Knowledge Organiser

Year 10

Cycle 2

CORE SUBJECTS

Name:

Tutor Group:

What is a Knowledge Organiser and why are they important?

A knowledge organiser is designed to summarise the key information, concepts, and vocabulary for a specific topic or unit of work in each subject. Its purpose is to help students:

- o Understand what they are expected to learn.
- o Make connections between ideas.
- o Retain and recall essential knowledge more effectively.
- o Support independent study and revision

Your Knowledge Organiser contains the essential knowledge that we expect every student to know. Regular use of the Knowledge Organiser helps you to recap, revise and revisit what you have learnt in lessons. This can be part of your homework in some subjects or as independent revision The aim is to help remember this knowledge in the long term and to help strengthen your memory.

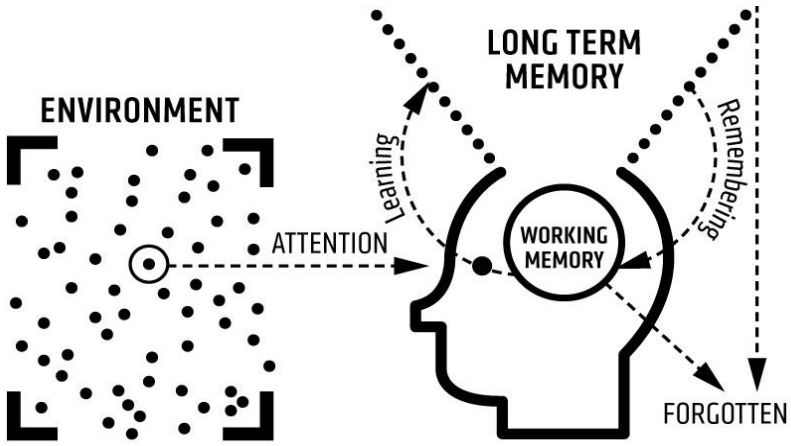
Each cycle there is an assessment in every subject and you will be assessed on the knowledge from your Knowledge Organiser; the more you revisit information the more likely it will be remembered for lessons, assessments and exams.

How we learn anything

We learn by focusing our attention on something. If we are distracted by other things in our environment (eg mobile phones, listening to music) it will affect how much/what we learn.

Information we pay attention to goes into our working memory, but our working memory is not very good and we quickly and easily forget things.

Learning happens when we think about, process or practise doing something so that it is stored in our long-term memory. Even then it can still be forgotten if we do not regularly think about it and go over it. *We remember what we think about*. Using your Knowledge Organiser outside of lessons helps you to remember things in the long-term.



Homework in Year 10-11

The purpose of homework

Homework plays a crucial role in reinforcing what you learn in the classroom, helping you to develop a deeper understanding of the material. It encourages independent learning, time management, and responsibility: skills that are essential for success both in school and in life.

Homework fosters a strong work ethic and a sense of discipline, preparing you for future academic and professional challenges. Homework is not just about completing tasks, it is about building lifelong learning habits. Learning is defined as a change in the long-term memory. You attend 5 hours of lessons per day, which is a lot of new information being taken in. Without additional opportunities to practise remembering, much of that information would be quickly forgotten.

Homework expectations

In Years 10-11 we expect every student to complete around 1 hour of homework a day, 5 days a week. English, Maths and Science will set around 1 per week each and the other GCSE subjects will be around 30 minutes each using the following timetable:

	Monday	Tuesday	Wednesday	Thursday	Friday
Subject 1	Science	Geog/History	Maths	Option Block F	Maths
Subject 2	English	Option Block E	English	Science	Option Block G

Maths and Science homework will be completed on Sparx. All other subjects may be a mixture of Seneca, Knowledge Organiser work and worksheets/tasks. Homework will be recorded on Class Charts to help students and parents keep track of what to do.

Year 10 Core Cycle 2

Knowledge Organiser Contents Page

Start with Week 1. Each week, complete the next colour block. Write each word out 3 times and each definition once. Check it all with a purple pen. Tick what is correct, amend what is wrong.

Coombeshead Academy *Inspiring Excellence*		English Learning Area			*Macbeth* - William Shakespeare
wk	**keyword**	definition	example		
Week 1	**Tragedy**	The main character falls from greatness because of a fatal flaw in their personality.	*The tragedy of Macbeth* is the full title of the play.	**Week 1**	**Supernatural and Heroism**  **Supernatural:** In Shakespeare's time, the powers of evil were thought to be absolutely real; to most people Hell was an actual place and the Devil a constant threat to their souls. In particular there was a fascination with witches and witchcraft. Hundreds of innocent people (mostly women) were executed as suspected witches. The interest came from the very top, led by King James I himself who published a book on the subject called *Demonology*. When Shakespeare came to write his play, he knew that his audience would find the theme of evil and the supernatural very interesting indeed. **Heroism: Macbeth** is a tragic **hero** because he started the play as a good man, but the manipulations of the Weird Sisters and his wife brought out his baser qualities. This leads to **Macbeth**'s moral corruption and downfall by the play's end. It is clear **Macbeth** begins the play as a loyal friend and decent man. 
	Protagonist	The leading character in a text.	Shakespeare often uses the name of the protagonist in the title – they are then called the titular character. Examples: *Macbeth, Othello, Julius Caesar.*		
	Hamartia (ham/art/ee/aa)	The fatal flaw leading to the downfall of the leading character.	"no spur to prick the sides of my intent, but only vaulting ambition"		
	Hubris (huw/bris)	Excessive ambition/self-confidence (that is the fatal flaw of Macbeth)	"Then live, Macduff: what need I fear of thee?"		
	Paradox	A statement used that seems contradictory.	"Fair is foul, and foul is fair."		
Week2	**Aside**	A speech in a play that is intended to be heard by the audience but unheard by the other characters in the play.	"If good, why do I yield to that suggestion/Whose horrid image doth unfix my hair" Only the audience hear Macbeth's first thoughts of murder.	**Week2**	**Act I** On a bleak Scottish moorland, Macbeth and Banquo, two of King Duncan's generals, discover three strange women (witches). The witches prophesy that Macbeth will be promoted twice: to Thane of Cawdor (a rank of the aristocracy bestowed by grateful kings) and King of Scotland. Banquo's descendants will be kings, but Banquo isn't promised any kingdom himself. The generals want to hear more, but the "weird sisters" disappear.
	Echo	When a character uses the words/phrases used earlier by another character to create a link between them.	"So fair and foul a day I have not seen." Macbeth echoes the witches ("Fair is foul and fouls is fair") to create a link between him and the supernatural.		
	Masculine imagery	Metaphor/simile/personification associated with characteristics linked to men in a given time period.	"with his brandish'd steel, Which smoked with bloody execution"		
	Hero	A person who is admired for great or brave acts or fine qualities	"For brave Macbeth—well he deserves that name"		
	Traitor	A person who betrays someone or something, such as a friend, cause, or principle.	"That most disloyal traitor" (Duncan about the original Thane of Cawdor)		

						Soon afterwards, King Duncan names Macbeth Thane of Cawdor as a reward for his success in the recent battles. The promotion seems to support the prophecy. The King then proposes to make a brief visit that night to Macbeth's castle at Inverness. Lady Macbeth receives news from her husband about the prophecy and his new title. She vows to help him become king by whatever means are necessary 
Week 3	**Foil**	A character who is presented as a contrast to another.	Banquo throughout the play is seen as (almost) perfect and honest, compared to Macbeth who is seen as flawed and power-hungry.		Week 3	**Act II** Macbeth returns to his castle, followed almost immediately by King Duncan. The Macbeths plot together to kill Duncan and wait until everyone is asleep. At the appointed time, Lady Macbeth gives the guards drugged wine so Macbeth can enter and kill the King. He regrets this almost immediately, but his wife reassures him. She leaves the bloody daggers by the dead king just before Macduff, a nobleman, arrives. When Macduff discovers the murder, Macbeth kills the drunken guards in a show of rage and retribution. Duncan's sons, Malcolm and Donalbain, flee, fearing for their own lives; but they are, nevertheless, blamed for the murder. 
	Aural (or/ul)	Images or methods associated with sound.	Rhyming used by the witches, “When the hurlyburly's done, When the battle's lost and won”.			
	Gender expectations (challenged)	The **gender roles** during the **Jacobean** era were fairly similar to the **Elizabethan** ones. Men assumed a dominant position in the society.	Come, you spirits That tend on mortal thoughts! unsex me here, And fill me from the crown to the toe top full Of direst cruelty;			
	Regicide	The murder of a King	Macbeth can’t say it (because it is so bad). He says “this business” and “horrid deed” instead. These are called euphemisms.			

Week 4	**Symbolises**	When a writer uses something to stand for/represent something else.	"Come let me clutch thee" (Macbeth trying to hold the illusory dagger)
	Conscience	A person's sense of right and wrong that guides their actions	"We will proceed no further in this business"
	Soliloquy (so/lil/o/kwey)	When a character speaks their innermost thoughts, heard only by the audience.	"Is this a dagger which I see before me?"
	Comic Relief	A short comic scene in a play which is mostly a tragedy	"nose-painting, sleep and urine" (the porter talking about being drunk)
	Tension	The sense that something is about to happen	"And yet I would not sleep" (Banquo unable to sleep on the night of the murder)
Week 5	**Jacobean**	The time period relating to the rule of James I of England.	1603-1625. Macbeth was written in 1606
	Personification	Giving human qualities or emotions to something that is not human	"Bleed, bleed poor country!" (Macduff)
	Euphemism (uu/fem/ism)	Replacing a harsh word/phrase with one that is milder	*"But Banquo's safe?" (Macbeth –he can't bear to say murdered or dead)*
	Irony	Using language that is the opposite of what you mean	"But Banquo's safe?" (Macbeth – he actually means is Banquo dead?)
	Dramatic irony	When the audience know something that the characters do not	We can see Banquo's ghost but none of the characters, except Macbeth, can. "What is't that moves your highness?"

Week 4

Act III

Macbeth becomes King of Scotland but is plagued by feelings of insecurity. He remembers the prophecy that Banquo's descendants will inherit the throne and arranges for Banquo and his son Fleance to be killed. In the darkness, Banquo is murdered, but his son escapes the assassins. At his state banquet that night, Macbeth sees the ghost of Banquo and worries the courtiers with his mad response. Lady Macbeth dismisses the court and unsuccessfully tries to calm her husband.

Lady Macbeth and Macbeth then discuss Banquo's murder but Macbeth begins to think about Macduff, the man he considers to be most dangerous to him.

Week 5

Act IV

Macbeth seeks out the witches who say that he will be safe until a local wood, Birnam Wood, marches into battle against him. He also need not fear anyone born of woman (that sounds secure, no loop-holes here).

"My secret is putting the toil in first and adding the trouble just as it comes to a boil."

They also prophesy that the Scottish succession will still come from Banquo's son. Macbeth embarks on a reign of terror, slaughtering many, including Macduff's family. Macduff had gone to seek Malcolm (one of Duncan's sons who fled) at the court of the English king. Malcolm is young and unsure of himself, but Macduff, pained with grief, persuades him to lead an army against Macbeth.

Week 6			
	Suspicious	Having or showing a cautious distrust of someone	“I fear thou played'st most foully for 't.”
	Tyrannical	Using power in a cruel or oppressive way.	"Thou liest, abhorred tyrant"
	Dynamic characters	Characters who change across the play.	Such as Macbeth and Lady Macbeth
	Hallucination **Hh/aa/ll/oo/ss/in/ay/shun**	To see something that it not really there	"Thou canst not say I did it; never shake Thy gory locks at me." - *Macbeth*, 3.4

Week 6	
	Act V Macbeth feels safe in his remote castle at Dunsinane until he is told that Birnam Wood is moving towards him. Malcolm's army is carrying branches from the forest as camouflage for their assault on Macbeth's stronghold. Meanwhile, an overwrought and conscience-ridden Lady Macbeth walks in her sleep and tells her secrets to her doctor. She commits suicide. As the final battle commences, Macbeth hears of Lady Macbeth's suicide and mourns.  In the midst of a losing battle, Macduff challenges Macbeth. Macbeth learns Macduff is the child of a caesarean birth (loophole!), realises he is doomed, and submits to his enemy. Macduff triumphs and brings the head of the traitor Macbeth to Malcolm. Malcolm declares peace and goes to Scone to be crowned king.

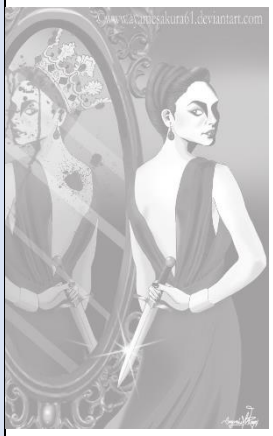
Week 7	**Imperative sentences**	Sentences that give an instruction or order.	"Beware the Thane of Fife"
	Exclamatory sentences	Sentences that show heightened emotion by having a ! at the end	"Fly good Fleance, fly, fly, fly!"
	Formal	A type of speech used in serious situations	"All our service In every point twice done and then done double" (Lady Macbeth welcoming Duncan)
	Methods	Anything the writer is doing to create a particular effect	Imagery, single word choice, lexical sets, repetition, sentence type, symbolism..and lots more
	Chivalry	Behaviour with high moral, and social codes.	Faith, charity, justice, prudence, resolution, truth, diligence, hope and valour "Valiant cousin"
Week 8	**Divine right of Kings**	Kings get their authority directly from God	"by the grace of Grace" (Malcolm about being King)
	Binary opposites	Set up as being directly opposite to each other	Lady Macduff and Lady Macbeth
	Domestic	Things related to the home (Lady Macduff cares primarily about this, not politics or battles)	"to leave his wife, to leave his babes, His mansion and his titles" (Lady Macduff)
	Kingship	The roles and responsibilities of being a King	"Hail, King of Scotland!" (rejoicing when Malcolm is crowned as he will be a good King)

Week 7

Ambition and Power in Macbeth

Shakespeare set Macbeth in the distant past and in a part of Britain that few of his audience would have been familiar with. Scotland is shown as a wild and savage place ruled over by a weak king (Duncan) who relies on his warrior thanes to keep control. However, through the character of Macbeth, Shakespeare goes on to show that having too much ambition and total control of power is just as bad. By the end of the play Malcolm has become King and it seems likely that he will be much fairer and treat his people justly.

Week 8



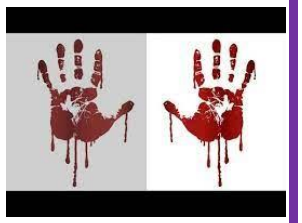
Appearances and Reality in Macbeth

In *Macbeth*, things are never quite what they seem. Characters say one thing yet mean something else and use euphemisms to hide reality. Wicked and violent acts such as murder are covered up or the blame is shifted onto someone else. The Witches mislead Macbeth, or they at least make suggestions which allow him to mislead himself. Ghosts, visions and apparitions occur regularly. All of these things contribute to the many contrasts which exist in the play; almost nothing is as it should be.

Week 9	**Shared Lines**	The witches appearance as one entity is emphasised by their shared lines.	"Fair is foul and foul is fair"	
	Iambic Pentameter	The pattern of stressed and unstressed syllables in a line. It is found frequently throughout the play.	"So foul and fair a day I have not seen"	
	Juxtaposition Jj/ux/ta/pp/o/zz/i/shun	Contrasting ideas presented near to each other.	Lady Macbeth is the juxtaposition of her former self in Act 5, Scene 1.	
	Oxymoron	Two contrasting words written next to each other.	"Fair is foul".	
Week 10	**Witchcraft**	The use of magic or supernatural powers, usually to harm others.	The witches practise this to lure Macbeth to his tragic downfall.	
	Antithesis	Where contrasting ideas are presented in quick succession.	Banquo and Macbeth's characters, Macbeth and Malcom's style of reign and Macbeth and his wife are all examples of contrasts.	
	James I	On the throne 1603-1625.	Intended victim of the Gunpowder plot. Direct descendant of Banquo.	
	Daemonologie	Book written by James I.	Details the King's fascination with withcraft. James I supported witch trials and was very superstitious himself.	

Week 9

Guilt in Macbeth



Initially, Macbeth is shown as reluctant to partake in his wife's plans. He cannot go through with the killing of Duncan and is frequently consumed by his own guilt, e.g. Banquo's ghost at the feast. However, he gradually becomes tyrannical and his need to kill shows this desperation. In contrast, Lady Macbeth is ruthless but is later driven mad by her guilt, e.g. her sleepwalking whilst trying to get imaginary blood off her hands.

Week 10

Violence in Macbeth

This is seen throughout the play. It begins with a battle, contains the murder of men, women and children and ends with the suicide of Lady Macbeth and beheading of Macbeth. Macbeth learns that violence breeds violence; with each violent act he commits, he opens the door for someone to challenge his kingship with more violence. He ends up with nothing but his violent tendencies and his life becomes a destructive cycle.

Make sure that you are confident with the AO2 Subject Terminology – You need to know the definition and be able to identify it in a passage of text.

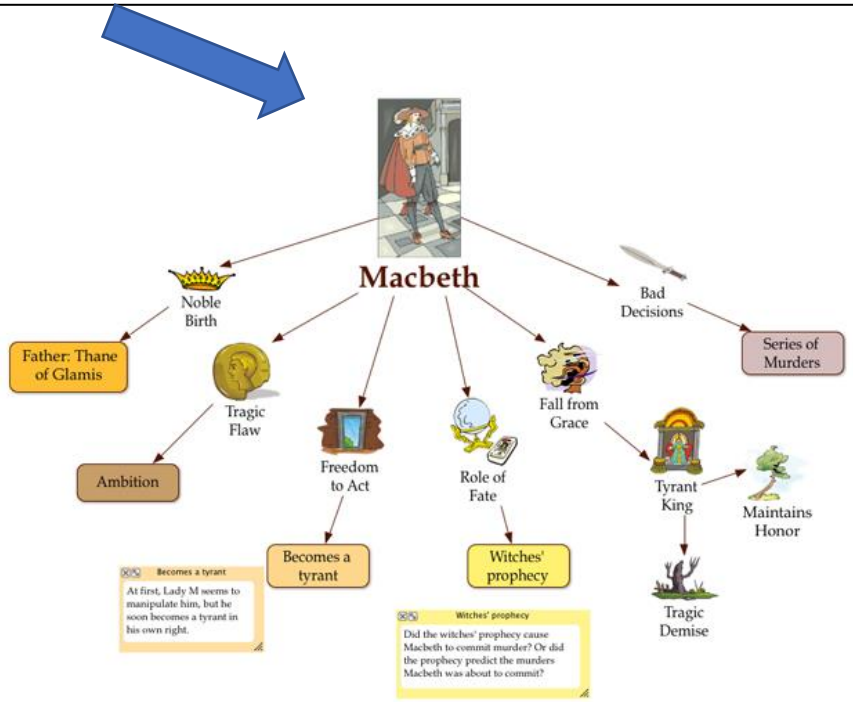
Learn quotes – You will need to memorise quotes for all your GCSE Literature exams. You also need to be able to analyse the quotes – comment on the Why it is significant, What it demonstrates about the character, How it affects the audience and How it develops the themes within the play.

Make sure you are confident with the plot and the characters. You should be able to explain how characters change in the text and their function.

Key Characters

(pick 1)
- ☐ Create a character sheet
- ☐ Create a mind map
- ☐ Plot their activities and actions
- ☐ Draw their picture using evidence from the play
- ☐ Write a letter home from their perspective
- ☐ Write a script between two characters
- ☐ Write what happens to a character after the play

Macbeth * Lady Macbeth * The Witches * MacDuff * Malcom



AO3 – Social Context – *(Influences on the book and author)*

Developing Cultural Capital - Themes

Read a newspaper article on a theme from the play that's linked to current events.

Tasks: (pick 1)
- ☐ Print them out and highlight literary techniques.
- ☐ Write a summary of the article
- ☐ Find two conflicting articles

Example:

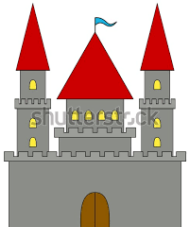
Supernatural – Modern witches. Representation of witches in literature (Harry Potter?)
Royalty – Any newspaper article about the Royal family
Scotland – Independence/ Laws/ identity
Goodness – Find an article about someone who was a hero (NHS workers)

PLACES IN THE PLAY:

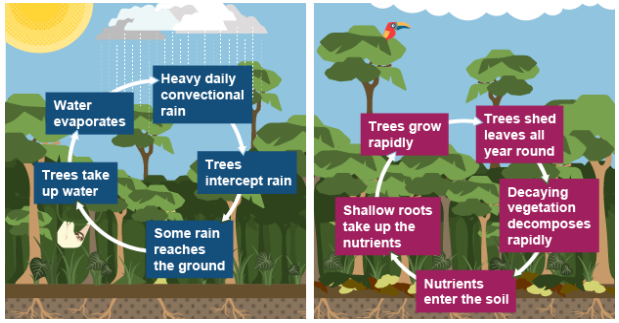
Think about how Shakespeare use of places even though it's a play. Find descriptions, key chapters and events that link to the main places.

Battle Field Castle Witches' home Heath Banquet Hall

BIG WRITE: Write your own description of these locations



Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

Week 1 – Tuesday 9th December 2025		
Lesson 1 – Components of an ecosystem	**Lesson 2 – Nutrient cycling**	**Lesson 3 – Change in an ecosystem**
Key Terms: **Abiotic:** Relating to non-living things. **Biotic:** Relating to living things. **Food Chain:** The connections between different organisms (plants and animals) that rely on one another as their source of food. **Food Web:** A complex interconnection of all the food chains in an ecosystem. **Consumer:** An animal that eats animals and/or plant matter.	**Key Terms:** **Nutrient Cycle:** A set of processes whereby organisms extract minerals necessary for growth from soil or water, before passing them on through the food chain - and ultimately back to the soil and water. **Decompser:** An organism, such as a bacterium or fungus, that breaks down dead tissue which is then recycled to the environment.	**Key Terms:** **Ecosystem Equilibrium:** A relatively stable state that keeps population sizes within a sustainable range (not too many of a certain species alive or dead).
Content: Ecosystems can be any size. **Local** e.g. a pond or under a dead log- **Regional** e.g. the upland moorland of the Pennines **Global** e.g. tropical rainforest. Also called biomes. At each (trophic) level of the food chain, the number of individuals declines. This is because not all individuals in any trophic level are consumed (eaten). This means not all energy is passed up to the next trophic level. **A small-scale ecosystem – A Freshwater Pond:** **Pond producers: turn sunlight into energy** Plants – including Marsh Marigold, Reed Mace, Water Lily **Pond consumers:** Water boatmen, Great diving beetle, small fish (stickleback), Frogs, Heron, Dragonfly, Kingfisher **Decomposer:** Return (break down organics mater) nutrients to the soil	**Content:** **Soil** is the top layer of the earth that is composed of disintegrated rock particles, humus, water and air. **Litter** is organic matter in and on the soil, it includes humus and leaf litter. **Biomass** is the total mass of living organisms, mainly plant tissue, per unit area. It is a store of energy and is also known as standing crop. **Nutrient cycling** happens **rapidly** in tropical rainforests as it is **very hot and wet**. It occurs very slowly in cold environments.  	**Content:** If any component within an ecosystem is changed it will have a knock-on effect on the rest of the ecosystem. **Yellowstone National Park in the USA** when they reintroduced wolves in 1995. **16 packs of grey wolves introduced. Each pack kills one elk a day.** More kills by wolves = more food for scavengers Reduction in predation from coyotes leads to **increase in mice and voles** **Elk population falls** from 20,000 to 10,000 in 8 years. Reduction in grazing pressure. Aspen and cottonwood regenerate. There is **more tree cover**. Increase in bank side trees **stabilises river banks** so there is **less erosion**. Competition from wolves results in **decrease in coyote population.**
Questions: 1. What is an example of a local ecosystem? 2. Why does the number of individuals decrease at each level of the food chain? 3. Name a producer in a freshwater pond 4. What role do decomposers play?	5. What is soil made of? 6. What is litter and what does it include? 7. What is biomass? 8. Why does nutrient cycling happen rapidly in tropical rainforests?	9. What happened in Yellowstone in 1995? 10. How did the change impact the Elk population? 11. What did trees do to river banks? 12. What did the competition from wolves decrease?

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

<table>
<tr><th colspan="3">Week 2 – Tuesday 16th December 2025</th></tr>
<tr><th>Lesson 4 – Global ecosystems and where</th><th>Lesson 5 – Global ecosystem characteristics</th><th>Specification terminology</th></tr>
<tr><td>Key Terms:
Ecosystem: A community of plants and animals that interact with each other and their physical environment.

Global ecosystem: A very large ecological area on the Earth's surface with fauna and flora (animals and plants) adapting to their environment. Examples include tropical rainforest and hot desert.</td><td>Key Terms:
Latitude: The measurement on a globe or map of locations north or south of the Equator.</td><td rowspan="3">1. Abiotic

2. Biotic

3. Food chain

4. Food web

5. Consumer

6. Nutrient cycle

7. Decomposer

8. Ecosystem

9. Global ecosystem</td></tr>
<tr><td>Content:
Examples of biomes: Tropical Rainforests; Deserts; Temperate Forests; Tundra.

Reasons for their location:

1. Concentration of Sun's energy: The same amount of energy from the sun hit all over the earth BUT because the earth is curved, in some places like the North and South, the energy is spread out. The more spread out it is, the colder it will be.

2. High and Low pressure (Global Atmospheric Circulation):

Low Pressure (air rising) causes evaporation and condensation, leading to rainfall.

High Pressure (air falling) means there is no evaporation, so very few clouds and rainfall.</td><td>Content:
Tropical Rainforests: Along equator. Constant 25°C to 30°C and over 250mm rain per month.

Deserts: At 30° latitude (Sahara and Australia). Over 30°C and less than 300 mmm per year rain.

Deciduous forests: Higher latitudes (W Europe) 5 – 20°C and 500 – 1500 mm rain per year.

Coniferous forest (Taiga): 60°N (Scandinavia / Canada). Cone bearing evergreen trees.

Tundra: Above 60°N (Arctic Circle). Less than 10°C and less than 500mm per year rain.</td></tr>
<tr><td>Questions:
1. List 4 biomes found in the world
2. What happens to the sun's energy in the north and south of the world?
3. What does low pressure cause?
4. What does high pressure cause?</td><td>5. Where are tropical rainforests found?
6. At which latitude are deserts found?
7. What type of trees are found in coniferous forests?
8. Where is the tundra found?</td></tr>
</table>

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

Week 3 – Tuesday 6th January 2026		
Lesson 6 – Tropical rainforest characteristics	**Lesson 7 – Rainforest plant adaptations**	**Lesson 8 – Rainforest animal adaptations**
Key Terms: **Insolation:** The amount of solar radiation (energy) received in the Earth's atmosphere or at the Earth's surface.	**Key Terms:** **Adaptation:** The process of change by which an organism or species becomes better suited to its environment.	**Key Terms:** **Adaptation:** The process of change by which an organism or species becomes better suited to its environment.
Content: **Location of Tropical Rainforests:** Around the equator, between 23.5° north and south of the equator (Tropic lines). **Examples:** Amazon in South America, Congo in Africa, and Borneo in Asia **Climate of rainforests:** **High Temperatures:** High concentration of sun's energy (insolation). High all year around 28°C. **High Rainfall:** Convectional Rainfall (low pressure). Around 250mm per month These are ideal growing conditions for plants. No seasons so plants grow all year round. **Structure of the Rainforest from the top (5 layers):** Emergents, Canopy, Under Canopy, Shrub Layer and Forest floor.	**Content:** Plants on the forest floor are shade tolerant able to cope in the darker conditions. **Epiphytes** grow high up on the branches of trees to gain access to the light. **Lianas** wrap themselves around other trees to gain access to light. Competition for light causes trees to grow fast. They are tall and straight. **Buttress roots** support these tall trees. **Drip tip** leaves that shed water quickly, so they don't snap under the weight of water. 	**Content:** **Three toed sloths:** Powerful hooked claws to hang from trees. Fur is green from algae giving it good camouflage in trees. Lives in trees (including mating and giving birth to avoid predators).  **Rhino Beetle:** Long horn at the front to fight and protect against predators. Curved black back to camouflage against forest floor. 
Questions: 1. Give 3 examples of tropical rainforest 2. What is the temperature like in tropical rainforests? 3. What is rainfall like in tropical rainforests? 4. Name the 5 layers of the tropical rainforest	5. What are plants on the forest floor tolerant to? 6. How do Epiphytes get enough sunlight? 7. What helps tall trees stay upright and stable? 8. Why do some rainforest plants have drip tips?	9. How do sloths stay safe from predators? 10. What helps sloths blend into their surroundings? 11. What is the purpose od the Rhino Beetle's long horn? 12. How does the Rhino Beetle stay hidden on the forest floor?

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

<table>
<tr><th colspan="3">Week 4 – Tuesday 13th January 2026</th></tr>
<tr><th>Lesson 9 – Biodiversity issues</th><th>Lesson 10 – Changing rates of deforestation</th><th>Specification terminology</th></tr>
<tr><td>Key Terms:
Biodiversity: The variety of life in the world or a particular habitat.</td><td>Key Terms:
Deforestation: The chopping down and removal of trees to clear an area of forest.</td><td rowspan="3">1. Insolation

2. Adaptation

3. Biodiversity

4. Deforestation</td></tr>
<tr><td>Content:
The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable

Diversity is higher in the tropics (not just tropical rainforests) primarily because there are fewer ecological obstacles to higher biodiversity.

Biodiversity is also high as it is hot and wet (ideal growing conditions) 12 hours of light, 200mm of rainfall 365 days a year

In the tropics, plants and animals have the greatest access to consistent energy, water, and carbon, etc.

Until recently they have largely been undisturbed by natural or human processes.</td><td>Content:
Current rates of deforestation:
• 1-hectare pre second
• 86,000 hectares per day
• 31 million hectares per year (larger than Poland)

Increasing rates:
• Indonesia +107%
• Madagascar +36%
• Malaysia +9%

Decreasing rates:
• Brazil -21%
• Senegal -21%
• Mexico -31%

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<tr><td>Questions:
1. Why is biodiversity higher in the tropics?
2. How much light and rainfall do the tropics get?
3. What resources do plants and animals have better access to in the tropics?
4. Until recently, why have they been undisturbed?</td><td>5. How many hectares are cut each day?
6. How many hectares are cut per year?
7. State 3 countries with an increasing rate
8. State 3 countries with a decreasing rate</td></tr>
</table>

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

Week 5 – Tuesday 20th January 2026		
Lesson 11 – Causes of deforestation in Malaysia (1)	**Lesson 12 – Causes of deforestation in Malaysia (2)**	**Lesson 13 – Impacts of deforestation in Malaysia (1)**
Key Terms: **Commercial farming:** Farming to sell produce for a profit to retailers or food processing companies. **Subsistence farming:** A type of agriculture producing food and materials for the benefit only of the farmer and his family. **Logging:** The business of cutting down trees and transporting the logs to sawmills.	**Key Terms:** **Mineral extraction:** The removal of solid mineral resources from the earth.	**Key Terms:** **Economic Development:** Increased employment, income, and usually industrial growth. **Soil erosion:** Removal of topsoil faster than it can be replaced due to natural (water and wind action), animal and human activity.
Content: **Commercial Farming:** Largest exporter of palm oil in the world. 1970s wide scale clearing of land. Landowners given tax incentives to produce palm oil.  **Subsistence farming:** Tribal people practise subsistence farming, traditionally small scale and sustainable. Slash and burn is sustainable but can grow out of control. **Logging:** In the 1980s Malaysia became world's largest exporter of tropical hardwood. Selective logging more recent development.	**Content:** **Mineral extraction:** Rainforest cleared on Peninsula Malaysia (tin and smelting). Drilling for oil and gas has started in Borneo.  **Hydroelectricity (HEP):** Bakun Dam started generating electricity in 2011. Asia's highest dam outside China. 700km^2 of forest and farm land flooded. Highly controversial project. **Population Pressure:** Rapidly growing and industrialising cities has led to migration. **Road building:** This is increasing as areas are being cleared to access mining areas, new settlements and energy projects. Logging requires road building too.	**Content:** **Economic gains and losses:** • Brings in jobs and income. • Infrastructure opens new areas for industrial development • Palm oil/rubber provide raw materials for industry. • Destroys resources in the long term. • Pollution of water courses • Changes in climate. **Soil erosion:** • Land left unprotected from heavy rain leads to landslides and flooding. • Nutrients are washed away decreasing nutrients in the soil. • Rivers silt up.
Questions: 1. What crop is Malaysia the largest exporter of? 2. What farming method do tribal people practice? 3. What was Malaysia the largest exporter of in the 1980s? 4. What sort of logging has become more recent?	5. Why has rainforest been cleared on Peninsula Malaysia? 6. What is the name of the dam? 7. What has led to migration in Malaysia? 8. Why is road building increasing?	9. What does deforestation bring? 10. Name the two raw materials provided for industry 11. What does land left unprotected lead to? 12. what happens to rivers?

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

<table>
<tr><th colspan="3">Week 6 – Tuesday 27th January 2026</th></tr>
<tr><th>Lesson 14 – Impacts of deforestation in Malaysia (2)</th><th>Lesson 15 – Value of the tropical rainforest</th><th>Specification terminology</th></tr>
<tr><td>Key Terms:
Climate Change: Any change in global temperatures and precipitation (rainfall) over time, due to natural or human activity.</td><td>Key Terms:
Indigenous: People or objects native to a certain region or environment.</td><td rowspan="3">1. Commercial farming

2. Subsistence farming

3. Logging

4. Mineral extraction

5. Economic development

6. Soil erosion

7. Climate change

8. Indigenous</td></tr>
<tr><td>Content:
Contribution to climate change
• Trees cut down change the water cycle and make it drier.
• Rainforests are referred to the lungs of the earth and so when deforested there is more carbon dioxide in the air.
• Burning also releases carbon dioxide into the air.

Main Range, Peninsula Malaysia
• 500 km stretch of pristine rainforest
• Rich in biodiversity
• The highland forest is home to 25% of all plant species in Malaysia
• Still many undiscovered plants here, with medicinal qualities
  </td><td>Content:
• Biodiversity: Tropical rainforests contain 50% of all the plants and animals in the world. Many of these have yet to be discovered.

• Medicine: 25% of all medicines come from rainforest plants. 200+ contain anti-cancer properties

• Resources: Provide hardwoods as well as nuts, fruit, and rubber.

• People: Indigenous People/Tribes live in harmony with the rainforest (1 million in Brazil).

• Climate: Produce 28% of the world's oxygen. Help to regulate the world's climate.

• Climate Change: Rainforests absorb and store CO_2 from the atmosphere.</td></tr>
<tr><td>Questions:
1. What are rainforests referred to?
2. What is released when an area is deforested?
3. How big is the Main Range, Peninsula Malaysia?
4. What percentage of plant species are found in this area?</td><td>5. What percentage of the world's plant and animals are found in tropical rainforests?
6. What percentage of medicine is found?
7. How many indigenous people are in Brazil?
8. How much of the world's oxygen do rainforests produce?</td></tr>
</table>

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

Week 7 – Tuesday 3rd February 2026		
Lesson 16 – Sustainable management (1)	**Lesson 17 – Sustainable management (2)**	**Lesson 18 – Characteristics of cold environments**
Key Terms: **Sustainability:** Actions and forms of progress that meet the needs of the present without reducing the ability of future generations to meet their needs. **Selective logging:** The cutting out of trees which are mature or inferior to encourage the growth of the remaining trees in a forest or wood.	**Key Terms:** **Debt reduction:** A political agreement where countries are relieved of some of their debt in return for protecting their rainforests. **Ecotourism:** A type of tourism that involves responsible travel to natural areas that helps to conserve the environment and sustain the wellbeing of the local people that may involve education.	**Key Terms:** **Polar:** The regions of Earth surrounding the North and South Poles. **Tundra:** The flat, treeless Arctic regions of Europe, Asia and North America where the ground is permanently frozen. **Permafrost:** Permanently frozen ground found in polar and tundra regions.
Content: **Selective logging:** This is where loggers remove the most valuable trees in the forest, such as mahogany, without damaging surrounding trees. Where trees are removed, the area is replanted as secondary forest. **Conservation & education:** Rainforest can be conserved in conservation areas, such as **national parks or nature reserves.** These can be used for education, scientific research and tourism. WWF (NGO) educate and train conservation workers. They also buy threatened areas. **International agreements:** International Tropical Trade Agreement restricts trade in hard woods. The FSC (Forest Stewardship Council) is an international organisation that **promotes sustainable forestry**. It aims to reduce the demand for rare and valuable hardwoods.	**Content:** **Debt reduction:** Donor countries and organisations have reduced debts in return for agreements that rainforest will not be deforested. This has become known as a **debt for nature swapping.** This is a large-scale programme and can be effective. **Ecotourism:** It aims to introduce people to the natural world, to benefit local communities and protect the environment for the future. Through **income generated** by ecotourism, local people and governments benefit from retaining and protecting their rainforest trees. 	**Content:** **Polar** This biome is the regions of the world covered by ice most of the year. This includes large portions of the Arctic and Antarctic. The soils Permanently covered by ice during and permanently frozen. **Climate:** Winter temperatures often below **-50°C**. Low precipitation levels **Tundra** One of the coldest of all the biomes. **Tundra** means treeless plain. It is noted for its barren landscapes, poor nutrients, and short growing seasons and permanently frozen soils (permafrost). **Climate:** Less extreme. Winter temperature may drop to **-20°C**. Summers are brief. Precipitation falls mainly as snow.
Questions: 1. Name a valuable tree 2. What happens when trees are removed? 3. What can conserved areas be used for? 4. What does the FSC prmote?	5. What have donor countries reduced debts in return for? 6. What is this become known has? 7. What does ecotourism aim to do? 8. What does ecotourism generate?	9. What are polar regions covered by most of the year? 10. What is the climate like in polar regions? 11. What does tundra mean? 12. What is the climate like in tundra regions?

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

<table>
<tr><th colspan="3">Week 8 – Tuesday 10th February 2026</th></tr>
<tr><th>Lesson 19 – Polar plant adaptations</th><th>Lesson 20 – Polar animal adaptations</th><th>Specification terminology</th></tr>
<tr><td>Key Terms:
Adaptation: The process of change by which an organism or species becomes better suited to its environment.</td><td>Key Terms:
Camouflage: An animal's colour, pattern, or shape helps it blend into its surroundings so it can hide from predators or sneak up on prey.

Nocturnal: Active at night and resting during the day. They come out after dark to hunt or feed.</td><td rowspan="3">1. Sustainability

2. Selective logging

3. Debt reduction

4. Ecotourism

5. Polar

6. Tundra

7. Permafrost</td></tr>
<tr><td>Content:
Arctic Moss: Grow close to the ground to stay out of cold winds. Can photosynthesis in low light.

Bearberry (shrub): Low growing (20cm) to cope with strong winds. Waxy leaves to reduce water loss. Hairy stems to trap heat and protect from frost. Bight berries to attract animals to help with seed dispersal.

Lichen: Grows on rocks and extracts minerals from them. Very slow growing to conserve energy. Tolerates freezing and drying out.
   </td><td>Content:
Polar bear: White fur for camouflage, large, padded paws to spread the weight on the ice, greasy coat that sheds water after swimming

Snowshoe Hare: White fur in the winter and will shed it during the summer. Large back feet so they don't sink in the snow. Nocturnal to avoid daytime predators.

Arctic Fox: Small ears and snout/nose to reduce heat loss. Brown/grey fur in the summer to help with camouflage.

Musk Ox: Long thick coat to trap heat and block wind. Herd behaviour and group together for warmth.

All animals have large blubber/ fat reserves to allow it to service for long periods without food.</td></tr>
<tr><td>Questions:
1. Where does Arctic Moss grow?
2. How do hairy stems help Bearberry survive
3. How does the Bearberry spread their seeds?
4. What can Lichen tolerate?</td><td>5. State two adaptations of a Polar Bear
6. State two adaptations of a Snowshoe Hare
7. State two adaptations of an Arctic Fox
8. State two adaptations of a Musk Ox</td></tr>
</table>

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

Week 9 – Tuesday 24th February 2026		
Lesson 21 – Svalbard Opportunities	**Lesson 22 – Svalbard Challenges**	**Lesson 23 – Value of cold environments**
Key Terms: **Svalbard:** Norwegian Territory in the Arctic Ocean. 60% covered in glaciers. No farming or trees. Longyearbyen largest town 2700 people. **Mineral extraction:** The removal of solid mineral resources from the earth. **Geothermal energy:** Energy generated by heat stored deep in the Earth.	**Key Terms:** **Infrastructure:** The basic equipment and structures (such as roads, utilities, water supply and sewage) that are needed for a country or region to function.	**Key Terms:** **Wilderness area:** A natural environment that has not been significantly modified by human activity. **Fragile environment:** An environment that is both easily disturbed and difficult to restore if disturbed. They cannot tolerate environmental changes.
Content: **Mineral extraction:** Coal mines. Main economic activity, 300+ employees, increases greenhouse gases. **Energy developments:** Longyearbyen coal-fired power station. Supplies all of Svalbard's energy needs. **Geothermal energy** – Close to Mid-Atlantic Ridge. Hot rocks close to surface and a source of heat to generate electricity. **Tourism:** People visit the natural environment (Northern lights, wildlife, snow mobile safaris). Growing industry – **2019 150,000 visitors** (45,000 from cruise ships) **Fishing:** Barents Sea – richest fishing grounds in world. **150 species of fish**. Important breeding and nursing grounds for fish stocks	**Content:** **Extreme Temperatures:** Longyearbyen temperatures in winter **-30°C**. Dangerous – risk of frostbite. **Work is slow** and difficult due to heavy clothing. **Inaccessibility:** Only accessed by road or ship. Only 50km of roads – **no roads to outlying communities**. Snowmobiles are needed in winter. **Provision of buildings:** Building houses, shops, offices, maintaining roads and mining operations takes place in **short summer months**. Frozen ground provides solid foundations – although melting of permafrost can make it **unstable** and roads to cracking or collapsing. **Infrastructure:** Water, electricity and sanitation. Kept **off the ground to prevent permafrost thaw** and easy maintenance.	**Content:** **Wilderness area:** These places have remained undisturbed by humans meaning that **unique species have lived and survived**. They are fragile environments and can be **easily damaged**. **Albedo Effect**: Ice reflects 90% of light back into space which keeps the planet cool. **Carbon and Methane store:** The permafrost stores large amounts of these gases. **Ice cores:** Provide important information about the Earth's past climate. **Svalbard seed bank:** This stores all the seeds and genes from every species in a giant natural fridge in the mountain should an extinction event occur. We can bring them back.
Questions: 1. How many people do the power stations employ? 2. What supplies Svalbard with energy? 3. How many people visited in 2019? 4. What is the name of the richest fishing area?	5. What temperature does Svalbard reach in the winter? 6. What is needed to travel in winter? 7. What can melting permafrost do to roads? 8. What is infrastructure kept off the ground?	9. What lives and survives in wilderness areas? 10. What percentage of light is reflected by ice? 11. What gases does the permafrost store? 12. Why is the seed bank important?

Year 10 Cycle 2 Geography Knowledge Organiser – The Living World

<table>
<tr><th colspan="3">Week 10 – Tuesday 3rd March 2026</th></tr>
<tr><th>Lesson 24 – Management of cold environments (1)</th><th>Lesson 25 – Management of cold environments (2)</th><th>Specification terminology</th></tr>
<tr><td>Key Terms:
Stakeholder: A person, group, or organisation that has an interest in or is affected by a decision, project, or issue.

Conservation: Careful protection and management of natural environments to preserve wildlife, habitats, and resources for the future.</td><td>Key Terms:
International agreement: A formal arrangement between two or more countries where they agree to work together on specific issues.</td><td rowspan="3">1. Mineral extraction

2. Geothermal energy

3. Infrastructure

4. Wilderness area

5. Fragile environment

6. Stakeholder

7. Conservation

8. International agreement</td></tr>
<tr><td>Content:
There is a need to balance between economic development and conservation.

Use of technology: Trans-Alaska pipeline
Pipes move oil 1300km from the north to the south of Alaska to avoid sea ice.
• Pipe raised to prevent it melting the permafrost.
• Raised to allow Caribou to migrate underneath.
• Pipes pass beneath rivers.

Conservation groups: WWF in Canada
• Works with locals to manage critical ecosystem e.g. Beaufort Sea
• Supports research to protect important species e.g. Polar bears, Greenland Sharks
• Work with stakeholders to plan for a sustainable future for the Arctic.</td><td>Content:
Role of governments: Alaska, USA
Been involved in protecting Alaska since oil was discovered in the 1960s.
• National Environmental Policy Act ensures companies involved with oil recognise the rights of native Alaskan people.
• Creation of Western Arctic Reserve – 9 million hectares of protected area where drilling for oil is kept away.

International agreements: IATO (International Antarctic Treaty Organisation)
A treat that came into effect in 1961 aiming to protect the natural environment of the world's largest wilderness
• Recognises Antarctica for shared scientific research.
• Controls tourism and keeps disturbance to a minimum.
• Prevents economic development, such as mineral extraction.</td></tr>
<tr><td>Questions:
1. What does there need to be a balance between?
2. How long is the Trans-Alaskan pipeline?
3. State two features of the Trans-Alaskan pipeline
4. State two features of WWF in Canada</td><td>5. What does the National Environmental Policy Act ensure?
6. What is the Western Arctic Reserve?
7. When did the IATO come into effect?
8. State 2 features of the IATO</td></tr>
</table>

Buckland Abbey (Monastery) Knowledge Organiser

1	Who founded Buckland Abbey in 1273?	Amicia, Countess of Devon
2	What order of monks were at Buckland Abbey?	Cistercian
3	What was a 'lay brother'?	A monk who mostly did manual labour rather than mostly religious duties
4	Which end of a church is most holy?	East End – it faces Jerusalem
5	In what shape were churches built in medieval times?	A cross (Cruciform)
6	Name 5 buildings that existed in the monastic era.	The abbey, the Great Barn, an infirmary, dormitories, Cloisters, north and south transepts
7	What is the Rule of St Benedict?	Collection of religious texts read by the Choir monks
8	What would have been produced on site as a Monastery?	Beer, bread, agricultural produce, wool.
9	What feature dominated the abbey building?	The crossing tower
10	Name 2 reasons the monks picked such an isolated place in Dartmoor to build an abbey.	To avoid distractions (better for religious reflection). Good water supply. Building materials.
11	Why might an artist's modern day reconstruction of what Buckland looked like as a monastery not be accurate?	Lack of sources and lots of changes made over the years (particularly by Richard Grenville).
12	How might an artist overcome the problem of not knowing what Buckland used to look like?	There are some remains of the original monastery. Comparison to other monasteries like Fountains Abbey.
13	What are the architectural features of the monastic buildings?	Buttresses, slit windows, bar tracery (stonework that supports glass in a stained glass windows), arched windows, made of stone.
14	What is a bar tracery?	Stonework that supports glass in a stained glass window

Key Terms

Abbot	a man who is the head of an abbey of monks
Abbey	the building or buildings occupied by a community of monks or nuns, also known as a monastery
Dormitories	the building in which the monks sleep
Chapter House	the building where monks hold meetings and where a chapter of the Rule of St Benedict would be read to them every morning
Buttress	a structure of stone or brick built against a wall to strengthen or support it.

Buckland Abbey (Tudor Home) Knowledge Organiser

1	Which King dissolved the monasteries by 1539?	Henry VIII
2	Who bought Buckland from Henry VIII?	Richard Grenville the Elder
3	Why did Henry Break from Rome? (To leave the Catholic church and create the Church of England)	To get a divorce from Catherine of Aragon and to gain the wealth of England's monasteries.
4	In what decade does Richard Grenville (the grandson) make alterations?	1570s
5	What kind of changes did Richard Grenville the Grandson make?	Removed North and South transepts; demolished cloisters and dormitories; Created a second floor in the Nave; Changed the Chancel into a service wing for servants + kitchen.
6	Why did Grenville make the changes?	Changed the building to take away its Catholic roots. Complex and solid build of the abbey meant to was too difficult and costly to change much.
7	What did MOST Tudor gentlemen do when buying an old monastery?	Demolish it and build a new home from scratch.
8	What other general features of Buckland show that it was a Tudor manor?	Rectangle/square windows (a design popular in the Tudor era. These did not exist in the monastic era.
9	How can we prove that the Grenville family had the fireplaces built in Drake's Chamber?	They have the family device or logo on them.
10	Who did Grenville sell Buckland to in 1580?	Sir Francis Drake
11	When the Drakes took over Buckland, did they invest heavily in it between 1590-1740?	No because their main property became Nutwell Lodge in Exeter from 1699 onwards and Buckland became a second home, visited irregularly.

Key Terms

Break From Rome	When Henry VIII broke away from the Catholic Faith and replaced the Pope as the Head of the Church in England. This occurred in 1533-4 and he dissolved the Catholic monasteries in England by 1539.
Tudor Era	A period in History with Tudor monarchs (like Henry VIII and Elizabeth I)
Catholic	A Christian who follows the Catholic faith and who follows the words of the Pope
Protestant	A Christian who does not follow the words of the Pope. They are 'protesting' against Catholicism.
Dissolution	The process of closing (dissolving) the monasteries in England. It happened from 1536. Buckland was

Buckland Abbey (Agricultural Revolution) Knowledge Organiser

1	Name two ways that the Agricultural Revolution made farming more productive	Enclosure meant more food could be grown. New machinery like the Seed Drill. Selective breeding to improve the quality of sheep, cows, pigs.
2	Which agricultural reformer visited Buckland in the late 18th century (late 1700s)?	William Marshall
3	How was the Great Barn amended?	3 new doors added, allowing carts to be driven the whole length of the barn.
4	Who owned Buckland when changes were made during this era?	Lord Francis Augustus Heathfield
5	Which extra buildings were built during this time?	The Ox Sheds and The Linhay
6	What animal was used to plough the fields?	Oxen
7	A diary was kept by Marshall, telling us about daily life. How many days per week did agricultural labourers work?	6
8	Did just men work at Buckland?	No – oxen and children too.
9	Name different tradesmen named in Marshall's diary	Mason, wheelwright, blacksmith, miller, cooper, harness-maker and a Mole Catcher.
10	Name types of crops grown at Buckland	Wheat, barley, oats, turnips, potatoes, cabbages, peas, dairy produce, honey and cider.
11	What did the owner of Buckland do with the wealth generated by improved farming?	Built the impressive wooden Georgian staircase.
12	Did the Drake's live Permanently at Buckland Abbey?	No, they were based at Nutwell Lodge near Exeter
13	What did the area which is now the Education Centre used to be	The Milking yard for dairy cows.

Key Terms

Agricultural Revolution	a period of technological improvement and increased crop productivity that occurred during the 18th and early 19th centuries in England and Europe
Linhay	A type of farm building found in Devon and Somerset. It has two storeys – the hay loft at the top and bottom storey is for keeping cattle in during winter. The hay at the top acted as insulation for the cows to keep warm
An estate (noun)	an extensive area of land in the country, usually with a large house, owned by one person or family
Georgian period	The **Georgian era** is a period in British history from 1714 to c. 1830–37, named after the kings George I, George II, George III and George IV.

Buckland Abbey (National Trust) Knowledge Organiser

1	Which resident of Buckland does the National Trust celebrate the most?	Sir Francis Drake
2	Name ways in which Drake is commemorated	There is a sundial to commemorate 400th anniversary of his death. A Drake statue in the Lifetimes gallery. Drake's Drum on display. Paintings and artefacts. Stag horns in kitchen.
3	What have the Ox Sheds been converted into?	Shops, galleries, toilets, video presentation room..
4	Name some changes the National Trust has made to make it attractive for tourists	Access made easier (e.g. for wheelchair users); Information signs ; Restaurants, toilets to ensure people are relaxed; opportunity to spend money (e.g. Gift Shop)
5	What has been done to attract children to Buckland?	The upstairs of the main house is modelled as a ship with entertainment for children, like being able to dress up. Ice cream!
6	What is the Linhay now used for?	To display agricultural machinery such as different types of ploughs
7	What is the Great Barn used for now?	It has a Victorian Cider Press (simply because it is interesting to tourists) and sometimes art exhibitions
8	What is the Guest House now used for?	The building tourists walk into to pay for entry/present their membership card of the National Trust. Another part of the Guest House is the gift shop. The Restaurant/Café.
9	What is the significance of Education Room?	Provides a base for visiting schools – shows the National Trust care about education

Key Terms

National Trust	**UK conservation charity, protecting historic places and green spaces**
English Heritage	Another charity, founded by the government to preserve historic sites.

Buckland Abbey (Compared with Fountains Abbey) Knowledge Organiser

1	What was Fountains Abbey built from?	Sandstone
2	Was the abbey bigger or smaller than Buckland?	Bigger
3	How many people worked at Fountains when the abbey was at the height of its wealth?	200
4	What ornamentation was there on Fountains Abbey?	The Green Man (like a gargoyle) and carving of the Abbot's face.
5	How were choir monks and laybrothers kept separate in terms of the abbey buildings at Fountains?	Stairs and dormitories were separate
6	Name additional buildings at Fountains Abbey other than the abbey	Dormitories, Refectory, library, Chapter House, Kitchen
7	Name three ways Fountains abbey is DIFFERENT to Buckland Abbey	Had a library and separate place for lay brothers The burial ground at Fountains Abbey is much more understood – as there are gravestones which mark the burials of 19 Abbots The cloisters are on the south side of the monastery (like nearly all monasteries) whereas Buckland was on the North (due to draining issues).
8	Fountains Abbey was dissolved in 1539 like Buckland was. In the 1600s ,Stephen Proctor decided to make a Tudor Home on the site. Did he convert the abbey or use the stone from the Abbey ruins to build a new house?	Used the stone from the ruins to build a new house.
9	When was Fountains Abbey at its wealthiest?	1200s
10	Why did Fountains Abbey face financial troubles in the 1300s?	It experienced sheep disease. The Black Death killed many of its inhabitants. Famine in Scotland meant Scots came from the north to steal from Fountains Abbey

Key Terms

Fountains Abbey	The ruins of an Abbey in North Yorkshire

Crime and punishment Knowledge Organiser. 1 Medieval period, c.500-c.1500.

Causes and Nature of Crime

Causes of crime during this period:

POVERTY

- Regular outbreaks of famine and disease caused pressure (e.g. Black Death of the 1340s)
- Government policies of taxation (e.g. Poll Tax 1370s) made people poorer
- Regular warfare had an impact as well – destroyed communites and because of increased taxation needed to fight the wars

ROYAL and CHURCH control

- Led to protests in the period

AGRICULTURAL community

- Access to farming materials may have been the cause of the high violent crime rate

Saxon period, c.500-1066

- Crimes against the person, e.g. assault / murder
- Crimes against property, e.g. theft
- Crimes against authority, e.g. treason
- Moral crimes (links to Church / religion), e.g. drunkenness, adultery, etc.

Normans, 1066 - c.1200, continuity and change.

- William generally retained Edward the Confessor's laws
  Reason for continuity: stressed continuity and that William was Edward's legitimate successor

Later Medieval, c.1200 – c.1500, continuity and change.

- **Challenges to authority becamse common e.g. Peasants' Revolt 1381 – this was a change as people had been less likely to protest earler in this period**
- Heresy Laws introduced from 1382 to deal with challenges to Church beliefs
  Reason for change: increasing challenges to the Church in England (Lollards) and over Europe
- Increased focus on treason
- Theft was the main crime (73.5% or all crimes) followed by Murder (18.2% of all crimes)

Policing and Law enforcement

Policing – community based:

Saxon period, c.500– 1066.

- Feedal system helped to keep control
- Hue and cry – witnesses / whole village expected to chase suspect; fines if failed to do so: no organised police force
- Tithings – all males over 12 in a group of 10 – responsible for each other's behaviour
- Hundremen- in charge of the hundred (10 tithings)- more serious crime

Normans, 1066 - c.1200, continuity

- No change after Norman Conquest (1066)
  Reason for continuity: system cheap and reasonably effective.

Later Medieval, c.1200 – c.1500, continuity and change

- 1285, Parish Constable introduced
  Reason for change: to organise hue and cry and link with county Sheriff for more important crimes / crimes outside village boundaries
- Watchman introduced - night-time patrols
  Reason for change: more organised efforts at policing
- Tithings fade out by the 1400s
  Reason for change: looser feudal ties of peasants after Black Death (1348/50)
- 1326, Justices of the Peace first appointed to look after the law in their local area

Punishment and attitudes

Saxon period, c.1000 – 1066.

- *Based on deterrence and retribution*
- *Public and corporal (physical)*
- Fines
- Corporal punishment - stocks, pillory, whipping, maiming
- Capital punishment – hanging
- Retribution – severity of punishment matched crime (treason – death; repeat offences maiming, etc.)
- Deterrent – painful / humiliating public punishment in front of community (linked to cost and lack of policing)
- NOT prison

Normans, 1066 - c.1200, continuity and change.

- Increase in crimes punishable by death or mutilation
- Reason for change: Norman harshness and need for deterrent as a small minority
- Retribution and deterrent overwhelmingly main purposes

Later Medieval, c.1200 – c.1500, continuity and change.

- 1305, introduction of 'hung, drawn and quartered' punishment for treason
  Reason for change: retribution / deterrent - hideous punishment to stress enormity of crime

Key considerations

Saxon period, c.500 – 1066.

Society:

- Agricultural: vast majority lived in small villages.
- Society was rural and community based
- Massive importance of community in policing, trials and public punishment.
- Growth of towns during Middle Ages (c.1200 onwards) reduced effectiveness of community.
- Importance of Church / religion in all areas of life (and death)

Institutions – government

- Saxons – slow growth of royal power.
- Normans, 1066 - . increased harshness of laws and punishments, e.g. brutality (Harrying of the North); Forest Laws; Murdrum Law; castles, etc. Particularly linked to deterrence as Normans a tiny minority of c.7000 among 2m Saxons.
- Later Middle Ages: Norman / Saxon divisions faded; development of government institutions seen in courts / coroners, etc.

Institutions – Church / religion

- Christian religion massively influential in all areas of life and crime, etc.
- **Society:** profound belief in God; massive wealth and influence of Church; tension between Church and government
- **Crimes:** Religious influence on moral crimes e.g. drunkenness, adultery, failure to attend church; Heresy – crimes against Church beliefs especially after 1382.
- **Policing:** Sanctuary linked to concept of mercy. Certain holy places left the criminal immune from arrest: had 40 days to decide whether to stand trial or go into exile.

Individuals

- William the Conqueror 1066 – Norman laws, harshness, personal love of hunting.

Attitudes

- Importance of religion

Science and technology

- Domination by religion

Crime and punishment Knowledge Organiser. 2 Early Modern period, c.1500-c.1700.

Causes and Nature of Crime

For the most part, crimes stayed the same

- Theft was still a common crime at 75% of all crime and many convicted of violent crimes (15% of all convictions)

Key causes of crime

Rise in population from 2.9m(1500) to 4.5m (1600) – led poverty and thus to vagrancy
Inflation (rising prices) – led to poverty and thus vagrancy
Bad harvests – rise in the price of food
Monasteries closed by Henry VII from 1530s onwards – monasteries had looked after the poor
Religious changes – during the 1500s there were a number of changes in religion. For example, Mary I was Catholic (1553-8) and her sister Elizabeth I was Protestant (1558-1603). This led to heresy as the main religion in the country changed under each ruler and people found themselves following the 'wrong' religion.

New crimes

- **Heresy:** even more important in the context of the religious Reformation.
  Used by Henry VIII, e.g. Anne Askew. Particularly used by Mary (1553-1558) – 283 Protestants burned

Not significant after c.1560.

- **Treason:** linked to sense to threat to the state from religious and other opponents.
  Used by Elizabeth (1558-1603) against Catholic priests and Catholic plotters. Elizabeth used Spies and
  Used by James I (1603-1625) against 1605 Gunpowder Plotters.
- **Vagrancy – vagrants were beggars who roamed the country tying to find food and work.** Linked to social and religious developments. Social problems – rich / poor divide; rising population, unemployment, homeless in search of work,
- 1495 Vagabonds and Beggars Act; 1547 Vagrancy Act; 1597 Act for Relief of the Poor; 1602 Poor Law Act

Rise of smuggling / poaching begins in the late 1600s, 1671 Game Act. See next sheet.

Policing and Law enforcement

Generally as before:

- Community-based, unpaid.
- Villages – hue and cry.
- Town Constables and Town Watch.

Developments:

Justices of the Peace (JP)- role grows

- JP (aka magistrates) - role grows in looking after local policing. Oversees local parish constables.
- 1601 has to monitor and control beggers and vagrants (after 1601 Poor Law)
- Workload of JP grew considerably

Charleys

- Voluntary watchman no longer effective in London, so 1663 Charles II introduced Charleys- paid watchmen.
- Low pay and object of ridicule**, <u>but the first law offices that were paid by public money</u>**

- Community based policing still strong, but effectiveness of community-based methods starts to decline, esp. in the growing number of larger towns. People anonymous / lesser sense of close community.

- Professional 'thief-takers' e.g. Jonathan Wild.

Punishment and attitudes

Generally as before:

- Fines
- Corporal punishment - stocks, pillory, whipping, maiming
- Capital punishment – hanging (in public)
- Bridewell / House of Correction (including hard labour) for vagabonds.
- Purpose: Linked to concepts of deterrence, retribution, removal and, to an extent, reform / rehabilitation (chance to create new life). Also helped England to populate and secure colonies.
- NOT prison

Heresy punichment e.g under Queen Mary (1553-8)

- Nearly 300 protestants burnt at the stake
- 130 executions of Cathcolics under Queen Elizabeth (1558-1603)

Purpose of punishment:

- Retribution – severity of punishment matched crime (treason – hanged, drawn and quartered; repeat offences maiming, etc.).
- Deterrent – painful / humiliating public punishment (linked to cost and lack of policing).
- Removal – return to parish, Houses of Correction, transportation
- Reform / rehabilitation – to an extent in Houses of Correction and transportation

Key considerations

Society:

- Still mainly agricultural with tight local communities.
- Growth of towns continued.
- Growing division between rich and poor.
- Religious change, division and instability of Reformation had an effect over whole period.
- Political instability and division due to the Civil Wars (1642-1651/60) had impact.

Institutions – government

- Led the implementation of religious change under Henry VIII, Edward VI, Elizabeth and James I. Strongly opposed by Queen Mary.
- Close links between the government and the established Church of England. Gunpowder Plot an attack on both.
- Use of treason laws to deal with opponents.

Institutions – Church / religion

- Change and instability in Reformation causing Catholic / Protestant division had effect over whole period.
- Use of heresy laws (to c.1558) to deal with opponents.
- Links to attitudes to vagrants.
- Gunpowder Plot links religion to attack on government.

Attitudes

- Still dominated by harsh concepts such as retribution and deterrent and humiliating public punishment.
  .
- Increasing social tension caused by growth in gap between rich and poor.
  - Hostility of vagabonds.

Science and technology

- Increasing influence of science (e.g. Royal Society, 1662)

Crime and punishment Knowledge Organiser : 3. Industrial period, c.1700 – c.1900. Part 1: extended 18th century, c.1700 to c.1820.

Causes and Nature of Crime

Causes of crime:

- Huge population increase 16m 1800 to 42m in 1900
- High taxation because of increased warfare in this period
- Increase in customs and exise duties (led to smuggling) e.g. 70% of the cost of Tea was taxation
- Societal and economic changes during the Industrial Revolution (see next page) led to a growth in social and political protest between 1790-1850 e.g. Peterloo Massacre 1819, Chartist Movement 1829-48

Generally crime was as before:

- Treason – still most serious crime.

New crimes:

Smuggling:

- Generally luxury goods, e.g. tea, wine, spirits, silk which government important duties made very expensive. Import duties main source of government income.
- Thousands of smugglers and some violent organised gangs (Hawkhurst Gang).
- Seen as 'social crime' with cross-class participation.
- Hard for government to combat due to ineffective customs force, long coast-line, support / alibis for smugglers.
- Decreased after William Pitt (1780s) and Robert Peel, etc. reduced import duties.

Highway robbery:

- Rise in late 17th/C18th: most common in this period: linked to increased wealth and solitary travel, ineffective banking, availability of horses and guns, poverty; demobilised soldiers.
- Image: dashing gentlemen who robbed rich (e.g. Dick Turpin): but poor main victims.
- Fall in early C19th: stagecoaches often with armed guards; increase in travel; growth of towns; controls on inns; mounted patrols around London; effective banking.

Crimes associated with urbanisation

- As Britain became more urban there was a growth of crimes such as pickpocketing

Policing and Law enforcement

Initially as before:

- Community-based, unpaid.
- Villages – hue and cry.
- Town Constables and Town Watch. Some towns paid these people but many were unpaid and ineffective.

Developments:

- Continued decline in the effectiveness of community-based methods due to growth of towns and cities.
- Bow Street Runners, 1748 – early 1800s.
  Henry and John Fielding's small London-based Bow Street police force.
  Sought to deter by increased likelihood of detection. Collected and shared evidence.
  After 1785 Runners paid by government.
  Similar methods used by other forces in the London / Middlesex area.
- Attitudes towards a professional police force: many people saw police as expensive and a dangerous government intrusion in people's freedoms.
- 1829, creation of Metropolitan Police, see below.

Punishment and attitudes

Initially as before:

- Fines; corporal punishment - stocks, pillory, whipping, maiming; capital punishment – hanging (see Bloody Code, below); Transportation to America until c.1776, later Australia; Houses of Correction, etc. - NOT prison initially.

Developments:

Transportation to America, c.1620-1776:

- See reasons for transportation, above.
- Old punishment but increasingly an alternative to death.
- After American Independence, 1776, new location needed.

Transportation to Australia, 1787-1868:

- Transportation old punishment but increasingly used as alternative to death. 160,000 transported (1/6 women).
- Purpose: Initially a strong deterrent due to separation from homeland, use of hulks, long / dangerous voyage and hard / primitive conditions in Australia. Also a more humane alternative to death; removal of criminals; population of new colonies; elements of rehabilitation through new chance.
- Sentences usually 7/14 years: convicts earned 'ticket of leave'.
- Decline – see below.

Prisons:

- Historically prison used pre-trial / pre- execution, for debtors and vagabonds (Houses of Correction).
- Rise in use in C.18th as less harsh alternative to death in era of Bloody Code.
- Early conditions: crowded mixed cells – violence / abuse and 'schools for crime'; corrupt gaolers; rich paid for better food / conditions.
- **Developments to 1820s:**
  John Howard's 1770s investigations and writings (*State of Prisons, 1777*) regarding conditions, corruption; emphasis on rehabilitation.
  Elizabeth Fry: Quaker; work with women and children prisoners; emphasis on Christian teaching, humane treatment and conditions, useful work, etc.
  Both Howard and Fry believed that prisoners were reformable.
- For impact of reformers and developments after c.1820- see below.

Purpose of punishment:

- Retribution: severity of punishment partly matched crime. Although 225 capital crimes under Bloody Code, most sentences were commuted unless major crime.
- Deterrent: harsh / painful / humiliating public punishment but Bloody Code arguably ineffective. Transportation / early prison conditions very unpleasant.
- Removal: transportation; increasing use of prisons
- Reform / rehabilitation: to an extent in transportation and, to an increasing extend in prisons through influence of Howard and Fry.

Key considerations

Society:

- Initially mainly agricultural. Increasingly urban as Industrial Revolution began to have an impact.
- England generally politically and religiously stable but division between rich landowning elite and poor.
- Ruling class fear of threat of crime. Strong efforts by to protect their lives and property, e.g. Bloody Code.
- After 1789 increasing political fears due to threat of repeat of the French Revolution (1789 -) in England.
- After end of French / Napoleonic Wars (1792-1815) economic depression and fears of political revolution intensify into early 1820s.

Institutions – government

- Government generally low income (mainly customs duties) and ineffective: main focus – fighting wars.
- Government explicitly linked to landowning ruling classes: only c.7% of men have the vote.
- Government / parliament passed laws to protect their property, e.g. Bloody Code generally, poaching.
- Government low involvement (e.g. absence of prisons, policing, etc.). Government involvement much greater from 1820s onwards, see below.

Institutions – Church / religion

- Decline in importance though Church still influential.
- Strong Christian motivation of reformers such as Howard and Fry.

Individuals

- Prisons – John Howard and Elizabeth Fry – but real influence felt after c.1820 (e.g. Gaols Act, 1823).
- Policing – John / Henry Fielding and Bow Street Runners but small-scale.

Attitudes

- Class divisions strong. Ruling classes passed laws to protect their property. Mass of population saw many laws as 'social crimes' and ignored them.
- Still dominated by harsh concepts such as retribution and deterrent and humiliating public punishment.
- Some evidence of tenderness, e.g. under Bloody Code victims, witnesses, juries, etc. wouldn't push case and death sentences increasingly commuted to prison / transportation, etc.
- Evidence of reform / rehabilitation ideas through Christian-influenced reformers, e.g. Howard and Fry.
- Low involvement by government or public:
  Prisons uncontrolled and conditions terrible.
  Few effective police forces except around London (Bow Street Runners).

Science and technology

- Some evidence of influence of science and technology, e.g. in transport, banking, trade, etc.

Crime and punishment Knowledge Organiser : 3. Industrial period, c.1700 – c.1900. Part 2: shorter 19th century, c.1820-1900.

Causes and Nature of Crime

Crimes generally.

- As above.

Changes:

Political challenge to the ruling classes, e.g. Peterloo Massacre 1819, Chartist Movement 1829-48 and the Tolpuddle Martyrs, 1834:

- Linked to social / economic and political divisions between rich and poor. ; poverty and unemployment after French / Napoleonic Wars (1792-1815); desire of rich to safeguard their property.
- Political: ruling elite fear of repeat of French Revolution (1789-) in Britain; ruling classes desire to exclude workers from political involvement. Desire of working classes to have a political voice when only 8% of men had vote.
- Events: Rebecca Riots 1839-42 – farmers angry about rent increases and road tolls disguised themselves as women and attacked the tollgates and workhouses

Policing and Law enforcement

Policing developments after c.1820:

- Metropolitan Police Act, 1829.
  Robert Peel, Home Secretary, persuaded parliament it was necessary: rising crime, controls on police powers, fear of radical protestors.
- Characteristics / equipment
  Initially a small force wearing non-military blue uniform.
  Limited equipment including whistle and truncheon.
  Decentralised – each town / county had own force – this stressed it wasn't central government control.
  Initially some public opinion hostile.
- Developments:
  1842 – first detectives.
  1856 – towns / counties had to have police force.
  1869 first National Crime Records.
  1878 CID detectives created.
  Use of fingerprinting and telegraph communication.

Punishment and attitudes

Transportation to Australia, from c.1840s-1868:

- **Decline:** hostility in Australia due to links to crime and demeaning nature; cost: c.£500,000 a year; improved conditions / 1851 Gold Rush made Australia desirable location.

Prisons – developments after c.1820.

- Influence of Howard / Fry (see above) on government especially Robert Peel (Home Secretary in 1820s) leading to Gaols Act, 1823.
- **Gaols Act, 1823.** Work of Robert Peel influenced by Howard and Fry. Improved prison conditions; paid warders; separated types of criminal; Christian instruction; visits by Prison Inspectors. (But only applied to 130 biggest prisons and sometimes ignored.)
- **Pentonville Prison, 1842: Separate System, c.1842-1860s/70s.**
  - Separate System prison – model for 90 others built 1842-77.
  - Purpose:
    Reasons for change:
    Generally: belief that criminals reformable but also desire to deter; e.g. to put reform ideas into effect but in a tough way, e.g. teaching, useful work and sanitary conditions with solitary confinement.
    Deterrent – loss of liberty; solitary confinement, etc.
    Reform / rehabilitation through Christian teaching and opportunity for reflection; useful work – learning skills; healthy / sanitary conditions; separation from negative influences.
    Influenced by reformers (Howard / Fry) regarding conditions, Christian teaching and useful work but Fry criticised the total separation.
  - Conditions:
    Each prisoner had own cell including hammock, toilet and basin, often loom. Kept separate from other prisoners at all times – masks worn in exercise yard / chapel. Some prisoners went mad due to separation.
- **Silent System, c.1860s-1902/1922.**
  - Conditions:
    Total silence at all times; 'Hard board, hard labour, hard fare'. Strict conditions, dull / monotonous food and useless monotonous work, e.g. crank and treadmill.
  - Purpose:
    Reasons for change:
    Cost of Separate System; fears of crime – influence of press, garrotting scares in 1860s; growth of beliefs in separate - less evolved –criminal class which could not be reformed / rehabilitated only deterred from crime; influence of Sir Edmund du Cane, Assistant Director of Prisons in late 19thC.
    Deterrent – loss of liberty; harsh conditions, meaningless work.

Key considerations

Society:

- Full impact of industrialisation creating a mainly urban / industrial society – factories, mines, etc. Great increase in wealth over this period.
- Initially deep social division between rich and poor: always evident but less divisive towards 1900.
- Improvement of working class experience over the period, especially after 1850s (Mid-Victorian economic boom):
  - Increased wages – better living conditions.
  - Better working conditions.
  - Improved education, especially after 1870.
  - Increased political rights- many urban workers gained right to vote, 1867 / 1884.

Institutions – government

- Initially sought to protect ruling class interests (e.g. Tolpuddle Martyrs).
- Increasing role in society based on:
  - Increased government revenue (government has more money to spend) due to increased national wealth and more taxation, e.g. income tax.
  - Development of moral conscience – govt want to help improve conditions / experience, e.g. prison conditions, working-class education.
  - Political necessity: after 1867 working classes were c.50% of voters – their demands had to be responded to.
- Evidence of increasing role:
  - Prisons: Gaols Act, 1823 and subsequent laws, etc.
  - Metropolitan Police Act, 1829 and subsequent laws, etc.
  - Laws regarding limiting death penalty.

Institutions – Church / religion

- Humanitarian / moral influence of Christianity influences, for example, prison conditions and death penalty limits.

Individuals

- Continuing influence of Christian-inspired reformers such as Howard and Fry.
- Massive influence of Robert Peel:
  - Home Secretary and Prime Minister during period 1822-1846. Very effective at persuading government / parliament of need for reform.
  - Influenced by Christian reformers.
  - Impact on prisons (Gaols Act) and policing, etc.

Attitudes – see also above.

- Influence of Christianity on reformers, etc. (on prisons, death penalty).
- Initial belief that criminals reformable / could be rehabilitated but later (1860s-) belief in unreformable less evolved criminal class.
- Acceptance of greater role for government; government greater wealth to afford to be involved (e.g. in prison building, creation of police force).
- Increasing belief that government must be involved to improve conditions of the working classes.
- Concept of 'social crimes' continued regarding poaching and smuggling.

Science and technology

- Industrialisation creating national wealth. Impact on transport, etc.

Crime and punishment Knowledge Organiser : 4. Twentieth century to the present, c.1900 – present.

Causes and Nature of Crime

Causes:

- Development of a more multicultural society following mass immigration to the UK post World War II (1945 onwards) – led to more race related crime
- Rise in mass-car ownership / use; number of accidents
- Development of computers – led to new ways to commit fraud
- Less respect for authority from the 1950s onwards- led to football hooliganism and violent crime

Race

- Race Relations Act, 1968 made it illegal to refuse work / housing, etc. on racial grounds; Criminal Justice Act, 2005 stated that racial hatred made another crime worse; Racial and Religious Hatred Act added crime of spreading hatred.
- Context: mass non-white immigration post-WWII, e.g. West Indians, Pakistanis, etc. Mass European, etc. immigration since 2000; asylum seekers from Afghanistan, Middle East, etc.
- Reasons for change: context, above; hope for tolerant multi-cultural society; more liberal social attitudes.

Driving offences – speeding / drunk driving:

- In past considered a 'social crime' and ignored / laughed at.
- Post-1967 limits on alcohol in blood plus government campaigns against drunk driving; old speeding laws much more vigorously enforced.
- 1983 seatbelts compulsory, 2003 mobile phone use in cars banned

Hooliganism and violent crime

- Happened before 20th Century but not serious (1885 Preston-Aston match – riot)
- Peaked in 1970s/1980s - organised gangs e.g. British and Itlaian fans fought at Heysel Stadium Belgium 1985
- Died down because Special Police Force set up dedicated to dealing with hooliganism, fans segregated during and before matches, grounds have seating, CCTV

Drugs:

- In past legal but relatively little used; made illegal 1971 Misuse of Drugs Act.
- Reasons for change: increased use in 1960s; harder / more dangerous drugs such as LSD, etc.
- Modern debate about freedom to take drugs which don't harm others.

Modern versions of old crimes:

- Terrorism: existed in past (e.g. Gunpowder Plot, 1605). In modern times linked to IRA (Irish Republican Army) in 1970s and 80s and to Al-Qaeda, 'Islamic State' in 2000s / 2010s.
- **People-trafficking:** in past 'white slave trade' lured girls into prostitution. 21stC gangs can control immigrant girls in same way.
- **Cybercrime: use of internet, etc. technology in crime:**
  Fraud – pretending to be another to get bank details / money, etc. Existed in past, now on-line.
  Copyright theft – stealing rights of artist / writer. In past included photocopying, etc. now downloads, etc.
  Extortion – using threats / blackmail to make victim pay. Now often refers to online images / data.

Terrorism

- Increased threat (though earlier examples include 1605 Gunpowder Plot).
- Initial threat in the 20th Century – IRA, 1960s onwards e.g. 1996 bombing of Arndale Centre on Manchester, 200 people injured. Good Friday Agreement (political agreement about N Ireland's future) led to descrease in IRA terrorism.
- More recently terrorism linked to Islamist extremism e.g. 7/7 attack -Al Qaeda

Policing and Law enforcement

Developments in policing:

Organisation:

- Now a small number of large police forces.

Role of women:

- First WPCs in 1920s

Training:

- 1947, Police Training College.

Equipment / transport:

- Police bicycles, 1909
- Police cars, 1920s/30s
- Two-way radio, 1930s
- 999 introduced

Technological support:

- Fingerprint Branch, 1901.
- National Fingerprint System.
- Blood types discovered, 1901.
- Progress in forensic science
- First police computers, 1960s
- Breathalysers, speed cameras
- Police National Computer, 1980 with 25 million records
- First DNA conviction, 1988
- Automatic fingerprint Identification, 1995
- National DNA database
- CCTV / mass surveillance video
- Biometric screening

Specialist units:

- Fraud Squad
- Specialist drugs units
- Dog handling units
- Special Branch

Crime Prevention:

- 1980s- Neighbourhood Watch
- Similarities - old community-based policing
- Differences – not compulsory; not a national system; only a help to professional police

Punishment and attitudes

PRISON developments:

From the Silent System to more humane prisons:

- 1902 Hard labour (crank / treadmill) ended.
- 1922 End of Silent System; abolition of solitary confinement; visits allowed; end of convict crop / arrow uniforms, etc. (Alexander Patterson.)
- 1933 Open Prisons, e.g. New Hall, Wakefield. Rehabilitation - to prepare prisoners for normal life after prison.
- 1967 Parole – good behaviour led to reduced sentence.
- Category A – D prisons – D being 'open prison' and used for non violent offenders
- Reasons for change: return of reform / rehabilitation ideas especially through influence, 1922-47, of Prisons Commissioner Alexander Patterson; sympathetic liberal ideas that there was not a 'criminal type' but that difficult individual experiences (at home / community) could negatively affect individuals.

Alternatives to prison:

- 1907 Probation Officers
- 1967 Suspended Sentences abd Parole introduced
- 1972 Community Service Orders
- 1990s / 2000s Electronic tagging; drug and alcohol treatment programmes; ASBOs; restorative justice.
- Reasons: cost of prison; belief that prison could have a negative impact on inmates which might make a life of crime more likely; also see above.

Treatment of young offenders:

- C19th young offenders kept in normal prisons.
- 1902 first Borstal
- Borstals – 1902- 1982, reform schools for juvenile offenders),
- 1982 Youth Custody Centres replaced Borstals
- Reasons for changes: focus on rehabilitation; avoid negative impact of prison; view that many young offenders victims of negative domestic and social influences; young needed help not punishment; care for drug abusers, etc.

DEATH PENALTY developments:

- In 1900 death penalty available for 4 crimes.
- 1908 / 1933 hanging of under 16s/18s ended.
- Miscarriages of justice / controversial executions: 1950 Timothy Evans; 1953 Derek Bentley; 1956 Ruth Ellis.
- 1957 Homicide Act restrictions
- 1965 Murder Act + 1969 Amendment ends use of death penalty; 1998 final abolition.
- *Reasons for change:* influence of government – changes to the law; changing public opinion linked to Miscarriages of justice / controversial executions

Purpose of punishment:

- Reform / rehabilitation increasingly seen by government / liberal public opinion as most important purpose. Deterrent still important especially to press and much of public.

Key considerations

Society:

- Mass immigration from 1940s onwards.
- Toleration especially during / after WWII; 1960s; early 21stC.

Institutions – government:

- Changes to laws including on crimes; prisons, alternatives to prison, young offenders; death penalty; etc.

Institutions – Church / religion:

- Continued moral / humanitarian influence of Church, e.g. opposition to death penalty.
- Decline in influence of Christian religion seen in changes to 'moral' crimes such as homosexuality and abortion.

Individuals

Attitudes:

- Influence of liberal / humanitarian beliefs on definition of crimes, use of prisons / treatment of prisoners and on punishment.
- Particular influence of tolerant / liberal / humanitarian influences in 1960s linked to eliminating traditional (often Christian religion-based) prejudices and restrictions on behaviour. Also evident in early 21stC regarding race, religion, sexuality, etc.
- Changing attitudes towards race (racial toleration) leading to changes in 'crimes'.
- Desire to combat intolerance: racism and religious hate crimes; homophobia.
- Concepts of 'social crimes'
  Continuity: small-scale smuggling and poaching. Change: attitudes to drunk driving, speeding.

Science and technology:

- Links to old crimes being committed in new ways, especially online but also terrorism
- Developments in police equipment, databases, forensic science, etc.
- Developments in alternatives to prison, e.g. electronic tagging, etc.

Normans Knowledge Organiser

Norman Conquest (Anglo-Saxon England) Knowledge Organiser

List three features that made England strong in 1065	It was divided into shires which made it easier to administer. The currency was well-respected and this encouraged trade and taxation. Burhs were fortified towns - good for defence.
Name the types of people in Anglo-Saxon England	King; Earls; Thegns; Ceorls; Thralls
What was the Wergild?	If someone was killed, the person responsible would have to pay the person's worth eg. a Ceorl was worth 160 shillings, a thrall was worth nothing.
What was life like for women in Anglo-Saxon England?	In some ways good (e.g. a woman's wergild was the same as a man's). But for thralls it was not good (e.g. Gangs of men would buy women thralls, rape them and sell them on.)
What were the main influences on Anglo-Saxon religion?	Roman Catholic Church and Celtic traditions from Ireland (which meant different forms of worship and art).
In what ways did the English not follow the Church's rules?	Some villages didn't have a church – they worshipped around a stone cross. There was a belief in local English Saints. Too much eating, drinking and sex.
List 3 ways St Dunstan reformed the English Church?	Ended corruption among Church leaders; Improving education of monks, nuns and priests; rebuilding churches, abbeys and monasteries.
What famous jewel could show the Anglo-Saxon to be a 'golden' era?	The Alfred Jewel
What was the purpose of the burhs?	They were protected towns that people could go to during Viking raids
Who was the corrupt Archbishop of Canterbury in England?	Stigand

Key Terms

Earl	King's chief advisers. There were 6 in 1065. Harold Godwinson was the most powerful
Thegn	These were wealthy landowners. There were around 5,000. They ran local courts and collected taxes.
Ceorls	Most people in England were Ceorls. Most lived on Thegns' land and farmed
Thrall	Slaves. 10% of the population were Thralls
Witan	Group of Earls and Bishops that were advisers and decided who should king when one died.

Norman Conquest (How/Why William became King) Knowledge Organiser

Why were the Normans effective warriors?	They had private armies supplied with armour and weapons; used horses (cavalry).
How did William take control of Normandy in 1047?	He persuaded the King of the Franks to help him crush a rebellion, he was brutal towards the rebels and married Matilda of Flanders (Flanders was a powerful neighbouring country)
Who was King of England at the start of 1066?	Edward the Confessor
Name the claimants to the throne in 1066	Harold Godwinson; Harald Hardrada; William of Normandy; Edgar Aetheling
In what ways was William prepared to win the Battle of Hastings?	Had cavalry, the Saxons did not Assembled a fleet of over 700 ships Took over two months to assemble his invasion fleet William's knights had spent years training to fight from horseback
In what ways was William a good leader during the Battle of Hastings?	William used the trick of fake retreats (feints) William fought the Battle of Hastings from horseback, Harold was on foot Towards the end of the battle William ordered his archers to change the angle they were shooting their arrows at
In what ways was William lucky to win the Battle of Hastings?	Some of Harold's troops left the shield wall at the Battle of Hastings Harold's army had to first defeat the Vikings in the north of England Harold's army had to do two very long marches with battles at the end of each Many of Harold's army at Hastings were from the fyrd (inexperienced soldiers) Harold was killed at a crucial point in the Battle of Hastings
How did the Normans break the English shield wall?	A group of Norman soldiers turned from the battle and ran down the hill. Some English soldiers chased after them.

Key Terms

Stamford Bridge	The battle between the Anglo-Saxons (Godwinson) and the Vikings (Hardrada). The Anglo-Saxons won.
Fyrd	This is the untrained men in Godwinson's army who were called up to fight when needed.
Cavalry	The soldiers on horses.
Normandy	The place in Northern France that William and his army came from.

Norman Conquest (How did William control England) Knowledge Organiser

Why did William take key English nobles (Edwin and Morcar) to Normandy?	As hostages to discourage the English from rebelling.
Which city was destroyed by Edric the Wild?	Hereford
How did William get the city of Exeter to promise to be loyal to him?	He asked the people to swear an oath of loyalty to him. After they refused, William had a hostage's eyes gouged out, then attacked the city for 18 days. Exeter surrendered and in return for their loyalty, William promised to show them mercy. He also built castles like at Totnes.
What kind of reasons did people in England have for resisting the Norman rule?	Anger over loss of land; Damaged pride at being defeated and ruled by a foreigner; anger at having to pay greater taxes.
What was the Harrying of the North?	In 1070, William ordered for an attack on Northern England (the least likely to be loyal to him because of their Viking roots). Crops, animals and food were destroyed. As many as 100,000 died of starvation.
Why did William confiscate treasure from monasteries?	To pay for the cost of putting down rebellions. Also a method of control (that wasn't too brutal). He did this at the same time as reforming the church, for example, English churchmen were largely replaced by Normans.
Why did King Svein (of Denmark) decide to leave England?	There were not enough Danes to take England. After a hard winter, they were tired and hungry. William told them to go, so King Svein left with treasures from Ely and Peterborough.
How did William capture the island of Ely from Hereward the Wake?	Gathered an army. Sent ships and boats to block supplies. Built a causeway (a bridge). Bribed some monks to lead them to the island.

Key Terms

Gytha	Harold Godwinson's mother. She led the rebellion in Exeter
Coronation	The ceremony where the king or queen is crowned.
Harrying	To carry out attacks
Differ	Be different – as in 'how far do these interpretations differ?' (Are they different or similar?)
Rebellion	An act of armed resistance against a government or a leader.

Norman Conquest (Castles) Knowledge Organiser

What was a 'ringwork'?	A castle without a motte. They had earth enclosures
Name some key features of Norman castles	Motte, Bailey, Ramparts (earth banks), Palisade (Wooden fence at the top of the ramparts), Moat, Gatehouse, Tower.
How many castles had William built by 1071?	35
How many castles were there by 1086 (when William died)?	Around 500 – mostly built by Norman lords.
Why did Normans build castles?	To control surrounding land. As a status symbol – to project an image of power. They were also used as an administrative centre for a local area.
What is the traditional interpretation of castles?	They were built for military purposes
What is the revisionist interpretation of castles?	The structures were weak so they were more about status
What is the recent interpretation of castles?	Castles were for controlling the local population. Heavily defended sites containing garrisons of Norman cavalry
Provide a military purpose that castles were built for?	To provide a defended area for Normans in in control of rebellious areas. To provide a base for Normans so if a rebellion broke out in the local area, there were Normans nearby to deal with it.
What were the fortified sites that Anglo-Saxon thegns had built prior to Normans building castles?	Burh-Geats

Key Terms

Interpretation	A view of something in History. In this case a written or pictorial view of the Norman era
Rampart	Earth banks which could be several metres high.
Motte	The hill in the bailey that the tower sat on. Good for defence.
Bailey	An enclosure inside the ramparts.
Burh-geat	Small defended sites used in Anglo-Saxon England

Norman Conquest (Impact of the Normans) Knowledge Organiser

What is Domesday Book?	It's actually 2 volumes that record every piece of land and every item of property in the country.
Why did William order Domesday Book to be made?	William knew how much tax to charge individuals in England. He needed money to pay for defence against invasion. Some historians think it was a way of legally proving the land in England had been taken by the Normans – therefore making William the undisputed ruler.
How many circuits (regions) were there? How many commissioners (people who collected the information for Domesday Book) in each?	7 circuits, 4 commissioners in each.
What percentage of land was owned by English landowners in 1086?	2% (William had given the rest of England to those who fought alongside him or funded William's invasion of England)
How did William prevent his nobles becoming a threat to him?	By spreading their land out. William's cousin, Alan Rufus, owned land in 12 different shires.
What was the Murdrum fine?	If a Norman was murdered, the local community had to pay an enormous fine until the murderer was found.
What was the main language after the Conquest?	Latin for writing. French for the ruling class. English for the lower (English!) class. This highlighted the difference between conquerors and conquered even more.
In what ways did life get better for the English under the Normans?	Most people still worked on the land – farming was unaffected. The number of thralls reduced hugely. Trade expanded in southern towns.
In what way did life get worse for the English under the Normans?	Number of free peasants were reduced. Peasants' rights were restricted eg. stopped from fishing in rivers, banning collecting firewood from forests. Also for the English noble, they had their land taken from them.

Key Terms

Undisputed	Nobody challenges you (as in William was undisputed King of England)
Exploit	To take advantage of (e.g. The Normans exploited the Anglo-Saxons)
Trial by combat	A new law introduced by the Normans – a sword fight between the accused of a crime and the accuser – whoever won was telling the truth
Ruling class	People who are the more powerful in a country. e.g. The Normans were the ruling class.

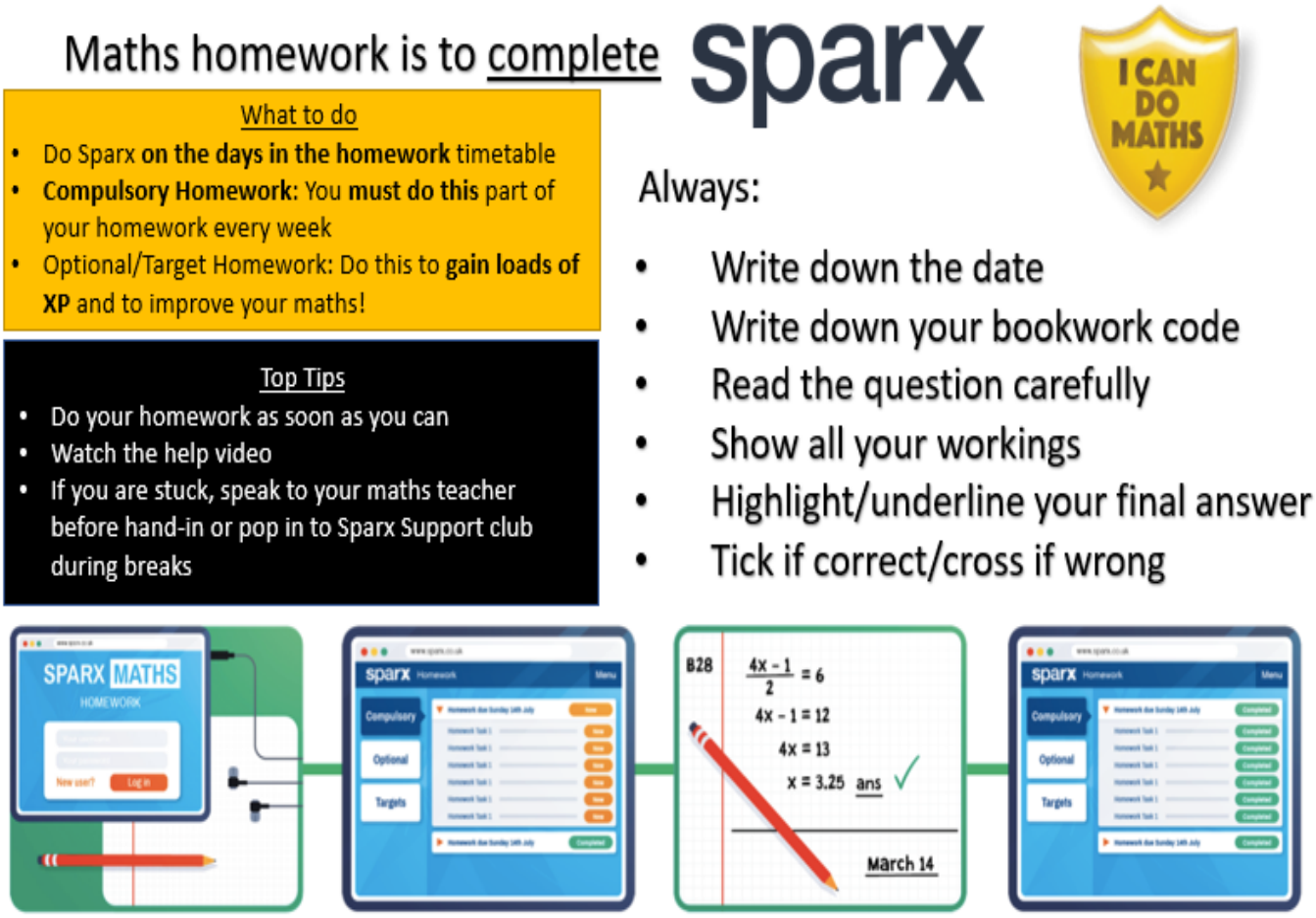
Year 10 Life Skills		
Lesson 1- Coping with change and building resilience	**Lesson 2- How our behaviour affects our mental health**	**Lesson 3- Intimate relationships**
Transition- the process or a period of changing from one state or condition to another. **Resilience-** the capacity to recover quickly from difficulties. **Anxiety**- a feeling of worry, nervousness, or unease about something with an uncertain outcome. **Building resilience:** - Staying connected to your friends and family, and talking about how you feel is a great way to help your emotional wellbeing - A healthy balanced diet can improve your mood and increase your energy levels. - Stay mentally active is also important; you can do this by completing any work set by your teachers and accessing online resources too - Exercise is important because your physical health has a big impact on how you are feeling - Getting enough sleep can help improve your mood **Websites:** Childline- Feelings and emotions YoungMinds- Feelings and symptoms Kooth https://www.healthforteens.co.uk/feelings/resilience/video-5-ways-to-build-resilience/	**Mental Health**- A person's condition with regard to their psychological and emotional well-being. **Stress**- A state of mental or emotional strain or tension resulting from adverse or demanding circumstances **Anxiety**- A feeling of worry, nervousness, or unease about something with an uncertain outcome. **Depression**- Depression is a constant feeling of sadness and loss of interest, which stops you doing your normal activities. Different types of depression exist, with symptoms ranging from relatively minor to severe. Generally, depression does not result from a single event, but from a mix of events and factors. **Emotional well-being** is the ability to produce positive emotions, moods, thoughts, and feelings, and adapt when confronted with adversity and stressful situations.	**Characteristics of a healthy one-to-one intimate relationship:** **Respect-** To feel admiration for someone/ something and to act in a way which shows that you are aware of someone's rights, wishes, etc. **Consent-** To give permission for something to happen or agreement to do something. **Loyalty-** The quality of being faithful to someone or something else. **Trust-** Trust is a feeling that somebody or something can be relied upon/ be truthful. **Shared interests-** Have the same tastes in hobbies/ interests/ sense of humour etc **Sex-** Sexual activity, including specifically sexual intercourse **Friendship-** People who are friends talk to each other and spend time together.

Lesson 4- Assertive Communication & Consent	Lesson 5- Changes and breakdown of relationships	Lesson 6-Sexual harassment and abuse
Peer Pressure- The pressure that you feel to behave in a certain way because your friends or people in your group expect it **Coercion**- The action or practice of persuading someone to do something they wouldn't normally do or something they don't want to do by using force or threats. **Assertiveness**- The quality of being confident and not frightened to say what you want or believe. **Sexual pressure** is when someone tries to make you feel like you should engage in sexual behaviour. **Sexual Consent- The giving of permission by a person to engage in any form of sexual activity including penetrative and oral sex.** **Sexting** is when someone sends or receives a sexually explicit text, image or video. This includes sending 'nude pics', 'rude pics', or 'nude selfies'. Taking, possessing or sharing a sexually explicit picture or video of someone under 18 is **against the law.**	**Emotions-** An emotion is a feeling such as happiness, love, fear, anger, or hatred, which can be caused by the situation that you are in or the people you are with. Your emotions are constantly changing all the time. You may feel different emotions at the start of a relationship, compared to at the end. **Grief-** Grief is a natural response to loss. The loss may be physical (such as a death), social (such as divorce), or occupational (such as a job). Emotional reactions of grief can include anger, guilt, anxiety, sadness, and despair. **Separation-** Separation means that you are living apart from your spouse but are still legally married until you get a judgment of divorce. Although a separation doesn't end your marriage, it does affect the financial responsibilities between you and your spouse before the divorce is final. **Divorce-** A divorce happens after a married couple decide not to live together anymore and that they no longer want to be married to each other. They agree to sign legal papers that make them each single again and allow them to marry other people if they want to.	**Sexual harassment-** Sexual harassment is any unwanted behaviour of a sexual nature that makes you feel distressed, intimidated or humiliated. **Sexual harassment can include:** - someone making sexually degrading comments or gestures your body being stared or leered at - being subjected to sexual jokes or propositions - e-mails or text messages with sexual content - physical behaviour, including unwelcome sexual advances and touching - someone displaying sexually explicit pictures in your space or a shared space, like at work - offers of rewards in return for sexual favours **Online harassment-** Internet harassment, also referred to as "cyberbullying", is the term used to describe the use of the Internet to bully, harass, threaten, or maliciously embarrass. **Challenging prejudice and discrimination:** The Equality Act (2010) provides a legal framework to protect the rights of individuals and advance equality of opportunity for all. It provides Britain with a discrimination law which protects individuals from unfair treatment and promotes a fair and more equal society. It makes all people equal in regard to sex, age, race, sexuality, religion, disability (this means the same laws apply to everyone).

Y10C2 Key Maths Knowledge

Your Maths Homework is to complete your sparx

Use this guide to make sure you know **what to do, when to do it and how to do it**:



We want you to do well with your maths and doing Sparx will help.

If you've tried something, watched the video and are still not sure how to do something make sure you ask for help!

You're expected to complete it every week and catch up if you haven't.

Your Maths Homework is to complete your sparx

Y10IC2 Key knowledge

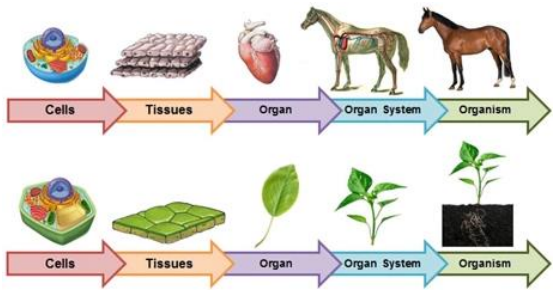
Item	Description
Bivariate	Involving or depending on two variables. Eg. A data set containing height and weight for a group of people would be called bivariate data.
Correlation	A relationship or connection between two things.
Positive correlation	A pattern on a scatter graph that has a positive gradient.
Negative correlation	A pattern on a scatter graph that has a negative gradient.
Interpolation	Estimating a value that falls **within** the range of data on a scattergraph.
Extrapolation	Estimating a value that falls **beyond** the range of data on a scattergraph.
Sine rule	$\frac{a}{sin(A)} = \frac{b}{sin(B)} = \frac{c}{sin(C)}$
Cosine rule	$a^2 = b^2 + c^2 - 2bccos(A)$
Area of a triangle (1)	$Area = \frac{1}{2} \times base \times height$
Area of a triangle (2)	$Area = \frac{1}{2}absin(C)$
Difference	The difference between the terms in a sequence
Arithmetic or Linear sequence	A sequence of numbers formed by adding or subtracting. Eg. 2, 12, 22, 32…
Geometric sequence	A sequence of numbers formed by multiplying or dividing. Eg. 3, 6, 12, 24…
Speed (1)	$Average\ speed = \frac{Distance}{Time}$
Speed (2)	Speed is the gradient of a Distance-Time graph.

Beliefs and Values – Unit 2 - Religion, Crime and Punishment

Key Words			
Community Service	Working in the community to pay back for a criminal act	**Hate Crime**	A crime motivated by hatred e.g. racism, homophobia
Corporal Punishment	Using physical pain as a punishment	**Poverty**	Not having enough money to be able to live a comfortable life
Crime	An action which is against the law and incurs a punishment	**Prison**	A place where criminals are sent to withdraw their freedom as punishment
Death Penalty	A form of punishment where the offender is killed for their crime	**Punishment**	Something negative done to criminals by the state
Deterrence	An aim of punishment – preventing future criminals by harsh treatment of offenders	**Reform**	An aim of punishment – to try and reform criminals
Forgiveness	To show mercy and pardon someone for what they've done wrong	**Retribution**	An aim of punishment – seeking a form of revenge on criminals

Key Ideas			
Christian Attitudes to Crime 	**Good and Evil Intentions** The Bible warns Christians against having **evil** thoughts which lead to evil actions. Avoiding sin and temptation steers Christians away from crime. Christians would be more willing to treat an offender who had good intentions with more **mercy** than one who acted out of evil intentions.	**Attitudes to Lawbreakers** Christians do not believe that people are evil, but that people can be **tempted** to do wrong and break the law. Christians are taught to "love the sinner, hate the sin" which means they should **forgive** and show mercy to people who have done wrong but admitted their mistakes and sought **atonement**.	
Reasons for Crime 	People are tempted to commit crime for a wide range of reasons including **poverty** (not having enough money or food), **upbringing** (where people are not taught right from wrong), **addiction** (some people commit crimes to feed an addiction), **greed** (committing crimes out of a desire for things they cannot afford), **hatred** or out of **opposition to unjust law** (breaking the law to oppose hateful or unjust laws)		
Three Aims of Punishment 	**Deterrence** This aim of punishment seeks to **use punishment as a message** to others considering committing crime. By giving one criminal a harsh punishment, others may be put off committing a similar crime.	**Reformation** This aim of punishment seeks to help criminals **change their behaviour for the better**. It may involve therapy, education or training. Many Christians support this as a form of 'love your neighbour' **mercy**.	**Retribution** This aim of punishment is society getting its own back on the offender. The Old Testament says **'an eye for an eye'** so some Christians would argue that this form of punishment is just according to the Bible.
Forgiveness 	**Forgiveness** is at the heart of Jesus' teaching. It means to show **mercy** and pardon someone for what they have done wrong but showing someone forgiveness does not mean they should be justly punished for their crimes. When Jesus was crucified, he forgave those who sentenced him to death and crucified him saying: **'Father forgive them, for they know not what they do'**. Forgiveness leads Christians to support **reformation** as an aim of punishment as it allows the criminal to be forgiven and to ask for forgiveness. They also use forgiveness as an argument against the death penalty.		
Christian Attitudes to Punishment 	**Prisons** Many Christians believe prisoners should be **treated well** when in prison as even though they have done wrong they do not believe in evil people as much as evil actions. Some Christians campaign for better prison conditions out of mercy.	**Corporal Punishment** Most Christians do not support using physical pain as a form of punishment as it is **harmful** and **negative**. It is currently illegal in the UK and many Christians would rather seek to reform a criminal than punish them in this way.	**Community Service** Many Christians argue in favour of community service where criminals work to **repay** their community as a punishment. It allows criminals to make up for what they have done and does not harm the offender in the process.
Death Penalty 	The **death penalty** means the state killing criminals who have committed the worst crimes. It has not been used in the UK since 1969 but is still a punishment elsewhere in the world. ☑ Some Christians argue that the death penalty is a just punishment for murder as the Bible says both 'you shall not kill' and **'an eye for an eye'**. ☑ They may also argue that it **deters** criminals from committing the worst crimes and keeps people safe. ☒ Other Christians argue that the death penalty goes against **sanctity of life**. Life is sacred and holy and only God can give and take life. ☒ They might also argue that the death penalty goes against the aim of **reformation** as a dead criminal cannot be reformed, forgiven or shown mercy to.		

Lesson 1
Organisational Hierarchy



Cell:
The smallest unit of an organism

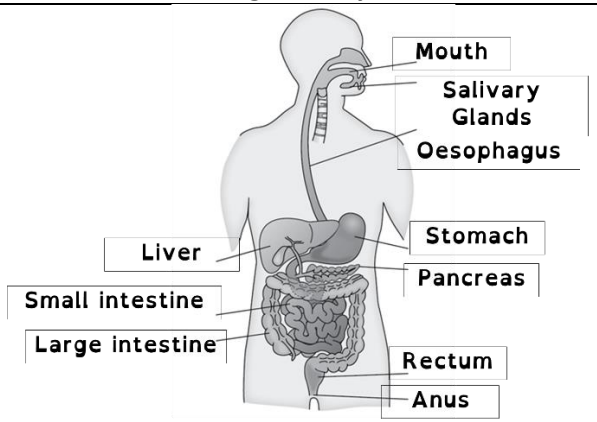
Tissue:
A group of cells with a similar structure and function, which all work together to do a particular job.

Organ:
Made from a group of different tissues, which all work together to do a particular job.

Organ system:
Made from a group of different organs, which all work together to do a particular job.

Organism:
An individual plant, animal, or single-celled organism.

Lessons 2 & 3
The Digestive System



Function:
Digestion: breaking down food so that it is small enough and soluble enough to pass through the wall of the small intestine.
Absorption: transporting digested food molecules from the lumen of the gut into the blood.

The small intestine is adapted to absorb food:
- Thousands of villi
- Large surface area – quicker absorption of food molecules
- Good blood supply

Lesson 4
Required Practical- Food Tests

1. Benedict's test for sugar

Add 10 drops of Benedict's solution to food sample.
Heat in a water bath at 80°C for 5 minutes.
Negative result – Blue
Positive result – Green/ orange/ brick red

2. Iodine test for starch

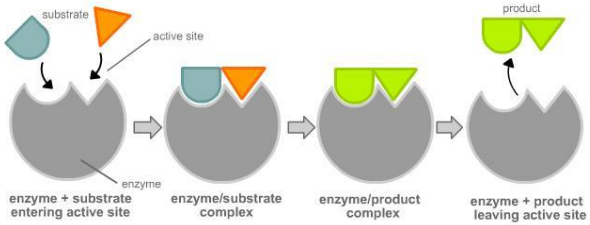
Add 5 drops of iodine solution to food sample.
Negative result – Orange
Positive result – Blue/black

3. Ethanol test for lipids (fats)

Add a few drops of distilled water and then a few drops of ethanol to food sample.
Positive result – white & cloudy emulsion forms

4. Biuret test for protein

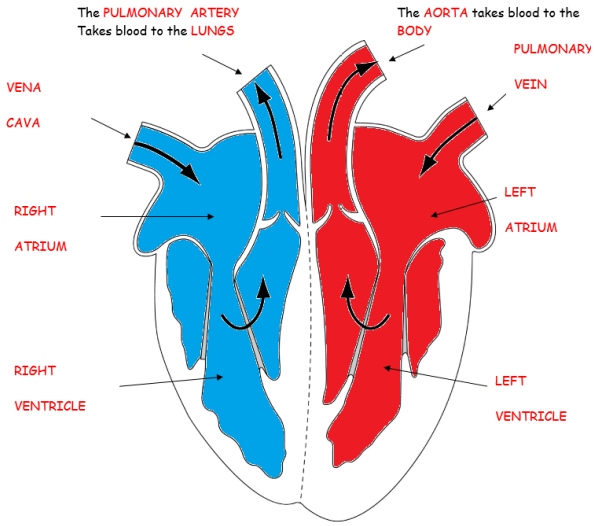
Add 5 drops of Biuret solution to food sample.
Negative result – Blue
Positive result – Purple

Lesson 5 Properties of Enzymes	Lesson 6 Required Practical - Enzymes	Lesson 7 Digestive Enzymes
Catalyst: A chemical which speeds up a reaction without being changed or used up. **Enzyme:** • A substance produced by a living organism that acts as a catalyst for chemical reactions. It is made up of amino acids. • Enzymes are **specific**, they can only catalyse one type of reaction. E.g. amylase in saliva only catalyses the reaction of breaking down starch. **Lock and Key Theory of Enzyme action:**  In the same way that a key fits into a lock, so a substrate is thought to fit into an enzyme's active site. The enzyme is the lock, and the substrate is the key.	**The effect of pH and temperature on enzymes:** • A low or high pH **denatures** enzymes. • At a low temperature enzyme and substrate molecules have low kinetic energy so rate of reaction is low. • At a high temperature the enzymes start to denature. **Denatured**: An enzyme's active site has changed shape, the substrate will no longer fit. The enzyme will no longer work. **Aim:** to find the optimum pH for the enzyme amylase to catalyse the reaction to break down starch. **Independent variable**: pH of the solution **Dependent variable**: time taken to break down starch in seconds **Control variables**: temperature, volume of starch solution, volume of buffer solution, time of intervals between testing, volume of amylase **Calculating rate of reaction:** Rate = $\frac{1000}{Time}$ Units = s^{-1}	Food molecules must be broken down before they can be absorbed into the blood because they are too **large** and **insoluble.** **Carbohydrate digestion** Carbohydrase enzymes e.g. amylase break down starch into sugar. **Protein digestion** Protease enzymes break down protein into amino acids. **Fat digestion** Bile emulsifies fats Lipase enzymes break down fat molecules into glycerol and fatty acid molecules.

Lesson 8
The Heart

- An organ that pumps blood around the body
- It is made of two pumps – **double circulation.**
- The walls of the heart are made up of **cardiac muscle**.
- The right side pumps blood to the lungs to pick up oxygen.
- The left side pumps blood around the rest of the body.

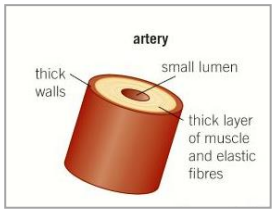
Oxygenated: Blood high in oxygen
Deoxygenated: Blood low in oxygen



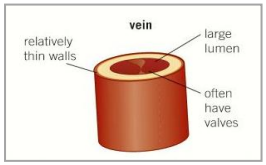
Lesson 9
Blood Vessels

There are 3 types of blood vessel:

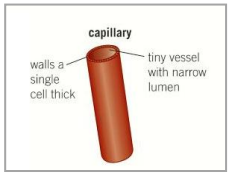
1. **Arteries**
   Carry blood away from the heart to the body.
   Usually hold oxygenated blood.
   Blood is under high pressure.
   Thick muscle walls and a small lumen.



2. **Veins**
   Carry blood back to the heart from the body.
   Carry deoxygenated blood.
   Blood is under low pressure.
   Thin muscle and elastic wall.
   Have valves to prevent back flow of blood.



3. **Capillaries**
   Carry blood to cells.
   Links arteries and veins
   Very thin walls – one cell thick
   Small vessel
   Narrow lumen



Lessons 10 & 11
Coronary Heart Disease (CHD)

Coronary arteries:
The blood vessels that supply oxygenated blood to the heart muscle.

Coronary heart disease (CHD):
When the heart's blood supply is blocked or interrupted by a build-up of fatty substances in the coronary arteries.

Stages of CHD:

- Fatty cholesterol plaques develop over time
- Hard outer layer of plaque can crack
- Platelets form blood clots around the cracks
- Artery narrows even more
- Blood flow blocked – oxygen doesn't reach the heart muscle, so the muscle dies.

Treating CHD:

- **Stents** –a metal mesh placed in a blocked or partially blocked artery. They are used to open up the blood vessel by the inflation of a tiny balloon.
- **Statins** – drugs used to lower blood cholesterol levels and improve the balance of HDLs and LDLs in the blood.

Treating heart failure:

- Heart transplant
- Artificial heart
- Replacement valves

Lesson 12 Blood

Functions of blood:

- Transports oxygen and nutrients to cells
- Transports carbon dioxide from cells back to lungs
- Transports waste products from cells
- Transports heat, water, slats, white blood cells and hormones around the body.

Components of blood:

Red blood cells

- Carry oxygen.
- Biconcave shape to absorb oxygen
- No nucleus

White blood cells

- Fight disease
- Some carry out phagocytosis
- Some produce antibodies & anti-toxins

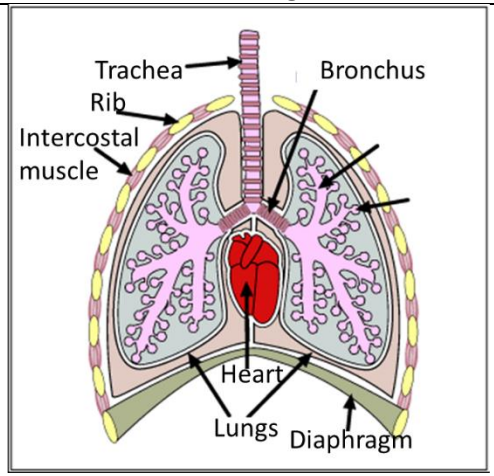
Platelets

- Cell fragments
- Stick cells together around cuts to clot blood.

Plasma

- Liquid part of blood
- Substances dissolve into plasma such as carbon dioxide, glucose and proteins

Lesson 13 Lungs



The job of the breathing system is to move air in and out of the lungs.

- Breathing air into the lungs= inhalation
- Breathing air out of the lungs = exhalation

Gas Exchange:

- Gas exchange occurs in the alveoli of the lungs.
- Here oxygen passes into the blood by diffusion.
- At the same time carbon dioxide passes from the blood into the alveoli to be breathed out.
- Alveoli are adapted for efficient gas exchange by having: a large surface area, thin, moist membranes and a good blood supply.

Lesson 14 Non-Communicable Diseases

Health:

A state of mental physical wellbeing

Non-communicable disease:

- A medical condition or disease that is non-infectious (cannot be passed on from one person to the next)
- E.g. Cardiovascular disease, diabetes, asthma

Causes of non-communicable disease:

Combination of genetic and environmental factors. Lifestyle factors such as smoking, alcohol abuse, unhealthy diets and physical inactivity.

Risk factors for non-communicable diseases:

- Cardiovascular disease – Obesity, poor diet, smoking, physical inactivity.
- Type 2 diabetes – Obesity, poor diet, physical inactivity.
- Lung disease – smoking
- Cancer – Poor diet, obesity, smoking, alcohol abuse, UV exposure, physical inactivity

Correlation:

A correlation shows a link between two variables, for example one may increase whilst the other also increases.

Causal mechanism:

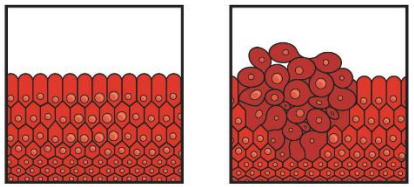
A causal mechanism proves the link between the two variables through a biological process. For example, there is a causal link between smoking and getting lung cancer.

Lesson 15
Cancer

Risk factors for cancer:

- Genetics
- Carcinogens e.g. asbestos, tar in tobacco smoke
- Ionising radiation e.g. UV light, X-rays, radioactive materials, nuclear disasters
- Viral infections e.g. HPV causing cervical cancer

Tumour:
A mass of cells caused by uncontrolled cell growth and division.
Most cancers are the result of mutations – changes in genetic material



Two types of tumour:

1. **Benign** – Not cancerous, the tumour stays in one place.
2. **Malignant** – Tumour grows and spreads to other tissues. Cells can break off and travel in the bloodstream to infect other tissues.

Lessons 1 & 2 Classification and Evolutionary trees	Lessons 3 & 4 Communities and Abiotic & Biotic factors	Lessons 5 & 6 Required practical lessons: Measuring distribution using a quadrat and a transect line
Classification: the organising of living organisms in to groups. 1st classification system, proposed by Carl Linnaeus, was based on structure and characteristics. Classification makes the **study** of organisms easier, provides information about **evolution** and a **common language**. Classification ladder: **Kingdom, phylum, class, order, family, genus and species** **Binominal name**: all organisms have unique binominal names, made up of its genus and species Developments in biochemistry, microscopy & genomic science, domain level added above kingdom by Carl Woese. There are 3 domains: **Bacteria, Eukarya and Archaea.** **Evolutionary tree**: diagrams which show how species are related to one another. They show common ancestors and relationships between species. Developing evolutionary trees: where organisms are living, evidence comes from DNA analysis and structural similarities. The fossil record is used for extinct organisms.	**Habitat**: where an organism lives **Population**: All the organisms of a certain species living in an area **Biotic**: Living things in an environment **Abiotic**: Non-living factors in an environment **Ecosystem**: The interaction of a community of living organisms (biotic) with the non- living parts (abiotic) of the environment. **Community**: The populations of different species living in a habitat. The survive a plant needs the following: Space, sunlight, carbon dioxide, water and minerals To survive an animal needs the following: Mates, prey/food, space, water and oxygen. Animals and plants have to compete with each other for limited resources. Those individuals that are the best adapted will win, survive and reproduce. **Interdependence**: Species depending on each other. **Stable community:** A community where all the species and environmental factors are balanced so that the population size remains constant.	**Distribution of organisms**: How organisms are spread out in an environment. **Quantitative data** on the distribution of organisms can be obtained by random sampling with quadrats or sample along a transect using a quadrat. **Quadrat**: Small frame which gives a snapshot of an area and the organisms that live there. **Transect line:** Used to investigate how the distribution of organisms change along a set direction e.g. with increasing distance from a tree. Allows the identification of patterns. Physical factors can affect the distribution of organisms including: Water, light, nutrients, oxygen, carbon dioxide, and temperature.

Lessons 7 & 8 **Adaptation and levels of organisation**	**Lessons 9 & 10** **The water and carbon cycle**	**Lessons 11** **Global Warming**
Animals and plants are <u>adapted</u> to the environment in which they live. Adaptations can be **Structural**: Features of the organism's body structure e.g. shape and colour **Behavioural**: Ways in which the organism behaves e.g. migration **Functional**: Things that go on inside the body of the organism that can be related to processes e.g. reproduction and metabolism. **Extremophile**: An organism that can survive in extreme environments, e.g. hot spring, high salt conditions and high pressure **Food chain:** A diagram which shows the feeding relationships of organisms **Herbivore**: An animal that only eats plants **Prey**: the name given to any animal that is eaten by another animal **Producer**: At the start of a food chain, makes it own food by photosynthesis **Food chain**: Diagram to show feeding relationships **Consumer**: An organism that gets food by eating other organisms **Carnivore**: An animal that eats other animals **Biomass**: The mass of all material in an organism, not including the water	**Water cycle:** The process of moving water through the environment **Precipitation**: Any form of water falling from the clouds **Condensation**: When water vapour cools and turns in to clouds **Evaporation**: When the sun heats up water from the sea and it goes in to the air. **Groundwater flow:** When water flows through rocks and soil underground **Surface run-off**: When the water run over the surface of the ground **Transpiration**: When the sun heats up water frim the leaves of trees **Infiltration**: The process of water soaking in to the ground **Carbon cycle:** The process of moving carbon through the environment <u>Key steps of the carbon cycle</u> **Respiration**: The process animals and plants use glucose and oxygen to release energy, carbon dioxide and water **Photosynthesis**: The process by which plants use carbon dioxide and water and make glucose and water. **Combustion**: The process of burning which releases carbon dioxide and water **Decomposition/decay**: The process of rotting and releasing mineral ions and carbon dioxide.	**Global warming**: The increase in the average temperature of Earth **Greenhouse effect:** Gases in the atmosphere naturally act like an insulating layer, absorbing heat energy that would be reflected back in to space. **Enhanced greenhouse effect**: The result of increased greenhouse gases, more heat energy is trapped, which warms the surface of the earth. **Greenhouse gases**: Carbon dioxide, methane, water vapour **Consequences of global warming**: Ice caps melt, sea level rise, flooding, extreme weather, changes to animal and plant distribution, changes to migration patterns and decreases biodiversity.

Revision Guide: Foundation pages 128-133, Higher pages

Lessons 1 & 2 Reactions of metals & Displacement

The **reactivity series** of metals is a **list** showing metals in order of decreasing **reactivity**.

Metal	Reaction with cold water	Reaction with dilute acids	Reactivity
Potassium	Violent	Violent	Most reactive
Sodium			
Lithium			
Calcium	Fast	Rapid	
Magnesium	Very slow		
(Carbon)			
Zinc	Usually no reaction	Slow	
Iron	Rusts slowly		
(Hydrogen)			
Copper	No reaction	No reaction	
Gold			Least reactive

When metals react, they lose electrons to form positive ions , (cations).

When a metal reacts with water, a metal hydroxide and hydrogen are formed. For example, sodium reacts rapidly with cold water:

$2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$

When a metal reacts with a dilute **acid**, a **salt** and hydrogen are formed. For example, magnesium reacts rapidly with dilute hydrochloric acid:

$Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

Many **metals** react with oxygen to make metal oxides. For example, magnesium burns rapidly in air:

$\mathbf{2Mg(s) + O_2(g) \rightarrow 2MgO(s)}$

The reactions are **oxidation** reactions because the metal gains oxygen.

Displacement: Moving a something from its place or position and occupying the space with something else.

A more **reactive** element can **displace , (take the place)** of a less reactive element from its **compounds**.

Lessons 3 (higher) Ionic Equations

First: write the balanced symbol equation.

$Mg(s) + CuSO_4(aq) \rightarrow MgSO_4(aq) + Cu(s)$

Second: write the equation in terms of the ions

$Mg(s) + Cu^{2+}(aq) + SO_4^{2-}(aq) \rightarrow Mg^{2+}(aq) + SO_4^{2-}(aq) + Cu(s)$

Third: Remove the **Spectator** Ions, (these are the ions that have not changed). SO_4^{2-} is the Spectator ion.

Ionic Equation: $Mg(s) + Cu^{2+}(aq) \rightarrow Mg^{2+}(aq) + Cu(s)$

This equation is an example of a balanced **ionic equation**. It can be split into two **half equations** :

$Mg(s) - 2e^- \rightarrow Mg^{2+}(aq)$ (Oxidation)

$Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$ (Reduction)

•

Lessons 4 Extraction of Metals

An ore is a rock that contains enough of a metal or a metal compound to make extracting the metal worthwhile.

Some **unreactive** metals can be found as **elements**. They are called **native** metals.

If a metal is less **reactive** than carbon, it can be extracted from its compounds by heating with carbon, (**reduction with carbon**).

If the metal is more reactive than carbon, **electrolysis** is used. This uses electricity to separate the metal form its ore.

If a metal is less **reactive** than carbon, it can be extracted from its compounds by heating with carbon.

Copper is an example of this:

$2CuO(s) + C(s) \rightarrow 2Cu(l) + CO_2(g)$

Copper oxide is **reduced** as carbon is **oxidised**, so this is an example of a **redox** reaction.

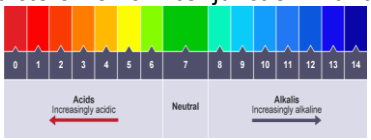
Iron(III) oxide is reduced to molten iron when it reacts with carbon. One of the products is carbon monoxide:

iron(III) oxide + carbon → iron + carbon monoxide

$Fe_2O_3(s) + 3C(s) \rightarrow 2Fe(l) + 3CO(g)$

Aluminium is more **reactive** than carbon so it must be extracted from its **compounds** using **electrolysis**.

Revision Guide: Foundation pages 128-133, Higher pages

Lesson 5, 6&7 Acids and Alkalis & Neutralisation	Lessons 8&9 Metals + acid & Metal carbonates + acid	Lesson 10 Required practical – making a salt
Acids form **acidic solutions** in water. Acids produce hydrogen **ions**, H^+ in aqueous solution. $HCl(aq) \rightarrow \mathbf{H^+}(aq) + Cl^-(aq)$ In a **dilute** acid there is less $\mathbf{H^+}$ and more water, this makes the acid safer to use, but its still an **Irritant**. In a **concentrated** acid there are more $\mathbf{H^+}$ and less water, this makes the acid more dangerous and **Corrosive**. **Alkalis** form **alkaline** solutions in water. Alkalis produce hydroxide ions, OH^- in aqueous solution. A **neutral** solution is neither acidic, nor alkaline. A neutral solution has a pH value of 7. A chemical indicator is a substance that undergoes a distinct observable colour change when conditions in its solution change. Litmus paper or solution is a simple indicator that changes colour in acidic or alkaline solutions. Universal indictors works in conjunction with the pH scale.  A **BASE** is any substance that reacts with an **ACID** to form a **SALT** and WATER only. Bases that are **soluble** in water are called **alkalis** and they **dissolve** in water to form **alkaline solutions**. A **neutralisation** reaction is a reaction between an acid and a base. Acid + Base -> Salt + Water	When acids react with **metals**, the products are a salt and hydrogen. In general: Acid + metal → salt + hydrogen **Naming the Salt:** We need two things, the name of the metal and the name of the acid. **Different acids make different Salts** Hydrochloric acid makes **CHLORIDE** salts **Chloride Cl^-** Sulfuric acid Makes **SULFATE** salts **Sulfate SO_4^{2-}** Nitric acid makes **NITRATE** salts **Nitrate NO_3^-** Calcium Carbonate is a good example of a metal carbonate. Its the compound found in chalk , Limestone and crustacean shells, (crabs + Lobster). **Calcium carbonate has the formula $CaCO_3$** A salt, water and carbon dioxide are produced when acids react with carbonates. In general: Acid + carbonate → salt + water + carbon dioxide Metal carbonates reacting with acids are neutralisation reactions	**Method: what you need to do!** 1. Measure 40 cm^3 sulfuric acid and put it into the 100 cm^3 beaker. 2. Put the beaker onto a gauze and heat the acid gently until it is almost boiling. Turn off the Bunsen burner. 3. Use a spatula to add a small amount of copper (II) oxide powder to the hot acid. Stir with the glass rod. The copper (II) oxide will disappear and the solution will turn clear blue. 4. Add some more copper (II) oxide and stir again. 5. Keep adding the copper (II) oxide until some of it remains after stirring, (excess). 6. Set up the funnel and filter paper over a conical flask and filter the contents of the beaker. 7. Pour the filtrate from the conical flask into the evaporating basin. 8. Set up a water bath using the 250 cm^3 beaker on the tripod and gauze. 9. Evaporate the filtrate gently using the water bath, (until 1/3 remains). 10. When crystals start to form, stop heating the water bath and pour the remaining solution into the crystallising dish. 11. Leave the crystallising dish in a cool place for at least 24 hour

Revision Guide: Foundation pages 128-133, Higher pages

Lesson 11 ,(higher) Strong and weak acids

Acids form **acidic solutions** in water. Acids produce hydrogen **ions**, H^+ in aqueous solution. For example:

$HCl(aq) \rightarrow \mathbf{H^+(aq)} + Cl^-(aq)$

The amount of H^+ ions determines acidity. The amount of H^+ can be defined as concentration of H^+.

It makes sense, that if there are more H^+ ions in solution then the acid will be stronger . Therefore, if there is a high concentration of H^+ ions there is more acidity and the pH will be Lower.

pH	H^+ concentration ,(mol/dm³)	H^+ concentration written in standard form , (mol/dm³)
1	0.1	$1X10^{-1}$
2	0.01	$1X10^{-2}$
3	0.001	$1X10^{-3}$
4	0.0001	$1X10^{-4}$
5	0.00001	$1X10^{-5}$
6	0.000001	$1X10^{-6}$

Acids in solution are a source of hydrogen **ions**, H^+. The hydrogen ions are produced when the acid **dissociates** or breaks down to form ions, (**ionises**).

Strong acids completely dissociate into ions in solution.

Weak acids only partially dissociate in solution.

Lesson 12 &13 Electrolysis of pure substances

An **ionic compound** is a giant structure of ions. The ions have a regular, repeating arrangement called an **ionic lattice**.

An ionic lattice is held together by strong **electrostatic forces** of attraction between the oppositely charged ions. **This is called ionic bonding**.

An ionic compound can conduct electricity only when:
it has **melted** to form a liquid, or
it has dissolved in water to form an **aqueous** solution

Electrolytes are **ionic compounds** that are:
in the **molten** state (heated so they become liquids),
or **dissolved** in water

Electrolysis separates the ions in an electrolyte using electricity.

The negatively charged electrode in electrolysis is called the **cathode**. Positively charged ions , (**cations**) move towards the **cathode**.

The positively charged electrode in electrolysis is called the **anode**. Negatively charged ions, (anions) move towards the anode.

Lesson 14 Electrolysis of solutions

An **electrolyte** formed by dissolving an **ionic compound** contains:

hydrogen ions from the water, and positive ions from the compound.

hydroxide ions from the water, and negative ions from the compound.

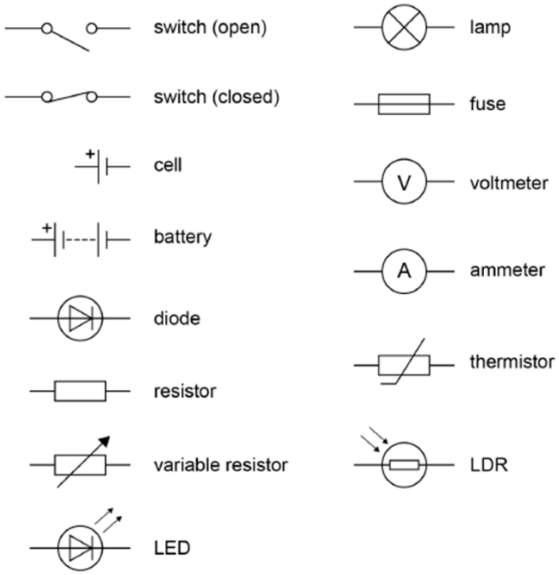
the metal is produced at the cathode if it is less **reactive** than hydrogen

hydrogen is produced at the cathode if the metal is more reactive than hydrogen

Oxygen is produced (from hydroxide ions), unless **halide** ions (chloride, bromide or iodide ions) are present.

Lesson 15 Required Practical – electrolysis	Lesson 16 Electrolysis of aluminium	
Method: 1. Pour approximately 50cm^3 copper (II) chloride solution into a beaker. 2. Add the petri dish lid and insert the carbon rods through the holes. **The rods must not touch each other.** 3. Attach crocodile leads to the rods. Connect the rods to a low voltage (4v) power supply. 4. Look at both electrodes and record your initial observations in a table. 5. Use forceps to hold a piece of blue litmus paper in the solution next to the anode (positive electrode) and identify the element? 6. Write all your observations in a table. 7. Rinse the electrochemical cell apparatus and collect a new set of electrodes. 8. Repeat steps 1–7 using the remaining solutions.	Aluminum is the most **abundant** metal on Earth. Its found in the earths crust as an Ore called **bauxite**. Within Bauxite, aluminum is found as a compound called **Aluminum Oxide**. Aluminium is quite a reactive metal, so **Carbon** is not reactive enough to extract the metal using **displacement**, (remember the reactivity series). Electrolysis must be used to extract Aluminium , which is expensive as it uses a lot of electricity. Aluminium oxide melts at 2050°c This would need a lot of heat energy and would be expensive. Scientists have found a way to overcome the high temperature needed to make the aluminium molten. They dissolve it in liquid Cryolite. Cryolite is another ionic compound which melts at 850°c. Aluminium is produced at the cathode Oxygen is produced at the anode , but its so hot that it reacts with the carbon electrode to make **Carbon Dioxide, (CO_2).**	

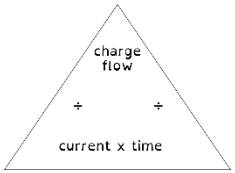
Lesson 1 Introduction to circuits



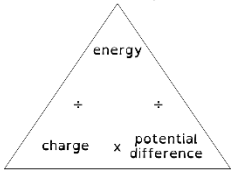
- **Charge** is a property of materials.
- It can be positive or negative and is measured in coulombs. Electrons have a negative charge.
- Metals have a "sea" of delocalised/free "conduction electrons".
- These electrons can move through the material, causing a current.
- **Insulators** do not have free electrons.

Lessons 2 & 3 Current, p.d. and resistance

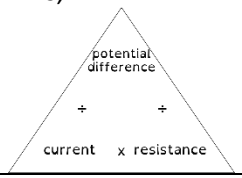
charge flow = current x time
Charge in Coulombs, C
Current in Amperes, A
Time in seconds, s



energy transferred = charge x potential difference
Energy transferred in Joules, J
Charge in Coulombs, C
Potential difference in Volts, V



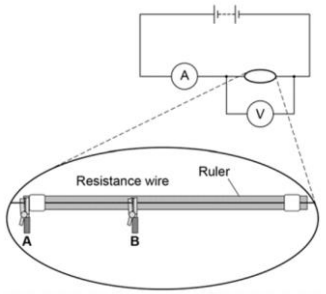
potential difference = current × resistance
Potential difference in Volts, V
Current in Amperes, A
Resistance in Ohms, Ω



Lesson 4 Required Practical – Resistance and the length of a wire

- **Resistance** is a measure of how hard or easy it is for a current to flow.
- The more resistance:
  - The lower the current will be for a given p.d.
  - The higher the p.d. will be needed for a particular current to flow.

- You will investigate **the relationship between the length of a wire and its resistance.**



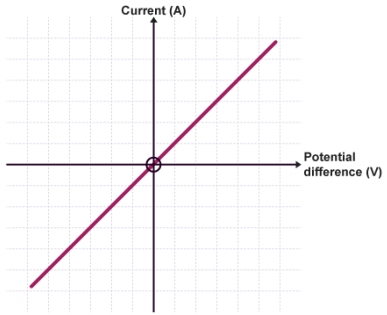
- **<u>Independent variable</u>**: Length of wire in metres
- **<u>Dependent variable</u>**: Resistance of wire in Ω
- **<u>Control variable</u>**: Current, temperature, material of wire

Revision Guide: Foundation pages 180-192, Higher pages 179-190

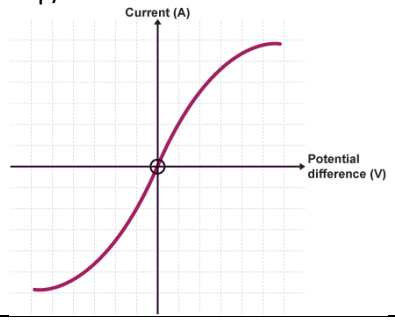
Lessons 5 & 6
Required Practical – I-V Characteristics

- You will investigate **the relationship between current and potential difference for circuit components**
- **Ohm's law** states that the current through a resistor is directly proportional to the potential difference across it, at constant temperature.
- A graph is **directly proportional** if a line of best fit is a straight line through the origin.

Resistor:

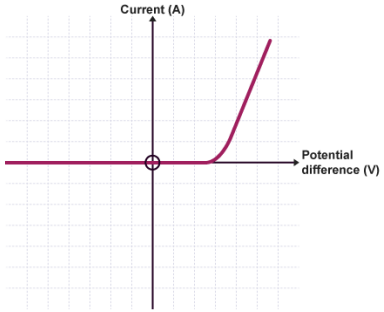


Filament lamp/bulb:



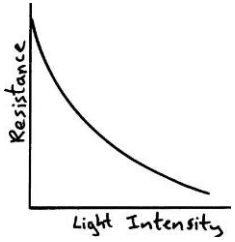
Lesson 7
Non-ohmic components

Diode/LED:

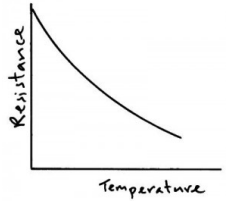


- Some components have a resistance that depends on an environmental factor.

LDR:

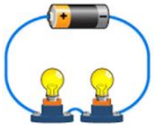


Thermistor:

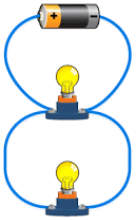


Lessons 8 & 9
Series and Parallel circuits

- In a series circuit, you have one component after another. All of the components are connected together by the same 'loop' of wire.



- A parallel circuit is one where components are connected in separate loops – sometimes called branches.
- Each component is placed along a different path.

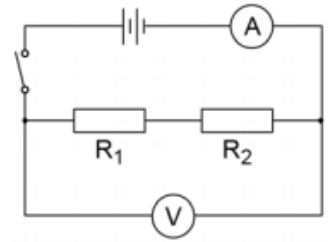


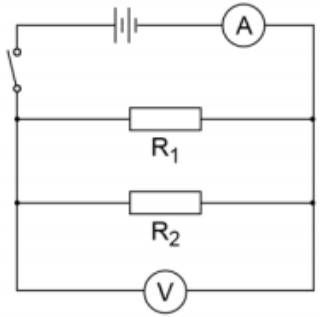
	Series	**Parallel**
Current	Same everywhere	Shared between branches
P.d.	Shared between components	Same in each branch (and equal to p.d. of the supply)
Resistance	Sum of individual resistances	Less than the resistance of any one resistance

Revision Guide: Foundation pages 180-192, Higher pages 179-190

Lesson 10
Required Practical – Resistance in series and parallel

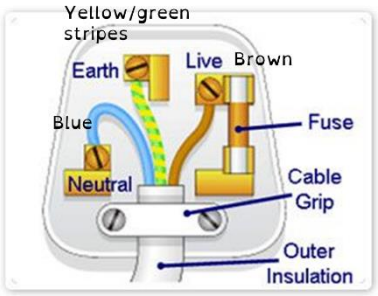
- You will investigate how **combinations of resistors in series and parallel behave**





- In series, current must flow through both resistors. It is harder to flow through both than to flow through either resistor individually, so the resistance increases.
- **In series**: $R_{total} = R_1 + R_2$
- In parallel, current can flow through both resistors at the same time. More current flows in the circuit than if only one of the resistors was there. As the p.d. remains constant, this means the total resistance must have decreased.

Lessons 11 & 12
The 3-pin plug and mains electricity

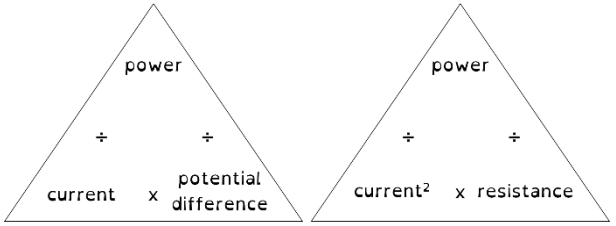


Name of wire	Colour	Job
Live	Brown	Supplies the alternating potential difference
Neutral	Blue	Completes the circuit
Earth	Green/Yellow stripes	Safety (can prevent shocks or fires)

- **A fuse** is a thin wire in a glass tube designed to melt at a specific current.
- **Earthing** means connecting the metal case of an appliance directly to the earth using a low resistance cable.
- The **UK mains supply** is an **alternating current** supplied at a p.d. of **230 V** and a frequency of **50 Hz**.

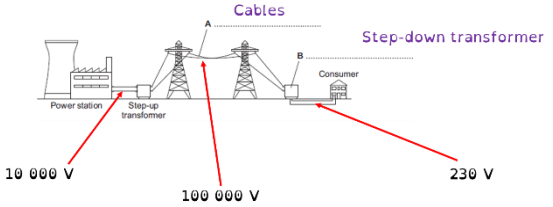
Lessons 13 & 14
Electrical power and The National Grid

power = potential difference x current
power = current2 x resistance

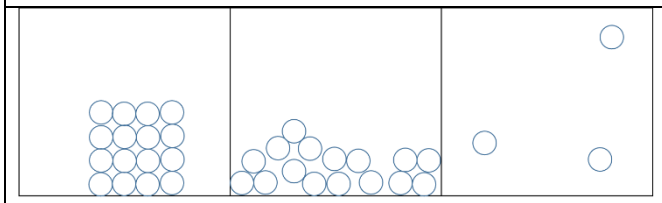
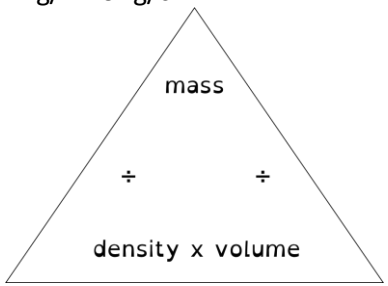


Power in Watts, W

- The National Grid is the system of cables and transformers that bring electricity to homes and businesses.



- Transformers increase (step up) or decrease (step down) the potential difference of the electricity supply.
- If the potential difference goes up the current goes down. (As power = current x p.d.)
- If the current goes down, less energy is lost as heat in the wires.
- (As power = current^2 x resistance, half the current means ¼ the energy lost!)

Lesson 1 The Particle Model	Lesson 2 Required Practical – Density	Lesson 3 Explaining Density
 Particles in a solid • Fixed and regular arrangement • Strong forces • Held close together • Vibrate about fixed positions • Low energy Particles in a liquid • Irregular arrangement • Fill bottom of container • Moderate forces • Some gaps between particles • Groups of particles move past each other • More energy than solids, less than gases Particles in a gas • Random arrangement • Fill container • Negligible forces • Far apart • Move randomly • High energy	Density = mass ÷ volume Mass in kg or g Volume in m^3 or cm^3 Density in kg/m^3 or g/cm^3  • You will investigate **the density of solids and liquids.** • • Mass is measured with a balance. • For **regular solids**, you can calculate the volume if you measure the length of the sides. • For **irregular solids** you can measure the volume of water displaced using a displacement can and a measuring cylinder. • For **liquids**, you measure volume with a measuring cylinder.	• How does the particle model explain why solids are denser than liquids and why liquids are denser than gases? • The short answer: there are **more particles in a given volume.** • The long answer: • The particles in a solid have **strong forces** between them. • This means they are **close together**. • 1 kg of a solid will **take up less space** than 1 kg of a liquid or gas. Therefore the solid will have a higher density. • Materials float if their density is less than that of the liquid they are in. (Water has a density of around 1.0 g/cm^3). • Ice must be less dense than water, even though the particle model says it should be more dense. (This is due to the shape of water molecules). This is a limitation of the particle model.

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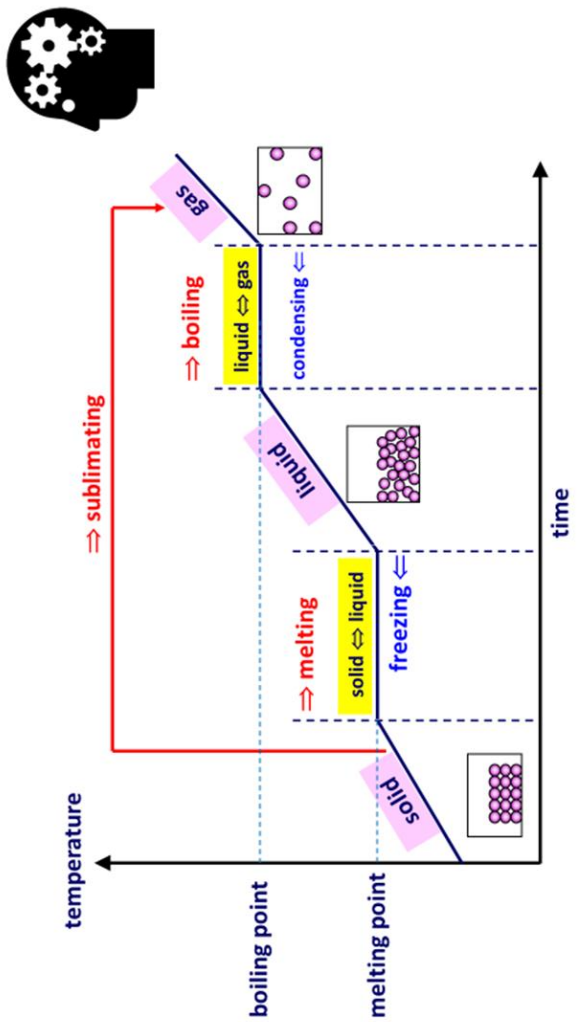
Lesson 4 Changes of state



Lesson 5 Internal Energy

- **Temperature** is a measure of the **average kinetic** energy of the particles in an object.
- The hotter an object is, the more energy the particles have (on average) and the higher the temperature. This energy is called heat.
- **Internal energy** is the **total kinetic** energy and **potential** energy of all the particles (atoms and molecules) that make up a system.
- **Heating** changes the energy stored within the system by **increasing the energy** of the particles that make up the system.
- **Either**, the kinetic energy will increase **or** the potential energy will increase, **but not both**.
- **Either the temperature of the system increases, or changes of state happen**.
- When the material changes state, the potential energy is changing because the particles are moving further apart.
- **The amount of energy required to change state will depend on the strength of the bonds between particles.**
-

Lesson 6 Specific Heat Capacity

- **Specific heat capacity** is a measure of how much energy a material can store. It is the energy needed to change the temperature of 1kg of a material by 1°C. It is measured in **J/kg°C**.
- Specific heat capacities tend to have values from a few hundred to a few thousand J/kg°C.
- **Liquids** tend to have higher specific capacities than solids.
- **Non-metals** tend to have higher specific capacities than metals.

Energy = mass x specific heat capacity x temperature change
Energy is the change in thermal energy in joules, J
Mass of the substance in kg
Specific heat capacity in J / kg °C
Temperature change in degrees Celsius, °C

Reminder: this is also covered in the Required Practical on Specific Heat Capacity in the Energy topic.

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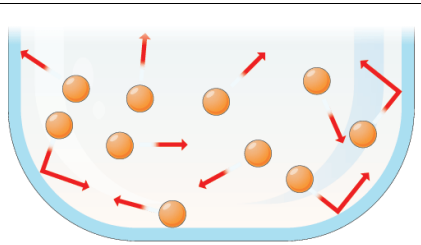
Lesson 7 Specific Latent Heat	Lesson 8 Brownian Motion	Lesson 9 Pressure in gases
• The **specific latent heat** of a substance is the amount of energy required to change the state of one kilogram of the substance with no change in temperature: • **Specific latent heat of fusion** – change of state from solid to liquid. • **Specific latent heat of vaporisation** – change of state from liquid to vapour *Thermal energy for a change of state = mass x specific latent heat* energy in joules , J mass in kilograms, kg specific latent heat in joules per kilogram, J/kg • The larger the value of specific latent heat, the more energy is needed for the change of state. • The specific latent heat of vaporisation of water is nearly 100 times larger than the specific latent heat of fusion of water.	• The motion of particles within a gas is **random**. They have a range of speeds and directions. • As the temperature of a gas increases, the internal energy of the gas increases. • As a gas is heated, the average kinetic energy of the particles within it increases. This means that the average speed of the particles increases. • Larger particles within a fluid (e.g., dust in air) move randomly and seem to "jiggle" about. This is because they are constantly being hit by the particles of the fluid, which move randomly. This is called **Brownian motion**.	 • Pressure in gases is caused because some of the particles collide with the sides of the container. • They change direction, which means (as their velocity changes) they are accelerating. • This means there is a force from the container on the particles. • Newton's 3rd law states that there is a force from the particles on the container. • This force gives rise to pressure. • Gas cylinders can explode in fires, even if they don't contain flammable gases, because the pressure inside the cylinder can rise dramatically.