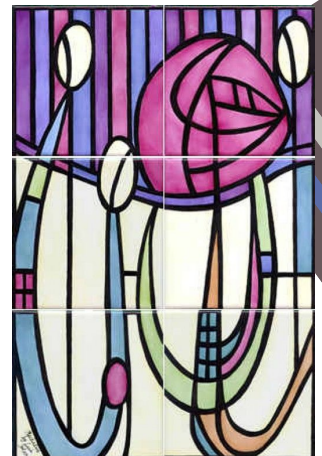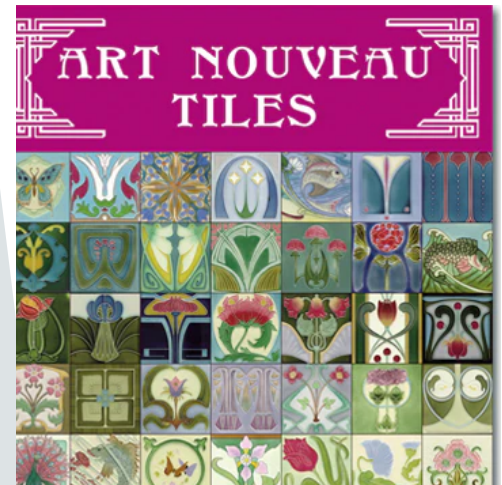
Develop a composition and manipulate media

--Using artist style, following plan

—Controlling application/presentation

—develop lino print technique

ART NOUVEAU TILES

Tools for printmaking
Roller Cutter Blades Ink Lino

Health & Safety—cut away from hand & body

Artists renown for lino/block printing
- Ian McCulloch
- Angie Lewin
- Edward Bawden
- Irving Amen
- Dale Deveraux Barker
- Clare Curtis
- Cyril E. Power

1 2 3 4 5

Computing: AI Knowledge Organiser

Key Word	Meaning
Artificial Intelligence	Artificial intelligence (AI) is the design and study of systems that appear to mimic intelligent behaviour.
Bias	Bias refers to a preference for or against something.
Data	Data refers to values, facts, or observations in a form suitable to be used by computer programs.
Data-driven	Data-driven is a way of designing systems using data instead of step-by-step instructions.
Generative AI	Generative AI is a type of artificial intelligence (AI) designed to generate content, such as text, images, or sound.
Machine Learning	Machine learning is designing and building AI systems that 'learn' by using examples in the form of data.
ML classification	Classification refers to the task of assigning things into predefined groups, called classes
ML confidence	In machine learning, confidence is a way of measuring the certainty of a prediction
ML decision tree	A machine learning decision tree is one type of ML model. They are used to make predictions.
ML model	A computer program that is trained to make predictions.
Reinforcement learning	Training an ML model by using trial and error.
Rule-based	Rule-based is a way of designing systems using a set of rules, instead of data.
Supervised learning	Training a model using data prepared by humans.
Unsupervised learning	An ML model trains itself by grouping data.

Drama Knowledge Organiser: Year 9

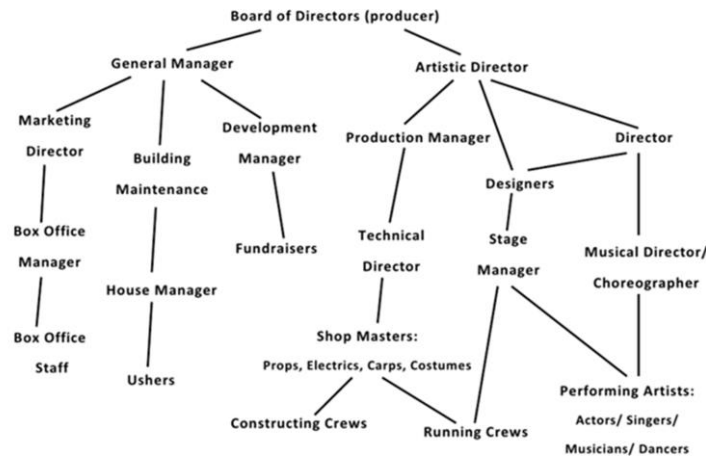| Techers	Practitioners	Frantic Assembly
• Play write = John Godber • Comedic play offering a social commentary. • Multirole • Breaking the forth wall • Devising • Stereotypes	• Bertolt Brecht • Konstantine Stanislavski • Naturalism • Emotion Memory • Magic If • Hot seating • Brecht- wanted the audience to think and to not get emotionally attached • Stan- Wanted the audience to feel the real emotions of the character.	• Physical Theatre • 'The Frantic Method' • Collaboration • Ensemble • Chair Duets • Round by Through • Music • Diverse Theatre • Body as a prop

Live theatre

- Treasure Island
- National Theatre
- Bryony Lavery
- Set design
- Costume design
- Characterisation
- Key elements of the different ones.
- Bringing it all together to evaluate the performance.
- Analysing and evaluating a piece of theatre while demonstrating knowledge and understanding of how theatre is performed

The Performing Arts

Board of Directors (producer)

General Manager — Artistic Director

Marketing Director — Building Maintenance — Development Manager — Production Manager — Director

Box Office Manager — House Manager — Fundraisers — Technical Director — Designers — Stage Manager — Musical Director/ Choreographer

Box Office Staff — Ushers — Shop Masters: Props, Electrics, Carps, Costumes

Constructing Crews — Running Crews — Performing Artists: Actors/ Singers/ Musicians/ Dancers

FLOODLIGHT
A 'Floodlight' is one of the simplest lanterns. It does not have a lens and cannot be focused. As a result, it provides a general wash of colour and is normally used for lighting flat scenery.
SYMBOL FOR LIGHTING PLAN

PROFILE SPOT
A 'Profile Spot' provides a strong beam of light that can be focused on a specific area of the stage. The defined beams are perfect for long throws and can be used to cut shapes on stage and project gobos.
SYMBOL FOR LIGHTING PLAN

FOLLOW SPOT
A 'Follow Spot' sits on a stand and is designed to follow performers around the stage. It is a more powerful variation of a profile spot with additional features such as colour magazines and an iris.
SYMBOL FOR LIGHTING PLAN

FRESNEL SPOT
A 'Fresnel Spot' is used to create a general wash of light across the stage. The Fresnel has a stepped lens that causes light to scatter, producing a softer edge. 'Barn doors' on all four sides of the lantern can be opened and closed to determine the spill of light.
SYMBOL FOR LIGHTING PLAN

PAR CAN
A 'Par Can' cannot be focused and is one of the cheaper types of lantern. Often used in rock concerts, Par Can lanterns throw a very harsh, strong beam of light, creating a dramatic effect.
SYMBOL FOR LIGHTING PLAN

Year 9 Cooking and Nutrition Knowledge Organiser

Hygiene and Safety – The four C's

Food hygiene & safety is a about protecting people and minimising the risk.

- **Cleaning** – e.g. following routine, meeting standards using correct materials, cloths and PPE ,

- **Chilling** – storing food at appropriate temperatures

- **Cooking** – making sure food is cooked and served at correct safe temperatures.

- **Cross-contamination** – avoiding food poisoning.

The 4 C's of food safety
CLEANING / COOKING / CHILLING / CROSS-CONTAMINATION

World Cuisine

World cuisines are one of the best ways to connect with others and to experience world cultures. Traditional food opens a window into the lifestyle of any given place. It tells a story of the people who lived there, its climate and the local flora and fauna.

Local ingredients and cooking techniques create a unique food profile distinctive to each area. Also, the customs around actually eating the food are integral to the culture.

World Cuisine's popular in the UK:

- Chinese
- Italian
- Thai
- Indian
- Mexican
- Japanese
- Turkish
- Greek
- American
- Spanish

How to Research

Key Skills

- Select a Topic and identify keywords.
- Decide which research methods will work best and locate information.
- Evaluate and analyse information.
- Write, organise, and communicate information in a way that your readers will find interesting and easy to understand.
- Cite sources – it is important that you state where you have got information from, you don't want to be suspected of plagiarism.

PRIMARY RESEARCH — Surveys/polls, Interviews, Focus groups, Observations. EXPLORATORY RESEARCH. SECONDARY RESEARCH — Online research, Literature research, Case study research
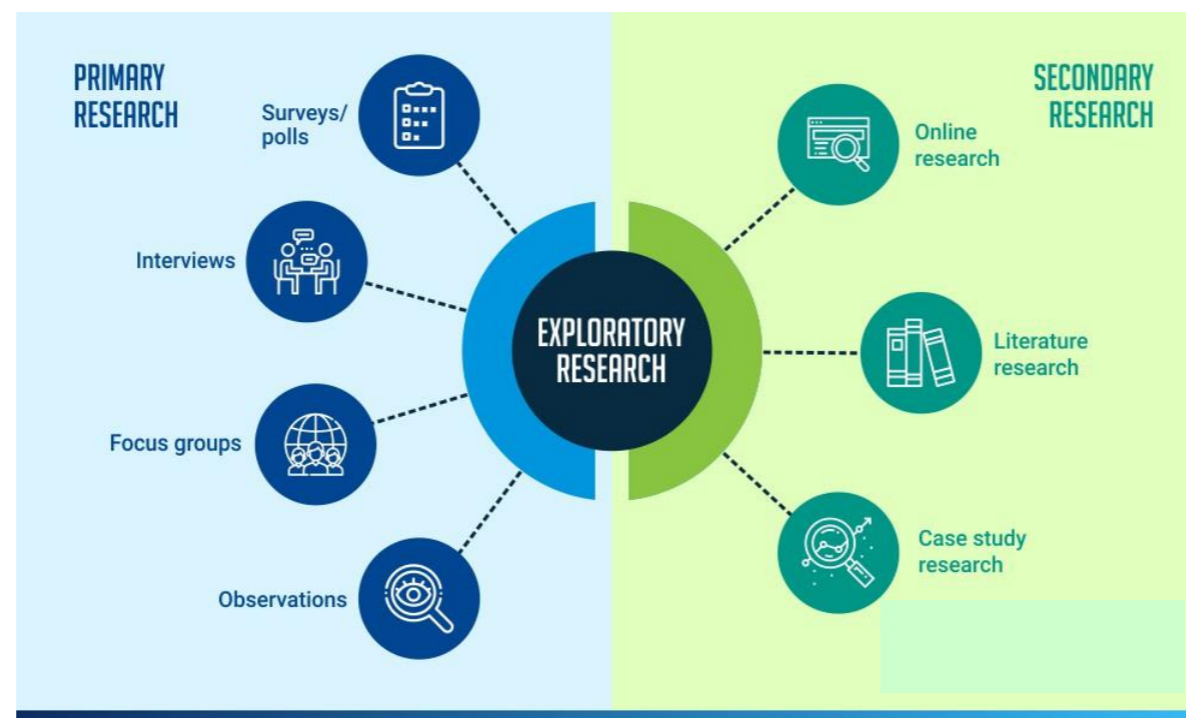
Key vocabulary	
Cross Contamination	Process by which bacteria or other microorganisms are unintentionally transferred from one substance or object to another, with harmful effect.
Task analysis	Detailed examination of the given task.
Primary Research	Primary research is data which is obtained first-hand. This means that the researcher conducts the research themselves, going directly to the source, rather than relying on pre-existing data samples.
Secondary Research	Secondary research or desk research is a research method that involves using already existing data. Existing data is summarised and collated.

Year 9 Product Design Knowledge Organiser

dt design technology

Architectural Light

Key Skills

- Responding to a Design Context

- Analysing & researching information

- Creating a brief & identifying an audience

- Writing a product specification

- Developing CAD/CAM skills using:
  - Techsoft 2D Design

- Applying Health & Safety procedures and PPE in the workshop environment

- Identifying & using specific workshop tools and equipment

- Developing practical skills to create lap, housing & dowel joints to join materials

- Using a line bender to manipulate Acrylic

- Knowledge of timbers, manufactured boards, thermosetting polymers & card

- Prototype modelling, finishing & presentation skills

- Evaluating the design & manufacturing process

Tools & Equipment

Try square	Steel rule	Soldering Iron
Bench vice	Bench hook	Tenon saw
LED	Side cutters	Sand Paper
Pillar drill	Belt & Disc sander	Sealant

Key vocabulary

Design Context	The circumstances, problem or setting in which a product will be used.
Design Brief	An written outline which explains the aims and objectives of a project.
Specification	A statement that details exactly a products function and the design requirements.
CAD	Computer aided design
CAM	Computer aided manufacture e.g. laser cutter
Finishing	The process of applying a finish to preserve or protect a material & improve aesthetics.
Prototype	A prototype is a model that is built to test to see if it is successful or whether it needs further modification or improvements.
PPE	Personal protective equipment are items

Timber is a natural material with imperfections, knots and grain – always sand with the grain

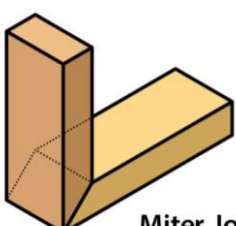|	
Softwood	From coniferous trees that are evergreen, which are faster to grow and are less expensive than hardwoods. Softwoods are a sustainable material as the resource can be regrown and not depleted. Softwoods are strong and easy to work with.
Hardwood	Hardwood. Hardwoods come from deciduous trees, which have large flat leaves that fall in the autumn. Hardwoods take longer to grow, are not easily sourced and are expensive to buy

Thermoplastic polymers are chemically manufactured and can be heated and shaped many times.

Acrylic	Acrylic is used in sheet form it is lightweight or shatter-resistant. It comes in a variety of colours it can be frosted or transparent. Acrylic is durable and is a good electrical insulator but scratches easily. It is recyclable and can be heat moulded.

L.E.D. - Light Emitting Diode
This component is usually called by its initials L.E.D. It lights up when connected to a battery and needs between 1.5v - 3v (Volts). More than 3 volts will burn it out. The long leg must be connected to the positive side of the circuit or current will not pass through.

LED SYMBOLS

Good solder joint | Too little solder | Too much solder

Year 9 Product Design Knowledge Organiser

Organiser

Key Skills

- Responding to a Design Context
- Analysing & researching information
- Creating a brief & identifying an audience
- Developing CAD/CAM skills using:
  - Techsoft 2D Design
- Applying Health & Safety procedures and PPE in the workshop environment
- Identifying & using specific workshop tools and equipment
- Developing practical skills to create mitre joints
- Drilling pilot holes, fixing screws
- Cutting Acrylic/MDF to produce a shelf
- Prototype modelling, finishing & presentation
- Evaluating the design & manufacturing process

Tools & Equipment

Try square	Steel rule	Mitre Clamps
Bench vice	Bench hook	Tenon saw
Coping saw	Chisel	File
Pillar drill	Belt & Disc sander	Screw driver

Key vocabulary

Design Context	The circumstances, problem or setting in which a product will be used.
Design Brief	An written outline which explains the aims and objectives of a project.
Specification	A statement that details exactly a products function and the design requirements.
CAD	Computer aided design
CAM	Computer aided manufacture e.g. laser cutter
Finishing	The process of applying a finish to preserve or protect a material & improve aesthetics.
Prototype	A prototype is a model that is built to test to see if it is successful or whether it needs further modification or improvements.
PPE	Personal protective equipment are items such as goggles and aprons.

Joining Materials – Mitre Joint

Mitre Joint	
Miter Joint	A mitre joint is a joint made by cutting each of two parts to be joined, across the main surface, usually at a 45° angle, to form a corner, usually to form a 90° angle, though it can comprise any angle greater than 0 degrees.

Thermoplastic polymers are chemically manufactured and can be heated and shaped many times.

Acrylic	
	Acrylic is used in sheet form it is lightweight or shatter-resistant. It comes in a variety of colours it can be frosted or transparent. Acrylic is durable and is a good electrical insulator but scratches easily. It is recyclable and can be heat moulded.

Timber is a natural material with imperfections, knots and grain – always sand with the grain

Softwood	
	From coniferous trees that are evergreen, which are faster to grow and are less expensive than hardwoods. Softwoods are a sustainable material as the resource can be regrown and not depleted. Softwoods are strong and easy to work with.

Manufactured boards are timber produced by gluing wood layers or wood fibres together.

Medium Density Fibreboard	
	Medium Density Fibreboard or also known as MDF is made from wood fibres which are glued together. MDF has a smooth even surface which makes it easier to work than natural timber.

Year 9 Textiles Knowledge Organiser

design technology

Novelty Hot Water Bottle Cover

Key Skills

- Responding to a Design Brief
- Analysing existing products
- Identifying an intended user
- Demonstrate the ability to apply decorative techniques:
  - Machine appliqué (including reverse)
  - Computerised embroidery
  - Embroidery stitches (hand & machine)
- Using a sewing machine to complete a range of construction techniques:
  - Seams
  - Hems
  - Application of components
- Understanding the properties of materials
  - Polyester
  - Fleece
- Understand CAM using computerised embroidery

Product features	
Use of woven, knitted & non-woven materials	Consideration of a specified target market
Originality	Creative
Components used as decoration	Efficient use of materials
A variety of hand embroidery stitches	Components & fastenings
CAM embroidery	Machine appliqué

Health & safety
Follow teacher instructions
Move slowly around the room do not run
Tie long hair back
Hold scissors or shears correctly when walking around the room.
Only one person operating a sewing machine at one time
Never use a sewing machine unless supervised by a teacher or technician
Turn off the sewing machine when not in use.
Report any injuries or breakages to the teacher immediately

Key vocabulary	
Components	The parts/materials/threads needed to make a product.
3D features	Use of wadding to make a feature stand up or raised from the backing fabric.
Function	What a product does, how it works and what it will be used for? Is it sensory or educational or both?
CAM	Computer Aided Manufactured
Target Audience	The person or people most likely to be interested or use your design or product.
Embroidery	Even stitch widths and lengths completed by sewing by hand or machine.
Reverse appliqué	A decorative technique whereby a fabric placed on the back and visible on the front and is sewn in place by hand or machine.
Original	A product that is unique, creative and has functional features.
Appliqué	A decorative technique whereby one material is sewn on top of another by hand or machine.
Design Brief	A Design Brief is a written outline which explains the aims and objectives of a project.

Key Knowledge	Definition
Tragedy/Tragic Hero	A play dealing with tragic events and having an unhappy ending, especially one concerning the downfall of the main character- the Tragic Hero
Hubris	Excessive pride or self-confidence
Sympathetic	Feeling, showing, or expressing sympathy
Subservient	Willing to do what other people want, or considering your wishes as less important than those of others
Climax	The most intense, exciting, or important point of something
Foreshadows	A warning or indication of (a future event)
Masculinity	Qualities or attributes regarded as characteristic of men or boys
Community	A group of people living in the same place or having a particular characteristic in common
Immigrant	A person who comes to live permanently in a foreign country
Protagonist	The leading character or one of the major characters
Catharsis	The process of releasing, and thereby providing relief from, strong or repressed emotions
Realism	The quality or fact of representing a person or thing in a way that is accurate and true to life
Naturalistic Dialogue	Dialogue written in a style to mimic real life conversation
Colloquial Language	Everyday, informal language
American Dream	The ideal that every citizen of the United States should have an equal opportunity to achieve success and prosperity through hard work, determination, and initiative

A View from the Bridge

Arthur Miller (Born 1915) was an American playwright, essayist and screenwriter in the 20th-century American theatre.

The play is set in the 1950s in **Red Hook**, Brooklyn. It tells the story of Eddie Carbone, an **Italian American** longshoreman who lives with his wife, Beatrice, and his niece, Catherine. When Beatrice's cousins, Marco and Rodolpho, arrive illegally from Italy and move into the Carbones' small apartment, Eddie's intense love for Catherine drives him to betray his family's trust.

Year 9 Geography
Unit 3: Climate Change and Atmospheric Hazards

LOOK SAY cover write check

KEYWORDS

Lesson 1: Hazard risk

What is a natural hazard? They are extreme natural events that can cause loss of life, extreme damage to property and disruption to human activity.

What factor can increase risk?

Urbanisation: With a more dense population urbanisation can increase hazard risk as there will be a more dense population which would increase the chance of those injured and the death rate.

Lesson 2: Global atmospheric circulation

Global atmospheric circulation creates winds across the planet as air moves from areas of high pressure to areas of low pressure. It also leads to areas of high rainfall, like tropical rainforests, and areas of dry air, like deserts
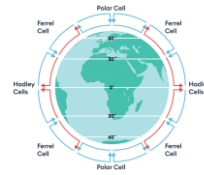
Polar – Ferrel – Hadley

Lesson 3: Formation of tropical storms

- A tropical storm is a huge storm that develops in the tropics.
- They form over warm oceans above 27 degrees Celsius.
- They form between 5 and 15 degrees north and south of the equator.
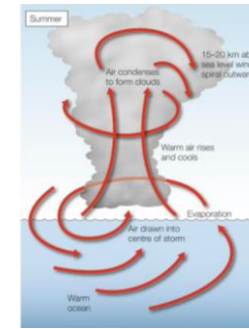
Lesson 4 – Lesson 5: Hurricane Katrina

Hit New Orleans 29th August 2005.
Cat 3 storm – 120 miles per hour

Social	1804 deaths due to Hurricane Katrina (700 in New Orleans)
Economic	350,000 peoples homes and possessions destroyed
Environmental	24 million gallons of oil spilt on the coastline

Responses:
- 20,000 people sheltered in the Superdome
- Coast guards rescued 33,500 people
- $62. 3 billion in aid

Lesson 6: Reducing the impacts of tropical storms

Monitoring/ prediction: hurricane watch and hurricane warning
Protection: reinforce windows and doors, houses close to the coast built on stilts, sea walls built to prevent flooding
Planning: Reduces hazard risk, education and evacuation plans

Lesson 7: Storm Fani

- Cyclone Fani made landfall in India 3rd May 2019.
- 1.6 million people were evacuated
- Storm surge breached the embankments
- 53,000 acres of agricultural land damaged
- 17 deaths in Bangladesh

Lesson 8: Global warming vs climate change

Global warming is the long-term heating of Earth's surface due to human activities which increases heat-trapping greenhouse gas levels in Earth's atmosphere
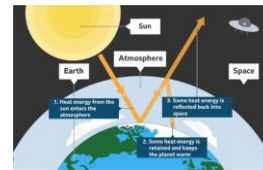
Lesson 9: Extreme weather in the UK

Extreme weather is an weather that is unusual or unexpected.

Examples of extreme weather in the UK:
- Strong winds and storms
- Droughts
- Floods

Lesson 10: Storm Desmond

December 2015 storm hit Cumbria with record breaking rainfall of 341.4mm in 24 hours with 81 mph winds.

1000 people evacuated
£500bn in damaged
200 military personnel had to support evacuation

Lesson 11 – 14: Climate change

Human Causes:
Fossil fuels and cattle farming
Physical causes:
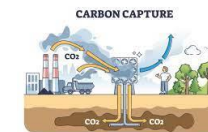Volcanic eruptions and orbital tilt

Effects:
- Sea level rise will affect 80 million people
- Increase in tropical storms
- Species will become extinct

How can we manage climate change?
Carbon capture – this is the removal of co2 from power stations and storing it underground.

	Definition
Hazard Risk	The probability of a hazard event causing harmful consequences (death, injury, loss of property, damage to environment etc.).
Tropical Storm	A very intense storm with winds faster than 73 miles per hour that forms over tropical oceans.
Climate change	The change in global or regional climate patterns.
Mitigation	Reducing the impact and severity of climate change such as through using environmentally friendly technology.

Scan the QR codes for useful links

Tropical Storms

Climate Change

Year 9 Geography
Unit 3: Contemporary Environmental Issues

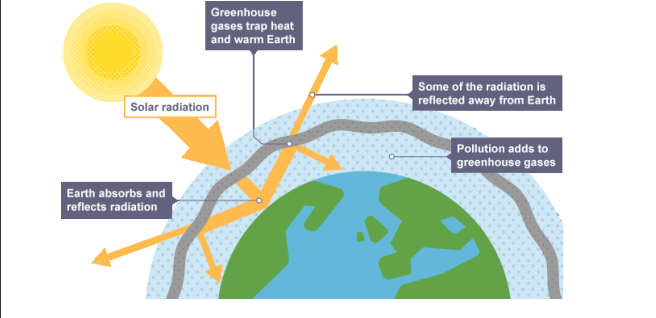## KEYWORDS

LOOk SaY coVer write CheCk

Global warming causes: Deforestation, burning fossil fuels, farming, landfills

Negative impacts of global warming around the world:
- sea level rise will affect 80 million people
- tropical storms will increase in magnitude (strength)
- diseases such as malaria increase,

There are also some **positive impacts** of a warmer climate:
- energy consumption may decrease due to a warmer climate
- longer growing season for agriculture
- frozen regions such as Canada may be able to grow crops

Greenhouse gases trap heat and warm Earth

Solar radiation

Some of the radiation is reflected away from Earth

Pollution adds to greenhouse gases

Earth absorbs and reflects radiation

As our **plastic** consumption is set to skyrocket, it's clear that urgent action is needed. We dump **eight million tonnes of plastic into the sea every year**. It's killing and harming marine life.
- **Turtles eat plastic bags** mistaking them for jellyfish
- **Seabirds** are found with their **stomachs** full of plastic items
- Plastic debris can get lodged in **coral** and affect the health of reefs
- **Microplastics** are consumed by animals like plankton, passing the problem back up the food chain – to **us**.

Solutions: reuse, reduce, recycle. Stop the use of plastic straws, choose to use reusable cups, use a bag for life.

Clothing Industry
Impact:
- Toxic chemicals (e.g. lead and arsenic) are released into rivers
- Water from rivers is diverted into cotton-producing farms
- Loss of tourists to the Aral Sea
- Loss of biodiversity in and around the Aral Sea

Solution:
Eco-fashion industry: swap clothes with friends, reduce the number of new clothes we buy, consider where the clothes you buy were made.
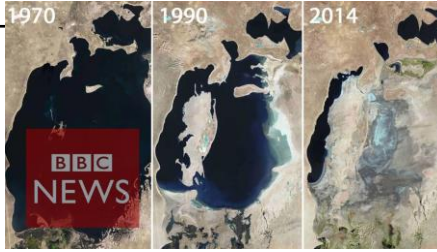
How to achieve environmental sustainability:
1. Choose to reuse, reduce and recycle your waste.
2. Reduce the amount of electricity you use.
3. Choose to walk/cycle/use public transport instead of travelling by car.
4. Eat less meat.
5. Buy new clothes less often. Try to find out where and how the clothes you do buy were produced.
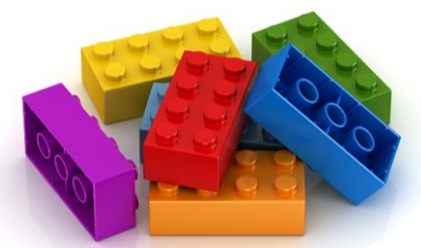6. Plant a tree or donate to plant a tree.
7. Pass the message on!

	Definition
Global warming	The gradual increase in the overall temperature of the earth's atmosphere
Climate Change	A long-term change in the earth's climate, especially a change due to an increase in the average atmospheric temperature.
Sustainable Development	Development that meets the needs of the present without limiting the ability of future generations to meet their own needs.
Greenhouse gases	A gas that contributes to the greenhouse effect by absorbing infrared radiation.
Fossil Fuels	A natural fuel such as coal or gas, formed in the geological past from the remains of living organisms.

✓ What and why? You will learn about the decline of the British Empire
o Stop, think and link: What caused country's to fight for their independence?

❖ **Want to explore further?**
Book: The Decline and Fall of the British Empire by Piers Brendon
Book: The Rise and Fall of the British Empire by Lawrence James
Website:
https://www.bbc.co.uk/bitesize/guides/zf7fr82/revision/1
Website:
https://www.bbc.co.uk/bitesize/guides/zp6csg8/revision/1

Key Questions

• What allowed Britain to grow such a vast empire?

• What factors led to the decline of empire?

• How did war play a crucial role in the decline of empire?

• How did country's gain their independence?

• What legacy has the Empire left today?

• Which individuals were important in nationalist movements?

• What control does Britain have today?

Keywords
Empire
an extensive group of states or countries ruled over by a single monarch, an oligarchy, or a sovereign state.
Imperialism
a policy of extending a country's power and influence through colonization, use of military force, or other means.
Independence
the fact or state of being independent
Nationalism
dentification with one's own nation and support for its interests, especially to the exclusion or detriment of the interests of other nations.
Dominion
sovereignty or control.
Colonialism
the policy or practice of acquiring full or partial political control over another country, occupying it with settlers, and exploiting it economically.

Key events and Key People

 1867 – Britain passes the British North America Act. The Provinces of the British North America become a federation called Canada. Canada rules itself but has close trade links to the British Empire
1901 – Australia became a federation of territories.
1931 – Britain created the Commonwealth of Nations. This effectively ended British rule over Canada, Australia and New Zealand.
1947- India gain Independence
1949 – Ireland became a Republic and Northern Ireland remained part of the UK.

ONE · KING · ONE · FLAG · ONE · FLEET · ONE · EMPIRE ·

✓ What and why? You will learn about the causes and escalation of the Cold War and how the Civil Rights movement progressed.

o Stop, think and link: How would the end of WWII cause world tension? Why would Black American's need to protest for their Civil Rights?

o Significance Assessment – How significant was the Cold War in the creation of the Modern World?

❖ **Want to explore further?**
Book: *The Cold War: A New History* – John Lewis Gaddis
Book: *The Vietnam War: An Intimate History* - Geoff Ward and Ken Burns
Book: *The Billion Dollar Spy* - David E. Hoffman
Website: https://www.jfklibrary.org/learn/about-jfk/jfk-in-history/civil-rights-movement

Key Questions

• What caused the Cold War?

• What was life like in Berlin?

• Why was the Korean War Significant?

• How did the Arms Race escalate tensions?

• What was the Cuban Missile Crisis?

• How did the Civil Rights Movement progress?

• Why was the Vietnam War Significant?

Keywords

Arms	**Weapons**
Atomic bomb	**Nuclear weapon**
Blockade	**Using force to prevent movement**
Boycott	**Withdraw from something in protest**
Capitalism	**Economic system in the West**
Censorship	**Controlling or removing information**
CIA	**American intelligence agency**
Communism	**Political and economic system in Russia**
Containment	**Limiting the spread of something**
Democracy	**Political system in the West**
Detente	**Period of increased diplomacy between the Soviets and Americans**
Deterrent	**Preventing something from happening**
Doctrine	**A set of ideas and beliefs**
Glasnost	**Russian for openness**
Hawks	**Those who supported going to war, opposite of *Doves* who were against war**
Ideology	**A set of shared beliefs**
MAD	**Mutually Assured Destruction**
Perestroika	**Russian for reconstruction**
Satellite state	**A country under the control of another**
Ultimatum	**A final demand, backed by a threat**
Vietcong	**The Communist fighters in Vietnam**
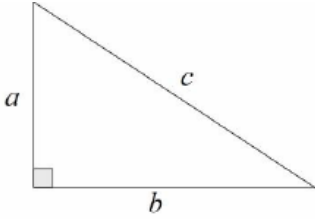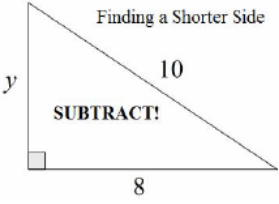
Key events and Key People

1945 Russians reach Berlin: Hitler commits suicide and Germany surrenders on 7 May. After atomic bombs are dropped on Hiroshima and Nagasaki, Japan surrenders on 14 August.
1946 Winston Churchill gives his "Iron Curtain" speech
1947 The Truman Doctrine is announced, with plans to "Contain" communism
1948 – 1949 The Berlin Blockade
1949 – The Soviets successfully test their first Atomic Bomb
1950 – 1953 The Korean War
1954 – 1968 The Civil Rights Movement
1953 – Josef Stalin dies. He is replaced by Nikita Krushchev
1961 – Berlin Wall begins construction.
1962 – The Cuban Missile Crisis.
1964 – 1975 – The Vietnam War
1989 – Berlin Wall pulled down
1991 – Collapse of the USSR.

Year 9: Pythagoras' Theorem

Topic/Skill	Definition/Tips	Example
1. Pythagoras' Theorem	For any **right angled triangle**: $$a^2 + b^2 = c^2$$ Used to find **missing lengths**. a and b are the shorter sides, c is the **hypotenuse** (**longest side**).	 Finding a Shorter Side $a = y, \; b = 8, \; c = 10$ $a^2 = c^2 - b^2$ $y^2 = 100 - 64$ $y^2 = 36$ $y = 6$
2. 3D Pythagoras' Theorem	Find missing lengths by **identifying right angled triangles**. You will often have to find a missing length you are not asked for before finding the missing length you are asked for.	Can a pencil that is 20cm long fit in a pencil tin with dimensions 12cm, 13cm and 9cm? The pencil tin is in the shape of a cuboid. Hypotenuse of the base = $\sqrt{12^2 + 13^2} = 17.7$ Diagonal of cuboid = $\sqrt{17.7^2 + 9^2} = 19.8cm$ No, the pencil cannot fit.
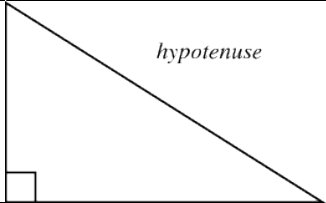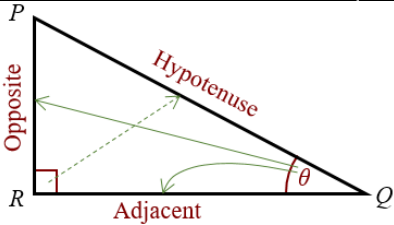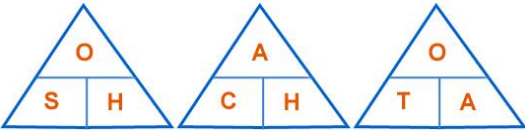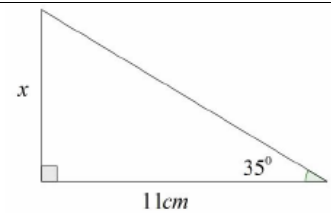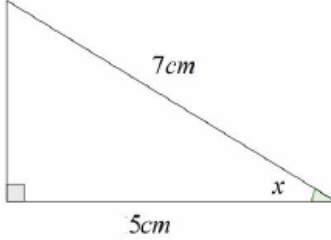
Topic/Skill	Definition/Tips	Example
1. Types of Data	**Qualitative** Data – **non-numerical** data **Quantitative** Data – **numerical** data **Continuous** Data – data that can take **any numerical value** within a given range. **Discrete** Data – data that can take **only specific values** within a given range.	Qualitative Data – eye colour, gender etc. Continuous Data – weight, voltage etc. Discrete Data – number of children, shoe size etc.
2. Grouped Data	Data that has been **bundled in to categories**. Seen in grouped frequency tables, histograms, cumulative frequency etc.	<table><tr><th>Foot length, l, (cm)</th><th>Number of children</th></tr><tr><td>$10 \leqslant l < 12$</td><td>5</td></tr><tr><td>$12 \leqslant l < 17$</td><td>53</td></tr></table>
3. Primary /Secondary Data	**Primary** Data – **collected yourself** for a specific purpose. **Secondary** Data – **collected by someone else** for another purpose.	Primary Data – data collected by a student for their own research project. Secondary Data – Census data used to analyse link between education and earnings.
4. Mean	**Add** up the values and **divide** by how many values there are.	The mean of 3, 4, 7, 6, 0, 4, 6 is $$\frac{3 + 4 + 7 + 6 + 0 + 4 + 6}{7} = 5$$
5. Mean from a Table	1. Find the midpoints (if necessary) 2. Multiply Frequency by values or midpoints 3. Add up these values 4. Divide this total by the Total Frequency If **grouped** data is used, the answer will be an **estimate**.	<table><tr><th>Height in cm</th><th>Frequency</th><th>Midpoint</th><th>F × M</th></tr><tr><td>$0 < h \leq 10$</td><td>8</td><td>5</td><td>8×5=40</td></tr><tr><td>$10 < h \leq 30$</td><td>10</td><td>20</td><td>10×20=200</td></tr><tr><td>$30 < h \leq 40$</td><td>6</td><td>35</td><td>6×35=210</td></tr><tr><td>Total</td><td>24</td><td>Ignore!</td><td>450</td></tr></table> **Estimated** Mean height: $450 \div 24 = 18.75$cm
6. Median Value	The **middle** value. Put the data in order and find the middle one. If there are **two middle values**, find the number half way between them by **adding them together and dividing by 2**.	Find the median of: 4, 5, 2, 3, 6, 7, 6 Ordered: 2, 3, 4, **5**, 6, 6, 7 Median = 5
7. Median from a Table	Use the formula $\frac{(n+1)}{2}$ to find the position of the median. n is the total frequency.	If the total frequency is 15, the median will be the $\left(\frac{15+1}{2}\right) = 8th$ position
8. Mode /Modal Value	**Most** frequent/common. Can have more than one mode (called bi-modal or multi-modal) or no mode (if all values appear once)	Find the mode: 4, 5, 2, 3, 6, 4, 7, 8, 4 Mode = 4
9. Range	**Highest value subtract the Smallest value**	Find the range: 3, 31, 26, 102, 37, 97. Range = 102-3 = 99

	Range is a 'measure of spread'. The smaller the range the more <u>consistent</u> the data.	
10. Outlier	A value that '**lies outside**' most of the other values in a set of data. An outlier is **much smaller or much larger** than the other values in a set of data.	
11. Lower Quartile	**Divides** the **bottom half** of the data into **two halves**. $$LQ = Q_1 = \frac{(n+1)}{4} th \text{ value}$$	Find the lower quartile of: 2, **3**, 4, 5, 6, 6, 7 $Q_1 = \frac{(7+1)}{4} = 2nd$ value → 3
12. Lower Quartile	**Divides** the **top half** of the data into **two halves**. $$UQ = Q_3 = \frac{3(n+1)}{4} th \text{ value}$$	Find the upper quartile of: 2, 3, 4, 5, 6, **6**, 7 $Q_3 = \frac{3(7+1)}{4} = 6th$ value → 6
13. Interquartile Range	The **difference** between the **upper quartile and lower quartile.** $$IQR = Q_3 - Q_1$$ The **smaller** the **interquartile range**, the **more consistent** the data.	Find the IQR of: 2, 3, 4, 5, 6, 6, 7 $$IQR = Q_3 - Q_1 = 6 - 3 = 3$$

Stage 7: Presentation of Data

Topic/Skill	Definition/Tips	Example
1. Frequency Table	A record of **how often each value** in a set of data **occurs**.	
2. Bar Chart	Represents data as vertical blocks. $x - axis$ shows the **type** of data $y - axis$ shows the **frequency** for each type of data Each bar should be the **same width** There should be **gaps** between each bar Remember to **label** each axis.	
3. Types of Bar Chart	**Compound/Composite** Bar Charts show data stacked on top of each other. **Comparative/Dual** Bar Charts show data side by side.	
4. Pie Chart	Used for showing **how data breaks down into** its constituent **parts**. When drawing a pie chart, **divide 360° by the total frequency**. This will tell you how many degrees to use for the frequency of each category. Remember to **label** the category that each sector in the pie chart represents.	 If there are 40 people in a survey, then each person will be worth 360÷40=9° of the pie chart.
5. Pictogram	Uses **pictures** or symbols to **show the value** of the data. A pictogram must have a **key**.	
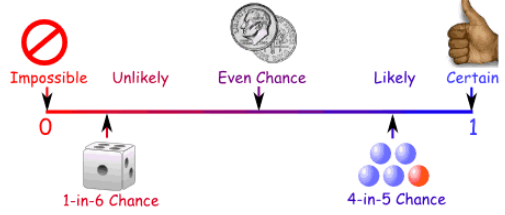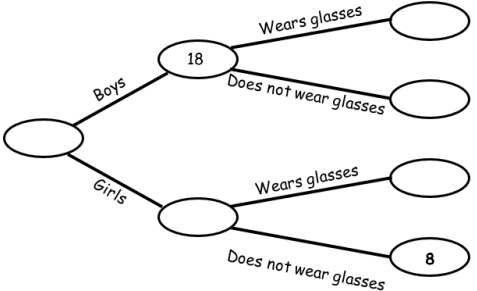
Topic/Skill	Definition/Tips	Example
1. Trigonometry	The **study** of **triangles**.	
2. Hypotenuse	The **longest side** of a **right-angled triangle**. Is always **opposite** the **right angle**.	
3. Adjacent	**Next to the angle given or trying to find.**	
4. Trigonometric Formulae	Use **SOHCAHTOA**. $$\sin\theta = \frac{O}{H}$$ $$\cos\theta = \frac{A}{H}$$ $$\tan\theta = \frac{O}{A}$$ When finding a missing angle, use the 'inverse' trigonometric function by pressing the 'shift' button on the calculator.	 Use 'Opposite' and 'Adjacent', so use 'tan' $$\tan 35 = \frac{x}{11}$$ $$x = 11\tan 35 = 7.70cm$$ Use 'Adjacent' and 'Hypotenuse', so use 'cos' $$\cos x = \frac{5}{7}$$ $$x = cos^{-1}\left(\frac{5}{7}\right) = 44.4°$$

Year 9: Right Angled Trigonometry

Exact Values of Trigonometric Functions

Angle (θ) Degrees	0°	30°	45°	60°	90°
$\sin(\theta)$	0	$\dfrac{1}{2}$	$\dfrac{\sqrt{2}}{2}$	$\dfrac{\sqrt{3}}{2}$	1
$\cos(\theta)$	1	$\dfrac{\sqrt{3}}{2}$	$\dfrac{\sqrt{2}}{2}$	$\dfrac{1}{2}$	0
$\tan(\theta)$	0	$\dfrac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not Defined

Topic: Basic Probability

Topic/Skill	Definition/Tips	Example
1. Probability	The **likelihood/chance** of something happening. Is expressed as a number **between 0 (impossible) and 1 (certain)**. Can be expressed as a fraction, decimal, percentage or in words (likely, unlikely, even chance etc.)	
2. Probability Notation	**P(A)** refers to the **probability that event A will occur**.	P(Red Queen) refers to the probability of picking a Red Queen from a pack of cards.
3. Theoretical Probability	$$\frac{\textit{Number of Favourable Outcomes}}{\textit{Total Number of Possible Outcomes}}$$	Probability of rolling a 4 on a fair 6-sided die $= \frac{1}{6}$.
4. Relative Frequency	$$\frac{\textit{Number of Successful Trials}}{\textit{Total Number of Trials}}$$	A coin is flipped 50 times and lands on Tails 29 times. The relative frequency of getting Tails $= \frac{29}{50}$.
5. Expected Outcomes	To find the number of expected outcomes, **multiply** the **probability** by the **number of trials**.	The probability that a football team wins is 0.2 How many games would you expect them to win out of 40? $$0.2 \times 40 = 8 \; games$$
6. Exhaustive	Outcomes are **exhaustive** if they **cover the entire range of possible outcomes**. The **probabilities** of an **exhaustive** set of outcomes **adds up to 1**.	When rolling a six-sided die, the outcomes 1, 2, 3, 4, 5 and 6 are exhaustive, because they cover all the possible outcomes.
7. Mutually Exclusive	Events are mutually exclusive if they **cannot happen at the same time**. The **probabilities** of an exhaustive set of **mutually exclusive** events **adds up to 1**.	Examples of mutually exclusive events: - Turning left and right - Heads and Tails on a coin Examples of non mutually exclusive events: - King and Hearts from a deck of cards, because you can pick the King of Hearts
8. Frequency Tree	A diagram showing how information is categorised into various categories. The **numbers** at the ends of branches tells us how often something happened (**frequency**).	

	The **lines** connected the numbers are called **branches**.	
9. Sample Space	The **set of all possible outcomes** of an experiment.	
10. Sample	A **sample** is a small selection of items from a population. A sample is **biased** if individuals or groups from the population are not represented in the sample.	A sample could be selecting 10 students from a year group at school.
11. Sample Size	The larger a sample size, the closer those probabilities will be to the true probability.	A sample size of 100 gives a more reliable result than a sample size of 10.

FOUNDATION WRITING : Describing a photo

Was gibt es auf dem Foto ?	What is in the photo ?
Es gibt	**There is/ are**
einen Mann	a man
einen Junge	a boy
eine Frau	a woman
eine Familie	a family
ein Mädchen	a girl
zwei M**ä**nn**er**	two men
zwei Frau**en**	two women
zwei Jungen	two boys
viele Leute	lots of people
einen Bahnhof	a train station
ein Geschäft/ ein Laden	a shop
einen Flohmarkt	a flea market
eine Imbissbude	a take away, snack stand
ein Einfamilienhaus	a detached house
eine Wohnung	a flat
ein Dorf	a village
eine Stadt	a town
einen Computer	a computer
einen Fernseher	a TV
einen Kleiderschrank	a wardrobe
einen Schreibtisch	a desk
ein Handy	a mobile phone
ein T-shirt	a T-shirt
einen Pullover	a jumper
eine Brille	glasses
einen Rock	a skirt
eine Hose	trousers
ein Hemd	a shirt
Kleidung/ Klamotten	clothes
gestreift	striped
kariert	checked

Year 9 German Knowledge Organiser: Half Term 5

Was für Musik hörst du gern ?	What kind of music do you like listening to ?
Wer ist dein Lieblingssänger / deine Lieblingssängerin ?	Who is your favourite singer (m) (f)?
Wann/ wie/ wo hörst du Musik ?	When/ how/ where do you listen to music ?
Was hast du als letztes gehört ?	What was the last thing I listened to ?
Wann bist du zuletzt auf ein Konzert gegangen ?	When did you last go to a concert ?
die Dance-Musik	dance music
der Deutschrap	German rap
der Hip-Hop	hip-hop
die klassische Musik	classical music
der Pop	pop
die Rockmusik	rock music
der Schlager	German pop
die Volksmusik	folk music
(Hip-Hop) hat einen tollen Rhythmus	(Hip-hop) has a great rhythm
beliebt	popular
entspannend	relaxing
laut	loud
lebendig	lively, upbeat
die Melodie	melody, tune
melodisch	tuneful
rhythmisch	rhythmic
Texte (pl)	lyrics
Ich höre (nicht) gern	I (don't) like listening to
Ich höre lieber	I prefer listening to

Question words

Was ?	What ?
Wo ?	Where ?
Wie ?	How ?
Wann ?	When ?
Warum ?	Why ?
Was für ?	What sort ?
Wer ?	Who ?
Mit wem ?	Who with ?
Wie so ?	Why ?

Pronunciation

Letter (s)	Sound
ie	ee
w	v
v	f
e	uh
j	yuh
sch	shh
sp	shp
st	sht
z	ts
ei	eye
au	ow
eu	oy
ö	er
ü	oo
ä	e

There are **useful videos** on how to pronounce these letters on the **Wellington MFL YouTube Channel.**

INFINITIVE	PAST	IMPERFECT	PRESENT	FUTURE
SPIELEN = to play	Ich habe….gespielt	Ich spielte	Ich spiele	Ich werde….spielen
MACHEN = to do	Ich habe…gemacht	Ich machte	Ich mache	Ich werde…machen
WOHNEN = to live	Ich habe…gewohnt	Ich wohnte	Ich wohne	Ich werde..wohnen
HÖREN = to listen	Ich habe…gehört	Ich hörte	Ich höre	Ich werde…hören
KAUFEN = to buy	Ich habe..gekauft	Ich kaufte	Ich kaufe	Ich werde…kaufen
BENUTZEN= to use	Ich habe..benutzt	Ich benutzte	Ich benutze	Ich werde…benutzen
ARBEITEN = to work	Ich habe…gearbeitet	Ich arbeitete	Ich arbeite	Ich werde…arbeiten
Zeit VERBRINGEN mit = to spend time with..	Ich habe Zeit mit der Familie verbr**a**cht	Ich verbrachte Zeit mit der Familie	Ich verbringe Zeit mit der Familie	Ich werde Zeit mit der Familie verbringen
LESEN = to read	Ich habe…gelesen	Ich las	Ich lese	Ich werde…lesen
SEHEN = to watch	Ich habe…gesehen	Ich sah	Ich sehe	Ich werde…sehen
ESSEN = to eat	Ich habe..gegessen	Ich aß	Ich esse	Ich werde…essen
TRINKEN = to drink	Ich habe…getr**u**nken	Ich trank	Ich trinke	Ich werde..trinken
TRAGEN = to wear	Ich habe…getragen	Ich trug	Ich trage	Ich werde…tragen
FINDEN = to find	Ich habe es…gef**u**nden	Ich fand es …	Ich finde es	Ich werde es…finden
HELFEN = to help	Ich habe…geh**o**lfen	Ich half	Ich helfe	Ich werde…helfen
Sport TREIBEN = to do sport	Ich habe Sport getr**ie**ben	Ich trieb	Ich treibe Sport	Ich werde Sport treiben
GEHEN = to go	Ich **bin**…ge**gang**en	Ich ging	Ich gehe	Ich werde… gehen
FAHREN = to travel	Ich **bin**…gefahren	Ich fuhr	Ich fahre	Ich werde…fahren
SEIN = to be	Ich bin…gewesen	Ich war	Ich bin	Ich werde…sein
HABEN = to have	Ich habe…gehabt	Ich hatte	Ich habe	Ich werde …haben

Opinions

Ich mag mein Haus.	I like my house.
Ich mag nicht meine Stadt.	I do not like my town.
Ich liebe Schokolade.	I love chocolate.
Ich hasse Federball.	I hate badminton.
Timperley gefällt mir	I like Timperley.
Ich interessiere mich für Mode.	I am interested in fashion.
Mein Handy ist mir wichtig.	My mobile is important to me.
Musik macht mich glücklich.	Music makes me happy.
Sport ist nicht mein Ding.	Sport is not my thing,
Ich finde das teuer	I find that expensive.
Ich denke, dass	I think that
Ich glaube, dass	I believe that
Ein Vorteil ist, dass	An advantage is that
Ein Nachteil ist, dass	A disadvantage is that
Meine Eltern denken, dass	My parents think that
Meine Mutter glaubt, dass	My mother believes that

Opinion Adverbs

Rule: ADD to the VERB.

Ich trage **gern** Jeans.
I like to wear jeans.

Ich trage **lieber** einen Rock.
I prefer to wear a skirt.

Ich trage am liebsten Ohrringe.
I like to wear earrings most/best.

Adverbs of frequency

Rule: ADD to the VERB.

Ich trage **nie** Jeans.
Ich trage **immer** Hose.

oft	*often*
immer	*always*
ab und zu	*now & again*
nie	*never*

Question words

Was ?	What ?
Wo ?	Where ?
Wie ?	How ?
Wann ?	When ?
Warum ?	Why ?
Was für ?	What sort ?
Wer ?	Who ?
Mit wem ?	Who with ?
Wie so ?	Why ?

Qualifiers

sehr	very
wirklich	quite
ganz	quite
echt	really
zu	too

More interesting adjectives

blöd	rubbish
unterhaltsam	entertaining
lässig	relaxed
idyllisch	idyllic
gemütlich	cosy

Sequencing words:

Jeden Tag	everyday
Zuerst	first of all
Dann	then, next
Danach	afterwards
Später	later
Zum Schluss	finally
Endlich	finally

Use a variety of connectives:
Locking: verb locked into the normal position.

und	and
denn	because
oder	or
aber	aber

       1   **2**
Ich benutze das Internet **und** ich chatte mit Freunden.

Sticking: the verb sticks to it.
jedoch   however

            verb
Ich mag Wasser, **jedoch** trinke ich lieber Cola.

Kicking: kicks the verb to the end of the sentence.

weil	because
da	because/ as
dass	that
obwohl	although

Ich lade Musik herunter, **da** es praktisch **ist.**

Past Time Expressions:

Gestern	yesterday
Letztes Wochenende	last weekend
Letztes Jahr	last year
Letzten Sommer	last Summer
Früher	before
Neulich	recently
Damals	Back then

Damals **hatte** ich kein Handy**.**
Back then I had no phone.

Future Time Expressions:

Morgen	tomorrow
Nächstes Wochenende	next weekend
Nächstes Jahr	next year
Nächsten Sommer	next Summer
In der Zukunft	in the future

In der Zukunft **werde** ich in Berlin **wohnen**
In the future I will live in Berlin.

50 WORD STRATEGY
10 WORDS for each bullet point.
Present tense.

90 WORD STRATEGY
30 WORDS for each bullet point.
3 time frames AND 2 opinions.

INFINITIVE	PAST	IMPERFECT	PRESENT	FUTURE
SPIELEN = to play	Ich habe….gespielt	Ich spielte	Ich spiele	Ich werde….spielen
MACHEN = to do	Ich habe…gemacht	Ich machte	Ich mache	Ich werde…machen
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HABEN = to have	Ich habe…gehabt	Ich hatte	Ich habe	Ich werde …haben

Year 9 French FOUNDATION Knowledge Organiser

HT 6 – End of Year Revision

Past
J'ai joué	I played
J'ai mangé	I ate
J'ai nagé	I swam
J'ai regardé	I watched
J'ai visité	I visited
J'ai bu	I drank
J'ai fait	I did
Je suis allé(e)	I went
C'était	**It was**

Present
Je joue	I play
Je mange	I eat
Je nage	I swim
Je regarde	I watch
Je visite	I visit
Je bois	I drink
Je fais	I do
Je vais	I go
C'est	**It is**

Future
Je vais jouer	I'm going to play
Je vais manger	I'm going to eat
Je vais nager	I'm going to swim
Je vais regarder	I'm going to watch
Je vais visiter	I'm going to visit
Je vais boire	I'm going to drink
Je vais faire	I'm going to do
Je vais aller	I'm going to go
Ce sera	**It will be**

Giving an opinion
J'apprécie	I appreciate
Ça me fait…	It makes me…
…rire	…laugh
…pleurer	…cry
…peur	…scared
Je pense que	I think that
À mon avis	In my opinion
Je préfère	I prefer
J'adore	I love
J'aime bien	I really like
J'aime mieux…	I like … better
J'aime beaucoup	I really like
J'aime	I like
Je n'aime pas	I don't like
Je déteste	I hate
Je ne supporte pas	I can't stand

La nourriture / Food
le pain	bread
le beurre	butter
le poulet	chicken
une banane	a banana
une pomme	an apple
les bonbons	sweets
les chips	crisps
la dinde	turkey
les frites	chips
le fromage	cheese
les fruits	fruit
les fruits de mer	seafood
les légumes	vegetables
un oeuf	an egg
les sucreries	sweet things
un gateau	a cake
une glace	an ice cream
le poisson	fish
la viande	meat
l'eau	water
un jus d'orange	an orange juice
le lait	milk
le vin	wine
la bière	beer

Frequency words/How often?
Souvent	Often
Quelquefois	Sometimes
Parfois	Sometimes
Normalement	Normally
De temps en temps	From time to time
Tous les weekends	Every weekend
Une/ deux fois par semaine	Once/twice a week
Ne…jamais	never
Ne…plus	no more/no longer

Connectives
Mais	But
Cependant	However
Aussi	Also
Puis	Then
Plus tard	Later
D'abord	Firstly
Ensuite	Next
Après	Afterwards

Intensifiers
Vraiment	Really
Très	Very
Assez	Quite
Un peu	A little bit
trop	too

Adjectives
ennuyeux	Boring
drôle	Funny
rasant	Boring
barbant	Boring
passionnant	Exciting
amusant	Fun/funny
égoïste	selfish
mignon	cute
jaloux	jealous
fidèle	loyal
têtu	stubborn
riche	rich
content	happy

Time phrases When?
Le weekend	At the weekend
Le weekend dernier	Last weekend
Le matin	In the morning
L'après-midi	In the afternoon
Le soir	In the evening
Samedi dernier	Last Saturday

La forme / Fitness
Je mange beaucoup de fruits /des légumes.	I eat a lot of fruit/vegetables
Je ne fais pas assez d'exercice.	I don't do enough exercise.
Je bois beaucoup d'eau.	I drink lots of water.
Je vais à la gym.	I go to the gym.
Je fume.	I smoke.
bon pour la santé	good for your health
mauvais pour la santé	bad for your health

HT 6 – End of Year Revision

Past (Perfect)

J'ai joué	I played
J'ai mangé	I ate
J'ai nagé	I swam
J'ai regardé	I watched
J'ai visité	I visited
J'ai bu	I drank
J'ai fait	I did
Je suis allé(e)	I went
J'ai eu	I had
C'était	**It was**

Past (imerfect)

Je jouais	I was playing /used to play
Je mangeais	I was eating/ used to eat
Je nageais	I was swimming/ used to swim
Je regardais	I was watching/ used to watch
Je visitais	I was visiting/ used to visit
Je buvais	I was drinking/ used to drink
Je faisais	I was doing/ used to do
J'allais	I was going/ used to go
J'avais	I had/used to have
J'étais	I was/used to be

Present

Je joue	I play
Je mange	I eat
Je nage	I swim
Je regarde	I watch
Je visite	I visit
Je bois	I drink
Je fais	I do
Je vais	I go
J'ai	I have
Je suis	I am
C'est	**It is**

Future (futur proche)

Je vais jouer	I'm going to play
Je vais manger	I'm going to eat
Je vais nager	I'm going to swim
Je vais regarder	I'm going to watch
Je vais visiter	I'm going to visit
Je vais boire	I'm going to drink
Je vais faire	I'm going to do
Je vais aller	I'm going to go
Je vais avoir	I'm going to have
Je vais être	I'm going to be
Ce sera	**It will be**

Future (futur simple)

Je jouerai	I will play
Je mangerai	I will eat
Je nagerai	I will swim
Je regarderai	I will watch
Je visiterai	I will visit
Je boirai	I will drink
Je ferai	I will do
J'irai	I will go
J'aurai	I will have
Je serai	I will be

Frequency words/How often

Souvent	Often
Quelquefois	Sometimes
Parfois	Sometimes
Normalement	Normally
De temps en temps	From time to time
Tout le temps	All the time
Tous les weekends	Every weekend
Une/ deux fois par semaine	Once/twice a week
Ne…jamais	never
Ne…plus	no more/no longer

Après avoir **+ past participle**	After having…
J'ai l'intention de **+ infinitive**	I intend…
Il faut/On doit **+ infinitive**	You must…

Adjectives

ennuyeux	Boring
drôle	Funny
rasant	Boring
barbant	Boring
passionnant	Exciting
amusant	Fun/funny
égoïste	selfish
mignon	cute
jaloux	jealous
fidèle	loyal
têtu	stubborn
riche	rich
content	happy

Giving an opinion

J'apprécie	I appreciate
Ça me fait…	It makes me…
…rire	…laugh
…pleurer	…cry
…peur	…scared
Je pense que	I think that
À mon avis	In my opinion
Je préfère	I prefer
Je **les** aime	I like **them**
Je **l'**aime	I like **it/him/her**
J'aime bien	I really like
J'aime mieux…	I like … better
J'aime beaucoup	I really like
Je me passionne pour…	I'm passionate about…
Je m'intéresse à la/au/aux…	I'm interested in…
Ce que j'aime le plus, c'est…	What I like best is…
Je ne supporte pas	I can't stand

Les loisirs — **Leisure**

Les comédies	Comedies
Les séries policières	Police series
Les feuilletons	Soaps
Les émissions musicales	Music programmes
Les émissions de sport	Sports programmes
Les émissions de science-fiction	Science-fiction programmes
Les émissions de télé réalité	Reality TV shows
Les jeux télévisés	Game shows
Les dessins animés	Cartoons
faire du VTT	to do mountain biking
faire de l'athlétisme	to do athletics
faire des randonnées	to go hiking
s'entraîner	to train
lire	to read

Connectives

car	because
comme	as, since
de plus	what's more
donc	therefore
finalement	finally

où	where
pourtant	however
y compris	including

Wellington School Music Department

KEYWORDS

Performing Four Chord Pop Songs - Keyboard

G — I → D — V

Em — vi → C — IV

Performing Four Chord Pop Songs - Ukulele

G — I → D — V

Em — vi → C — IV

Keyword	Definition
Rap	Stands for 'rhythm and poetry'. Speaking lyrics to a beat.
Ensemble	A musical group, e.g. a band/choir/orchestra.
Rock	A genre of popular music that evolved from rock and roll and pop music during the 1960s.
Lyrics	The words to the song.
Rhyme	Words with endings that sound the same, e.g. bend and friend, said and shed, day and way.
Chord Progression	Movement from chord to chord
Compose	To create your own piece of music.
Chorus	The catchy part of the song that is repeated after each verse. In rap songs, the chorus is usually the part that is sung.

Performing Four Chord Pop Songs – Drum kit

If you don't have access to a drum kit, use the drum kit sounds on the keyboard. Look for the symbols above the notes on the keyboard.

Simple	1	&	2	&	3	&	4	&
Hi-Hat								
Snare			●				●	
Bass	●				●			

Basic	1	&	2	&	3	&	4	&
Hi-Hat	●		●		●		●	
Snare			●				●	
Bass	●				●			

Standard	1	&	2	&	3	&	4	&
Hi-Hat	●	●	●	●	●	●	●	●
Snare			●				●	
Bass	●				●			

Complex	1	&	2	&	3	&	4	&
Hi-Hat	●	●	●	●	●	●	●	●
Snare			●				●	●
Bass	●		●		●	●		

Performing Four Chord Pop Songs - Guitar

G   D   Em   C

This is an example of the C chord. Figure the rest out in your group.

Year 9 Unit 3: Living in the Wider World

KNOWLEDGE

L1. study, organisational, research and presentation skills

L2. to review their strengths, interests, skills, qualities and values and how to develop them

L3. to set realistic yet ambitious targets and goals

L4. the skills and attributes that employers' value

L5. the skills and qualities required to engage in enterprise

L6. the importance and benefits of being a lifelong learner

L8. about routes into work, training and other vocational and academic opportunities, and progression routes

L9. the benefits of setting ambitious goals and being open to opportunities in all aspects of life

L10. to recognise and challenge stereotypes and family or cultural expectations that may limit aspirations

L13. about young people's employment rights and responsibilities

L14. to manage emotions in relation to future employment

SKILLS

1. Engage with and reflect on different ideas, opinions and beliefs to help develop personal opinion.
2. Can express and explain opinions through discussion and written work.
3. Develop empathy with others and an understanding of how to safely and respectfully interact.
4. Is reflective about the knowledge and skills needed for setting realistic targets and personal goals.
5. Work individually and with others to negotiate, plan and take action.
6. Can recognise and reduce risk, minimising harm and getting help.
7. Develop skills of enquiry and advocacy via research and group work

Y9: Unit 3 Humanism

Humanism in the UK is a growing movement that seeks to separate religion from state. Ultimately Humanists want equality and fairness for all human beings and they believe that this cannot be achieved when religion governs our laws, morals and education systems. In this unit you will consider what it actually means to be a Humanist today and how this world view has an impact on ethical decision making and philosophical enquiry. Would the world be a better place if we were all Humanist?

Knowledge Organiser

Lesson 1-2

What does it mean to be Humanist?

Society is progressing and becoming increasingly secular (non-religious) – so what is Humanism?

Is religion necessary in the 21st century? A humanist view of society.

Some people argue that religion is a danger to society and it is now time to put our faith into other things. Are Humanists right when they say religion isn't needed anymore?

Lesson 3-4

Euthanasia, abortion and animal testing. How do Humanists view these issues?

Humanists don't believe in the sanctity of life and so what do they believe about modern ethical issues surrounding human and animal life?

Organ donation after death – should we all do it?

Organ donation is something that many people think about but what are the laws in the UK and why might it be important for us to consider in a religious world?

Lesson 5-6

What do Humanist marriages/funerals look like?

If Humanists aren't religious how do they mark important events in life and are they seen to be as important to them as they are to religious people?

What are Humanist views on life and death?

Humanists have a very different outlook on death than most – what are their views and why might they be considered to be quite refreshing?
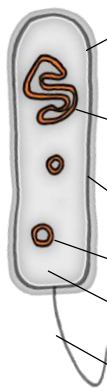
Lesson 7-8

End of year exam and feedback

Your end of year examination will not only include elements of Humanism but also Christianity and Buddhism. Crucially, you need to be able to compare and contrast elements of each of the movements you have studied this academic year.

SCIENCE BIOLOGY: B1 - Cells (Part 1)

Eukaryotes complex organisms

animal cell
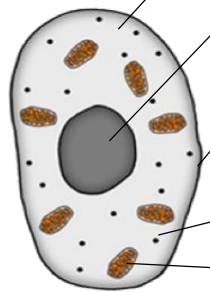
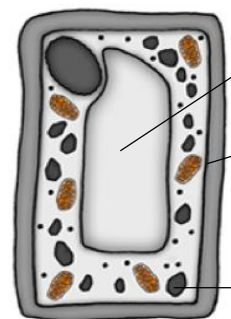|		
cytoplasm	*site of chemical reactions in the cell*	gel like substance containing enzymes to catalyse the reactions
nucleus	*contains genetic material*	controls the activities of the cell and codes fro proteins
cell membrane	*semi permeable*	controls the movement of substances in and out of the cell
ribosome	*site of protein synthesis*	mRNA is translated to an amino acid chain
mitochondrion	*site of respiration*	where energy is released for the cell to function

plant cell

contains all the parts of animal cells plus extras

permanent vacuole	*contains cell sap*	keeps cell turgid, contains sugars and salts in solution
cell wall	*made of cellulose*	supports and strengthens the cell
chloroplast	*site of photosynthesis*	contains chlorophyll, absorbs light energy

Prokaryotes simpler organisms

cell membrane	*site of chemical reactions in the cell*	gel like substance containing enzymes to catalyse the reactions
bacterial DNA	*not in nucleus floats in the cytoplasm*	controls the function of the cell. Can be found as chromosomal DNA and plasmid DNA (small rings).
cell wall	*NOT made of cellulose*	supports and strengthens the cell
cytoplasm	*semi permeable*	controls the movement of substances in and out of the cell
flagella	*whip like tail*	allows the bacterial cell to move
ribosome	*site of protein synthesis*	mRNA is translated to an amino acid chain

Bacterial cells are much smaller than plant and animal cells

Specialised cells

egg	*fertilised by a sperm*	nutrients in the cytoplasm, haploid nucleus and changes in the cell membrane after fertilisation
sperm	*fertilise an egg*	streamlined with a long tail acrosome containing enzymes large number of mitochondria, haploid nucleus
Ciliated epithelial cell	*push and move mucus*	Thin layer of moving hairs on the surface of the cells called cilia.

Microscopy

magnification $M = \dfrac{\text{size of image } I}{\text{real size of the object } A}$

decreasing size and scale

PREFIXES

| Prefix	Multiple	Standard form
centi (cm)	1 cm = 0.01 m	x 10^{-2}
milli (mm)	1 mm = 0.001 m	x 10^{-3}
micro (μm)	1 μm = 0.000 001 m	x 10^{-6}
nano (nm)	1nm = 0.000 000 001 m	x 10^{-9}
pico (pm)	1pm = 0.000 000 000 001m	x 10^{-12}

eyepiece lens

objective lens

focusing wheel

stage

light source

Estimates can be useful when you only have a sample of what you are counting e.g. the number of red blood cells in a blood sample

Many of the structures found in cells were not able to be seen before the development of electron microscopes e.g. ribosomes
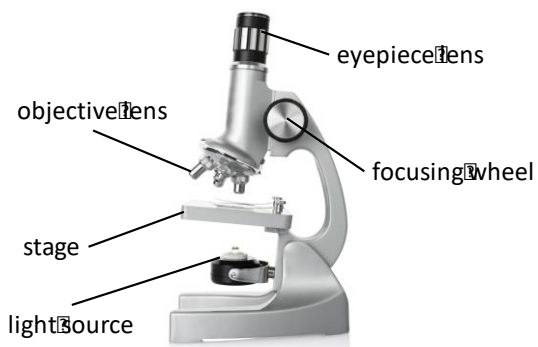
Feature	Light (optical) microscope	Electron microscope
Radiation used	Light rays	Electron beams
Max magnification	~ 1500 times	~ 2 000 000 times
Resolution	200nm	0.2nm
Size of microscope	Small and portable	Very large and not portable
Cost	~£100 for a school one	Several £100,000 to £1 million plus

Enzymes catalyse (increase the rate of) specific reactions in living organisms.

The rate of a reaction can be measured by how fast reactants are used up or by how fast products are formed.

The activity of enzymes is affected by changes in temperature, pH and substrate concentration

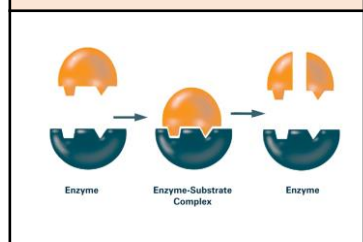| *Enzymes activity has an optimum temperature*	*Enzyme activity has an optimum pH*	*Increasing substrate concentration increases rate (limited by number of active sites)*
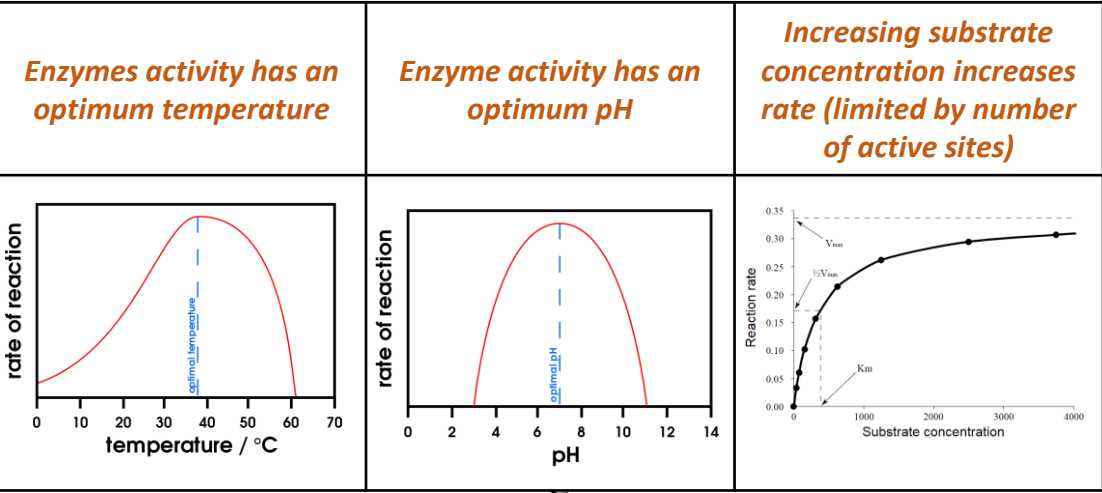
The 'lock and key theory' is a simplified model to explain enzyme action

Enzymes catalyse specific reactions in living organisms due to the shape of their active site.

Enzymes

SCIENCE BIOLOGY: B1 - Cells (Part 2)
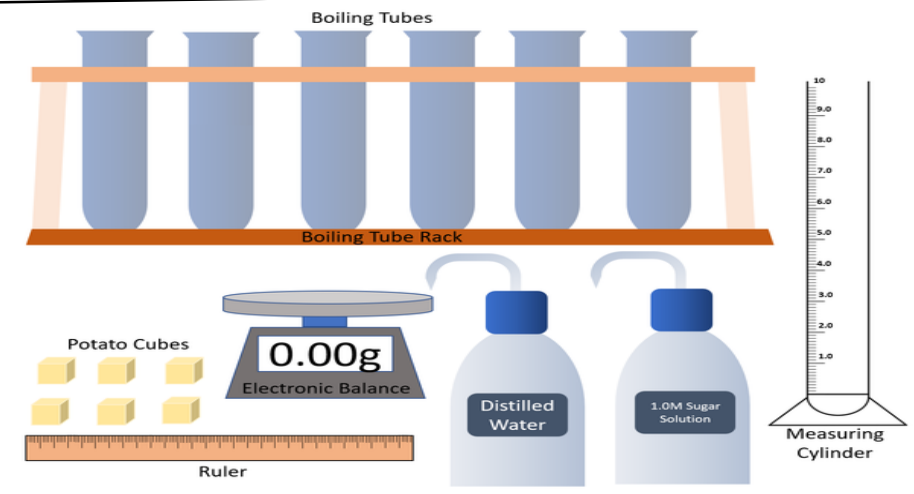
Osmosis

Calculate percentage gain/loss of mass in osmosis.

$$\% \ change \ in \ mass = \frac{(final \ mass - initial \ mass)}{initial \ mass} \times 100$$

The greater the difference in concentrations the faster the rate of diffusion.

Digestive enzymes speed up the conversion of large insoluble molecules (food) into small soluble molecules that can be absorbed into the bloodstream.

Large changes in temperature or pH can stop the enzyme from working (denature).

Temperature too high	*pH too high or too low*

Enzyme changes shape (denatures) the substrate no longer fits the active site.

Transport in cells

Carbohydrases (e.g. amylase)		*Made in salivary glands, pancreas, small intestine*	Break down carbohydrates to simple sugar (e.g. amylase breaks down starch to glucose).
Proteases		*Made in stomach, pancreas*	Break down protein to amino acids.
Lipases		*Made in pancreas (works in small intestine)*	Break down lipids (fats) to glycerol and fatty acids).

The products of digestion are used to build new carbohydrates, lipids and proteins. Some glucose is used for respiration.

Diffusion *No* energy required	*Movement of particles in a solution or gas from a higher to a lower concentration*	E.g. O_2 and CO_2 in gas exchange, urea in kidneys. Factors that affect the rate are concentration, temperature and surface area.
Osmosis *No* energy required	*Movement of water from a dilute solution to a more concentrated solution*	E.g. Plants absorb water from the soil by osmosis through their root hair cells. Plants use water for several vital processes including photosynthesis and transporting minerals.
Active transport *ENERGY* required	*Movement of particles from a dilute solution to a more concentrated solution*	E.g. movement of mineral ions into roots of plants and the movement of glucose into the small intestines.

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Melting point of a pure substance

Melting point of an impure substance

PiXL Science

s	solid
l	liquid
g	gas

Phase changes of matter

Solid, liquid, gas	*Melting and freezing happen at melting point, boiling and condensing happen at boiling point.*	SOLID LIQUID GAS The amount of energy needed for a state change depends on the strength of forces between particles in the substance.

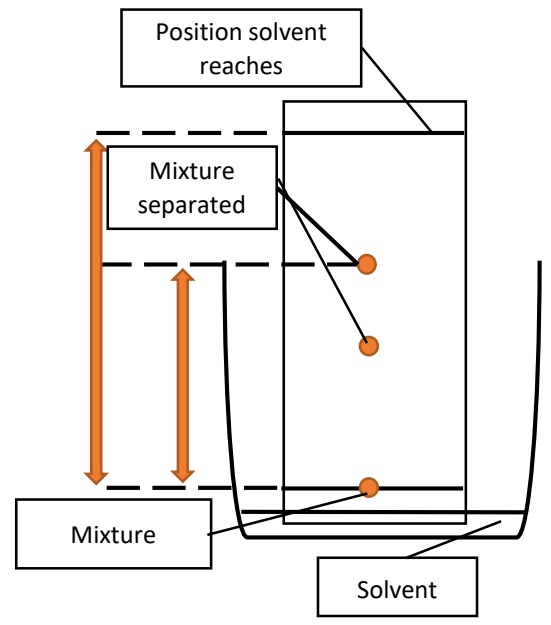| Pure substances	*A pure substances is a single element or compound, not mixed with any other substance.*	Pure substances melt and boil at specific temperatures. Heating graphs can be used to distinguish pure substances from impure.

Energy and movement	*Gas particles have higher levels of energy than liquids and solids*	**Gas particles move more than the other states of matter, with solids moving the least due to their tightly packed arrangement. Solid particles can only vibrate around their fixed positions.**

Pure substances

States of matter

Position solvent reaches

Mixture separated

Mixture

Solvent

SCIENCE: CHEMISTRY – C2 Separating mixtures (Part 1)

Method of separating substances

Fractional distillation

Fractions	*The hydrocarbons in crude oil can be split into fractions*	Each fraction contains molecules with a similar number of carbon atoms in them. The process used to do this is called fractional distillation.
Fractional distillation	*Crude oil is heated and hydrocarbons boil and condense at certain temperatures*	This is due to the different lengths of hydrocarbon chains.

Chromatography

Simple distillation

Chromatography	*Can be used to separate mixtures and help identify substances.*	Involves a mobile phase (e.g. water or ethanol) and a stationary phase (e.g. chromatography paper).
R$_f$ Values	*The ratio of the distance moved by a compound to the distance moved by solvent.*	R$_f$ = $\dfrac{\text{distance moved by substance}}{\text{distance moved by solvent}}$
Pure substances	*The compounds in a mixture separate into different spots.*	This depends on the solvent used. A pure substance will produce a single spot in all solvents whereas an impure substance will produce multiple spots.

Distillation	*Used to separate a mixture of liquids*	**During distillation, the mixture gets heated causing one liquid at a time to evaporate and then condense in the Liebig condenser.**
Boiling points	*Each of the liquids in the mixture will have a different boiling point*	**This enables the liquids to be separated. Distillation can also be used to analyse purity of a substance as pure substances have a sharp boiling point.**

Using fractions	*Fractions can be processed to produce fuels and feedstock for petrochemical industry*	We depend on many of these fuels; petrol, diesel and kerosene. Many useful materials are made by the petrochemical industry; solvents, lubricants and polymers.

Potable water	*Water of an appropriate quality is essential for life*	Human drinking water should have low levels of dissolved salts and microbes. This is called potable water.
UK water	*Rain provides water with low levels of dissolved substances*	This water collects in the ground/lakes/rivers. To make potable water an appropriate source is chosen, which is then passed through filter beds and then sterilised.
Desalination	*Needs to occur is fresh water is limited and salty/sea water is needed for drinking*	This can be achieved by distillation or by using large membranes e.g. reverse osmosis. These processes require large amounts of energy.

The filtrate is the liquid that moves through the filter paper and collects underneath	The residue is the insoluble solid that collects in the filter paper.	
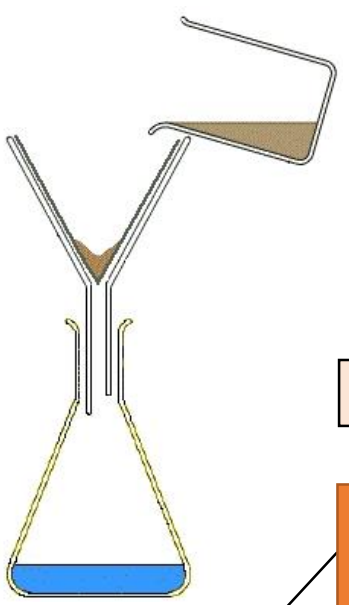
Filtration	*This technique separates substances that are insoluble in a solvent from those that are soluble*	An example is sand in water; the sand will collect in the filter paper and the water will move through the it.

Filtration

Sterilising agents include chlorine, ozone and UV light.

Potable water

Using water	*Water used for chemical analysis must not contain any dissolved salts*	Water used for this purpose must be treated in order to be suitable.
Producing potable water	*There are 4 main steps to producing potable water*	1. Choosing appropriate source of fresh water 2. Sedimentation 3. Passing the water through filter beds 4. Chlorination

Methods of separating substances

SCIENCE: CHEMISTRY – C2 Separating mixtures (Part 2)

Purifying substances

Crystallisation

Crystallisation	*This technique separates a soluble substance from a solvent by evaporation*	An example is the crystallisation of sodium chloride from a salt solution.

Waste water treatment

Waste water	*Produced from urban lifestyles and industrial processes*	These require treatment before used in the environment. Sewage needs the organic matter and harmful microbes removed.
Sewage treatment	*Includes many stages*	- Screening and grit removal - Sedimentation to produce sludge and effluent (liquid waste or sewage). - Anaerobic digestion of sludge - Aerobic biological treatment of effluent.

solvent vapour
evaporating basin
solution
gauze
HEAT

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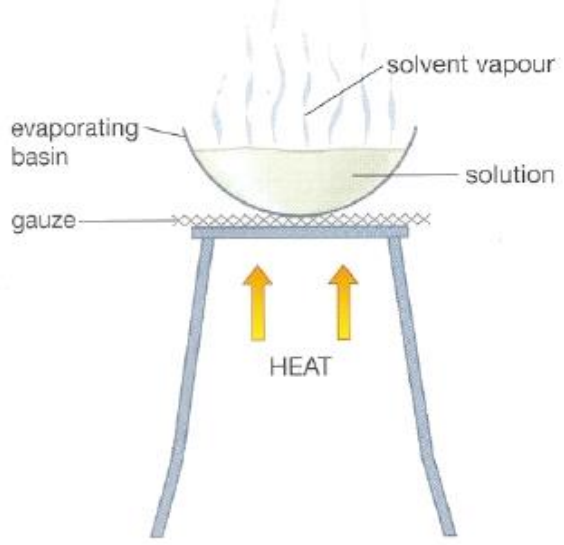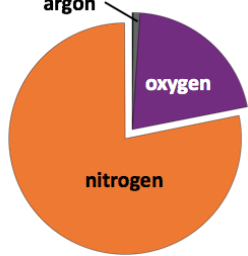
Gas	Percentage
Nitrogen	~80%
Oxygen	~20%
Argon	0.93%
Carbon dioxide	0.04%

Proportions of gases in the atmosphere

PiXL Science

Algae and plants	*These produced the oxygen that is now in the atmosphere, through photosynthesis.*	carbon dioxide + water → glucose + oxygen $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$
Oxygen in the atmosphere	*First produced by algae 2.7 billion years ago.*	Over the next billion years plants evolved to gradually produce more oxygen. This gradually increased to a level that enabled animals to evolve.

How oxygen increased

The Earth's early atmosphere

Volcano activity 1st Billion years	*Billions of years ago there was intense volcanic activity*	This released gases (mainly CO_2) that formed to early atmosphere and water vapour that condensed to form the oceans.
Other gases	*Released from volcanic eruptions*	Nitrogen was also released, gradually building up in the atmosphere. Small proportions of ammonia and methane also produced.
Reducing carbon dioxide in the atmosphere	*When the water vapour condensed, the oceans formed and the carbon dioxide dissolved into it*	This formed carbonate precipitates, forming sediments. This reduced the levels of carbon dioxide in the atmosphere.

How carbon dioxide decreased

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

Earth and atmospheric science

SCIENCE: CHEMISTRY – C8 Earth Science (Part 1)

Earth and atmospheric science

Greenhouse gases

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

Testing for oxygen	*Glowing splint*	Re-lights the splint in the presence of oxygen.

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

Human activities and greenhouse gases

Effects of climate change

Rising sea levels

Extreme weather events such as severe storms

Change in amount and distribution of rainfall
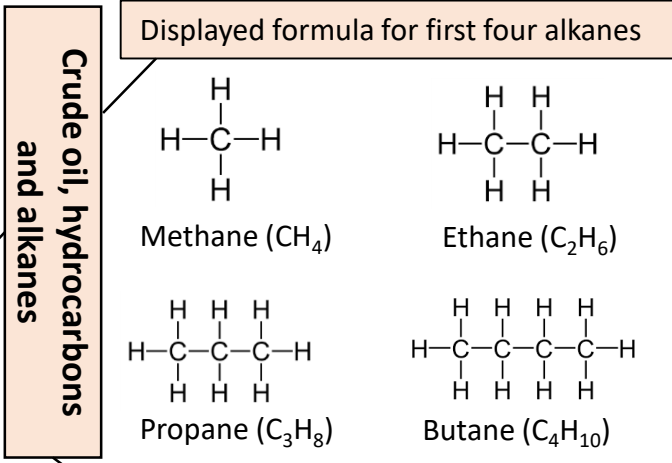
Changes to distribution of wildlife species with some becoming extinct

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

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

SCIENCE: CHEMISTRY – C8 Fuels (Part 2)

Carbon compounds as fuels and feedstock

Crude oil, hydrocarbons and alkanes

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

Displayed formula for first four alkanes

Methane (CH_4)

Ethane (C_2H_6)

Propane (C_3H_8)

Butane (C_4H_{10})

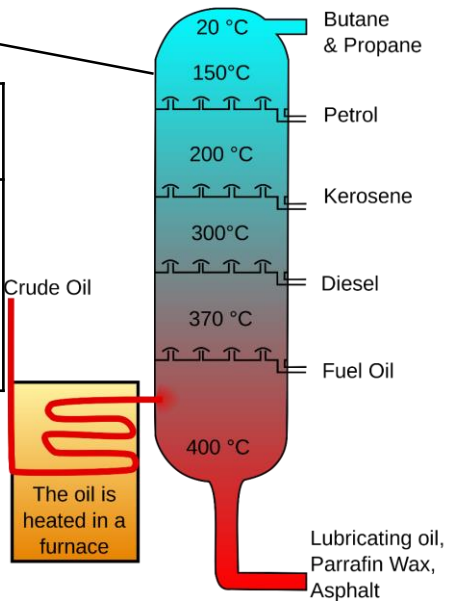|		
Fractions	*The hydrocarbons in crude oil can be split into fractions*	Each fraction contains molecules with a similar number of carbon atoms in them. The process used to do this is called fractional distillation.
Using fractions	*Fractions can be processed to produce fuels and feedstock for petrochemical industry*	We depend on many of these fuels; petrol, diesel and kerosene. Many useful materials are made by the petrochemical industry; solvents, lubricants and polymers.

Cracking	*The breaking down of long chain hydrocarbons into smaller, more useful chains*	The smaller chains are more useful. Cracking can be done by various methods including catalytic cracking and steam cracking.

Fractional distillation and petrochemicals

Hydrocarbon chains

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

20 °C — Butane & Propane
150°C — Petrol
200 °C — Kerosene
300°C — Diesel
370 °C — Fuel Oil
400 °C

Crude Oil

The oil is heated in a furnace

Lubricating oil, Parrafin Wax, Asphalt

Fuels

Sulfur dioxide	*Released from burning hydrocarbons with sulfur impurities in*	Sulfur dioxide dissolves in rain water to form acid rain. This damages plant life and can make water habitats acidic. Acid rain can also weather limestone and sandstone structures. It can make soil acidic and affect crop growth
Oxides of nitrogen	*Oxygen and nitrogen react from the air under high temperatures inside engines*	As pollutants, oxides of nitrogen cause acid rain and are also classified as greenhouse gases. Can cause respiratory problems.
Hydrogen fuel	*Hydrogen reacts with oxygen in the engine as a fuel for the vehicle*	**Advantages:** - Water is the product - No greenhouse gases released - Renewable **Disadvantages:** - Expensive to buy - Difficult to re-fuel
Fossil fuels	*Crude oil, natural gas and coal*	Petrol, kerosene and diesel oil are non-renewable. Methane is found in natural gas and is also non-renewable.
Incomplete combustion issues	*Carbon monoxide is an odourless, toxic gas that can kill*	Soot (carbon) is also produced that builds up in the atmosphere and can cause global dimming. This reduces the amount of sunlight that reaches the Earth and can alter rainfall patterns.

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

Complete combustion of methane:
Methane + oxygen → carbon dioxide + water + energy
CH_4 (g) + $2O_2$ (g) → CO_2 (g) + 2 H_2O (l)

Boiling point (temperature at which liquid boils)	*As the hydrocarbon chain length increases, boiling point increases.*
Viscosity (how easily it flows)	*As the hydrocarbon chain length increases, viscosity increases.*
Flammability (how easily it burns)	*As the hydrocarbon chain length increases, flammability decreases.*

Science – Physics: P2 Motion

A **quantity** tells us how much of something there is.

A **scalar** quantity is a quantity with just a **magnitude** (size).

A **vector** quantity is a quantity with both a **magnitude** and a **direction**.

Examples of scalar quantities	Examples of vector quantities
Speed Mass Distance Energy Time	Displacement (distance in a straight line) Force Weight Velocity Acceleration Momentum

The **speed** of an object tells us how quickly an object travels a certain distance.

The **average speed** tells us the how quickly an object has completed a whole journey.

The **instantaneous speed** tells us the how quickly an object has travelled **at a specific point** in the journey.

Speed is calculated using the following formula:

$$\text{speed (m/s)} = \frac{\text{distance travelled (m)}}{\text{time taken (s)}}$$

Some typical speeds include:
Airliners – 250m/s
Speed limit in town centres – 10.5m/s
Commuter trains – 55m/s
Motorway speed limit – 31m/s

Ferry – 18m/s
High speed trains – 90m/s
Cycling – 6m/s   **Sound – 330m/s**
**Stong wind – 15m/s** `   **Walking – 1.4m/s**
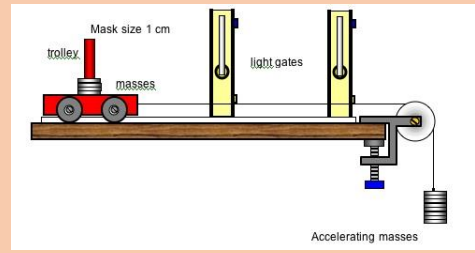
Light gates can be used in a lab to measure the time taken for an object to travel.

Light gates are **more accurate** than using a stopwatch as a computer records the time and isn't affected by **reaction times.**

Light gates are used in the following way:
- the object passes through the first light gate and starts the timer
- when it passes through the second light gate, the timer stops
- the computer works out the difference between the two times from the light gates

Distance/time graphs show us how objects move throughout a journey.
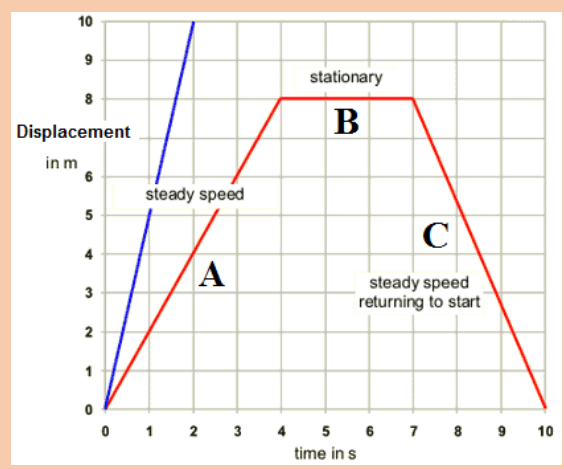
Horizontal lines mean the object is **stationary (not moving).**

Straight, sloping lines mean the object is travelling at **a constant speed.**

The steeper the sloping line, **the faster the object is travelling.**

We can calculate the speed of the object by working out the **gradient** of the line.

Worked example:
In the graph what is the speed of the red object at point A?
Step 1: Find the change in distance on the graph = 8m
Step 2: Find the change in time on the graph = 4s
Step 3: Carry out the speed calculation = 8 ÷ 4 = 2m/s

Science Physics – P1 Maths in Science

In Science, all scientists use **SI units** to measure certain quantities.

We use multiples and sub-multiples of SI units if quantities are very large or very small.

Quantity	SI unit	Abbreviation
Distance	metre	m
Mass	gram	g
Time	second	s
Current	ampere	A
Temperature	kelvin	K
Concentration	mole	mol
Frequency	hertz	Hz
Force	newton	N
Energy	joule	J
Power	watt	W
Pressure	pascal	Pa
Electric charge	coulomb	C
Potential difference	volt	V
Electric resistance	ohm	Ω
Magnetic flux density	tesla	T

GIGA (e.g. gigawatt, GW)

↑ ÷1000

MEGA- (e.g. megawatt, MW)

↑ ÷1000

KILO- (e.g. kilowatt, kW)

↑ ÷1000

BASE UNIT (e.g. watt, W)

↓ x10

CENTI - (e.g. centiwatt, cW)

↓ x100

MILLI - (e.g. milliwatt, mW)

↓ x1000

MICRO - (e.g. microwatt, μW)

↓ x1000

NANO- (e.g. nanowatt, nW)