Great in name, greatest together

Great Sankey High School

Knowledge Organiser

Spring Term

Year 11

A Knowledge Rich Curriculum at Great Sankey High School

Research around memory suggests that if knowledge is studied once and not revisited or revised, it is not stored in the long-term memory. This means that after one lesson, or revising for one test, the knowledge will not be retained unless it is studied again. To ensure that knowledge is embedded in the long term memory it must be revisited frequently. Ensuring knowledge is embedded aids understanding, and in turn makes future learning more successful. To quote Daniel Willingham's learning theory,

"Thinking well requires factual knowledge that is stored in our long-term memory"

As part of home learning, students should be revising what they have been taught recently but also content they were taught previously. Therefore, as part of our strategy to embed learning over time we have developed knowledge organisers across years 7 -11. These will provide key content and knowledge allowing students to pre-learn and re-learn, a vital part of processing all the information required to be successful. This knowledge will form the back-bone of assessments in school.

How to use your knowledge organiser

Knowledge organisers will be used in subject lessons, homework activities and form time and therefore you need to bring your knowledge organiser to school every day.
Ensuring that knowledge is retained into your long-term memory and you are ready for tests takes work!

READ → **COVER** → **WRITE** → **CHECK**

To encourage students to build good study habits, students will be assigned homework quizzes on a week A through the Google Classroom. Students will be expected to use revision strategies such as read, cover, write, check to learn key knowledge and will then complete the quizzes to demonstrate their learning. Completion of these quizzes is an essential homework activity and will be closely monitored by the pastoral team.

Other methods that you may wish to try at home are listed below:

- Create mind maps.
- Create flashcards.
- Get sticky with your learning: write out key points from the KO as you read over it on post-it notes.
- Write your own basic recall quizzing questions around the keywords, definitions and key facts that you need to know. Test yourself with these questions and then leave it overnight to answer them the next day.
- Write your own challenging questions using the following command words – explain, compare, evaluate. Then create a model answer for these questions.
- Put the key words from your KO into new sentences.
- Make mnemonics to remember the order of particular concepts.
- Draw a comic strip, storyboard or a timeline describing any series of events that have a chronological order.
- Write yourself or a partner some quiz questions. Quiz each other or swop your questions to see if you can answer each other's questions.
- Think about the big picture – why is knowing specific information important to you/other people/society/companies/science/technology? The more links that you can make, the more meaningful you make your learning and the more likely it is that you will remember it. Think about the big picture – are there any links in the content on your KO to anything that you have watched on TV, read about or heard in the news?
- Give yourself spelling tests.
- Definition tests.
- Draw diagrams of key processes or theories.
- Draw images and annotate/label them with extra information.
- Create fact files.
- Create flowcharts for descriptions or explanations that have a chronological order.
- Summarise in your own words each section.
- Get your parents/carers to test you.
- Pick out key words and write definitions.
- Pre-learning (read a section of your knowledge organiser prior to the lesson).
- Learn key quotes (if applicable). Consider what you may say about these quotes e.g. what the author is trying to make you think/feel, their choice of language, what can be inferred from it.
- Write a letter/blog/article to someone explaining a key idea or concept.
- Prepare to overcome any hurdles: write down any questions or any areas of the KO that you feel you need to speak to your teacher about.
- Use the guidance that may have been given with a specific KO to help you learn the information and use it.

"Don't practise until you get it right. Practise until you can't get it wrong."

Portable Knowledge in STEM at KS4

STEM stands for Science, Technology, Engineering and Maths, and it is important that you can see connections between each of these subjects. In the real world there are very few challenges that only require one set of skills. For example, you wouldn't be able to design a new app, video game or computer program without an understanding of all of the STEM concepts. This section of the knowledge organiser will show you how different STEM subjects have things in common, including examples of how you might use them, and how some things may actually appear slightly different from one subject to the next. As Geography is a Natural Science we can include that too.

EXAMPLE	SCIENCE	TECHNOLOGY & ENGINEERING	MATHS	GEOGRAPHY
Tally chart	Can be used to record the number of pupils in different height ranges in biology.	Can be used when choosing a final design choice from a selection of draft designs.	Can be used to record the number of pupils (usually labelled frequency) with different eye colours or what their favourite subject is.	Can be used to record the number of people visiting honeypot sites when studying tourism such as visitor numbers in Jamaica over a 5 year period.
Pie chart	Can be used to display the % of different hydrocarbons in crude oil or % of different gases in the atmosphere in chemistry.	Can be used to display results of a tally chart.	Can be used to display the proportion or % of pupils who travel to school in different way.	Can be used to record the amount of people working in different job sectors over time in the UK in comparison to other countries.
Bar chart	Can be used to display the number of people with different blood groups in biology.	Can be used to display results of a tally chart.	Can be used to display the number of pupils with a different favourite sweet.	In geography the term histogram and bar chart are interchangeable and are used to display data such as the percentage of forest lost in a range of countries. A range of different bar charts and histograms are used when writing up fieldwork.
Histogram	This is similar to a bar chart but the bars touch each other and they represent continuous data that is grouped, for example number of pupils in different height ranges in biology.	Can be used to display research data. Can also be used to represent time on a "Gant" chart.	In maths this can be used to show the distribution of a data set such as the ages within a population. In most cases, a histogram has different class widths meaning the area of each bar is the frequency for it.	
Line graph	Can be used to display the time taken for salt to dissolve at different temperatures in chemistry.	Can be used to represent trend data during research pieces.	In maths these are sometimes called scatter graphs or timeseries graphs. They can be used to display house prices and/or the trend in a data set over time.	Can be used when studying climate graphs. Line graphs are also used when analysing climate data over a period of time.
Line of best fit	In biology a line of best fit can be point to point, but in chemistry they are most often a straight line. In all 3 sciences they could be a curve depending on distribution of the points. For example the extension of a spring in physics.	x	In maths you might be asked to add a line of best fit to a scatter graph. It is always a straight line drawn with a ruler and can be used on graphs to show correlation between hours of revision and score in test. In GCSE Statistics, we use correlation coefficients and linear regression equations to analyse this in detail.	In geography lines of best fit are used to look for negative and positive correlations when comparing data usually in physical geography modules. It is always a straight line drawn with a ruler through as many points as possible.

Portable Knowledge in STEM at KS4

Hopefully this section of the knowledge organiser will help you spot where things crossover from one STEM subject to another as you move from lesson to lesson. REMEMBER some things are exactly the same, some are very similar but might be called different things, and some things are different altogether! ……..and don't forget STEM stands for **Science, Technology, Engineering and Maths**

EXAMPLE	SCIENCE	TECHNOLOGY & ENGINEERING	MATHS	GEOGRAPHY
Range	Range around a mean can be used with data for heart rate after exercise in biology, amount of hydrogen gas produced in a chemical reaction in chemistry and number of times a ball bounces in physics.	x	The range is a measure of the spread of a data set. It can be used to compare data, with a smaller range meaning it is more consistent such as comparing times athletes run 100m over 10 races.	Range is used in the geographical skills section of course. Range can be used when looking at rainfall and temperature data for different locations or when using development indicators such as literacy rate, life expectancy etc.
Mean, Median and Mode	Mean, median and mode can be used to analyse any sets of data with a range of results.	x	Mean, median and mode can be used to analyse any sets of data in conjunction with the range.	Mean, median and mode are used in the geographical skills section of the course and can be used to analyse any sets of data with a range of results.
Continuous data	These are data values that can take any value and are grouped/rounded. In biology an example would be bubbles of oxygen produced during photosynthesis.	x	These are data values that can take any value and are grouped/rounded. Data could be length, time, capacity or mass.	This is where you have any value in your data. An example would be mm of rainfall.
Discrete data	In science this is sometimes called discontinuous data. An example would be blood group or eye colour in biology.	x	These are specific data values and can be quantitative (numerical) and qualitative (word or category). Examples include type of colour, the result from rolling a dice or the number of pets people have.	Discrete data in geography includes both primary and secondary data. Fieldwork data could include rock sample sizes and how they change from the source to the mouth of a river.
Using co-ordinates	x	Used by a CNC machine to position the cutter when machining a piece of material. Marking out a series of holes from dimensions on a drawing.	4 and 6 figure grid references are used when plotting in 4 quadrants and used in transformations.	Both 4 and 6 figure references are used across all topics in geography to locate places from a map.
Taking measurements that are accurate and precise	Accurate data is close to the true value and precise data gives similar results if you repeat the measurement. In science there are far too many examples to mention!	Used when marking out materials prior to cutting and quality during checking when manufacturing a component.	Being able to read a variety of scales is a key skill for plotting and drawing graphs or measuring angles and lines. It is important in constructions and scale drawings to be within 0.1 cm or 1°	Measurements and accuracy are really important when studying map skills, especially when looking at scale and distance.

		Definition	Contextual Sentence
1	*sphere (2 definitions)*	An area of activity, interest, or expertise. A round solid figure.	He wanted to spread his ideas to a wider sphere than the school. He worked with a sphere of clay.
2	*subordinate*	Lower in rank or position.	In Shakespeare's time, women were subordinate to men.
3	*supplementary*	Completing or enhancing something.	There is a supplementary water supply in case the rain supply fails.
4	*suspended (2 definitions)*	To hang something from somewhere. To temporarily prevent from continuing.	The light was suspended from the ceiling. They were suspended from school for two days.
5	*team*	Two or more people working together; a group forming one side in a competitive game/sport.	Winning the match was a well deserved reward for the team.
6	*temporary*	Lasting for only a limited period of time; not permanent.	There is a temporary entrance at the side of the building.
7	*trigger*	An event that is the cause of a particular action, process, or situation.	The trigger for the strike was the closure of the factory.
8	*unified*	To make or become united, uniform, or whole; brought together as one	The situation unified the local community.
9	*violation*	Harm done to someone/something; the breaking of established rules	He was in violation of the rules.
10	*vision*	The act or power of seeing/imagining ; something seen	The eye test shows she has perfect vision.

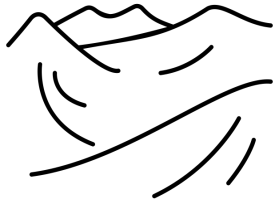
11	*adjacent*	Next to or adjoining something else.	We moved to the adjacent classroom.
12	*albeit*	Even though / although	He was making progress, albeit rather slowly.
13	*assembly (2 definitions)*	A group of people gathered together for a common purpose. The fitting together of manufactured parts into a complete machine.	The bell rang for the school assembly. Robots are replacing people on assembly lines.
14	*collapse (2 definitions)*	Suddenly fail/fall down or give way. Fold or be foldable into a small space.	The collapse of the bridge was due to the flood. The chairs collapse for storage.
15	*colleagues*	Fellow workers or professionals; people that you work with	He has good relationships with most of his colleagues.
16	*compiled*	Produces a list or document by collecting information from other sources.	The report was compiled from a survey of 5000 people.
17	*conceived*	Caused to begin; formed or devised a plan or idea in the mind.	The project was conceived by the group last year.
18	*convinced*	Completely certain about something.	She was convinced that it was a good idea.
19	*depression (2 definitions)*	The action of lowering something or pressing something down. Feelings of severe sadness and despair.	Depressions can be clearly seen in the landscape. He was undergoing counselling for depression.
20	*encountered*	Unexpectedly be faced with or experience something difficult ; to meet someone/something unexpectedly.	We have encountered a problem with the computer system.

Tier 2 Vocabulary

21	*enormous*	Very large in size, quantity, or extent.	There was an enormous amount of books in the new library.
22	*forthcoming*	About to happen or appear.	He was in training for the forthcoming rugby season.
23	*inclination (2 definitions)*	A slope. A particular state of mind for; a liking	There's a small inclination beyond the trees. They had little inclination for revision.
24	*integrity*	The quality of being honest/having strong moral principles.	He is a man of the highest integrity.
25	*intrinsic*	Belonging naturally; essential.	Maths is an intrinsic part of the school curriculum.
26	*invoked*	Appealed to; give rise to	The music invoked a memory of the summer.
27	*levy*	A tax / fee /sum of money.	The new levy will be 15%
28	*likewise*	In the same way/ similarly; also.	She started to tidy up and told the others to do likewise.
29	*nonetheless*	In spite of what has just been said.	The hike was difficult, but fun nonetheless.
30	*notwithstanding*	Despite; in spite of.	He still walked home, notwithstanding the heavy rain.
31	*odd*	Different to what is usual or expected; strange.	The ending of the film was very odd.
32	*ongoing*	Continuing; still happening.	Rehearsals for the performance are ongoing.
33	*panel (2 definitions)*	A small group of people brought together to decide on a particular matter. A separate part of a surface.	He was happy to be on the interview panel. The door was made up of three panels.
34	*persistent*	Happening for a long/longer than usual time or continuously.	Persistent rain will affect many areas.
35	*posed (2 definitions)*	Took a particular position in order to be photographed, painted, or drawn. Presented or caused a problem/danger.	The group posed by the window Discarded waste posed a threat to the animals.
36	*reluctant*	Unwilling and hesitant.	He was reluctant to get involved in the matter.
37	*so-called*	Commonly named; alleging to be something but you are not sure it is.	Those so-called friends are a bad influence.
38	*straightforward*	Uncomplicated /easy to do or understand.	The directions were straightforward and I found the house easily.
39	*undergo*	To experience something (typically something unpleasant or difficult).	New recruits undergo basic training for six weeks.
40	*whereby*	By which.	They had a system whereby people could vote by telephone.

ENGLISH

'Ozymandias' by Percy Byshee Shelley - Key Quotes

Image	Quote	Analysis
	'Look on my Works, ye Mighty, and despair!'	**The imperative show Ozymandias' commanding style**. The verb 'despair' shows he wanted his subjects and enemies to view him with fear and envy. This is **ironic because there is nobody in the desert to view the crumbling statue – the only one who would 'despair' is Ozymandias. The exclamation is strong and authoritative – this is ironic because nobody is listening.** He was clearly a **tyrannical ruler, who seemed to use his power to punish others.** When he addresses the 'Mighty', he could have been talking to the gods, suggesting his **deluded opinion of himself.**
	'And wrinkled lip and sneer of cold command'	**Synesthesia** (when you experience one of your senses through another) and **alliteration of 'cold command'** presents Ozymandias' character as powerful and arrogant; this is ironic now as nothing is left. The use of the **adjective 'wrinkled'** shows how transient power is – yet again, this is ironic due to Rameses II's deluded view of himself.
	'Stamped on these lifeless things, The hand that mocked them'	**Verb 'stamped'** - makes the ruler seem ruthless, empowered, selfish, arrogant. 'Mock': to a model of, but also to make fun of. This is a **pun** because of the double meaning, and showcases the ruler's tyrannical actions towards others. The reference to the **adjectival phrase 'lifeless things'** shows how demeaning and dehumanising Ozymandias was – he was an oppressive ruler.
	***'Round the decay Of that colossal wreck, boundless and bare The lone and level sands stretch far away'***	**Adjective 'colossal'** connotes something that is vast or huge – potentially acting as a metaphor for his ego rather than the statue. He is egocentric. The 'lone and level sands' outlast the statue, **juxtaposed** to the power and ego of the statue. **The concrete noun 'sands'** are also **symbolic** of the passing of time. The **verb 'stretch'** suggests that nature will outlast man and humanity – our place on earth is only temporary and is no match for our natural environment and time. This reinforces the transient nature of power.

'London' by William Blake - Key Quotes

Image	Quote	Analysis
	'"I wander thro' each charter'd street"	The **verb ' wander'** showcases how the speaker aimlessly is walking down the streets of London. The use of the **adjective 'charter'd'** connotes a sense of oppression and entrapment – a place where everyone is restricted.
	"marks of weakness, marks of woe"	**This line breaks the iambic tetrameter** – it falls short by a syllable. This may reflect the innate suffering and weakness of all in London – not only are people physically weak, but also mentally due to the corruption of the government. This is reinforced with the **nouns 'weakness' and 'woe'** emphasising that the oppression is present in everyone - it appears to be innate.
	"the mind-forg'd manacles"	The **metaphorical** indoctrination and restriction is present in everyone – everyone is restricted mentally within London. Their minds and vision is indoctrinated by the corrupt government and institutions – the people of London believe the way they are treated is okay.
	"plagues the marriage hearse"	The **oxymoron** suggests that everything which is positive is destroyed and metaphorically dies in London. This is showcased through the ceremony of love (marriage) and the vehicle of death (hearse).

ENGLISH

'My Last Duchess' by Robert Browning - Key Quotes

Image	Quote	Analysis
	"That's my last Duchess painted on the wall"	The use of the possessive determiner 'my' makes the Duke sound as if he owns the Duchess herself, not just the picture of her. Implies a sense of instrumental power (authority) over her -> reinforcing a patriarchal society.
	"She thanked men, - good! But thanked somehow – I know not how – as if she ranked my gift of a nine-hundred-years-old name"	Verb 'thanked' implies a sense of jealousy from the Duke – he is inferring that she flirted a lot with other men (so he thinks anyway). The caesura, alongside the repetition reflects the Duke's sense of exasperation (annoyance) with her behaviour. The fact that he is proud of his history and legacy heightens his frustration as he views her 'flirty' behaviour as almost mocking his importance, and his family's importance.
	"I gave commands; then all smiles stopped together"	Euphemism for his wife's murder – a sign of lack of control. 'I gave commands' - this declarative presents the Duke as cold and heartless. He 'gave commands' because he was suspicious of her behaviour towards other men. It demonstrates his power and authority over his wife and how he objectified women.
	"Notice Neptune, though, taming a sea-horse, thought a rarity"	Metaphor of Neptune (Roman god of the sea) suggests he sees himself as god-like; men are gods that must tame their wives (seahorses). This heightens his hubristic nature. He believes his status and wealth should be seen as more valuable than anything available to the common man - it is a rarity. This reinforces his materialism.

'The Emigree' by Carol Rumens - Key Quotes

Image	Quote	Analysis
	"There once was a country... I left as a child"	**Temporal deixis (a phrase referring to a time in which an event takes place) – T**he poem starting with the phrase inflicts a childlike tone to the poem; it sounds as if it is the start of a fairytale. However, the use of the **adverb 'once'** foreshadows loss. The use of **aposiopesis** implies the speaker is longing for her childhood memory she is about to recall.
	"it cannot break my original view, the bright, filled paperweight"	**Metaphor –** the speaker's views on her old city cannot be faltered. The **adjective 'filled'** implies that the paperweight is difficult to move – implying how obstinate her views are on how beautiful her old city is, regardless of the wars that now currently possess it. She chooses to remain ignorant to the threats that now inhabit it; reinforcing a sense of appearance vs. reality. It depicts the city as almost quixotic.
	"it tastes of sunlight"	**Synaesthesia (connects one sense to another) - i**mplies how vivid the memory is for the speaker. It reinforces how much solace and delight the memory brings to the speaker. The memory is depicted as something tangible and realistic, which only portrays it in a fantastical light.
	"I have no passport, there's no way back at all"	The use of the **concrete noun 'passport'** connotes there is a sense of power with inanimate objects and represents a clear loss of identity. The speaker is depicted as entrapped and oppressed. The **volta** presents how the city is infested with discrimination towards the speaker, in which she is entrapped in.
	"My city takes me dancing through the city of walls"	**Personification –** The old city is personified. It is depicted as providing the speaker with comfort and support, by guiding the speaker through dance. The **verb 'dancing'** portrays a sense of enjoyment. This is **juxtaposed with the noun phrase 'the city of walls'** that depicts the new city as restrictive – a place where dancing is a strange action to be completing due to the restriction enforced.
	"They mutter death, and my shadow falls as evidence of sunlight"	The new city appears menacing and troublesome with the reference to the **verb phrase 'mutter death'. The verb 'mutter'** makes the new city appear sneaky and mischievous towards the speaker – as if it is disingenuous. The speaker appears feel the need to protect her old city as it is her 'sunlight' - potentially **symbolising** the speaker's hope in this restrictive city.

'Checking Out Me History' by John Agard - Key Quotes

Image	Quote	Analysis
	"Dem tell me wha dem want to tell me"	The **repetition of the pronouns 'Dem' and 'me'** create a sense of separation and division between the speaker and the teachers that taught them. The **anaphora** reinforces this sense of division between the two. The use of this **dialect** shows the speaker's sense of pride. **Phonetic spelling of Carribean accent** – the speaker's voice links to his identity. The use of 'want' is interesting as it suggests the teachers consciously made a choice to omit details.
	"Bandage up me eye with me own history blind me"	The **metaphor 'bandage up me eye'** shows how the teachers are deliberately attempting to hide history. The use of the **verb 'bandage'** is ironic, as they are used to aid healing but here, they are used to cause blindness. This heavily juxtaposes the influential historical figures that are relevant to the speaker's identity, as they are presented as providing hope and radiance to the world.
	"Toussaint de beacon"	The **lexical field of hope** is portrayed through the **noun 'beacon' and 'vision' (previously mentioned in the stanza)**, portraying the hope such historical black figures bring to the speaker and his culture. This only heightens the speaker's frustration with the British education system for not teaching him about his culture. **Toussaint was a ruler who led the slaves to victory in the Haitian revolution.**
	"hopeful stream to freedom river"	The speaker connects Nanny to nature and water – she is depicted as a spiritual person, linking to liberty and hope. The **lexical field of nature** through the **concrete noun 'stream'** and **'river'** makes Nanny appear to bring solace and peace to the speaker, as well as all the people she led. **Nanny de Maroon was a leader of the Maroons (runaway slaves), who led the Jamaican resistance against the British.**
	"a healing star among the wounded"	The **metaphor** of Mary Seacole as a star links her to the wider universe, suggesting she is warm and an image of hope. This can also be linked to the **motif of light** and how these historical black figures were great examples of providing revolutionary guidance to their culture. **Mary Seacole (a Jamaican nurse, who helped the sick in the Crimean War).**
	"I carving out me identity"	**Emphatic final words** – the clear and forcibility associated with this **declarative** expresses how the speaker is determined to use his own history to create his identity. The **verb 'carving'** shows how passionate the speaker is about the power behind their history and how it influences their identity.

'The Prelude' by William Wordsworth - Key Quotes

Image	Quote	Analysis
	"One summer evening (led by her) I found a little boat tied to a willow tree"	**Parentheses** – it's unclear who 'her' is. However, it is suggested in an earlier part of the poem that it is nature personified. This **allusion** to the idea of Mother Nature leading the speaker portrays how nature plays a vital role in Wordsworth's life, reinforcing the romantic ideology. The **adjective 'little'** shows the delicacy of manmade objects in contrast to the **adjective 'rocky'**, which highlights the power nature demonstrates over man.
	"She was an elfin pinnace"	The **personification** and **metaphor**, 'She was an elfin pinnace' (a fairy boat) makes the scene seem magical and otherworldly, but still not threatening. It is depicting the scene as almost too good to be true, heightening the threatening image that is to follow.
	"I struck and struck again, and growing still in stature the grim shape towered up"	The **dynamic verb 'struck'** shows the urgent need the speaker has to row away in a fast manner, which heightens the mountains threatening nature. However, more of the mountain comes into view which depicts it as getting bigger, potentially making it sound like a nightmare. Nature is being depicted as an omnipotent force here that ultimately belittles and intimidates mankind.
	"with purpose of its own and measure motion like a living thing, strode after me"	**A semantic field of control** is created through the **noun 'purpose', adjective 'measured'** and **verb 'strode'.** This depicts the mountain as the one now in control, which **juxtaposes** the speaker's fear. This contrast only emphasises the power of nature further, with it being almost taunting and indestructible. The **simile** also shows the sheer power of nature and how quickly it can turn against mankind.
	"O'er my thoughts there hung darkness, call it solitude or blank desertion"	The use of this **prepositional phrase** infers that the speaker is haunted by the power of nature. The use of the stative verb 'hung' implies a sense of lingering and burden that they now carry because of this encounter. The use of **nouns 'solitude'** and **'desertion'** now demonstrate how alone the speaker feels, contrasting his familiarity with nature at the beginning of the poem. This heightens the unpredictability associated with the power of nature.
	"trouble to my dreams"	The poem ends with an **unsettling image** which helps the reader to empathise with the speaker. The poem ends on a **sinister tone**, which is a complete contrast to the opening line. Nature takes many forms to demonstrate its power, and this phrase shows the long-term impact nature has on the speaker. The use of the **abstract noun 'trouble'** shows how the power of nature has almost poisoned his innocent outlook on nature, with reference to 'dreams' connoting peace and tranquillity.

ENGLISH

'Storm on the Island' by Seamus Heaney - Key Quotes

Image	Quote	Analysis
	"We are prepared: we build our houses squat"	The first-person plural pronoun 'we' suggests a sense of community and togetherness. The first line shows the reader that poem is written in present tense, potentially reflecting that storms happen time and time again. The declarative 'we are prepared' portrays a sense of solidarity and stability in face of the storm. It presents a sense of safety. The semantic field of safety is ironic given that the strength and power of nature inflicts fear on the speaker. It gives an impression of mankind trying to assert their power, but aren't successful to nature.
	"Nor are there trees which might prove us company when it blows full Blast"	The plosive sound of 'Blast' emphasises the brutal nature of the storm – the power and strength of nature. This is further reinforced with it being syntactically positioned at the start of the line. The fact that the enjambment has carried the noun 'blast' into the next line may physically represent the strong nature of the wind in the storm. 'Blast' is part of the semantic field of warfare that is seen presented in the poem, alluding to the political troubles of Ireland. The lack of trees enhances how isolated and barren the island and the speaker is.
	"You might think that the sea is company, Exploding comfortably down on the cliffs But no"	The repetition of the noun 'company' heightens the loneliness and isolation felt by the speaker on the island. Not even nature can provide them with comfort and placement. The oxymoron 'exploding comfortably' emphasises the sheer contrast between feelings of safety and fear – potentially a representation of the political conflicts that took place in Ireland. The caesura and monosyllabic lexis within the volta 'But no' could reflect the last moments of calm, before the storm.
	"spits like a tame cat turned savage"	The simile 'spits like a tame cat turned savage' suggests how familiar things become dangerous and frightening during a storm. The enjambment with 'turned savage' on the next line presents the volatile nature of things during the storm; how the most innocent things can quickly change in nature. It shows how omnipotent nature is.
	"We just sit tight while the wind dives and strafes"	Semantic field of warfare – foreshadowing the deeper meaning that the poem may be about the political upheaval. This presents the storm as an extended metaphor for the violent political troubles that Ireland has experienced. Metaphorical language - the reference to 'dives and strafes' depicts the wind as an enemy fighter plane. It alludes to the wind as a weapon against mankind. The fact the speaker and the other islanders 'just sit tight' depicts them as helpless and powerless in contrast to the storm.
	"It's a huge nothing that we fear"	The declarative in the final line suggests the storm is invisible – there's nothing physical (solid) there. This juxtaposes the second line, where the houses are formed of solid rock. Could this suggest the power of nature against man-made things? It could imply that the power of nature will always triumph. The half rhyme on the final two lines creates somewhat a cyclical structure to the poem, depicting the storm as inescapable.

Year 11 Mathematics Knowledge Organiser

Topic
Tier 2 Vocabulary Part 1

What do we mean by Tier 2 Vocabulary?

Tier 2 words are also referred to as academic vocabulary. They are cross-curricular words, appearing frequently across topics and content areas. They can also be referred to as **command words**.

Change…to

Change a value from one unit to another.

Example in context

Change 260 millimetres into metres

Circle the reason for your answer

Follows a question about congruence. The options will be the congruence conditions SSS, SAS, ASA and RHS.

Example in context

The two triangles shown are congruent. Circle the reason that they are congruent.

SSS SAS ASA RHS

Compare…and/to/with

Work out or identify the values required and say which is smaller/larger, etc.
Where appropriate, consider the context when giving your answer.

Example in context

- Compare $\frac{5}{6}$ of 120 and 40% of 240? Which is larger?
- Billy says that there is a positive correlation between the data. Within the context of the question describe what this means?

Complete

Add the missing information to a table or diagram (often statistical).

Example in context

There were 18 people who attended on Saturday. Using this information complete the pictogram.

Construct

Draw accurately.
If told to use compasses, all construction arcs and lines should be shown.

Example in context

Construct accurately an equilateral triangle with sides of 6.5 cm.

Convert …(in)to

Change a value from one numerical form to another or a measure from one unit to another.

Example in context

Convert 85% into a fraction in its simplest form

Describe (fully) the single transformation that maps...

Use mathematical terminology to define the given information.

Example in context

- With enlargement, give the scale factor and centre of enlargement.
- With reflection, give the equation of the line of reflection.
- With rotation, give the angle, direction and centre of rotation.
- With translation, give the translation vector.
- This should always be done fully, even if that word is absent.

Do not use a graphical method

Algebraic manipulation or interpretation is required.

Example in context

Solve the pair of simultaneous equations

Do **not use a graphical method**

Does the data support this statement?

Use calculations and/or statistical measures based on the given data to make a decision.

Example in context

Fatima says that Group A on average has done better. Does the data support this statement?

Draw

Give an accurate depiction of a graph, map, diagram, etc.

Example in context

Draw a sketch of the net of the cuboid shown

Estimate (a mean from grouped frequency)

Use class midpoints to work out an estimate of the mean.

Example in context

Height (cm)	Frequency
$140 \le x < 150$	4
$150 \le x < 160$	10
$160 \le x < 170$	6

Estimate the mean

Estimate the value of (used with a calculation)

Use approximations to work out a value.

Example in context

By rounding each value to 1 significant figure, estimate

$$\frac{30.96^2}{\sqrt{98}} + 4.87^3$$

Evaluate… (Higher only)

Identify which part of the method, calculation or assertion is incorrect or explain why it must be correct.

Example in context

By evaluating Cameron's working out, show why they are wrong.

Express…as (Higher only)

Convert a number from one form to another

Example in context

Express $2.7\dot{5}\dot{6}$ as a fraction in its simplest form

Factorise fully

Take out any common factors of an expression or convert a quadratic expression into two linear factors.

Example in context

Factorise fully
$15x^2 + 10x$

Give a reason for your answer/choice

Show a calculation and/or written evidence for your answer.

Example in context

By comparing the box plots, which team has performed better?
Give a reason for your choice

Year 11 Mathematics Knowledge Organiser

Topic
Tier 2 Vocabulary Part 2

What do we mean by Tier 2 Vocabulary?
Tier 2 words are also referred to as academic vocabulary. They are cross-curricular words, appearing frequently across topics and content areas. They can also be referred to as **command words**.

Give your answer in terms of π

Don't use a decimal value of pi, just do the working with the coefficients of pi.

Example in context

Calculate the area of the circle.
Give your area in terms of **π**.

Give your answer to… decimal places/significant figures

Show the full answer in your working, but give the rounded value on the answer line.

Example in context

Use your calculator to work out $\sqrt{72.8}$

Give your answer to 2 decimal places

How does this affect…

Comment on how your answer to a previous question part is different due to a change to an assumption used.

Example in context

The scores in a class are 4, 6, 5, 7, 10
Another student scores 8.
How does this affect the range.

Is… correct?

Tick a box if given or state 'yes' or 'no' in your answer.

Example in context

Antoine thinks 9 is a prime number. Is Antoine correct?

Give a reason for your answer

Is your answer to part… sensible?

Use approximations to check if a previous answer makes sense in the context of the question.

Example in context

By rounding the numbers to 1 significant figure, is your answer to part (a) sensible?

Label

Identify required regions, lengths or axis labels.

Example in context

On the grid identify the region represented by
$x \le 5, y \le 4, x + y > 6$
Label the region R

List

Write down all qualifying values or items.

Example in context

A six-sided dice is rolled and a fair coin is flipped.

List all the possible outcomes

Make… (different) criticism(s) of…

Write down the required number of errors or omissions in the given method or diagram.

Example in context

Eoin displays the data in a bar chart

Make two criticisms of the bar chart

Mark

Show a position on a map or diagram with the letter or symbol required.

Example in context

Mark the point which is equidistant from A and B.

Label it C.

Match each… to…

Join corresponding items in two lists by straight lines.

Example in context

Match each expression on the left with one on the right

$a + a + a + a$	$2a + 2b$
$a + a + b + b$	$4a$

Measure

Use a ruler to measure a length or a protractor to measure an angle.

Example in context

Measure the line below

_____

Multiply out (and simplify)

Multiply out the bracket(s), collecting like terms where possible.

Example in context

Multiply out and simplify

$4(x + 7) + 2(x - 3)$

One has been done for you

The given example shows the format in which the rest of the answers are required.

Example in context

Write these numbers in standard form. One has been done for you

$6 \times 10^4 = 6000$

$5.2 \times 10^3 =$ _____

Plot

Mark the points with a cross.

Example in context

Plot the points on the scatter graph.

Prove that… (Higher Tier only)

Give a formal algebraic proof with each step shown **or** a formal geometric proof with each step shown and justification for each step.

Example in context

Prove that $x^2 + x + 1$ is always positive

Rearrange… to make… the subject

Write the given formula with a different subject as specified.

Example in context

Rearrange $v = u + at$

to make a the subject

Reflect

Draw the image in the correct position.

Example in context

Reflect the shape in the x-axis

Rotate

Draw the image in the correct position.

Example in context

Rotate the shape 90° anticlockwise about the point (1, 0)

Year 11 Mathematics Knowledge Organiser	Topic	What do we mean by Tier 2 Vocabulary?
	Tier 2 Vocabulary Part 3	Tier 2 words are also referred to as academic vocabulary. They are cross-curricular words, appearing frequently across topics and content areas. They can also be referred to as **command words**.

Shade

Show a required region by dark colouring or cross-hatching, etc.

Example in context

On the grid shade the region represented by $x \le 5, y \le 4, x + y > 6$

Label the region R.

Show all your construction lines

The drawing should be done by standard constructions with all arcs shown.

Example in context

Construct the angle bisector for the angle shown. You should show all your construction lines

Show how… could use the data to support their hypothesis (Higher \ only)

Work with the given information to give calculations and/or statistical measures that support the given hypothesis.

Example in context

Show how Freya could use the box plot correctly to support their hypothesis.

Show that…

Give every step of a process that will lead to the required outcome.

Example in context

In the diagram, *DC* is parallel to *AB*.

Show that triangle ABD is isosceles.

Show working to check…

Show working that helps you decide whether or not the given working was correct and give your decision.

Example in context

Kim says, "The sum of any two **different** square numbers is **always** even."

Is she correct? Write down a calculation to support your answer.

Simplify your answer

Cancel any fractions and collect any like terms.

Example in context

Write 16 as a fraction of 12. Simplify your answer

Simplify (fully)

Collect terms or cancel a fraction.
This should always be done fully, even if that word is absent from the instruction. Use of the word 'fully' is a hint that more than one simplification step will be required.

Example in context

Simplify fully $\frac{24}{30}$

Simplify fully $(2x - 3)^2 - (x - 4)^2$

Sketch

Give a depiction of a graph, map, diagram, etc, where the important features are identified.

Example in context

Sketch the graph of $y = x^2 - 3x - 4$ highlighting the coordinates where it crosses the axes

Solve

Find the value(s) that satisfy a given equation or inequality.

Example in context

Solve $x^2 - 3x - 4 = 0$

Solve $4x + 6 < 2x + 9$

State

Write the required information.

Example in context

State the integers that satisfy the inequality

$-3 \le x < 4$

State the units of your answer

The correct units must be given to gain full marks (there may be a stand-alone) mark for giving the correct units

Example in context

Find the volume of the cuboid.

State the correct units of your answer

Translate

Draw the image in the correct position.

Example in context

Translate the shape by the vector $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

Use approximations to…

Unless told otherwise, students should round the given values to one significant figure.

Example in context

Use approximations to provide an estimate for

$\frac{63 \times 38}{0.42}$

Use the data/the graph/ your answer to part (a) to…

You should get your answer from the data/the graph/ a previous answer in order to move on rather that a direct calculation

Example in context

Hence, use your answer to part (a) to solve

$X^2 - 3x - 4 = 0$

What error has… made? (Higher only)

Identify which part of the method or calculation is incorrect

Example in context

Jason is using the quadratic formula to solve the problem.

He says there is only 1 solution.

What error have they made?

Write down your full calculator display

Give your answer as a decimal and write all the digits shown on your calculator. At least 6 digits would be seen as sufficient.

Example in context

Calculate $\sqrt{76.8}$

Write down your full calculator display

You must show your working

A correct answer will not receive the marks unless working is given to show how the answer was arrived at.

Example in context

Increase £234 by 17%.

You **must** show your working

Year 11 Mathematics Knowledge Builder	Topic	What can you do to assist yourself to be successful?
	Mathematics Sites	Revision sites are a great option for you to build upon your understanding. On this page, we highlight sites (and other things) that can help you to improve and consolidate towards your achievement goals

MathsWatch

vle.mathswatch.co.uk

Great for
One-Minute Maths Videos
Interactive Questions and worksheets
Online Past Papers
Six Week Revision Plans

My login details	
Login	@greatsankey
Password	@greatsankey

Corbettmaths

www.corbettmaths.com

Great for
Videos, Textbook and Exam Practice Questions
Five a Day Questions
AQA Level 2 Further Mathematics Practice
Corbett Maths Cards (£6.50 from Maths Office)

There are no logon details needed, but they are great for just continual practice!

SENECA

senecalearning.com

Great for
Building up knowledge for FREE
Learning in a different way to Mathswatch, Corbett and GCSEPod
Uses Memes and GIFs to help you maintain positivity

My Seneca login details – You create	
Login	
Password	

gcsepod
education on demand

www.gcsepod.com

Great for
Videos and Pods
Booklets of questions
Specific Grade 4/5 Booster Material

My login details

Login

Password

Maths Genie

www.mathsgenie.com

Great for
Easy to navigate with specific topic practice
Can use at both GCSE and A-Level so you can see the progression across the subject
Video tutorials

There are no logon details needed, but they are great for just continual practice!

Over to you!

Do you have additional sites you use?

Make a note of them here to help you

Year 11 Mathematics Knowledge Builder	Topic
	Formulae

What is a formulae?			
Definition	A rule or fact written with **mathematical** symbols.	**Etymology**	early 17th century (in the sense 'fixed form of words'): from Latin, diminutive of *forma* 'shape, mould'.

You are expected to know the following formulae; they will not be given in the exam.

The quadratic formula (Higher only)

The solution of $ax^2 + bx + c = 0$ where $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Circumference and Area of Circle

Where r is the radius and d is the diameter:

Circumference of a circle = $2\pi r = \pi d$

Area of a circle = πr^2

Pythagoras and Trigonometry (Sine and Cosine are higher)

In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

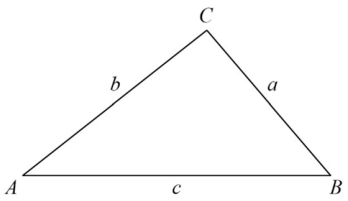
$$\sin A = \frac{a}{c} \qquad \cos A = \frac{b}{c} \qquad \tan A = \frac{a}{b}$$

In any triangle ABC where a, b and c are the length of the sides:

sine rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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

Area of triangle $= \dfrac{1}{2} ab \sin C$

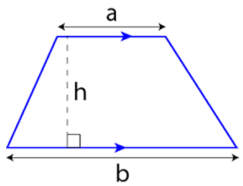


You are expected to know the following formulae and be able to derive them; they will not be given in the exam.

Perimeter, area, volume, surface area

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

Area of a trapezium $= \dfrac{1}{2}(a + b)h$



Volume of a prism = area of cross section × length

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is number of times that the interest is compounded:

$$\text{Total accrued} = P\left(1 + \frac{r}{100}\right)^n$$

Probability (Higher Tier)

Where $\mathrm{P}(A)$ is the probability of outcome A and $\mathrm{P}(B)$ is the probability of outcome B:

$$\mathrm{P}(A \text{ or } B) = \mathrm{P}(A) + \mathrm{P}(B) - \mathrm{P}(A \text{ and } B)$$

$$\mathrm{P}(A \text{ and } B) = \mathrm{P}(A \text{ given } B)\,\mathrm{P}(B)$$

You are not expected to know the following formulae; they will be given in the exam. It is good to know them

Perimeter, area, volume, surface area

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone

Curved surface area of a cone = $\pi r l$

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Kinematics (Higher Tier)

Where

- a is constant acceleration
- u is initial velocity
- s is displacement from the position
- when $t = 0$ and t is time taken

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

Year 11 Biology: Adaptations, Interdependence, and Competition

Communities

A **community** is made up of the populations of different species of organisms that are all **interdependent** in a habitat. **Interdependence** is when organisms rely on each other for survival. If you remove one organism from a community, it can affect every species within that community.

Abiotic (non-living) factors	Biotic (living) factors
- Light intensity - Temperature - Moisture levels - Soil pH & minerals - Wind intensity - Oxygen availability - Carbon dioxide availability	- Availability of food - New pathogens/parasites - New predators - Competition between different organisms

Distribution and Abundance

Ecologists will often conduct studies to look at how abiotic factors affect the **distribution** and **abundance** of organisms. They do this by measuring a **sample** of the organism.

Quadrat sampling

Quadrats are used to measure the abundance of organisms in a habitat.

1) Grid the area and assign co-ordinates to each square.
2) Use a **random number generator** to generate at least 10 co-ordinates of the area.
3) Place the quadrat in these areas and count how many of the desired organism there are.
4) Calculate the **mean** abundance per m^2 of the 10 sample sites.
5) Multiply this by the total area of the site to get an estimated abundance.

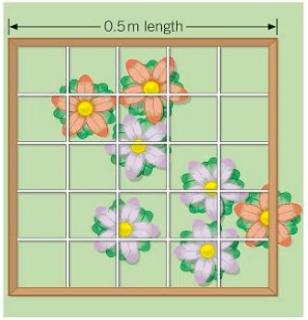


Figure 2 *It doesn't matter if organisms partly covered by a quadrat are counted as in or out, as long as you decide and do the same each time. In this diagram of a quadrat, you have six or seven plants per 0.25 m^2 (that's 24 or 28 plants per square metre), depending on the way you count*

Competition

Every organism shares their habitat with other organisms, yet there are only a limited amount of resources. Organisms therefore need to **compete** with each other for these resources to maximise their chances of survival.

What do animals compete for?	What do plants compete for?
- Food - Territory - Mate	- Light - Water - Minerals - Space

Adaptations

To survive and reproduce, organisms need a supply of materials from their surroundings. An **adaptation** is a feature that an organism has that makes it better suited to its' environment. Organisms that are well adapted to extreme environments, such as hot, volcanic, deep sea vents are called **extremophiles.**

Animal adaptations	Plant adaptations
Cold climates- small surface area to volume ratio, fat and fur for insulation. Dry climates- specialised kidneys to produce concentrated urine, behavioural adaptations to be active at cooler times, large surface area to volume ratio to maximise heat loss.	Dry climates- funnel shaped leaves for water to get to roots, curled leaves to trap a layer of moist air to reduce water loss, extensive root systems, thick waxy cuticle.

Year 11 Biology: Adaptations, Interdependence, and Competition Key Vocabulary

Key word	Definition	Contextual Sentence
abundance	A measure of how common or rare a particular type of organism is in a given environment.	The **abundance** of a species can be measured used quantitative sampling.
adaptations	Special features that make an organism particularly well suited to the environment where it lives.	A thick, waxy, cuticle is an example of an **adaptation** that a cactus has to reduce water loss.
community	Group of interdependent living organisms in an ecosystem.	Species in **communities** often rely on each other for survival.
competition	The process by which living organisms compete with each other for limited resources such as food, light, or reproductive partners.	Male lions will often **compete** with each other for territory and mates.
distribution	Where particular types of organisms are found within an environment.	A transect can be used to measure the **distribution** of an organism along a transect.
extremophile	An organism that can survive and reproduce in extreme conditions.	Tube worms are an example of an **extremophile** that live on deep.
interdependence	The network of relationships between different organisms within a community, for example each species depends on other species for food, shelter, pollination, seed dispersal, etc.	**Interdependence** can often mean that if one species declines, other species in the same community will also decline.
mean	The arithmetical average of a series of numbers.	A **mean** must be calculated when using a quadrat as you are calculating a representative sample.
median	The middle value in a list of numbers.	In the numbers 1,2,3,4,5, the **median** is 3.
mode	The number which occurs most often in a set of data.	The **mode** of {4 , 2, 4, 3, 2, 2} is 2 because it occurs three times, which is more than any other number.
quadrat	A sample area used for measuring the abundance and distribution of organisms in the field.	To measure the abundance of an organism, you can use the **quadrat** sampling method.
quantitative sampling	Records the numbers of organisms rather than just the type.	Measuring the abundance of an organism is an example of **quantitative sampling**.
range	The maximum and minimum values for the independent or dependent variables.	The **range** is important in ensuring that any patterns are detected.
sample size	The size of a sample in an investigation.	The bigger the **sample size**, the more reliable your results.
transect	A measured line or area along which ecological measurements are made.	Using the **transect** sampling method can tell you the distribution of an organism.

Material cycling

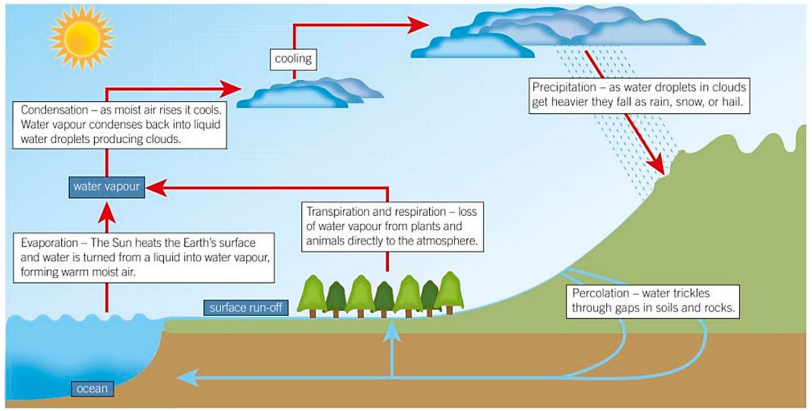


Figure 3 *The water cycle in nature*

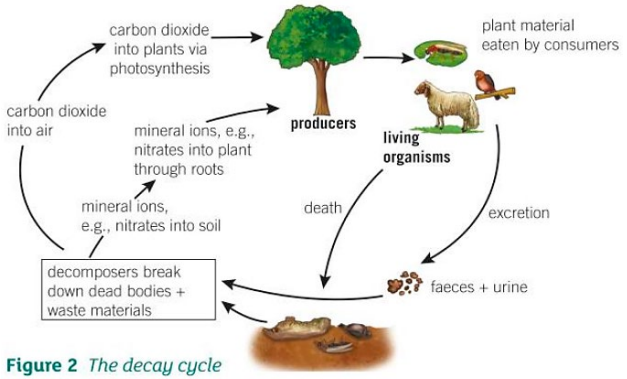


Figure 2 *The decay cycle*

Key points

- Material in the living world is recycled to provide building blocks for future organisms.
- Decay of dead animals and plants by microorganisms returns carbon to the atmosphere as carbon dioxide and mineral ions to the soil.
- Carbon dioxide in the atmosphere is used by plants in photosynthesis.
- The water cycle provides fresh water for plants and animals on land before draining into the seas. Water is continuously evaporated, condensed, and precipitated.

Carbon Cycle

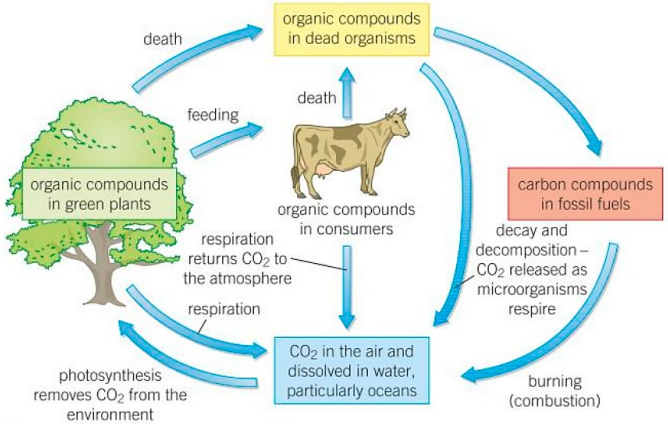


Figure 2 *The carbon cycle in nature*

- Photosynthesis- green plants and algae remove carbon dioxide from atmosphere to make carbohydrates, proteins, and fats.
- Respiration- organisms use oxygen to breakdown glucose, which releases energy and carbon dioxide as a waste product.
- Combustion- wood from trees contains a lot of stored carbon, which releases carbon dioxide into the atmosphere when burned.

Rates of decomposition (separates only)

Decomposition is vital for the recycling of materials in an ecosystem. There are 3 main factors required for decay to take place:

- Temperature- increases the speed of chemical reactions, will decrease the rate if temperature gets too high as enzymes will denature.
- Moisture- makes it easier for decomposers to digest their food.
- Oxygen- allows respiration to occur for decomposers to allow them to release energy.

We can use the process of decay to create compost, and some bacteria that decompose waste in anaerobic conditions produce methane. Biogas generators can be used to produce methane gas as a fuel.

Figure 2 *A year's worth of grass clippings and kitchen waste can be reduced to useful compost in a bin like this*

Figure 1 *This orange is slowly being broken down by the action of decomposers. You can see the fungi clearly, but the bacteria are too small to be seen*

Year 11 Biology: Biodiversity and Ecosystems Key Vocabulary

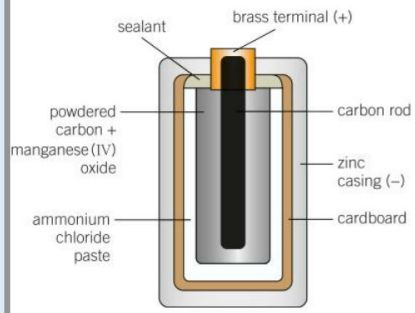
Key word	Definition	Contextual Sentence
biomass	The amount of biological material in an organism.	Not all the **biomass** can be passed down a food chain as not all of the organism is eaten (bones etc.)
carbon cycle	The cycling of carbon through the living and non-living world.	Respiration, photosynthesis, combustion are all key processes in the **carbon cycle**.
decomposers	Microorganisms that break down waste products and dead bodies.	Examples of **decomposers** are woodlice and fungus.
primary consumer	Animals that eat producers.	**Primary consumers** are often herbivores, as they only eat producers.
producers	Organisms such as plants and algae that can make food from raw materials such as carbon dioxide and water.	**Producers** often use photosynthesis to create their own glucose.
secondary consumer	Animals that eat the primary consumers.	**Secondary consumers** will often have adaptations that make them better suited to hunting prey.

Chemical cells and batteries (Seps)

A chemical cell converts chemical energy into electrical energy. More than one cell is called a battery. There are two types of chemical cell; rechargeable and non-rechargeable.

Non-rechargeable cells will produce a voltage until the chemicals inside are used up. Once this happens it will not work and will need to be recycled.

Rechargeable cells/ batteries can be recharged many times. An electrical current is passed through the cell. This works by reversing the chemical reactions to be used again.



The first mass-produced cells (Seps)

The first mass-produced cells were similar to this diagram, a zinc-carbon dry cell. This diagram represents cell that produces a voltage of 1.5V. It cannot be recharged. It is prone to leaking if left in the appliance. These cells should always be disposed of in a recycling center.

Other cells can be recharged and used more than once. The recharging process, the battery is connected to a power supply that reverses the chemical reactions.

Voltage (Seps)

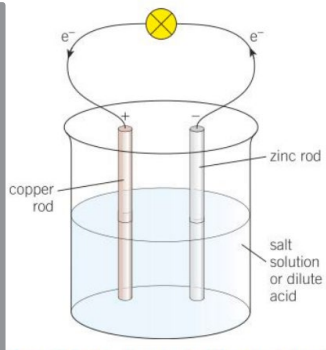
The voltage of a cell is affected by the metals used inside it.

Metals tend to lose electrons to form ions. If two different metals are dipped in a salt solution and are connected by a wire, the more reactive metal will lose electrons. This is a simple cell.

The bigger the difference in the reactivity of the two metals, the bigger the voltage produced.

E.g. aluminium and zinc = small voltage as they are close on reactivity series. By aluminium and copper = larger voltage as they are further apart.

Li	*Lithium*
K	*Potassium*
Ba	*Barium*
Ca	*Calcium*
Na	*Sodium*
Mg	*Magnesium*
Al	*Aluminum*
C	*Carbon*
Zn	*Zinc*
Fe	*Iron*
Ni	*Nickel*
Sn	*Tin*
Pb	*Lead*
H	*Hydrogen*
Cu	*Copper*
Hg	*Mercury*
Ag	*Silver*
Au	*Gold*
Pt	*Platinum*

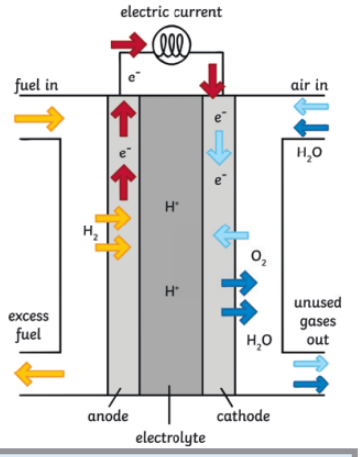


Hydrogen Fuel Cells (Seps)

Hydrogen fuel cells provide an alternative to burning fossil fuels. They cause less pollution but they are highly flammable and difficult to store.

Fuel cells work differently to chemical cells in that they need to be supplied with continuously with a fuel and oxygen. This will allow the fuel cell to produce a voltage.

Inside the fuel cell, hydrogen is oxidized electrochemically. This allows for the reaction to take place at a lower temperature. The fuel is not combusted and the cells only produce water.



Advantages & Disadvantages of Fuel Cells (Seps)

Advantages

- Do not need to be electrically recharged
- No pollutants are produced
- Can be a range of sizes for different uses

Disadvantages

- Hydrogen is highly flammable
- Hydrogen is sometimes produced for the cell by non-renewable means
- Hydrogen is difficult to store

How to dispose of cells/batteries

Cells/batteries must be taken to a waste disposal site for batteries. Some supermarkets have them or the local waste disposal service run by your council. The dry cells are prone to leaking over a period of time which can be harmful.

So what's happening in the diagram above?

An electrical cell made from zinc and copper. The **electrons** flow from the more reactive metal (which is zinc) to the less reactive metal (copper).

This means that zinc is acting as the **negative terminal** of the cell, providing **electrons** to the external circuit. The **current** will flow in the circuit opposite until one of the reactants is used up.

This is the principle that is used when you see people using lemons as a battery to charge their phones on TV.

Ionic equations (Seps)

Ionic equations show the movement of ions/electrons without showing the spectator ions. Spectator ions are ions that don't change within the reaction. E.g.: if a sulphate ion is still a sulphate ion on the products – it hasn't changed.

Within the fuel cell, you have the following reaction;

$$2H_2 + O_2 \rightarrow 2H_2O$$

At the cathode: $2H_2 + 4OH^- \rightarrow 4H_2O + 4e^-$

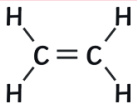
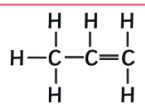
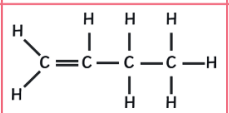
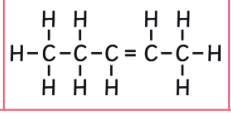
At the anode: $O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$

This means that oxygen is being reduced (gains electrons) and hydrogen is being oxidized (loss of electrons). Oxidation and reduction happen simultaneously, this is known as a redox reaction.

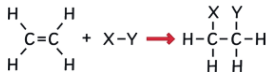
Alkenes

Alkenes are a **C=C** double-bonded hydrocarbon, with the general formula C_nH_{2n}.

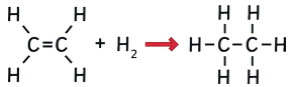
Alkenes are unsaturated hydrocarbons. This means that the double bond can break and allow other elements or molecules to bond to it. This is called an addition reaction.

Name of Alkene	Structural Formula	Molecular Formula
ethene		C_2H_4
propene		C_3H_6
butene		C_4H_8
pentene		C_5H_{10}

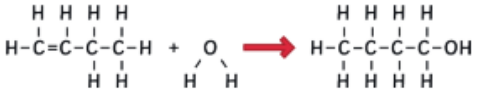
Alkenes have a C=C double bond. This is known as its functional group. This can break to form an **addition** reaction



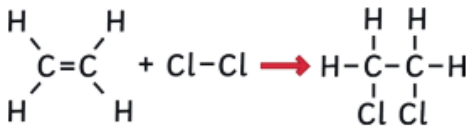
Alkenes are able to react with hydrogen in an **addition** reaction called **hydrogenation**. This requires a catalyst.



Alkenes can react with water vapour to produce alcohol. This is called a **hydration** reaction. The type of compound produced contains a hydroxyl group (-OH) this compound is an alcohol. This reaction requires a high temperature of around 300°C and a catalyst.



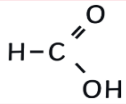
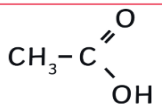
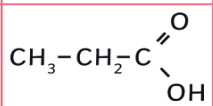
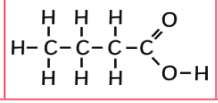
Alkenes will also react with group 7 elements, known as halogens. The reaction is called a **halogenation** reaction. It is when an alkene reacts with a halogen and an **alkyl halide** is produced. This is how the bromine test works.



Combustion and Alkenes

Alkenes can combust; however, they rarely combust completely and tend to undergo some incomplete combustion.

When they burn in air they burn with a **smoky yellow flame**. Alkenes will release less energy per mole compared to alkanes. This means that alkenes are not used for fuels.

Name of Carboxylic Acid	Structural Formula	Molecular Formula
methanoic acid		HCOOH
ethanoic acid		CH_3COOH
propanoic acid		C_2H_5COOH
butanoic acid		C_3H_7COOH

Alcohols

Uses of alcohols is common in a lot of products. Ethanol is the main source in alcohol. It is made by fermenting sugars from plant material with yeast and it is also becoming popular as an alternative fuel.

Glucose → ethanol + carbon dioxide

$$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$$

It can also be made on an industrial scale.

Combustion of alcohol

Alcohols are flammable and burn with a clean blue flame.

$$2C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$$

Reaction with Sodium

Alcohols react similar to that of water, the sodium will effervesce, it will produce hydrogen gas and the sodium will get smaller. The reaction is not as rigorous as that in water.

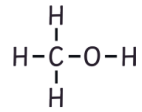
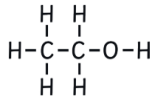
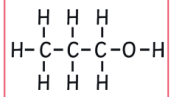
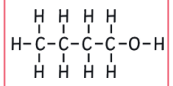
$$2Na + 2C_2H_5OH \rightarrow 2C_2H_5ONa + H_2$$

Oxidation of alcohol

You can oxidise alcohol using chemical oxidizing agents such as potassium dichromate (VI). Alcohol will oxidise to a carboxylic acid when boiled with acidified potassium dichromate (VI)

$$C_2H_5OH + 2[O] \rightarrow CH_3COOH + H_2O$$

Alcohols will also oxidise if exposed to the air; that's why wine or beer tastes of vinegar if they are left open too long.

Name of Alcohol	Structural Formula	Molecular Formula	Uses
methanol		CH_3OH	chemical feedstock
ethanol		C_2H_5OH	alcoholic drinks, fuels and solvents
propanol		C_3H_7OH	fuels and solvents
butanol		C_4H_9OH	fuels and solvents

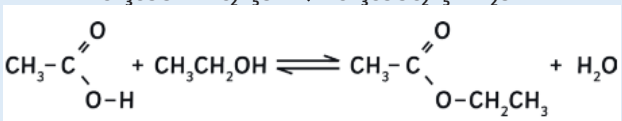
Carboxylic acids

Forms an acid solution when they dissolve in water and form a weak acid. A weak acid is when the H+ ions only partially ionise.

A carboxylic acid can react with alcohol to make an ester. Normally H_2SO_4 is used as a catalyst.

Ethanoic acid + ethanol → ethyl ethanoate + water

$$CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COOC_2H_5 + H_2O$$



Esters

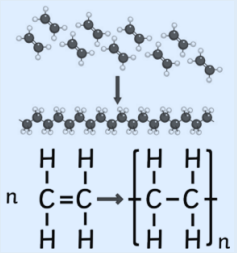
Esters form a distinct smell, most are fruity and sweet-smelling, making them useful as perfumes. However, they are volatile.

Year 11 Chemistry: Organic Chemistry (Seps only) & Key Vocab

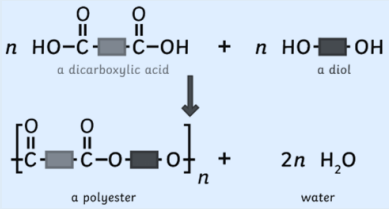
Polymers
Polymers are used throughout everyday life from plastics to clothing to cosmetics. They are made from refined **crude oil.**

Polymerisation
You need to know about two types of polymerisation; addition and condensation.

Addition
Addition is where there is only one main polymer formed. E.g. Ethene is a small molecule with a double bond. To indicate it's a polymer you add **"poly"** as a prefix, so it becomes poly(ethene).



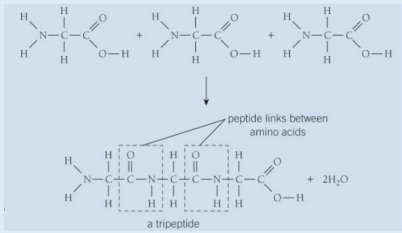
Condensation
Condensation is where there is the main polymer formed and a smaller molecule such as H_2O or HCl. You don't need a C=C for this, but you do need two functional groups. For example, polyester is made from a monomer that has two hydroxyl groups and another monomer that has two carboxylic acid groups.



The polymer could use a large number of monomers so we use the letter **"n"** to represent "any" number of monomers.

Natural Polymers
There are some **natural polymers** such as DNA and proteins.

Amino acids are the monomers that have two functional groups **amine (NH_2)** and a **carboxyl group (COOH).** These bond through condensation Polymerisation.



The polymer could use a large number of monomers so we use the letter **"n"** to represent **"any"** number of monomers when drawing out polymers.

Key Vocabulary	Definition	Contextual Sentence
Chemical Analysis Vocab		
Pure	A pure substance is one that is made up of just one substance, either an element or a compound.	Bottled water is not **pure,** it is a mixture of several ions and compounds.
Fixed Point	The melting or boiling points of pure substance.	The melting and boiling points of an element or compound are called its **fixed points**.
Formulation	A mixture that has been designed to produce a useful product.	Paint is a **formulation**, it contains a pigment, a binder and a solvent that work together.
Mobile Phase	When the solute is more attracted to the solvent and moves up the chromatogram.	A solute is dissolved in the solvent during the **mobile phase**.
Stationary Phase	When the solute is more attracted to the paper so stops moving up the paper.	A solute is no longer dissolved in the solvent and is deposited on the paper in the **stationary phase**.
Retention Factor	A ratio, calculated by dividing the distance a solute travel up the paper divided by the distance the solvent travels.	**Retention factor** can be used to identify a solute if the solvent.
Precipitate	When an insoluble solid is formed from the reaction of aqueous solutions.	When the teacher mixed the solutions, a white **precipitate** formed in the beaker.
Crude Oil & Organic Vocab		
Fermentation	the reaction in which the enzymes in yeast turn glucose into ethanol and carbon dioxide.	Wine and beer is made by the process of **fermentation**
Functional group	an atom or group of atoms that give organic compounds their characteristic reactions	The functional group of an **alkene** is the double C=C.
Homologous	a group of related organic compounds that have the same functional group	Methane, ethane, propane and butane are **homologous**
DNA	a molecule that encodes genetic instructions for the development and functioning of living organisms/ viruses	Every living organism contains **DNA**
Monomer	small reactive molecules that react together in repeating sequences to form a very large molecule (a polymer)	Lots of monomers link together to form a polymer
Polymer	a substance made from very large molecules made up of many repeating units	A **polymer** is made from crude oil
Nucleotides	the basic repeating units, or monomers, that join together to form DNA	A monomer of DNA is called a **nucleotide**
The Atmosphere		
Atmosphere	the relatively thin layer of gases that surround planet Earth	The **atmosphere** is a mixture of gases.
Carbon footprint	the total amount of carbon dioxide and other greenhouse gases emitted over the full life cycle of a product, service or event	We need to reduce our **carbon footprint** to save the planet
Particulate	small solid particle given off from motor vehicles as a result of incomplete combustion of its fuel	**Carbon particulates** cause global dimming
global dimming	a process that reduces the amount of sunlight reaching the Earth's surface. It is caused by particulates in the atmosphere reflecting light back into space before it can reach Earth	**Global dimming** reduces the visibility in large cities.

This history of the Atmosphere

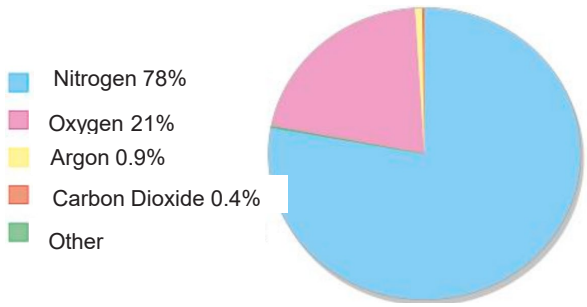
There are lots of ideas about how the Earth and atmosphere formed based on some evidence found. These are called theories. Scientists use theories when there is a lack of evidence to say what really happened. No one was around 4.6 billion years ago to take photos and write it all down!!!

One theory is that intense volcanic activity release gases, such as CO_2, CH_4, H_2O and N_2 into the atmosphere, which is similar to Mars or Venue now. It is thought that there was little/no oxygen.

From this, as the Earth started to cool down, the water vapour (H_2O) would **condense** and fall to the ground to make the oceans. It is also believed that **comets** brought more water to the Earth.

The CO_2 in the atmosphere would have **dissolved** in the oceans, this then led to carbon-based organisms forming and oxygen being produced over time, in the process of **photosynthesis.** This contributed to the **increasing the oxygen levels.**

The Current Atmosphere

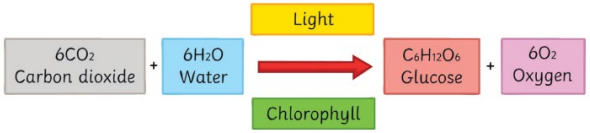


Over the last 200 million years, the proportions of gases in the Earth's atmosphere has stabilised. See the pie chart above.

Approximately four-fifths (80%) of the atmosphere is **nitrogen** and one-fifth (20%) is **oxygen.**
There are some noble gases in the atmosphere, the most abundant is argon, but there is also a small amount of neon, krypton and xenon.

How did the oxygen levels increase over time?

Around 2.7 billion years ago the first carbon-based organism formed; algae. It is believed that it first produced oxygen, through the process of **photosynthesis.** As the organisms evolved, the levels of oxygen increased. This led to more complex life forms developing.



How did the carbon dioxide levels decrease over time?

There are a few ways that carbon dioxide was reduced over time;

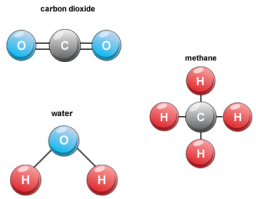
1. Carbon dioxide **dissolved in the water** (oceans).
2. A lot of carbon dioxide become **locked-up** in the Earth's Crust. The dissolved carbon dioxide (CO_2) produced carbonate compounds, that formed a precipitate, what we know today as limestone, a sedimentary rock. The chemical name for limestone is calcium carbonate.
3. Plants **absorb** carbon dioxide during the process of photosynthesis. Any lifeforms that relied on plants fell to the bottom of the seabed and were trapped under layers of sand and mud, over time and under a lot of pressure and heat, and an environment where there was no oxygen, it was turned into fossil fuels.

Meet the greenhouse gases?

Greenhouse gases is a term used for a group of gases that absorb energy radiated by their surface.

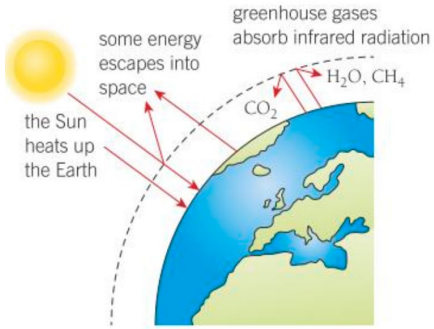
The main greenhouse gases are:
- **Carbon dioxide (CO_2)**
- **Methane (CH_4)**
- **Water Vapour (H_2O)**

Others can include (extra info)
- Chlorofluorocarbons (CFCs)
- Nitrous oxides (NOx)



Greenhouse Gases: how it warms the Earth

1. UV radiation from the Sun reaches Earth
2. Some Infra-Red re-radiated back into space
3. A portion doesn't reach space and is **absorbed** by greenhouse gases.
4. These gases re-radiate the Infra-Red radiation back to Earth.
5. This warms the Earth's surface.



Evidence of greenhouse gases

Over the last 200 years, there is an increase in the volume of CO_2 produced. This is mainly due to the advances in technology and the use of fossil fuels. CO_2 has been locked-up in fossil fuels for millions of years, but as we burn it, it releases CO_2.

Methane gets into our atmosphere from **swamps** and **rice fields**. Methane is also produced from **grazing cattle** and from **decomposing waste** (poop).

Landfill sites are another source that produces methane, from the **rotting food waste**. This has increased over the years due to the population increasing.

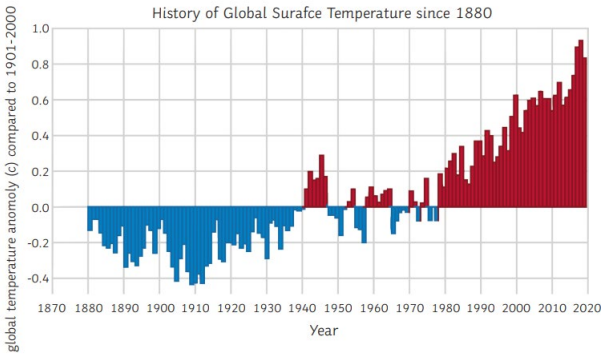
Scientists use "hard" evidence to link the levels of CO_2 with the climate and any changes. One source of evidence is the ice cores from Greenland, which have trapped gases over time. These can be dated and analysed for changes.

But remember it is difficult to predict with complete certainty the effects on the climate due to greenhouse gases, however, the evidence is showing trends which can be used to suggest the future effects.

Climate Change

Climate change is the long-term shifts in temperature and weather patterns. These changes can be natural or man-made.

Below is a graph that shows the surface temperature since 1880. This shows climate change. When considering the evidence, use a reputable source. This was taken from the University of Berkeley in USA.



Some scientists predict, based on evidence and research, that global warming may increase the Earth's average temperature by as much as 5.8°C by the year 2100. This would have a huge impact on the climate

The consequences of rising levels of greenhouse gases

We are already seeing the start of the consequences of climate change;

- Winters are getting shorter
- Rising sea levels: the ice caps are melting and this is expanding the warmer seas.
- Flooding of low-lying land.
- Increase coastal erosion (so islands could disappear)
- Increasing spurts of extreme weather conditions, such as severe storms.
- Changes in rainfall: temperature/volume/distribution. This could impact communities that produce food and less food will be produced.
- More wildlife becoming extinct, and the fast change in climate puts stress on the ecosystems.

What can we do?

We can reduce our carbon footprint. Reduce the amount of carbon dioxide we produce on a day-to-day basis.

What is a carbon footprint?

The carbon footprint of a product, service or event is;

the total amount of carbon dioxide and other greenhouse gases emitted over its full life cycle.

When companies are making a new product, they have to consider how much carbon dioxide/ greenhouse gases it will produce by making, transporting, using and recycling the product.

Other ways to reduce the carbon footprint

Electricity companies can use **carbon capture & storage**, using the waste product CO_2 from burning fossil fuels and capturing CO_2 produced and storing it underground in porous rock. However, it may increase electricity bills by roughly 10%.

Methane could decrease if more people ate plant-based meals, reducing the need for as many cattle. It also allows for more efficient use of the land to grow crops.

Car sharing / using public transport/walking will minimize the use of fuel for cars.

Why can't we just stop using fossil fuels?

Reducing greenhouse gases in the atmosphere relies mainly on reducing the use of fossil fuels, using alternative sources of energy and conserving energy.

Most economies of developed countries rely on fossil fuels and putting strategies in place to reduce this will cost money and take time to set up.

However, the changes are necessary because of the potential risks arising from global climate changes, such as sea levels rising and threats to food production.

Burning fossil fuels

There are two types of combustion: complete and incomplete combustion. **Complete combustion** happens when there is plenty of oxygen for fuel to burn.

Pentane + oxygen → carbon dioxide + water

$$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O$$

Incomplete combustion happens when there is not enough oxygen to burn fully. The products for this can be CO, H_2O and / or carbon solids.

Ethane + oxygen → carbon monoxide + water

$$2C_2H_6 + 5O_2 \rightarrow 4CO + 6H_2O$$

Why is incomplete combustion so bad?

Carbon monoxide is a poisonous gas.

It's a colourless and odourless gas that can kill. It works by binding to the haemoglobin in your red blood cells and prevents oxygen from being carried around your body to your cells.

Carbon particulates (solids) irritate the lining of your lungs, this could make pre-existing conditions worse, like asthma. There are also links that it can cause cancer. The particulates also cause global dimming where the sun's rays are blocked out and reduce visibility.

Burning fuel in a car

This can produce what is known as **nitrogen oxides** with a general formula of **NOx**.

This happens when oxygen and nitrogen come together in a **hot environment**, like a car engine and there is enough activation energy to cause a reaction.

The NOx compounds can react with UV light in the atmosphere and produce photochemical smog, mainly in densely populated areas.

NO and **NO_2** are **toxic** and can trigger **asthma attacks**, they can also react with water to form nitric acid, and form **acid rain.**

Also when you burn fuel there are **impurities** in the hydrocarbons, such as **sulphur**. When this is released, **sulfur** reacts with the **oxygen** to form sulfur dioxide, which can then dissolve in rainwater to form **acid rain.** This can damage forests, and plants and erode buildings. It can then react further to form sulfur trioxide.

Natural resources from the Earth

We rely a lot on resources from the Earth to meet our needs for food, clothing, shelter, fuel and materials. Resources are classed as **finite** and **renewable** resources.

Food: water, Fruit, vegetables, crops and meat
Shelter: Wood, limestone and sand
Fuel: Crude Oil that produces propane, petrol and diesel that we use for transport
Materials such as metal ores from the Earth's crust.

Scientists are used for developing and advancing technology to assist with agriculture and industrial processes to meet the growing population demands in a sustainable way.

Sustainability

Sustainability is about ***meeting the needs of current society, without endangering the ability of future generations to meet their needs.***

Finite resources are resources that are being used up faster than they can be replaced, so if you can carry on using them, they will run out. Fossil fuels (coal, oil and natural gas) and limestone are examples of **finite** resources.

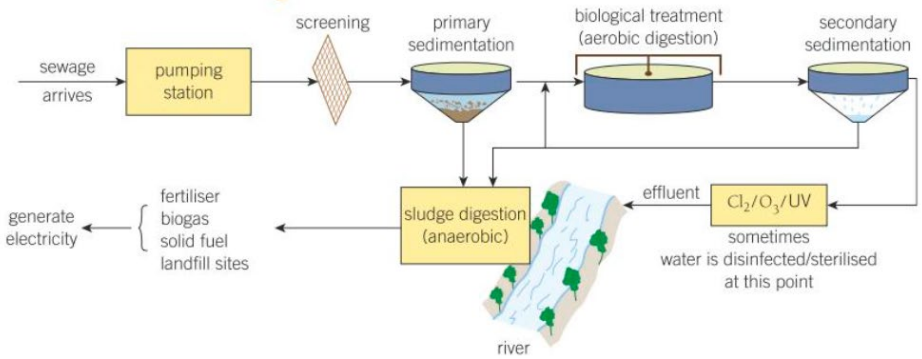
Renewable resources are resources that can be replaced at the same rate at which that is used up. Crops, wool, silk, rubber and wood are all examples of **renewable** resources.

Water

Water is a vital resource. It is used as a **raw material** for agriculture and in industry, such as solvents and coolants and its also used in washing, cleaning and for drinking. Most water supplies in the UK are source of **fresh water** (e.g. lakes, reservoirs, rivers or groundwater aquifers).
Safe drinking water is known as **potable water**. This means that it has been treated to remove any impurities from it. The impurities such as minerals (dissolved salts) or microorganisms are found naturally in the ground, and can be harmful for human consumption.

Treating waste-water

Waste water is water that has been used, normally in homes, that go down the sink/ shower/ bath/ toilet. It all enters a large sewer with waste from other houses/businesses/factories. This is named **sewage.** This waste water needs to be treated to make it safe before it can re-enter the environment. This process can be seen below:

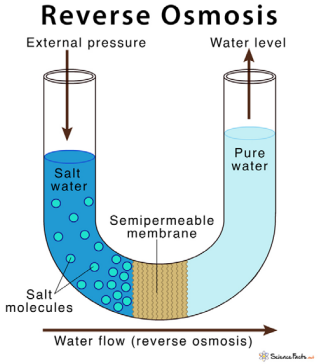


How to purify salty water

Most water in the UK is fresh water, however, there are countries that don't have any freshwater supplies. Therefore, salt water is treated using processes such as **distillation** or **desalination**. **Distillation** is expensive due to the energy costs needed therefore most countries use **desalination.**

Desalination

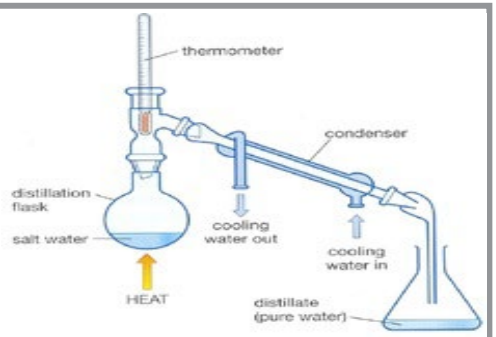
Desalination uses reverse osmosis through a semipermeable membrane that removed the NaCl particles from the salt water.



Required Practical: Water Distillation

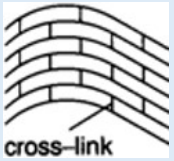
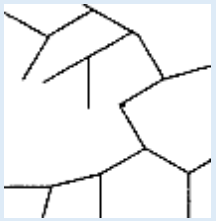
You can test the "**pure**" water you distil using several methods to see if it is **pure**. Remember, **pure** means that there is only one substance present.

- Measure the boiling point. **Pure water** boils are 100°C
- Test the pH value
- Burn a sample in a flame. Any Sodium will produce an orange/yellow flame.



Polymers and their properties (Separates)

The properties of polymers depend on what monomers they are made from and the conditions under which they are made.

Thermosoftening polymers	Soften or melt easily when heated because the **intermolecular forces** between the chains are **weak**.	
Thermosetting polymers	Contain **crosslinks** (strong covalent bonds) between chains so they do not soften or melt easily.	
High density polyethene	Made using very high pressures and a trace of oxygen. Polymer chains are randomly **branched and can't pack closely** together resulting in a **low density.**	 **branched**
Low density polyethene	Made using a catalyst at 50°C and a slightly raised pressure. Made of **straight chain** molecules which are **closely packed**, stronger and more **dense**.	**Straight chain**

Haber Process (Separates)

Scientists find new ways in producing synethic methods of to replace natural materials. One such product is Ammonia, NH_3, which is an important gas product. Mostly used in agriculture as a fertaliser. It is synthesised in industry by the Haber Process. The reaction is **reversible,** which means it can reach **dynamic equilibrium.**

The nitrogen used comes from the air. The hydrogen used usually comes from a reaction between methane (natural gas) and steam.

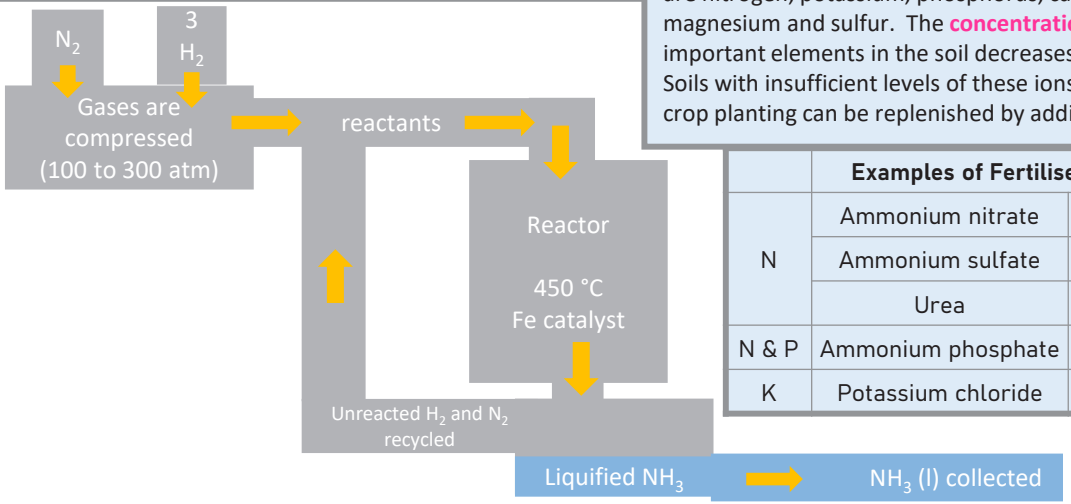
nitrogen + hydrogen ⇌ ammonia

$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$$

3 parts hydrogen and 1 part nitrogen are passed into a reactor. The mixture is:

- pressurised to between 100 and 300 atmospheres
- heated to 450 °C
- passed over an iron catalyst

Then the reaction mixture is cooled and ammonia in the mixture liquifies and is collected. Nitrogen and hydrogen that are unreacted are recycled back into the reactor.



Changing the conditions (Separates)

The forward reaction is **exothermic.**

$$N_{2(g)} + 3H_{2(g)} \underset{\text{endothermic}}{\overset{\text{exothemic}}{\rightleftharpoons}} 2NH_{3(g)}$$

Increasing the temperature will favour the reverse reaction (**endothermic** reaction). The equilibrium will shift towards the left to **reduce** the temperature. The yield will **decrease.**

Decreasing the temperature will favour the forward reaction (**exothermic** reaction). The equilibrium will shift towards the right to **increase** the temperature. The yield will **increase.**

However, if the temperature if too low, the rate of both the forward and reverse reactions will be too slow to be economically viable.

Fertilisers (Separates)

Fertilisers are that supply essential minerals to crops for optimal growth and crop yield. Fertilisers usually consist of soluble salts. Essential minerals and elements are nitrogen, potassium, phosphorus, calcium, magnesium and sulfur. The **concentration** of these important elements in the soil decreases over time. Soils with insufficient levels of these ions for the next crop planting can be replenished by adding fertilisers.

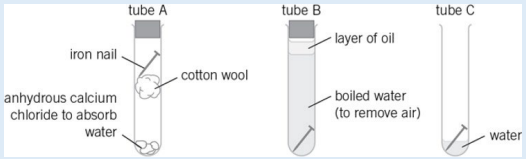
	Examples of Fertiliser Compound	
N	Ammonium nitrate	NH_4NO_3
	Ammonium sulfate	$(NH_4)_2SO_4$
	Urea	$CO(NH_2)_2$
N & P	Ammonium phosphate	$(NH_4)_3PO_4$
K	Potassium chloride	KCl

Finite resource	A **non-renewable** resource used by humans that has a **limited supply** e.g. coal.
Renewable resources	A resource used by humans that can be **replenished** e.g. trees. If not managed correctly, the resource may decrease.
Potable water	Water that is **safe to drink**. Has **low levels of dissolved salts** and **microbes**.
Fresh water	Water that has **low levels of dissolved salts**. Rain water is an example of fresh water but sea water is not.
Pure water	**Only** contains **water molecules**, nothing else.
Desalination	A process that **removes salt from sea water** to create potable water. **Expensive** as it **requires a lot of energy**.
Sewage	**Waste water produced by people**. Contains potentially dangerous **chemicals** and large numbers of **bacteria**.
Reverse osmosis	Uses **membranes** to **separate dissolved salts** from **salty water**.
Natural resource	Natural resources have **formed without human imput**, includes anything that comes from the earth, sea or air (e.g. cotton).
Synthetic resource	Synthetic resources are **man made**
Aerobic	With oxygen
Anaerobic	Without oxygen
Sustainable development	Using resources to meet the needs of people today without preventing people in the future from meeting theirs.
Life cycle assessment	A life cycle assessment looks at every stage of a product's life to assess the impact it would have on the environment.
Subjective judgement	Judgement based on a person's opinion and/or values.
Phytomining	Plants are used to absorb metal compounds from the soil as part of the metal's extraction.
Bioleaching	Use of bacterial to convert metal compounds in ores into soluble metal compounds which can then be extracted.
Leachate	A solution produced from bioleaching

Rusting (Separates)

For iron to **rust**, both air and oxygen are needed. Providing a barrier between iron either air (oxygen) and water protects the iron from **rusting**.

Iron + oxygen + water → hydrated iron(III)oxide



Tube A tests to see if air alone makes iron rust. Tube B tests to see if water alone will make iron rust. Tube 3 tests to see if air and water will make iron rust.

Rusting is only observed in tube 3 illustrating that both air and water are needed for iron to rust. Sacrificial protection provides protection against **rusting**. The iron needs to be attached to a more reactive metal (galvanising it). Zinc is a stronger **reducing agent** than iron, so it has a stronger tendency to form positive ions by giving away electrons. As the zinc atoms lose electrons they become **oxidised**. Therefore, any water or oxygen reacts with the zinc instead of the iron (protecting the iron from oxidation).

Alloys (Separates)

Alloys are harder than pure metals because the regular layers are distorted by differently sized atoms and therefore cannot slide.

Pure iron is too soft for it be useful in its pure form. Steel is an **alloy** of iron which contains carefully controlled quantities of carbon so that it's the hardness is controlled.

Glass (Separates)

The most common form of glass is Soda Glass which is made by heating a mixture of sand (SiO_2), limestone ($CaCO_3$) and sodium carbonate (soda) at 1500°C. As it cools down the glass turns into a solid. Different types of glass exist depending on the amounts of each of the reactants; borosilicate glass involves an extra compound B_2O_3. Atoms are arranged irregularly. It is transparent, brittle, has a high melting point, keeps its shape (not flexible).

Ceramics

Wet clay is moulded into the desired shape, then heated in a furnace to 1000°C. Used in bricks, tiles, crockery, and bathroom furniture. Atoms are held together in a giant covalent lattice, generally in a regular pattern. It is hard but brittle and make good electrical insulators.

Composites

Materials made from two or more different materials, with one material acting as a binder for the other material, reinforcing it. Usually, fibres or fragments of one material are held in a 'matrix' (network of atoms) by the other. Glass-ceramic composites are very hard and tough (not brittle). Fibreglass (polymer-ceramic) is a low-density, tough, flexible material- e.g. used in kayaks, plywood, carbon fibres and cement are other examples

Extracting copper from copper-rich ores (Higher)

Copper ore is a finite resource that is in danger of running out. There are two main methods in extracting copper.

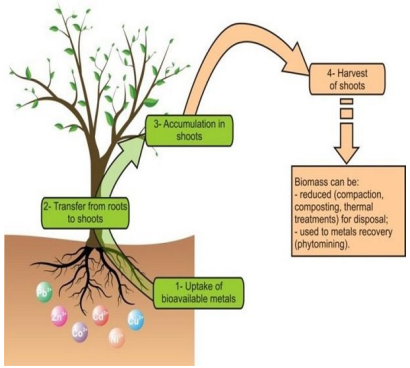
1. Sulfuric acid is used to produce copper sulfate solution before extracting the copper metal.
2. "Smelting" (roasting) the copper ore to a high temperature in a furnace to produce impure copper.

The impure copper will then need to go through the process of electrolysis to make pure copper. Electrolysis is a costly process due to the amount of energy (electricity) needed.

Extracting copper from low-grade ores

Due to the limited amount of copper, scientists have developed methods to extract copper from poor sources.

1. **Bioleaching** use bacteria to produce an acidic solution called leachate which contains copper ions. This can be harmful to the environment as it produces a toxic substance. The process used a displacement reaction with iron, which is a more cost-effective way to produce copper from leachate.
2. **Phytomining** uses plants. The plants absorb the copper compounds found in the soil. The copper ions build up in the plant's leaves. The plants are dried and burnt in a furnace. The ash is collected and dissolved in acid (hydrochloric or sulfuric) and then the copper is then extracted by electrolysis or through a displacement reaction with iron



Life Cycle Assessments (LCA)

An L.C.A or Life cycle assessment is an evaluation of all the resources used for the whole of a product's life. It assesses the environmental impact of the products. Data is available for the use of energy, water, Earths resources as well as the waste products that are produced.

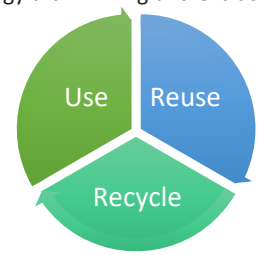
What do we evaluate in an L.C.A?

For our product, for example a plastic bag, we must evaluate each stage in its life. The five main stages are;

For each stage you need to think about how much it affects the environment, how much CO_2 is produced, what raw materials are being used, transport/fuel used, and whether it be reused, recycled or will it end up in landfill?

Reduce, Reuse & Recycle

There are social, economic and environmental issues associated with exploiting the Earth's limited resources of **raw materials** such as metal ores and crude oil. The environmental impact of products can be **reduced** by **reusing** the product. For example, glass bottles can be crushed and melted to produce different glass products. Whereas some materials can be **recycled** e.g., metals. Metals can be **recycled** by melting and recasting or reforming into different products. **Recycling** uses less energy than mining and extracting.



Recycling, **reusing** and **reducing** products have advantages and disadvantages.

Advantages

- Few resources such as mines and quarries are needed to remove raw, finite resources from the ground – such as copper.
- Crude oil, which is used to make plastics does not need to be extracted. This avoids using processes such as fractional distillation and cracking which require a lot of energy.
- In turn, the number of greenhouse gases would reduce as you reuse and recycle other products, which produces a lot fewer greenhouse gases.

Disadvantages

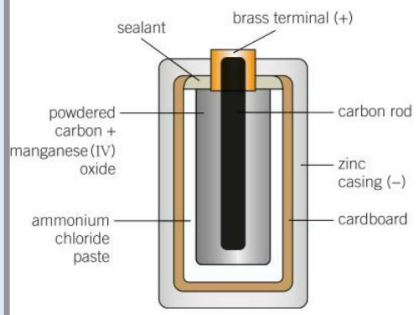
- Recycling requires the collection and transportation of goods, which will have some impact on CO_2 production.
- Sorting and reusing metals can be difficult as the use depends on purity for example high-grade copper is needed for electrical goods.

Chemical cells and batteries (Seps)

A chemical cell converts chemical energy into electrical energy. More than one cell is called a battery. There are two types of chemical cell; rechargeable and non-rechargeable.

Non-rechargeable cells will produce a voltage until the chemicals inside are used up. Once this happens it will not work and will need to be recycled.

Rechargeable cells/ batteries can be recharged many times. An electrical current is passed through the cell. This works by reversing the chemical reactions to be used again.



The first mass-produced cells (Seps)

The first mass-produced cells were similar to this diagram, a zinc-carbon dry cell. This diagram represents cell that produces a voltage of 1.5V. It cannot be recharged. It is prone to leaking if left in the appliance. These cells should always be disposed of in a recycling center.

Other cells can be recharged and used more than once. The recharging process, the battery is connected to a power supply that reverses the chemical reactions.

Voltage (Seps)

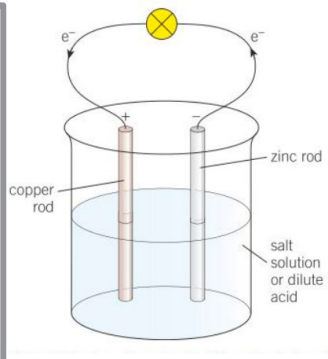
The voltage of a cell is affected by the metals used inside it.

Metals tend to lose electrons to form ions. If two different metals are dipped in a salt solution and are connected by a wire, the more reactive metal will lose electrons. This is a simple cell.

The bigger the difference in the reactivity of the two metals, the bigger the voltage produced.

E.g. aluminium and zinc = small voltage as they are close on reactivity series. By aluminium and copper = larger voltage as they are further apart.

Li	*Lithium*
K	*Potassium*
Ba	*Barium*
Ca	*Calcium*
Na	*Sodium*
Mg	*Magnesium*
Al	*Aluminum*
C	*Carbon*
Zn	*Zinc*
Fe	*Iron*
Ni	*Nickel*
Sn	*Tin*
Pb	*Lead*
H	*Hydrogen*
Cu	*Copper*
Hg	*Mercury*
Ag	*Silver*
Au	*Gold*
Pt	*Platinum*

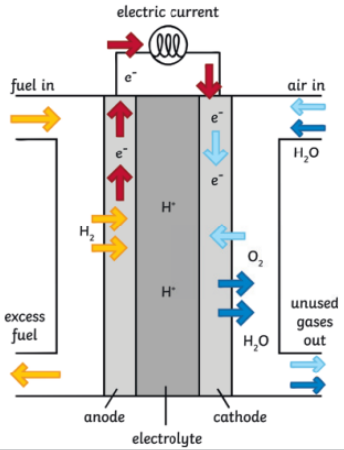


Hydrogen Fuel Cells (Seps)

Hydrogen fuel cells provide an alternative to burning fossil fuels. They cause less pollution but they are highly flammable and difficult to store.

Fuel cells work differently to chemical cells in that they need to be supplied with continuously with a fuel and oxygen. This will allow the fuel cell to produce a voltage.

Inside the fuel cell, hydrogen is oxidized electrochemically. This allows for the reaction to take place at a lower temperature. The fuel is not combusted and the cells only produce water.



Advantages & Disadvantages of Fuel Cells (Seps)

Advantages

- Do not need to be electrically recharged
- No pollutants are produced
- Can be a range of sizes for different uses

Disadvantages

- Hydrogen is highly flammable
- Hydrogen is sometimes produced for the cell by non-renewable means
- Hydrogen is difficult to store

How to dispose of cells/batteries

Cells/batteries must be taken to a waste disposal site for batteries. Some supermarkets have them or the local waste disposal service run by your council. The dry cells are prone to leaking over a period of time which can be harmful.

So what's happening in the diagram above?

An electrical cell made from zinc and copper. The **electrons** flow from the more reactive metal (which is zinc) to the less reactive metal (copper).

This means that zinc is acting as the **negative terminal** of the cell, providing **electrons** to the external circuit. The **current** will flow in the circuit opposite until one of the reactants is used up.

This is the principle that is used when you see people using lemons as a battery to charge their phones on TV.

Ionic equations (Seps)

Ionic equations show the movement of ions/electrons without showing the spectator ions. Spectator ions are ions that don't change within the reaction. E.g.: if a sulphate ion is still a sulphate ion on the products – it hasn't changed.

Within the fuel cell, you have the following reaction;

$$2H_2 + O_2 \rightarrow 2H_2O$$

At the cathode: $2H_2 + 4OH^- \rightarrow 4H_2O + 4e^-$

At the anode: $O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$

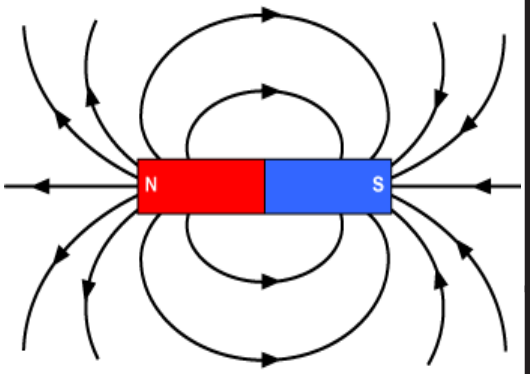
This means that oxygen is being reduced (gains electrons) and hydrogen is being oxidized (loss of electrons). Oxidation and reduction happen simultaneously, this is known as a redox reaction.

Year 11 Physics: Electromagnetism Knowledge

Magnets

Only **Iron**, **Cobalt**, **Nickel** and **Steel** are magnetic materials.
A magnet can exert a force on another nearby magnet. Magnets have two poles:

- a north pole
- a south pole

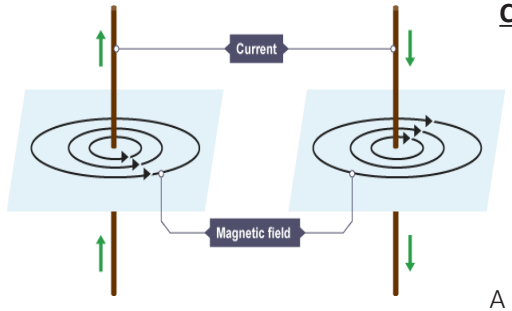


Magnetic field-
A region where a force is felt.
It can be found using **plotting compasses** or **iron fillings**

Permanent Magnet-
A magnet that has a permanent magnetic field

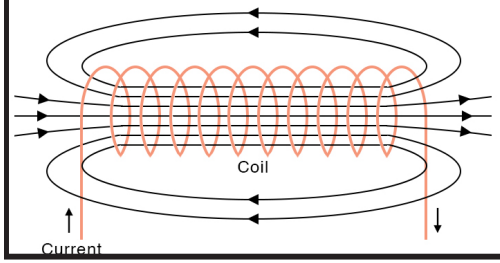
Induced Magnet
A magnet that only has a magnetic field when within the magnetic field of a permanent magnet

Current Carrying Wire



When a current flows in a wire, it creates a circular **magnetic field** around the wire

Solenoid



A **solenoid** consists of a wire coiled up into a spiral shape. The small magnetic fields caused by the current in each coil add together to make a stronger magnetic field.

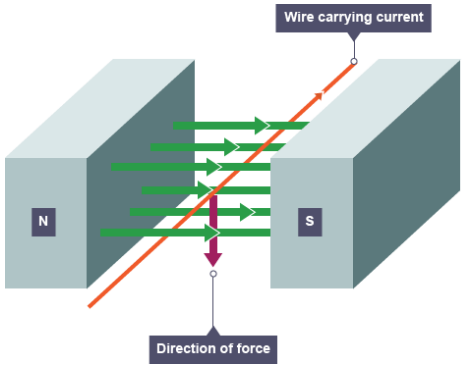
Electromagnets

A solenoid with an iron core is called an **electromagnet**.
Increase the strength by:-

- Increasing turns
- Increasing PD
- Adding an iron core

Electromagnets are used in devices such as **electric bells**, and **door locks** that can be controlled remotely.

The Motor Effect (Higher)



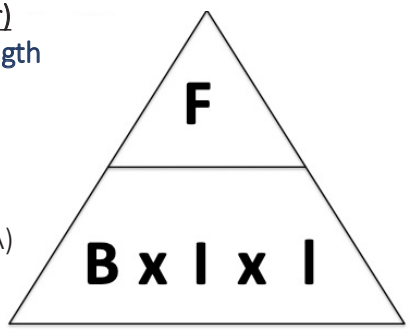
Motor Effect- A wire carrying a current creates a **magnetic field**. This can interact with another magnetic field, causing a force that pushes the wire at right angles.

Calculating the motor effect force (Higher)

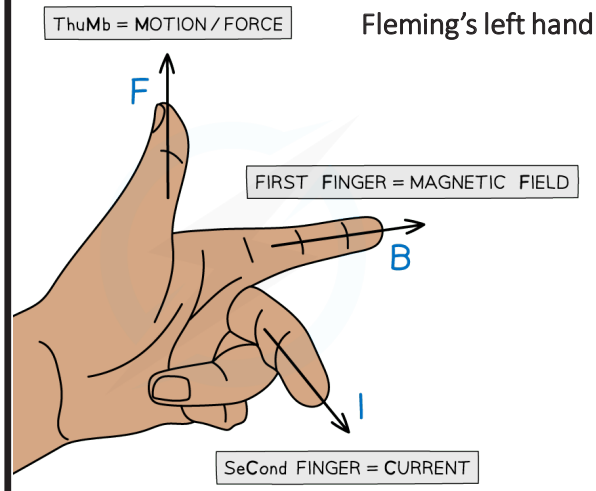
force = magnetic flux density × current × length

F=B I l

- *F* is force in newtons (N)
- *B* is magnetic flux density in tesla (T)
- *I* is current in amperes - also referred to as amps (A)
- l is length in metres (m)



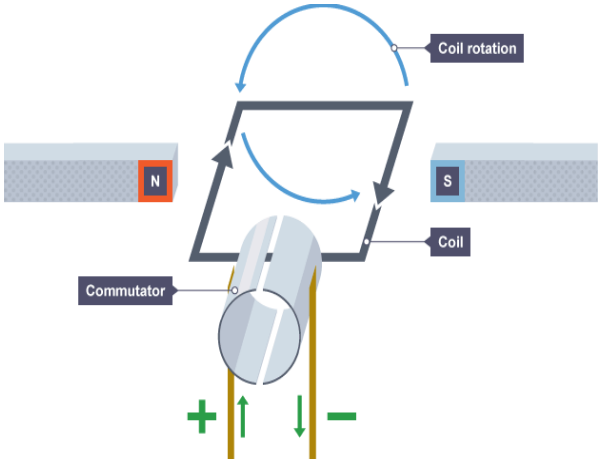
Fleming's left hand rule - Higher



- The **first** is lined up with magnetic **field** lines pointing from north to south
- the **second** finger is lined up with the **current** pointing from positive to negative
- the **thumb** shows the direction of the motor effect **force** on the conductor carrying the current

Electric Motors (Higher)

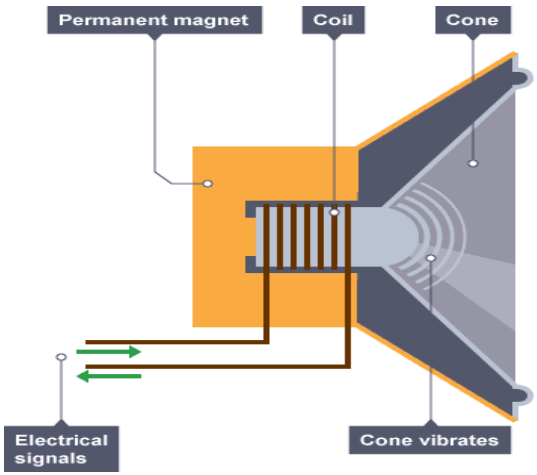
A coil of wire carrying a current in a **magnetic field** experiences a force that tends to make it rotate. This effect can be used to make an electric motor.



Starting from the position shown in the diagram of the **dc motor**:

1. current in the left hand part of the coil causes a downward force, and current in the right hand part of the coil causes an upward force
2. the coil rotates **anticlockwise** because of the forces described above
3. the momentum of the motor carries it on round a little
4. a **split ring commutator** changes the current direction every half turn.
5. current flows in the **opposite** direction through the wire in the coil.
6. each side of the coil is now near the opposite magnetic pole

Loudspeaker (Seperates)



Alternating current supplied to the loudspeaker creates sound waves in the following way:

1. A **current** in the coil creates a **magnetic field**
2. The **electromagnetic** field interacts with the **permanent magnet** generating a **force**, pushing cone outwards
3. The **current** is made to flow in the **opposite** direction
4. The **magnetic field reverses**
5. The **force** on the cone now pulls it back in
6. Repeatedly **alternating** the **current direction** makes the cone vibrate in and out
7. the cone **vibrations** causes are **sound waves**

Transformer Calculations (Seperates)

INPUT POWER = OUTPUT POWER

$$I_P V_P = I_S V_S$$

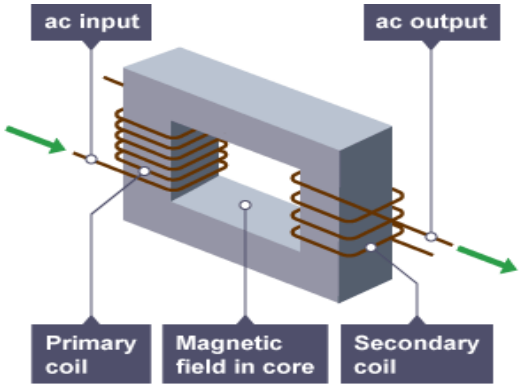
$$\frac{\text{INPUT (PRIMARY) VOLTAGE}}{\text{OUTPUT (SECONDARY) VOLTAGE}} = \frac{\text{PRIMARY TURNS}}{\text{SECONDARY TURNS}}$$

$$\frac{V_P}{V_S} = \frac{N_P}{N_S}$$

Transformers (Seperates)

A **transformer** is a device that can change the **PD** or **voltage** of an alternating current:

- a step-up transformer increases the voltage
- a step-down transformer reduces the voltage



When a transformer is working:

1. a primary voltage drives an **alternating current** through the primary coil
2. the primary coil current produces a **magnetic field**, which changes as the current changes
3. the iron core increases the strength of the magnetic field
4. the changing magnetic field **induces a changing potential difference** in the secondary coil
5. the induced potential difference produces an **alternating current** in the external circuit

The **National Grid** carries electricity around Britain. The **higher** the **current**, the **greater** the **energy transferred** to the surroundings by **heating**. High currents **waste more energy** than low currents. To **reduce** energy transfers to the environment, step-up transformers to increase the voltage from power stations to thousands of volts, which lowers the current in the transmission cables.

Year 11 Physics: Electromagnetism Vocab

Key Vocabulary	Definition	Contextual Sentence
alternator	an alternating current generator	The **alternator** in the car hand failed.
dynamo	a direct-current generator	The bike light was powered by a **dynamo**.
electromagnet	an insulated wire wrapped round an iron bar that becomes magnetic when there is a current in the wire	An **electromagnet** is used in the lock of a car.
electromagnetic induction	the process of inducing a potential difference in a wire by moving the wire so it cuts across the lines of force of a magnetic field	Faraday was a pioneer in the field of **electromagnetic induction**
Fleming's left-hand rule	a rule that gives the direction of the force on a current-carrying wire in a magnetic field according to the directions of the current and the field	The physics teacher used **Fleming's left hand rule** to find the direction of the current in the wire
generator effect	the production of a potential difference using a magnetic field	A fossil fueled power station uses the **generator effect**.
induced magnetism	magnetism of an unmagnetised magnetic material by placing it in a magnetic field	The paper clip became an **induced magnetic** in the presence of a permanent magnet
magnetic field	the space around a magnet or a current-carrying wire	Iron filings can be used to find the **shape of a magnetic** field
magnetic field line	line in a magnetic field along which a magnetic compass points – also called a line of force	The **magnetic field lines** around a magnet always point away from the North pole, towards South pole.
magnetic flux density	a measure of the strength of the magnetic field defined in terms of the force on a current-carrying conductor at right angles to the field lines	A strong magnet has a greater **magnetic flux density**
motor effect	when a current is passed along a wire in a magnetic field, and the wire is not parallel to the lines of the magnetic field, a force is exerted on the wire by the magnetic field	A motor works due to the **motor effect.**
solenoid	long coil of wire that produces a magnetic field in and around the coil when there is a current in the coil	The **solenoid** became an electromagnet due to the presence of an iron core.
split-ring commutator	metal contacts on the coil of a direct current motor that connects the rotating coil continuously to its electric power supply	The **split-ring commutator** should not be confused with a slip-ring commutator.
step-down transformer	electrical device that is used to step-down the size of an alternating potential difference	The **step down transformer** in the phone plug changed 230V to 12V
step-up transformer	electrical device that is used to step-up the size of an alternating potential difference	The **step-up transformer** in a power station changed 2300V to 400,000V

Year 11 Physics (Seperates only): Space Knowledge

Our Solar System

- The **Sun** lies at the centre of the Solar System
- There are **8 planets** and an unknown number of **dwarf planets** which **orbit** the Sun
  - There are **4 rocky planets**: Mercury, Venus, Earth and Mars
  - There are **4 gas planets**: Jupiter, Saturn, Uranus and Neptune
- Some planets have **moons** which orbit them
  - Moons are an example of **natural satellites**
- **Artificial satellites** are man-made and can orbit any object in space
  - The International Space Station (ISS) orbits the Earth and is an example of an artificial satellite
- **Asteroids** and **comets** also orbit the sun
- An **asteroid** is a small **rocky object** which orbits the **Sun**
- **Comets** are made of **dust and ice** and orbit the **Sun** in a different orbit to those of planets

Orbital Motion

Object moves in a circle: -

- Constant **speed**, changing direction = A **change in velocity** = **acceleration**

An object will only accelerate if a **resultant force** acts on it.

- Resultant force is the **centripetal force** that acts towards the **middle** of the circle.
- Gravitational attraction provides the centripetal force needed to keep planets and all types of satellite in orbit.

Start of the Universe

Big Bang Theory- Universe began as just a single point, then expanded.

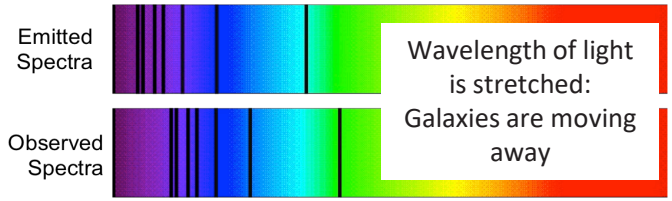
Steady State Theory
Expanding but maintaining a constant average density, with matter being continuously created.

Expanding Universe

Red Shift: The further away a galaxy is, the more red-shifted its light is

CMBR: remains of the thermal energy from the Big Bang, spread thinly across the whole Universe

Red Shift



The Future of the Universe

Big Crunch: Universe expands and then rapidly contracts
Big Tear: Universe expands and then tears apart
Big Freeze: All matter eventually runs out of energy

Dark Energy: Matter is moving away faster than it should.
Dark Matter: Galaxies are rotating faster than they should

Lifecycle of stars

A cloud of rock, dust and gas will form a nebula.

↓

Gravity causes fusion reactions, turning the nebula into a protostar.

↓

The protostar will turn into a main sequence star, through fusing hydrogen nuclei into helium nuclei.

↓

The main sequence star will carry on undergoing the fusion reactions until the hydrogen runs out in the core. Our Sun is at this stage.

↓

The main sequence star will turn into a red giant as the surface of the star cools down. During this time, heavy elements are formed in the core, as a product of the lighter elements fusing together.

Similar size to our Sun

↓

The red giant becomes unstable and fusion stops. The star gets smaller and smaller, until it becomes a white dwarf, which is the dense core.

↓

The white dwarf emits energy in the form of light. Over time, the white dwarf emits less energy and gets called a **black dwarf**.

Much Larger than our Sun

↓

The red supergiant explodes into a supernova, where the outer layers of dust and gas are flung into space.

↓

Once the supernova has exploded, the leftover core will be called a neutron star.

↓

Really large stars do not become neutron stars. Instead, the exploding supernova will turn into a **black hole**.

RELIGIOUS STUDIES

Religious Studies

GCSE Knowledge Organiser

Peace and Conflict

GCSE Paper 2 Themes Peace and Conflict
1. Introduction to Peace and Conflict
2. Violence, violent protest, and terrorism
3. Causes of war
4. Weapons of mass destruction
5. Just War
6. Holy War
7. Pacifism
8. Victims of war

1. Introduction to Peace and Conflict

Peace is to live in harmony and without fear. Peace may be hard to achieve through war because its aftermath is often instability and resentment. Christians and Muslims seek inner peace and tranquillity through prayer and mediation. The prophet Isaiah spoke of a time when God will bring peace, and the Qur'an also emphasises peace ***'He will judge between the nations and will settle disputes for many people…Nation will take up sword against nation, nor will they train for war anymore.'*** **Isaiah 2:4**

Justice is fairness.Isaiah says God, the ultimate judge, will establish justice. Justice is equality of opportunity. If more privileged parts of the world are seen to be the cause of injustice, conflict may result. In Islam 'the Just' is one of the 99 names for God who gives humans laws to follow. In Christianity God is a Just God, Christians should follow this .

Forgiveness is a deliberate decision to release feelings of resentment or vengeance toward a person or group who has harmed you. Christians are taught in the Lord's prayer to forgive if they wish to be forgiven. Forgiveness does not mean no action should be taken to right a wrong, but when conflict is over forgiveness should follow. Actions to establish peace and justice need to be taken to avoid further conflict. Both Muslims and Christians believe God offers forgiveness to all who ask in faith

Reconciliation is a conscious effort to rebuild a relationship which has been damaged by conflict. It is also important in the prevention of conflict.

2. Violence, violent protest, and terrorism

- The right to protest (express disapproval, often in a public group) is a basic right in a democracy. The UK allows peaceful public protest marches if police are told six days before so that violence can be avoided.
- Christians believe protest to achieve what is right is acceptable as long as violence is not used- Jesus taught ***'Blessed are the peacemakers'.*** Martin Luther King Jr, a Christian pastor organised peaceful protests against unjust racist laws which succeeded in bringing civil rights to African-American citizens .
- However, humans have freewill and where non-violent protest is ignored violent protest may be used for the common good.
- In Islam, fighting is only allowed in self-defence of the faith and only against those who actively fight against you.

'Do not repay anyone evil for evil …If it is possible, as far as it depends on you, live at peace with everyone.' **Romans 2:17-19**
'Do not kill each other for God is merciful to you. If any of you does these things out of hostility and injustice, We shall make him suffer Fire' **Qur'an 4:29-30**

Terrorism

- Some individuals or groups use terrorism to further their cause by killing innocent people.
- Suicide bombers, car bombs and using cars to injure others are examples of terrorism tactics.
- The aim of terrorism is to make society aware of their cause, make people frightened and push the authorities in to giving way to their demands.
- Terrorists may link their cause with a religion, but no religion promotes terrorism.
- Most Christians and Muslims believe terrorism is wrong as it targets innocent people.

3. Reasons for war

Greed

- This is war to gain more land, more power and more resources.
- The Bible warns against greed ***'For the love of money is the root of all kinds of evil'*** **Timothy 6:10**
- The Qur'an warns against greed also ***'God does not like arrogant, boastful people who are miserly…hiding the bounty God has given them'*** **Qur'an 4:36-37**

Self-defence

- If a country or religion is under attack then conflicts can happen. It would be seen as entirely right to defend your country against attack or fight evil such as genocide.
- The Bible says fighting in self-defence is okay ***'Do not repay anyone evil for evil…if it is possible as far as it depends on you, live at peace with everyone'*** **Romans 12:17-19**
- The Qur'an also says it is okay ***'Those who have been attacked are permitted to take up arms because they have been wronged- God has the power to help them'***

Retaliation

- At times a country will be attacked in a way that provokes retaliation e.g. WW1
- Retaliation however can often lead to the escalation of a situation with war.
- Jesus taught that retaliation is wrong ***'But I tell you, do not resist an evil person. If anyone slaps you on the right cheek, turn to them the other cheek also'*** **Matthew 5:39**
- Islam teaches God allows fair retribution but retaliation must be measured and not cruel.

4. Weapons of Mass Destruction

- **Nuclear weapons** are weapons that work by nuclear reaction; they devastate huge areas and kill large numbers of people.
- US forces used atom bombs on Hiroshima and Nagasaki during WW2, causing 140,000 people to die in Hiroshima alone. Japan surrendered ending the war so some people may say that their use of nuclear weapons was justified.
- Since then countries have developed more powerful nuclear weapons which are used a deterrents.

Other types of **weapons of mass destruction** (WMD- kill large numbers of people/cause great damage) include:

1) **Chemical weapons** (use chemicals to poison, burn or paralyse humans and destroy the natural environment) The Chemical Weapon Convention (1993) made the production, stockpiling and use of these weapons illegal worldwide. Chemical weapons are thought to have been used in Syria and Iraq.
2) **Biological weapons** (that have living organisms or infective material that can lead to disease or death. Biological weapons are illegal but many countries have them.

Christian and Muslim Beliefs

All are wrong because:

- Sanctity of life- only God has the right to end life
- Nuclear, chemical and biological weapons kill huge numbers of innocent people ***'Do not murder'*** **Exodus 20:13**. The Qur'an also writes; ***'Do not contribute to your destruction with your own hands, but do good, for God loves those who do good.'*** **Qur'an 2:195**
- The quote ***'Eye for an eye'*** can be used to justified war **BUT NOT NUCLEAR WEAPONS! HOWEVER, some Christians might see nuclear weapons as a deterrent to maintain peace.**

5. The Just War Theory

The Just War theory gives the conditions/rules that must apply if a war is to be considered just. **Christian** writer St Augustine (fourth century) and Thomas Aquinas (thirteenth century) developed the concept of a 'just war'.

Rules to decide whether the war is just (jus ad bellum)

- Be fought for a just cause (e.g. self-defence)
- Have a just intention (fought to restore a greater good)
- Be the last resort
- Have a reasonable chance of success
- Be proportional (excessive force should not be used)

Rules about how the war should be fought (jus in bello)

- The war should be fought by just means (innocent civilians should not be targeted)
- Only appropriate force should be used
- Internationally agreed conventions must be obeyed (Geneva Convention rules)

6. Holy War

A Holy War is a war fought in the name of God; believing God has sanctioned the war.

- A Holy War seems to a contradiction- how can killing large numbers of people be holy?
- In **Christianity** the Old Testament refers to God helping the Jews in battles to win the Promised Land.
- In the **Crusades** (11-14th century battles between Christians and Muslims) both sides believed God was on their side.

For both Muslims and Christians, a holy war must:

- Be authorised by a religious leader with great authority.
- Only fought be fought to defend the faith from attack (e.g. the right to worship being denied)
- Those who take part gain spiritual rewards) e.g. if they die in battle they will go straight to heaven/paradise.
- In Islam, holy war must meet the criteria for a just war.

7. Pacifism

Pacifists believe that war and violence can rarely be justified- conflicts can be settled in a peaceful way. They think it is better to prevent war by promoting justice and peace.

Christian views on pacifism

FOR:

1. Jesus said ***'Blessed are the peacemakers'*** **Matthew 5:9**

2. Christians should follow the teachings of the **Sermon on the Mount to *'Turn the other cheek'***

3. It doesn't fit in with '***Love your neighbour'***

4. Quakers are a Christian denomination that strongly support pacifism

5. During WW1 and WW2 some people called conscientious objectors refused to fight and faced punishment. Many conscientious objectors took on non-fighting roles as cooks, doctors or nurses

AGAINST:

1. Fighting may be needed to overcome a greater evil

2. Jesus healed the Roman centurion (soldier) he did not condemn him

3. War can be used to achieve peace

ANGLICAN PACIFIST FELLOWSHIP

Works to overcome the inequality and injustice that leads to war within and between nations. Sponsors the Week of Prayer for World Peace and contributes to peace related events and religious services that raise awareness of pacifism.

8. Religious response to victims

Victims of war may need:

- Psychological support
- A safe place to live
- Medical help
- Access to food and clean water
- A means of earning a living

Christian reasons for helping

- Jesus taught ***'Love your neighbour as yourself'*** **Mark 12:31**
- Jesus' parable of the Good Samaritan (Luke 10:25-37) taught that everyone is everybody else's neighbour, regardless of race etc.

Christian organisations that help

1. Caritas a Catholic charity that serves the poor and promotes charity and justice world wide, provided food, shelter, translators and legal services to Syrian refugees who escaped to Greece in 2015

2. Christian Aid works to end poverty and promotes peace, justice and human rights so that war is prevented. It raises money to support local organisations that help refugees from places such as Gaza, Afghanistan and Syria

Definition	Definition	Contextual Sentence
Civil War	Armed conflict between factions within the same country.	A ***civil wa***r happened in England in 1642-1651.
Conscientious Objector	A person who refuses to do something, here fight in war, because of their conscience	Many ***conscientious objectors*** refused to fight in World War 2 because of their religious beliefs.
Conventional (warfare)	War using conventional weapons- weapons acceptable under the Geneva Conventions	World War 1 is an example of ***conventional warfare.***
Forgiveness	Willingness to not blame a person any more for the wrongs they have done	Many Christians believe Jesus taught ***forgiveness*** on the cross.
Holy War	Rules around fighting a war acceptable to Islam	The crusades are an example of ***Holy War.***
Justice	Making things fair again	A war fought in self defence is also fought for ***justice***.
Just War	Rules around fighting a war acceptable to Christians and Muslims	Thomas Aquinas establishes a rule book for war called the ***Just War Theory.***
Nuclear weapons	A weapon/war of mass destruction	A ***nuclear weapon*** was used in Hiroshima.
Pacifism	Belief that all violence is wrong	The Christian denomination Quakers believe in ***pacifism.***
Peace	The opposite of war; harmony	The aim of the Just War theory should be to establish ***peace.***
Protest	Voicing disagreement with something	Martin Luther King used protest to end ***segregation*** laws in America.
Reconciliation	Making up between two groups after disagreement	***Reconciliation*** is an important part of establishing peace.
Retaliation	To pay back for harmful actions	Christians do not agree with a war fought in ***retaliation.***
Terrorism	Use of violence and threats to intimidate, especially for political purposes to create a state of fear in a population	9/11 is an example of ***terrorism***.
Violence	Causing harm to someone	A pacifist agrees with no form of ***violence.***

RELIGIOUS STUDIES

Religious Studies

Year 9 Knowledge Organiser

Spring Term

AQA
Islam Beliefs

1. Oneness of God and the supremacy of God's will
2. Key beliefs of Sunni Islam and Shi'a Islam
3. The nature of God
4. Angels
5. Predestination
6. Life after death
7. Prophethood and Adam
8. Ibrahim
9. Muhammad and the Imamate
10. Holy books in Islam

1. Nature of God

There is only **ONE God (monotheism).** The 'oneness' of God is called Tawhid in Arabic.
Muslims call God Allah, which means 'the one true God'. In the Qur'an and the Sunnah, Allah has 99 'names. E.g. the Merciful, the Just, the Almighty…
Allah has revealed his will through his prophets.
Allah must never be pictured
Allah is beyond understanding and nothing must ever be compared to Allah. Comparing things to Allah is a terrible sin (shirk)
Immanent – Allah is present everywhere and within all things
Transcendent – Allah is beyond and outside the physical world, He is not limited by it.

"Say "He is Allah who is one."
"He neither begets nor is born. Nor is there any equal to him."

2. Sunni or Shia

Sunni Muslims make up 95% of the worlds Muslim population. While **Shia** are most of the remaining 5%.
Sunni Muslims believe that when the Prophet Muhammad died he wanted his friend and follower, Abu Bakr, to take over and lead the faith. They generally don't follow human leadership on religious matters, but look to the Qur'an for guidance. Shia Muslims believe that when the prophet died he asked for his son-in-law, Ali, to lead the religion. They believe in the Imamate, the human leadership of the religion. Shia Muslims generally pray 3 times a day, by combining prayers, and place a piece of clay on the floor when praying, and resting their head upon it.
Shia Muslims claim that Ali is the "friend of Allah."

3. Six Articles of Faith and the Five Roots of Usul Ad-Din

Six Articles of Faith – Sunni Islam
1. Tawhid – The oneness of God
2. Malaikah – The belief in Angels
3. Authority of Kutub – Belief in the Holy Books
4. Risalah – Following the prophets
5. Al-Qadr – Predestination
6. Akirah – Belief in afterlife

Five Roots of Usul Ad-Din – Shia Islam
1. Tawhid – The oneness of God
2. Adalat – Justice
3. Nubuwwah – Belief in Prophets
4. Imamate – The human leaders of the religion after Muhammad
5. Mi'ad – The Day of judgement and Akirah

4. Al Qadr – Predestination:

This is the idea that life is planned out by Allah.

Sunni Islam
- Sunni Muslims believe that God has planned out every event in a person's life in the book of decrees.
- However some people see this as being against free will.

Shia Islam
- Shia Muslims believe that God knows everything that will happen but did not plan it. This is because he knows us well and is outside of time.

5. Angels

- Angels are beings created by Allah from light and given wings. They fulfil all of Allah's wishes, but have no minds of their own. They live to obey.
- Jibril/Gabriel – The messenger of Allah. Brought the message of the Qur'an to Muhammad, and spoke to Ibrahim and tested him.
- Azrael – The angel of death. Tests people when they are alive, and then helps their souls to paradise when they die
- Mi'kail/Michael – He looks after people and brings rain and thunder. Sometimes known as the Angel of Mercy as he forgives us.
- Ishrafil – It is his role to play a great trumpet when Allah decides to end the world.

"Anyone who opposes Jibril or the other angels will become an enemy of Allah'

Religious Studies

Year 9 Knowledge Organiser

Spring Term

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HISTORY

Year 11 History
Spring Term- America and the bust years

The New Deal

In the first 100 days of FDR's presidency, Americans saw more action being taken to end the depression than they had seen since it began. The 'laissez-faire' attitude of the previous presidency was over.

The emergency banking act	Confidence in Americas banking system was at a low. FDR temporarily closed all banks and had them inspected. Only honest, well-run banks with enough cash would give out loans and reopened. People started to put their money back in their accounts. Banks started to lend money to well run businesses which would create jobs as businesses expanded.
The Economy act	All government employees' pay was cut by 15% saving nearly $1 billion.
The beer act	Prohibition ended, putting gangsters out of business. The government could raise money by taxing alcohol.

The Alphabet Agencies

- FCA (Farm Credit Administration) lent money to farmers who couldn't pay loan repayments.
- AAA (Agricultural Adjustment Agency) paid farmers to produce less. Food prices rose and farmers' incomes increased.
- TVA (Tennessee Valley Authority) Provided work building dams and power stations along the Tennessee River area.
- NRA (National recovery administration) encouraged workers to work out a code of fair conditions and pay. Gave workers the right to join a union. .
- HOLC (Home owners Loan Corporation) Gave loans to people struggling to pay their mortgages.
- CCC (Civilian conservation corps) Jobless 18-25 year olds were put to work in the countryside.
- CWA (Civil works administration) Provided temporary jobs for 4 million people, building schools, airports and roads.
- FERA (Federal Emergency relief agency) $500 million was given to states to help the homeless.

	Opposition to the new deal
The Rich	• To pay for the New Deal FDR raised taxes for the rich, which angered them.
Business people	• Many business owners didn't like the way the New Deal agencies 'interfered' with business and gave more rights to workers.
The Supreme court	• America's highest court ruled that the AAA was illegal. • It said that giving help to farmers was a matter for state governments, bit the federal governments. • Declared many of the NRA codes illegal.
Republicans	• Believed in ideas like 'laissez- faire' and 'rugged individualism'. • Were horrified by the way the New Deal dominated lives. • Some said Roosevelt was behaving like a dictator and making the government too powerful.
Huey Long – Louisiana politician	• Suggested an alternative 'Share Our Wealth'. • All fortunes over $ 5 million would be confiscated and shared out. • Every family would receive $5000, free education. • His ideas were radical, but he was popular.
Francis Townsend	• Retired doctor – wanted everyone to retire at 60 to give younger people job opportunities.
Charles Coughlin	• Set up the 'National Union for social justice' which aimed to provide work and fair wages for everyone. • However, he made speeches attacking Jewish people and trade unions. His support declined.

The effectiveness of the New Deal

New Deal was effective	New Deal was not effective
• Social security act 1935 was Americas first system of social welfare. • The New Deal created jobs. • The number of Bank failures dropped. • Gross National Product rose from 1933 to 41 • The alphabet agencies provided work for many skilled and unskilled workers. • Measures were introduced to help raise the price of crops and help farmers. • 200,000 African-Americans got jobs in the CCC. • Government loans were provided to help American Indians.	• Unions were still treated with suspicion • There was still severe poverty in much of rural America. • The New Deal did not seek to end discrimination • Many American Indians still lived in poverty and suffered discrimination • Women still faced discrimination. • Some argue that the New Deal interfered too much in citizens' lives and wasted money on work programmes.

Year 11 History
Spring Term- America and post WWII

Popular culture in the 1930s

The term popular culture refers to the common ideas and behaviour of a particular group or country at a particular time in history. This could be the music they listened to, the films or television shows people watched and the books they read.

Cinema

- Over 100 million people went to the cinema each week.
- Musicals (42nd street), comedies staring Charlie Chaplin, Walt Disney cartoons and historical dramas (Gone with the wind) were popular.

Comic books

- Appeared in the early 1930s, but popularity soared after the publication of action comics (1938), which included Superman.
- Comics were bright, cheap and provided an escape into the world of adventure.

Literature

- Authors such as Erskine, Caldwell, John Steinbeck and James T Farrell wrote about the Great Depression and poverty that the witnessed.

Music

- Jazz remained popular.
- Performers such as Judy Garland and Bing Crosby became famous.
- Most people listened to a radio or gramophone.
- Radios broadcast poetry, plays, news reports, live sport and variety and shows

The arts

The Works Progress Administration (WPA) provided work for unemployed artists.

- Actors were hired to put on free shows.
- Artists painted pictures for display in schools and parks.
- Writers produced guidebooks for every US state.

The American dream

- Post war America saw an era of consumerism. Millions of Americans were living the American dream – the idea that anyone could succeed through hard work.
- Consumer goods included televisions and cars. Demand was high because these goods were rare during the war.
- Advertising and buy no pay later persuaded people to spend money.
- Shopping malls sold goods and were built on the outskirts of town.
- By the end of the 1950s, 9 out of 10 US households had a television, eight had a car and telephone and seven had a washing machine.
- America experienced a baby boom that saw 40% increase in the population.

America and WWII

- America followed a policy of Isolationism after the first world war, keeping out the affairs of other countries. Instead, the USA concentrated on building up its economy and strong trade links.
- In October 1937, FDR said peace-loving nations should break off relations with aggressive nations. It was clear that he was referring to Germany, Italy and Japan, which had been taking over other nations.
- When war broke out America supported Britain and France. FDR was concerned about Japan's aggressiveness.
- In November 1939, the USA began to help Britain and France against Germany:
  - The cash and carry plan – America sold Britain and France US weapons, which created valuable production jobs at a time of rising unemployment.
  - Lend lease: From March 1941, America started to 'lend' weapons to Britain. The USA struck a similar deal with the USSR when Germany attacked it in June 1941.

Weapon making

- The War production board (WPB) converted industries from peacetime work to war work.
- Each factory received materials it needed to produce most war goods in the fastest time.
- In 1943, factories produced 85,000 planes.

Women

- As millions of men joined up, women began to fill their place in the factories etc.
- Between 1940 and 1945, the number of women in work rose from 12 million to nearly 19 million. Women now occupied a third of all America's jobs.

Unemployment

- Unemployment dropped as America started to rearm.
- By 1941 4 million found a job in the armed forces.
- Farmers prospered because they supplied food to the military.
- Traditional industries like coal were boosted.

African-Americans

- In June 1941, the government set up the Fair Employment Practice Committee (FEPC) to help prevent discrimination in defence/government jobs.
- FEPC could not force companies but could recommend they didn't get government contracts.
- Around a million African-Americans fought.

Truman's fair deal

- After his death FDR was replaced by Harry Truman. Truman felt it was important for the government to help bring a fairer society. Truman called his plans the 'Fair Deal' . The two main issues he hoped to tackle were poverty and African-Americans.
- Truman raised the minimum hourly wage and cleared large areas of slums to make new affordable housing. The GI bill made cheap home loans available to war veterans and grants were paid for ex-soldiers to attend college.
- Trumans proposal to include a national health scheme was blocked by republicans. An attempt to improve the rights of African-Americans was halted when many Southern politicians voted against it.

Women after WW2

- Most women went back to traditional roles.
- Women who did not got jobs in traditional female jobs.
- Women trying to pursue a management career often faced discrimination.
- By 1950, the average age a woman got married was 20. There was a view that a woman's place was in the home, and she was living the American Dream if she had all the latest gadgets.

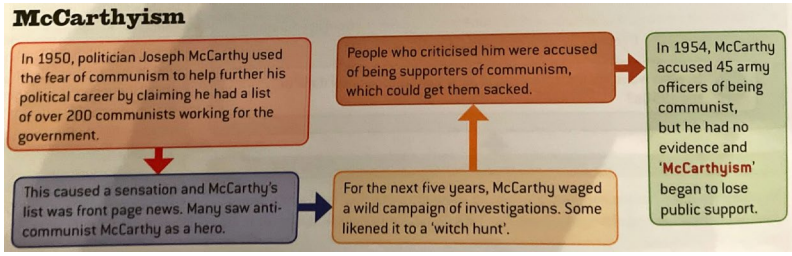
The rock and roll generation

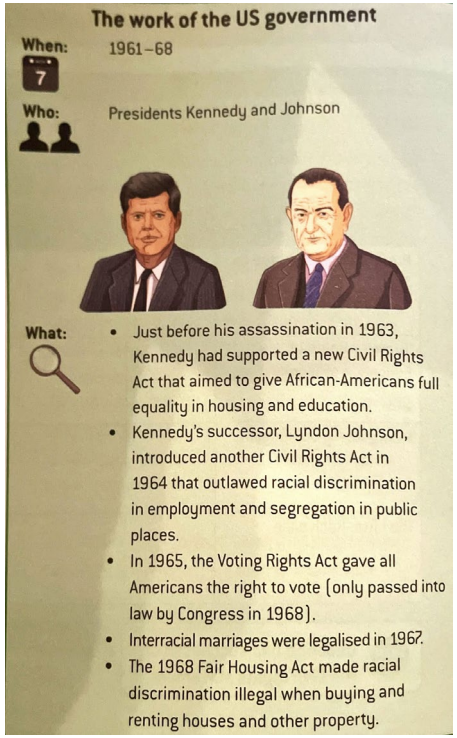
- The bombing economy meant many parents could financially help their children. Children no longer had to get a job to support the family so many finished school and went to college.
- Rock and roll music became popular. Many older people viewed it as dangerous and linked it to teenage crime and gang culture.
- Teenagers spent between $10 -$15 a week.

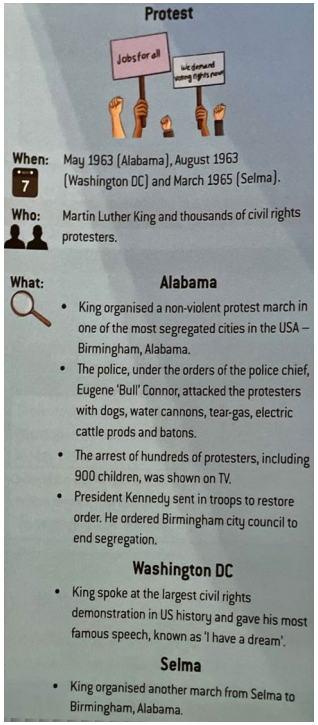
Year 11 History
Spring Term- America and post WWII

The growing fear of communism

- A US government group (the HUAC or House of Representatives Un-American Activities Committee) began searing for communists in the US government, in workplaces, in the media and in the movie industry.
- President Truman introduced a Loyalty programme that allowed the FBI to investigate all government employees and sack any security risks.
- Millions of Americans were investigated between 1947 and 1950. Although none were found guilty of spying, Many were forced out of their jobs because of the disgrace associated with their investigation.







The Civil Rights movement

• 'Civil rights' refers to equal opportunities with regards to access to employment, housing and education, as well as the right to vote and be free of racial discrimination.
•The Civil Rights Movement was a campaign that took place from the 1940s to the late 1960s.
•The aim was to achieve civil rights for African-Americans equal to those of white Americans.
•The Civil Rights Movement had already had some small success in the 1940s such as the 'Fair Employment Law' in 1941 and Truman's 1946 President's Committee on Civil Rights to try to eliminate segregation in American life.

Brown vs the Board of Education

- Most of America's schools were segregated. In 1951, in Topeka, Kansas, the father of an African-American girl named Linda Brown took the local education authority (the Board of Education) to court. He wanted his daughter to attend her local 'whites only' school.
- He was helped in his case by the NAACP (National Association for the Advancement of Colored People).
- Brown lost but appealed against the decision to the Supreme Court.
- In May 1954, the Chief Judge declared that every education board had to end segregation in schools.
- Within weeks, many cities and towns began to 'de-segregate' their schools. Some states refused.
- By 1956, not a single African-American child was attending any school where there were white students in six Southern states.

Montgomery bus boycott

•In Montgomery, Alabama, like in many Southern states, buses were segregated.
•On 1 December 1955, Rosa Parks, an African-American woman, refused to move from the 'whites only' section. She was arrested.
• Rosa Parks was the secretary of the local NAACP and news of her arrest spread fast. Local Black community leaders agreed to call a boycott of all city buses. Church preacher Martin Luther King led the boycott.
• The boycott lasted many months. African-Americans had provided 75% of the bus company's business, which was soon in financial difficulty. King told the community to remain peaceful. He believed that non-violent protest, or 'direct action', was the best to achieve equal rights.
•Almost a year later, the Supreme Court ruled that segregated buses were illegal. This was a significant victory for the Civil Rights Movement and for peaceful direct action.

Little rock nine

•In September 1957, nine African-American pupils tried to attend Central High School in Little Rock, Arkansas.
•Arkansas had refused to de-segregate schools and Central High was a school for white children.
•The governor of Arkansas sent National Guard soldiers to prevent the black children entering the school. A hostile crowd greeted the children.
•The African-Americans of Little Rock took the governor to court and won. The soldiers were forced to leave, and the pupils had the right to go the school.
•By 1960, out of Arkansas' 2 million black students, only 2500 were going to the same school as white children.
•By 1962, there were still no black children attending white schools in Alabama, South Carolina or Mississippi.

A new Civil Rights law

- In 1957, a Civil Rights Act was passed giving all African Americans the right to vote, but little was done to enforce it.
- However, it showed that the government was no longer willing to accept that the states could ignore federal government when it came to the rights of African-Americans.

Malcolm X and the Black Power movement

Some civil rights campaigners rejected the approach of people like Martin Luther King. They felt that change was not happening quickly enough; millions of African Americans still faced poverty and poor education. Several organisations promoting 'Black power' grew in the 1960s.

Year 11 History
Spring Term- Elizabethan England

Queen Elizabeth, I reigned from 1558-1603. Her mother Anne Boleyn had been executed for treason on the orders of her father King Henry VIII. Her sister Queen Mary saw her as a potential threat. Elizabeth learned quickly who she could trust. Elizabeth was only 25 when she became queen. Her government gave her a clear structure of advisors and other powerful figures. Most of the power was held by a few trusted individuals in Elizabeths court. Many were privy councillors. The Queen could ensure support through patronage. Patronage was an important way of ensuring loyalty. Elizabeth could award titles, land, monopolies etc for obedience and support.

Group	Who had the power?
Lord Lieutenants	• Appointed by the queen. • Responsible for running a particular area and for raising a militia to fight for the queen. • Many also served on the Privy council.
Justices of the peace	• Several in every country. • Responsible for maintaining order and enforcing the law.
Parliament	• Made up of the House of Lords and the House of Commons. • Had influence over tax and was responsible for passing laws. • The queen could choose when to call parliament and was able to ignore advice.
Privy council	• Responsible for the day to day running of the country, dealing with all policy areas. • The queen could technically appoint whoever she wished, she had to appoint the most powerful landowners in the country, to prevent rebellion. • If the council was united, it was almost impossible for Elizabeth to go against their wishes. Unity was rare in a group • William Cecil and Francis Walsingham were two figures who served as Secretary of State.

Elizabeths problems

Succession
- Elizabeth was the last living child of Henry VIII. It was unclear who would succeed her.
- In 1562, she nearly died of smallpox.

Religion
- Many Catholics didn't trust Elizabeth and claimed she had no right to be queen.
- Puritanism was seen as a threat. Some hoped to take control of the church.

Taxation
- The country was short of money. Elizabeth needed to raise taxes.
- Poverty made more tax unpopular.

Ireland
- Elizabeth considered herself Queen of Ireland. In 1559, she faced a major revolt in Ireland.

Foreign policy
- Catholic countries like Spain and France wanted influence over England and had the Popes support.
- The Netherlands caused tensions. The Protestant population conflicted with its Spanish rulers.

Mary Queen of Scots
- With no direct heir, the next in line was Elizabeth's Catholic cousin, Mary.

Marriage
For a monarch, marriage was seen as an important duty. It was a way of cementing alliances and producing an heir.

For marriage	Against marriage
• Create an alliance with a foreign country or guarantee the loyalty of a powerful English family. • Produce an heir to continue the Tudor line and stop Mary, Queen of Scots becoming queen when Elizabeth died	• Loss of authority – by not marrying Elizabeth kept her independence • Her experience of marriage had been bad. Her father had been married 6 times. • Elizabeth was able to use the possibility of marriage to her advantage with foreign leaders.

Relations with Parliament
The most challenging relationship that Elizabeth had was with parliament. Parliament consisted of bishops and nobles who sat in the House of Lords. 'Commoners' (MPs) sat in the House of Commons. Its role was to discuss issues and advise the queen. Responsible for passing laws and setting taxes. The queen could decide when to call Parliament and did not have to listen to it. But she could not ignore it completely.

Marriage and succession	Saw it as Elizabeths duty to marry. By 1566 had begun to discuss it. Elizabeth banned them from talking about it.
Religion	Most of those in Parliament were Protestants and supported Elizabeth's religious settlement. Elizabeth found support in Parliament to introduce laws to make life more difficult for Catholics.
Freedom of speech	An MP called Peter Wentworth was arrested three times during Elizabeths reign for arguing that MPs should be able to speak on any matter they chose.
Crime and poverty	Poverty was significant. Many MPs recognised that punishing the poor didn't work and attempted to introduce new laws. They were unsuccessful until 1601 when the poor law was finally passed.
Mary, Queen of Scots	MPs saw Mary as a Catholic threat. This pressure and that of the Privy council led to her execution
Monopolies	Monopolies were a way for Elizabeth to maintain loyalty. In 1571, an MP called Robert Bell said they were unfair, and Elizabeth agreed to make a few changes.

GEOGRAPHY

Tropical Rainforests: Case Study Malaysia

Malaysia is a LIC country is south-east Asia. 67% of Malaysia is a tropical rainforest with 18% of it not being interfered with. However , Malaysia has the fastest rate of deforestation compared to anywhere in the world

Adaptations to the rainforest

Orangutans	Large arms to swing & support in the tree canopy.
Drip Tips	Allows heavy rain to **run off leaves easily**.
Lianas & Vines	**Climbs** trees to reach sunlight at canopy.

Rainforest inhabitants

Many tribes have developed sustainable ways of survival. The rainforest provides inhabitants with…

- **Food** through hunting and gathering.
- **Natural medicines** from forest plants.
- **Homes and boats** from forest wood.

Issues related to biodiversity

Why are there high rates of biodiversity?

- **Warm and wet climate** encourages a wide range of vegetation to grow.
- There is **rapid recycling of nutrients** to speed plant growth.
- Most of the rainforest is **untouched.**

Main issues with biodiversity decline

- **Keystone species** (a species that are important of other species) are extremely important in the rainforest ecosystem. Humans are threatening these vital components.
- **Decline in species** could cause tribes being unable to survive.
- **Plants** & **animals** may become **extinct.**
- Key medical **plants** may become **extinct.**

Impacts of deforestation

Economic development

+ Mining, farming and logging creates employment and tax income for government.
+ Products such as palm oil provide valuable income for countries.
- The loss of biodiversity will reduce tourism.

Soil erosion

- Once the land is **exposed by deforestation,** the soil is more **vulnerable to rain**.
- With **no roots to bind soil together**, soil can easily **wash away.**

Climate Change

-When rainforests are cut down, the climate becomes **drier.**
-Trees are **carbon 'sinks'**. With greater deforestation comes more greenhouse emissions in the atmosphere.
-When trees are burnt, they **release more carbon in the atmosphere**. This will enhance the **greenhouse effect.**

What are the causes of deforestation?

Logging

- Most widely reported cause of destructions to biodiversity.
- Timber is harvested to create **commercial items** such as furniture and paper.
- **Violent confrontation** between indigenous tribes and logging companies.

Agriculture

- Large scale **'slash and burn'** of land for ranches and palm oil.
- Increases **carbon emission**.
- **River saltation** and **soil erosion** increasing due to the large areas of **exposed land.**
- Increase in **palm oil** is making the **soil infertile**.

Mineral Extraction

- **Precious metals** are found in the rainforest.
- Areas **mined** can experience **soil and water contamination**.
- **Indigenous people** are becoming **displaced** from their land due to roads being built to transport products.

Tourism

- **Mass tourism** is resulting in the building of hotels in extremely **vulnerable areas**.
- Lead to **negative relationship** between the government and indigenous tribes
- Tourism has **exposed animals** to human **diseases.**

Energy Development

- The **high rainfall** creates ideal conditions for **hydro-electric power (HEP).**
- The **Bakun Dam** in Malaysia is key for creating energy in this developing country, however, both people and environment have suffered.

Road Building

- **Roads** are needed to bring supplies and **provide access** to new mining areas, settlements and energy projects.
- In Malaysia, logging companies use an **extensive network of roads** for heavy machinery and to transport wood.

Sustainability for the Rainforest

Uncontrolled and unchecked exploitation can cause irreversible damage such as loss of biodiversity, soil erosion and climate change.

Possible strategies include:

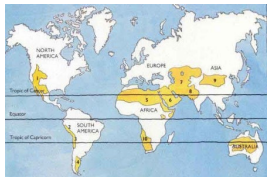
- **Agro-forestry** - Growing trees and crops at the same time. It prevents soil erosion and the crops benefit from the nutrients.
- **Selective logging** - Trees are only felled when they reach a particular height.
- **Education** - Ensuring those people understand the consequences of deforestation
- **Afforestation** - If trees are cut down, they are replaced.
- **Forest reserves** - Areas protected from exploitation.
- **Ecotourism** - tourism that promotes the environments & conservation

Hot Desert: Case Study Sahara Desert/ Sahel desert-fringe

The Sahara desert is our largest desert – it covers a USA-sized area, stretching across many north African countries. There are many opportunities for economic development in the Sahara.

Distribution of the world's hot deserts

Most of the world's hot deserts are found in the **subtropics** between **20 degrees and 30 degrees north & south** of the Equator. The **Tropics of Cancer and Capricorn** run through most of the worlds major deserts.



Major characteristics of hot deserts

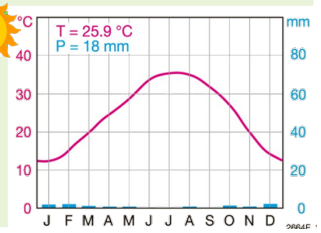
- **Aridity** – hot deserts are extremely dry, with annual rainfall below **250 mm**.
- **Heat** – hot deserts rise over **40 degrees.**
- **Landscapes** – Some places have dunes, but most are **rocky** with **thorny bushes.**

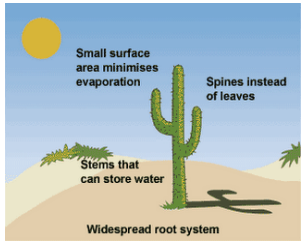
Hot Deserts inhabitants

- People often live in large **open tents** to **keep cool.**
- Food is often **cooked** slowly in the **warm sandy soil.**
- **Head scarves** are worn by men to provide **protection from the Sun.**

Climate of Hot Deserts

- **Very little rainfall** with less than **250 mm per year.**
- It might only **rain once every two to three years.**
- Temperate are **hot in the day** (45 °C) but are **cold at night** due to little cloud cover (5 °C).
- In winter, deserts can sometimes receive occasional frost and snow.





Adaptations to the desert

Cactus	• **Large roots** to absorb water soon after rainfall. • **Needles** instead of leaves to reduce surface area and therefore **transpiration**.
Camels	• Hump for storing **fat (NOT water).** • **Wide feet** for walking on sand. • **Long eyelashes** to protect from sand.

Desert Interdependence

Different parts of the hot desert ecosystem **are closely linked together and depend on each other**, especially in a such a harsh environment.

Opportunities and challenges in the Hot desert

Opportunities

- **Energy resources such as oil and gas in Algeria.**
- **Mineral resources such as phosphate, iron and copper are found in Morocco**
- **Great opportunities for renewable energy such as solar power in Tunisia**
- **The Sahara desert has attracted tourists, especially sandboarding and cross-desert camel rides**
- **Farming occurs in Egypt thanks to the Aswan Dam.**

Challenges

- **The extreme heat makes it difficult to work outside for very long.**
- **High evaporation rates from irrigation canals and farmland.**
- **Water supplies are limited, creating problems for the increasing number of people moving into area.**
- **Access through the desert is tricky as roads are difficult to build and maintain.**

Causes of Desertification – The Sahel region

Desertification means the turning of semi-arid areas (or drylands) into deserts.

Climate Change
Reduce rainfall and rising temperatures have meant less water for plants.

Fuel Wood
People rely on wood for fuel. This removal of trees causes the soil to be exposed.

Overgrazing
Too many animals mean plants are eaten faster than they can grow back. Causing soil erosion.

Over-Cultivation
If crops are grown in the same areas too often, nutrients in the soil will be used up causing soil erosion.

Population Growth
A growing population puts pressure on the land leading to more deforestation, overgrazing and over-cultivation.

Strategies to reduce Desertification

- **Water management** - growing crops that don't need much water.
- **Tree Planting** - trees can act as windbreakers to protect the soil from wind and soil erosion.
- **Soil Management** - leaving areas of land to rest and recover lost nutrients.
- **Technology** – using less expensive, sustainable materials for people to maintain. i.e. sand fences, terraces to stabilise soil and solar cookers to reduce deforestation.

Tier 3 Vocab	Definition	Contextual Sentence
Agribusiness	Application of business skills to agriculture.	Cargill is an example of a large agribusiness company that specialize in agricultural and food production.
Carbon footprint	A measurement of all the greenhouse gases we individually produce, through burning fossil fuels for electricity, transport etc.	Using electric vehicles can reduce a person's carbon footprint.
Energy mix	The range of energy sources of a region or country, both renewable and non-renewable.	The UK has a large energy mix of recyclable, renewable and non-renewable energy.
Food miles	The distance covered supplying food to consumers.	Food miles vary from person to person based on the imported goods they choose to buy.
Fossil fuel	A natural fuel such as coal or gas, formed in the geological past from the remains of living organisms.	Renewable resources are an attempt to reduce the amount of fossil fuels used globally.
'Grey' water	Wastewater from people's homes that can be recycled and put to good use. Uses include water for laundry and toilet flushing. Treated greywater can also be used to irrigate both food and non-food producing plants.	A sustainable method of water management would be to use 'grey' water.
Groundwater management	Regulation and control of water levels, pollution, ownership and use of groundwater.	A water supply management strategy that is effective in the middle east is groundwater management.
Over abstraction	When water is being used more quickly that it is being replaced.	The middle east have a depleting supply of groundwater due to over abstraction.
Sustainable development	Development that meets the needs of the present without limiting the ability of future generations to meet their own needs.	Development is important but sustainable development for LIC's and NEE's is more beneficial for their progress.
Sustainable water supply	Meeting the present-day need for safe, reliable, and affordable water, which minimises adverse effects on the environment, whilst enabling future generations to meet their requirements.	Grey water is an example of sustainable water supply.
Waterborne diseases	Diseases caused by microorganisms that are transmitted in contaminated water. Infection commonly results during bathing, washing, drinking, in the preparation of food, or the consumption of infected food. E.g., cholera.	Heavily polluted waters can increase the risk of waterborne diseases such as cholera.
Water conflict	Disputes between different regions or countries about the distribution and use of freshwater. Conflicts arise from the gap between growing demands and diminishing supplies.	Turkey, Iran and Syria are in a water conflict due to the rivers Tigris and Euphrates flowing through them.
Water conservation	The preservation, control and development of water resources, both surface and groundwater, and prevention of pollution.	To sustainably use water, we can improve the supply by adopting the water conservation strategy.
Water deficit	This exists where water demand is greater than supply.	The southeast of England is in a water deficit.
Water insecurity	When water availability is not enough to ensure the population of an area enjoys good health, livelihood and earnings. This can be caused by water	Typically, LIC's have water insecurity due to the lack of water available for their population.

Unit 2c

AQA

The Challenge of Resource Management

Resource Challenges

Resources are things that humans require for life or to make our lives easier. Humans are becoming increasingly dependent on exploiting these resources, and as a result they are in high demand.

Significance of Water

Resources such as food, energy and water are what is needed for basic human development.

FOOD	WATER	ENERGY
Without enough nutritious food, people can become **malnourished**. This can make them ill . This can prevent people working or receiving education.	People need a supply of **clean and safe water** for drinking, cooking and washing. Water is also needed for food, clothes and other products.	A good supply of energy is needed for a basic standard of living. People need **light and heat** for cooking or to stay warm. It is also needed for industry.

Demand outstripping supply

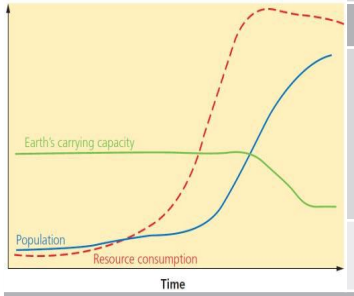
The demand for resources like food, water and energy is rising so quickly that supply cannot always keep up. Importantly, access to these resources vary dramatically in different locations

1. Population Growth

- Currently the global population **is 7.3 billion**.
- Global population has risen **exponentially** this century.
- Global population is expected to reach **9 billion by 2050**.
- With more people, the **demand** for food, water, energy, jobs and space **will increase**.

2. Economic Development

- As **LICs** and **NEEs** develop further, they require **more energy** for industry.
- **LICs** and **NEEs** want similar lifestyles to **HICs**, therefore they will need to **consume more resources**.
- Development means **more water is required** for food production as diets improve.



Resource Reliance Graph

Consumption – The act of using up resources or purchasing goods and produce.
Carry Capacity – A maximum number of species that can be supported.

Resource consumption exceeds Earth's ability to provide!

3. Changing Technology and Employment

- The demand for resources has driven **the need for new technology** to reach or gain more resources.
- More people in the **secondary and tertiary industry** has increased the **demand for resources** required for electronics and robotics.

Food in the UK

Growing Demand

- The UK imports about 40% of its food. This increases people's **carbon footprint**.
- There is growing demand for greater choice of **exotic foods** needed all year round.
- Foods from abroad are more affordable.
- Many food types are unsuitable to be grown in the UK.

Impact of Demand

Foods can travel long distances (food miles). Importing food adds to our carbon footprint.
+ Supports workers with an income
+ Supports families in LICs.
+ Taxes from farmers' incomes contribute to local services.
- Less land for locals to grow their own food.
- Farmers exposed to chemicals.

Agribusiness

Farming is being treated like a large industrial business. This is increasing food production.
+ Intensive faming maximises the amount of food produced.
+ Using machinery which increases the farms efficiency.
- Only employs a small number of workers.
- Chemicals used on farms damages the habitats and wildlife.

Sustainable Foods

Organic foods that have little impact on the environment and are healthier have been rising.
Local food sourcing is also rising in popularity.
- **Reduces emissions** by only eating food from the UK.
- **Buying locally sourced** food supports local shops and farms.
- A third of people **grow their own food**.

Water in the UK

Growing Demand

The average water used per household has risen by 70%. This growing demand is predicted to increase by 5% by 2020.
This is due to:
- A growing UK population.
- Water-intensive appliances.
- Showers and baths taken.
- Industrial and leisure use.
- Watering greenhouses.

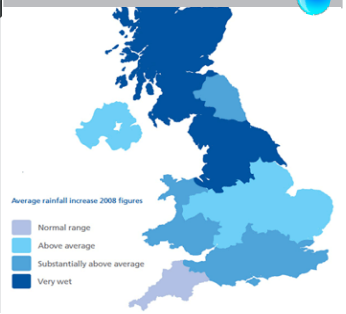
Deficit and Surplus

The north and west have a **water surplus** (more water than is required).
The south and east have a **water deficit** (more water needed than is actually available).
More than half of England is experiencing **water stress** (where demand exceeds supply).

Pollution and Quality

Cause and effects include:
- Chemical run-off from farmland can destroy habitats and kills animals.
- Oil from boats and ships poisons wildlife.
- Untreated waste from industries creates unsafe drinking water.
- Sewage containing bacteria spreads infectious diseases.

Water stress in the UK



Management

UK has **strict laws** that limits the amount of discharge from factories and farms.
Education campaigns to inform what can be disposed of safety.
Waste water treatment plants remove dangerous elements to then be used for safe drinking.
Pollution traps catch and filter pollutants.

Water Transfer

Water transfer involves moving water through pipes from areas of surplus (Wales) to areas of deficit (London).
Opposition includes:
- Effects on **land and wildlife**.
- High maintenance **costs**.
- The **amount of energy** required to move water over long distances.

Energy in the UK

Growing Demand

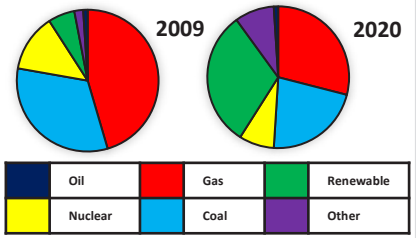
The UK **consumes less energy** than compared to the 1970s despite a smaller population. This is due to the **decline of industry**.

Energy Mix

The majority of UK's energy mix comes from **fossil fuels**. By 2020, the UK aims for 15% of its energy to come from **renewable sources**. These renewable sources do not contribute to **climate change**.

Changes in Energy Mix

- 75% of the UK's oil and gas has been used up.
- Coal consumption has declined.
- UK has become too dependent on imported energy.



Energy in the UK (continued)

Significance of Renewables

+ The UK government is investing more into low carbon alternatives.
+ UK government aims to meet targets for reducing emissions.
+ Renewable sources include wind, solar and tidal energy.
- Although infinite, renewables are still expensive to install.
- Shale gas deposits may be exploited in the near future

Exploitation

Nuclear	New plants provide job opportunities. Problems with safety and possible harm to wildlife. Nuclear plants are expensive.
Wind Farm	Locals have low energy bills. Reduces carbon footprint. Construction cost is high. Visual impacts on landscape. Noise from wind turbines.

Option 2: WATER

Water security is when people have good access to enough clean water to sustain well-being and good health. Water insecurity is when areas are without sufficient water supplies. Water Stress is when less than 1700m³ is available per person.

Human

- **Pollution caused** from human and industrial waste being dumped into people's water sources.
- **Poverty prevents** low-income families affording water.
- **Limited infrastructure** such as a lack of water pipes and sewers.
- **Over-abstraction** is when more water is taken than is replaced.

Physical

- **Climate** needs to provide enough rainfall to feed lakes and rivers. Droughts affect supply if water.
- **Geology** can affect accessibility to water. Permeable rock means sourcing water from difficult aquifers, whereas impermeable allows water to run-off into easily collected basins.

Impact of Water Insecurity

Food production

The less water available for irrigating crops the less food that will be produced. This could lead to starvation.

Industrial output

Manufacturing industries depend heavily on water. A severe lack of water can impact economic output.

Disease and Water Pollution

Inadequate sanitation systems pollutes drinking water causing diseases such as cholera and typhoid.

Water conflict

Water sources that cross national borders can create tensions and even war between countries.

Increasing Water Supply

Water diversion - Involves diverting water to be stored for longer periods. Often water is pumped underground to prevent evaporation.
Dams and Reservoirs - Dams control flow and storage of water. Water is released during times of water deficit.
Water transfer – includes schemes to move water from areas of surplus to areas of deficit.
Desalination – Involves the extraction of salt from sea water to produce fresh drinking water.

C.S. Lesotho Highland Water Project

Lesotho is a highland country dependent on South Africa. Lesotho has water surplus due to high rainfall.

Advantages

- **Provides 75% of Lesotho's GDP.**
- **Provides water to areas of drought in South Africa.**

Disadvantages

- **Dams displaced 30,000 people.**
- **Destruction to key ecosystems.**
- **40% lost through pipe leakages.**

Sustainable Water Supply

Ensures water supplies don't cause damage to the environment whilst also supporting the local economy.

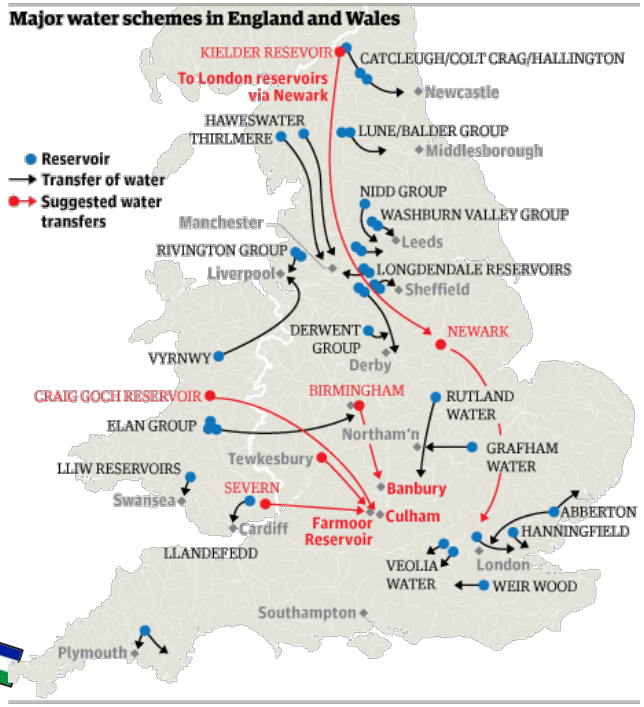
Water conservation - Aims to reduce the amount of water wasted.
Groundwater Management - Involves the monitoring of extracting groundwater. Laws can be introduced.
Recycling and 'Grey' Water - Means taking water that has already been used and using it again rather than returning it to a river or the sea. This includes water taken from bathrooms and washing machines.

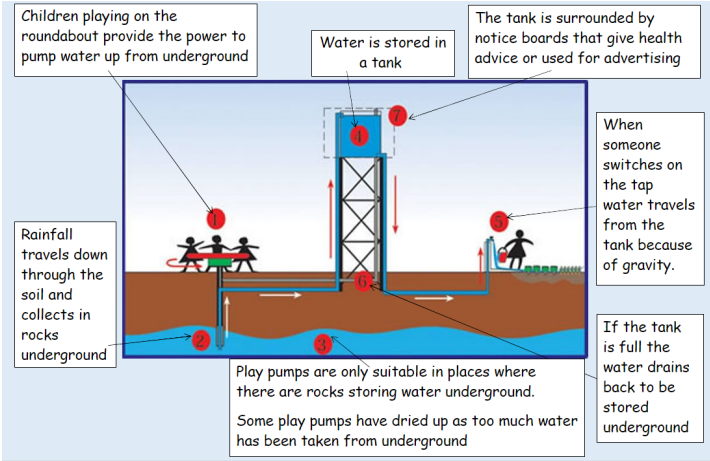
C.S. NEE - The Wakel River Basin

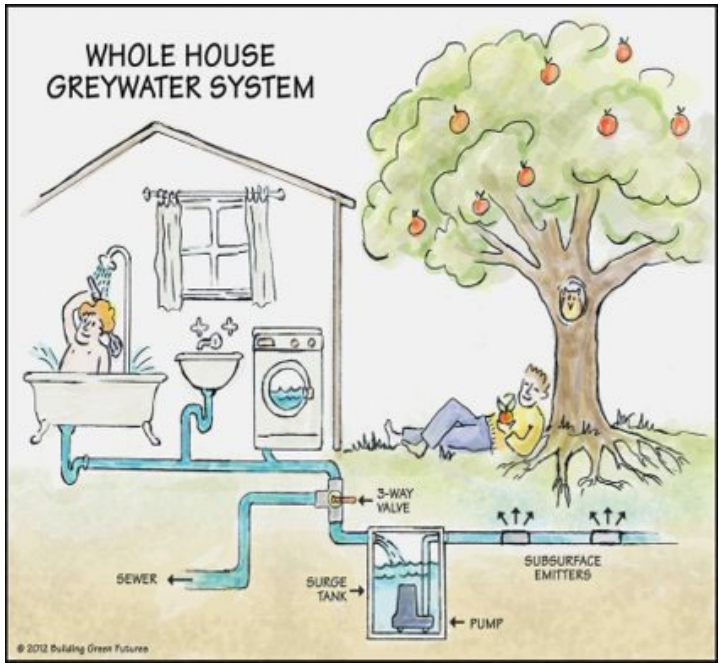
A project in India that aims to improve water use by encouraging greater use of rainwater harvesting techniques.

How does the project work?

- Provides 'taankas' that store water underground.
- Small dams called 'johed' interrupt water flow and encourages infiltration.
- Villages take turns to irrigate their fields, so water is not overused.
- Maintained by farmers so it is entirely sustainable.
- Greater education for awareness.







Jobs, Career Choices and Ambitions GCSE Foundation Tier Spanish Knowledge Organiser

Key Ideas

- Tus prácticas profesionales en una empresa
- Tus primeros trabajos
- Lo que vas a hacer después del instituto/ bachillerato
- Los empleos de tus padres
- Los empleos que te interesan y por qué
- Los empleos que no te interesan y por qué
- Tu trabajo ideal y por qué

Los verbos	
encontrar	to find
estar en paro	to be unemployed
ganar	to earn
llegar a ser	to become
obtener	to get, to obtain
trabajar	to work
triunfar	to triumph, to succeed

Los adjetivos	
aburrido/a	boring
agotador/a	tiring
agradable	pleasant
bien organizado/a	well organised
ruidoso/a	noisy
responsable	responsible
útil	useful
variado/a	varied

Key Vocabulary

Los sustantivos	
el camarero	waiter
el carnicero	butcher
el cocinero	cook
el dependiente	shop assistant
el empleado	employee, worker
el empleo	job, employment
la empresa	company
el enfermero	nurse
la entrevista	interview
el hombre de negocios	businessman
las horas de trabajo flexibles	'flexitime'
el ingeniero	engineer (civil, mechanical)
el jardinero	gardener
el jefe	boss
el paro	unemployment
las prácticas (profesionales)	work experience
el obrero	worker

Key Phrases	
He decidido que me gustaría ser...	I've decided that i would like to be...
Me gustaría trabajar como/ser...	I'd like to work as/to become...
Me llevo bien con...	I get along well with...
Mi padre es/mi madre es...	My dad is/my mum is...
Antes, él/ella soñaba con convertirse en...	Before, he/she used to dream of becoming...
en el extranjero	abroad
Él/ella está en paro.	He/she is unemployed.
Me gusta cuidar pacientes/ enfermos.	I like to look after patients/ill people.
Me gusta trabajar con niños/ animales.	I like to work with children/ animals.
Sería/el trabajo sería...	I would be/the work would be...
La ventaja de este trabajo es que está bien pagado.	The advantage of this job is that it is well paid.
El inconveniente de este trabajo es que está mal pagado.	The disadvantage of this job is that it is badly paid.

Infinitivo	Presente	Pasado (Pretérito)	Futuro
hacer – to do	yo hago ; él/ella hace ; nosotros/as hacemos	yo hice ; él/ella hizo ; nosotros/as hicimos	yo haré ; él/ella hará ; nosotros/as haremos
ser – to be	yo soy ; él/ella es ; nosotros/as somos	yo era ; él/ella era ; nosotros/ as éramos	yo seré ; él/ella será ; nosotros/ as seremos
estar- to be	yo estoy ; él/ella está ; nosotros/as estamos	yo estuve ; él/ella estuvo ; nosotros/as estuvimos	yo estaré ; él/ella estará ; nosotros/as estaremos
tener – to have	yo tengo ; él/ella tiene ; nosotros/as tenemos	yo tuve ; él/ella tuvo ; nosotros/as tuvimos	yo tendré ; él/ella tendrá ; nosotros/as tendremos
ir- to go	yo voy ; él/ella va; nosotros/as vamos	yo fui ; él/ella fue ; nosotros/ as fuimos	yo iré ; él/ella irá ; nosotros/ as iremos
trabajar- to work	Yo trabajo; él/ella trabaja; nosotros/as trabajamos	yo trabajé ; él/ella trabajó ; nosotros/as trabajamos	yo trabajaré ; él/ella trabajará ; nosotros/as trabajaremos

Jobs, Career Choices and Ambitions GCSE Foundation Tier Spanish Knowledge Organiser

Key Questions	
1. ¿Has hecho prácticas profesionales?	Have you done work experience?
2. ¿Tienes un trabajo a tiempo parcial?	Do you have a part-time job?
3. ¿Has trabajado alguna vez?	Have you already worked?
4. Describe los trabajos de tus padres	Describe your parents' jobs.
5. ¿Cuál es tu trabajo ideal?	What is your ideal job?
6. ¿Te gustaría trabajar en el extranjero?	Would you like to work abroad?
7. ¿Qué te gustaría hacer en el futuro y por qué?	What would you like to do in the future and why?

Useful Grammatical Structures

- **Personalise** the opinions of others, e.g. según él/ella (according to him/her); piensa que (he/she thinks that); en su opinion (in his/her opinion).
- **Omit the article** when saying which job you do, e.g. mi padre es camarero (my dad is a waiter;) me gustaría convertirme en actriz (I would like to become an actress).
- Be clear as to the differences between **male and female jobs**. Most jobs only change the article and the ending (o/a), e.g. el profesor/la profesora). However, be careful as there are a few irregular ones, e.g. actor/actriz.
- Use the **future tense** to express future plans. Use the immediate future (ir+ a + infinitive), e.g. voy a trabajar en una tienda (I am going to work in a shop) ; or form the future tense by using the infinitive of the verb plus the following endings: yo trabajar**é**, tu trabajar**ás**, él/ella trabajar**á**, nosotros/as trabajar**emos**, vosotros/as trabajar**eis**, ellos/as trabajar**án**.
- Use **comparatives**: más que... (more than); menos que (less than) ; igual de.... que (as..... as).

Tricky Spellings		
el dependiente	shop assistant	Check the word doesn't become anglicised
útil	useful	Check the accent

Tricky Pronunciation	Practise these with your teacher!
el jefe	boss
las prácticas (profesionales)	work experience

Jobs, Career choices and Ambitions: GCSE Higher Tier Spanish Knowledge Organiser

Key Ideas

- Tus prácticas profesionales en una empresa
- Tus primeros trabajos
- Algún trabajo a tiempo parcial que has tenido
- Lo que harás después del instituto/bachillerato
- Tu trabajo ideal y por qué
- Los empleos de tus padres
- Los empleos que te interesan/ no te interesan y por qué

Key Vocabulary

Los sustantivos	
el abogado	lawyer, solicitor
el albañil	brick-layer, building worker
la azafata	flight attendant
el bombero	firefighter
el carpintero	joiner, carpenter
el cartero	postman
el contable	accountant
el encargado	person in charge
la expectativa	hope, prospect
el gerente	manager
el granjero	farmer
el horario	hours of work
los jóvenes	young people
el permiso de conducir	driving licence
la solicitud	(job) application
el sueldo	wages, salary

Los verbos	
conseguir	to reach
desear	to wish
expresar	to express
provocar	to cause
sobrellevar	to cope
superar	to overcome

Los adjetivos	
agotador/a	tiring
bajo presión	under pressure
exigente	demanding
gratificante	rewarding
molesto/a	annoying
variado/a	varied

Key Phrases

He decidido que me gustaría ser...	I've decided that i would like to be...
He elegido/he decidido... + infinitive	I've chosen to/i've taken the decision to...
Este tipo de trabajo me agrada/me agradó.	This type of work pleases me/pleased me.
Mi sueño era convertirme en...	My dream was to become...
Él/ella trabaja muchas horas.	He/she does long hours.
Él/ella está en paro.	He/she is unemployed.
Antes, él/ella soñaba con convertirse en...	Before, he/she used to dream of being...
me sentí...	I felt...
en el extranjero	abroad
Este trabajo me daría la oportunidad... de+ infinitive	This work would give me the opportunity to...
estás de pie todo el rato.	you are always on your feet.
Sería/el trabajo sería...	I would be/the work would be...
La ventaja/inconveniente de este trabajo es que está bien/ mal pagado.	The advantage/disadvantge of this profession is that it is well/badly paid.

Key Verbs

Infinitivo	Presente	Pasado	Futuro	Condicional	Imperfecto
hacer – to do	yo hago ; él/ella hace ; nosotros/as hacemos	yo hice; él/ella hizo ; nosotros/as hicimos	yo haré ; él/ella hará ; nosotros/as haremos	yo haría ; él/ella haría ; nosotros/as haríamos	yo hacía; él/ella hacía ; nosotros/as hacíamos
ser – to be	yo soy ; él/ella es ; nosotros/as somos	yo era; él/ella era ; nosotros/as éramos	yo seré ; él/ella será ; nosotros/as seremos	yo sería ; él/ella sería ; nosotros/as seríamos	yo era ; él/ella era ; nosotros/as éramos
estar - to be	yo estoy ; él/ella está ; nosotros/as estamos	yo estuve; él/ella estuvo ; nosotros/as estuvimos	yo estaré ; él/ella estará ; nosotros/as estaremos	yo estaría ; él/ella estaría ; nosotros/as estaríamos	yo estaba; él/ella estaba; nosotros/as estábamos
tener - to have	yo tengo ; él/ella tiene ; nosotros/as tenemos	yo tuve; él/ella tuvo ; nosotros/as tuvimos	yo tendré ; él/ella tendrá ; nosotros/as tendremos	yo tendría ; él/ella tendría ; nosotros/as tendríamos	yo tenía; él/ella tenía ; nosotros/as teníamos
ir - to go	yo voy ; él/ella va ; nosotros/as vamos	yo fui; él/ella fue ; nosotros/as fuimos	yo iré ; él/ella irá; nosotros/as iremos	yo iría ; él/ella irías ; nosotros/as iríamos	yo iba; él/ella iba ; nosotros/as íbamos
trabajar - to work	Yo trabajo; él/ella trabaja; nosotros/as trabajamos	yo trabajé ; él/ella trabajó ; nosotros/as trabajamos	yo trabajaré ; él/ella trabajará ; nosotros/as trabajaremos	yo trabajaría ; él/ella trabajaría; nosotros/as trabajaríamos	yo trabajaba ; él/ella trabajaba ; nosotros/as trabajábamos

Jobs, Career choices and Ambitions: GCSE Higher Tier Spanish Knowledge Organiser

Key Questions

¿Has hecho prácticas profesionales?	Have you done work experience?
¿Tienes un trabajo a tiempo parcial?	Do you have a part-time job?
¿Has trabajado alguna vez?	Have you already worked?
Describe los trabajos de tus padres	Describe your parents' jobs.
¿Cuál es tu trabajo ideal?	What is your ideal job?
¿Te gustaría trabajar en el extranjero?	Would you like to work abroad?
¿Qué te gustaría hacer en el futuro y por qué?	What would you like to do in the future and why?

False Friends

estar de pie	standing, on your feet
provocar	to cause
las prácticas (profesionales)	work experience
bajo presión	under pressure

Useful Grammatical Structures

- **Personalise** the opinions of others, e.g. según él/ella (according to him/her); piensa que (he/she thinks that); en su opinion (in his/her opinion).
- **Omit the article** when saying which job you do, e.g. mi padre es camarero (my dad is a waiter;) me gustaría convertirme en actriz (I would like to become an actress).
- Be clear as to the differences between **male and female jobs**. Most jobs only change the article and the ending (o/a), e.g. el profesor/la profesora). However, be careful as there are a few irregular ones, e.g.actor/actriz.
- Use the **future tense** to express future plans. Use the immediate future (ir+ a + infinitive), e.g. voy a trabajar en una tienda (I am going to work in a shop) ; or form the future tense by using the infinitive of the verb plus the following endings: yo trabajar**é**, tu trabajar**ás**, él/ella trabajar**á**, nosotros/as trabajar**emos**, vosotros/as trabajar**eis**, ellos/as trabajar**án**.
- Use **comparatives**: más que... (more than); menos que... (less than) ; igual de.... que (as... as).

Tricky Pronunciation

Practise these with your teacher!

bajo presión	under pressure
gratificante	rewarding
el horario	hours of work

Tricky Spellings

sobrellevar	to cope

Social Issues GCSE Foundation Tier French Knowledge Organiser

Key Ideas

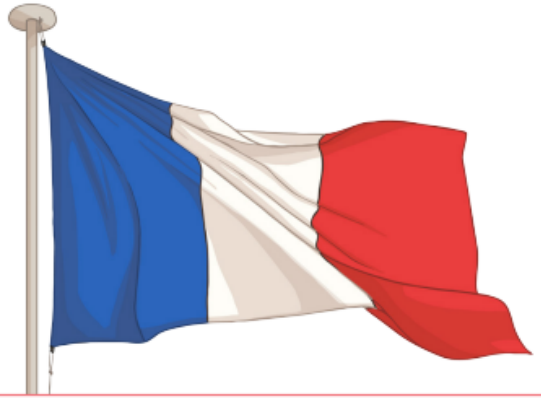
- Description d'une alimentation saine/malsaine
- Les dangers de la cigarette/de l'alcool
- L'importance du sport pour la santé
- Les sans-abris dans ta ville
- Une association caritative que tu connais

Key Vocabulary

Les noms	
l'alcool (m)	alcohol
l'alimentation (f)	food
l'association caritative (f)	charity
le bonheur	happiness
la drogue	drugs
l'égalité	equality
la forme	fitness
la maladie	illness
les matières grasses (f)	fats
l'obésité (f)	obesity
l'odeur (f)	smell
le repas	meal
la santé	health
les sans-abris (m)	homeless people
le sommeil	sleep
le tabac	tobacco
le travail bénévole	voluntary work

Les adjectifs	
équilibré(e)	balanced
fatigué(e)	tired
gras(se)	fatty
malade	ill
malsain(e)	unhealthy
sain(e)	healthy
sucré(e)	sugary
varié(e)	varied

Les verbes	
(s)arrêter	to stop
combattre	to combat
se détendre	to relax
dormir	to sleep
se droguer	to take drugs
éviter	to avoid
faire un régime	to be on a diet
fumer	to smoke
rester	to stay
se sentir	to feel
tuer	to kill



Key Phrases	
Pour le petit-déjeuner/le déjeuner/le dîner, d'habitude, je prends...	For breakfast/lunch/dinner, I usually have...
C'est bon/mauvais pour la santé	It's good/bad for your health
Ça contient beaucoup/trop de...	It contains a lot of/too much...
Pour garder la forme, il faut faire/manger/boire/éviter...	To keep fit, you have to do/eat/drink/avoid...
Le tabac/L'alcool cause...	Tobacco/Alcohol causes...
Il provoque l'obésité/une perte de poids/un gain de poids	It causes obesity/weight loss/weight gain
Mon oncle a arrêté de fumer il y a six mois	My uncle quit smoking six months ago
Il faut faire du sport régulièrement pour se détendre	You must play sport regularly to relax
Il y a beaucoup de sans-abris dans ma ville	There are many homeless people in my town
Je suis membre d'une association caritative qui s'appelle...	I am a member of a charity called...

Key Verbs

Infinitif	Présent	Passé	Futur
faire – to do	je fais; il/elle fait; nous faisons	j'ai fait; il/elle a fait; nous avons fait	je ferai; il/elle fera; nous ferons
être – to be	je suis; il/elle est; nous sommes	j'ai été; il/elle a été; nous avons été	je serai; il/elle sera; nous serons
avoir – to have	j'ai; il/elle a; nous avons	j'ai eu; il/elle a eu; nous avons eu	j'aurai; il/elle aura; nous aurons
manger – to eat	je mange; il/elle mange; nous mangeons	j'ai mangé; il/elle a mangé; nous avons mangé	je mangerai; il/elle mangera; nous mangerons
aller – to go	je vais; il/elle va; nous allons	je suis allé(e); il/elle est allé(e); nous sommes allé(e)(s)	j'irai; il/elle ira; nous irons
fumer – to smoke	je fume; il/elle fume; nous fumons	j'ai fumé; il a fumé; elle a fumé; nous avons fumé	je fumerai; il/elle fumera; nous fumerons
dormir – to sleep	je dors; il/elle dort; nous dormons	j'ai dormi; il a dormi; elle a dormi; nous avons dormi	je dormirai; il/elle dormira; nous dormirons

Key Questions
Que faut-il faire pour garder la forme ?
As-tu une alimentation saine ? Pourquoi (pas) ?
Est-ce que tu fumes ? Pourquoi (pas) ?
Quels sont les dangers de la cigarette/de l'alcool ?
Selon toi, pourquoi est-ce que c'est important de faire du sport ?
Que penses-tu de la situation des sans-abris ?
Est-ce que tu connais des associations caritatives ?

False Friends	
la fumée	smoke
le médecin	doctor
le travail	work
garder	to keep
rester	to stay

Tricky Pronunciation	
Practise these with your teacher!	
l'alcool	alcohol
l'alimentation	food
l'association caritative	charity
le sommeil	sleep
le tabac	tobacco
le travail bénévole	voluntary work
équilibré(e)	balanced
fumer	to smoke
trop	too (much/many)

Useful Grammatical Structures

- Use **modifiers** to modify an adjective.
  Examples include: assez **(quite)**; plutôt **(rather)**; un peu **(a bit)**.
- Use **intensifiers** to intensify an adjective.
  Examples include: vraiment **(really)**; très **(very)**; particulièrement **(particularly)**; totalement **(totally)**; complètement **(completely)**; si **(so)**.
- Use **comparatives** to compare two or more items.
  Examples include: plus/moins/aussi sain que... **(more/less/as healthy as...)**
- Use **connectives and conjunctions** to make longer sentences.
  Examples include: parce que **(because)**; car **(as/because)**; mais **(but)**; cependant **(however)**; quand **(when)**.
- Use a range of **negatives**.
  Examples: je ne mange pas de viande **(I don't eat meat)**; je ne mange plus de chocolat **(I no longer eat chocolate)**; je ne bois jamais de coca **(I never drink coke)**.
- Use the **perfect tense with avoir or être** to describe past events.
  Examples include: je suis allé(e) **(I went)**; j'ai mangé **(I ate)**; j'ai fait **(I did)**; j'ai travaillé **(I worked)**; j'ai bu **(I drank)**; j'ai aidé **(I helped)**.
- Use the **future tense** to describe future intentions.
  Examples include: je mangerai moins de chocolat **(I will eat less chocolate)**.

Tricky Spellings		
l'alcool	alcohol	No 'h'
équilibré(e)	balanced	Check the accents
nous mangeons	we eat	Remember to add 'e' before the ending

Jobs, Career Choices and Ambitions: GCSE Foundation Tier French Knowledge Organiser

Key Ideas

- Ton stage en entreprise
- Ton petit boulot
- Ce que tu vas faire après le collège
- Les emplois de tes parents
- Les emplois qui t'intéressent et pourquoi
- Les emplois qui ne t'intéressent pas et pourquoi
- Ton métier idéal et pourquoi

Key Vocabulary

Les verbes	
devenir	to become
gagner	to earn
nettoyer	to clean
quitter	to leave
rêver	to dream
travailler	to work

Les adjectifs	
agréable	pleasant
bien organisé(e)	well-organised
bruyant(e)	noisy
ennuyeux/ennuyeuse	boring
fatigant(e)	tiring
responsable	responsible
utile	useful
varié(e)	varied

Les noms	
l'avenir (m)	future
le bureau	office
la carrièr	career
le commerc	business
l'étudiant (m)	male student
l'étudiante (f)	female student
le facteur/la factrice	postman/postwoman
la femme/l'homme (m) au foyer	housewife/househusband
l'instituteur (m)/l'institutrice (f)	primary school teacher
le/la mannequin	model
la mode	fashion
le patron / la patronne	boss
le permis de conduire	driving licence
le stage work	placement
le travail	work
l'usine (f)	factory
le vendeur/la vendeuse	shop assistant

Key Phrases	
J'ai décidé que je voudrais être...	I've decided that I would like to be...
Je voudrais devenir/travailler comme...	I'd like to become/to work as...
Je m'entends bien avec...	I get along well with...
Mon père est/Ma mère est...	My dad is/My mum is...
Avant, il/elle rêvait d'être...	Before, he/she used to dream of becoming...
en plein air	in the fresh air
à l'intérieur/à l'extérieur	inside/outside
à l'étranger	abroad
Les heures sont longues	The hours are long
Il est/Elle est au chômage	He/she is unemployed
J'aime soigner les malades	I like to look after patients/ill people
J'aime travailler avec les enfants/les animaux	I like to work with children/animals
Je serais/Le travail serait...	I would be/The work would be...
L'avantage de ce métier, c'est que c'est bien payé	The advantage of this profession is that it is well paid
L'inconvénient de ce métier, c'est que c'est mal payé	The disadvantage of this profession is that it is badly paid

Key Verbs

Infinitif	Présent	Passé	Futur
aller – to go	je vais ; il / elle va ; nous allons	je suis allé(e) ; il est allé; elle est allée ; nous sommes allé(e)s	j'irai; il / elle ira ; nous irons
devenir – to become	je deviens ; il / elle devient ; nous devenons	je suis devenu(e) ; il est devenu ; elle est devenue ; nous sommes devenu(e)s	je deviendrai ; il / elle deviendra ; nous deviendrons
être – to be	je suis ; il / elle est ; nous sommes	j'ai été ; il / elle a été ; nous avons été	je serai ; il / elle sera ; nous serons
faire – to do	je fais ; il / elle fait ; nous faisons	j'ai fait ; il / elle a fait ; nous avons fait	je ferai ; il / elle fera ; nous ferons
travailler – to work	je travaille ; il / elle travaille ; nous travaillons	j'ai travaillé ; il / elle a travaillé ; nous avons travaillé	je travaillerai ; il / elle travaillera ; nous travaillerons

Key Questions	
Tu as fait un stage en entreprise ?	Have you done work experience?
Tu as un petit boulot ?	Do you have a part-time job?
Tu as déjà travaillé ?	Have you already worked?
Décris les emplois de tes parents.	Describe your parents' jobs.
Quel est ton emploi idéal ?	What is your ideal job?
Tu voudrais travailler à l'étranger ?	Would you like to work abroad?
Que voudrais-tu faire à l'avenir ?	Pourquoi ? What would you like to do in the future and why?

False Friends	
la mode	fashion
le stage	work experience
le travail	work
travailler	to work

Tricky Pronunciation	
Practise these with your teacher!	
bruyant(e)	noisy
est/c'est	is/it is
travailler	to work
l'emploi (m)	job
soigner	to look after

Useful Grammatical Structures

- **Personalise** the opinions of other people, e.g. **selon lui/elle** (according to him/her); **il/elle pense que** (he/she thinks that); **à son avis** (in his/her opinion).
- **Omit the article** when saying which job you do, e.g. **mon père est serveur** (my dad is a waiter); **je voudrais devenir actrice** (I would like to become an actress).
- Be clear on the differences between **male and female jobs**, e.g. **acteur/actrice** ; **musician/musicienne** ; **boucher/bouchère** ; **coiffeur/coiffeuse**.
- Use **the future tense** to express future plans. Use the immediate future (aller + infinitive), e.g. **je vais jouer**, **il va jouer**, **elle va jouer**, **nous allons jouer**, **ils/elles vont jouer** ; or form the future tense by using the infinitive of the verb plus the following endings: je jouer**ai**, il jouer**a**, elle jouer**a**, nous jouer**ons**, ils/elles jouer**ont**.
- Use **comparatives**, e.g. **plus que** (more than); **moins que** (less than); **aussi ... que** (as ... as).

Key Phrases		
à l'étranger	abroad	Check the accents/apostrophes.
déjà	already	Check the accents.
les emplois (m)	jobs	Check the word doesn't become anglicised.
je deviendrai	I will become	Check the vowels.
il/elle rêvait d'être	he/she used to dream of being	Check the accents/apostrophes.

German Knowledge Organiser

Key Ideas

- Ein gesunder/ungesunder Lebensstil
- Die Gefahren des Rauchens/Alkohols
- Was muss man machen, um fit zu sein?
- Die Freiwilligenarbeit im Ausland
- Die Wohltätigkeit

Die Substantive	
der Alkohol	alcohol
die Ernährung	food, nutrition, nourishment
die Wohltätigkeit	charity
die Krankheit	illness
die Drogen (pl)	drugs
die Gleichheit	equality
der Krebs	cancer
das Krankenhaus	hospital
das Fett	fat
die Fettleibigkeit	obesity
der Geruch	smell
der Unfall	accident
die Gesundheit	health
die Leber	liver
der Drogenhändler	drug dealer
das Heim	home
die Wohltätigkeit	charity
der/die Drogensüchtige	drug addict
die Freiwilligenarbeit	voluntary work

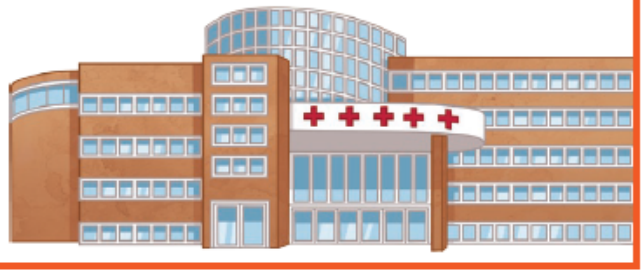
Key Vocabulary

Key Phrases	
Zum Frühstück/Mittagessen/Abendessen esse ich normalerweise...	For breakfast/lunch/dinner, usually, I have...
Das ist gut/schlecht für die Gesundheit	It's good/bad for your health
Das enthält zu viel/wenig...	It contains too much/too little...
Um fit zu bleiben, muss man ... essen/trinken/vermeiden	To keep fit, you have to eat/drink/avoid...
Ein hoher Alkoholkonsum...	A high consumption of alcohol
...führt zur Fettleibigkeit	...leads to obesity
Mein Onkel hat auf das Rauchen verzichtet	My uncle has stopped smoking
Um sich zu entspannen, muss man regelmäßig Sport treiben	You must do sports regularly to relax
Ich spende Geld an Hilfsorganisationen	I donate money to relief organisations
Ich arbeite mit ... an einem Wohltätigkeitsprojekt zusammen	I am working together with ... at a charity project
Ich will in Afrika arbeiten	I want to work in Africa
Es ist mir sehr wichtig, anderen Menschen zu helfen	It is very important for me to help other people
Ich will mich sozial engagieren	I want to get involved in community/social projects

Die Verben	
entspannen (sich)	to relax
gewinnen	to win
halten	to hold, to keep
helfen	to help
rauchen	to smoke
schmerzen haben	to have an ache
sorgen für	to care for
spenden	to donate
sterben	to die
weh tun	to hurt
zunehmen	to increase/to put on weight

Infinitiv	Präsens	Perfekt	Futur
rauchen – to smoke	ich rauche; du rauchst; er raucht; sie raucht; wir rauchen	ich habe geraucht; du hast geraucht; er hat geraucht; wir haben geraucht	ich werde rauchen; du wirst rauchen; er wird rauchen; sie wird rauchen; wir werden rauchen
spielen – to play	ich spiele; du spielst; er spielt; sie spielt; wir spielen	ich habe gespielt; du hast gespielt; er hat gespielt; sie hat gespielt; wir haben gespielt	ich werde spielen; du wirst spielen; er wird spielen; sie wird spielen; wir werden spielen
essen – to eat	ich esse; du isst; er isst; sie isst; wir essen	ich habe gegessen; du hast gegessen; er hat gegessen; sie hat gegessen; wir haben gegessen	ich werde essen; du wirst essen; er wird essen; sie wird essen; wir werden essen
trinken – to drink	ich trinke; du trinkst; er trinkt; sie trinkt; wir trinken	ich habe getrunken; du hast getrunken; er hat getrunken; sie hat getrunken; wir haben getrunken	ich werde trinken; du wirst trinken; er wird trinken; sie wird trinken; wir werden trinken

Die Adjektive	
anonym	anonymous
betrunken	drunk
fettig	fatty
fettleibig	obese
freiwillig	voluntarily
gesund	healthy
hilflos	helpless
menschlich	human, humane
schädlich	damaging
süchtig	addicted



Key Questions	
Was machst du, um fit zu bleiben?	What do you do to keep fit?
Bist du gesund?	Are you healthy?
Rauchst du? Trinkst du Alkohol? Warum/Warum nicht?	Do you smoke/drink? Why/Why not?
Was sind die negativen Auswirkungen des Alkoholkonsums/Drogenkonsums?	What are the negative effects of alcohol/drug consumption?
Warum ist es wichtig, fit zu sein?	Why is it important to keep fit?
Möchtest du freiwillig arbeiten?	Would you like to do volunteer work?

False Friends	
spenden	to donate
der Rat	advice

Useful Grammatical Structures

Introduce your opinions using set conjunctional adverbs. Examples include: **einerseits** (on the one hand); **andererseits/auf der anderen Seite** (on the other hand).

Einerseits kann man Alkohol geniessen, ohne abhängig zu werden (On the one hand, you can enjoy alcohol without becoming addicted).

Auf der anderen Seite braucht man keinen Alkohol, um cool/lustig zu sein (On the other hand, you don't need alcohol to be cool/fun).

Use **adjectives** (with the correct ending) to give more detail about key ideas. Examples include: **ein hoher/regelmäßiger/beschränkter Drogenkonsum/Alkoholkonsum** (a high/regular/limited consumption of drugs/alcohol).

Use **more sophisticated opinion structures**. Examples include. **Meiner Meinung nach/Meiner Ansicht nach/Soweit ich sehe/Was mich angeht** (in my opinion/as far as i can see/as far as i'm concerned) + verb + conjunction/subordinating conjunction.

Use the subordinating conjunction **wenn** to introduce reasons. Remember to put the verb to the end.

Wenn man zu viel isst/Alkohol trinkt/raucht, kann man übergewichtig/süchtig werden (when you eat/drink too much alcohol/smoke too much you can become overweight/addicted).

Tricky Spellings	
freiwillig (voluntarily)	Note the double use of l.
das Frühstück (breakfast)	Pay attention to the double use of ü.
der Geruch (smell)	Pay attention to the pronunciation of uch.

Tricky Pronunciation	
Practise these with your teacher!	
Wohltätigkeit (charity)	Pay attention to the ä sound.
enthält (contains)	Pay attention to the ä sound.
Fettleibigkeit (obesity)	Pay attention to th ei sound.