KNOWLEDGE ORGANISER BOOKLET

YEAR 9 - Spring

Contents

Instructions for Use

For all of your subjects, there are certain **facts** that you **need** to know in order for you to best understand the content you study in lessons.

In this booklet are **Knowledge Organisers** for each subject, which contain the core concepts that you have to know to be successful in your lessons.

How to use this Knowledge Organiser:

Look: read a specific section of the *Knowledge Organiser*.

Cover: cover it over or put it to one side;

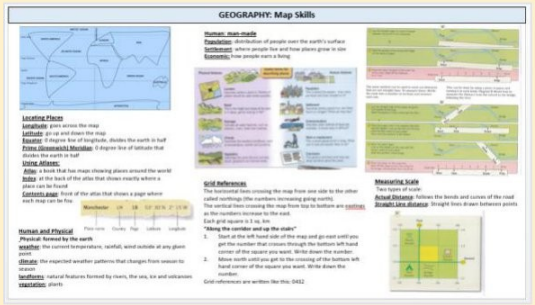
Write: from memory, write out as much of the information as you can remember for that section;

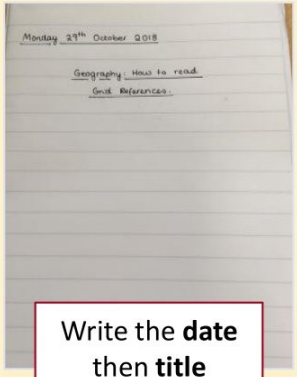
Check: check back with the *Knowledge Organiser*. Anything missing or incorrect, add in green pen;

Review: information you didn't recall the first time by using different format, such as repeating the process or creating your own *flashcards* to revise from.

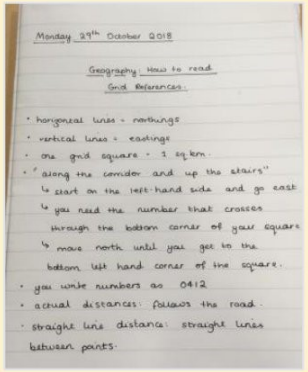
Instructions for Use: Example

1. **LOOK:** carefully read the section of the *Knowledge Organiser* which you are learning.
2. **COVER:** cover it over or put it to one side
3. **WRITE:** write out as many details as you can from memory.
4. **CHECK:** check back over your answer with the *KO*. Anything which is missing or incorrect, add in green pen.
5. **REVIEW:** if you had significant gaps or parts you didn't understand, repeat the process from Step 1.





Write the **date** then **title** (**subject: focus**)



Sparx Maths

We do not have a knowledge organiser for Maths. This is because the best way to remember and understand mathematics is to practice it. We use the **Sparx Maths** online platform to provide our students plenty of opportunities for practise and to develop their mathematical knowledge.

What should we do each week?

Complete all of your compulsory section of **Sparx** homework and get it 100% correct. Don't worry, there are videos to help if you get stuck.

How long should it take?

Sparx will adjust your homework, so it will take about 1 hour to complete. If you find yourself taking longer than this, you should ask your teacher for support on the topics you find most challenging.

What if I get stuck?

You can watch the videos, ask a friend or parent, or your teacher, in person or by email.

Why do I get different questions to my friends?

Sparx creates custom homework just for you - because you are an individual. This means your maths homework is designed around your ability and constantly challenges you to make improvements.

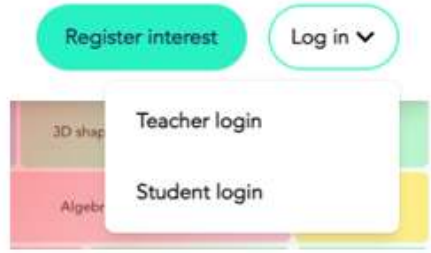
Why do I have to get 100%

We believe you deserve the chance to do really well in Maths. Students who complete all the questions on **Sparx** learn more and get better results. You can also earn rewards.

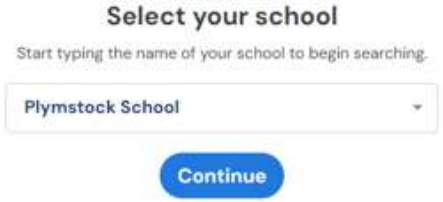
Sparx Maths

Logging into Sparx Maths

- Visit sparxmaths.com and click log in



- Select your school from the drop-down menu



- Log in using your Sparx Maths username and password

  Or

- Log into Sparx using Microsoft. This will give you option to use your usual school log in to Sparx Maths.

  Make sure you remember to add **@plymstockschool.org.uk** to your username

'Bayonet Charge' – Knowledge Organiser

What happens in the poem? The poem starts mid-action with a soldier charging towards the enemy with a bayonet attached to his rifle - it is exhausting, disorienting and overwhelming. In the heat of battle, the soldier realises he is no longer motivated by patriotism. The soldier is suddenly confused: if he's not there for patriotism, why is he fighting? He reflects on how he is there because of the decisions of others: he's a cog in a machine. He briefly pauses in his charge as he realises this. However, the soldier is shaken from his reflection by the danger to him: his instincts take over and charges towards the enemy because the only thing he cares about now is surviving (by killing).

What is the context of the poem?

- Ted Hughes was inspired to write the poem by World War 1 (his father fought in it and Hughes admired the poetry of WW1 poets such as Wilfred Owen.
- There were strong feelings of patriotism at the start of WW1: men queued up to fight. Many expected the war to be over in just a few months.
- However, the war lasted from 1914-18 and conditions were horrific.
- Nearly a million British personnel died in the war.

What is the significance of the title? The poem describes the experience of being in a bayonet charge (and considers the thoughts and feelings a soldier might have).

What are the central ideas in this poem?

- The battlefield is a chaotic and overwhelming place.
- People might choose to fight because of patriotism or a sense of duty; however these are soon forgotten on the battlefield.
- On the battlefield, it is survival instinct that truly motivates people to fight.
- Soldiers on the battlefield are just pawns in the games of kings and governments.
- Even thoughtful, reflective individuals can become mindless killing machines when the survival instinct takes over.

Key Vocabulary	Definition	Example
Patriotic	Describing someone who loves or is proud of their country.	Many people _____ at the start of WW1: they were proud to fight for their country.
Overwhelmed	The feeling that there is much more than you can deal with.	If you let work pile up, it is easy to feel _____ because it becomes difficult to see how you will manage it all.
Disorientated	Confused about where you are or where you are going.	When walking through a maze, it is easy to become _____.
Bewilderment	Confusion.	If are confused about why we are doing something, we might experience _____.
Terror	Extreme fear.	If I saw a real ghost, I wouldn't just experience fear, I'd experience _____.
Survival instinct	The instinct in humans and animals to do things in a dangerous situation that will prevent them from dying.	It's amazing what we can do when we're threatened – once the _____ kicks in, we become more like animals.
Imagery	The use of words or phrases to create mental images.	In 'Bayonet Charge', the phrase 'his terror's touchy dynamite' is a very effective use of _____.

Key Quotes: 'cold clockwork of the stars and the nations.' 'dropped like luxuries' 'his terror's touchy dynamite'

Writer's Craft:	Explanation
How does the poet convey the chaos of battle in the first stanza?	By using a list of sensory detail (e.g. the dazzling guns, the loud noises, the exhaustion) as a single sentence. The poem also starts in the middle of the action which adds to the sense of chaos.
Why describe the sweat as 'like molten iron'?	Molten iron is incredibly hot; it suggests that his chest is burning (perhaps his lungs from the effort of charging); this sweat is what was once his 'patriotic tear'.
What is meant by 'the cold clockwork of the stars and the nations'?	Hughes presents the soldier as the second hand of a clock; a second hand has to move if the cog it is attached to moves: one cog turns another etc. The soldier is powerless: he's ended up where he is because of governments making decisions (turning cogs) which have led to him being where he is.
What is meant by 'king, honour, human dignity dropped like luxuries'?	Luxuries are things that are pleasant to have but not necessary; when you are fighting to survive luxuries are worthless; 'honour' and patriotism ('king') are 'dropped' on the battlefield because they are luxuries: only fighting and surviving matters.
What is meant by 'his terror's touchy dynamite'?	The soldier's survival instincts. Dynamite can explode, but it needs a spark; the soldier's survival instincts need the spark of danger to 'light the fuse'; terror is this spark and the suggestion is that he will 'explode' when he reaches the enemy.
How does Hughes use sentence length to present the soldier as feeling overwhelmed?	The first sentence doesn't end until part way through the second stanza. This means that the reader is given little pause and might struggle to take in everything that is happening: this mirrors the soldier's experience on the battlefield.
How does Hughes structure the poem to present the soldier's changing thoughts and feelings?	The poem starts in the middle of the action and the first stanza focuses on how overwhelming and chaotic it feels to be on a battlefield. The second stanza shows the soldier questioning why he is fighting and wondering if he is just a powerless cog in a machine. The third stanza shows the soldier's survival instincts kick in (causing him to abandon his deep thoughts).





For more revision of this poem', search for 'Bayonet Charge poemanalysis.com'

'London' – Knowledge Organiser

What happens in the poem? It's the late 1700s. The persona (Blake we might imagine) walks around the poor streets of London by the Thames river and comments on what he sees. What he sees is misery: in every face he looks at. He thinks about those who are especially powerless in this miserable city and how the powerful in society are responsible for their suffering: children work in dangerous conditions but the powerful church does nothing about this; kings and governments send soldiers off to die in their wars. In all the sounds of suffering that he hears he sees that people are metaphorically imprisoned, mental slaves. Although they are not physically trapped, they are trapped in their misery and slaves to the city or the powerful people within it.

What is the context of the poem?

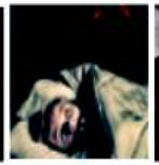
- The poem was written in the 1790s.
- London was (and is) the capital city of the United Kingdom.
- As a capital city, it is where the power is: it's where the king lives, it's where the government meets.
- London was at the centre of the rapidly-growing British Empire and was a place where extreme wealth could be found (as today).
- However, it was a place of extremes: it was also a place of extreme poverty (as today).

What is the significance of the title? The name 'London' connotes power because it is where the powerful make decisions that affect ordinary people; it hints at the idea of government control and the powerlessness of the individual.

What are the central ideas in this poem?

- London is a miserable and nightmarish place for the poor.
- People are trapped in lives of misery because they are powerless (or feel powerless) to make changes to their lives.
- The powerful don't care about the suffering of ordinary people.
- Childhood is destroyed by city life.

For more revision of this poem search for 'William Blake London Lit Charts'




Key Vocabulary	Definition	Example
Nightmarish	Extremely upsetting and very unpleasant or frightening.	The poem describes a dark and _____ world without hope.
Wealth	A large amount of money or valuable things that someone has.	It has been argued that some people have too much money and that _____ should be shared more evenly.
Poverty	The condition of being extremely poor.	In a city like London, it is possible to see great wealth but also great _____.
Freedom	1. The power or right to act, think or speak as you want. 2. The state of not being imprisoned or enslaved.	She gained her _____ after 10 years of imprisonment.
Slavery	The condition of being owned by someone and forced to do their work or obey them.	We often associate _____ with the past, but the sad truth is that there are people in this country who are 'owned' by criminal gangs.
Restriction	Something that limits your actions or movements.	There is a _____ on what you are allowed to do before you are 18.
Misery	Great unhappiness.	It wasn't just sadness that I saw when I visited the town; it was _____.
Woe	Extreme sadness.	I cried when I heard his story: it was such a tale of _____.
Repetition	Writing (or saying) something more than once in order to emphasise it.	The writer uses _____ of the word 'every'

Key Quotes: 'mind-forged manacles' 'chartered Thames' 'chimney-sweeper's cry'

Writer's Craft:	Explanation
Why does the title 'London' connote power and control?	London is the capital city: it is where the king is based and where government meets. It is where all the important decisions that affect ordinary people's lives are made.
How does the use of the word 'chartered' suggest a lack of freedom?	It means that there are rules and restrictions about how places can be used: the streets and the river are effectively owned. Describing the Thames in this was is interesting as we would normally associate nature with freedom.
What is Blake trying to emphasise through repetition of the word 'every'?	He's trying to make it clear that suffering is omnipresent (everywhere) in this part of London: it's not just one or two people in this miserable state. It suggests that it's a problem with society rather than individual people.
What is Blake trying to emphasise through repetition of the word 'cry'?	Cry can mean 'shout' but it can also mean to call out in pain. Repeating it suggests that pain is also omnipresent (everywhere) in this part of London.
What is Blake suggesting through the image of the mind-forged manacles?	He's suggesting that the people he sees are trapped in their misery through invisible slavery (the manacles (handcuffs) are in the mind rather than physically imprisoning them. It could be that they are 'slaves' because they are ordinary poor people without the power to change the system; it could be that they have been trained to think that this misery is a normal part of life and so can't even imagine trying to change anything.
What do the words 'cry', 'tear' and 'woe' have in common? What is Blake suggesting?	They are part of the semantic field of suffering (i.e. they are all words to do with suffering). Blake is making us constantly aware of how much suffering there is in London.
What does the metaphorical blood on the palace walls represent?	It symbolises the blood shed by soldiers who have fought in wars on behalf of the palace (i.e. the king and the government).
How does the end of the poem suggest that the misery will continue?	There is no hope mentioned. The next generation seem already 'infected' and cursed to suffer.

'My Last Duchess' – Knowledge Organiser

What happens in the poem? It's the 16th century and we're in a Duke's palace. The Duke is showing an emissary around. The emissary works for a Count and has come to negotiate the marriage of the Count's daughter to the Duke. The Duke stops at a painting of his former – now dead – wife (his last Duchess). The Duke uses this as an opportunity to show his irritation that his wife seemed to be too happy around other men and hints that she may have been unfaithful. He seems to think she should have only smiled and blushed for him. The Duke says that he gave orders and that the smiles stopped – hinting that he had her killed. The Duke then calmly moves on to discussing his next marriage.

What is the context of the poem?

- The poem is based on real life people (and rumours about them).
- The Duke in the poem is Duke Alfonso II who ruled Ferrara in Northern Italy; the Duchess is his wife, Lucrezia de Medici.
- The Duke's wife died in mysterious circumstances – there were rumours at the time that the Duke had her poisoned.
- Browning wrote the poem in the Victorian period.
- Although it set in the 16th century, the poem is seen by some as a criticism of Victorian values e.g. attitudes to women.

What is the significance of the title? The title shows the Duke's desire to possess ('my'); it also hints at the Duke's almost obsessive focus in the poem on his last Duchess.

What are the central ideas in this poem?

- Some people feel a need to dominate others.
- Powerful people can be immoral.
- Power can cause people to see other human beings as objects.
- Women have historically been treated as objects.
- Paranoia and jealousy can lead people to cruel acts.

For more revision of this poem, search for 'My Last Duchess Lit Charts'.




Key Vocabulary	Definition	Example
Dominate	To control someone or something (often in a negative way) because you have more power or influence.	It is not healthy for one person to _____ a relationship.
Obsession	Something or someone that you think about all the time.	The toy was his _____. He couldn't think of anything else.
Possessive	Not wanting to share someone's love and attention with anyone else.	The Duke is very _____ of the Duchess; he doesn't want anyone else to share her affection.
Status	Social rank; position in the hierarchy.	Being important matters to some people; to them, _____ can be worth more than money.
Superiority	One person or thing better or more important than another.	Some people look down on others and act with a sense of _____.
Omnipotent	All powerful.	According to Christian belief, God is _____.
Stoop	To bend the top half of the body forwards and down.	If you are very tall, you might have to _____ in a house with low ceilings.
Countenance	The appearance or expression of someone's face.	His countenance conveyed his fear.
Symbolise	To represent something else.	A sun might _____ light or happiness.
Diatribe	Another word for a rant.	The Duke's _____ about his last wife shows the level of his irritation.

Key Quotes: 'Notice Neptune though, / Taming a sea-horse' 'I choose / Never to stoop' 'I gave commands; / Then all smiles stopped together'

Writer's Craft:	Explanation
What's the effect of using 'my'?	It suggests possession, as if the Duchess belongs to the Duke.
Why does Browning include the detail about only the Duke opening the curtains?	The curtains are in front of the picture of the Duchess; this detail allows Browning to demonstrate the Duke's desire to dominate: he controls who sees his Duchess (in a way he couldn't when she was alive).
The poem is a dramatic monologue. How does this make the Duke seem controlling?	It makes it seem as though the Duke even wants to control the conversation as no-one else (e.g. the emissary) is allowed to speak.
The poem is written as a single stanza. How does this make the Duke seem dominating?	It gives the reader little pause from the Duke's speech; it is as if we are being dominated by his words.
The Duke says 'I choose never to stoop'. Why does Browning include this?	To stop means to bend down. The Duke sees himself as superior (more important than) other people and thinks he would be lowering himself to even tell the Duchess that he is disgusted with her.
It is hinted that the Duke kills his wife. Why has Browning included this detail?	This shows the Duke's obsession with control – he is so infuriated that he can't fully control his wife's physical responses (e.g. blushing) that he has her killed. It also shows how immoral the Duke is and how power can be abused.
What does the statue of Neptune taming a seahorse in this poem symbolise?	Neptune is the Roman god of the sea; a seahorse is a weak creature in comparison, but one that is wild. The statue symbioses how the Duke sees himself: as an almost omnipotent figure who has to tame his 'wild' wife (by killing her and then controlling who sees her blush by putting her portrait behind a curtain).
How does evidence about the Duke build up over the poem?	The reader's impression of the Duke builds up gradually. As the poem progresses, there is more and more evidence that he is controlling, jealous and paranoid. This builds to the dramatic hint that he had his wife killed because he was irritated her, followed by his quick switch to the topic of his next marriage. This shows him to be immoral and remorseless.

'Remains' – Knowledge Organiser

What happens in the poem? The speaker and two other soldiers are sent to tackle some looters who are robbing a bank. They open fire on a looter who is running away. The looter is seriously wounded He is carried away in the back of a lorry. The soldier has to walk past the blood stain left on the ground week after week. He returns home and is haunted by the memory of what he has done, reliving it again and again. He drinks and takes drugs in an attempt to forget what happened. However, he is unable to forget the looter and what he did. The memory remains stuck in his mind.

What is the context of the poem?

- Simon Armitage wrote 'Remains' (and other poems) for a Channel 4 programme called 'The Not Dead'.
- He has never been to war himself and has never been a soldier.
- To write the poems, he interviewed a number of soldiers who have survived war (in Iraq, Afghanistan, the Falklands etc.) i.e. the 'not dead'.
- The poems show the suffering soldiers experience long after wars have finished.
- 'Remains' is heavily based on the experience of Guardsman Tromans who fought in the Iraq war.
- Tromans shot a looter in Iraq and suffers from PTSD.

What is the significance of the title? The poem is about PTSD – in other words, how the traumatic experience of war REMAINS with the soldier. It could also refer to the human REMAINS – the image of the looter – that the soldier obsesses over so much as part of his PTSD.

What is a central idea in this poem? As is implied by the title, the poem explores the trauma experienced by soldiers and the terrible impact of PTSD on survivors long after the battle has ended.

What other ideas are explored in the poem?

- War can cause suffering beyond the battlefield.
- War is damaging.
- Guilt is powerful and can overwhelm us.
- War can result in us dehumanising the enemy.
- War can cause us to act in ways we later regret.
- Memory can have a powerful effect on us.

Key Vocabulary	Definition	Example
Traumatic	Causing severe and lasting emotional shock or pain.	Being involved in war is deeply disturbing and a highly _____ experience.
PTSD (post-traumatic stress disorder)	This is an anxiety **disorder** caused by very stressful, frightening or distressing events. Someone with this often relives the **traumatic** event through nightmares and flashbacks, and may experience feelings of isolation, irritability and guilt.	The soldier in 'Remains' is suffering from _____.
Guilt	A feeling of worry or unhappiness that you have because you have done something wrong.	The soldier struggles to come to terms with the _____ he feels over shooting the looter.
Haunt	To revisit again and again.	The memory of the shooting _____ the soldier.
Dehumanisation	To treat people as less than human.	It can be argued that the soldiers in 'Remains' _____ the looter by treating him with so little respect.
Dramatic monologue	A poem made up of a single *character* speaking (i.e. the poet is very clearly writing as someone else).	'Remains' is a _____ because Armitage is writing as someone else and there is only one speaker in the poem.

Writer's Craft:	Example
Why is the poem written as a dramatic monologue?	To explore a traumatised soldier's thoughts and feelings; because the poem was produced following an interview with a soldier.
Why does Armitage use colloquial language?	To create a convincing voice – an ordinary person/soldier; to contribute to the almost matter-of-fact tone in the first half of the poem.
What does the first/second half focus on? What is the turning point?	First half: the shooting; second half: the emotional impact on the soldier. Turning point = 'End of story, except not really.'
Why is the shooting described with graphic imagery?	To convey the brutality; to show what has traumatised the soldier; because it's so vivid in the soldier's mind.
Why is the blood on the street described as a 'blood shadow'?	Shadow = dark imagery – connotations of death and misery; the shooting has cast a shadow over his life; a shadow follows you around
What does the imagery 'dug in behind enemy lines' suggest?	To the looter, the soldier is the enemy; the soldier's mind is enemy territory. The looter is in the soldier's mind, so this is 'behind enemy lines'. 'Dug in' means well defended and prepared for attack – this suggests that the memory of the looter is difficult to remove; 'dug in' is a military term, suggesting that the war/conflict is still going on for the soldier.
What impression does the final stanza leave us with and what is meant by 'bloody hands'?	It leaves us with the impression that the pain will be ongoing – there seems little hope of an end as the looter is still 'here and now'. 'Bloody' can suggest frustration (swearing), but 'to have blood on your hands' also means to be responsible for an act of violence against someone i.e. to be guilty of something.



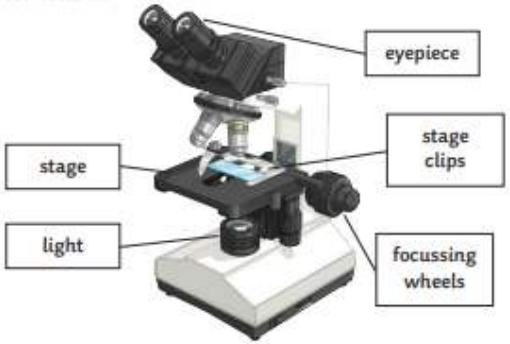

For more revision of 'Remains', search for 'Remains BBC Revision'.

Cell Biology Knowledge Organiser – Foundation and Higher

Required Practical

Microscopy Required Practical

- Includes preparing a slide, using a light microscope, drawing any observations – use a pencil and label important observations.



Osmosis and Potato Practical

- Independent variable – concentration.
- Dependent variable – change in mass.
- Control variable – volume of solution, temperature, time, surface area of the potato.

The potato in the sugar solution will lose water and so will have less mass at the end; the potato in the pure water solution will gain water.

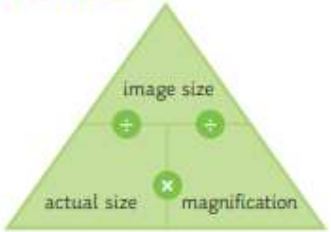
Specialised Cells

When a cell changes to become a specialised cell, it is called differentiation.

Specialised Cell	Function	Adaptation
sperm	To get the male DNA to the female DNA.	Streamlined head, long tail, lots of mitochondria to provide energy.
nerve	To send electrical impulses around the body.	Long to cover more distance. Has branched connections to connect in a network.
muscle	To contract quickly.	Long and contain lots of mitochondria for energy.
root hair	To absorb water from the soil.	A large surface area to absorb more water.
phloem	Transports substances around the plant.	Pores to allow cell sap to flow. Cells are long and joined end-to-end.
xylem	Transports water through the plant.	Hollow in the centre. Tubes are joined end-to-end.

Equations and Maths

Equation



Maths Skills

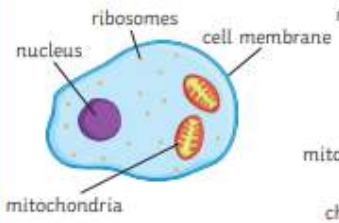
Conversions:
Micrometres to millimetres: divide by 1000.

Standard Form:
$0.003 = 3 \times 10^{-3}$

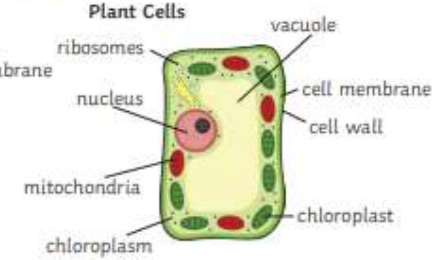
$5.6 \times 10^{-5} = 0.0056$

Prokaryotic and Eukaryotic Cells

Animal Cells



Plant Cells

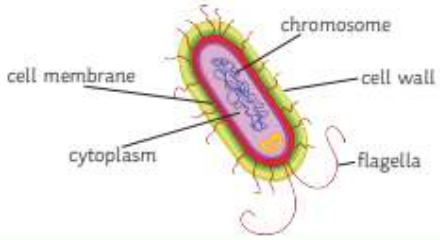


Plant and animal cells have similarities and differences:

	Animal	Plant
nucleus	✓	✓
cytoplasm	✓	✓
chloroplast	X	✓
cell membrane	✓	✓
permanent vacuole	X	✓
mitochondria	✓	✓
ribosomes	✓	✓
cell wall	X	✓

Bacterial Cells

Bacterial cells do not have a true nucleus, they just have a single strand of DNA that floats in the cytoplasm. They contain a plasmid.



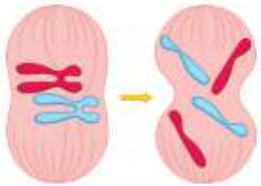
Cell Biology Knowledge Organiser - Foundation and Higher

Chromosomes and Mitosis

In the nucleus of a human cell there are 23 pairs of **chromosomes**. Chromosomes contain a double helix of **DNA**. Chromosomes have a large number of genes.

The **cell cycle** makes new cells.

Mitosis: DNA has to be **copied/replicated** before the cell carries out mitosis.



Key Vocabulary

active transport
alveoli
chromosome
diffusion
eukaryotic
gas exchange
mitosis
multicellular
osmosis
prokaryotic
undifferentiated
replicated
specialised
villi

Stem Cells

Embryonic stem cells are **undifferentiated** cells, they have the potential to turn into any kind of cell.

Adult stem cells are found in the bone marrow, they can only turn into some types of cells e.g. blood cells.

Uses of stem cells:

- Replacing faulty blood cells;
- making insulin producing cells;
- making nerve cells.

Some people are against stem cell research.

For Stem Cell Research	Against Stem Cell Research
Curing patients with stem cells - more important than the rights of embryos.	Embryos are human life.
They are just using unwanted embryos from fertility clinics, which would normally be destroyed.	Scientists should find other sources of stem cells.

Stem Cells in Plants

In plants, stem cells are found in the **meristem**. These stem cells are able to produce clones of the plant. They can be used to grow crops with specific features for a farmer, e.g. **disease resistant.**

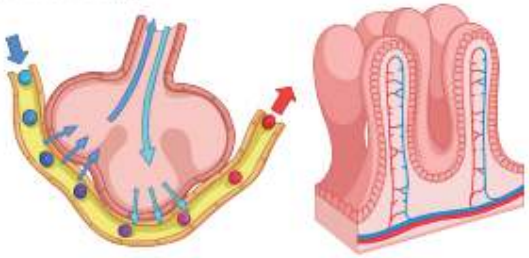
Exchange – Humans

Multicellular organisms have a large surface are to volume ratio so that all the substances can be exchanged.

Gas exchange: Lungs

The alveoli are where gas exchange takes place.

They have a large surface area, moist lining, thin walls and a good blood supply.

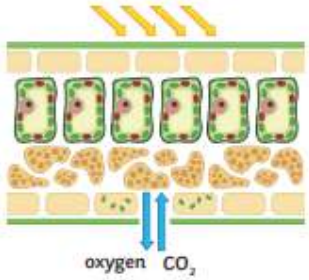


Villi: Small Intestine

Millions of villi line the small intestine increasing the surface area to absorb more digested food.

They are a single layer of cells with a good blood supply.

Exchange in Plants



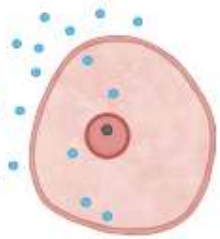
The surface of the leaf is flattened to increase the surface area for more gas exchange by diffusion.

Oxygen and water vapour diffuse out of the stomata. Guard cells open and close the stomata, controlling water loss.

Key Processes

Diffusion is the spreading out of particles from an area of higher concentration to an area of lower concentration.

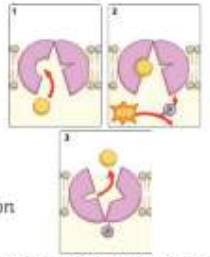
Cell membranes are semi-permeable, only small molecules can get through.



Cell Diffusion

Osmosis is the movement of water molecules across a partially permeable membrane from a region of higher concentration to a region of lower concentration.

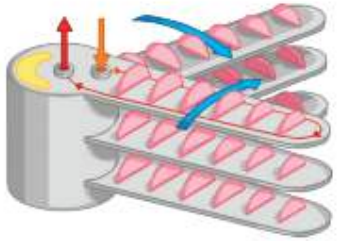
Active transport is the movement of substances against the concentration gradient. This process requires energy from respiration.



Active Transport in Cells

Exchange in Fish

Fish have a large surface area for gas exchange. These are called **gills**. Water enters the fish through the mouth and goes out through the gills. The oxygen is transported from the water to the blood by **diffusion**. Carbon dioxide diffuses from the blood to the water. Each gill has **gill filaments** which give the gills a large surface area. **Lamellae** cover each gill filament to further increase the surface area for more gas exchange. They have a **thin surface layer** and **capillaries** for good blood supply which helps with diffusion.



AQA GCSE Biology (Combined Science) Unit 2: Organisation

Principles of Organisation





cell	→ tissue	→ organ	→ organ system	→ organism
Cells are the basic building blocks of all living things.	A group of cells with a similar structure and function is called a tissue.	An organ is a combination of tissues carrying out a specific function.	Organs work together within an organ system.	Organ systems work together to form whole living organisms.

Food Tests (Required Practical)

What are you testing for?	Which indicator do you use?	What does a positive result look like?
sugar	Benedict's reagent	Once heated, the solution will change from blue-green to yellow-red.
starch	iodine	Blue-black colour indicates starch is present.
protein	biuret	The solution will change from blue to pink-purple.
lipid	sudan III	The lipids will separate and the top layer will turn bright red.

Effect of pH on the Rate of Reaction of Amylase (Required Practical)

Iodine is used to test for the presence of **starch**. If starch is present, the colour will change to blue-black.

The **independent variable** in the investigation is the pH of the buffer solution.

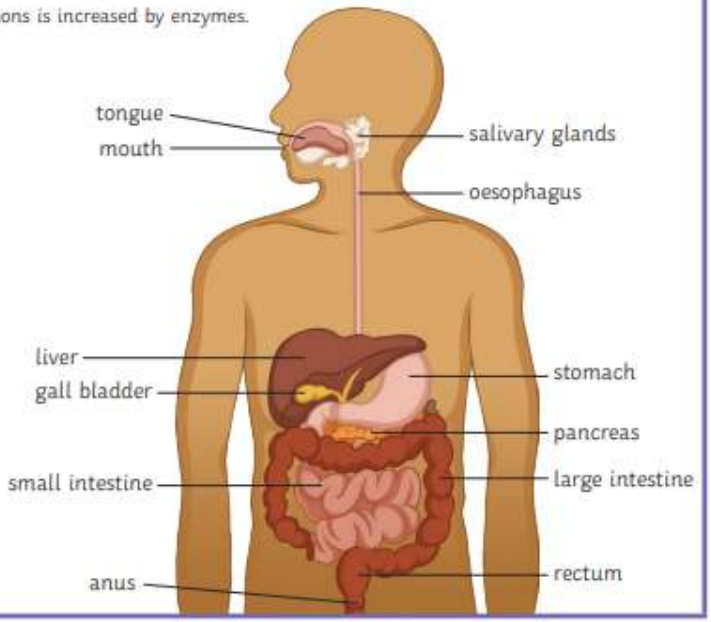
The **dependent variable** in the investigation is the time taken for the reaction to complete (how long it takes for all the starch to be digested by the amylase).

Method:

1. Use the marker pen to label a test tube with the first value of pH buffer solution (pH 4) and stand it in the test tube rack.
2. Into each well of the spotting tiles, place a drop of iodine.
3. Using a measuring cylinder, measure 2cm^3 of amylase and pour into the test tube.
4. Using a syringe, measure 1cm^3 of the buffer solution and pour into the test tube.
5. Leave this to stand for five minutes and then use the thermometer to measure the temperature. Make a note of the temperature.
6. Add 2cm^3 of starch solution into the test tube, using a different measuring cylinder to measure, and begin a timer (leave the timer to run continuously).
7. After 10 seconds, use a pipette to extract some of the amylase/starch solution, and place one drop into the first well of the spotting tile. Squirt the remaining solution back into the test tube.
8. Continue to place one drop into the next well of the spotting tile, every 10 seconds, until the iodine remains orange.
9. Record the time taken for the starch to be completely digested by the amylase by counting the wells that were tested positive for starch (indicated by the blue/black colour change of the iodine). Each well represents 10 seconds of time.
10. Repeat steps 1 to 8 for pH values 7 and 10.

The Digestive System

The purpose of the digestive system is to break down large molecules into smaller, soluble molecules, which are then absorbed into the bloodstream. The rate of these reactions is increased by enzymes.



Enzymes

An enzyme is a biological **catalyst**; enzymes speed up chemical reactions without being changed or used up.

This happens because the enzyme lowers the **activation energy** required for the reaction to occur. Enzymes are made up of chains of amino acids folded into a globular shape.

Enzymes have an **active site** which the **substrate** (reactants) fits into. Enzymes are very specific and will only catalyse one specific reaction. If the reactants are not the complimentary shape, the enzyme will not work for that reaction.

Enzymes also work optimally at specific conditions of pH and temperature. In extremes of pH or temperature, the enzyme will **denature**. This means that the bonds holding together the 3D shape of the active site will break and the active shape will deform. The substrate will not be able to fit into the active site anymore and the enzyme cannot function.

Enzyme	Reactant	Product
amylase	starch	sugars (glucose)
protease	protein	amino acids
lipase	lipid	glycerol and fatty acids

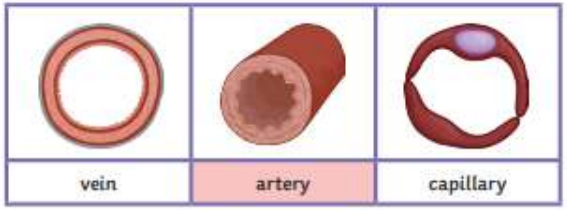
The products of digestion are used to build new carbohydrates and proteins and some of the glucose is used for respiration.

Bile is produced in the **liver** and stored in the gall bladder. It is an **alkaline** substance which **neutralises** the hydrochloric acid in the stomach. It also works to **emulsify** fats into small droplets. The fat droplets have a higher **surface area** and so the rate of their digestion by lipase is increased.

The Heart and Blood Vessels

The **heart** is a large muscular organ which **pumps blood** carrying oxygen or waste products around the body. The **lungs** are the site of **gas exchange** where oxygen from the air is exchanged for waste carbon dioxide in the blood. Oxygen is used in the **respiration** reaction to release energy for the cells and carbon dioxide is made as a waste product during the reaction.

glucose + oxygen ⟶ carbon dioxide + water + [energy]



The three types of blood vessels, shown above, are each adapted to carry out their specific function.

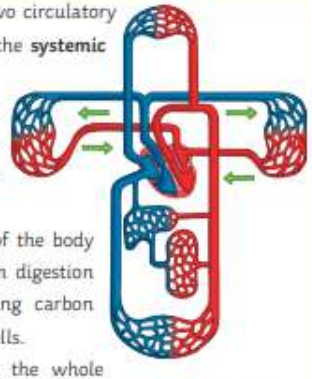
Capillaries are narrow vessels which form networks to closely supply cells and organs between the veins and arteries. The walls of the capillaries are only **one cell thick**, which provides a short **diffusion pathway** to increase the rate at which substances are transferred.

The table below compares the structure and function of arteries and veins:

	Artery	Vein
direction of blood flow	away from the heart	towards the heart
oxygenated or deoxygenated blood?	oxygenated (except the pulmonary artery)	deoxygenated (except the pulmonary vein)
pressure	high	low (negative)
wall structure	thick, elastic, muscular, connective tissue for strength	thin, less muscular, less connective tissue
lumen (channel inside the vessel)	narrow	wide (with valves)

The Heart as a Double Pump

The heart works as a **double pump** for two circulatory systems; the **pulmonary** circulation and the **systemic** circulation.



The pulmonary circulation serves the lungs and bring deoxygenated blood to exchange waste carbon dioxide gas for oxygen at the **alveoli**.

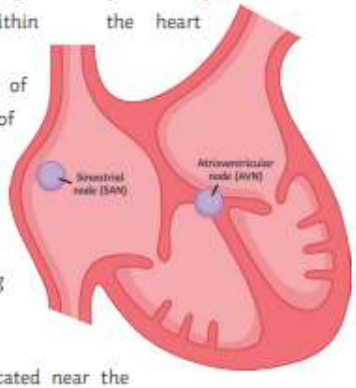
The systemic circulation serves the rest of the body and transports oxygen and nutrients from digestion to the cells of the body, whilst carrying carbon dioxide and other waste away from the cells.

The systemic circulation flows through the whole body. This means the blood is flowing at a much higher pressure than in the pulmonary circuit.

The Heart as Pacemaker

The rate of the heart beating is very carefully, and automatically, controlled within the heart itself.

Located in the muscular walls of the heart are small groups of cells which act as pacemakers. They produce electrical impulses which stimulate the surrounding muscle to contract, squeezing the chambers of the heart and pumping the blood.



The **sino-atrial node (SAN)** is located near the right atrium and it stimulates the atria to contract.

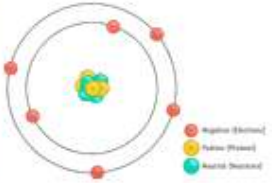
The **atrio-ventricular node (AVN)** is located in between the ventricles and stimulates them to contract.

Atomic Structure and the Periodic Table – Foundation and Higher

Atoms

Contained in the nucleus are the **protons** and **neutrons**. Moving around the nucleus are the **electron** shells. They are negatively charged.

Particle	Relative Mass	Charge
proton	1	+1
neutron	1	0
electron	Very small	-1



Overall, atoms have no charge; they have the same number of protons as electrons. An ion is a charged particle - it does not have an equal number of protons to electrons.

Atomic Number and Mass Number

Elements

Elements are made of atoms with the same atomic number. Atoms can be represented as symbols.

N = nitrogen **F** = fluorine **Zn** = zinc **Ca** = calcium

Isotopes – an isotope is an element with the **same number of protons** but a **different number of neutrons**. They have the same atomic number, but different mass number.

Isotope	Protons	Electrons	Neutrons
$^{1}_{1}H$	1	1	1 - 1 = 0
$^{2}_{1}H$	1	1	2 - 1 = 1
$^{3}_{1}H$	1	1	3 - 1 = 2

Compounds – a compound is when two or more elements are chemically joined. Examples of compounds are carbon dioxide and magnesium oxide. Some examples of formulas are CO_2, NaCl, HCl, H_2O, Na_2SO_4. They are held together by chemical bonds and are difficult to separate.

Equations and Maths

To calculate the relative atomic mass, use the following equation:

relative atomic mass (A_r) =

$$\frac{\text{sum of (isotope abundance} \times \text{isotope mass number)}}{\text{sum of abundances of all isotopes}}$$

Balancing Symbol Equations

There must be the same number of atoms on both sides of the equation:

$CH_4 + 2O_2 \rightarrow 2H_2O + CO_2$

C = 1

O = 4

H = 4

Chemical Equations

A chemical reaction can be shown by using a **word equation.**

e.g. magnesium + oxygen → magnesium oxide

On the left-hand side are the reactants, and the right-hand side are the products.

They can also be shown by a **symbol equation.**

e.g. $2Mg + O_2 \rightarrow 2MgO$

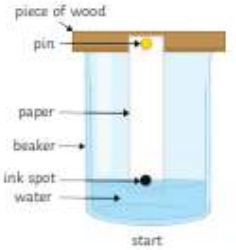
Equations need to be **balanced,** so the same number of atoms are on each side. To do this, numbers are put in front of the compounds.

$CH_4 + \mathbf{2}O_2 \rightarrow \mathbf{2}H_2O + CO_2$

Mixtures, Chromatography and Separation

Mixtures – in a mixture there are no chemical bonds, so the elements are easy to separate. Examples of mixtures are air and salt water.

Chromatography – to separate out mixtures.



Filtration – to separate solids from liquids.

Evaporation – to separate a soluble salt from a solution; a quick way of separating out the salt.

Crystallisation - to separate a soluble salt from a solution; a slower method of separating out salt.

Separating out salt from rock salt:

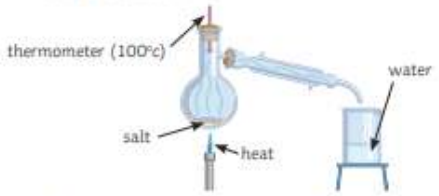
1. Grind the mixture of rock salt.
2. Add water and stir.
3. Filter the mixture, leaving the sand in the filter paper
4. Evaporate the water from the salt, leaving the crystals.

Atomic Structure and the Periodic Table – Foundation and Higher

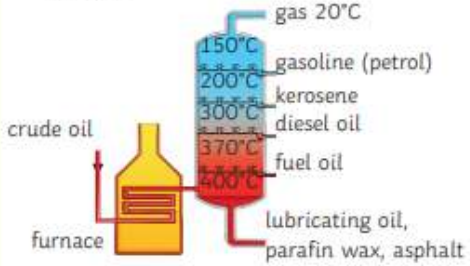
Distillation

To separate out mixtures of liquids.

1. **Simple distillation** – separating a liquid from a solution.



2. **Fractional distillation** – separating out a mixture of liquids. Fractional distillation can be used to separate out crude oil into fractions.



Metals and Non-metals

They are found at the **left** part of the periodic table. Non-metals are at the **right** of the table.

Metals

Are strong, malleable, good conductors of electricity and heat. They bond metallically.

Non-Metals

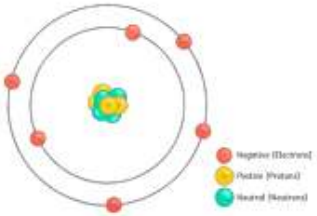
Are dull, brittle, and not always solids at room temperature.

History of the Atom

Scientist	Time	Discovery
John Dalton	start of 19th century	Atoms were first described as solid spheres.
JJ Thomson	1897	Plum pudding model – the atom is a ball of charge with electrons scattered.
Ernest Rutherford	1909	Alpha scattering experiment – mass concentrated at the centre; the nucleus is charged. Most of the mass is in the nucleus. Most atoms are empty space.
Niels Bohr	around 1911	Electrons are in shells orbiting the nucleus.
James Chadwick	around 1940	Discovered that there are neutrons in the nucleus.

Electronic Structure

Electrons are found in shells. A maximum of two in the most inner shell, then eight in the 2nd and 3rd shell. The inner shell is filled first, then the 2nd then the 3rd shell.



Group 7 Elements and Noble Gases

Halogens

The halogens are **non-metals**: fluorine, chlorine, bromine, iodine. As you go down the group they become less reactive. It is harder to gain an extra electron because its outer shell is further away from the nucleus. The melting and boiling points also become higher.

Noble Gases

The **noble gases** (**group 0** elements) include: **helium**, **neon** and **argon**. They are un-reactive as they have full outer shells, which makes them very stable. They are all colourless gases at room temperature.

The boiling points all increase as they go down the group – they have greater intermolecular forces because of the increase in the number of electrons.

Development of the Periodic Table

In the early 1800s, elements were arranged by atomic mass. The periodic table was not complete because some of the elements had not been found. Some elements were put in the wrong group.

Dimitri Mendeleev (1869) left gaps in the periodic table. He put them in order of **atomic mass**. The gaps show that he believed there was some undiscovered elements. He was right! Once found, they fitted in the pattern.

The Modern Periodic Table

Elements are in order of **atomic mass/proton number**. It shows where the metals and non-metals are. **Metals** are on the **left** and **non-metals** on the **right**. The **columns** show the **groups**. The **group number** shows the number of **electrons** in the **outer shell**. The rows are **periods** – each period shows another full shell of electrons.

The periodic table can be used to predict the reactivity of elements.

Alkali Metals

The alkali metals (**group 1 elements**) are soft, very reactive metals. They all have **one electron** in their **outer shell**, making them **very reactive**. They are **low density**. As you go down the group, they become more reactive. They get bigger and it is easier to lose an electron that is further away from the nucleus.

They form ionic compounds with non-metals.

They react with water and produce hydrogen.

E.g.

lithium + water → lithium hydroxide + hydrogen

$2Li + 2H_2O \rightarrow 2LiOH + H_2$

They react with chlorine and produce a metal salt.

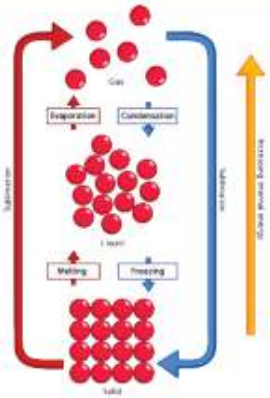
E.g.

lithium + chlorine → lithium chloride

$2Li + Cl_2 \rightarrow 2LiCl$

They react with oxygen to form metal oxides.

AQA GCSE Chemistry (Combined Science) Unit 2: Bonding, Structure and Properties of Matter



The three states of matter are **solid, liquid and gas**.

For a substance to change from one state to another, **energy** must be **transferred**.

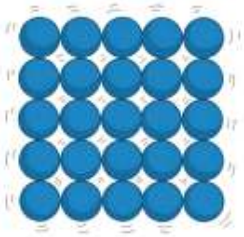
The particles gain energy. This results in the breaking of some of the **attractive forces** between particles during melting.

To evaporate or boil a liquid, more energy is needed to overcome the remaining chemical bonds between the particles.

Note the difference between **boiling** and **evaporation**. When a liquid **evaporates**, particles **leave the surface** of the liquid **only**. When a liquid **boils**, **bubbles** of gas form **throughout** the liquid before rising to the surface and escaping.

The amount of energy needed for a substance to change state is dependent upon the **strength** of the **attractive forces** between particles. The **stronger** the **forces of attraction**, the **more energy** needed to **break them apart**. Substances that have strong attractive forces between particles generally have **higher melting and boiling points**.

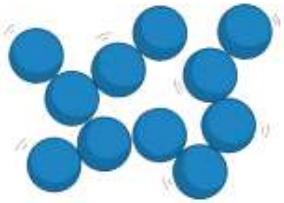
Solid



The particles in a **solid** are arranged in a regular pattern. The particles in a solid **vibrate** in a fixed position and are tightly packed together. The particles in a solid have a **low amount of kinetic energy**.

Solids have a **fixed shape** and are unable to flow like liquids. The particles **cannot be compressed** because the particles are very close together.

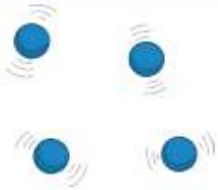
Liquid



The particles in a **liquid** are randomly arranged. The particles in a liquid are able to **move around** each other. The particles in a liquid have a **greater amount** of **kinetic energy** than particles in a **solid**.

Liquids are able to **flow** and can take the shape of the container that they are placed in. As with a solid, liquids **cannot be compressed** because the particles are close together.

Gas



The particles in a **gas** are randomly arranged. The particles in a gas are able to **move around very quickly** in all directions. Of the three states of matter, gas particles have the **highest amount** of **kinetic energy**.

Gases, like liquids, are able to **flow** and can fill the container that they are placed in. The particles in a gas are **far apart** from one another which allows the particles to move in any direction.

Gases can be **compressed**; when squashed, the particles have empty space to move into.

Limitations of the Particle Model (HT only)

The chemical bonds between particles are not represented in the diagrams above.

Particles are represented as solid spheres – this is not the case. Particles like atoms are mostly empty space. Particles are not always spherical in nature.

State Symbols

In chemical equations, the three states of matter are represented as symbols:

solid **(s)**
liquid **(l)**
gas **(g)**
aqueous **(aq)**

Aqueous solutions are those that are formed when a substance is dissolved in water.

Identifying the Physical State of a Substance

If the given temperature of a substance is **lower** than the **melting point**, the physical state of the substance will be **solid**.

If the given temperature of the substance is **between** the **melting point and boiling point**, the substance will be a **liquid**.

If the given temperature of the substance is **higher** than the **boiling point**, the substance will be a **gas**.

AQA GCSE Chemistry (Combined Science) Unit 2: Bonding, Structure and Properties of Matter

Formation of Ions

Ions are charged particle. They can be either positively or negatively charged, for example Na^+ or Cl^-.

When an element loses or gains electrons, it becomes an ion.

Metals **lose** electrons to become **positively charged**.

Non-metals **gain** electrons to become **negatively charged**.

Group 1 and 2 elements **lose** electrons and group 6 and 7 elements **gain** electrons.

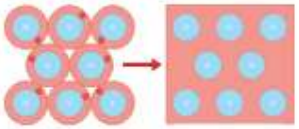
Group	Ions	Element Example
1	+1	$Li \rightarrow Li^+ + e^-$
2	+2	$Ca \rightarrow Ca^{2+} + 2e^-$
6	-2	$Br + e^- \rightarrow Br^-$
7	-1	$O + 2e^- \rightarrow O^{2-}$

Metals and Non-metals

Metals are found on the **left-hand side** of the **periodic table**. Metals are strong, shiny, malleable and good conductors of heat and electricity. On the other hand, non-metals are brittle, dull, not always solids at room temperature and poor conductors of heat and electricity. **Non-metals** are found on the **right-hand side** of the **periodic table**.

Metallic Bonding

Metallic bonding occurs between **metals only**. Positive metal ions are surrounded by a **sea of delocalised electrons**. The ions are tightly packed and arranged in rows.

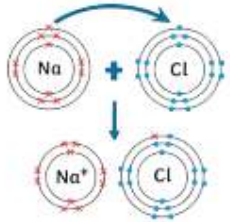


There are strong electrostatic forces of attraction between the positive metal ions and negatively charged electrons.

Pure metals are too soft for many uses and are often mixed with other metals to make alloys. The mixture of the metals introduces different-sized metal atoms. This **distorts the layers** and **prevents them from sliding over one another**. This makes it harder for alloys to be bent and shaped like pure metals.

Ionic Bonding

Ionic bonding occurs between a metal and a non-metal. Metals lose electrons to become positively charged. Opposite charges are attracted by electrostatic forces – an ionic bond.



Ionic Compounds

Ionic compounds form structures called giant lattices. There are **strong electrostatic forces of attraction** that **act in all directions** and act between the **oppositely charged ions** that make up the giant ionic lattice.

Properties of Ionic Compounds

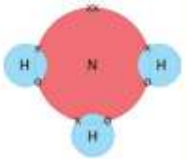
- High melting point – lots of energy needed to overcome the electrostatic forces of attraction.
- High boiling point
- **Cannot conduct electricity** in a **solid** as the ions are not free to move.
- Ionic compounds, when **molten** or in **solution**, can **conduct electricity** as the ions are free to move and can carry the electrical current.

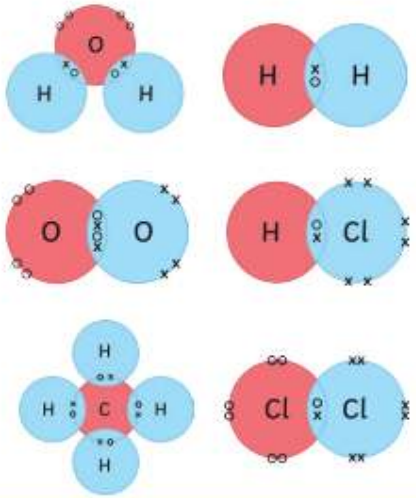
Covalent Bonding

Covalent bonding is the sharing of a pair of electrons between atoms to gain a full outer shell. This occurs between **non-metals only**. Simple covalent bonding occurs between the molecules below. Simple covalent structures have **low melting and boiling points** – this is because the **weak intermolecular forces** that hold the molecules together break when a substance is heated, not the strong covalent bonds between atoms. They **do not conduct electricity** as they do not have any free delocalised electrons.

Dot and cross diagrams are useful to show the **bonding** in **simple molecules**. The **outer electron shell** of each atom is represented as a **circle**, the circles from each atom overlap to show where there is a **covalent bond**, and the electrons from each atom are either drawn as **dots or crosses**. There are **two different types** of **dot and cross diagram** – one with a circle to represent the outer electron shell and one without.

You should be able to draw the dot and cross diagrams for the following simple covalent structures: chlorine, oxygen, nitrogen, water, ammonia, hydrogen chloride and methane.

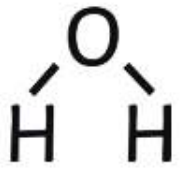




AQA GCSE Chemistry (Combined Science) Unit 2: Bonding, Structure and Properties of Matter

Structural Formulae

In this type of diagram, the element symbol represents the type of atom and the straight line represents the covalent bonding between each atom.



The structure of small molecules can also be represented as a 3D model.

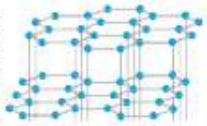
Giant Covalent Structure – Diamond

Each **carbon** atom is **bonded** to **four** other carbon atoms, making diamond very strong. Diamond has a high melting and boiling point. **Large** amounts of **energy** are needed to break the strong covalent bonds between each carbon atom. Diamond **does not conduct** electricity because it has **no free electrons**.

Silicon dioxide (silicon and oxygen atoms) has a similar structure to that of diamond, in that its atoms are held together by **strong covalent bonds**. Large amounts of energy are needed to break the strong covalent bonds therefore silicon dioxide, like diamond, has a high melting and boiling point.

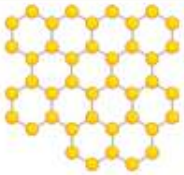
Giant Covalent Structure – Graphite

Graphite is made up of layers of **carbon** arranged in **hexagons**. Each carbon is bonded to **three** other carbons and has **one free delocalised electron** that is able to move between the layers. The layers are held together by weak intermolecular forces. The layers of carbon can slide over each other easily as there are no strong covalent bonds between the layers. Graphite has a high melting point because a lot of energy is needed to break the covalent bonds between the carbon atoms. Graphite can **conduct** electricity.



Giant Covalent Structure – Graphene

Graphene is one layer of graphite. It is very **strong** because of the covalent bonds between the carbon atoms. As with graphite, each carbon in graphene is bonded to three others with one **free delocalised electron**. Graphene is able to **conduct electricity**. Graphene, when added to other materials, can make them even stronger. Useful in electricals and composites.



Nanoscience

Nanoscience refers to structures that are **1–100nm** in size, of the order of a few hundred atoms. Nanoparticles have a **high surface area to volume ratio**. This means that smaller amounts are needed in comparison to normal sized particles. As the side length of a cube decreases by a factor of 10, the surface area to volume ratio increases approximately

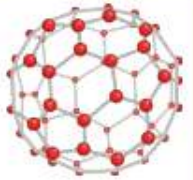
Name of Particle	Diameter
nanoparticle	1–100nm
fine particles (PM_{25})	100–2500nm
coarse particles (PM_{10})	2500–10000nm

Polymers

Polymers are long chain molecules that are made up of many smaller units called **monomers**. Atoms in a polymer chain are held together by **strong covalent bonds**. Between polymer molecules, there are **intermolecular forces**. Intermolecular forces **attract** polymer chains towards each other. Longer polymer chains have stronger forces of attraction than shorter ones therefore making stronger materials.

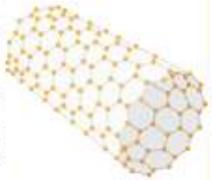
Fullerenes and Nanotubes

Molecules of carbon that are shaped like hollow tubes or balls, arranged in hexagons of five or seven carbon atoms. They can be used to **deliver drugs into the body**.



Buckminsterfullerene has the formula C_{60}

Carbon Nanotubes are tiny carbon cylinders that are very long compared to their width. Nanotubes can conduct electricity as well as strengthening materials without adding much weight. The properties of carbon nanotubes make them useful in electronics and nanotechnology.



Possible Risks of Nanoparticles

As nanoparticles are so **small**, it makes it possible for them to be inhaled and enter the lungs. Once inside the body, nanoparticles may **initiate harmful reactions** and toxic substances could bind to them because of their large surface area to volume ratio. Nanoparticles have many applications. These include medicine, cosmetics, sun creams and deodorants. They can also be used as catalysts.

Modern nanoparticles are a relatively new phenomenon therefore it is difficult for scientists to truly determine the risks associated with them.

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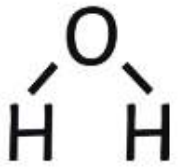

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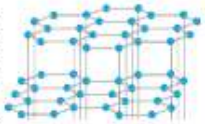

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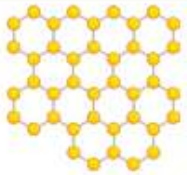

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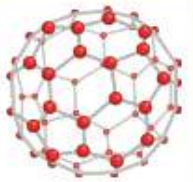

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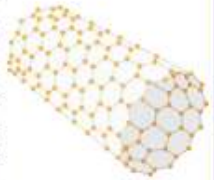

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AQA GCSE Chemistry (Combined) Unit 5 Energy Changes Knowledge Organiser

Exothermic and Endothermic Reactions

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

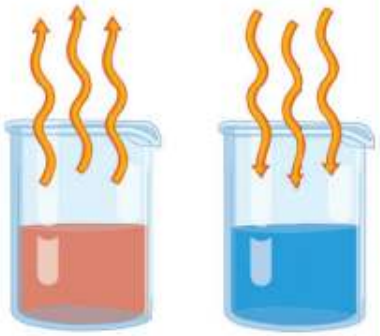
Exothermic reactions are those which involve the transfer of energy **from the reacting chemicals to** the surroundings. During a practical investigation, an exothermic reaction would show an **increase in temperature** as the reaction takes place.

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

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

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

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



Exothermic

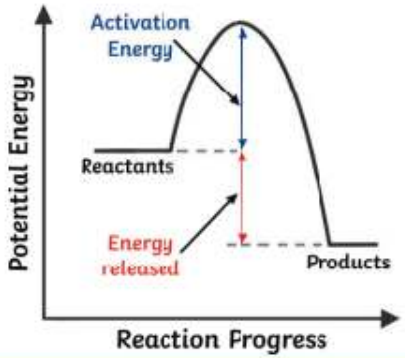
Endothermic

Reaction Profiles – Exothermic

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

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

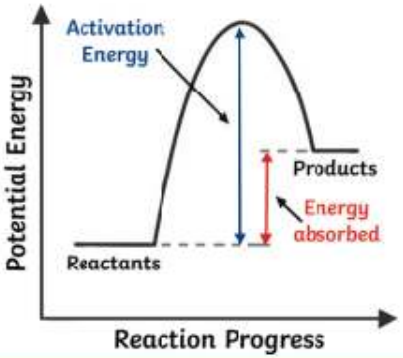
In an **exothermic** reaction, the difference in energy is **released** to the surroundings and so the **temperature** of the surroundings **increases**.



Reaction Profiles – Endothermic

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

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



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

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

Bond Making and Bond Breaking

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

You may also find, in some textbooks, **ΔH** referred to as the **enthalpy change.**

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

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

Required Practical

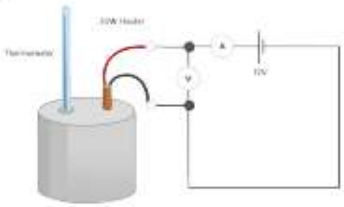
Investigating Specific Heat Capacity

independent variable – material

dependent variable – specific heat capacity

control variables – insulating layer, initial temperature, time taken

$\Delta E = m \times c \times \Delta\theta$



Method:

1. Using the balance, measure and record the mass of the copper block in kg.
2. Wrap the insulation around the block.
3. Put the heater into the large hole in the block and the block onto the heatproof mat.
4. Connect the power pack and ammeter in series and the voltmeter across the power pack.
5. Using the pipette, put a drop of water into the small hole.
6. Put the thermometer into the small hole and measure the temperature.
7. Switch the power pack to 12V and turn it on.
8. Read and record the voltmeter and ammeter readings – during the experiment, they shouldn't change.
9. Turn on the stop clock and record the temperature every minute for 10 minutes.
10. Record the results in the table.
11. Calculate work done and plot a line graph of work done against temperature.

Equations

$E = \frac{1}{2}mv^2$

$E_p = mgh$

$E_e = \frac{1}{2}ke^2$

$\Delta E = m \times c \times \Delta\theta$

$P = \frac{E}{t}$

$P = \frac{W}{t}$

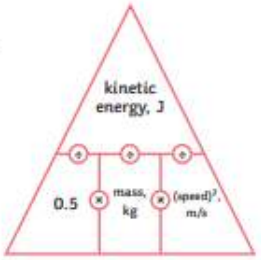
Kinetic and Potential Energy Stores

Movement Energy

kinetic energy = $\frac{1}{2}$ x mass x speed^2

$$E_k = \frac{1}{2}mv^2$$

(J) (kg)(m/s)

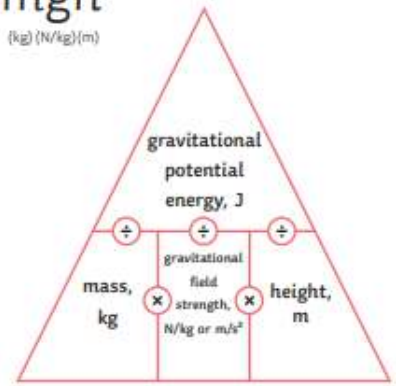


When something is off the ground, it has gravitational potential energy

gravitational potential energy = mass x gravitational field strength x height

$$E_p = mgh$$

(J) (kg) (N/kg) (m)



When an object falls, it loses gravitational potential energy and gains kinetic energy.

Stretching an object will give it elastic potential energy.

elastic potential energy = $\frac{1}{2}$ × spring constant × extension^2

$$E_e = \frac{1}{2}ke^2$$

(J) (N/m) (m)

Transferring Energy by Heating

Heating a material transfers the energy to its thermal energy store - the temperature increases.

E.g. a kettle: energy is transferred to the thermal energy store of the kettle. Energy is then transferred by heating to the waters thermal energy store. The temperature of the water will then increase.

Some materials need more energy to increase their temperature than others.

change in thermal energy = mass × specific heat capacity × temperature change

$$\Delta E = m \times c \times \Delta\theta$$

(J) (kg) (J/kg°C) (°C)

Specific heat capacity is the amount of energy needed to raise the temperature of 1kg of a material by 1°C.

Energy Stores and Systems

Energy Stores	
kinetic	Moving objects have kinetic energy.
thermal	All objects have thermal energy.
chemical	Anything that can release energy during a chemical reaction.
elastic potential	Things that are stretched.
gravitational potential	Anything that is raised.
electrostatic	Charges that attract or repel.
magnetic	Magnets that attract or repel.
nuclear	The nucleus of an atom releases energy.

Energy can be transferred in the following ways:

mechanically – when work is done;

electrically – when moving charge does work;

heating – when energy is transferred from a hotter object to a colder object.

Conservation of Energy

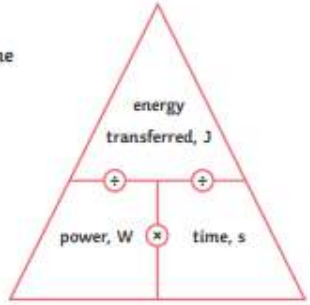
Energy can never be created or destroyed, just transferred from one form to another. Some energy is transferred usefully and some energy gets transferred into the environment. This is mostly wasted energy.

Power

Power is the rate of transfer of energy – the amount of work done in a given time.

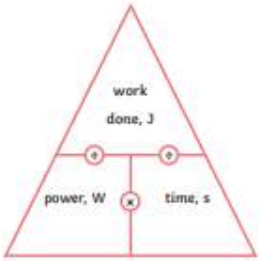
power = energy transferred ÷ time

P (W) = E (J) ÷ t (s)



power = work done ÷ time

P (W) = W (J) ÷ t (s)



Energy Transfer

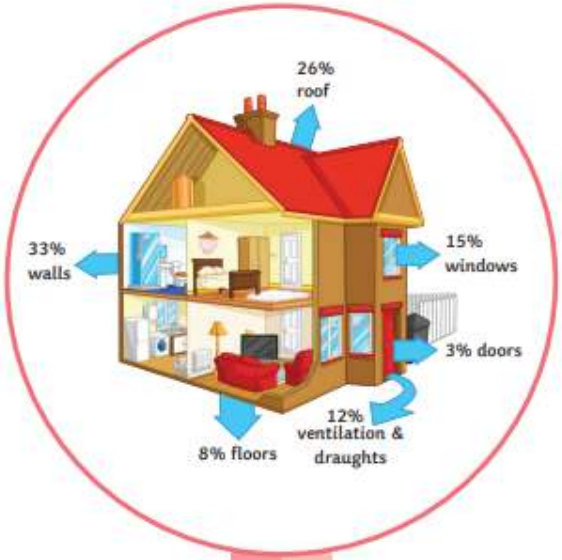
Lubrication reduces the amount of friction. When an object moves, there are frictional forces acting. Some energy is lost into the environment. Lubricants, such as oil, can be used to reduce the friction between the surfaces.

Conduction – when a solid is heated, the particles vibrate and collide more, and the energy is transferred.

Convection – when a liquid or a gas is heated, the particles move faster. This means the liquid or gas becomes less dense. The denser region will rise above the cooler region. This is a convection current.

Insulation – reduces the amount of heat lost. In your home, you can prevent heat loss in a number of ways:

- thick walls;
- thermal insulation, such as:
- loft insulation (reducing convection);
- cavity walls (reduces conduction and convection);
- double glazing (reduces conduction).

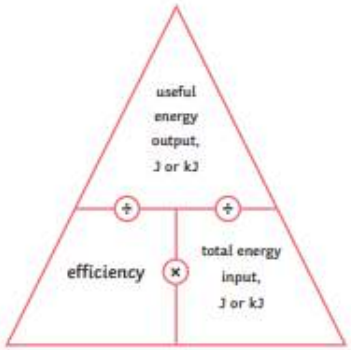


Efficiency

When energy is transferred, some energy is wasted. The less energy that is wasted during the transfer, the more efficient the transfer.

There are two equations to calculate efficiency:

$$\text{efficiency} = \frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$$



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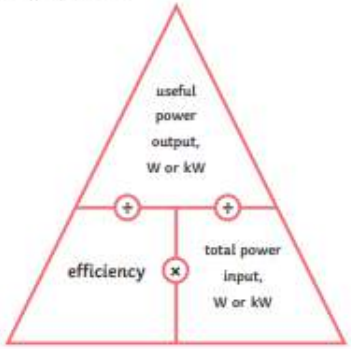


Some energy is always wasted. Nothing is 100% efficient.

Efficiency

Non-renewable – coal, oil, gas - they will all run out, they damage the environment, but provide most of the energy.

Renewable – they will never run out, can be unreliable and do not provide as much energy.

Energy Resource	Advantages	Disadvantages
solar – using sunlight	Renewable, no pollution, in sunny countries it is very reliable.	Lots of energy needed to build, only works during the day, cannot increase power if needed.
geothermal – using the energy of hot rocks	Renewable and reliable as the rocks are always hot. Power stations have a small impact on environment.	May release some greenhouse gases and only found in specific places.
wind – using turbines	Renewable, no pollution, no lasting damage to the environment, minimal running cost.	Not as reliable, do not work when there is no wind, cannot increase supply if needed.
hydroelectric – uses a dam	Renewable, no pollution, can increase supply if needed.	A big impact on the environment. Animals and plants may lose their habitats.
wave power – wave powered turbines	Renewable, no pollution.	Disturbs the seabed and habitats of animals. Unreliable.
tidal barrages – big dams across rivers	Renewable, very reliable, no pollution.	Changes the habitats of wildlife, fish can be killed in the turbines.
biofuels	Renewable, reliable, carbon neutral.	High costs, growing biofuels may cause a problem with regards to space, clearance of natural forests.
non-renewable – fossil fuels	Reliable, enough to meet current demand, can produce more energy when there is more demand.	Running out, release CO_2, leading to global warming, and also release SO_2 which causes acid rain.

Trends in energy resources – most of our electricity is generated by burning fossil fuels and nuclear. The UK is trying to increase the amount of renewable energy resources. The governments are aware that non-renewable energy resources are running out; targets of renewable resources have been set. Electric and hybrid cars are also now on the market.

However, changing the fuels we use and building renewable power plants cost money. Many people are against the building of the plants near them and do not want to pay the extra in their energy bills. Hybrid and electric cars are also quite expensive.

AQA Combined Science: **Physics Topic 3 Particle Model of Matter**

Required Practical

Measuring the density of a regularly shaped object:

- Measure the mass using a balance.
- Measure the length, width and height using a ruler.
- Calculate the volume.
- Use the density ($\rho = m/V$) equation to calculate density.

Measuring the density of an irregularly-shaped object:

- Measure the mass using a balance.
- Fill a eureka can with water.
- Place the object in the water - the water displaced by the object will transfer into a measuring cylinder.
- Measure the volume of the water. This equals the volume of the object.
- Use the density ($\rho = m/V$) equation to calculate density.

Density

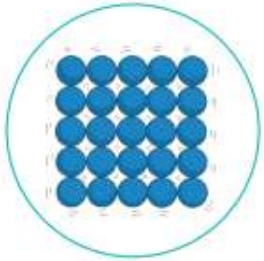
Density is a measure of how much mass there is in a given space.

Density (kg/m^3) = mass (kg) ÷ volume (m^3)

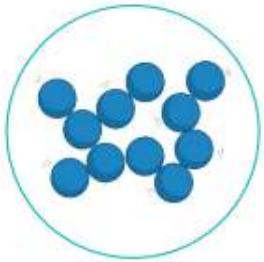
A more dense material will have more particles in the same volume when compared to a less dense material.

Particles

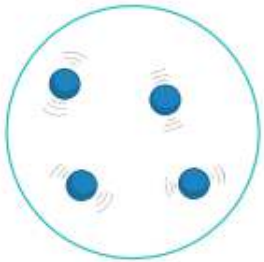
Solids have strong forces of attraction. They are held together very closely in a fixed, regular arrangement. The particles do not have much energy and can only vibrate.



Liquids have weaker forces of attraction. They are close together, but can move past each other. They form irregular arrangements. They have more energy than particles in a solid.



Gases have almost no forces of attraction between the particles. They have the most energy and are free to move in random directions.



Particles

Gas particles can move around freely and will collide with other particles and the walls of the container. This is the pressure of the gas.

If the temperature of the gas increases, then the pressure will also increase. The hotter the temperature, the more kinetic energy the gas particles have. They move faster, colliding with the sides of the container more often.

Density

The density of an object is $8050 kg/m^3$ and it has a volume of $3.4 m^3$ - what is its mass in kg?

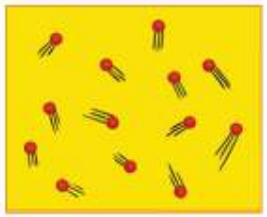
8050 = mass ÷ 3.4

8050 × 3.4 = mass

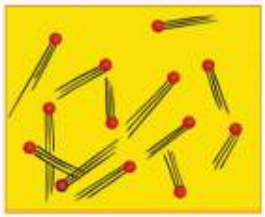
27 370kg

Internal Energy

Particles within a system have kinetic energy when they vibrate or move around. The particles also have a potential energy store. The total internal energy of a system is the kinetic and potential energy stores.



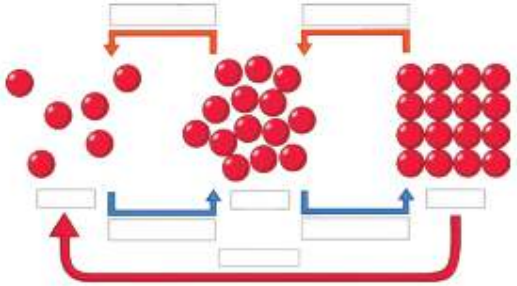
Low Temperature



High Temperature

If the system is heated, the particles will gain more kinetic energy, so increasing the internal energy.

Changing State

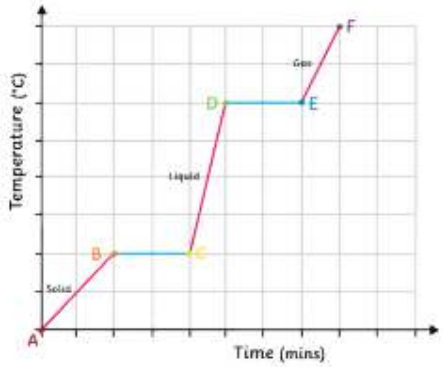


If a system gains more energy, it can lead to a change in temperature or change in state. If the system is heated enough, then there will be enough energy to break bonds.

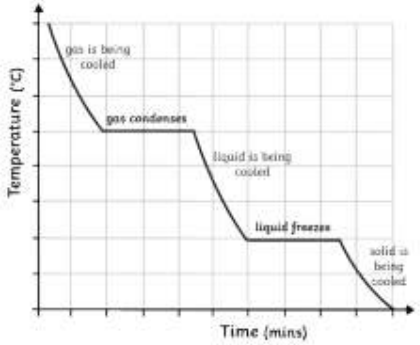
When something changes state, there is no chemical change, only physical. No new substance is formed. The substance will change back to its original form. The number of particles does not change and mass is conserved.

Specific Latent Heat

Energy is being put in during melting and boiling. This increases the amount of internal energy. The energy is being used to break the bonds, so the temperature does not increase. This is shown by the parts of the graph that are flat.



When a substance is condensing or freezing, the energy put in is used to form the bonds. This releases energy. The internal energy decreases, but the temperature does not go down.



The energy needed to change the state of a substance is called the latent heat.

Specific latent heat is the amount of energy needed to change 1kg of a substance from one state to another without changing the temperature. Specific latent heat will be different for different materials.

- solid ⟶ liquid - specific latent heat of **fusion**
- liquid ⟶ gas - specific latent heat of **vaporisation**

Specific Latent Heat Equation

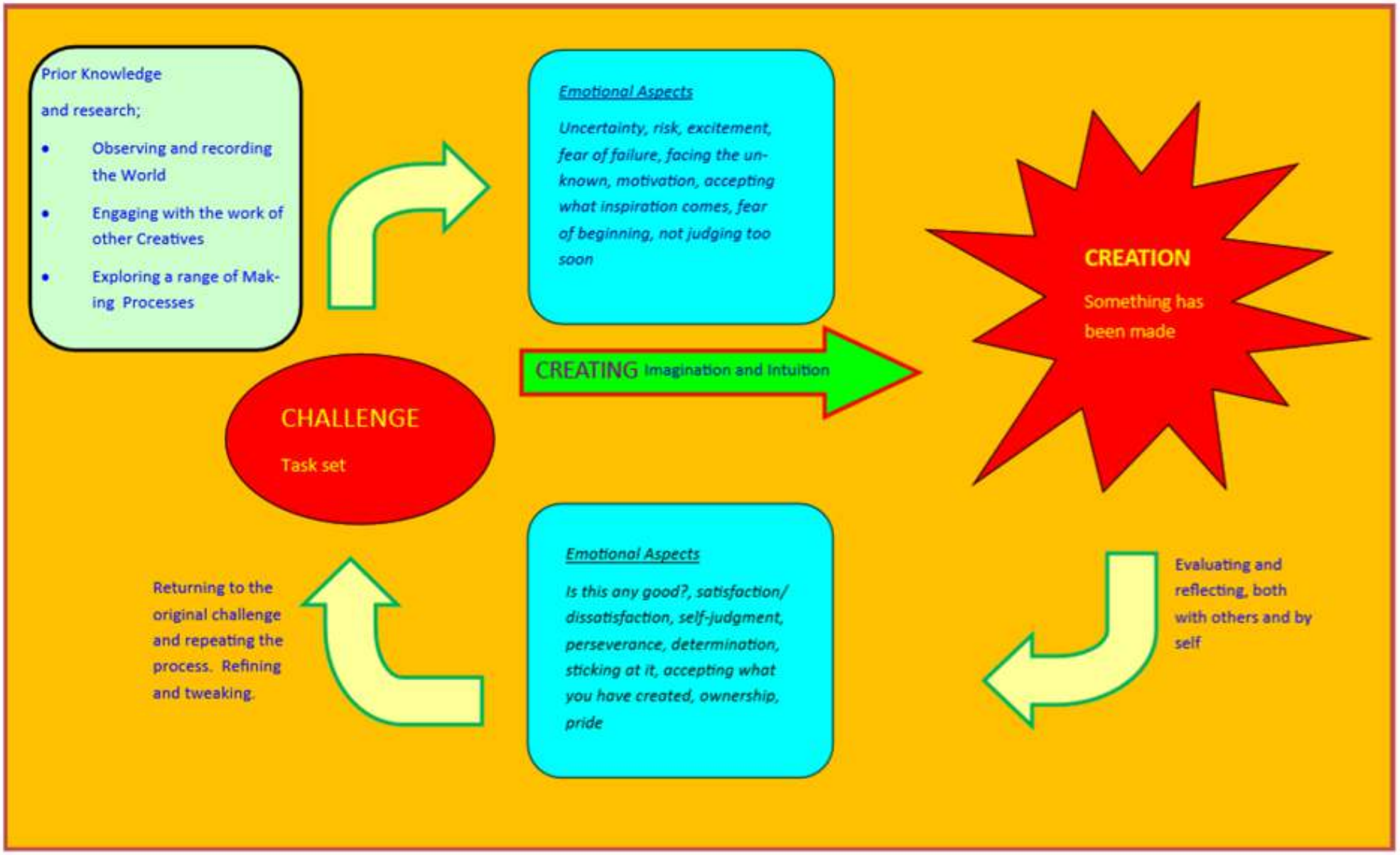
The amount of energy needed/released when a substance of mass changes state.

energy (E) = mass (m) × specific latent heat (L)

$E = mL$

ART, CRAFT AND DESIGN - CORE KNOWLEDGE In addition to completing projects exploring a 2-D and 3-D process, and a range of relevant artists, **by the end of Year 9 students will be able to….**	
Creative Process	Name the stages of the Creative Process, identify which stages are happening on each page of their sketchbook, and give examples of what might happen in each stage.
Drawing	Apply Y7/8 knowledge to draw a skull/human face. Use simple one/two/three point linear perspective.
Painting	Recall Y7/8 knowledge and experience using hue, value, intensity and temperature, then apply these skills to create a final painting. Consolidate their understanding of different brushstrokes by employing a range of sizes of brush.
Critical Understanding and Analysis	Remember and understand the meaning of the following words, and use them when writing about art; *Line, Shape, Form, Tone, Texture, Pattern, Colour* *Colour; Hue, Value, Intensity, Temperature* *Composition* *Perspective* Use and answer the following key questions when studying the work of other artists; *How did the artist make this piece of work?* *How can we describe and analyse what is happening in this piece using art language?* *What was happening in the world when this work was made, and why is this piece of art important?*
Use of a Sketchbook	Students apply Y7/8 knowledge and sketchbook routines with greater confidence and proficiency, beginning to develop a personal style of presentation. Their writing for their double page of "*Research into Other Creatives*" answers the three questions for Y9 in *Critical Understanding and Analysis* (see above). Students include a short piece of reflective annotation for their final piece, explaining how the outcome connects to the artist(s) studied, their observational work and the making process being used in the project. This piece of writing also uses the vocabulary above to discusses which visual elements are most significant in their final piece.

The Creative Process



TIME This is essential. Process requires sufficient time to work properly.

Macronutrients – needed in the body in large amounts			
Name	Needed in the body for…	Other Information	Main Sources
Protein	Growth Repair Maintenance	High Biological Value – contains all amino acids	Animal based – meat, fish, poultry, eggs, dairy
		Low Biological Value – amino acids missing so need combining	Plant based
Carbohydrates	Slower release of energy	Complex – starchy Products	Wholegrain, potatoes, pasta, rice, bread
	Quick release of energy	Simple – sugary products	Cakes, sweets, ice cream, chocolate, fizzy drinks
Fats	Making cell membranes and nerve cells. Insulation. Backup stores of energy	Unsaturated Fats (liquid at room temp.)	Vegetable based – rapeseed, olive. Oily fish
		Saturated Fats (solid at room temp.)	Animal based – lard, cheese.

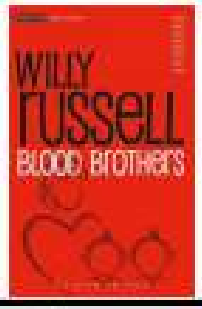
Name	Needed in the body for…	Main Sources
Fibre	Helps to remove waste from the body and keep digestive system working properly	Vegetables, fruit, brown bread, wholemeal and wholegrain foods, lentils, beans
Water	Keeps you hydrated, helps digestion, controls body temperature	Water, juice, tea, etc; fruit and vegetables.

Micronutrients – needed in the body in small amounts		
Name	Needed in the body for…	Main Sources
Iron	Makes haemoglobin to help carry oxygen in the blood	Red meat, Green leafy vegetables
Calcium	Forms, strengthens and maintains bones and teeth	Dairy foods, green leafy vegetables
Vitamin A	Healthy immune system; To help eyesight (be able to see in dim light)	Yellow fruit and vegetables
Vitamin B Group	Helps release energy from Carbohydrates	Cereals, yeast and marmite, meat
Vitamin C	Fights off infection; Helps heal wounds; Helps body to absorb iron	Citrus fruits Green leafy vegetables
Vitamin D	Controls the amount of calcium in the body	Oily fish, eggs, liver

8 tips for healthy eating

Blood Brothers

One of the most popular productions to ever be performed, Blood Brothers ran on the west end for 24 consecutive years from 1991. The themes of the play and the experiences of both the working-class and upper-middle class families in Britain still resonate with audiences to this day; the key question is why?



Key Contextual Factors

Margaret Thatcher Saw manufacturing as uncompetitive and believed trade unions had too much power. She reduced union power and closed or sold off elements of British manufacturing leading to a rise in unemployment.

Economic recession Particularly effected the more industrialised northern areas of the country; Liverpool's docks, a chief source of employment in the city, were allowed to fold, causing thousands of households to fall into poverty and unemployment. Crime levels increased, drug use sky-rocketed, and housing deteriorated in poorer areas.

Social class One of the pivotal beliefs in Thatcher's system was that success and wealth came to those who chose to work hard. In Blood Brothers, Russell demonstrates opposition towards that view, suggesting that opportunities are more limited for those that are raised in working class backgrounds, when compared to those from the middle classes. This is divided society is demonstrated through showing the effect of different upbringings on a set of twins.

Marilyn Monroe Reflected the gradual change in society from the 1950s in which everyday people became more influenced by pop/celebrity culture. Monroe became addicted to anti-depressants as both her career and marriage fell apart.

Key Themes

Class and Money Both have a significant effect on the behaviours of every character in the play and the decisions they make.

Fate and Superstition The voice of fate is provided over and over again throughout the play by the Narrator, who reveals even at the outset that the two will die. Despite some characters refusing to believe in superstition, eventually no matter how ridiculous, the superstitions come true.

Nature vs Nurture As Mickey and Edward are twins, they are genetically (nature) as similar as can be. Therefore, Russell is suggesting that it is in fact nurture (their upbringing) that causes their contrasting behaviours, actions, and mannerisms. It is clear that Russell feels that unjust society is the heaviest influence in where people end up.

Social Injustice/ social stigma Characters are treated not as individuals but due to their social status and the idea, for example, that all working-class families on the council estate are bad news.

Coming of age One of the lighter themes, as the play explores Mickey, Eddie and Linda's relationship as they go from young children, to awkward teens and then fully grown adults.

Act One

The Narrator introduces the twins and gives an overview of the story. We see a preview of the play's final moments- Mickey and Edward both die. Mrs Johnstone sings about how her husband left her with seven children and she can't afford to feed them.

Mrs Johnstone goes to clean at Mrs Lyons' house. Mrs Lyons reveals that she and her husband can't have children.

Mrs Johnstone finds out she is pregnant with twins. Mrs Lyons persuades her to give her one of the babies. The babies are born. Debt collectors repossess Mrs Johnstone's belongings. Mrs Lyons takes one of the babies. Mrs Lyons fires Mrs Johnstone and tells her that both boys will die if they ever find out they are twins.

When the twins are seven, Mickey and Edward meet near Mickey's house. They bond immediately. Mrs Johnstone is horrified when she realises who Mickey's new friend is. She tells Edward to leave and not to come back.

Mickey goes to see Edward but Mrs Lyons sends him away. Edward is angry and uses swear words he learnt from Mickey. Mrs Lyons hits him. Edward sneaks out to play with Mickey and Linda. Mrs Lyons tells her husband that they need to move away, but he's unconvinced.

Soon afterwards, a policeman catches Edward, Mickey and Linda misbehaving, which persuades Mr Lyons to move his family. Edward goes to Mrs Johnstone's house upset about moving. She gives him a locket with a picture of her and Mickey in it. The Johnstones find out that they're being moved to Skelmersdale.

Act Two

The Johnstones are happier in Skelmersdale. When Edward is fourteen, he is suspended from his boarding school. Mickey and Linda are also suspended from their comprehensive school.

Back home, Mickey and Edward meet and recognise each other. They renew their friendship. Mrs Lyons sees the boys together. She tries to bribe Mrs Johnstone to move away. When she refuses, Mrs Lyons tries to attack her with a knife.

Mickey, Edward and Linda meet and the play moves through scenes in which they age from fourteen and eighteen. Edward reveals his love for Linda but then encourages Mickey to ask her out. Edward leaves for university.

Mickey and Linda get married because Linda is pregnant. Mickey loses his job and has to go on the dole. Edward comes home from university. Mickey resents him and they fall out.

Edward asks Linda to marry him. Linda admits she has feelings for him but tells him she's married to Mickey. Sammy persuades Mickey to act as a lookout for a robbery but it goes wrong and Sammy shoots the petrol station attendant. Mickey's sentenced to seven years in prison. He becomes depressed and is put on pills. Mickey is released early but he is still depressed.

Linda begs him to stop taking the pills. Linda gets them a new house and a job for Mickey. Mickey knows that Edward, who is now a local councillor, is responsible for both. Linda and Edward kiss. Meanwhile, Mickey stops taking his pills. Mrs Lyons shows Mickey that Edward and Linda are together. Mickey takes Sammy's gun and goes to confront Edward at the Town Hall. Mrs Johnstone tells the boys they are brothers. Mickey loses control and accidently shoots Edward. The police shoots Mickey in response.

Key Dramatic Devices

Dramatic Irony When the audience have more information on what is about to happen, than the characters on-stage.

Breaking the fourth wall When an actor talks directly to the audience.

Episodic construction A play made up of smaller snap-shots of action which can be placed in any order. An audience could understand the point of a play from watching just one episode.

Narration The act of telling a story to the audience.

Tension A feeling that something bad or serious is about to happen.

Knowledge Organiser Coasts

Coastal zone: The coastal zone is the place where the land meets the sea.

Wave types

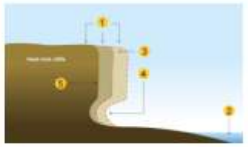
Destructive waves have a strong swash and a weak backwash. They are big strong waves made when the wind is powerful. They have high energy and they erode the coast.

Constructive waves have a weak swash and a strong backwash. They are less powerful. They have low energy and they build beaches.

Hydraulic action	Air may become trapped in joints and cracks on a cliff face. When a wave breaks, the trapped air is compressed which weakens the cliff and causes erosion.
Abrasion	Bits of rock and sand in waves grind down cliff surfaces like sandpaper.
Attrition	Waves smash rocks and pebbles on the shore into each other, and they break and become smoother.
Solution	Acids contained in sea water will dissolve some types of rock such as chalk or limestone.

Weathering

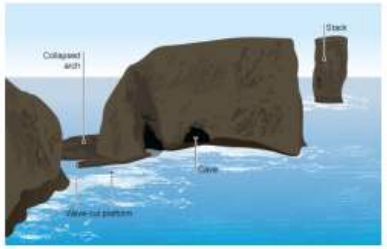
Biological	Chemical	Physical
When plants wear away rocks because the roots get into the cracks. Or animals burrow into the cracks.	Carbon dioxide from the air dissolves into the rainwater making it acidic. Limestone and chalk are easily eroded.	Freeze thaw weathering is when water gets into a crack and freezes. As it freezes it expands and breaks the rock apart.



Wave cut platform

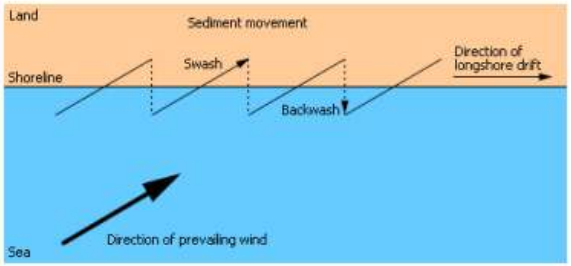
1. Weather weakens the top of the cliff.
2. The sea attacks the base of the cliff forming a wave-cut notch.
3. The notch increases in size causing the cliff to collapse.
4. The backwash carries the rubble towards the sea forming a wave-cut platform.
5. The process repeats and the cliff continues to retreat.

Caves arches stacks and stumps



1. **Caves** occur when waves force their way into cracks in the cliff face. Water contains sand and other materials that grind away at the rock until the cracks become a cave. This is hydraulic action.
2. If the cave is formed in a headland, it may eventually break through to the other side forming an **arch**.
3. The arch will gradually become bigger until it can no longer support the top of the arch. When the arch **collapses**, it leaves the headland on one side and a **stack** (a tall column of rock) on the other.
4. The stack will be attacked at the base in the same way that a wave-cut notch is formed. This weakens the structure and it will eventually **collapse** to form a **stump**.

Longshore drift



1. Waves approach the coast at an angle.
2. Swash carries sediment up the beach at an angle.
3. Backwash carries sediment down the beach with gravity – at right angles to the beach.
4. This creates a zig-zag movement of sediment along the beach.

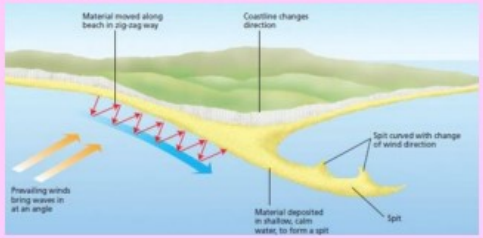
Depositional landforms

1. **Beaches** - formed by constructive waves. Sand beaches are flat and wide, shingle are steep and narrow.
2. **Sand dunes**—sand is moved by longshore drift, obstacles cause wind speed to drop so sand is deposited. Plants and grass grow (colonise). The **embryo dune** becomes a **mature dune** over time.
3. **Spits** - if there is a bend in the coastline, longshore drift continues and builds up a spit.

Coastal management strategies

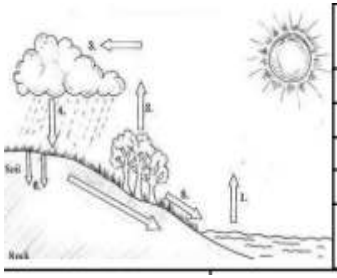
Hard Engineering	Soft Engineering
man-made structures e.g. Sea wall, gabions, rock armour, groynes. E.g. Sea wall—a wall made of concrete that reflects waves back to the sea. Positive—prevents flooding. Negative—creates a strong backwash. Expensive to build and maintain.	Beach nourishment, Dune regeneration E.g. Dune regeneration—creating sand dunes by planting vegetation to stabilise it. Positive: provides a barrier, is cheap. Negative - Nourishment is expensive and limited to a small area.

Formation of a spit

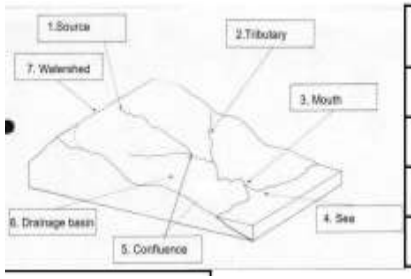


1. Longshore drift moves material along the coastline.
2. A **spit** forms when the material is deposited.
3. Over time, the spit grows and develops **a hook** if wind direction changes further out.
4. Waves cannot get past a spit, which creates a sheltered area where silt is deposited and mud flats or **salt marshes** form.

Knowledge Organiser Rivers



Evaporation	When the sun heats up water from the sea and it goes into the air.
Transpiration	When the sun heats up water from the leaves of trees.
Condensation	When water vapour cools and turns into clouds
Precipitation	Rain, hail, sleet and snow that falls from the clouds
Surface run-off	When the water runs off the surface of the ground.
Groundwater flow	When water goes into the ground (infiltration) and flows through the rocks/soil underground.

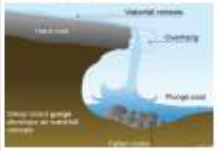


Drainage Basin	The area of land in which water drains into a specific river.
Source	The point where the river begins.
Tributary	A stream or small river that joins a larger stream or big river.
Confluence	A point where two streams or rivers meet.
Mouth	The point where the river meets the sea or ocean.

River	A channel of water which flows downstream.
Social uses of the river	▪ Supplying water to people's homes: *Water is taken from the Thames, cleaned and piped to millions of homes. Dirty water is collected from homes, cleaned and put back in rivers.* ▪ Leisure activities: *Rowing, canoeing, swimming, picnics, walking. Over 250,000 fishing licenses are brought each year to fish along the Thames and its tributaries.* ▪ Transporting people: *The Thames River Boats transport thousands of people to work everyday. Tourists also enjoy Thames cruises.*
Economic uses of the river	▪ Use in industries:*Factories (e.g. the Ford Factory in east London) uses water for cooling and washing factory machinery.* ▪ Transporting goods to other countries: *London Gateway Port is located in East London. It is used for importing and exporting goods.* ▪ Producing electricity to sell. *In power stations, steam drives turbines. River water is used to cool tanks of steam. For example in the power station beside the Thames at Didcot.* ▪ Agriculture (farming) *A lot of the River Thames passes through rural areas and farmland. Farmers use the river water to water their crops in dry weather (irrigation).*
Erosion	The wearing away or breakdown of rocks by wind, water or ice.
Hydraulic Action	The force of water hits against the river channel and removes material. It is common with fast moving, high energy water.
Abrasion	Sediment carried by the river hits the river channel and removes material.
Corrosion	Chemicals in the water dissolve rocks (e.g. limestone)
Attrition	Stones carried by the river hit into each other, gradually making the rocks smaller and smoother. Rocks in the upper course are large and more angular than rocks in the lower course.
Transportation	Eroded material is carried by the river downstream.
Traction	Large particles roll along the river bed.
Saltation	Pebble-sized particles bounce along the river bed.
Suspension	Small particles (silt and clay) are carried in the water.
Solution	Soluble materials dissolve in the water and are carried along.
Deposition	Deposition takes place where a river does not have enough energy to carry sediment (its load). As a result it is dropped.

LANDFORMS FORMED BY EROSION

WATERFALL



A waterfall is a steep fall of water, where water flows over a ledge of hard rock.

1. Waterfalls occur in areas where hard rock overlies soft rock.
2. The soft rock erodes more quickly than the hard rock, creating a plunge pool and overhanging ledge.
3. Further erosion of the soft rock, makes the plunge pool deeper and the overhanging ledge unstable. Eventually the ledge falls into the plunge pool.
4. As the steps 1-3 are repeated, the waterfall retreats upstream.

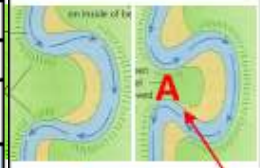
GORGE

A gorge is a narrow, steep sided valley that is found immediately downstream from a waterfall.

It is formed by the gradual retreat of a waterfall over hundreds or thousands of years.

LANDFORMS FORMED BY EROSION and DEPOSITION

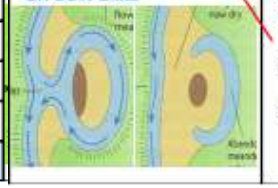
MEANDER



A bend in the river.

1. It starts with a slight bend.
2. Water moves faster on the outside of the bend and slower on the inside.
3. The fast water erodes the outside of the bend. The slower water deposits material on the inside of the bend.
4. Continued erosion and deposition makes the bend bigger.

OX-BOW LAKE



U-shaped lakes formed when a meander is no longer connected to a river

1. Further erosion and deposition make the meander bend larger and the neck of the meander (A) narrows.
2. Eventually the neck breaks through and the water takes the most direct route, avoiding the meander.
3. As less water is flowing through the meander, the energy is reduced = deposition. The meander is blocked off and an oxbow lake is created.

CAUSES OF WWII –

WWI – the Treaty of Versailles treated Germany harshly and was a dictated peace. Many German's wanted revenge and elected Hitler's Nazi party because he promised to restore strength to Germany.
Appeasement – this was a policy persued by France and Britain which gave in to Hitler's demands and allowed him to keep land he had invaded in Austria and Czechoslovakia.
League of Nations – This was a peace keeping force set up in 1919 to prevent another war. Although 42 countries were members, the USA refused to join, preferring a policy of 'isolationism' – this was an important reason for its failure.
Aggressive Alliances – Gemrnay signed no agreessive pacts with Russia, Italy and Japan which allowed her to invade European countries without fear of attack.

DUNKIRK AND THE BATTLE OF BRITAIN

The Evacuation of Dunkirk refers to the evacuation of nearly 300,000 BEF soldiers in May 1940 on the French beaches, saving them form the advancing German army. Civilians got involved, sailing fishing and pleasure boats across the English Channel. It is often referred to as the 'Miracle of Dunkirk' but this interpretation has been heavily influenced by propaganda.

Battle of Britain: Between July – October 1940, the RAF fought in the skies against the German Luftwaffe over the English Channel. They were successful in preventing a Nazi land invasion of Britain. Prime Minister Winston Churchill said of the RAF pilots: "Never in the field of human conflict, has so much been owed by so many, to so few"

THE PLYMOUTH BLITZ

The **Plymouth Blitz** was a series of bombing raids carried out by the Nazi German Luftwaffe on the English city of **Plymouth** in the Second World War. The bombings launched on numerous British cities were known as the **Blitz**. Plymouth was a target because it was a coastal town of **key economic importance** with a busy port bringing goods into the country.
It was also an **important base for the Royal Navy**. **Plymouth City had never been planned** and its compact and narrow streets would make evacuation difficult – causing panic and affecting the morale of the people.
Plymouth's location on the coast made it a target – it was easy for German planes to fly across the English Channel from their bases in France to attack and fly home before running out of fuel.

YEAR 9 World War Two

PEARL HARBOUR

WHEN? (December 7, 1941),

WHAT? surprise aerial attack on the U.S. naval base at Pearl Harbour on Hawaii, by the Japanese who wanted to take control of the area and push back American expansion in eth region.
The attack killed **2,403** service members and wounded 1,178 more, and sank or destroyed six U.S. ships,. They also destroyed 169 U.S. Navy and Army Air Corps planes. The Japanese losses included 29 aircraft, in addition to five midget submarines, and 129 attackers were killed and one taken prisoner

WHY WS IT IMPORTANT? It precipitated the entry of the USA into WWII and the strike climaxed a decade of worsening relations between the United States and Japan

THE HOLOCAUST

WHAT WAS IT? was the mass murder of the European Jews and other groups (such as gypsies and homosexuals) that the Nazis saw as a threat during World War II. Between 1941 and 1945, nearly 6 million Jews were killed.
WHY DID IT HAPPEN? Historians argue that the responsibility for the holocaust lies with several factors:
Roots in WWI – Germany's treatment at the end of WWI left them humiliated and the Jews became a scapegoat for many.
Hitler & the Nazis promoted anti-Semitic ideas
Anti-Semitism was a long-term historical problem
WWII meant that the Nazis invaded countries with high Jewish populations.
Ordinary people – Many Germans took part in the Holocaust informing on Jewish neighbours, driving deportation trains or were too afraid to stand up to the Nazis

THE ATOMIC BOMB

On 6 August 1945 the first **atomic bomb**, codenamed 'Little Boy', was dropped on the Japanese city of **Hiroshima**.

Three days later, a second **bomb** was dropped on Nagasaki. On 14 August 1945, the Japanese surrendered.

The creation and use of the **atomic bomb** was truly a turning point in warfare. Ever since, historians have questioned if the USA decision to use the atomic bomb was justified.

Over the next two to four months, the effects of the atomic bombings killed between 90,000 and 146,000 people in Hiroshima and 39,000 and 80,000 people in Nagasaki.

KEY INDIVIDUALS:

PERSON	KEY DETAILS
HITLER 	Leader of the Nazi Party and Central / Axis Powers during WWII. Allied with Italy, Russia and Japan. His Anti-Semitic views led to the Holocaust.
CHURCHILL 	British Leader during WWII who delivered a famous speech ..." we shall fight on the **beaches**, we shall fight on the landing grounds, we shall fight in the fields and in the streets, we shall fight in the hills; we shall never surrender..." .
CLEMENCEAU 	French President after WWI who helped write the Treaty of Versailles (with US President Wilson and GB Prime Minister Lloyd George). Nicknamed 'The Tiger' because the terms of the treaty were so harsh.
TRUMAN 	US President responsible for dropping the atomic bomb on Hiroshima and Nagasaki;
EMPEROR TOJO 	Leader of Japan who agreed to the attack on the American naval base at Pearl Harbour in December1941.

KEYWORDS

KEYWORD:	DEFINITION:
ALLIANCE	A friendship between countries (Also a pact)
APPEASEMENT	To give in to a country's demands
LEAGUE OF NATIONS	Set up in 1919 as a peace keeping force to encourage diplomacy. 42 members, but not the USA
B.E.F.	British Expeditionary Force (British Army)
RAF	Royal Air Force
BLITZ	Mass bombing of cities – civilian targets to lower morale & fighting spirit
ANTI-SEMITISM	Hatred of the Jews
HOLOCAUST	The mass murder of 6 million Jews by the Nazis during WWII
GHETTO	Walled parts of a city that quarantined Jews
ATOMIC BOMB	An immensely powerful weapon involving nuclear reactions used by the USA to end the war with Japan.

KNOWLEDGE CHECKER:

KNOWLEDGE AND UNDERSTANDING	R	A	G
I can explain the causes of WWII and analyse Hitler's significance			
I can describe the key events of WWII			
I can analyse different interpretations of the evacuation of Dunkirk and reach my own judgement			
I can explain why the Battle of Britain was so important			
I can explain why Plymouth was a target of the Blitz and can analyse sources and make inferences, identify differences and assess usefulness.			
I can explain what the Holocaust was and give reasons why it happened.			
I understand why the USA dropped the atomic bomb on Hiroshima & can reach my own judgement on this			

Adverbs

What it's for:

Adverbs help us understand better the way something is being done. They might say:

- when
- how
- how often

something happens.
Some adverbs can be used to compare.

Adverbs we know:

aujourd'hui – today
en ce moment – at the moment
souvent - often
parfois – sometimes

bien – well
mieux better

How it works:

In French, adverbs that say when something happens can go at the **start** or **end** of the sentence.

Examples:

Aujourd'hui, je prépare le déjeuner.
En ce moment, je fais les devoirs.

Adverbs that say how or how often something is done, go **after** the verb they describe.

Je mange souvent le déjeuner.
Je regarde parfois un film.
Je joue bien.
Tu joues mieux.

Adverbs	
beaucoup	a lot
déjà	already
facilement	easily
lentement	slowly
mal	badly
mieux	better
presque	nearly
pas encore	not yet
toujours	always
seulement	only
tellement	so much
très	very
trop	too much
un peu	a bit
vite	quickly

Time Elements	
à l'avenir	in the future
aujourd'hui	today
bientôt	soon
d'abord	first
demain	tomorrow
en ce moment	at the moment
ensuite	next, then
enfin	finally
hier	yesterday
maintenant	now
normalement	normally
parfois	sometimes
puis	then
rarement	rarely
souvent	often

Regular ~er verbs perfect tense

What it's for:

The perfect tense is used to talk about things you **did/have done** at some point in the past.

This is a really important tense so learn the way regular ~er verbs work below!

Other key verbs:
apporter – to bring
voyager – to travel
utiliser – to use
travailler – to work
jouer – to play
emporter – to take (with)
traverser – to cross
acheter – to buy

How it works:

J'ai	envoyé	I (have)	sent
Tu as		You (have)	
Il a		He (has)	
Elle a		She (has)	
Nous avons		We (have)	
Vous avez		You all (have)	
Ils ont		They (m) (have)	
Elles ont		They (f) (have)	

Sentence-building words:

un email
une lettre
une photo
une vidéo

Regular ~ir verbs perfect tense

What it's for:

The perfect tense is used to talk about things you **did/have done** at some point in the past.

This is a really important tense so learn the way regular ~ir verbs work below!

Other key verbs:
finir – to finish
réussir – to pass; to succeed
remplir – to fill (up or in)
définir – to define
punir – to punish
contenir – to contain

(See page 57 for a list of regular ~ir verbs you know.)

How it works:

J'ai	choisi	I (have)	chosen
Tu as		You (have)	
Il a		He (has)	
Elle a		She (has)	
Nous avons		We (have)	
Vous avez		You all (have)	
Ils ont		They (m) (have)	
Elles ont		They (f) (have)	

Sentence-building words:

un cadeau – a gift
un film – a film
un portable – a phone
la couleur – the colour

The verbs *faire* and *dire* perfect tense

What it's for:

The perfect tense is used to talk about things you **did/have done** at some point in the past.

These 2 verbs follow a pattern so learn them together.

Other key verbs:
écrire - to write
interdire - to not allow
inscrire - to sign up for

Common misconception:

In French:	are expressed as:
I did	I have done
I said	I have said

How it works:

J'ai	fait	I have	done
Tu as		You have	
Il a		He has	
Elle a		She has	
Nous avons		We have	
Vous avez		You all have	
Ils ont	dit	They (m) have	said
Elles ont		They (f) have	

Sentence-building words:

le ménage
la cuisine
une promenade
du vélo

la vérité

Verbs like prendre - perfect tense

What it's for:

The perfect tense is used to talk about things you **did/have done** at some point in the past.

Verbs like prendre change to form the past participle in a particular way. Learn the pattern.

Other key verbs:
apprendre – to learn/learning
appris – learnt

comprendre – to understand/understanding
compris – understood

How it works:

J'ai	pris	I (have)	taken
Tu as		You (have)	
Il a		He (has)	
Elle a		She (has)	
Nous avons		We (have)	
Vous avez		You all (have)	
Ils ont		They (m) (have)	
Elles ont		They (f) (have)	

Sentence-building words:

le déjeuner
une photo
une douche (a shower)
une vidéo

Past (perfect) with *haben*

To talk about what other people have done, use the "**er**" and "**sie**" form of *haben*, together with the past participle:

Sie **hat** im Café **gegessen**.
She *has eaten* / *ate* in the café.

Sie **hat** eine Liste **geschrieben**.
She *has written* / *wrote* a list.

The past participle stays the same when we are talking about different people!

Er **hat** Freunde **getroffen**.
He *has met* / *met* friends.

Er **hat** viel Wasser **getrunken**.
He *has read* / *read* a book.

Present and past tense: 1st person singular and plural

To make the past (perfect) tense in German use a form of ***haben*** with a past participle.
To make the ***we*** form, change the ending of ***haben***.

Ich	habe	eine Tasche	**ge**kauft.	I bought / have bought a bag.
Wir	haben	eine Tasche	**ge**kauft.	We bought / have bought a bag.

Remember, strong verbs make the past participle differently:

Ich	habe	ein Lied	**ge**sungen.	I sung / have sung a song.
Wir	haben	ein Lied	**ge**sungen.	We sang / have sung a song.

Only *haben* changes!
The past participle is the same in the singular and plural.

pron	welcher, welche, welches	which
pp	gegessen	eaten, ate
pp	gelegen	lay (down)
pp	gesprochen	spoke, spoken
pp	geschrieben	written, wrote
pp	gesungen	sang, sung
pp	getroffen	met
pp	getrunken	drank, drunk
vb	treffen	to meet, meeting
nm	der Sommer	summer
nnt	Frankreich	France
nnt	Spanien	Spain
adv	bisher	until now, up to now, yet

Past (perfect) with sein

To talk about what you did, you often use the present tense of ***haben*** and a past participle:

Ich	**habe**	Schottland	**besucht.**
I	have	visited	Scotland.
I	visited		Scotland.

With certain verbs, mostly verbs of movement to a destination you use the present tense of ***sein*** and a past participle:

Ich	**bin**	nach Schottland	**gefahren.**
I	have	travelled	to Scotland.
I	travelled		to Scotland.

Remember that our word for 'to' is **nach** for countries.

To say what someone else has done, change ***haben*** or ***sein*** to the er / sie form:

Er	**hat**	Deutschland	**besucht.**
He	has visited		Germany.
He	visited		Germany.

Sie	**ist**	nach Deutschland	**gefahren.**
She	has travelled		to Germany.
She	travelled		to Germany.

Remember: the perfect in German can be **I** and **I have** in English.

Ich **bin** gestern schon auf den Feldberg **gestiegen**.
I climbed the Feldberg already yesterday.

When something happened at a specific time in the past use the simple past.

Durch is a preposition and is always followed by R2 (accusative).

Er **ist** noch nicht durch den Schwarzwald **gewandert**.
He **has** not hiked through the Black Forest yet.

Word order 3 – conjunctions *weil* and *denn*.

Weil and **denn** both mean '**because**'. **Denn** is followed by Word Order 1:

Ich mag Sport, **denn** es **ist** lustig. → I like sport **because** it is enjoyable.

Weil is followed by Word Order 3:

Ich mag Sport, **weil** es lustig **ist**.

The word **weil** kicks the verb to the end of the clause, but the meaning is the same as **denn**.

Weil and **denn** are a type of word called **conjunctions**. They connect clauses or sentences. Unlike the English example above, there is always a **comma** before **weil** or **denn**.

Adjective agreement

When adjectives come before the noun, they have different endings. The endings depend on the type of article:

masculine **feminine** **neuter**



der große Tisch **die** gelbe Flasche **das** kleine Fenster
ein großer Tisch **eine** gelbe Flasche **ein** kleines Fenster
(**the**/**a** big table) (**the**/**a** yellow bottle) (**the**/**a** small window)

Explaining likes and dislikes

adj	interessant	interesting
adj	unmöglich	impossible
adj	notwendig	necessary
adj	wunderbar	wonderful
adj	spannend	exciting, thrilling
adj	lustig	funny, enjoyable
adv	warum?	why?
conj	weil	because
conj	denn	because, for

Opinions with 'dass' (that)

Use the verbs **denken** (*think*), **glauben** (*believe*) and **meinen** (*have the opinion*) to say what you think.

The conjunction ***dass*** *sends the verb to the end* - (Word Order 3):

WO1 (no 'dass'):

Ich denke, Sport **ist** lustig.

*I think sport **is** enjoyable.*

WO3 (with 'dass'):

Ich denke, **dass** Sport lustig **ist**.

*I think **that** sport **is** enjoyable.*

Another WO3 conjunction you know is **weil**:

Ich denke **dass** Sport lustig **ist** **weil** es fit **macht**.

*I think **that** sport **is** enjoyable **because** it **makes** (you) fit.*

In German, there is always a **comma** after an opinion verb.
Spot the around the commas above!

Describing others

vb	verbringen	to spend (time), spending (time)
nnt	das Auge	eye
nnt	das Haar	hair
nnt	das Gesicht	face
nm	der Mund	mouth
nf	die Nase	nose
nm	der Schüler	pupil (m)
nf	die Schülerin	pupil (f)
nf	die Zeit	time
adj	ähnlich	similar
adj	breit	wide
adj	dünn	thin
adj	rund	round
adj	neu	new
adv	als	as

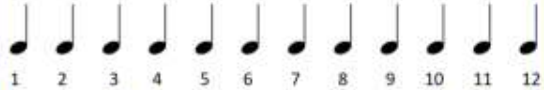
Dance Music

Exploring Rhythm, Chords and Metre in Music for Dance

The **RHYTHMS** of dance music always match the **STEPS** of the dance: the two are inter-related. Dance music is based on **CHORD PATTERNS**: mainly **PRIMARY CHORDS (I, IV & V(7))** and has a clear **MELODY** with an **ACCOMPANIMENT (HOMOPHONIC TEXTURE)**. Different dances and their music use different **METRES/TIME SIGNATURES**.

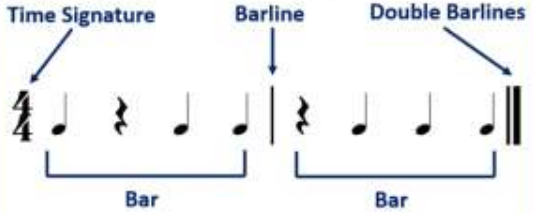
A. Pulse, Time and Metre in Dance Music

The **BEAT** or **PULSE** of dance music is always **REGULAR**. Here is a regular crotchet pulse of 12 beats:



A single **BEAT** is a basic unit of musical time. In dance music, beats are grouped together to make a repeating pattern – normally made up of either twos, threes or fours.

The repeating pattern of beats gives us the **METRE** or the **TIME** of the music, shown by the **TIME SIGNATURE** at the start of a piece of music. Each repetition of the beat-pattern is called a **BAR** and bars are separated by vertical lines called **BARLINES**. A **DOUBLE BARLINE** always comes at the end of a piece of music or section of music.



The **TOP NUMBER** of a time signature tells you how many beats there are in each bar. The **BOTTOM NUMBER** tells you what types or note values these beats are (as divisions of a semibreve = 1):

1 = Semibreve
2 = Minim
4 = Crotchet
8 = Quaver
16 = Semiquaver

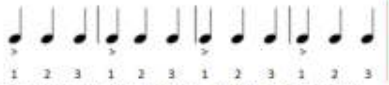
4/4 can also be shown by a "C" meaning **COMMON TIME**

B. Simple Time in Dance Music

SIMPLE DUPLE METRE: Two beats to a bar

Dance music such as **MARCHES**, the **TANGO** and **IRISH REEL** often use simple duple metre.

SIMPLE TRIPLE METRE: Three beats to a bar

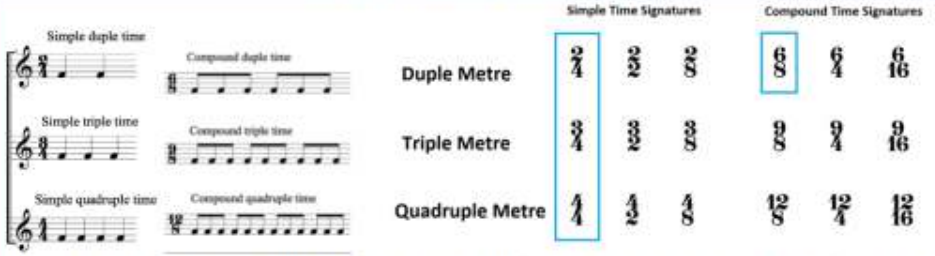


Dance music such as **WALTZES** and the **MINUET, COURANTE** and **SARABANDE** from the Baroque Dance Suite often use simple triple metre.

SIMPLE QUADRUPLE METRE: Four beats to a bar

Dance music such as the **TANGO**, the **IRISH REEL**, the **ALLEMANDE** from The Baroque Dance Suite, **AMERICAN LINE DANCE MUSIC** (Country and Western), **DISCO** and **CLUB DANCE** often use simple quadruple metre.

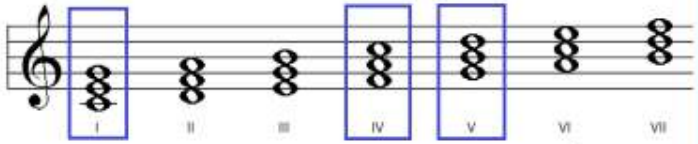
C. Simple and Compound Time



Dance music such as the **IRISH JIG** and the **GIGUE** from the Baroque Dance Suite often use compound duple metre (6/8) with a "**ONE** and a **TWO** and a" feel to the music.

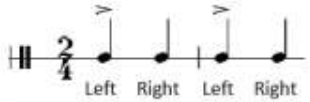
D. Chords in Dance Music

Dance music is based on **CHORD PATTERNS**. **PRIMARY CHORDS**: **CHORD I**, **CHORD IV** and **CHORD V** are most commonly used in dance music with **SEVENTH CHORDS** featuring in popular dance music such as **DISCO** and **CLUB DANCE** (adding a note seven notes above the root of a chord, such as and **DOMINANT SEVENTH CHORD**). All seventh chords have 4 notes. Chords are often performed in different ways as an **ACCOMPANIMENT** in dance music.

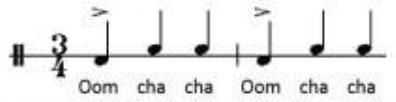


E. Characteristic Rhythms in Dance Music

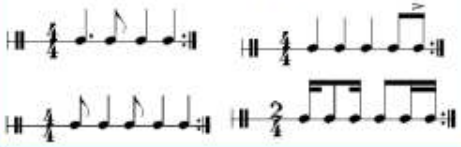
The **MARCH** has a strong **LEFT**, right, **LEFT**, right rhythm:



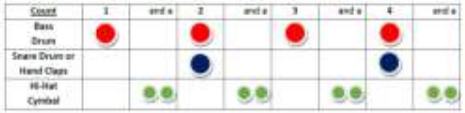
The **WALTZ** has a strong **OOM**-cha-cha, **OOM**-cha-cha rhythm:



The **TANGO** has several rhythms:



FOUR-ON-THE-FLOOR is a common rhythm in **DISCO** and more modern dance music:



F. Marches

Often with military connections or performed at ceremonies by large groups together.

SIMPLE DUPLE METRE (2/4 time signature), although some marches can be in 4/4).
Strong emphasis on the first beat of the bar (**LEFT**, right, **LEFT**, right).
Clear **MELODY** and **ACCOMPANIMENT** (**HOMOPHONIC TEXTURE**).
Uses mainly **PRIMARY CHORDS (I, IV & V)**.
Often performed by **MARCHING BANDS** featuring **BRASS**, **DRUMS** and **PERCUSSION**.

G. The Waltz

A **PAIRED DANCE** with couples close, arms around and facing each other. Popular in Vienna and became a fashionable **BALLROOM DANCE**.
SIMPLE TRIPLE METRE (3/4 time signature).
Emphasis on first beat of the bar.
Clear **OOM**-cha-cha, **OOM**-cha-cha rhythm. Clear **MELODY** and **ACCOMPANIMENT** (**HOMOPHONIC TEXTURE**).
REGULAR 4-BAR PHRASES.
Slow **HARMONIC RHYTHM** using **PRIMARY CHORDS (I, IV & V)**.
Performed by **ORCHESTRAS**.
STRINGS (occasionally **WOODWIND**) normally have the **MELODY LINE**.

H. Latin Dance: The Tango

Originated in Argentina and became a popular **LATIN BALLROOM DANCE**. A dramatic and sensual **PAIRED DANCE** with close contact, serious expressions, and quick, jerky movements.
Characteristic crisp "**TANGO RHYTHMS**" (see E.) often **DOTTED/SYNCOPATED RHYTHMS**.
SIMPLE DUPLE METRE (2/4) or **SIMPLE QUADRUPLE METRE** (4/4).
Often **MINOR TONALITY** (sometimes **MAJOR** for contrast).
Clear **MELODY** and **ACCOMPANIMENT** (**HOMOPHONIC TEXTURE**).
Uses mainly **PRIMARY CHORDS (I, IV & V)**.
Instruments such as **BANDONEON, VIOLIN, CELLO, DOUBLE BASS** (often plucked – **PIZZICATO**), **SPANISH/ACOUSTIC GUITAR, PIANO**.

I. The Baroque Dance Suite

Popular between 1600-1750, a collection of shorter dances (**MOVEMENTS**) grouped together to form a **SUITE**.
Dances included:

- **ALLEMANDE** (German, 4/4, Stately)
- **COURANGE** (French, 3/4, Lively, Dotted Rhythms and Disjunct melody)
- **SARABANDE** (Spanish, 3/2, Slow and Stately, emphasis on 2nd bear of bar)
- **MINUET** (3/4, Elegant, Stately)
- **GIGUE** (6/8, Fast, Lively, Triplet Rhythms)

All dances in **BINARY FORM (AB)** with each section repeated **(AABB)**.
Performed by a group of instruments such as **HARPSICHORD, LUTE, VIOLIN, CELLO, OBOE, RECORDER, FLUTE**.

J. American Line Dance

GROUP SYNCHRONISED DANCE.
All dancers face same way standing in lines performing steps at the same time without touching.
Accompanied by **COUNTRY AND WESTERN MUSIC:**
CATCHY MELODY, CROTCHET BASS LINE, SIMPLE HARMONY (CHORDS I & V) in crotchets.
SIMPLE QUADRUPLE METRE (4/4)
POPULAR SONG FORM
MAJOR TONALITY
Instruments such as **GUITARS (Electric and Acoustic), STEEL GUITAR, DRUMS, BANJO, FIDDLE, HARMONICA, ACCORDION**.

K. Irish Jig and Reel

Traditional **FOLK DANCES** from Ireland with intricate footwork and arms by sides.
REEL: COMPOUND TIME (6/8); **JIG: SIMPLE TIME** (2/4 or 4/4) both with "two in a bar" feel, continuous bouncy quaver or semiquaver rhythms, fast tempo and **DECORATED** melodies. **BINARY FORM**.
MAJOR/MINOR or **MODAL**.
Folk Instruments include: **FIDDLE, FLUTE, TIN WHISTLE, ACCORDION, BODHRAN, UILLEANN PIPES, HARP**.

L. Disco

Appeared in 1970's as an individual, **IMPROVISED DANCE** in clubs from a mix of jazz, funk and soul.
SIMPLE QUADRUPLE METRE (4/4)
FAST TEMPO (around 120 BPM)
FOUR-ON-THE-FLOOR RHYTHM (see E.)
SYNCOPATED bass line parts.
Simple **CHORD PATTERNS** using **CHORDS I** and **V** and **SEVENTH CHORDS.**
POPULAR SONG FORM with a strong **GROOVE** (long repeated rhythm section) and fade out endings, and catchy **HOOKS/RIFFS**.
GUITARS, VOCALS, DRUMS, STRING/BRASS SOUNDS, SYNTHESISERS, SAMPLES.

M. Club Dance

Influenced by **MUSIC TECHNOLOGY:** samplers, synthesisers, sequencers and drum machines.
Various genres: House, Techno, Drum and Bass, Garage, Trance, Ambient. Dancing in individual and **IMPROVISED** on one spot.
SIMPLE QUADRUPLE METRE (4/4).
Use of **ELECTRONIC SOUNDS.**
A **STRONG BEAT** emphasised by the **DRUM** and **STRONG BASS LINES**.
SHORT PHRASES and **REPETITIVE SECTIONS**.
FAST TEMPO (Ambient is slower/chilled)
Complex, layered drum patterns.
Inclusion of **SAMPLES**.

What Makes a Good Song?

Exploring Popular Songs and Musical Arrangements

A. Popular Song Structure

SONG STRUCTURE – How a song is made up of or divided into different sections (see below) and the order in which these sections occur. To work out the structure of a song, it's helpful to analyse the **LYRICS and** listen to a recording for the song (for instrumental sections).

INTRO – often shortened to 'intro', the first section of a song which sets the mood of the song and is sometimes, but not always, an instrumental section using the song's chord pattern.

VERSES – songs normally have several verses. Verses introduce the song's theme and have the same melody but different lyrics for each verse which helps develop the song's narrative and story. Songs made up entirely of verses are called **STROPHIC**.

LINK – a optional short section often used to join different parts of a song together, often instrumental, and sometimes joins verses together or appears at other points within a song.

PRE-CHORUS – an optional section of music that occurs before the **CHORUS** which helps the music move forward and "prepare" for what is to come.

CHORUS – occurs several times within a song and contains the most memorable **HOOK/RIFF**. The chorus relays the message of the song and is repeated with the same melody and lyrics each time it is heard. In popular songs, the chorus is often repeated several times towards the end of the song.

MIDDLE 8/BRIDGE – a section (often 8 bars in length) that provides contrasting musical material often featuring an instrumental or vocal solo using new musical material allowing the performer to display their technical skill on their instrument or voice.

CODA/OUTRO – The final section of a popular song which brings it to an end (Coda is Italian for "tail"!)

B. Key Words

LYRICS – The words of a song, usually consisting of **VERSES** and a **CHORUS**.

HOOK – A 'musical hook' is usually the 'catchy bit' of the song that you will remember. It is often short and used and repeated in different places throughout the piece. Hooks can be either **MELODIC, RHYTHMIC** or **VERBAL/LYRICAL**.

RIFF – A repeated musical pattern often used in the introduction and instrumental breaks in a song or piece of music. Riffs can be rhythmic, melodic or lyrical, short and repeated.

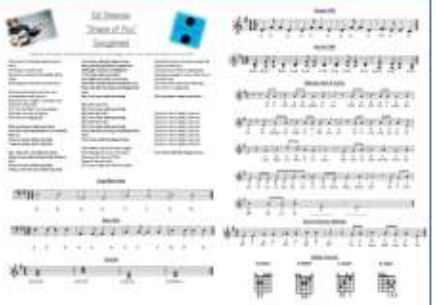
MELODY – The main tune of the song often sung by the **LEAD SINGER**.

COUNTER-MELODY – An 'extra' melody often performed 'on top of' the main melody that 'fits' with it a **DESCANT** or **INSTRUMENTAL SOLO**.

TEXTURE – The layers that make up a song *e.g., Melody, Counter-Melody, Hooks/Riffs, Chords, Accompaniment, Bass Line*.

C. Lead Sheet Notation and Arrangements

A **LEAD SHEET** is a form of musical **NOTATION** that contains only the essential elements of a popular song such as the **MELODY, LYRICS, RIFFS, CHORDS** (often as guitar chord symbols) and **BASS LINE**; it is not as developed as a ***FULL SCORE ARRANGEMENT*** and is open to interpretation by performers who need to use and adapt the given elements to create their own musical **ARRANGEMENT:** their "version" of an existing song.



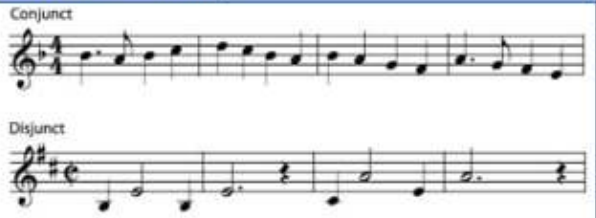
COVER (VERSION) – A new performance, remake or recording by someone other than the original artist or composer of the song.

D. Conjunct and Disjunct Melodic Motion

CONJUNCT MELODIC MOTION – Melodies which move mainly by step or use notes which are next to or close to one another.

DISJUNCT MELODIC MOTION – Melodies which move mainly by leap or use notes which are not next to or close to one another.

MELODIC RANGE – The distance between the lowest and highest pitched notes in a melody.



E. Song Timbre and Sonority (Instruments that are used to Accompany Songs)

Pop Bands often feature a **DRUM KIT** and **PERCUSSION** to provide the rhythm along with **ELECTRIC GUITARS (LEAD GUITAR, RHYTHM GUITAR** and **BASS GUITAR)** and **KEYBOARDS**. Sometimes **ACOUSTIC INSTRUMENTS** are used such as the **PIANO** or **ACOUSTIC GUITAR**. **ORCHESTRAL INSTRUMENTS** are often found in pop songs such as the **STRINGS, SAXOPHONE, TROMBONE** and **TRUMPET.**

Singers are essential to a pop song - **LEAD SINGER** – Often the "frontline" member of the band (most famous) who sings most of the melody line to the song. **BACKING SINGERS** support the lead singer providing **HARMONY** or a **COUNTER-MELODY** (a melody that is often higher in pitch and different, but still 'fits with' the main melody) and do not sing all the time but just at certain points within a pop song e.g. in the chorus.

Year 9 PE

Term 2

- Evaluating & Improving
- Self-Motivation
- Leadership
- Body Management
- Innovation
- Resilience

PHYSICAL ME

Application of physical skills and tactics

EMPLOYABLE ME

Demonstrate person values, behaviours & character traits

HEALTHY ME

Develop personal health and wellbeing

To experience a variety of leadership roles across a range of activities. To develop the ability to add value to others and improve their success whilst gaining an appreciation of the importance of these skills for the future.

	3		4	
1	Hockey	SM4	Basketball	HM2
2	Basketball	SM4	Hockey	HM2
3	Football	SM4	Volleyball	HM2
4	Volleyball	SM4	Football	HM2

- Leadership
- Body Management

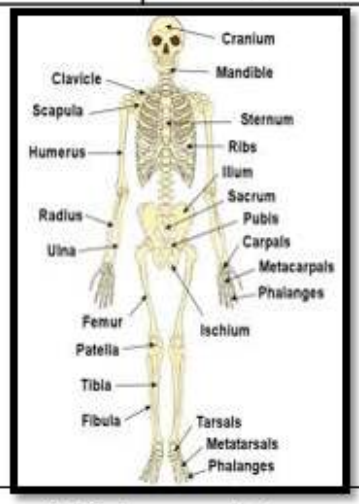
EM2	Recognise the effect of personal behaviour on others. Step up and take the lead or allow others to undertake that role. Recognise other students' ability.				
	Above	Excellent	Expected	Working Towards	Concern
	Is always keen to a undertake a leadership role within the lesson in terms of coaching and offiiciating	Often engages in leadership qualities and frequently helps others to recognise their abilities within the lesson.	is able to show leadership qualities by being a role model and recognising other students abilities.	Shows elements of leadership within their immendiate peer group but finds recognising the abilities of other students a challenge.	Rarely demonstrates leadership skills and feel uncomforable is a spot light situation.
HM2	Understand the short term effects of exercise on the body. Understand the long term effects of exercise on the body.				
	Above	Excellent	Expected	Working Towards	Concern
	Demontsrates an excellent understanding of the short term and long terms effects of exercise during PE lessons and extra curricular actvities	Demontstrates a secure knowledge and understanding of the short term and long term effects of exercise and applies this to their weekly exercise .	is able to understand both short and long term effects of exercise on the body and apply this to their own body management	Shows some basic understanding of the short term and long term effects of exercise and can verbalise the importance of this to a basic level	Shows limited understanding of the short term and long term effects of exercise on the body and fails to apply this in PE lessons

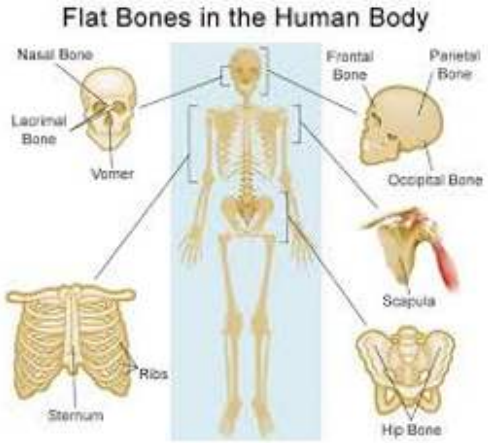
Skeletal system

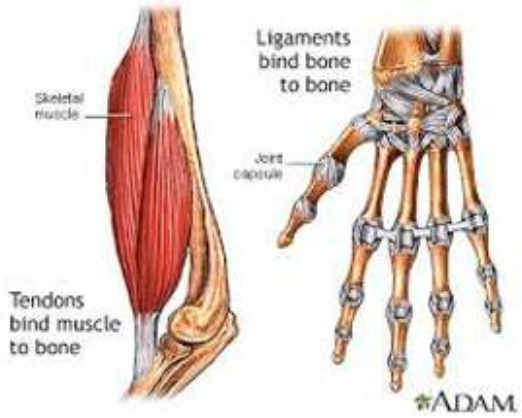
Functions of Skeletal System:

- ***Protection*** - the cranium and ribs protect the brain and vital organs in the chest.
- ***Shape*** - gives shape to the body and makes you tall or short.
- ***Support*** - holds your vital organs in place when playing sport. The vertebral column holds the body upright.
- ***Movement*** - muscle are attached to bones, which are jointed. When the muscles contract the bones move.
- ***Blood production*** - red blood cells (to carry oxygen) and white blood cells (to protect against infection) are produced in the bone marrow of some bones.

Type of bone	Example	Function in sport
Long	Femur, humerus	Movement - to generate strength and speed
Short	Carpals, tarsal	Shock absorption - spreading load
Flat (Plate)	Ribs, cranium	Protection of vital organs, attachment of muscles to help movement
Irregular	Vertebrae, face	Provide shape, protection







Synovial joints and Connective Tissue Functions:

- ***Cartilage*** reduces friction. Acts as a shock absorber.
- ***Synovial fluid*** lubricates the joint.
- ***Synovial membrane*** produces synovial fluid.
- ***Tendon*** joins muscle to bone enabling movement.
- ***Ligament*** joins bone to bone, stabilising the joint

PERSONAL DEVELOPMENT KNOWLEDGE ORGANISER YEAR 9

UNIT 3: RELATIONSHIPS AND SEX EDUCATION

LESSON 8: FAMILIES AND PARENTING

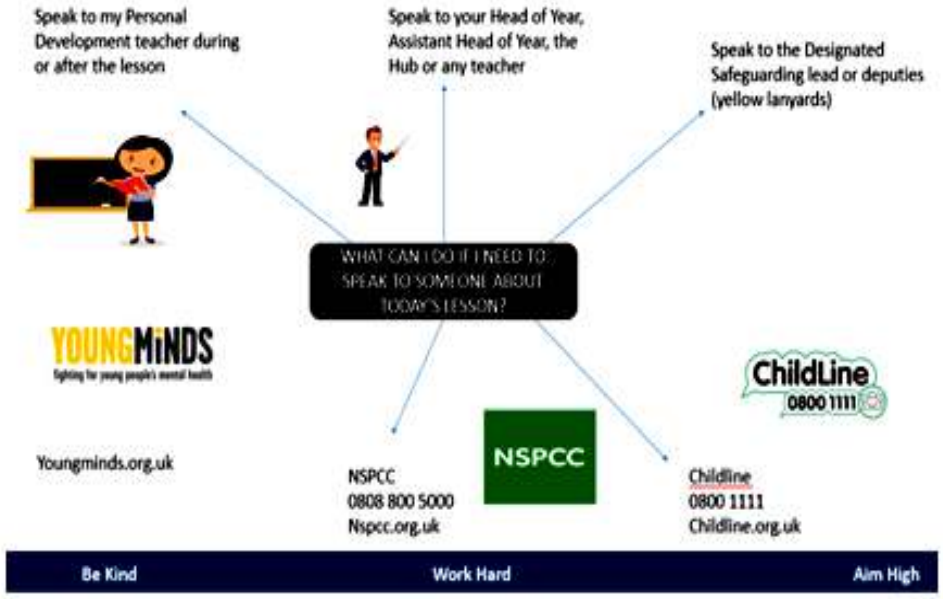
- There are many different family units in the United Kingdom-in many ways there is no such thing as any average family.
- In 2022, there were 19.4 million families in the UK, an increase of just over 1 million families (5.7%) in the decade since 2012.
- The qualities of a good parent could include being loving; having rules; trust and good communication.
- The majority of the 2.9 million lone-parent families in 2022 were headed by a lone mother (2.5 million, 84%), with lone fathers now accounting for 16% (457,000) of lone-parent families.

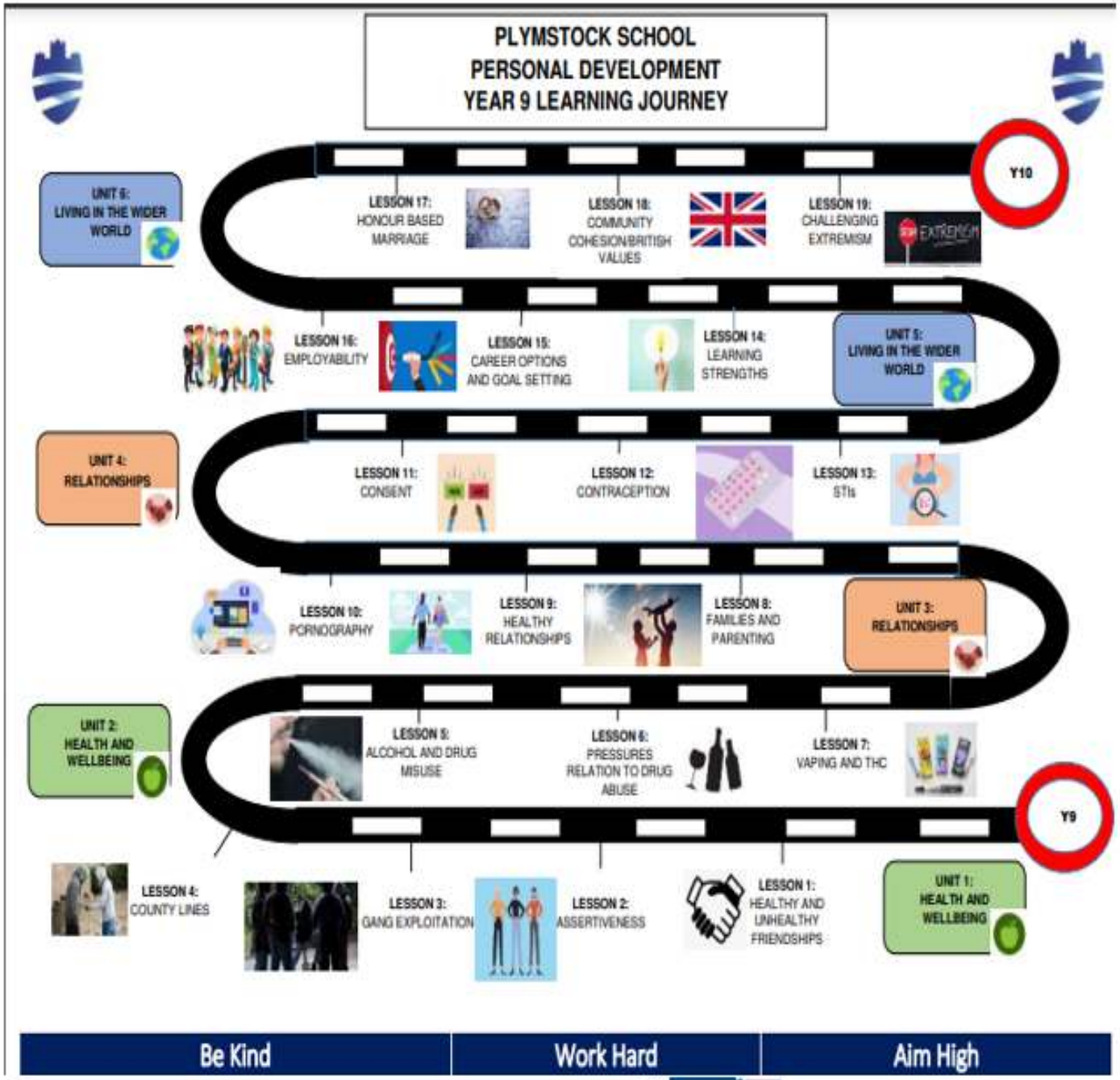
LESSON 9: HEALTHY RELATIONSHIPS

- As we get older, we develop different types of relationships, including romantic relationships. In new romantic relationships it can be difficult to know what is healthy and what is unhealthy.
- We looked at unhealthy relationship features such as forcing, being controlling and not trusting. What other unhealthy relationship features can you think of?
- We looked at healthy relationship features like being respectful, sharing, and not being controlling. What other healthy relationship features can you think of?

LESSON 10: PORNOGRAPHY

- Pornography is defined as visual material containing the explicit description or display of sexual organs or activity, intended to stimulate sexual excitement.
- Many young people begin to watch pornography and often discover is online by accident.
- 46% of young people had seen online pornography for the first time because it "just popped up", as opposed to 22% who reported being shown it by others and 22% who searched for it themselves.
- Studies have shown that when children and young people are exposed to sexually explicit material, they are at greater risk of developing unrealistic attitudes about sex and consent.
- Pornography should not be accessed by under 18s.





KEY TERMS:

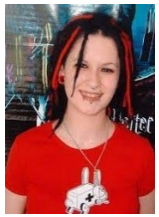
KEY TERM:	DEFINITION:
Families	A group of one or more parents and their children living together as a unit. There are many different family types in the UK.
Parenting	The activity of the activity of bringing up a child as a parent.
Pornography	Visual material containing the explicit description or display of sexual organs or activity, intended to stimulate sexual excitement.
Relationships	The way in which two or more people or things are connected.

Plymstock School

For more activities visit the remote curriculum page of the Plymstock school website under the curriculum heading.

Year 9: Should people be able to practice what they want?

Key Words			
Weird	Something strange or unusual that is outside of the norms within society.	**Tradition**	Practices or customs carried out because they are passed from one generation to another.
Practice	A customary or traditional way of doing something.	**Consent**	Giving permission for something to happen or agreeing to do something.
Ritual	An act or practice with religious meaning or importance.	**Belief**	Accepting something to be true or to exist without evidence or proof.
Secular	Not connected with religious or spiritual matters.	**Religious**	Relating to or believing in a religion.
Prejudice	An opinion not based on experience or actual reason about a group of people.	**Discrimination**	The action of treating someone differently because of prejudice.
Body Modification	Deliberating altering the human body to look a different way	**Eschatological**	Belief in life after death.

Key Information	
Is it weird to be religious? 	According to 2015 data Christianity is the biggest religion in the world with over 2 billion followers 31% of the population. 84% of the population of the world has some religious belief in the worlds religious traditions or spirituality. This figure increases in relation to belief in life after death. Eastern traditions are growing in numbers as family members are more likely to share and continue religious beliefs and rituals with the nest generation. Society in general is becoming more secular as are rules, laws and culture are not based on religion as they would have been traditionally. While Britain could be seen to be becoming more secular different faith groups and traditions are widely accepted across the country.
Body Modifications 	Deliberately altering your body to a different way and express belief and tradition is not a new practice. Chinese foot binding was performed on young girls to keep their feet small as a sign of beauty. This was done without consent as it is a painful process. Tradition meant families forced their daughters to have the practice. The Suri tribe women usually consent to have their lips stretched by inserting ceramic plates. The practice is believed to have originally deterred slavers from taking the women. Today to shows the value of a woman on her marriage and the dowry (usually cattle) that should be paid.
Sophie Lancaster 	Sophie Lancaster was a young girl was a young woman who liked to be different from the norm. She was non-conformist in how she dressed, wore her hair and piercings or body-modifications. She faced abuse and was called names in the street along with her boyfriend because they were different. The discrimination became violent when Sophie and her boyfriend were attacked and killed by men who did not tolerate their difference. Sophie was murdered because she was different. This was a hate crime that usually stems from prejudice and fear of difference.

Amish 	Immigrated to Pennsylvania, USA in 1800's and speak Pennsylvania Dutch. The Amish are a group of ultra traditional Christians who follow very strict rules. They are known for simple living and limit their use of things like electricity, transport and telephones. The Amish are pacifists and do not believe in the use of violence so will join the military. Baptism is essential before marriage and once baptised they can only marry within the community. There are about 250,000 in the Amish community across the USA and Canada.
Sky burial 	Buddhists rituals around death reflect their beliefs that human beings are reborn many times and that there is no permanent soul. This belief is called **Anatta**. **Samsara** is the Cycle of life/death and rebirth that Buddhists believe we are trapped in. Sky burials show the **impermanence** of the soul, bodies are left to decompose and are eaten or scavenged by vultures. This shows impermanence as nothing last for ever, after the death the boy returns to the earth.
Day of the Dead 	**Dia De Los Muertos,** the holiday celebrated in Mexico is like a family reunion to celebrate loved ones who have died. Offerings of food and flowers are made to act as a doorway for loved ones to visit the living. Marigolds (a type of flower) are believed to offer a pathway to the mortal world.
Polygamy 	The practice of having more than one husband or wife at the same time. Polygamy is illegal in the UK, but is legal in 58 countries around the world. Christianity does not support the practice of polygamy, they practice monogamy, marrying one spouse or partner for life as an ideal. Polygamy can support the economic stability of a family and husbands and wives work together to support the family unit.
Fundamentalism 	The Taliban is an extreme Islamic group, which ruled Afghanistan from 1996 to 2001. This means their beliefs are outside of the norm for MOST Muslims. They want their leaders to be in charge of Afghanistan. The Taliban want to organise Afghanistan so that it follows laws approved by Islam. They refer to the Qur'an and believe that it is inerrant (it can't be wrong). The problem is, that many of the laws imposed by the Taliban are not laws that most people would believe are Islamic. They say they are followers of Islam but many people do not agree with this, as their beliefs are much more extreme than those of the majority of Muslims.