

KNOWLEDGE ORGANISER BOOKLET

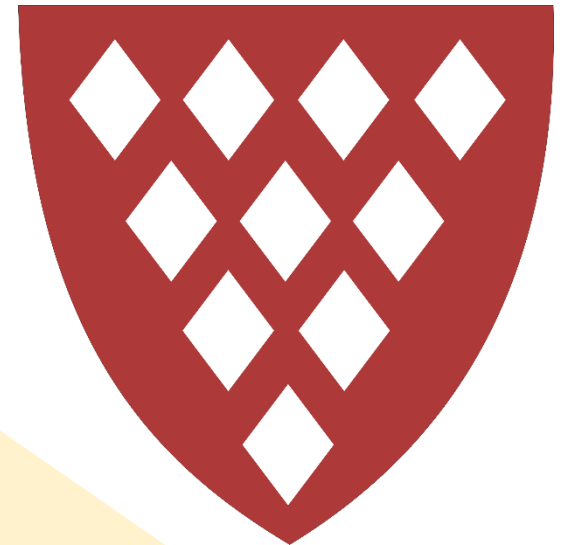
YEAR 10 – CYCLE 1

2026 - 2027

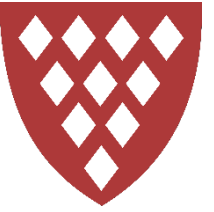
CORE & HUMANITIES

Name:

Tutor Group:



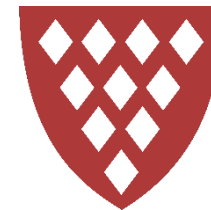
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CORE & HUMANITIES

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Instructions for Use



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

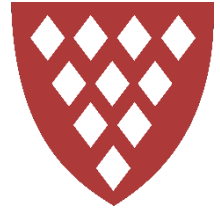
In this booklet are **Knowledge Organisers** for each subject which contain the core concepts that you have to know to be successful in your lessons.

The **first 15 minutes** of Home Learning is the same in all subjects (apart from Maths) and should be completed in your single **Home Learning exercise book**:

-  **Look:** read a specific section of the *Knowledge Organiser*.
-  **Cover:** cover it over or put it to one side;
-  **Write:** from memory, write out as much of the information as you can remember for that section;
-  **Check:** check back with the *Knowledge Organiser*. Anything missing or incorrect, add in purple pen.
-  **Review:** information you didn't recall the first time you may wish to check in a different format, such as repeating the process or creating revision cards.

The next lesson, your teacher will check that you have completed this process and you will be quizzed in your subject lesson to see what you can recall.

Instructions for Use : Example



Show My Homework for Geography says: 'Knowledge Organiser: How to Read Grid References'.



1. **LOOK:** carefully read the section of the *Knowledge Organiser* which you are learning.



2. **COVER:** cover it over or put it to one side.



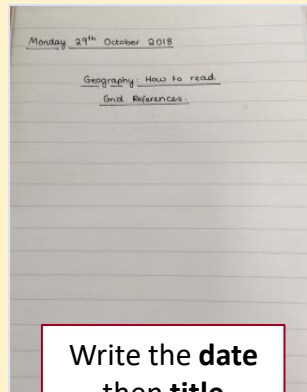
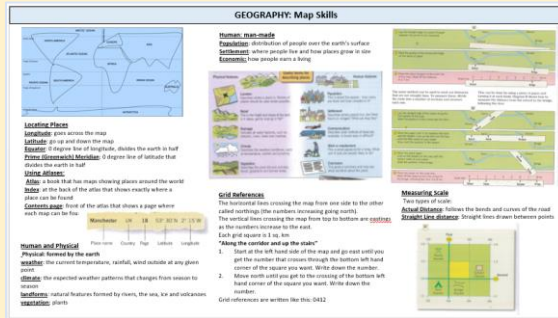
3. **WRITE:** write out as many details as you can from memory.



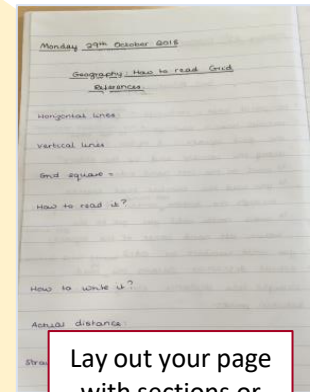
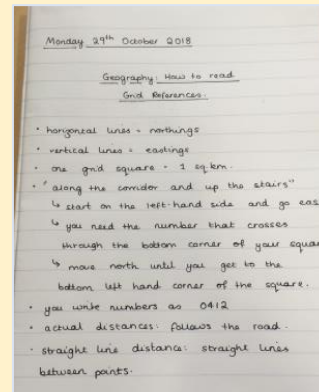
4. **CHECK:** check back over your answer with the *KO*. Anything which is missing or incorrect, add in in **purple pen**.



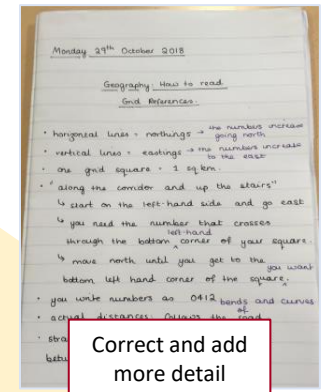
5. **REVIEW:** if you had significant gaps or parts you didn't understand, repeat the process from Step 1.



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



Lay out your page
with sections or
questions to help



Correct and add
more detail
using your
purple pen.

sparx is your Maths homelearning

You do not have a knowledge organiser for maths. This is because the best way to remember and understand mathematics is to do it. Write your Sparx password in the space below so you don't forget it.

Sparx username:

Sparx password:

How do I log on?

Go to www.sparxmaths.uk. Select **Kingsbridge Academy** and enter your username and password.

What do I have to do each week?

Complete all of your Compulsory Section Sparx homework and get it 100% correct. If within your hour of home learning time you should complete the target and optional sections which are designed to help you make better progress in Maths.

How long should it take?

Sparx will adjust your homework so it should take about 1 hour. If you find yourself taking longer than this you should make sure you are coming for help on the difficult bits.

When should I do it?

You should complete your Sparx homelearning in the 4 allocated 15 minute slots in your homelearning timetable

What if I get stuck or can't do it?

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

Why do I get different questions to my friend?

Sparx creates a custom homework just for you – because you are an individual. We are really pleased that we are able to offer you personalised homework.

Why do I have to do 100%?

We care about you and believe that you deserve to do well in maths. Students who do all questions learn more and get better results.

GCSE Maths

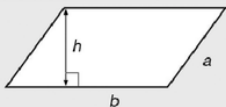
For GCSE Maths you are required to learn the following formulas.

Areas

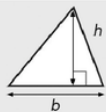
Rectangle = $l \times w$



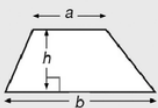
Parallelogram = $b \times h$



Triangle = $\frac{1}{2} b \times h$

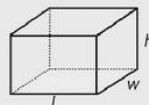


Trapezium = $\frac{1}{2} (a + b)h$

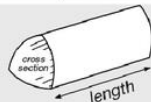


Volumes

Cuboid = $l \times w \times h$



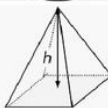
Prism = area of cross section $\times$ length



Cylinder = $\pi r^2 h$



Pyramid = $\frac{1}{3} \times$ area of base $\times h$

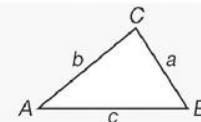


Trigonometric formulae

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



Quadratic equations

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Compound measures

Speed

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



Density

density = $\frac{\text{mass}}{\text{volume}}$



Pressure

pressure = $\frac{\text{force}}{\text{area}}$

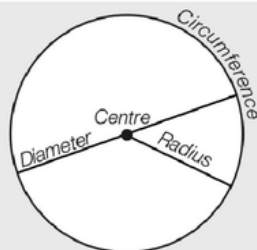


Circles

Circumference = $\pi \times \text{diameter}$, $C = \pi d$

Circumference = $2 \times \pi \times \text{radius}$, $C = 2\pi r$

Area of a circle = $\pi \times \text{radius squared}$, $A = \pi r^2$



Foundation tier formulae

Higher tier formulae

GCSE English Literature - R.L. Stevenson's *Jekyll and Hyde*: Knowledge Organiser

Key Vocabulary		
	Word	Example:
	curiosity: The desire to learn or know more about something or someone.	Lanyon's curiosity leads to his eventual death.
	internal conflict: having two opposite thoughts or feelings at once.	Jekyll experiences an internal conflict between civilised and savage behaviours.
	responsibility: blame; a duty to care for someone or something.	Jekyll feels very little responsibility for Hyde's crimes.
	morality: The belief that some behaviour is right and acceptable and other behaviour is wrong.	Stevenson leads us to question the morality of Jekyll's experiment.
	suppression: not allowing yourself to feel, show, or be affected by (an emotion).	Hyde's outburst is caused by his suppression within Jekyll.
	civilised: behaving in a polite, reasonable and respectful way. Following the rules of society.	Jekyll is initially presented as a civilised member of society.
	duality: the quality or state of having two parts.	Stevenson explores the duality of human nature.
	dichotomy: a division of something into two opposing or contrasting parts.	Jekyll's experiment does create a clear dichotomy between good and evil.
	virtue and vice: a virtue is a moral behaviour. A vice is an immoral behaviour.	Jekyll desires both virtue and vice .
	consequence: something that happens as a result of another action.	Jekyll is eventually forced to face the consequences of his actions.
	concealment: the act of hiding something	The letter within the safe is a good example of concealment .
	savagery: 1. The quality of being fierce or cruel. 2. The condition of being primitive or uncivilised.	Hyde's violence represents the inner savagery of humans.

Key Quotations		
Utterson is a lawyer: his affections 'grow like ivy'.	The back of Jekyll's house is a 'sinister block' with 'neither bell nor knocker'. There are no windows.	Hyde 'trampled calmly' over the small girl. He is described as a 'damned Juggernaut'.
When murdering Carew, Hyde 'broke out of all bounds' and broke out in a 'great flame of anger'.	Lanyon changes: 'The rosy man had grown pale; his flesh had fallen away'.	Jekyll discovered that 'man is not truly one but truly two'.
Jekyll describes his transformation: 'racking pangs... a grinding in the bones... deadly nausea'.	Hyde is associated with 'darkness' and 'fog'. After Carew's murder, the fog 'began to lie thickly' in the houses.	Enfield warns us about curiosity: 'You start a question and it's like starting a stone'.

GCSE English Literature - R.L. Stevenson's *Jekyll and Hyde*: Knowledge Organiser

Plot Overview

Story of the Door	Utterson and Enfield take their regular Sunday walk down a well-maintained street in a dingy neighbourhood. Enfield stops at a door and tells the story of a girl being trampled . Utterson realises the story is connected to his friend, Henry Jekyll.
Search for Mr Hyde	Utterson is worried by the reference to Hyde in Jekyll's will, but Jekyll laughs off his worries. Utterson is worried and has nightmares about Hyde. He eventually manages to speak with him. Hyde is repellent and Utterson feels no better having met him.
Dr Jekyll Was Quite At Ease	Utterson goes to dine with Jekyll. He brings up the subject of Hyde. Jekyll grows pale and wants to drop the subject but Utterson persists. Jekyll claims he can be rid of Hyde at any moment, but makes Utterson promise to look after Hyde if necessary in future.
The Carew Murder Case	Nearly a year later, a vicious murder occurs. Sir Danvers Carew is brutally attacked and killed by Hyde. Utterson notices the weapon used was a stick he had given to Jekyll. They visit Hyde's flat in Soho but he has disappeared.
The Incident of the Letter	Utterson visits Jekyll and finds him looking 'deadly sick'. He gives Utterson a letter from Hyde and asks Utterson to judge what should be done with it. However, Utterson learns that no letter was delivered to the house. Later, Guest notices that the handwriting is the same as Jekyll's own, but slanted the opposite way. Utterson thinks Jekyll is covering for Hyde.
The Incident of Dr Lanyon	Jekyll appears recovered and is living a good life. However, in January, he refuses to see anyone. Utterson visits Lanyon and finds him gravely ill after a huge shock. Lanyon dies and leaves Utterson a letter, to be opened after Jekyll's death or disappearance.
The Incident at the Window	Utterson and Enfield are back on their Sunday walk. They decide to enter Jekyll's court to try and see him. Jekyll appears at the window but suddenly his face changes to a look of terror. The two visitors are left terrified and shocked.
The Last Night	Poole visit Utterson in fear: he believes Hyde is hiding in Jekyll's lab and may even have killed Jekyll. Utterson and Poole break down the door. They find the body of Hyde who has taken his own life . There is a letter for Utterson.
Dr Lanyon's Narrative	Utterson reads Lanyon's letter. It tells him of Lanyon seeing Hyde transform into Jekyll. This is what shocked him and led to his eventual death.
Henry Jekyll's Full Statement	Utterson read's Jekyll's letter, in which he explains the nature of his experiment to try and separate good and evil. We learn that his savage, instinctive side took control and he could no longer return to his normal self.

Character Function

	Dr. Henry Jekyll	Jekyll is the main character. He experiments in order to try and separate good and evil. He represents new science and a move away from traditional values.
	Edward Hyde	Hyde is the other, savage side of Jekyll. He is amoral and acts on instinct. He represents our hidden, instinctive side.
	Dr. Hastie Lanyon	Lanyon is a traditional doctor. He dies after witnessing Hyde's transformation. He symbolises the death of traditional values.
	Gabriel Utterson	Utterson is a lawyer. He is a reliable narrator, so we believe his account. He functions as a detective, and we follow his investigations.
	Richard Enfield	Enfield is Utterson's cousin. They walk together. He recalls the 'story of the door' and functions as a catalyst for the story.
	Sir Danvers Carew	Danvers Carew is an MP who is murdered by Hyde. He is kind, innocent and virtuous. His death reflects the death of innocence and Hyde's lack of motive.
	Mr Guest	Guest only appears in Chapter 5. His role is to 'guess' the link between Jekyll's and Hyde's writing.
	Female minor characters	The only females are minor characters. They are passive and weak. Females seem to have little role to play in traditional society.

Writer's Craft:

light and darkness	Stevenson uses imagery of light to represent the virtuous part of humans. Darkness symbolises the inner, savage parts of us. Hyde is always associated with darkness, Jekyll with both.
symbolic setting	Jekyll's house symbolises the dual nature of humans. The front (respectable) part is the façade (face) that we put on in public. The back is our hidden, secret instinctive self. Hyde's own flat is in Soho, part of London associated with poverty and immorality. Represents the ability to move easily between good and evil.
figurative imagery	Stevenson uses metaphor and simile throughout. Many images are linked to animals (e.g. ape-like) and to natural forces (storm of blows). They help us to imagine this unknown force.
foil	A foil is a character who acts as a contrast to another. Hyde is a foil to Jekyll: his wild behaviour emphasises Jekyll's respectability. Lanyon is also a foil to Jekyll, as he is content with traditional values.
epistolary form	Epistolary form = written in the form of letters. This allows Stevenson to delay revealing key information until the end to increase tension. It also reflects the theme of secrecy.
structure	Non-chronological (not in time order) structure – we find out information alongside Utterson which enhances the sense of mystery.

GCSE English Literature - R.L. Stevenson's *Jekyll and Hyde*: Knowledge Organiser

Key Context:

	gothic genre	Gothic horror was a popular genre. It relies on psychological fear rather than terror – often fear of the unknown. Darkness and supernatural elements are common.
	mystery genre	Mystery was another common genre. People enjoyed following detectives as they investigated mysterious occurrences.
	changing values	Traditional Victorians valued reputations, respectability and appearances. These values were beginning to be questioned.
	attitudes to science	Science was broadening beyond the traditional biology to become more experimental. People could see experiments in their homes. There was a thirst for new knowledge.
	attitudes to religion	Traditional Victorians had been Christian. With the discovery of evolution, religion was being questioned and beliefs were weakened.
	evolution	Darwin published 'On the Origin of Species' in 1859, in which he outlined theories of evolution. People started to question creationism.
	atavism	The belief that people could start to exhibit behaviours from earlier ancestors (e.g. Hyde's animalistic 'ape-like' violence)
	shilling shockers	Shilling shockers were cheap stories of crime and violence. They usually featured lower class criminals – <u>JandH</u> subverts this.
	physiognomy	The belief that it was possible to tell a person's character from their outer appearance. This links to the description of Hyde's character, and Jekyll's 'slyish cast'.

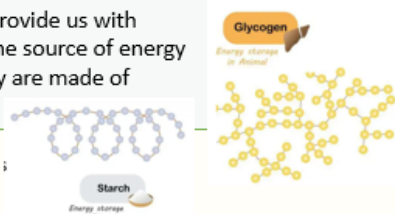
Themes and Ideas: Stevenson may be suggesting that...

the duality of human nature	... humans are not born 'good' in God's image, but are a complex mix of good and evil. We are a product of our animal ancestors and our socialisation. Both good and evil are natural to us.
curiosity	...we should be cautious about what we want to know. Some knowledge can be dangerous. Once we discover something, we can never 'unknow' it.
science and religion	...science can be helpful but we shouldn't go too far. We also need religion to give us a source of morality and control our behaviours. If we have no morals and no consequences, we may revert to savagery.
secrecy and repression	...the culture of secrecy and repression in society could be dangerous as it leads to violence and sexual repression building up.
fear and violence	...our biggest fear should be of our own human natures, as they are capable of terrible, destructive acts. Humans have naturally violent instincts. We also fear the unknown, as we can't deal with it.
friendship	...friendship is valuable. True friends take risks for others and have relationships that are built on trust.
human weakness	...humans are easily tempted and may look for easy options. It is difficult to remain moral at all times: even the most respectable characters struggle at times.

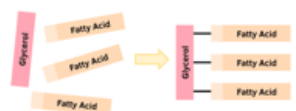
Year 10 Cycle 1 KO_Molecules Enzymes Respiration and Plant Organisation

Lesson 1: Molecules of Life

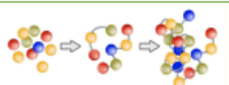
Carbohydrates – provide us with energy. They are the source of energy in respiration. They are made of **glucose**.



Lipids – provide a store of energy. They are made of **fatty acids (x3)** and **glycerol**



Proteins – used for building cells and tissues in your body, they carry out many functions. They are made of **amino acids**.



20 amino acids are arranged in different orders and sequences to make up over 100,000 proteins in the human body.

Questions:

1. What are all proteins made from?
2. Which carbohydrate is found in potatoes, rice and pasta?
3. Which carbohydrate do animals store in their liver and muscles?
4. What are all lipids (fats and oils) made from?
5. Which two groups of biological molecules provide us with an energy store?

Lesson 2: RP Biological Molecules

Prep: if the substance is a liquid, you can do the test straight away. If the food is a solid you have to:

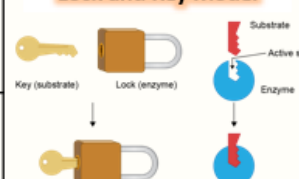
- Grind up the food in a pestle and mortar
- Add liquid to make a solution and filter

Questions: Which quantitative tests should you use? Name the test solution and state the colour change for a positive result. The first one has been done for you:

1. Starch e.g. Use iodine solution (brown → black)
2. Sugars
3. Protein
4. Lipids (fats and oils)

Lesson 3: Enzymes and Bile

Lock and Key Model



The **substrate** is the **perfect match** for the **enzyme**. The **active site** of the **enzyme** has a **complementary, shape** that only one **specific** substrate can fit into.

Bile emulsifies fats



Bile also neutralises hydrochloric acid from the stomach.

Emulsifies lipids resulting in a larger surface area for lipase

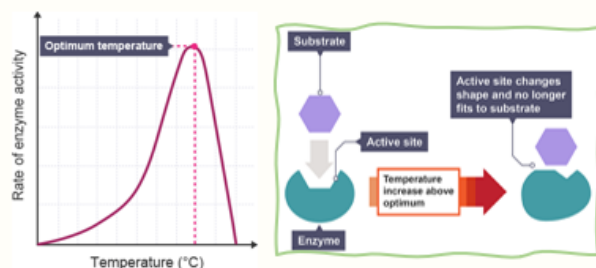
Enzymes	Where they are produced	Job
Carbohydrase e.g. amylase	• Mouth • Pancreas	Starch → simple sugars e.g. glucose
Protease e.g. pepsin, trypsin	• Stomach • Pancreas • Small intestine	Proteins → amino acids
Lipase	• Pancreas • Small intestine	Lipids → 3x fatty acids and glycerol

Questions:

1. State the job of the three different types of enzymes.
2. What **two** jobs does bile have in the digestive system?
3. Where is bile made and stored?
4. How does the 'lock and key' model help us to understand how enzymes work?

Lesson 4: Temperature on enzymes

Enzymes catalyse specific reactions in living organisms because of the shape of their **active site**.

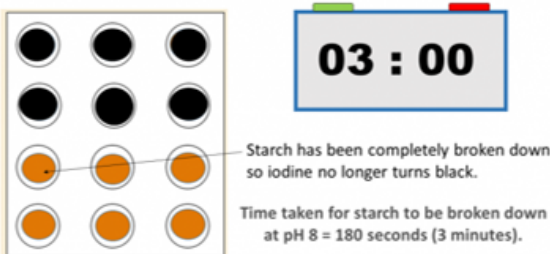
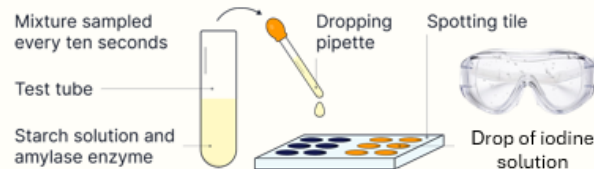


- At **low temperatures**, the number of successful collisions between the enzyme and substrate is less as molecular movement decreases. The reaction is slow.
- The human body is maintained at **37°C** as this is the temperature at which the enzymes in our bodies work best.
- Higher temperatures** disrupt the shape of the active site, which prevent it from working. The enzyme will have been denatured.

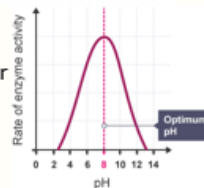
Questions:

- Why are enzyme catalysed reactions slower at lower temperatures?
- Why are enzyme catalysed reactions faster at warmer temperatures?
- Why do enzyme catalysed reactions stop if the temperature gets too hot?
- What is the optimum temperature for enzymes working in the human body?

Lesson 5 & 6: RP pH on enzymes



- Independent variable** – pH
- Dependent variable** - time take for starch digest
- Control variables** – temperature, volume of starch soln., volume of amylase, concentration of amylase



Questions:

- Amylase and Iodine solution are both irritants, suggest a safety precaution for this experiment.
- Describe how the student knows when the starch has all been digested.
- Suggest an improvement for taking out a sample every 30seconds.
- Why should the amylase and starch solution be left in a water bath at 37°C before mixing?

Lesson 7: Digestive System

The digestive system is an example of an organ system in which several organs work together to digest and absorb food.

Digestive organ	Function	Chemicals produced (including enzymes)
Mouth	Digestion of food starts in the mouth. Teeth break down the food and mix it with the saliva which contains an enzyme to break down starch .	Salivary amylase (carbohydrase)
Oesophagus	Muscular tube which moves ingested food down to the stomach . Using muscular contractions called peristalsis .	
Stomach	Muscular organ which churns and pummels food and mixes it with acid to kill microbes and enzymes that break down protein .	Hydrochloric acid Pepsin (protease)
Liver	Produces a chemical called bile that emulsifies lipids (fats and oils) in food.	Bile
Gall Bladder	Stores bile before releasing it into the small intestine.	
Pancreas	Produces digestive enzymes and secretes them into the small intestine .	Pancreatic amylase Trypsin (protease) Lipase
Small Intestine	Food is mixed with digestive enzymes and bile. Food is then absorbed into the blood stream.	Amylase lipase Peptidase (protease)
Large Intestine	This is where water is absorbed.	
Rectum	Faeces is stored here.	
Anus	Faeces leaves the digestive system.	

Questions:

- What is the job of the digestive system?
- Why is the digestive system referred to as a 'system'?
- What is the role of bile in the digestive system?
- Name the types of enzymes and where they are made in the digestive system.

Lesson 8: Aerobic Respiration

Respiration

Is the process of transferring **energy** from **glucose** which goes on in **every cell** all the time.

The energy is used to:

- Build up larger molecules from smaller molecules
- So, muscles can contract so animals can move about
- To maintain body temperature and keep mammals and birds warm in colder surroundings.

Word equation for Aerobic Respiration:

Aerobic respiration is respiration using **oxygen**



Symbol equation for Aerobic Respiration:



Respiration is exothermic so heat energy is transferred to the environment



Aerobic respiration is the most efficient way of transferring energy from glucose. It releases more energy than anaerobic respiration.

Questions:

1. What is respiration?
2. What is aerobic respiration?
3. Write the word equation for aerobic respiration.
4. Why is respiration an exothermic reaction?
5. Why is aerobic respiration more efficient than anaerobic respiration?

Lesson 9: Response to Moderate Exercise

When you exercise you respire more

Your cells **respire more** so your cells need **more oxygen** and need to remove more **carbon dioxide**.

Breathing rate ↑ - to get more O_2 into body and more CO_2 out.

Breathing volume ↑ - to more O_2 into body and more CO_2 out.

Heart rate ↑ - to get more oxygenated blood around the body faster and to remove more carbon dioxide from the cells at the same time.



Muscles **contract** more when we exercise and this needs more **energy** released from **respiration**

Questions:

1. Why does the rate of respiration increase when you exercise?
2. Why does your breathing rate increase when you exercise?
3. Why does your heart rate increase when you exercise?
4. Why does movement need more respiration to happen?

Lesson 10: Response to Intense Exercise

Anaerobic Respiration in animals

Is the process of transferring **energy** from glucose when your body can't supply enough **oxygen** to the **muscles**. In other words, during the **incomplete oxidation of glucose**. This is not the best way to respire as **less energy** is released.

Word equation for anaerobic respiration:

Breathing rate and heart rate stay high - to deliver more oxygen to your muscle cells, and to remove the body of **lactic acid** which causes **muscle fatigue**. The muscles get **tired** and stop contracting with as **much force**.

The extra oxygen you breathe in after you **stop** doing intensive exercise is called the **oxygen debt**.

Lactic acid reacts with the **extra oxygen** (**oxygen debt**) you breathe in after exercise, and **two things** can happen to it.



Lactic acid can be turned back into **Glucose**



Lactic acid can react with **oxygen** and be converted into CO_2 and **water**

**Questions:**

1. Compare the reactants in aerobic respiration with the reactants in anaerobic respiration.
2. Compare the products of aerobic respiration with the products in anaerobic respiration.
3. What happens to the lactic acid after it has formed?
4. Why do you continue to breathe heavily after intensive exercise?
5. What is the oxygen debt?

Lesson 11: Anaerobic Respiration Plants and Yeast

Anaerobic respiration in plants and yeast is called **fermentation**. It has **economic importance** in the manufacture of **bread** and **alcoholic drinks**.

- **Bread-making** – the CO₂ from fermentation makes the bread rise.
- **Beer and wine-making** the fermentation process produces **alcohol**.



Plants and fungi (yeast) can respire without oxygen, but they produce CO₂ and ethanol instead of lactic acid

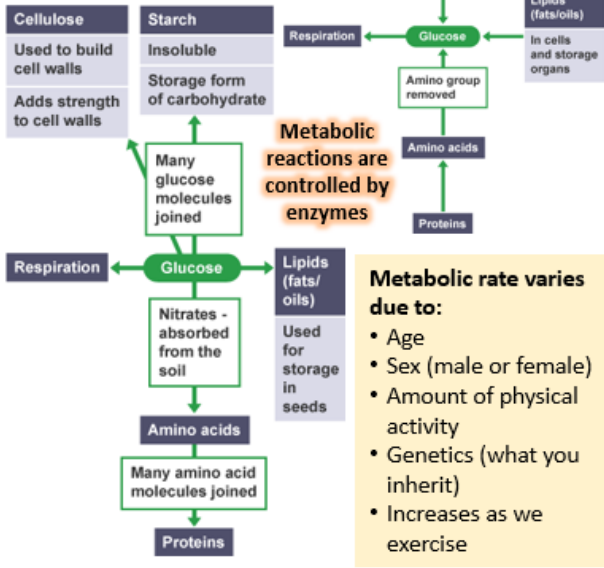
Statement	Aerobic Respiration		Anaerobic Respiration	
			Anaerobic Respiration in animals	Anaerobic respiration in plants and yeast
Glucose required	✓		✓	✓
Oxygen required	✓		X	X
Amount of energy transferred (lots/less)	lots		less	less
End products produced	carbon dioxide water		Lactic acid	ethanol carbon dioxide

Questions:

1. What is the word equation for anaerobic respiration in plants and fungi?
2. Why is fermentation needed for bread-making?
3. Why is fermentation needed for making beer and wine?
4. Compare the processes of aerobic respiration, anaerobic respiration in animals and in plants and yeast (give their similarities and differences).

Lesson 12: Metabolism

Metabolism – the sum of all the chemical reactions in a cell or organism.

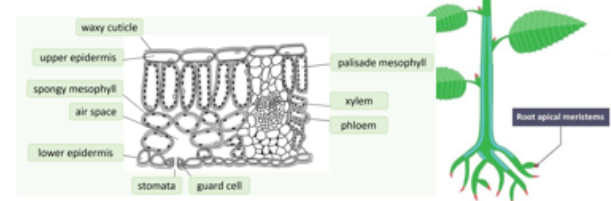


Questions:

1. What is metabolism?
2. What are the biological catalysts that control metabolic reactions called?
3. State some factors that affect the metabolic rate.
4. Write about three ways that glucose can be made using the above diagrams.
5. Write about 5 ways glucose can be used using the above diagrams.

Lesson 13: Plant Tissues and Organs

The specialised cells in multicellular plants are organised into **tissues** and **organs**.



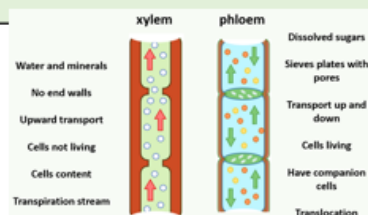
Tissue	Function
epidermis	This tissue covers and protects the surface of the leaf. These cells secrete a waxy cuticle to reduce the loss of water.
Palisade mesophyll	This tissue contains a lot of chloroplasts, which carry out photosynthesis.
Spongy mesophyll	This tissue contains big air spaces for a larger surface area to increase the space for diffusion and gas exchange. Gases can easily get to and from the palisade layer.
Xylem	This tissue carries water and dissolved minerals up from the roots to the leaves.
Phloem	This tissue carries dissolved food from the leaves up and down the plant.
meristem	This tissue is found at the root and shoot tips it is made up of rapidly dividing cells going through mitosis that differentiate into all other types of plant cells.

Questions:

1. Where is the meristem tissue found in plants?
2. Why do plants need xylem tissue?
3. Why do plants need phloem tissue?
4. Which tissue does the most photosynthesis take part in?
5. Which tissue secretes the waxy cuticle and what is this for?
6. What is the job of the spongy mesophyll?

Lesson 14: Plant Transport Xylem and Phloem

Xylem and phloem tissue are made of specialised cells

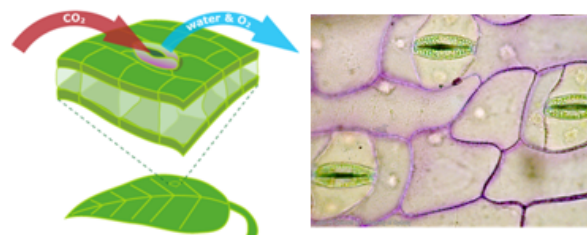


Differences of Xylem and Phloem

Fact	Xylem	Phloem
Tissue living/dead	Tissue is dead	living
What the tissue transports	water & minerals	Dissolved sugars
Name of transport process	Transpiration stream	translocation
Direction of transport	Up	up and down
If the tissue is hollow	hollow	Not hollow
If the walls are strengthened with lignin	Strengthened with lignin	Not strengthened
If the cells have end walls.	end walls absent	End walls present
If the end walls have pores.	pores absent	Pores present
Where the substances are transported	From roots to leaves	From photosynthetic areas to... growing/storage areas
If active transport requiring energy is needed.	Energy not required	Active process
If companion cells are present	Companion cells absent	absent

Lesson 15: Transpiration and Stomatal Density

Transpiration is caused by the **evaporation** and **diffusion** of water from the plant's surface. Most transpiration happens at the **leaves**, through tiny holes called **stomata**.



Evaporation of water from the leaf pulls more water up through the **xylem vessels**.

Water is drawn up from the **roots** and so there is a constant **transpiration stream** of water through the plant.

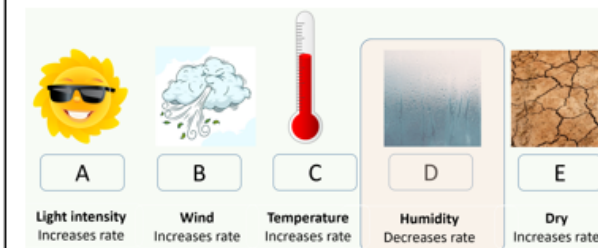
Transpiration is a side-effect of the way the leaves are adapted for **photosynthesis** they have stomata so **gas exchange** can happen and because there is more water in the **air spaces** in the plant water molecules **diffuse** out of the stomata into the surrounding air down the **water concentration gradient**.

Questions:

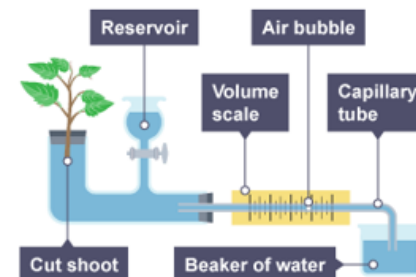
1. What is transpiration?
2. What is the difference between transpiration and the transpiration stream?
3. Why does water diffuse out of the stomata and not into them?
4. Name the gas that diffuses into the stomata and state what the plant uses this gas for.

Lesson 16: Factors Affecting Transpiration

These are the factors that affect the rate of transpiration:



The **rate of transpiration** can be estimated by measuring the **water uptake** using a piece of equipment called a **potometer**



Questions:

1. Why does an increase in wind speed increase the rate of transpiration?
2. Which factor causes more stomata to open so increasing the rate of transpiration?
3. Why does an increase in humidity decrease the rate of transpiration?
4. Name the cells that open and close the stomata.

The Mole

The Avogadro constant, 6.02×10^{23} , is the number of molecules of a substance that make up one mole of that substance.

Iron has an A_r of 56, so 1 mole of iron has a mass of 56g.

Oxygen (O_2) gas has an M_r of 32, so 1 mole of oxygen has a mass of 32g.

Ammonia (NH_3) has an M_r of 17, so 1 mole of ammonia has a mass of 17g.

$$\text{number of moles} = \frac{\text{mass in g (of an element or compound)}}{M_r \text{ (of the element or compound)}}$$

Moles and Equations

Write a balanced symbol equation for the reaction in which 5.6g of iron reacts with 10.65g of chlorine to form iron chloride.

Work out the M_r of all the substances.

A_r of Fe = 56 and A_r of Cl = 35.5

Divide the mass of each substance by its M_r to calculate how many moles of each substance reacted or produced.

$$\text{moles Fe} = 5.6/56 = 0.1$$

$$\text{moles Cl} = 10.65/35.5 = 0.3$$

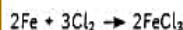
Divide by the smallest number of moles

$$\begin{array}{ccc} \text{Fe} = \frac{0.1}{0.1} & = & 1 \\ \text{Cl} = \frac{0.3}{0.1} & = & 3 \end{array}$$

Write down the balanced symbol equation.



Chlorine exists as Cl_2 so the whole thing must be multiplied by 2.

**Limiting Reactions**

If one reactant gets used up in a reaction before the other, then the reaction will stop. The reactant that has been used up is limiting.

If you halve the amount of reactant then the amount of product will also be halved.

Group 7 Elements and Noble Gases**Halogens**

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

Noble Gases

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

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

Metals and Non-metals

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

Metals

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

Non-Metals

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

Development of the Periodic Table

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

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

The Modern Periodic Table

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

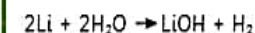
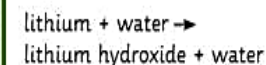
**Alkali Metals**

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

They form ionic compounds with non-metals.

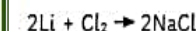
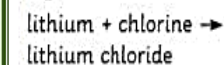
They react with water and produce hydrogen.

E.g.



They react with chlorine and produce salt.

E.g.



They react with oxygen to form metal oxides.

Cycle 1

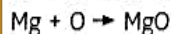
Chemistry Yr 10

Conservation of Mass

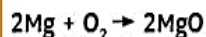
No atoms can be created or made during a chemical reaction, so the mass of the reactants will equal the mass of the product.

Reactions can be shown as a word or symbol equation.

magnesium + oxygen → magnesium oxide



Symbol equations should also be balanced; they should have the same number of atoms on each side.

**Relative Formula Mass**

The relative formula mass (M_r) is the sum of all the relative atomic masses (A_r) of the atoms in the formula.

Examples:

HCl

A_r of H = 1

A_r of Cl = 35.5

M_r of HCl = 1 + 35.5 = 36.5

H₂SO₄

A_r of H = 1

A_r of S = 32

A_r of O = 16

M_r of H₂SO₄ = (1 × 2) + 32 + (16 × 4)

M_r of H₂SO₄ = 2 + 32 + 64

M_r of H₂SO₄ = 98

Calculating Percentage Mass of an Element in a Compound

percentage mass of an element in a compound =

$$A_r \times \frac{\text{number of atoms of that element}}{M_r \text{ of the compound}}$$

Find the percentage mass of oxygen in magnesium oxide.

A_r of magnesium = 24

A_r of oxygen = 16

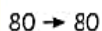
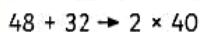
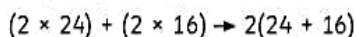
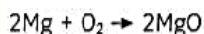
M_r of MgO = 24 + 16

= 40

$$\% \text{ mass} = \frac{A_r}{M_r} = \frac{16}{40} = 0.4 \quad 0.4 \times 100 = 40\%$$

Conservation of Mass

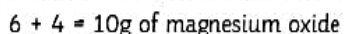
Show that mass is conserved in a reaction.



Total M_r on the left-hand side of the equation is the same as the M_r on the right-hand side.

Calculate the mass of the product.

6g of magnesium reacts with 4g of oxygen:



During a reaction the mass can change. If one of the reactants is a gas, the mass can go up.

E.g.

magnesium + oxygen → magnesium oxide

Oxygen from the air is added to the magnesium (making the product) which will be heavier in mass.



If one of the products is a gas, the mass can go down.

E.g.

sodium carbonate → sodium oxide + carbon dioxide

When sodium carbonate is thermally decomposed, carbon dioxide gas is produced and released into the atmosphere.

**Concentration of Solutions**

Concentration is the amount of a substance in a specific volume of a solution. The more substance that is dissolved, then the more concentrated the solution is.

It is possible to calculate the concentration of a solution with the following equation:

$$\text{concentration (g/dm}^3\text{)} = \text{mass (g)} \div \text{volume of solvent (dm}^3\text{)}$$

The equation can be rearranged to find the mass of the dissolved substance:

$$\text{mass (g)} = \text{concentration (g/dm}^3\text{)} \times \text{volume (dm}^3\text{)}$$

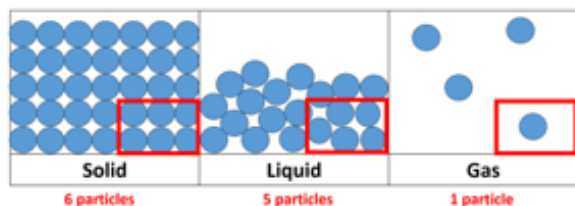
Lesson 1 – Density and the Particle Model

Density is the amount of **mass** in each unit of **volume**.

$$\text{density} = \frac{\text{mass}}{\text{volume}} \quad \rho = \frac{m}{V}$$

The units are:

- Mass – kilograms (kg)
- Volume – metres cubed (m^3)
- Density – kilograms per metre cubed (kg/m^3)



Comparing the same volume of a solid, liquid and gas shows that solids have a **higher density** than liquids and gases.

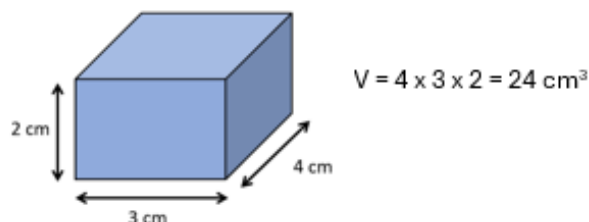
This is because their particles are **closer together**, meaning there is **more mass** in each unit of **volume**.

Sometimes values can be given to us in **standard form**. It is important that when entering standard form values into a calculator we use the **standard form button** ($\times 10^x$).



Lesson 2 – Density of Solids

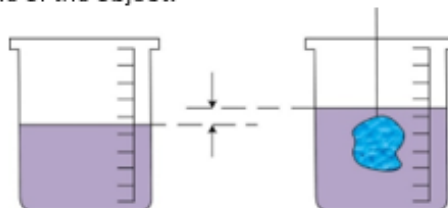
To calculate the **volume** of a regular shape we multiply the **length** by the **width** by the **height**.



To measure the volume of an irregular shape, the object can be **submerged** in water.

The object **displaces** some of the water, **increasing** the overall **volume**.

The **volume of water displaced** is equal to the volume of the object.



Change in volume = volume of object

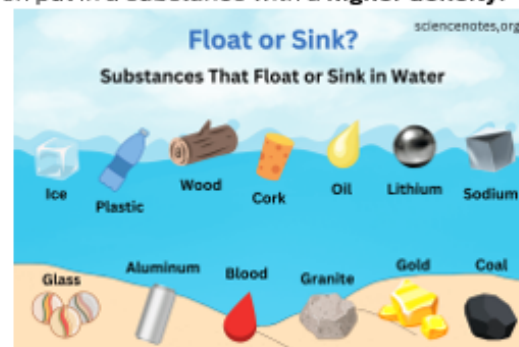
We measure the **mass** of an object using a **balance**.

The density of the object can then be calculated using:

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Lesson 3 – Density of Liquids

Substances with a **lower density** will always **float** when put in a substance with a **higher density**.

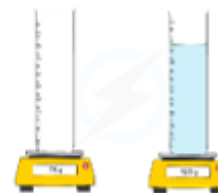


The objects that are floating have a density lower than that of water.

To measure the **density** of a liquid, we first measure the **mass** of an empty measuring cylinder.

We then add the liquid into the cylinder and measure the **total mass**.

Subtracting these two values gives us the mass of the liquid.



The **volume** of the liquid can be measured using the scale on the **measuring cylinder**.

The density of the object can then be calculated using:

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Lesson 4 – Changes of State

The different changes of state are shown below:



Boiling happens at the **boiling point** and happens everywhere **within the liquid** – forming bubbles.

Evaporation happens at a **lower** temperature. Particles escape from the **surface** during **evaporation**.

Changes of state are **physical changes**.

No new substances are formed.

The change is easily **reversible**.



Conservation of Mass:

The **number of particles doesn't change** during a change of state.

This means the **mass** of the substance **doesn't change**.

Lesson 5 – Internal Energy

Particles in a substance have **kinetic energy** due to their motion. They also have **potential energy** due to the forces between them.

Internal energy is the total kinetic and potential energy of all the particles in a system.

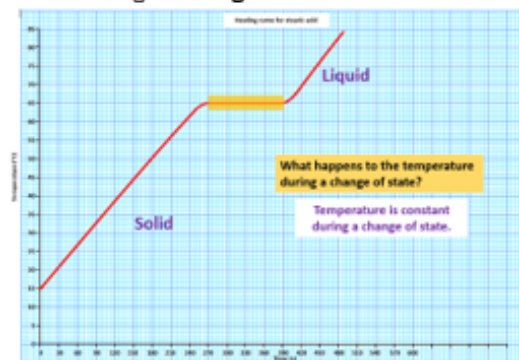
When a substance is heated:

- Energy is **transferred** to the particles.
- Particles move **faster**.
- **Kinetic** energy increases
- **Temperature** is a measurement of the **average kinetic energy** of the particles.

When a substance changes state:

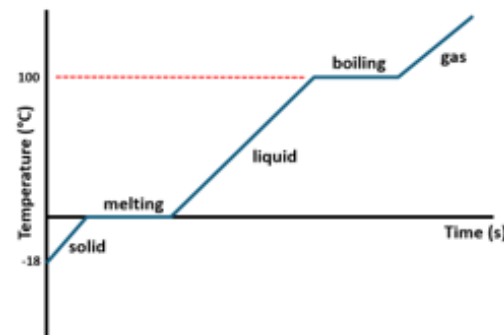
- Energy is **transferred** to the particles.
- **Forces** between particles are overcome and they **separate**.
- **Potential** energy increases
- **Kinetic** energy and temperature do not change.

This means the **temperature** of a substance is **constant** during a **change of state**.



Lesson 6 – Specific Latent Heat

The graph shows how the temperature of ice changes as it is heated at a constant rate. The melting and boiling points are shown.



Specific Latent Heat is the **energy** required to change the **state** of **1kg** of a substance without changing its temperature.

$$\text{energy for a change of state} = \text{mass} \times \text{specific latent heat}$$

$$E = mL$$

The units are:

- Energy – Joules (J)
- Mass – kilograms (kg)
- Specific latent heat – Joules per kilogram (J/kg)

Every substance has two specific latent heat values:

- **Specific latent heat of fusion** – changing state between solid and liquid.
- **Specific latent heat of vaporisation** – changing state between liquid and gas.

Lesson 7 – Specific Heat Capacity Theory

Different substances require different amounts of energy to change their temperature. Even if their mass is the same.

The **specific heat capacity** of a substance is the **energy** needed to raise the **temperature** of **1 kg** of the substance by **1°C**.

The energy required to change the **temperature** of a substance can be calculated using:

$$\text{change in} = \text{mass} \times \text{specific heat capacity} \times \text{temperature change}$$

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

The units are:

- Energy – Joules (J)
- Mass – kilograms (kg)
- Specific heat capacity – Joules per kilogram per degree Celsius (J/kg °C)
- Temperature change – degrees Celsius (°C)

During calculations with this formula, we assume that **no energy is dissipated** from the object to its surroundings.

Large answers are sometimes asked to be given in **standard form**:

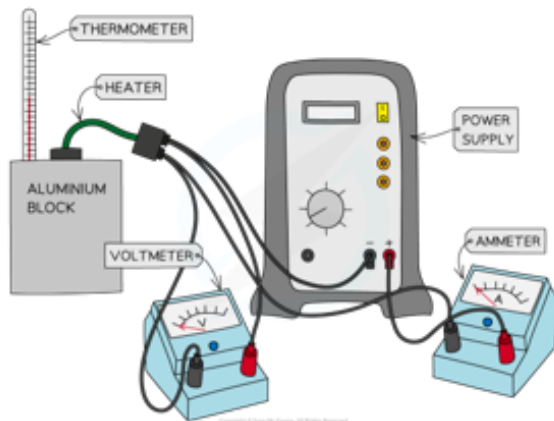
For example:

$$\begin{aligned} &3,500,000. \\ &= 3.5 \times 10^6 \end{aligned}$$

Lesson 8 – Specific Heat Capacity Practical

The specific heat capacity of a metal can be measured by:

- Measuring the **mass** of the metal on a **balance**.
- Measuring the **initial temperature** of the metal using a **thermometer**.
- Heating the metal using an electric heater.
- Measure the **current** and **potential difference** using an **ammeter** and **voltmeter**.
- Measure the **time** using a **stopwatch**.
- Measure the **final temperature** using the **thermometer**.
- Calculate the **temperature change** (final temperature – initial temperature).
- Calculate the **power** of the heater using $P = VI$
- Calculate the **energy transferred** using $E = Pt$
- Calculate the specific heat capacity using $E = m c \Delta\theta$



Lesson 9 – Gas Pressure and Temperature

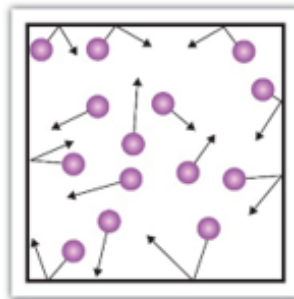
Pressure is the amount of **force** acting on each unit of **area**.

$$\text{pressure} = \frac{\text{force}}{\text{area}} \quad p = \frac{F}{A}$$

The units are:

- Pressure – Pascals (Pa)
- Force – Newtons (N)
- Area – metres squared (m²)

Gas pressure is caused by **particles colliding** with the inside of their **container**.



Each collision causes a **small force**.

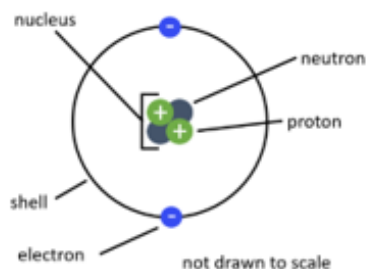
The **sum** of these forces added up over an **area** is the gas pressure.

Gas pressure is measured in **Pascals (Pa)**.

When the **temperature increases**, the **pressure increases** because the **average speed** of the particles increases. Which means they **collide more frequently** with the walls of the container and with **more force**.

Lesson 10 – Atomic Structure

Here is the structure of an atom you have learned in chemistry:



The typical diameter of an atom is: $1 \times 10^{-10} \text{ m}$

The properties of the **subatomic particles** are:

subatomic particle	location	relative charge	relative mass
proton	nucleus	+1	1
electron	shells	-1	0.0005
neutron	nucleus	0	1

The **mass number** tells us the **total number of protons and neutrons** in the nucleus.

9

Be

The **atomic number** of an element tells us the **number of protons** in the nucleus.

4

Isotopes are different versions of the **same element** that have different numbers of **neutrons**.

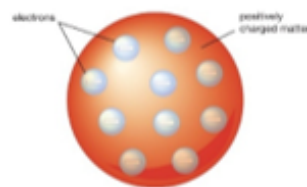
Lesson 11 – Atomic Models & Rutherford's Experiment

The **model** of the atom has changed over time, as new **experimental evidence** showed that previous models were incorrect.

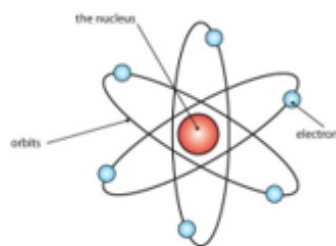
The main models of the atom were:

Dalton - atoms are solid spheres with no internal structure.

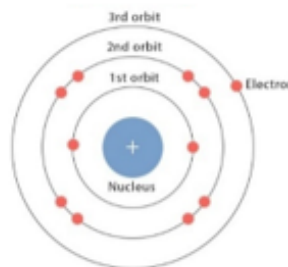
Thomson – positive charge spread out throughout the atom, with electrons randomly embedded into it. Sometimes called the “plum pudding” model.



Rutherford – positive charge concentrated in the centre of the atom (the nucleus) and electrons orbit the nucleus. Sometimes called the “nuclear” model.



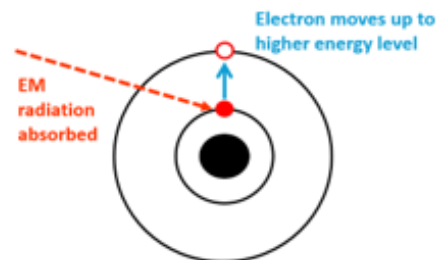
Bohr – electrons can only orbit the nucleus at specific distances (shells).



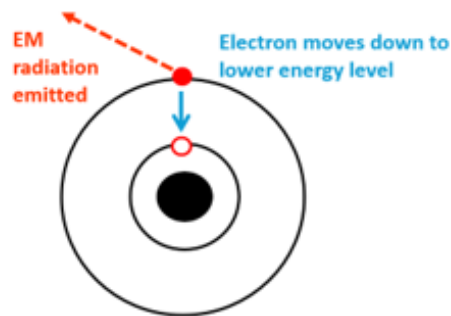
Lesson 12 – Electron Energy Levels

Electrons are arranged in shells around the nucleus. Physicists call these shells “**energy levels**” because electrons in each shell have a specific amount of energy.

An electron can move up to a **higher energy level** if it gains energy by **absorbing electromagnetic radiation** (e.g. light).



An electron can move down to a **lower energy level** if it loses energy by **emitting electromagnetic radiation** (e.g. light).



Different **elements** emit light of different wavelengths (**colours**) when burned or heated, because they have **different electron energy levels**.

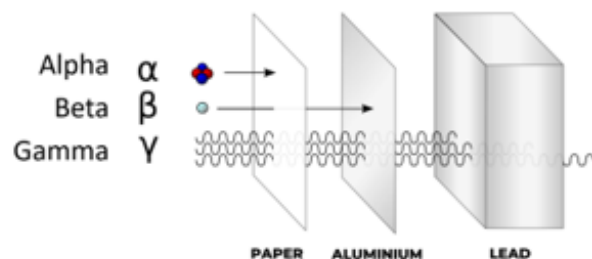
Lesson 13 – Properties of Radiation

Radioactive substances contain **unstable nuclei**. These nuclei give off **ionising radiation**. Radiation is **ionising** if it has enough energy to **remove electrons** from atoms.

When living cells are **exposed** to radiation they can be damaged and cease to function properly. Higher doses of radiation can **kill cells** completely. Ionising radiation can also damage the **DNA** inside cells leading to the creation of **cancer** cells.

There are **three** main types of ionising radiation emitted by **unstable nuclei**: alpha, beta and gamma.

They are **absorbed** by different materials:



Gamma is the **most** penetrating and alpha is the **least**. Alpha is absorbed by only a few centimetres of air.

Alpha is the most **ionising** and gamma is the least.

Lesson 14 – Measuring Radiation

In some **isotopes** of some elements, the nucleus is **unstable**. They emit **radiation** as they **decay** into a more stable nucleus. Materials that contain these unstable nuclei are said to be **radioactive**.

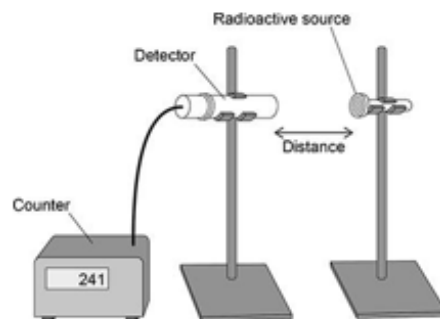
Activity is the **rate** at which unstable nuclei decay. It is measured in **Becquerels (Bq)**. An activity of **1 Bq** means **1 nucleus** is decaying **each second**.

Count rate is the number of decays **recorded by a detector** each second. Measured in **counts per second (cps)**.



The measured count rate is **always lower** than the true **activity** of the source because not all the radiation is detected by the detector.

Experiments can be performed to investigate the effect of the **distance** between the source and detector, or the effect of different **absorbers**, on the count rate.



Lesson 15 – Alpha and Beta Decay

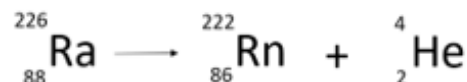
Alpha Decay:

In alpha decay, the unstable nucleus ejects alpha particles. An **alpha particle** is identical to a **helium nucleus**. It contains **2 protons** and **2 neutrons**.

It is written as either:



This is an example equation for **alpha decay**:

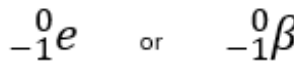


The Ra nucleus has lost 2 protons and 2 neutrons, so its atomic number decreases by 2 and its mass number decreases by 4. A new element is formed.

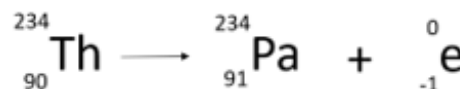
Beta Decay

In beta decay, a **neutron changes into a proton** and an **electron**. The **proton** stays in the nucleus. The **electron** is ejected – the **beta particle**.

It is written as either:

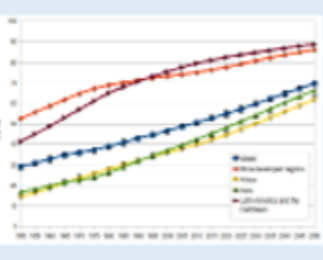
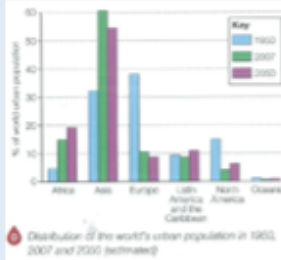
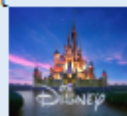


This is an example equation for **beta decay**:



Inside the Th nucleus, a neutron changed into a proton. So, the atomic number increases by 1 and its mass number stays the same. A new element (Pa) is formed.

Review questions Lessons 1-5	Review questions Lessons 6-10	Review questions Lessons 11-15
1. Define density. 2. Explain why solids typically have a higher density than liquids and gases. 3. Describe how to calculate the volume of a regularly shaped solid. 4. Describe how to calculate the volume of an irregularly shaped solid. 5. Explain why some substances float on water but others do not. 6. Describe how to measure the density of a liquid. 7. Explain why mass is conserved during a change of state. 8. Explain the difference between evaporation and boiling. 9. Define internal energy. 10. Explain what happens to the temperature of a substance during a change of state.	1. Define specific latent heat. 2. State the names of the two specific latent heat values. 3. Define specific heat capacity. 4. State the units for specific latent heat and specific heat capacity. 5. State which measurements must be taken in order to calculate the specific heat capacity of a substance. 6. Explain how a gas exerts a pressure on its container. 7. Explain why the pressure exerted by a gas increases as its temperature increases. 8. Explain what is meant by isotopes of an element. 9. Describe the properties of protons, neutrons and electrons. 10. Explain how to calculate the number of protons, neutrons and electrons in an atom.	1. Describe the main features of Thomson's model of the atom. 2. Describe the main features of Rutherford's model of the atom. 3. Explain why physicists' models of the atom changed over time. 4. Explain what happens to an electron inside an atom when it absorbs light. 5. Explain what happens to an electron inside an atom when it emits light. 6. Explain why ionising radiation is hazardous. 7. State which material absorbs each type of nuclear radiation. 8. Explain the difference between activity and count rate. 9. Describe what happens to a nucleus during alpha decay. 10. Describe what happens to a nucleus during beta decay.

Lesson 1 Urban Change	Lesson 2 Urban Growth and Megacities	Lesson 3 LIC city – Mumbai Location and Importance
What is urbanisation? Urbanisation is the increase in the amount of people living in urban areas such as towns or cities. In 2007 the UN announced that more than 50 % of the world's population live in urban areas Where is Urbanisation happening? The number of people living in urban areas is highest in HIC But Urbanisation is highest in LICs and NEEs This is mostly because of the rapid economic growth, which is leading to increasing life expectancies. The population is rising fastest in Asia so they are projected to have the highest levels of urbanisation whereas in Europe and the US, urban populations will decrease as their populations are stagnating.  	Causes of urbanisation Rural to urban migration – the movement of people from the countryside to towns and cities areas Push factors that encourage people to move away from a place. Natural disasters e.g. drought, War and Conflict, Lack of jobs Pull factors that encourage people to move to a place (can be perceived rather than actual) More jobs, Better education and healthcare, Following family members Natural Increase When birth rate is greater than the death rate Migration can involve young adults when there is a high percentage of population of child-bearing age this leads to higher birth rate Types of Cities Megacities Urban area with over 10 million people living there 2/3 of megacities currently in NEEs/ LICs and in Asia. Predicted to increase from 28-41 by 2030. 	Location and Background of Mumbai Located on the west coast of India on the Arabian Sea it has access to the Indian Ocean and is therefore an important trade route. It one of the most globalised cities.  Importance of Mumbai - It has regional HQ of important TNCs such as Disney, GlaxoSmithKline, Johnson and Johnson and Volkswagen. - It is the location of the Indian Stock Exchange - It is a globally important transport hub - It has a population of over 21 million people - It is India's commercial and financial capital Growth of Mumbai Mumbai has grown rapidly due to rural to urban migration. It has a population of 23 million and is growing by 1 person a minute The majority of migrants are between 20 and 35, 64% are male and looking for work in TNCs or manufacturing The initial economic activity was textiles and trade as it is a port. This stimulated further economic growth through the positive multiplier effect. Which encouraged further investment and in migration
1. Define urbanisation? 2. What is happening to the global rate of urbanisation? 3. Which type of countries have the highest levels of urbanisation? 4. Where is urbanisation going to increase the most? 5. Why will urbanisation slow down in Europe?	1. What is meant by 'push factor'? 2. Why might natural increase be higher in cities? 3. Define Megacity. 4. Where are most megacities? 5. What is likely to happen to the number of megacities?	1. What is the population of Mumbai? 2. Which TNCs have regional HQ based in Mumbai? 3. Mumbai is the world's ____th largest city. 4. Name one economic reason for the importance of Mumbai. 5. What was the primary function of Mumbai and why did this lead to economic growth

Lesson 4 Opportunities in Mumbai	Lesson 5 Challenges in Mumbai	Lesson 6 Improving Quality of Life in Mumbai
OPPORTUNITIES in Mumbai Social Access to education means that literacy rates are 86% although rapid population growth means that places are limited and some struggle to attend. Employment is 85% within slums and 90 % total. However, some people lack the education, skills and training for formal employment and therefore work in the informal sector in markets Economic The TNCs and other businesses such as telecommunications and call centres mean there is a range of high skilled and low skilled employment opportunities. The incomes are reliable. Within the slum 15 000 informal businesses create over \$1 billion per year Environmental Whilst rapid urban growth has created environmental challenges the city is trying to improve air quality by improving public transport and vision Mumbai.  	CHALLENGES in Mumbai Social Rapid economic migration has caused hyper-urbanisation so there is a growth in informal settlements such as Dharavi which is a slum/ squatter settlement. There is 1 million people within 1 mile². Limited access to water 10 families share a stand pipe that comes on for 2 hours a day There is a lack of sanitation 500 people share 1 toilet and 4000 cases of water related diseases e.g. cholera, per day. Economic However, 90% of people are employed, some in the informal sector and provide an invaluable service such as recycling. 80% of all plastic is recycled by 35000 ragpickers however, there is corruption and many of these people earn very low wages and work in dangerous conditions which cause a hazard to their health. Environmental There are 3.2 million vehicles in Mumbai. It is one of the most congested cities. The cars are usually older and highly polluting- contributing to Mumbai being the 4th most polluting city globally.	Vision Mumbai Under the government-led Dharavi Redevelopment Project, developers will provide the people living there – who can prove residency since 2000 – a new, 300 sq ft house for free. The plan has created a storm of controversy. Toilets, sanitation and electricity improvements to Dharavi Since 1993, 366 toilet blocks with 6,952 toilets serving more than 350,000 people have been built in Mumbai, thanks to the federation of slum and pavement dwellers. Providing Electricity Reliance infrastructure, the Global Partnership on Output-Based Aid (GPOBA), and other partners have launched a project to provide improved access to safe electricity supply to around 104,000 Indian slum dwellers. Reducing Crime: This is hard as cyber crime is difficult to track and occurs across countries borders 
1. Why are literacy rates higher in Mumbai? 2. What is the rate of employment in informal settlements 3. Which sectors do uneducated people work in in Mumbai? 4. How much income is generated from businesses in the informal sector each year? 5. How is air quality being improved in Mumbai	1. Why do people migrate to Mumbai? 2. What is the name of the largest slum in Mumbai? 3. There are 2 sectors that people can work in, what are they? 4. What can rapid economic migration lead to? 5. How many cases of water related diseases are there per day?	1. Name the strategy to improve the lives of the urban poor? 2. What is a negative impact of moving people to the new apartments? 3. How many people got a safe electricity supply? 4. Which informal settlement has gained from improvements to sanitation 5. How many people have benefitted from the new toilet blocks?

Lesson 7 Traffic congestion	Lesson 8 Economic Growth in Mumbai	Lesson 9 Major UK cities and population distribution
Traffic Management Urban areas are busy places with many people travelling by different modes of transport. This has caused traffic congestion leading to various issues. Environmental Problems Traffic increases air pollution which releases greenhouse gases that is leading to climate change. More roads have to be built. Economic Problems Congestion can make people late for work. Business deliveries take longer. This costs companies more money as drivers take longer to make the delivery. Congestion Solutions Costing \$1 billion, Mumbai Urban Transport Project (MUTP) aims to improve and build roads and highways in Mumbai, such as the East West Highway; providing modern trains that are safer, faster and with more space; and 600 eco-friendly buses, enabling more people to travel. In HICs, roads can be widened to allow more traffic to flow more easily and avoid congestion. Building ring roads and bypasses to keep traffic out of city centres. Introduce park and ride schemes to reduce car use.	Positive Multiplier Effect for Mumbai - Mumbai was originally a port in the 1800s which caused the growth of the textile industry - The textile industry employed 20,000 workers in Mumbai. - The workers received an income - The government used taxes from income to improve infrastructure, schools and hospitals and other services. - Mumbai became a more attractive place to live - TNCs such as Disney/VW and the Bollywood film industry set up HQ. - Workers immigrate - People/workers spend money in local economy which starts the cycle again - The government uses taxes to improve infrastructure, roads, railways, airports, ports and superfast broadband 	Distribution of Population and cities in the UK The UK's population is unevenly distributed. Some parts have a high population density, such as the South East, whereas some have a low population density such as the North West of Scotland. The location of most UK cities is linked to the availability of natural resources (particularly coal), or near to the coast for imports, and the subsequent location of industry during the industrial revolution. This is because coal was the original source of power for the factories e.g Glasgow, Newcastle, Nottingham and Cardiff.   London is a major anomaly to this trend. Instead its location on the River Thames enabled resources to be imported along the River Thames. Imports from across the British Empire were then used in industry.
- How many vehicles are there on the roads in Mumbai? - Why are cars in Mumbai so polluting? - Which gases lead to climate change? - Name 2 economic problems linked to traffic congestion in Mumbai. - What is the name of the Mumbai project aimed at improving transport?	- What is the name of the positive process where people work, pay taxes and then these taxes are used to invest in infrastructure/improve an area? - Approximately how many people were employed in the port in 1800 in Mumbai? - What country is Mumbai located in? - What are the taxes paid by workers used for? - Which TNCs have been attracted to Mumbai?	- Describe the population distribution in the UK - Define high population density - Which region in the UK has the highest population density? - What is the location of most UK cities linked to? - Which cities in the UK used coal as a source of power?

Lesson 10 Location and importance of London	Lesson 11 London Opportunities	Lesson 12 Urban Greening and Sustainable Urban Living
Location, Migration and Growth in London London is the UK capital and is located in the SE. It has a population of 8 million inhabitants (likely to rise to 10million by 2030. It has 5 international airports, rail links to Europe through HS1 and Eurotunnel. The majority are national migrants between 18 and 35 who attend university or work. There is considerable international migration. 300 languages spoken. The majority do low skilled work such as security guards and cleaners but many work for TNCs or in the NHS as doctors, dentists and nurses. 45% is white British and the other 55% is other ethnicities such as Asian and Eastern European. London's importance • It is the location of many TNCs such as GlaxoSmithKline, HSBC, Barclays and the UK stock exchange • It is the administrative capital where UK Parliament sits House of Commons • London is the UK capital • It is the largest and wealthiest city • It has 5 international airports, rail links to Europe through HS1 and Eurotunnel • It generates 20% of the total UK GNI • Home to major media companies BBC, Ch 4, ITV	Social and economic opportunities Migrants are attracted to the wide range of employment and high wages (£10,000 higher than national average) although cost of living is also very high. There is also a wide variety of recreation and entertainment such as the West End and Olympic Park. The wide variety of ethnicities has led to Cultural Mix through various festivities such as Notting Hill Carnival. The ITS attracts people as it is makes travel easy (1 billion journeys a day) but it can be congested which makes people late for work Environmental opportunities Although many people feel that city life is very built up, London is actually one of the greenest cities in the world with 46% being green space. This is good for the environment and peoples physical and mental health.  	Sustainable urban living means being able to live in cities in ways that do not pollute the environment and using resources in ways that ensure future generations can also use them. Sustainable living should ensure that all facilities necessary for people are available, and that areas are economically viable. Water conservation- reducing the amount of water used. Example- Rainwater harvesting provides water for gardens and for flushing toilets. Energy Conservation- Using less fossil fuels can reduce the rate of climate change. Example- Making homes and appliances more energy efficient. Urban Greening- Creating green spaces in urban areas can improve places for people who want to live there. • 47% of London is open green space. This includes parks such as Hyde and Regent's Park. • 8.1 million trees in London • Provide natural cooler areas for people to relax in. • Encourages people to exercise. • Reduces the risk of flooding from surface runoff. Waste recycling- More recycling means fewer resources are used. Less waste reduces the amount that eventually goes to landfill. This reduces waste gases (methane) and contamination of water sources.
1. How many different languages are spoken in London? 2. What is a positive impact of international migration into London? 3. What is the approximate population of London? 4. Name a major international airport in London 5. State one economic reason why London is internationally important.	1. How much higher are wages in London compared to the national average? 2. What makes travel in London easier? 3. Why are high levels of ethnicity positive? 4. Name a social opportunity linked to entertainment. 5. What is negative about the cost of living in London?	1. How many parks are there in London? 2. What % of London is considered green space? 3. Why is London known as a urban forest? 4. Name 2 major parks in central London. 5. Why is open space important in cities? 

Lesson 13 Urban Sprawl	Lesson 14 London Social Challenges	Lesson 15 Urban Regeneration – London Olympic Park
Urban Sprawl The unplanned growth of urban areas into the surrounding countryside The Issue More houses are needed due to a rising population. It is better for the environment to build on brownfield sites as you are not removing trees and vegetation. It is closer to existing roads and infrastructure. However, it is costly to decontaminate the land so companies prefer greenfield sites as the land is cheaper so that is why they are building on the rural urban fringe Rural Urban Fringe A zone of transition between built up areas and the countryside, where there is often competition for land use. It often has mixed land uses such as golf courses and shopping centres Greenbelt - This is a zone of land surrounding a city(14 in the UK) where new building is strictly controlled to try to prevent cities growing too much and too fast. Some developments are now being allowed on green belt. This is controversial Brownfield site - Abandoned buildings and wasteland or land that has previously been built on, is now derelict and awaiting some new use. Commonly found across urban areas and inner cities.	Social and economic challenges: Urban deprivation Not everyone has benefited from urban growth. Newham is one of the most deprived boroughs in London. Life expectancy is 7 year below national average. Unemployment is 9.4% as opposed to 4% in the UK. Pupils achieving 5A*C is 62% as opposed to 80%. The government has tried to ease these by regeneration projects like Docklands, but they haven't always met the needs of local people. There is a lack of affordable housing Environmental Challenges: <i>Waste disposal and pollution</i> There is a high level of air pollution with 4000 premature deaths as it frequently rises above the EU limit. The government is trying to improve this with electric buses and taxis, the low emission zone and congestion charge. London recycles 61% of its waste but this varies between boroughs. 	Reasons why the area needed regeneration Newham was one of most deprived areas of London and UK with 6.7% unemployment (England and Wales average 3.4%), low GCSE 51% (London average 57%), high crime 8.9 per 1000 (England and Wales average 1.8), low income £600/week average (London average £800/week+) The main features of the project Social: The athletes' village has been relaunched as a housing estate called the East Village. A new school opened in the grounds of the park - Chobham Academy. The aquatics centre now uses its 50m pools as facilities for the community, schools and elite athletes. Economic: The new Stratford Tube station helped to connect the area to the rest of London. The Olympics brought more than £9bn of investment to east London, much of which went into transport. Lloyds TSB estimated that the Olympics will generate £10 billion in extra income for the UK economy. All the Olympic venues have been sold, including the £300m high-tech media centre Environmental: Grounds in the Olympic Park have been kept as parkland. Water quality improved in the River Lea. Wildlife habitats were created, stadiums made of at least 25% recycled materials.
- What is the unplanned growth of urban areas into the surrounding countryside known as? - Why are more homes needed in the UK? - Describe a benefit of building on brownfield sites. - What is the protected land called that is found around 14 of the UK's largest urban areas called? - What do we call an area where there is competition from different uses on the edge of urban areas?	- What is a key term used to describe a standard of living below the majority? - Name a deprived borough in London. - How much higher is unemployment in Newham compared to the rest of the UK? - How many premature deaths are there due to air pollution each year? - Why is a 61% recycling rate misleading?	- Name the regeneration project that was built to reduce deprivation in Newham, London. - Why did Newham need regenerating? Quote 2 pieces of data to support your answer - What happened to the Athletes village after the 2012 event? - State one environmental feature of the project. - Describe one economic benefit to the UK

Lesson 16 BedZED – Sustainable Urban Living	Lesson 17 Urban Transport Strategies	Key Terms
BedZED (Beddington Zero Energy Development) is the UK's first and largest carbon-neutral eco-community. It consists of 82 residential homes, an onsite shop, café, sport facilities, health centre and childcare facilities. BedZED's aim = Produce at least as much energy from renewable sources as it consumes. Transport: A green transport plan promotes walking, cycling and use of public transport. On-site charging points for electric cars are available. There are accessible pavements and good local transport links Energy: Buildings made from materials that store heat during warm conditions and release heat at cooler times. Houses have south facing terraces to maximise heat gain from the sun. Low energy lighting and energy efficient appliances. 777 square meters are covered with solar panels. Water: Water use is reduced to 76 litres/day; out of which 18% represents rainwater or recycled water; use of aerated taps, low flush toilets, smaller baths Local materials: Materials were sourced within a 35 mile radius of BedZED wherever possible. Social: 50% of the dwellings are allocated to low income families Recycling- Multi-bins have been designed in to the kitchens for standard recycling so that residents can separate their waste	Integrated Transport System This is the linking of different forms of public and private transport within a city and the surrounding area e.g. bus timetables coincide with train arrivals and departures. Trams lines associated with peak flow from park and ride locations. London Traffic Management The congestion charge Introduced in 2003 and extended in 2007 and 2011 the London congestion charge covers an area of central London. Motorists are discouraged from driving in the zone by a £15 daily charge. Buses, taxis, emergency vehicles and low emission vehicles are exempt. The number of vehicles driving in the congestion zone is 10% lower than before its introduction. Evidence that the congestion charge has caused local business problems is limited. 	Cultural mix Commuter settlement Challenge Deprivation Brownfield site Greenfield site Importance Informal/ formal sector Informal settlement Infrastructure ITS Migration Megacity Multiplier effect Opportunity Rural urban fringe Sustainability Urbanisation
1. What does BedZED stand for? 2. Which way do the windows face in BedZED and why? 3. What is sustainable about the materials sourced to build the project? 4. They also make use of rain water. What is the term for this? 5. What is the main aim of BedZED?	1. What does ITS stand for? 2. What does ITS link together? 3. How are drivers discouraged from driving in central London? 4. Which vehicles are exempt from the congestion charge? 5. How much lower is the number of vehicles driving in central London?	Urban change Urban Greening Urban poor Regeneration Write out the definition of all of the key words

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 dissolved in 1541.

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 18 th 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	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 400 th 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
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People's Health (Medieval Period 1250-1500) Knowledge Organiser

1	Differences in Diet between Country, Town and Monasteries	Country: Healthy food (eg. Veg) but bad harvest =starvation. Towns: Not so fresh food; using the same cart for food and waste; Butchering animals. Monastery: Fish from ponds; bakeries; farming fresh food.
2	Differences in Housing between Country, Town and Monasteries	Country: No chimney = lung problems. Geese and ducks bring in disease to houses. Towns: Rich merchants would have houses with upper floors over street = less light for those below. Dirty gutters and drains. Monastery: Stone buildings, separate beds and infirmary for sick.
3	Differences in Water between Country, Town and Monasteries	Country: Streams and wells for clean water. Towns: Conduit (water fountain) but lead pipes could poison people. Water carriers selling water but often from dirty rivers. Monastery: Pure spring water pumped into kitchens.
4	Differences in Waste between Country, Town and Monasteries	Country: Middens and cesspits in back gardens = disease spread. Towns: Latrines and more built by Dick Whittington. End of market day, lots of food and dung on streets. Monastery: Latrines downstream from freshwater so no contamination.
5	When did the Black Death reach England?	1348
6	What kind of things did people believe caused the Black Death?	Punishment from God; Miasma (bad air); Imbalance of humours; blame on Jews
7	How did people respond to the Black Death?	Confession to Priests/praying; Carrying posies of flowers to purify air; blood-letting
8	What did National Government/King do for public health?	King Edward I ordered authorities in York to clear streets and keep town clear
9	What did local authorities do for public health?	Norwich: People named and shamed for polluting water ways or dumping waste; Carlisle: Couldn't afford to keep streets clean due to Scottish raids.
10	How did local health improve?	Only if the wealthy or the King ordered it, or taxation was good enough to pay for it.
11	What did London do for public health?	Piped water to its citizens since the 1230s; a warden appointed to check Thames banks were clean.

Key Terms

Midden	Dunghill consisting of human waste, rotting food and other waste.
Latrines	Early type of toilet
Conduits	A public water fountain
Four Humours	A belief that the body has 4 liquids. If these liquids were imbalanced you would get ill.

People's Health (Early Modern Period 1500-1750) Knowledge Organiser

1	How had people become more healthy by the Early Modern period?	Improvements in farming (like planting clover to increase soil quality) meant few people died of starvation
2	How did the growth of alehouses make people less healthy?	More drunkenness and smoking
3	What were the differences in diet for rich and poor?	Rich: Lots of beef, mutton and pork, wine and beer. But rotten teeth from imported sugar. Poor: Bread and Veg. Pottage (a veg soup). Healthy diet but not enough calories.
4	What were the differences in getting water for town and country?	Country: Clean water from wells and rivers. Town: Public water fountains (conduits), water sellers. Not very safe to drink.
5	What were the differences in removing human waste for town and country?	Town: Once or twice a week, it was collected by scavengers or rakers. Richer people might have privies (early toilets). Countryside: Little had changed from Medieval period. Many peasants built their own cesspits.
6	What were the similarities and differences in responses to the 1665 Plague compared to the 1348 Black Death?	Similarities: Same belief in causes. Turning to God, Running away (if rich enough), Avoiding the sick (people reluctant to take food to victims). Differences: Physicians (doctors) now wore heavy cloaks and 'beaks' with herbs. Using tobacco to get rid of the plague.
7	How did the National Government respond to the Plague?	1578 – Elizabeth I issued Plague Orders eg. Infected houses should be shut up for 6 weeks
8	How did local government respond to the Plague?	Cambridge: Strangers to town needed health certificate, streets cleaned, stray cats killed.
9	How did local government try to improve health?	York: Pigs to be kept in sties; fines for making a dunghill in your garden or throwing waste into street. None of this was very effective.
10	How was the Gin Craze eventually ended?	1751: Anyone selling gin illegally was imprisoned, whipped and faced transportation.

Key Terms

Midden	Dunghill consisting of human waste, rotting food and other waste.
Scavengers/Rakers	People who cleaned the streets
Conduits	A public water fountain
Transportation	To be deported for a crime to, for example, America or Australia
Privies	Early toilets - often plank of wood with a hole over a pit.

People's Health (Industrial Period 1750-1900) Knowledge Organiser

1	Why were living conditions so bad?	Overcrowded cities = diseases spread (and still not understood); too much human waste with few privies; poor quality housing. No help for the poor - Doctors had to be paid for.
2	Problems with Housing	Back to back houses: few windows so lack of fresh air meant diseases like TB. Overcrowded.
3	Problems with Food	Poor quality food for workers. Mainly lived on bread, potatoes and tea. Malnourished.
4	Problems with Water	Rare to have piped water. Use of contaminated water pumps. Only rich could afford water charges.
5	Problems with Waste	Rarely had sewers. Often one privy for 10 houses. Leaking cesspools contaminated water.
6	What responses to Cholera were ineffective?	Burning tar barrels (miasma), Day of Fasting and Prayer (God). Isolation in cholera hospitals.
7	How effective was the work of John Snow?	Removing water pump at Broad Street in 1854 worked. But only small area of London and the medical community didn't believe his link between water and cholera.
8	What effects did Joseph Bazalgette's sewers in London have?	Cholera struck in 1866, but human waste was carried away, so cholera didn't spread.
9	How effective was Edwin Chadwick and the 1848 Public Health Act?	Opposition to his ideas – more taxes to pay for it. 1848 Act was not compulsory.
10	What changes improved health between 1854-1875	1860 Pure Food Act ; 1867 Working Class got the vote – now politicians had to listen to their calls for better public health. Public Health Act 1875 (now councils HAD to clean up towns)
11	How did local authorities improve people's health?	Manchester Corporation dammed Thirlmere Lake and made 96 mile aqueduct to carry water to the centre of the city.
12	What were the key factors that improved people's health in the Industrial period?	Key individuals (eg. Snow, Pasteur, Chadwick); National and Local Government (eg Public Health Acts); Use of science/technology (eg. Germ Theory and Sewers and pumping stations)

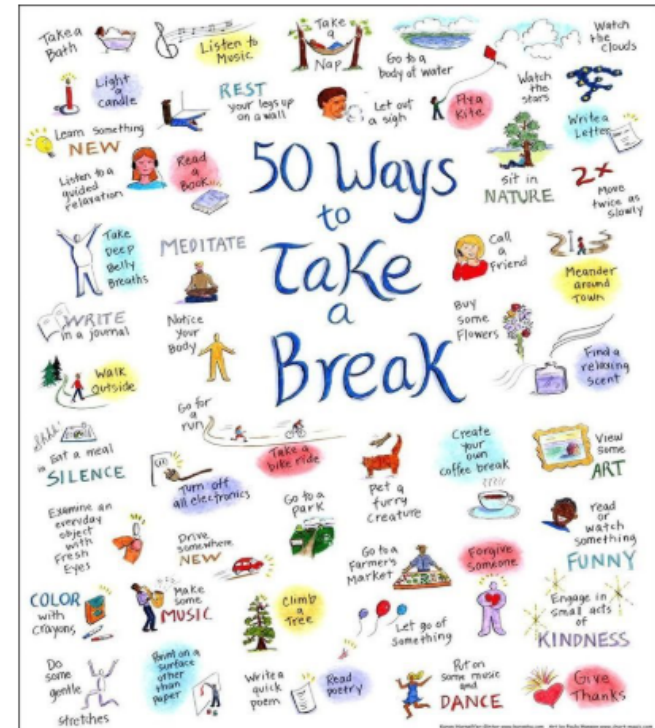
Key Terms

Democracy	Being able to vote – important because then politicians have to listen to your views (such as to improve public health)
Back to Back housing	Cheap housing with a front wall but joined to others on side and back. This was to pack in many people.
Laissez-Faire	Means 'Let it Be'. It was the general attitude that the government should not get involved in people's lives (like laws to improve public health). This attitude changed and the government got more involved.
Germ Theory	Louis Pasteur's discovery in 1861. It explained disease – no longer was it miasma or God.
Adulteration	Adding substances to food (eg chalk to make bread) which is cheaper to make but makes it poor quality.

Key terms:

Mental health		This refers to how we feel, how well we're coping with daily life or what feels possible at the moment.
Good mental health		Having good emotional and mental health is when we are in control of our thoughts, feelings, and behaviour. We are able to cope with life's challenges, and we mostly feel good about ourselves and have good relationships with others.
Mental health		Relating to the mind
Physical		Relating to the body as opposed to the mind.
Emotions		These are also called feelings . They can be affected by situations and our relationships with others
Healthy coping strategy		Good things we can do to help us to manage our most intense, thoughts and emotions.

Take a break: do something you enjoy
Try to plan some activities that you enjoy, and which will take your mind off things, whether that's texting or facetimeing a friend, watching a film, reading a book or going for a walk.



- Your tutor
- Your Raising Standards Lead
- Your Inclusion lead
- Your PSHE teacher /PSHE team including Mrs Joyce
- Ms Ray (in charge of safeguarding)
- Any teacher

Peer led student support:

- Your 6th from Mental Health Ambassador
- Your 6th form student leaders – email Mrs Joyce



There are lots of places to get advice about emotional wellbeing, social media or to discuss feelings.

ChildLine:

www.childline.org.uk Phone: 0800 1111

Young Minds:

www.youngminds.org.uk

Samaritans:

www.samaritans.org Phone: 116 123

In a crisis, text 'Shout' to



'10 a day' choices towards balancing our mental health



1 Talk about your feelings



2 Do something you enjoy and are good at



3 Keep yourself hydrated



4 Eat well



5 Keep active in mind and body



6 Take a break



7 Stay connected to those you care about



8 Ask for help



9 Be proud of your very being



10 Actively care for others

5 minute mental wellbeing actions

These are simple, free actions you can do daily.

Many take very little time or energy, and most can be done in less than five minutes.

- Breathe – take a few deep breaths
- Have a glass of water
- Have a healthy snack
- Do a 5 minute burst of exercise
- Connect with someone you care about – give them a hug, send them a message
- Take a moment to be still and present

RE: Christian Beliefs Knowledge Organiser

1. Key Terms

Omnibenevolent		The state of being all-loving and infinitely good. Attribute of God
Omnipotent		The all-powerful, almighty and unlimited nature of God.
Omniscient		The all-knowing nature of God
Omnipresent		The all-present nature of God.
Transcendent		The idea that God is above or beyond the world
Immanent		The idea that God can also be active and 'within' the world
Trinity		The three persons of God. God the Father, the Son and the Holy Spirit
Moral Evil		Evil caused by humans e.g. murder
Natural Evil		Evil caused by the natural world e.g. tsunami

2. More Key Terms

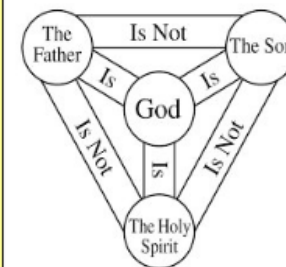
Incarnation		God becoming human in the form of Jesus
Atonement		The belief that Jesus' death on the cross healed the rift between humans and God
Resurrection		The belief that Jesus rose from the dead on Easter Sunday
Crucifixion		The death of Jesus on the cross on Good Friday
Salvation		The belief that Jesus died on the cross in order to save the souls of all humanity and to bring them back to God
Sin		Wrongdoing. Doing something that God doesn't approve of
Ascension		When Jesus was taken up into heaven 40 days after Easter Sunday. This was the last day Jesus was seen on earth

3. A Few More Key Terms!

Original Sin		The first sin/wrong doing committed by Adam and Eve in the Garden of Eden
Creation		How the world was made
Non-Literal Creation		The creation story shows a myth or a story to show the power of God. It is not a factual account of how the world was made.
Literal Christian		The Bible is the word of God, and the world was made in 6 days.
Judgement		The Christian belief that God will judge people on their actions

4. Trinity

- ❖ Christians believe that there is one God. He is best understood through three forms: Father, Son and Holy Spirit.
- ❖ Each role of God are different, but all are God.
- ❖ Father – Creator of the world, omnipotent
- ❖ Son – Jesus, incarnation, allowed for salvation
- ❖ Holy Spirit – Invisible, guide, spiritually active in the world



RE: Christian Beliefs Knowledge Organiser

5. Problem of Evil

- ❖ Christians believe God is Omniscient, Omnibenevolent and Omnipotent.
- ❖ If you remove one of these there doesn't seem to be a problem. However, it seems as if God cannot be all 3 whilst evil exists. Since we know that evil exists, atheists try to use this to disprove the existence of God.
- ❖ Why would an all loving, all powerful and all-knowing God allow evil to exist?
- ❖ Even for Christians, evil can pose a real problem to a person's faith however they may respond that it is either 'a test of faith' (story of Job) or is a result of human free will (freedom to make our own choices)

6. Jesus – Crucifixion, Atonement and Salvation

- ❖ Crucifixion – The death of Jesus on the cross on Good Friday.
- ❖ Christians believe Jesus' death was a sacrifice. They believe Jesus died for the sins of all humans, past, present and future. This is known as atonement.
- ❖ This also means they can be forgiven by God due to Jesus' sacrifice and that they will be able to enter heaven. This is known as Salvation.



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7. Creation

- ❖ There are two main Christian views on creation – literal and non-literal.
- ❖ Literal Christians believe the Bible is true word for word and therefore believe the creation story in Genesis in the Bible is literally true. They believe the world was created in 6 days by God.
- ❖ Non-literal Christians do not take every part of the Bible literally and believe that the Bible can be seen as a myth or story and can be interpreted. This means they may believe the story shows God's power and may choose to fit their beliefs about God's creation with Science.

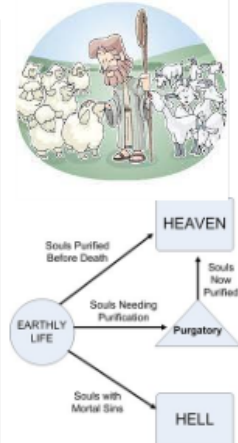


8. Jesus - Resurrection

- ❖ Christians believe on Easter Sunday that Jesus was resurrected – came back to life. The resurrection is significant to Christians because:
- ❖ It shows the power of Jesus
- ❖ It proved Jesus to be the Son Of God
- ❖ It means they no longer need to fear death and know that they can enter Heaven and be with God
- ❖ It showed them that no matter how much you suffer in this life, you will not suffer in the next life
- ❖ It meant that Jesus' disciples had even stronger belief and went on to spread the word of Christianity further.

10. Judgement, Heaven and Hell

- ❖ Christians believe that they will be judged by God on their actions on earth to determine whether they will go to Heaven or Hell.
- ❖ Christians look to parables such as The Rich Man and Lazarus or The Sheep and the Goats to show this.
- ❖ Many Christians believe they will go straight to either Heaven or Hell based on their actions. Others may believe Heaven and Hell are symbolic of the idea of the soul being with or without God in the afterlife.
- ❖ Catholics also believe in purgatory – a place where the soul can be cleansed before entering Heaven.



9. The Life of Jesus

- ❖ Christians believe Jesus is the Incarnation – God in human form.
- ❖ Christians believe Jesus' life involved both MIRACLES and PREACHING
- ❖ Miracles – events that go against the laws of nature and cannot be explained. Christians believe Jesus performed miracles such as nature miracles (walking on water) and healing miracles (healing of the paralysed man).
- ❖ Preaching – Jesus taught people about the teachings of God E.g. Sermon on the Mount
- ❖ Jesus' miracles and preaching were found to be offensive by some Jewish leaders. They did not believe him to be the Son of God. This led to his arrest.