

# Knowledge Organiser

**Year 10**

**Cycle 1**

**CORE SUBJECTS**

Name:

Tutor Group:



## What is a Knowledge Organiser and why are they important?

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

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

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

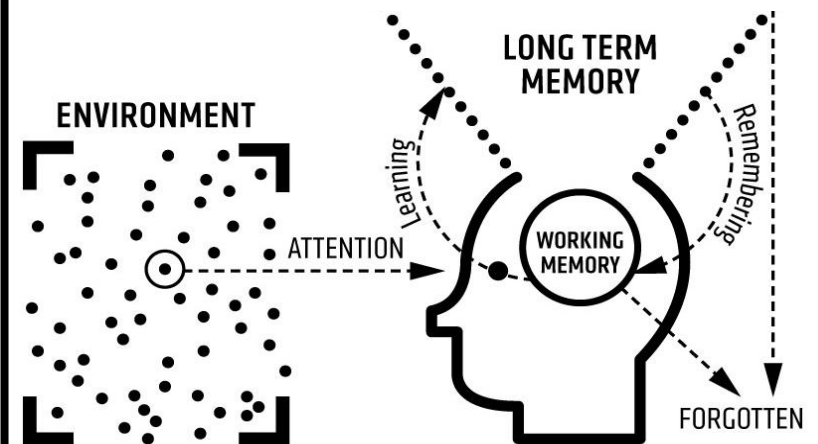
Each cycle there is an assessment in every subject and you will be assessed on the knowledge from your Knowledge Organiser; the more you revisit information the more likely it will be remembered for lessons, assessments and exams.

### How we learn anything

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

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

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



## Homework in Year 10-11

### The purpose of homework

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

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

### Homework expectations

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

|                  | <b>Monday</b> | <b>Tuesday</b> | <b>Wednesday</b> | <b>Thursday</b> | <b>Friday</b>  |
|------------------|---------------|----------------|------------------|-----------------|----------------|
| <b>Subject 1</b> | Science       | Geog/History   | Maths            | Option Block F  | Maths          |
| <b>Subject 2</b> | English       | Option Block E | English          | Science         | Option Block G |

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

**Year 10 Core Cycle 1**  
**Knowledge Organiser Contents Page**

| <b>Subject</b>                 | <b>Page Number</b> |
|--------------------------------|--------------------|
| English                        | 5-13               |
| Geography                      | 14-23              |
| History                        | 24-28              |
|                                |                    |
| Maths                          | 29-33              |
| Religion Philosophy and Ethics | 34                 |
| Science                        | 35-47              |

Start with Week 1. Each week, complete the colour block. Write each word out 3 times and each definition once. Check it all with a purple pen. Tick what is correct, fix what is wrong. There are chapter summaries and extension tasks on the right to support your understanding of the text.

| Coombeshead Academy Inspiring Excellence |                  |                                                                                     | English Learning Area                                                                            |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| wk                                       | keyword          | definition                                                                          | example                                                                                          |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Week 1                                   | Context          | The wider circumstances in which something exists.                                  | The storyline has deeper meaning when it is considered in the context in which it was written.   | Week 1 | <p><b>Stave 1 summary: Marley's Ghost</b></p> <p>The story opens on Christmas Eve in London. <b>Jacob Marley</b>, business partner of <b>Ebenezer Scrooge</b>, has been dead for seven years. Scrooge runs a moneylending business; he's cold-hearted and hates Christmas. Scrooge rejects a request of charity from well-wishers, as well as an invitation from his nephew, <b>Fred</b>, to spend Christmas lunch with them. Scrooge's clerk, Bob Cratchit, is underpaid and is forced to work in the cold with only a tiny fire.</p>  <p>Scrooge returns to his dark, gloomy home. He sees Marley's face appear on his door knocker, and ghostly noises fill the house. Suddenly, <b>Marley's Ghost</b> appears, bound in heavy chains made of cashboxes and ledgers — symbols of his greed in life. Marley warns Scrooge that he will share the same miserable fate unless he changes. He tells Scrooge that three spirits will visit him over the next three nights to help him avoid his doom. As Marley leaves, Scrooge is left terrified.</p> |
|                                          | Fiction          | A text that is based upon events that are not real.                                 | The book she had chosen to read was from the fiction section.                                    |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                          | Foreshadowing    | Where something is hinted at in a text before it happens.                           | The emphasis on Marley being dead at the start of the story foreshadows his importance later on. |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                          | Allegory         | A text that can be interpreted to reveal a hidden meaning, usually a political one. | Animal Farm is an allegory for the tyranny of the Russian Revolution.                            |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                          | Pathetic Fallacy | Where the weather reflects the mood of the text.                                    | Gothic stories usually have gloomy or spooky weather.                                            |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Week 2                                   | Redemption       | The action of being saved from evil.                                                | Marley begs Scrooge to redeem himself in life to avoid being punished in death.                  | Week 2 | <p><b>Stave 1 key quotations and themes:</b></p> <p>1. Explode the quotation:</p> <p>"Mankind was my business. The common welfare was my business". (Marley to Scrooge)</p> <p>2. Find 2 key quotations for each of these themes:</p> <ul style="list-style-type: none"> <li>- Greed and selfishness</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                          | Isolation        | Being away from people and refusing help.                                           | Scrooge has isolated himself.                                                                    |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                          | Contrast         | Qualities that are vastly different between characters.                             | Fred's generosity contrasts his uncle's selfishness.                                             |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                          | Poverty          | State of extreme poorness                                                           | Bob Cratchit and his family live in poverty.                                                     |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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|  | <b>Greed</b> | An intense and selfish desire for something. | Scrooge's greed for money has led to his isolation from society. |  | <ul style="list-style-type: none"> <li>- Isolation</li> <li>- Redemption</li> </ul> |
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| <b>Week 3</b> | <b>Symbolism</b>  | Where an image is used to represent something else.      | <b>Scrooge's small fire at the start of the story symbolises his meanness.</b>                                 | <b>Week 3</b> | <b>Stave 2 summary: The First of the Three Sprits</b><br><br><b>Scrooge wakes up at midnight, confused and anxious. When the clock strikes one, the Ghost of Christmas Past appears — a strange figure that looks both young and old at the same time, with light shining from its head. The ghost represents memory and reflection. The spirit takes Scrooge on a journey through scenes from his own past, including:</b> <ul style="list-style-type: none"> <li>- his own lonely childhood and his sister Fan, who makes comments about their father being 'kinder' now</li> <li>- Old Fezziwig (Scrooge's boss when he was a young man), who was famed for throwing generous Christmas parties</li> <li>- Belle, Scrooge's former fiancée, ending their engagement because of his obsession with money</li> <li>- Belle with the family she had after Scrooge- Scrooge realises this could have been his reality.</li> </ul> <b>Scrooge begs the spirit to stop and angrily tries to extinguish his light. He then falls asleep.</b> |
|               | <b>Charity</b>    | The voluntary giving of help to those in need.           | Scrooge refuses to give charity, claiming that the poor should make use of the workhouses and prisons instead. |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|               | <b>Regret</b>     | Feeling of sadness or disappointment over something.     | Scrooge begins to regret the choices he has made over his lifetime.                                            |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|               | <b>Innocence</b>  | Being naïve to, or unaware of something.                 | Scrooge lost his innocence when he was forced to grow up young and became obsessed with money.                 |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|               | <b>Reflection</b> | The ability to look back on something and learn from it. | Scrooge begins to reflect upon the choices he made and what he should have done instead.                       |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



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| Week 4 | Motif      | A recurring image throughout a text.                                               | Fire/light is a motif in the novella because the amount of it relates to a character's generosity. | Week 4 | <p><b>Stave 2 Key quotations and themes:</b></p> <p>1. Explode the following quotation:</p> <p>“There was a boy singing a Christmas carol at my door last night. I should like to have given him something”.<br/>(Scrooge as he begins to show empathy).</p> <p>2. Find 2 key quotations for each of these themes:</p> <ul style="list-style-type: none"> <li>- Memory and regret</li> <li>- Loss of innocence</li> <li>- Power of generosity and love</li> </ul> |
|        | Commentary | An expression of opinions about an event.                                          | The novella can be considered a commentary on the consequences of not being charitable.            |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Imagery    | The collective term for language that is not intended to be interpreted literally. | Dickens uses imagery when describing Marley's ghost to make him both recognisable and terrifying.  |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Empathy    | The ability to understand and share the feelings of another.                       | Scrooge begins to feel empathy for those he previously disregarded.                                |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Tone       | The mood or atmosphere of something.                                               | Scrooge's tone begins to shift as he reflects upon his behaviour.                                  |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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| Week 5 | Commentary            | An expression of opinions about an event.                                                          | The novella can be considered a commentary on the consequences of not being charitable.                                                           | Week 5 | <p><b>Stave 3 summary: The Second of the Three Spirits</b></p> <p>Scrooge awakes to find his room transformed with bright light, greenery, and food everywhere. The <b>Ghost of Christmas Present</b> appears.</p> <p>The ghost takes Scrooge through scenes showing how people across London celebrate Christmas with love and gratitude, even when they are poor. The scenes are:</p> <ul style="list-style-type: none"> <li>- Scrooge visits <b>Bob Cratchit's</b> home. Despite their poverty, the family are happy and loving. He meets <b>Tiny Tim</b>, Bob's youngest son, who is frail and sick but full of hope and kindness. Scrooge asks if Tiny Tim will live; the ghost sadly says that if nothing changes, "<i>the child will die.</i>"</li> <li>- The ghost shows miners, lighthouse keepers, and sailors all finding joy in Christmas, showing how <b>the Christmas spirit unites everyone</b>, no matter their situation.</li> <li>- They then visit Fred's Christmas party. Fred and his friends laugh about Scrooge's selfish behaviour but also express pity for him. Scrooge enjoys watching the fun and realises what he's missing by isolating himself.</li> </ul> <p>The ghost begins to age quickly. Beneath his robe, he reveals two starving, ragged children called <b>Ignorance</b> and <b>Want</b>. The ghost warns Scrooge to beware of them, especially <i>Ignorance</i>, who represents moral and social blindness.</p> <p>The spirit disappears as the clock strikes midnight, and Scrooge sees a dark, hooded figure approach — the <b>Ghost of Christmas Yet to Come</b>.</p> |
|        | Compassion            | Showing pity and concern for the misfortunes of others.                                            | Scrooge feels more compassion for the poor when he sees how they live.                                                                            |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Social Responsibility | The belief that all individual have a duty to fulfil; our actions must benefit society as a whole. | The ghosts help Scrooge to see how he has failed in his social responsibility.                                                                    |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Christmas Spirit      | The feelings of joy, gratitude and generosity that are associated with Christmas.                  | Everyone in the story upholds the Christmas Spirit, except for Scrooge initially.                                                                 |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Ignorance             | Having a lack of knowledge or information about something.                                         | Scrooge is ignorant to the plight of those who have less than him- he believes they deserve to be poor because he has worked hard to become rich. |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Week 6 | Transformation        | A drastic change in something.                                                                     | Scrooge undergoes a moral transformation.                                                                                                         | Week 6 | <p>Stave 3 key quotations and themes:</p> <ol style="list-style-type: none"> <li>1. Explode the following quotation:<br/> "<i>Will Tiny Tim live?</i>" (Scrooge showing his first bit of real concern)</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|        | Pity                  | Feeling sorrow on behalf of someone else's misfortune.                                             | Scrooge feels pity for the Cratchit family.                                                                                                       |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



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|  | Characterisation | How a character has been crafted through description.       | Tiny Tim has been characterised to present his inner goodness and innocence.                    |  |  | <p>2. Find 2 key quotations for each of the following themes:</p> <ul style="list-style-type: none"> <li>- Generosity and compassion</li> <li>- Social Responsibility</li> <li>- Transformation</li> </ul> |
|  | Morality         | The principles concerning behaviour that is right or wrong. | Scrooge's reflection enables him to see how his sense of morality has been warped up until now. |  |  |                                                                                                                                                                                                            |
|  | Inequality       | Differences in circumstance and resources across people.    | Scrooge begins to learn that inequality exists because of people like himself.                  |  |  |                                                                                                                                                                                                            |

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| Week 7 | Extended metaphor | A metaphor that is introduced then further developed throughout the text.                    | The cold and foggy weather is used throughout the text to show Scrooge's unfeeling nature.                   | Week 7 | <p>Stave 4 chapter summary: The Last of the Spirits</p> <p>The Ghost of Christmas Yet to Come appears. He looks like the Grim Reaper. The ghost doesn't speak; it only points. Scrooge, determined to change, follows it through several disturbing scenes:</p> <ul style="list-style-type: none"> <li>- Scrooge overhears some businessmen casually discussing someone's death — they only show interest in what the dead man's possessions might be worth.</li> <li>- In a dark part of London, Scrooge sees thieves and servants selling a dead man's stolen belongings. They mock the man and feel no guilt. Scrooge realises how hated this person must have been.</li> <li>- The spirit shows a corpse lying alone in bed, covered by a sheet. Scrooge cannot bring himself to lift the sheet and look at the face. He begins to fear the dead man might be himself.</li> <li>- Scrooge then sees the Cratchit family mourning the death of Tiny Tim. Bob Cratchit is grief-stricken, and the family supports one another lovingly. Scrooge is deeply moved and vows to change to prevent this tragedy.</li> <li>- Finally, the spirit takes Scrooge to a neglected grave in a lonely churchyard. The gravestone reads: <b>"EBENEZER SCROOGE."</b></li> </ul> <p>Scrooge breaks down in despair, begging the ghost for mercy. He promises to change his ways.</p> <p>The ghost's hand trembles and then vanishes. Scrooge wakes up in his own bed — it's Christmas morning.</p> |
|        | Juxtaposition     | Placing two opposing items/images together in a text to highlight the contrast between them. | Scrooge's thoughts and beliefs about Christmas juxtapose everyone else's.                                    |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|        | Mortality         | Being subject to death.                                                                      | Scrooge is reminded of his own mortality, and how his death would be treated by others if he doesn't change. |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|        | Legacy            | The long-lasting impact of someone's life.                                                   | Scrooge realises his legacy is one of bitterness and greed.                                                  |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|        | Fear              | The feeling of being scared of something.                                                    | Scrooge's fear of his future is his motivator to change.                                                     |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Week 8 | Consequences      | Something that happens as a result of someone's choices.                                     | Scrooge realises that his actions could have grave consequences for lots of people.                          | Week 8 | <p>Stave 4 key quotations and themes:</p> <p>1. Explode the following quotation:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



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|               | <b>Justice</b>          | The idea that people should be treated with consideration and fairness. | Scrooge realises that his treatment of others has been unjust.                        |               | <p>"I will honour Christmas in my heart, and try to keep it all the year".</p> <p>2. Find 2 key quotations for the following key themes:</p> <ul style="list-style-type: none"> <li>- Mortality and legacy</li> <li>- Fear as a motivator</li> <li>- Redemption</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|               | <b>Want</b>             | Have a desire to have or possess something.                             | Scrooge has always had a want for more wealth.                                        |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | <b>Christian Values</b> | Moral principles based upon the teachings of Jesus.                     | Examples include: honesty, charity and compassion.                                    |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | <b>Dialogue</b>         | A language interaction between two or more participants.                | The Ghost of Christmas yet to Come is given no dialogue.                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Week 9</b> | <b>Reformed</b>         | When someone's character now takes on a different form.                 | Scrooge was miserly and cold; he's now empathetic and compassionate. He has reformed. | <b>Week 9</b> | <p><b>Stave 5 summary: The End of It</b></p> <p>Scrooge wakes up on <b>Christmas morning</b> full of joy and relief — he has been given a second chance. Everything feels bright, warm, and full of possibility. He is transformed: generous, kind, and full of love for others.</p>  <ul style="list-style-type: none"> <li>- Scrooge immediately begins making amends. He buys a large turkey and anonymously sends it to the <b>Cratchit family</b>, surprising them and showing he genuinely cares.</li> <li>- Scrooge goes to his nephew <b>Fred's</b> house, and for the first time, he joins in the Christmas celebrations with happiness and laughter. He enjoys being part of a family and reconnects with Fred.</li> <li>- Scrooge becomes like a second father to <b>Tiny Tim</b>, supporting the family financially and emotionally. Tim survives and thrives thanks to Scrooge's kindness.</li> <li>- From this day onward, Scrooge lives by the lessons he has learned. He embraces <b>compassion, generosity, and the</b></li> </ul> |
|               | <b>Enlightened</b>      | A realisation that means you see things in a different way.             | Scrooge is enlightened by the spirits; he realises that the poor deserve his help.    |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | <b>Supernatural</b>     | Something that cannot be explained through science or logic.            | The presence of the ghost cannot be explained through science or logic.               |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | <b>Penitent</b>         | Feeling sorrow or regret for something you have done.                   | Scrooge is feeling penitent for what he was like previously.                          |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | <b>Morally corrupt</b>  | A person who acts in a dishonest way, for their own gain.               | Scrooge was morally corrupt at the start of the story.                                |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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|         |               |                                                                                 |                                                                                      |  |         | Christmas spirit. People notice his transformation, and he becomes respected and loved in the community.                                                                                                                                                                                                                                                                                                                                        |
| Week 10 | Narrator      | The person recounting the events in a narrative.                                | The book has a third-person narrator.                                                |  | Week 10 | <p>Stave 5 key quotations and themes:</p> <ol style="list-style-type: none"> <li>1. Explode the following quotation:<br/>'And so, as Tiny Tim observed, God bless Us, Every One!' (The last line of the story)</li> <li>2. Find 2 key quotations for the following themes: <ul style="list-style-type: none"> <li>- Redemption and transformation</li> <li>- Generosity and community</li> <li>- The Spirit of Christmas</li> </ul> </li> </ol> |
|         | Community     | A group of people living in the same place, or having something in common.      | Scrooge learns the importance of community.                                          |  |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|         | Philanthropy  | The act of seeking to promote the welfare of others.                            | The gentlemen who ask Scrooge for a donation to the poor practise philanthropy.      |  |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|         | Social Divide | The differences in quality of life between those with money, and those without. | Scrooge's reformation helps to heal the social divide; he sees others as his equals. |  |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|         | Capitalism    | A system in which resources are controlled by private owners for profit.        | Scrooge held firm capitalist beliefs at the start of the story.                      |  |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Inspiring Excellence- Developing Revision Skill

**Past paper questions to write essay plans/practise with:**

1. How is Scrooge presented in *A Christmas Carol*?
2. How are the Cratchit family presented in *A Christmas Carol*?
3. How does Dickens explore the theme of redemption in *A Christmas Carol*?
4. How does Dickens criticize society in *A Christmas Carol*?
5. How does Dickens create atmosphere in *A Christmas Carol*?
6. How does Dickens use the supernatural to create intrigue and excitement in *A Christmas Carol*?



Practise your **SPaG!** by doing the following:

- Practise your **spellings**.
- Think of **synonyms** for words you use a lot.
- List all types of **punctuation** and know when to use them (EG: semi-colon; brackets; speech marks; colon; dash; etc...)
- Use **connectives** to link paragraphs.
- Use TiP ToP to **paragraph** correctly!

**Relevant context to research and revise:**

**Social Responsibility:** Dickens believed the wealthy had a duty to support the poor.

**Victorian Poverty:**

**Christmas Traditions:** Dickens helped to popularise modern Christmas traditions.

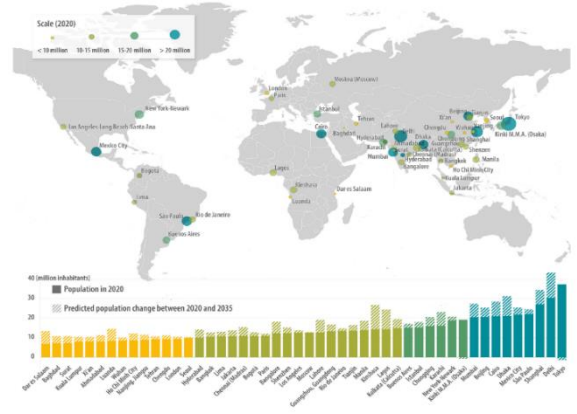
**Personal Experience:** Dickens' own tough upbringing helped to shape the commentary.

**Morality and the Supernatural:** Ghosts and the supernatural were often used to teach moral lessons in Victorian literature.



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 1 – Tuesday 8 <sup>th</sup> September                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lesson 1 – Urban change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Lesson 2 – Migration & Natural increase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Lesson 3 – Megacities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Key Terms:</b><br/> <b>Urban:</b> The characteristics of a town or city with a population of over 20,000 people.</p> <p><b>Rural:</b> An area with a population of less than 10,000 people</p> <p><b>Urbanisation:</b> A process where an increasing proportion of a population lives in towns and cities.</p>                                                                                                                                                                                                                      | <p><b>Key Terms:</b><br/> <b>Migration:</b> The movement of people from one place to live in another, permanently or semi permanently.</p> <p><b>Rural to urban migration:</b> The movement of people from the countryside to towns and cities areas.</p> <p><b>Natural increase:</b> When birth rates are greater than death rates.</p>                                                                                                                                                                                                                                                                                | <p><b>Key Terms:</b><br/> <b>Megacity:</b> Urban area with over 10 million people living there.</p> <p><b>Counter-urbanisation:</b> Large numbers of people move from urban areas into surrounding countryside or rural areas.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Content:</b><br/> More than 4 billion people live in urban areas.</p> <p>The number of people living in urban areas is highest in HIC.</p> <p>But urbanisation is highest in LICs and NEEs. This is mostly because of the rapid economic growth, which is leading to increasing life expectancies.</p> <p>The population is rising fastest in Asia, so they are projected to have the highest levels of urbanisation.</p> <p>Whereas in Europe and the US, urban populations will decrease as their populations are stagnating.</p> | <p><b>Content:</b><br/> <b>Push factors</b> that encourage people to move away from a place (negatives).</p> <p>Examples of push factors: natural disasters e.g. drought, war and conflict, lack of jobs.</p> <p><b>Pull factors</b> that encourage people to move to a place (can be perceived rather than actual) (positives).</p> <p>Examples of pull factors: more jobs, better education and healthcare, following family members.</p> <p><b>Natural increase and migration</b> can involve young adults. When there is a high percentage of population of child-bearing age, this leads to higher birth rate.</p> | <p><b>Content:</b><br/> Two thirds of megacities currently in NEEs/LICs and in Asia. Predicted to increase from 28 to 41 by 2030.</p>  <p>The figure consists of a world map and a bar chart. The map shows the locations of megacities (populations over 10 million) in 2020, with a legend indicating four size categories: &lt; 10 million, 10-11 million, 11-20 million, and &gt; 20 million. Major megacities like New York, London, Tokyo, and Shanghai are highlighted. The bar chart below the map shows the predicted population change between 2020 and 2035 for various countries. The y-axis represents population in millions, ranging from 0 to 40. The x-axis lists countries. Bars are color-coded: yellow for population in 2020 and green for predicted population change between 2020 and 2035. The chart shows that while some countries like India and China have large populations, their growth is slowing down, while others like Africa and South America show more significant projected growth.</p> <p>HIC cities are growing slower as people are moving to rural areas, moving to commuter settlements, the population is older (non-fertile age range) and the cost of raising children.</p> |
| <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>1. How many people live in urban areas?</li> <li>2. Where is urbanisation highest?</li> <li>3. Why is it highest here?</li> <li>4. Why will populations decrease in Europe and US?</li> </ol>                                                                                                                                                                                                                                                                             | <ol style="list-style-type: none"> <li>5. What are push and pull factors?</li> <li>6. Give examples of push factors</li> <li>7. Give examples of pull factors</li> <li>8. What leads to natural increase?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                    | <ol style="list-style-type: none"> <li>9. Where are two thirds of today's megacities?</li> <li>10. Which continent has the most megacities?</li> <li>11. How many megacities will there be in 2030?</li> <li>12. Why are HIC cities growing slower?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



### Homework 2 – Tuesday 15<sup>th</sup> September

| Lesson 4 – Mumbai location & importance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Lesson 5 – Mumbai growth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Specification terminology                                                                                                                                                                                                                                                                                |
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| <p><b>Key Terms:</b><br/> <b>Globalised:</b> More connected, so people, products and ideas can easily move between countries.</p> <p><b>TNC (Transnational corporation):</b> Large companies that operate all over the world.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Key Terms:</b><br/> <b>Positive multiplier effect:</b> The introduction of a new industry or the expansion of an existing industry in an area also encourages growth in other industrial sectors.</p>                                                                                                                                                                                                                                                                                                                                                              | <ol style="list-style-type: none"> <li>Urban</li> <li>Rural</li> <li>Urbanisation</li> <li>Migration</li> <li>Rural to urban migration</li> <li>Natural increase</li> <li>Megacity</li> <li>Counter-urbanisation</li> <li>Transnational corporation (TNC)</li> <li>Positive multiplier effect</li> </ol> |
| <p><b>Content:</b><br/> <b>Location:</b></p> <ul style="list-style-type: none"> <li>On the west coast of India on the Arabian Sea.</li> <li>It has access to the Indian Ocean and is therefore an important trade route.</li> <li>It one of the most globalised cities. 4<sup>th</sup> largest in the world.</li> </ul>  <p><b>Regional importance of Mumbai:</b></p> <ul style="list-style-type: none"> <li>Regional capital of Maharashtra State.</li> </ul> <p><b>National importance of Mumbai:</b></p> <ul style="list-style-type: none"> <li>Receives 60% of India's imports.</li> <li>Location of India's main scientific and number research centres.</li> </ul> <p><b>International importance of Mumbai:</b></p> <ul style="list-style-type: none"> <li>HQ of important TNCs such as Disney, GlaxoSmithKline, Johnson and Johnson and Volkswagen.</li> <li>It is a globally important transport hub.</li> </ul> | <p><b>Content:</b><br/> Mumbai has grown rapidly due to <b>rural to urban migration</b>. It has a population of <b>23 million</b> and is growing by <b>1 person a minute</b>.</p> <p>Most migrants are aged between <b>20 and 35</b>, 64% are male and looking for work in TNCs or manufacturing.</p> <p>The <b>initial</b> economic activity was <b>textiles</b> and <b>trade</b> as it is <b>a port</b>.</p> <p>This stimulated further economic growth through the <b>positive multiplier effect</b>.</p> <p>This encouraged further investment and in migration.</p> |                                                                                                                                                                                                                                                                                                          |
| <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>Where is Mumbai located in India?</li> <li>State a regional importance of Mumbai</li> <li>State a national importance of Mumbai</li> <li>State an international importance of Mumbai</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ol style="list-style-type: none"> <li>Why has Mumbai grown rapidly?</li> <li>What is Mumbai's population?</li> <li>What age are most migrants?</li> <li>What was Mumbai's initial economic activity?</li> </ol>                                                                                                                                                                                                                                                                                                                                                         | <p>9. Use lessons 1-5 to write out the definition for each key term above.</p>                                                                                                                                                                                                                           |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 3 – Tuesday 22 <sup>nd</sup> September                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| Lesson 6 – Mumbai social opportunities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Lesson 7 – Mumbai economic opportunities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Lesson 8 – Mumbai social challenges                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>Key Terms:</b><br/> <b>Social opportunities:</b> Chances for people to improve their quality of life such as access to education and health care.</p> <p><b>Literacy rate:</b> The percentage of people who can read and write.</p>                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Key Terms:</b><br/> <b>Economic opportunities:</b> Chances for people to improve their standard of living through employment.</p> <p><b>Informal employment:</b> When workers do not work regular hours and do not pay tax.</p>                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Key Terms:</b><br/> <b>Informal settlement:</b> An area of low-quality housing, lacking amenities such as a clean water, sewage systems and access to electricity. They often develop spontaneously and illegally.</p> <p><b>Sanitation:</b> Measures designed to protect public health including the provision of clean water and the disposal of sewage and waste.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Content:</b><br/> <b>Health care:</b><br/> Easier access to a wider range of medical services including doctors, hospitals and nurses.</p> <p><b>Education:</b><br/> Many have access to schools for their children. 85% of children receive an education. Literacy rate is 90%.</p> <p><b>Clean water supply:</b><br/> 95% of households can access water from pipes for 2 hours a day. Can be shared by up to 12 families.</p> <p><b>Energy:</b><br/> In rural areas, access to electricity is limited. In Mumbai, electricity is available to run a fridge, light and charge a mobile phone.</p> | <p><b>Content:</b><br/> The <b>TNCs</b> and other businesses such as telecommunications and call centres mean there is a <b>range of high skilled</b> and <b>low skilled</b> employment opportunities. The incomes are reliable.</p> <p>15,000 small factories employ 250,000 people.</p> <p>The <b>informal employment sector</b> employs <b>85% of people</b> in the informal settlement of Dharavi.</p> <p>Within the informal settlement <b>15,000 informal businesses</b> create <b>over \$1 billion</b> per year.</p> <p>Jobs include <b>rag picking</b>, making <b>pottery</b>, <b>selling items</b> on the street.</p> | <p><b>Content:</b><br/> Rural to urban migration has caused the growth of informal settlements (slums). They are <b>illegal</b>. The government supplies limited services such as sanitation, water, electricity. <b>40%</b> of Mumbai live in informal settlements. <b>Dharavi</b> is the largest with <b>1 million people</b> per mile<sup>2</sup></p> <p>Up to <b>500 people</b> can share <b>one public latrine</b> (toilet). There is limited or <b>no sewage system (sanitation)</b>.</p> <p>Doctors deal with <b>4,000 cases</b> a day of <b>diphtheria</b> and <b>typhoid</b>.</p> <p>People earn around a <b>£1 a day</b> for their work and often work in poor conditions.</p> <p>Mumbai has the <b>3<sup>rd</sup> highest crime rate</b> of all cities in India. <b>22%</b> have been exposed to bribery. They don't have the money for police or people distrust the police. Gangs control the areas.</p> |
| <p><b>Questions:</b><br/> 1. What health care do people have access to?<br/> 2. What percentage of children have an education?<br/> 3. What is the literacy rate in Mumbai?<br/> 4. What percentage of households' access water?</p>                                                                                                                                                                                                                                                                                                                                                                      | <p>5. How many small factories are there and how many do they employ?<br/> 6. What percentage of Dharavi is employed in the informal sector?<br/> 7. How many informal businesses are there?<br/> 8. How much do informal businesses earn?</p>                                                                                                                                                                                                                                                                                                                                                                                 | <p>9. What percentage of Mumbai's people live in informal settlements?<br/> 10. How many people share one public latrine?<br/> 11. How much to people earn a day?<br/> 12. Why is there a lack of police?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 4 – Tuesday 29 <sup>th</sup> September                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                     |
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| Lesson 9 – Improving Mumbai's quality of life                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Lesson 10 – Mumbai environmental challenges                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Specification terminology                                                                                                                                                                                                                                           |
| <p><b>Key Terms:</b><br/> <b>Residency:</b> The place where someone lives most of the time and is officially allowed to stay.</p> <p><b>Trade:</b> When people or countries buy, sell, or swap things like goods or services with each other.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Key Terms:</b><br/> <b>Pollution:</b> The presence of chemicals, noise, dirt or other substances which have harmful or poisonous effects on an environment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ol style="list-style-type: none"> <li>1. Social opportunities</li> <li>2. Literacy rate</li> <li>3. Economic opportunity</li> <li>4. Informal employment</li> <li>5. Informal settlement</li> <li>6. Sanitation</li> <li>7. Trade</li> <li>8. Pollution</li> </ol> |
| <p><b>Content:</b><br/> <b>Vision Mumbai - Dharavi Redevelopment Project:</b><br/> The \$2 billion project offers <b>free housing</b> in apartment blocks to residents who can prove <b>residency since 2000</b>.</p> <p>Aims to provide <b>26,000 new electricity connections</b> for residents of Mumbai's Shivaji Nagar informal settlement and <b>7,000 new toilets</b> for <b>350,000 people</b>.</p> <p>Reliance Infrastructure, The Global Partnership on Output-Based Aid (GPOBA), and other partners have launched <b>a project to provide improved access to safe electricity supply to around 104,000 people</b> in Mumbai's informal settlements.</p> <p>Many people work in the <b>informal sector</b>. Mumbai has also started the <b>Mumbai Bangalore Industrial Corridor</b> to create <b>more jobs</b> in manufacturing and <b>boost trade</b>.</p> <p>Authorities are trying to <b>reduce begging and crime</b> by having <b>more police</b>, ensuring children are in school and installing <b>CCTV</b>.</p> | <p><b>Content:</b><br/> Mumbai produces <b>7,500</b> metric tonnes of waste every day. However, the <b>trucks can't get into the informal settlements</b> as the streets are too narrow. Dharavi has a recycling zone. <b>80% of plastic waste is recycled</b>. In the UK its between 20- 60%</p> <p><b>77%</b> of households suffer from poor water quality in the city. Mumbai has some very dirty air including dangerous levels of <b>Nitrous Oxides</b>, due to vehicles, industry and wood burning stoves in Dharavi.</p> <p>Traffic congestion is caused by the <b>3 million vehicles</b> which are often old and polluting. They contribute to both noise and air pollution. They create high levels of <b>traffic congestion</b>. Mumbai is the <b>4<sup>th</sup> most polluting city globally</b>.</p> <p>Mumbai's <b>renowned train system</b>. This is hard to manage due to the <b>sheer volume of people</b>. Also, trying to build new roads is difficult as they are so congested.</p> |                                                                                                                                                                                                                                                                     |
| <p><b>Questions:</b><br/> 1. How much did the project cost?<br/> 2. Who are they offering free housing to?<br/> 3. How many new toilets are they providing?<br/> 4. What is creating more jobs and boosting trade?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>5. How much waste is produced in Mumbai?<br/> 6. What percentage of waste is recycled?<br/> 7. What is there dangerous levels of in the air?<br/> 8. Why is the train system difficult to manage?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>9. Use lessons 6-10 to write out the definition for each key term above.</p>                                                                                                                                                                                     |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 5 – Tuesday 6 <sup>th</sup> October                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| Lesson 11 – Mumbai traffic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Lesson 12 – Mumbai economic growth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Lesson 13 – UK cities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>Key Terms:</b><br/> <b>Traffic congestion:</b> Occurs when there is too great a volume of traffic for roads to cope with, so traffic jams form and traffic slows to a crawl.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>Key Terms:</b><br/> <b>Positive multiplier effect:</b> The introduction of a new industry or the expansion of an existing industry in an area also encourages growth in other industrial sectors.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>Key Terms:</b><br/> <b>City:</b> A large settlement with many buildings and people, offering services like transport, education, and healthcare, and usually acting as a centre for business and government.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Content:</b><br/> <b>Environmental Problems:</b></p> <ul style="list-style-type: none"> <li>Traffic increases air pollution which releases greenhouse gases that is leading to climate change</li> </ul> <p><b>Economic Problems:</b></p> <ul style="list-style-type: none"> <li>Business deliveries take longer. This costs companies more money as drivers take longer to make the delivery.</li> </ul> <p><b>Social Problems:</b></p> <ul style="list-style-type: none"> <li>Congestion can make people late for work.</li> </ul> <p><b>Solution: Mumbai Urban Transport Project (MUTP)</b></p> <ul style="list-style-type: none"> <li>Costing \$1 billion</li> <li>Aims to improve and build roads and highways such as the East West Highway</li> <li>Providing modern trains that are safer, faster and with more space</li> <li>600 eco- friendly buses, enabling more people to travel.</li> </ul> <p><b>In HICs</b>, roads can be widened, build ring roads and bypasses to keep traffic out of city centres, Park and Ride schemes to reduce car use.</p> | <p><b>Content:</b><br/> <b>Positive Multiplier Effect for Mumbai:</b></p> <ul style="list-style-type: none"> <li>Mumbai was <b>originally a port</b> in the 1800s which caused the growth of the textile industry.</li> <li>The <b>textile industry</b> employed 20,000 workers in Mumbai.</li> <li>The workers received an <b>income</b>.</li> <li>The government <b>used taxes</b> from income to improve infrastructure, schools and hospitals and other services.</li> <li>Mumbai became a <b>more attractive place</b> to live</li> <li>TNCs such as Disney/VW and the Bollywood film industry set up HQ.</li> <li>Workers <b>immigrate</b>.</li> <li>People/workers <b>spend money</b> in local economy which starts the cycle again.</li> <li>The government <b>uses taxes to improve</b> infrastructure, roads, railways, airports, ports and superfast broadband.</li> </ul> | <p><b>Content:</b><br/> The location of most UK cities is linked to the availability of <b>natural resources</b> (particularly coal), or near to the coast for imports, and the subsequent location of industry during the industrial revolution.</p> <p>This is because <b>coal was the original source</b> of power for the factories e.g. Glasgow, Newcastle, Nottingham and Cardiff.</p> <p>Primary and secondary industries have closed in the centre and north of the UK.<br/> <b>Cities in the north are growing slower.</b></p> <p>London and the SE of the UK have a lot of tertiary (banking and insurance), quaternary industries and universities so <b>people are migrating to these cities</b> from within the UK and from other countries.</p> |
| <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>State an environmental problem of traffic</li> <li>State an economic problem of traffic</li> <li>State a social problem of traffic</li> <li>Give 4 features of the MUTP</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ol style="list-style-type: none"> <li>How many people did the textile industry employ?</li> <li>What did the government use taxes for?</li> <li>Where do people/workers spend their money?</li> <li>Draw a diagram of the multiplier effect</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ol style="list-style-type: none"> <li>What is the location of UK cities linked to?</li> <li>What was the original source of power in the UK?</li> <li>Why are cities in the north growing slower?</li> <li>Why are cities in the south growing quicker?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 6 – Tuesday 13 <sup>th</sup> October                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                         |
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| Lesson 14 – UK population distribution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Lesson 15 – London location & importance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Specification terminology                                                                                                                                                                                                                                               |
| <p><b>Key Terms:</b><br/> <b>Population distribution:</b> How a population is a spread out.</p> <p><b>Population density:</b> A measure of how many people there are in an area. Measured in km<sup>2</sup>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>Key Terms:</b><br/> <b>National importance:</b> Significant to the nation/rest of the country.</p> <p><b>International importance:</b> Significant to other nations/countries across the world.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ol style="list-style-type: none"> <li>1. Traffic congestion</li> <li>2. Positive multiplier effect</li> <li>3. City</li> <li>4. Population distribution</li> <li>5. Population density</li> <li>6. National importance</li> <li>7. International importance</li> </ol> |
| <p><b>Content:</b><br/>           Mountainous areas tend to have the lowest population densities. These areas are <b>sparsely populated</b> (low number of people per km<sup>2</sup>).</p> <p>Wales has the Cambrian Mountains, the SW has Dartmoor and Central UK has the Pennines. These places tend to have low population densities</p> <p>Cardiff, Bristol and Liverpool all have large docks and lots of trade. There are jobs so there are high population densities here.</p> <p>Birmingham has a lot of industries so there is a high population density here. These areas are <b>densely populated</b> (high number of people per km<sup>2</sup>).</p> <p>SE is flat and has good farmland. London is the largest and most densely populated city with a variety of employment opportunities.</p> | <p><b>Content:</b><br/>           London is the <b>UK capital</b> and is in the <b>SE</b>. It has a population of <b>8 million inhabitants</b> and likely to rise to 10 million by 2030.</p> <p><b>National importance:</b></p> <ul style="list-style-type: none"> <li>• It is the administrative capital where UK Parliament sits House of Commons</li> <li>• London is the UK capital</li> <li>• It generates 20% of the total UK GNI</li> </ul> <p><b>International importance:</b></p> <ul style="list-style-type: none"> <li>• It is the location of many TNCs such as GlaxoSmithKline, HSBC, Barclays and the UK stock exchange</li> <li>• Well-connected through the motorway network and has 5 international airports and the Eurotunnel link through Waterloo.</li> </ul> |                                                                                                                                                                                                                                                                         |
| <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>1. What does sparsely populated mean?</li> <li>2. Give an area of the UK that is sparsely populated</li> <li>3. What does densely populated mean?</li> <li>4. Give an area of the UK that is densely populated</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ol style="list-style-type: none"> <li>5. Where in London in the UK?</li> <li>6. What is the population of London?</li> <li>7. State a national importance</li> <li>8. State an international importance</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ol style="list-style-type: none"> <li>9. Use lessons 11-15 to write out the definition for each key term above.</li> </ol>                                                                                                                                             |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 7 – Tuesday 20 <sup>th</sup> October                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| Lesson 16 – London growth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Lesson 17 – London opportunities (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Lesson 18 – London opportunities (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p><b>Key Terms:</b><br/> <b>Internal/national migrant:</b> Individuals who move from one place to another within the same country.</p> <p><b>International migrant:</b> Individuals who move from one place to another within the same country.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>Key Terms:</b><br/> <b>Urban Change:</b> The process of change as a result of growth, decline, dereliction or redevelopment.</p> <p><b>Cultural mix:</b> When several different ethnic, racial, religious or cultural groups coexisting in harmony in the same society.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Key Terms:</b><br/> <b>Integrated transport system (ITS):</b> When different transport methods connect together making journeys smoother and, therefore, public transport more appealing.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>Content:</b><br/> Most people who move to London are <b>internal/national migrants</b> between 18 and 35 who attend <b>university or work</b>. This <b>creates a vibrant and energetic character</b>, with a lot of social opportunities. Often means that <b>many single occupancy homes are needed which puts the price of rents up</b>.</p> <p>There is <b>considerable international migration</b>. 300 languages spoken. The <b>majority do low skilled work</b> such as security guards and cleaners but many work for TNCs or in the NHS as doctors, dentists and nurses.</p> <p>In London, <b>60% of people are white British</b> and the other <b>40% are other ethnicities</b> such as Asian and Eastern European.</p> <p>This contributes to a multicultural mix and creates <b>ethnic enclaves</b> such as <b>China Town</b>. It can also create tension and conflict.</p> | <p><b>Content:</b><br/> <b>Recreation &amp; entertainment:</b></p> <ul style="list-style-type: none"> <li>• Huge number of <b>cultural attractions</b> such as the British Museum, the National Gallery and the Natural History Museum.</li> <li>• The <b>West End</b> where a huge number of shows can be seen and tourist attractions such as Buckingham Palace and the Houses of Parliament.</li> <li>• Huge number of <b>concert and cinema</b> venues and lots of <b>sporting events</b> such as the Oxford-Cambridge Boat Race, the Wimbledon Tennis Open, big name football teams and even hosted the Olympics.</li> </ul> <p><b>Cultural mix:</b><br/> Strategies to improve this include:</p> <ul style="list-style-type: none"> <li>• Improve literacy in areas where English can be a second language</li> <li>• Increasing employment through initiatives to ensure basic skills and access to information and training</li> <li>• Numerous cultural celebrations such as Notting Hill Carnival, Diwali, Chinese New Year.</li> </ul> | <p><b>Content:</b><br/> <b>Employment:</b></p> <ul style="list-style-type: none"> <li>• The <b>biggest growth</b> has been in professional, real estate and business sectors.</li> <li>• <b>Many TNCs</b> have offices here including <b>HSBC, Barclays and Unilever</b>.</li> <li>• “<b>The City</b>” is the main <b>financial services</b> which has highly paid jobs.</li> <li>• There are also <b>many low skilled employment</b> opportunities, support services, the service sector and tourism.</li> </ul> <p><b>Integrated transport scheme (ITS):</b><br/> ITS makes for efficient travel across the city on the Underground, Buses, Tramlink, the Docklands Light Railway, London River Services and the London Overground.</p> <p><b>This means you do not need to own a car, and travel is quick efficient and affordable.</b></p> <p>More than 3 million passengers travel on the Underground (the Tube) every day.</p> |
| <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>1. Why do most internal migrants move to London?</li> <li>2. What type of work do international migrants do?</li> <li>3. What is the ethnic split of London?</li> <li>4. What does migration contribute to?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ol style="list-style-type: none"> <li>5. State 3 cultural attractions in London</li> <li>6. State 3 tourist attractions in London</li> <li>7. State 3 sporting events held in London</li> <li>8. State 3 strategies to improve the cultural mix</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ol style="list-style-type: none"> <li>9. What sectors have the biggest economic growth?</li> <li>10. What is in “The City”?</li> <li>11. What sectors have low skilled employment?</li> <li>12. What is the benefit of an integrated transport scheme?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 8 – Tuesday 3 <sup>rd</sup> November                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                       |
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| Lesson 19 – London greening                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Lesson 20 – London environmental challenges                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Specification terminology                                                                                                                                                                                                                                                                             |
| <p><b>Key Terms:</b><br/> <b>Urban greening:</b> The process of increasing and preserving open space such as public parks and gardens in urban areas.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p><b>Key Terms:</b><br/> <b>Urban Sprawl:</b> The unplanned growth of urban areas into the surrounding rural areas.</p> <p><b>Rural-urban fringe:</b> A zone of transition between the built-up area and the countryside where there is often competition for land use.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ol style="list-style-type: none"> <li>1. Internal/national migrants</li> <li>2. International migrants</li> <li>3. Urban change</li> <li>4. Cultural mix</li> <li>5. Integrated transport system (ITS)</li> <li>6. Urban greening</li> <li>7. Urban sprawl</li> <li>8. Rural-urban fringe</li> </ol> |
| <p><b>Content:</b><br/> London is 47% green space. It has over <b>3,000 parks, 30,000 allotments, three million gardens and two National Nature Reserves.</b> Creating more green space by creating rooftop green spaces. There are <b>8.1 million trees.</b></p> <p><b>Environmental benefits:</b></p> <ul style="list-style-type: none"> <li>• Cleaner air as trees filter pollution</li> <li>• Trees reduce flood risk</li> <li>• Habitat for animals</li> </ul> <p><b>Social and health benefits:</b></p> <ul style="list-style-type: none"> <li>• Place for exercise</li> <li>• Reduces stress</li> <li>• Accessible and free</li> </ul> <p><b>Economic benefits:</b></p> <ul style="list-style-type: none"> <li>• Attract UK and overseas visitors</li> <li>• Healthier workers have less time off work</li> </ul> | <p><b>Content:</b><br/> There is <b>not enough affordable housing</b> in London, so the Government has suggested building on <b>greenfield sites</b> on the <b>rural urban fringe.</b></p> <p><b>Greenfield:</b> A plot of land, often in a rural or on the edge of an urban area, that has not yet been subject to any building development.</p> <p>This has led to the rise of <b>commuter settlements</b> outside London. People live here and commute to the city for work.</p> <p><b>Alternative</b> is to use brownfield sites and areas of dereliction.</p> <p><b>Brownfield:</b> Land that has been used, abandoned and now awaits some new use. Commonly found across urban areas, particularly in the inner city.</p> <p><b>Dereliction:</b> Abandoned buildings and wasteland.</p> |                                                                                                                                                                                                                                                                                                       |
| <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>1. What percentage of London is green space?</li> <li>2. State two environmental benefits</li> <li>3. State two social and health benefits</li> <li>4. State two economic benefits</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ol style="list-style-type: none"> <li>5. Why is the government suggesting building on greenfield sites?</li> <li>6. What is a greenfield site?</li> <li>7. What has building on greenfield sites led to a rise of?</li> <li>8. What is a brownfield site?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>9. Use lessons 16-20 to write out the definition for each key term above.</p>                                                                                                                                                                                                                      |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 9 – Tuesday 10 <sup>th</sup> November                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| Lesson 21 – London social challenges (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Lesson 22 – London social challenges (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Lesson 23 – London urban regeneration (Olympic)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>Key Terms:</b><br/> <b>Inequalities:</b> Differences between poverty and wealth as well as in peoples' wellbeing and access to things like jobs, housing and education.</p> <p><b>Deprivation:</b> A standard of living below that of the majority of society that involves hardships and lack of access to services and resources.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Key Terms:</b><br/> <b>Spiral of decline:</b> A process where a decrease in one area leads to further decreases in other areas.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>Key Terms:</b><br/> <b>Urban regeneration:</b> The revival of old parts of the built-up area by either installing modern facilities in old buildings (known as renewal) or opting for redevelopment (i.e. demolishing existing buildings and starting afresh).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Content:</b><br/> <b>Multiple deprivation includes:</b></p> <ul style="list-style-type: none"> <li>• Low education achievement (low levels of achievement <b>GCSE Grade 9-5</b>)</li> <li>• High levels of <b>unemployment</b></li> <li>• High <b>crime</b> rates</li> <li>• Lower <b>life expectancy</b></li> <li>• Low <b>participation</b> in sport</li> </ul> <p><b>East London – Newham</b></p> <ul style="list-style-type: none"> <li>• 62% of students achieved 5+ GCSE</li> <li>• 30% 16-24yr old unemployed</li> <li>• Life expectancy is 75</li> <li>• Over 1300 crimes a year (8.9 per 1000)</li> <li>• £758 average weekly income</li> </ul> <p><b>West London – Chelsea and Kensington</b></p> <ul style="list-style-type: none"> <li>• 94% of students achieved 5+ GCSE</li> <li>• 3% unemployed</li> <li>• Life expectancy is 87</li> <li>• Less than 300 crimes a year</li> <li>• £988 average weekly income</li> </ul> | <p><b>Content:</b><br/> <b>Why does inequality exist in London?</b><br/>           Inequality is often located in areas which were former industrial areas employing a lot of people.</p> <p><b>Spiral of Decline:</b></p> <ol style="list-style-type: none"> <li>1. Loss of industry</li> <li>2. Unemployment</li> <li>3. Low income</li> <li>4. Poorer health, diet &amp; lack of exercise</li> <li>5. Lack of engagement with education</li> <li>6. Lack of investment and opportunity</li> <li>7. Increase in crime</li> <li>8. High levels of multiple deprivation</li> </ol> <div data-bbox="808 1013 1473 1246">  </div> | <p><b>Content:</b><br/> <b>Reasons why the area needed regeneration:</b><br/>           Newham was one of most deprived areas of London and UK. It hosted the 2012 Olympics.</p> <p><b>The main features of the project:</b><br/> <b>Social:</b></p> <ul style="list-style-type: none"> <li>• Housing in East Village.</li> <li>• New school – Chobham Academy.</li> <li>• The aquatics centre for the community, schools and elite athletes.</li> </ul> <p><b>Economic:</b></p> <ul style="list-style-type: none"> <li>• The new Stratford Tube station</li> <li>• All the Olympic venues have been sold, including the £300m high-tech media centre</li> </ul> <p><b>Environmental:</b></p> <ul style="list-style-type: none"> <li>• Grounds in the Olympic Park have been kept as parkland.</li> <li>• Water quality improved in the River Lea.</li> <li>• Wildlife habitats were created</li> <li>• Stadiums made of at least 25% recycled materials.</li> </ul> |
| <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>1. State 5 areas of multiple deprivation</li> <li>2. Compare GCSE grades between the 2 areas</li> <li>3. Compare life expectancy between the 2 areas</li> <li>4. Compare income between the 2 areas</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ol style="list-style-type: none"> <li>5. State why there is inequalities in London</li> <li>6. What starts the spiral of decline?</li> <li>7. What happens after low income in the spiral of decline?</li> <li>8. What does the spiral of decline lead to?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ol style="list-style-type: none"> <li>9. Where was the Olympics hosted in London?</li> <li>10. State two social features of the project</li> <li>11. State two economic features of the project</li> <li>12. State two environmental features of the project</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



## Year 10 Cycle 1 Geography Knowledge Organiser – Urban Issues and Challenges



| Homework 10 – Tuesday 17 <sup>th</sup> November                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                 |
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| Lesson 24 – Sustainable urban living (BedZED)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Lesson 25 – Urban transport strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Specification terminology                                                                                                                                                                                                                                       |
| <p><b>Key Terms:</b><br/> <b>Sustainable urban living:</b> A city is one in which there is minimal damage to the environment, resources allocated fairly and jobs secure, and there is a strong sense of community, with local people involved in decisions made.</p> <p><b>Waste recycling:</b> The process of extracting and reusing useful substances found in waste.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>Key Terms:</b><br/> <b>Integrated transport system (ITS):</b> When different transport methods connect together making journeys smoother and, therefore, public transport more appealing.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ol style="list-style-type: none"> <li>1. Inequalities</li> <li>2. Deprivation</li> <li>3. Spiral of decline</li> <li>4. Urban regeneration</li> <li>5. Sustainable urban living</li> <li>6. Waste recycling</li> <li>7. Integrated transport system</li> </ol> |
| <p><b>Content:</b><br/> <b>BedZED (Beddington Zero Energy Development)</b> is the UK's first and largest carbon-neutral eco-community.</p> <p><b>Transport:</b></p> <ul style="list-style-type: none"> <li>• Promotes walking, cycling, use of public transport.</li> <li>• On-site charging points for electric cars</li> </ul> <p><b>Energy:</b></p> <ul style="list-style-type: none"> <li>• Houses have south facing terraces</li> <li>• 777 square meters are covered with solar panels.</li> </ul> <p><b>Water:</b></p> <ul style="list-style-type: none"> <li>• Water use is reduced to 76 litres/day; out of which 18% represents rainwater or recycled water</li> </ul> <p><b>Local materials:</b></p> <ul style="list-style-type: none"> <li>• Materials were sourced within a 35 mile radius of BedZED wherever possible.</li> </ul> <p><b>Social:</b></p> <ul style="list-style-type: none"> <li>• 50% of the dwellings are allocated to low income families</li> </ul> <p><b>Waste Recycling:</b></p> <ul style="list-style-type: none"> <li>• Multi-bins have been designed into the kitchens so that residents can separate their waste</li> </ul> | <p><b>Content:</b><br/> <b>London Underground:</b></p> <ul style="list-style-type: none"> <li>• There are 3 million passengers per day.</li> </ul> <p><b>Oyster card:</b></p> <ul style="list-style-type: none"> <li>• Integrated travel payment method which allows people to use buses, trains and tubes quickly.</li> <li>• This has now been superseded by contactless payments on debit cards and smart phones.</li> </ul> <p><b>Congestion Charging zone:</b></p> <ul style="list-style-type: none"> <li>• A fee of £11.50 is charged to any vehicle travelling in central London between 7am and 6pm, Monday to Friday.</li> </ul> <p><b>Low emissions zone (ULEZ):</b></p> <ul style="list-style-type: none"> <li>• All vehicles in the emissions zone will have to meet strict exhaust emission standards or pay a daily rate of £12.50 for cars and £100 for lorries and buses.</li> <li>• This will be on top of the congestion charge.</li> </ul> <p><b>Bike sharing scheme and E Scooters:</b></p> <ul style="list-style-type: none"> <li>• Bicycles can be self-hired in many public places.</li> <li>• E Scooters are rentable, but these are increasing accidents, and the laws are still being written.</li> </ul> |                                                                                                                                                                                                                                                                 |
| <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>1. State two transport features of BedZED</li> <li>2. State two features of energy in BedZED</li> <li>3. State a feature of water in BedZED</li> <li>4. How do they encourage recycling?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ol style="list-style-type: none"> <li>5. How many passengers use the London Underground?</li> <li>6. What is the congestion charging zone?</li> <li>7. What is the low emission zone?</li> <li>8. What is the bike sharing scheme?</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>9. Use lessons 21-25 to write out the definition for each key term above.</p>                                                                                                                                                                                |

## Making of America (Growing Tensions 1789-1838) Knowledge Organiser

|                                                                                      |                                                                                                                                                                      |
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| Name three states which joined the USA between 1790 and 1838                         | Maine; Alabama; Ohio; Indiana; Illinois; Michigan; Tennessee; Mississippi; Vermont                                                                                   |
| Name one early President of the USA 1789-1838                                        | George Washington; John Adams; Thomas Jefferson James Monroe;                                                                                                        |
| What powers did states have to make laws?                                            | Each had its own Governor and could make their own laws but couldn't go against the US Constitution                                                                  |
| How many slaves lived in the South by 1838?                                          | Over 2 million                                                                                                                                                       |
| Give three reasons why slavery expanded                                              | Cotton gin sped up the process of separating cotton fibres.<br>- New cotton-growing lands became available after 1790<br>- A huge demand from the North and overseas |
| What piece of machinery did Eli Whitney invent?                                      | Cotton Gin                                                                                                                                                           |
| How much cotton was the USA exporting by 1838?                                       | Over a million bales a year                                                                                                                                          |
| Explain how the Missouri Compromise tried to solve divisions over slavery in the USA | New states added in the West would be in pairs: For every free state there would have to be a slave state. This would keep the balance of power in government        |
| Name three of the Five Civilised Tribes                                              | The Cherokee; Chickasaw; Choctaw; Creek; Seminole                                                                                                                    |
| What was the Indian Removal Act of 1830?                                             | A law that promised money to tribes if they relocated to the west of the Mississippi                                                                                 |
| Which tribe challenged the Indian Removal Act in the Supreme Court?                  | Cherokee                                                                                                                                                             |
| Which President was responsible for the Indian Removal Act?                          | Andrew Jackson.                                                                                                                                                      |
| What was the 'Trail of Tears'?                                                       | Cherokee were force marched to Indian Territory. 4000 died.                                                                                                          |

### Key Terms

|                      |                                                                                         |
|----------------------|-----------------------------------------------------------------------------------------|
| <b>Supreme Court</b> | Highest, most important court in the USA                                                |
| <b>Constitution</b>  | Set of 'rules' by which a country is run, eg. Who can vote                              |
| <b>Congress</b>      | USA's place of government (Like UK's Houses of Parliament)                              |
| <b>State</b>         | Areas of the USA with their own government and a governor. They can pass some laws.     |
| <b>Territory</b>     | Land with not enough people to be a State. They don't send representatives to Congress. |

## Making of America (Visions of the West 1839-1860) Knowledge Organiser

|                                                                              |                                                                                                                                                                                                 |
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| Name the two main branches of the Sioux Indians                              | Lakota and Dakota. Lakota Sioux were more experienced with guns and horses.                                                                                                                     |
| What was the main source of food for the Cheyenne?                           | Buffalo                                                                                                                                                                                         |
| What was the name of the sacred centre of Sioux culture?                     | Black Hills of Dakota                                                                                                                                                                           |
| Explain why the Sioux moved on to the Plains                                 | Sioux homelands began filling up with other Indian tribes escaping white expansion in the East                                                                                                  |
| Why did migrants from East USA want to travel West from the 1849s onwards?   | Economic problems in the East.; Oregon and California had advertising campaigns to attract people.; Manifest Destiny – the belief that God wanted white people to settle in the West of America |
| Name two diseases which killed people on the trails to Oregon and California | Cholera and Typhoid                                                                                                                                                                             |
| Who led the Mormons to Utah?                                                 | Brigham Young                                                                                                                                                                                   |
| Why were the Mormons so keen to settle in the West (in Utah)?                | They wanted to practise their religion. They had been persecuted in the East and their leader, Joseph Smith had been killed.                                                                    |
| Where was gold first discovered in California in 1848?                       | Sutter's Mill, California Territory                                                                                                                                                             |
| Name two states or territories added to the USA between 1839 and 1860        | California, Colorado, Utah, Kansas                                                                                                                                                              |
| Why did more people go to Pike's Peak than to California to search for gold? | It was nearer and easier to get to. Plus trains could take you to the edge of the Plains.                                                                                                       |
| What impact did the gold rush have on California?                            | Improved Californian economy (created jobs); Impacted negatively on Indians; environmental impact (mining damaged landscapes and created flooding)                                              |
| Impacts of Pike's Peak                                                       | Population increase led to Colorado becoming a state. New towns grew, tensions with Native Americans                                                                                            |

### Key Terms

|                         |                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------|
| <b>Sioux</b>            | The largest Indian tribe                                                                           |
| <b>Mormons</b>          | A religious group. Christian but with specific beliefs different to most Christians                |
| <b>Gold Rush</b>        | Many people travelling to find gold                                                                |
| <b>Wakan Tanka</b>      | The Great Spirit – The idea that all living things had their own spirit which came from the earth. |
| <b>Manifest Destiny</b> | The belief that God's plan was for white Americans to settle the whole continent of America        |

## Making of America (Cause and aftermath of Civil War) Knowledge Organiser

|                                                                                                      |                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Which political party was established in 1854?                                                       | The Republican Party (an anti-slavery party)                                                                                                                                                                                     |
| What Act was passed in 1854 that allowed states to decide if they wanted to be free or slave states? | Kansas-Nebraska Act                                                                                                                                                                                                              |
| Give a political reason for the start of the Civil War                                               | People in the North were worried that slaveholders in the South were becoming too powerful. People in the South were angry at the election of President Lincoln                                                                  |
| Give an economic reason for the start of the Civil War                                               | The North was jealous that the South were benefitting from slavery – ie. not paying their workforce and receiving huge profits from cotton                                                                                       |
| How did the election of Abraham Lincoln in 1860 lead to Civil War?                                   | His election in 1860 meant that South Carolina voted to secede (leave) the United States. It was quickly followed by 6 other states. Lincoln called this 'Confederacy' of states illegal.                                        |
| When was the Emancipation Proclamation (which freed all slaves) issued?                              | 1863                                                                                                                                                                                                                             |
| Name one positive change for black Americans during the Civil War                                    | By 1862, South Carolina was freed and ex-slaves began setting up regiments. Many slaves in the South were given 40 acres of land by General Sherman.                                                                             |
| Name one negative change for black Americans during the Civil War                                    | Some slaves were made to hard labour (eg. digging ditches). Some slaves continued working on cotton plantations even though they were free. They were paid less than white soldiers.                                             |
| In what year did soldiers get equal pay in the army?                                                 | 1864 (but they still couldn't serve as officers)                                                                                                                                                                                 |
| What was the Sea Islands Experiment?                                                                 | Islands of the coast of South Carolina were given to freed slaves of the South                                                                                                                                                   |
| Name two steps that Lincoln took to rebuild the USA                                                  | Passed the 13 <sup>th</sup> Amendment freeing slaves. Set up the Freedman's Bureau (a charity to help ex-slaves)                                                                                                                 |
| Name two ways President Johnson failed to help black Americans                                       | Ended the Freedman's Bureau; Allowed Southern states to introduce Black Codes (removed rights for blacks); pardoned (forgave) thousands of Confederate soldiers                                                                  |
| Name two ways Radical Republicans helped black Americans                                             | Re-established the Freedman's Bureau; Passed a Civil Rights Law in 1866; Passed the 14 <sup>th</sup> and 15 <sup>th</sup> Amendments (saying that blacks could be citizens and could vote); Sent in soldiers to police the South |
| Name two ways things got worse for Black Americans after 1870                                        | Freedman's Bureau shut down in 1872; The Supreme Court said that voting rights were down to states to decide; In 1877, soldiers stationed in the South were removed.                                                             |

### Key Terms

|                                  |                                                                                    |
|----------------------------------|------------------------------------------------------------------------------------|
| <b>Emancipation Proclamation</b> | A statement made by Abraham Lincoln in 1863 declaring that all slaves will be free |
|----------------------------------|------------------------------------------------------------------------------------|

## Making of America (Settlement and conflict on the Plains) Knowledge Organiser

|                                                                       |                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name an impact of the railroads on Indians                            | Disrupted buffalo hunting grounds; Encouraged settlers and cattle ranchers to settle on Plains.                                                                                                                  |
| Name an impact of the railroads on workers                            | Created jobs for thousands (12,000 of whom were Chinese). Paid poorly and working conditions were terrible.                                                                                                      |
| Name an impact of the railroads on the USA                            | New towns were created. More railroads were created. By 1880s, journey across USA could be done in days rather than months.                                                                                      |
| Why did the cattle industry cause tension and conflict on the Plains? | Texas Longhorn disrupted buffalo roaming areas. Overgrazing of Plains meant buffalo started to die out.                                                                                                          |
| Give two reasons why people moved to the Plains                       | Cheap land; Railroads meant farmed goods could be sold easily; Homestead Act (1860) offered people 160 acres free for 5 years.                                                                                   |
| Why were the Plains so difficult to farm on?                          | Plains was a long way from big towns so supplies were difficult to get. Few trees so building was difficult. Cholera a problem. People felt isolated.                                                            |
| Name two solutions homesteaders used to survive on the Plains?        | Houses were made from earth (sod) Dry-farming techniques and new types of wheat (like Turkey red) which grew well on the Plains. Barbed wire meant enclosing land was easy. Wind pumps used to draw clean water. |
| What caused Little Crow's War in 1862?                                | Little Crow (Chief) had signed a reservation agreement in return for supplies from US government. Reservation officials refused to give emergency supplies even when the Sioux were starving.                    |
| What were the results of Little Crow's War?                           | Little Crow was killed. 38 Santee Sioux were publically hanged. Remaining Santee Sioux were forced to move to reservation in Dakota.                                                                             |
| What caused Red Cloud's War 1866-68?                                  | Gold discovered on the Sioux reservation in 1862. Red Cloud began attacking some miners. The US government set up forts.                                                                                         |
| What were the results of Red Cloud's War?                             | The US were defeated. Fort Laramie Treaty signed promising no settlers on Sioux land.                                                                                                                            |
| What caused the Great Sioux War?                                      | Gold discovered on sacred ground. US govt. ordered all Sioux to leave but many refused.                                                                                                                          |
| What were the results of the Great Sioux War?                         | General Custer defeated by Sitting Bull but Sioux eventually forced onto reservations.                                                                                                                           |

### Key Terms

|                            |                                                                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Texas Longhorn</b>      | A breed of cattle that is particularly good for beef                                                                                     |
| <b>Reservation</b>         | Areas of land that Indians were forced to live on                                                                                        |
| <b>Dry-Farming</b>         | A technique of using soil to retain rainwater. This was used on the dry plains to grow crops.                                            |
| <b>Fort Laramie Treaty</b> | Treaty signed in 1868 (after previously being signed in 1851) that guaranteed US settlers wouldn't enter Indian lands without permission |
| <b>Cattle Ranchers</b>     | People who made lots of money by rearing cattle and selling it for beef                                                                  |

## Making of America (Changing lives 1877-1900) Knowledge Organiser

|                                                                                         |                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Give three ways the US government tried to destroy the plains Indians culture           | Tribes split up; Indians forced to convert to Christianity; Indian children forced to choose English names; history lessons showed Indians as barbaric.                                                      |
| Which group tried to protect the rights of Native Americans?                            | 'Friends of the Indian' set up in 1883                                                                                                                                                                       |
| How did they, in fact, help to destroy the Indian cultures?                             | They set up schools to help Indian children learn English. They persuaded the US government to pass the Dawes Act in 1887. It gave each Indian family 160 acres if they gave up their claims to tribal lands |
| How was life in the South for blacks still bad after the end of Reconstruction?         | Majority worked as sharecroppers; Jim Crow laws meant there was segregation in the South; Blacks didn't have access to better paid jobs.                                                                     |
| What opportunities were there in the West for blacks after the end of Reconstruction?   | Homestead Act was open to blacks. By 1879, over 6000 black Americans had moved to Kansas. They were known as the exodusters                                                                                  |
| How did life for Blacks in the North improve after 1877?                                | In 1882 Booker T Washington set up a school to train black children to be farmers and house servants. In 1900 he set up the Negro Business League.                                                           |
| How did Big Business create positive opportunities between 1877 and 1900?               | Cotton and tobacco demand increased so created jobs. Huge 'bonanza' farms meant jobs for many who couldn't afford their own land. Growth of railroads meant demand for coal, iron and steel.                 |
| What negative impact did Big Business have on people between 1877 and 1900              | Cotton demand meant more blacks as poorly paid sharecroppers; American Tobacco Company refused to improve wages; Small farms lost out to Bonanza Farms                                                       |
| How did the growth of cities create new opportunities for people between 1877 and 1900? | Work, entertainment, education and freedom.                                                                                                                                                                  |
| What problems did the growth of cities lead to?                                         | Overcrowding & Disease                                                                                                                                                                                       |
| Why did people want to move to America?                                                 | American economy was booming by 1880s; USA offered freedom of religion and thought                                                                                                                           |
| What problems did immigrants face in America?                                           | Immigrants often ended up in the poorest areas of cities; Laws preventing Chinese workers from                                                                                                               |

### Key Terms

|                      |                                                                                                                                                                               |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Jim Crow laws</b> | The name given to laws that separated white and black people in the South                                                                                                     |
| <b>Sharecropper</b>  | Many black people lived on land owned by whites and had to give them 2/3 of their crops as rent. It gave control to white people and felt a lot like slavery to black people. |
| <b>Homestead Act</b> | 1862 law that said people could get 160 acres of land on the Plains if they paid a small fee and stayed on the land for 5 years.                                              |
| <b>Bonanza farms</b> | Huge farms owned by large businesses. Around 10,000 acres in size                                                                                                             |

## Y10C1 Key Maths Knowledge

# Your Maths Homework is to complete your sparx

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

## Maths homework is to complete sparx



### What to do

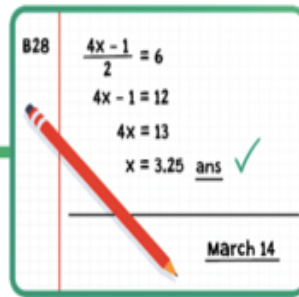
- Do Sparx on the days in the homework timetable
- **Compulsory Homework:** You must do this part of your homework every week
- **Optional/Target Homework:** Do this to gain loads of XP and to improve your maths!

### Top Tips

- Do your homework as soon as you can
- Watch the help video
- If you are stuck, speak to your maths teacher before hand-in or pop in to Sparx Support club during breaks

### Always:

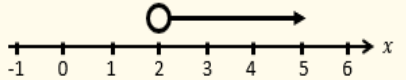
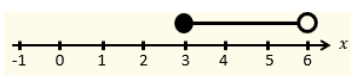
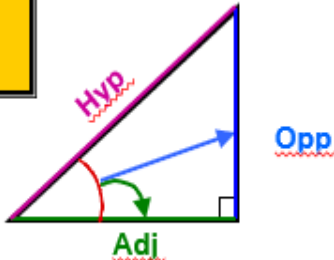
- Write down the date
- Write down your bookwork code
- Read the question carefully
- Show all your workings
- Highlight/underline your final answer
- Tick if correct/cross if wrong

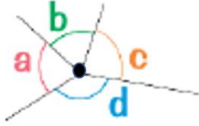
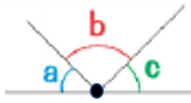
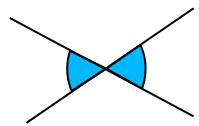
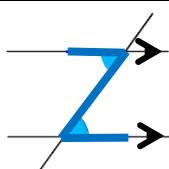
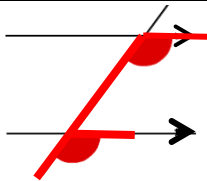
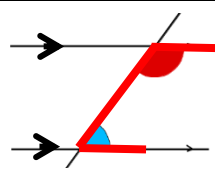
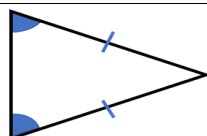
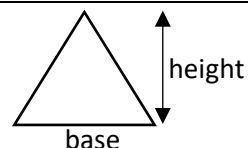
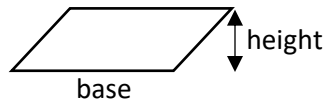
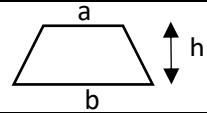


We want you to do well with your maths and doing Sparx will help.

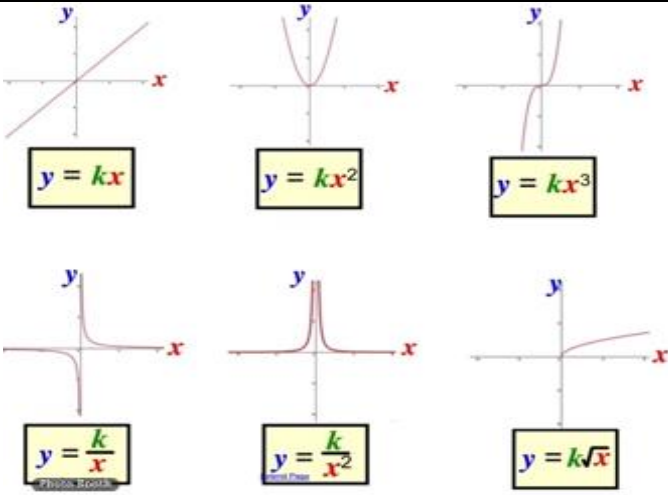
If you've tried something, watched the video and are still not sure how to do something make sure you ask for help!

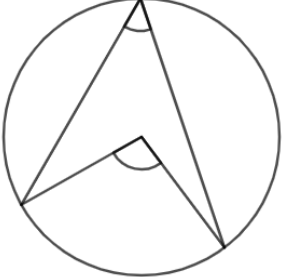
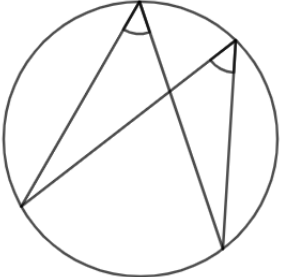
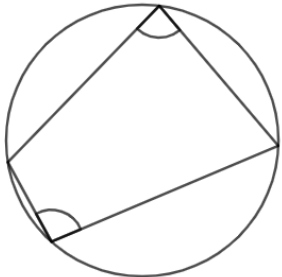
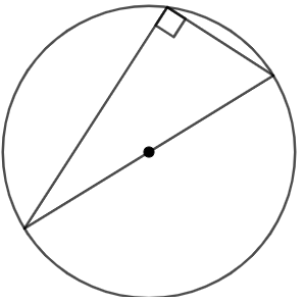
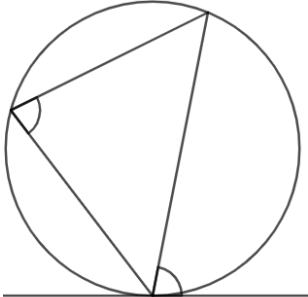
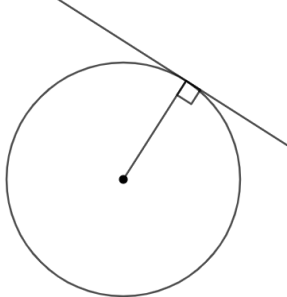
You're expected to complete it every week and catch up if you haven't.

| Item                                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Proportion<br>Use <b>unitary</b><br>method                                              | Work out what <b>ONE</b> is worth.<br>example: If a recipe for 8 buns needs 160g butter<br>then 1 bun will need 20g.                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Collect like terms</b>                                                               | Add/subtract terms which are the same type<br>example $5a + 7b + 2a - 6b + 11 = 7a + b + 11$                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Simplify fractions</b>                                                               | Make the values as small as possible $\frac{12}{18} = \frac{2}{3}$                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Convert fractions                                                                       | <b>mixed</b> number $2\frac{3}{4} = \frac{11}{4}$ top-heavy ( <b>improper</b> ) fraction                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Add or Subtract fractions                                                               | The <b>denominators</b> must be the same<br>example $\frac{2}{3} + \frac{4}{5} = \frac{10}{15} + \frac{12}{15} = \frac{22}{15} = 1\frac{7}{15}$                                                                                                                                                                                                                                                                                                                                                                           |
| Multiply Fractions                                                                      | Multiply the numerators and the denominators<br>example $\frac{2}{3} \times \frac{4}{5} = \frac{2 \times 4}{3 \times 5} = \frac{8}{15}$                                                                                                                                                                                                                                                                                                                                                                                   |
| Solve an Equation                                                                       | Use inverse (opposite) operations to both sides to find the value                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Inequality</b> on a number line                                                      | $x > 2$<br> $3 \leq x < 6$<br>                                                                                                                                                                                                                                                                                                                     |
| <b>Percentage % of an amount</b>                                                        | To find 10% divide by 10<br>example 10% of 70 = 7      so    20% of 70 = 14                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Trigonometry</b><br>– finding lengths of sides and sizes of angles using sin cos tan | <div style="border: 2px solid black; padding: 5px; display: inline-block;"> <math>\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}</math> </div><br><b>S</b> <sup>O</sup> <b>H</b> <b>C</b> <sup>A</sup> <b>H</b> <b>T</b> <sup>O</sup> <b>A</b><br><br><b>Remember : The hypotenuse is the longest side opposite the right angle</b> |

| Angle Facts                                                                       |                                                                                   |                                                                                       |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Angles together <b>around a point</b> add up to $360^\circ$                       | Angles together on a <b>straight line</b> add up to $180^\circ$                   | Vertically <b>opposite</b> angles are equal                                           |
|  |  |    |
| <b>Corresponding</b> Angles on Parallel lines are equal                           | <b>Alternate</b> Angles on Parallel lines are equal                               | <b>Co-Interior</b> Angles on Parallel lines add up to $180^\circ$                     |
|  |  |    |
| Angles in a <b>triangle</b> add up to $180^\circ$                                 |                                                                                   | Base angles of an <b>isosceles</b> triangle are equal                                 |
|  |                                                                                   |    |
| Area Formulas – Area is the space inside a shape                                  |                                                                                   |                                                                                       |
| Area of a rectangle                                                               | $\text{Area of rectangle} = \text{base} \times \text{height}$                     |                                                                                       |
| Area of a triangle                                                                | $\text{Area of triangle} = \frac{1}{2} \text{base} \times \text{height}$          |  |
| Area of a parallelogram                                                           | $\text{Area of parallelogram} = \text{base} \times \text{height}$                 |  |
| Area of a trapezium                                                               | $\text{Area of trapezium} = \frac{1}{2} (a + b) \times h$                         |  |
| Area of a circle                                                                  | $\text{Area of circle} = \pi \times \text{radius}^2$                              |  |

## Y10HC1 Key Maths Knowledge – Higher

| Item                               | Description                                                                                                                                                                           |                                                                                                                                                                                                                                                               |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Direct proportion formulae</b>  | $y = kx$<br>$y = kx^2$<br>$y = kx^3$<br>$y = k\sqrt{x}$                                                                                                                               | <p>y is proportional to x</p> <p>y is proportional to the <b>square</b> of x</p> <p>y is proportional to the <b>cube</b> of x</p> <p>y is proportional to the <b>square root</b> of x</p>                                                                     |
| <b>Inverse proportion formulae</b> | $y = \frac{k}{x}$<br>$y = \frac{k}{x^2}$<br>$y = \frac{k}{x^3}$<br>$y = \frac{k}{\sqrt{x}}$                                                                                           | <p>y is <b>inversely</b> proportional to x</p> <p>y is <b>inversely</b> proportional to the <b>square</b> of x</p> <p>y is <b>inversely</b> proportional to the <b>cube</b> of x</p> <p>y is <b>inversely</b> proportional to the <b>square root</b> of x</p> |
| <b>Shapes of graphs</b>            |                                                                                                    |                                                                                                                                                                                                                                                               |
| <b>Irrational number/Surd</b>      | <p>A number that cannot be written as a fraction. Usually written as the square root of a number.</p> <p>Eg. <math>\sqrt{2}</math> is irrational but <math>\sqrt{4}</math> is not</p> |                                                                                                                                                                                                                                                               |

| Circle theorems                                                                    |                                                                                        |                                                                                      |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| The angle at the centre is double the angle at the circumference                   | Angles subtended by the same chord are equal                                           | The opposite angles of a cyclic quadrilateral sum to $180^\circ$                     |
|   |       |   |
| The angle in a semicircle is $90^\circ$                                            | The angle between a tangent and a chord is equal to the angle in the alternate segment | The angle between a tangent and a radius is $90^\circ$                               |
|  |      |  |

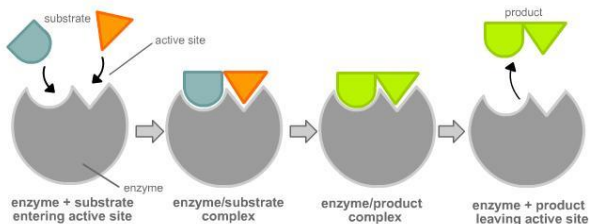
## Year 10 – Unit 1 – Extremism

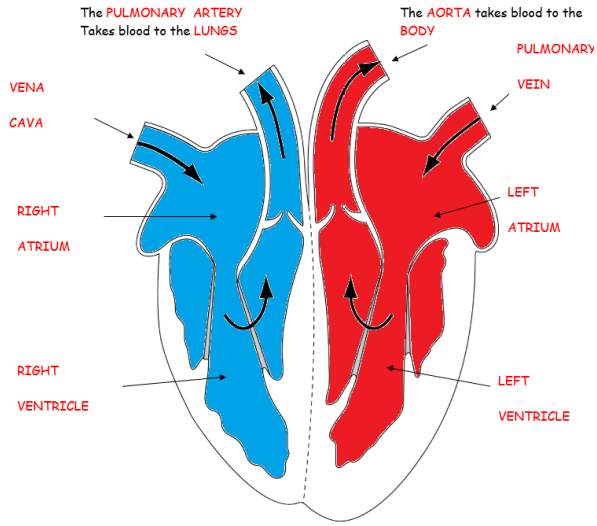
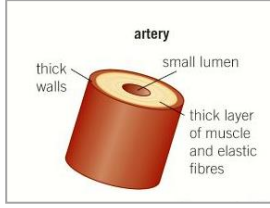
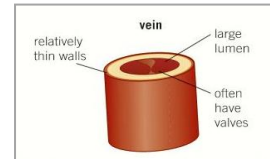
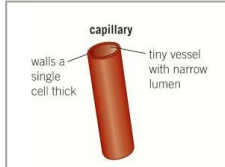
| Key Words      |                                                                                          |             |                                                                  |
|----------------|------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------|
| Extremism      | Holding extreme political or religious views.                                            | Supremacy   | A belief that someone or something is better than everyone else. |
| Terrorism      | The unlawful use of violence and intimidation to bring about political or social change. | Radicalised | A process where someone comes to believe in extreme beliefs.     |
| Fundamentalist | Where people stick very strictly to the rules/beliefs of religion.                       |             |                                                                  |

| Key Information                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| <p>Islam key beliefs</p>  | <ul style="list-style-type: none"> <li>The <b>six articles of faith</b> in Sunni Islam and <b>five roots of Usul ad-Din</b> in Shi'a Islam, including key similarities and differences.</li> <li>The <b>oneness of God (Tawhid)</b>, Quran Surah 112 and the nature of God: <b>omnipotence, beneficence, mercy, fairness and justice</b> (Adalat in Shi'a Islam), including different ideas about God's relationship with the world: <b>immanence and transcendence</b>.</li> <li>Angels, their nature and role including <b>Jibril</b> and <b>Mik'ail</b> and <b>predestination</b> and <b>human freedom</b> (free will) and its relationship to the <b>Day of Judgement</b>.</li> <li>Life after Death (<b>Akhirah</b>), <b>human responsibility</b> and <b>accountability, resurrection, heaven and hell</b>.</li> <li>Authority: Prophethood (<b>Risalah</b>) including the role and importance of <b>Adam, Ibrahim and Muhammad</b>.</li> <li>Authority: The Holy Books – <b>Qur'an</b>: revelation and authority, <b>the Torah, the Psalms, the Gospel</b> and their authority. The <b>imamate</b> in Shi'a Islam: its role and significance.</li> </ul> |
| <p>Extremism</p>         | <ul style="list-style-type: none"> <li><b>Extremism</b> in its broadest sense is an individual or group of individuals who take an extreme position from that of the norm or take an extreme action.</li> <li>Commonly, those with extremist perspectives have a particular perspective or belief 'in the sense that they take their opinions or beliefs to the limit and do not allow much room for the existence of any other views of life.'</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>Malala</p>            | <ul style="list-style-type: none"> <li><b>Malala Yousafzai</b> is an activist for female education. She was attacked by the <b>Taliban</b> (religious extremists). She is quoted as saying: <i>'The extremists are afraid of books and pens. The power of education frightens them.'</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>Radicalisation</p>    | <ul style="list-style-type: none"> <li>It is important to remember that <b>radicalisation</b> does not just happen to Muslims.</li> <li>A person who becomes involved with any <b>extremist group</b> can be said to be radicalised.</li> <li>The UK government has been worried about the rise in extremism for some years. In 2014, it introduced a new responsibility to schools to teach about what the government has called <b>British Values</b>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| <b>Lessons 1 &amp; 2</b><br><b>Homeostasis &amp; Organisation of the Nervous System</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Lessons 3 &amp; 4</b><br><b>Neurones &amp; Synapses</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Lessons 5 &amp; 6</b><br><b>Required Practical- Reaction Times &amp; Reflex Actions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p>Homeostasis is <b>the maintenance of a constant internal environment to ensure optimal conditions for enzyme action and cell function.</b></p> <p>Examples of factors we need to control are <b>blood sugar levels, blood water levels, body temperature</b></p> <p>There are 3 parts to a homeostatic control system; Receptors, Co-ordination centre and Effectors.</p> <p>The <b>Central Nervous System (CNS)</b> is the brain &amp; spinal cord.</p> <p>The <b>Peripheral Nervous System (PNS)</b> carries nerve impulses around the body.</p> <p><b>Receptors</b> detect a <b>stimulus</b>.<br/>Examples are Eyes, Ears, Skin, Tongue, Nose</p> <p><b>Effectors</b> carry out a <b>response</b>.</p> <p>There are 2 types of effector</p> <p><b>Muscles</b> – contract</p> <p><b>Glands</b> - produce a hormone</p> | <p><b>Sensory</b> neurones take impulses from the receptor to the CNS.</p> <p><b>Relay</b> neurones pass the impulse around the CNS.</p> <p><b>Motor</b> neurones carry impulses from the CNS to an effector.</p> <p>The gap between 2 neurones is called a <b>Synapse</b>.</p> <p>A nerve impulse reaches the end of a neurone.</p> <p><b>Neurotransmitters</b> are chemicals that pass across the gap.</p> <p>Once the chemicals reach receptors on the next neurone the impulse can continue on its way.</p> | <p>You will investigate the <b>Effect of Practice on Reaction Time</b>.</p> <p><b>Independent variable:</b> the amount of practice</p> <p><b>Dependent variable:</b> reaction time</p> <p><b>Control variable:</b> partner, ruler, how the ruler is dropped, where the measurement is taken, the use of dominant hand, hand resting on the table.</p> <p><b>Reflex actions</b> are automatic and very quick they <b>do not involve the conscious part of the brain</b> to save time eg...</p> <ul style="list-style-type: none"> <li>• coughing</li> <li>• sneezing</li> <li>• blinking</li> <li>• moving quickly to prevent injury</li> </ul> <p>Messages sent by the nervous system are <b>quicker</b> and <b>shorter lasting</b> than messages sent by hormones.</p> |

| <b>Lesson 1</b><br><b>Organisational Hierarchy</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Lessons 2 &amp; 3</b><br><b>The Digestive System</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Lesson 4</b><br><b>Required Practical- Food Tests</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <div data-bbox="174 304 719 587" data-label="Diagram"> </div> <p><b>Cell:</b><br/>The smallest unit of an organism</p> <p><b>Tissue:</b><br/>A group of cells with a similar structure and function, which all work together to do a particular job.</p> <p><b>Organ:</b><br/>Made from a group of different tissues, which all work together to do a particular job.</p> <p><b>Organ system:</b><br/>Made from a group of different organs, which all work together to do a particular job.</p> <p><b>Organism:</b><br/>An individual plant, animal, or single-celled organism.</p> | <div data-bbox="808 268 1391 683" data-label="Diagram"> </div> <p><b>Function:</b><br/> <b>Digestion:</b> breaking down food so that it is small enough and soluble enough to pass through the wall of the small intestine.<br/> <b>Absorption:</b> transporting digested food molecules from the lumen of the gut into the blood.</p> <p><b>The small intestine is adapted to absorb food:</b></p> <ul style="list-style-type: none"> <li>• Thousands of villi</li> <li>• Large surface area – quicker absorption of food molecules</li> <li>• Good blood supply</li> </ul> | <p><b>1. Benedict's test for sugar</b><br/>Add 10 drops of Benedict's solution to food sample. Heat in a water bath at 80°C for 5 minutes.<br/>Negative result – Blue<br/>Positive result – Green/ orange/ brick red</p> <p><b>2. Iodine test for starch</b><br/>Add 5 drops of iodine solution to food sample.<br/>Negative result – Orange<br/>Positive result – Blue/black</p> <p><b>3. Ethanol test for lipids (fats)</b><br/>Add a few drops of distilled water and then a few drops of ethanol to food sample.<br/>Positive result – white &amp; cloudy emulsion forms</p> <p><b>4. Biuret test for protein</b><br/>Add 5 drops of Biuret solution to food sample.<br/>Negative result – Blue<br/>Positive result – Purple</p> |

| <p><b>Lesson 5</b><br/><b>Properties of Enzymes</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>Lesson 6</b><br/><b>Required Practical - Enzymes</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Lesson 7</b><br/><b>Digestive Enzymes</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <p><b>Catalyst:</b><br/>A chemical which speeds up a reaction without being changed or used up.</p> <p><b>Enzyme:</b></p> <ul style="list-style-type: none"> <li>A substance produced by a living organism that acts as a catalyst for chemical reactions. It is made up of amino acids.</li> <li>Enzymes are <b>specific</b>, they can only catalyse one type of reaction. E.g. amylase in saliva only catalyses the reaction of breaking down starch.</li> </ul> <p><b>Lock and Key Theory of Enzyme action:</b></p>  <p>In the same way that a key fits into a lock, so a substrate is thought to fit into an enzyme's active site. The enzyme is the lock, and the substrate is the key.</p> | <p><b>The effect of pH and temperature on enzymes:</b></p> <ul style="list-style-type: none"> <li>A low or high pH <b>denatures</b> enzymes.</li> <li>At a low temperature enzyme and substrate molecules have low kinetic energy so rate of reaction is low.</li> <li>At a high temperature the enzymes start to denature.</li> </ul> <p><b>Denatured:</b> An enzyme's active site has changed shape, the substrate will no longer fit. The enzyme will no longer work.</p> <p><b>Aim:</b> to find the optimum pH for the enzyme amylase to catalyse the reaction to break down starch.</p> <p><b>Independent variable:</b> pH of the solution</p> <p><b>Dependent variable:</b> time taken to break down starch in seconds</p> <p><b>Control variables:</b> temperature, volume of starch solution, volume of buffer solution, time of intervals between testing, volume of amylase</p> <p><b>Calculating rate of reaction:</b></p> $\text{Rate} = \frac{1000}{\text{Time}}$ <p>Units = s<sup>-1</sup></p> | <p>Food molecules must be broken down before they can be absorbed into the blood because they are too <b>large</b> and <b>insoluble</b>.</p> <p><b>Carbohydrate digestion</b><br/>Carbohydrase enzymes e.g. amylase break down starch into sugar.</p> <p><b>Protein digestion</b><br/>Protease enzymes break down protein into amino acids.</p> <p><b>Fat digestion</b><br/>Bile emulsifies fats<br/>Lipase enzymes break down fat molecules into glycerol and fatty acid molecules.</p> |

| <p><b>Lesson 8</b><br/><b>The Heart</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>Lesson 9</b><br/><b>Blood Vessels</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Lessons 10 &amp; 11</b><br/><b>Coronary Heart Disease (CHD)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <ul style="list-style-type: none"> <li>An organ that pumps blood around the body</li> <li>It is made of two pumps – <b>double circulation</b>.</li> <li>The walls of the heart are made up of <b>cardiac muscle</b>.</li> <li>The right side pumps blood to the lungs to pick up oxygen.</li> <li>The left side pumps blood around the rest of the body.</li> </ul> <p><b>Oxygenated:</b> Blood high in oxygen<br/><b>Deoxygenated:</b> Blood low in oxygen</p>  | <p>There are 3 types of blood vessel:</p> <ol style="list-style-type: none"> <li> <b>Arteries</b><br/>           Carry blood away from the heart to the body.<br/>           Usually hold oxygenated blood.<br/>           Blood is under high pressure.<br/>           Thick muscle walls and a small lumen.            </li> <li> <b>Veins</b><br/>           Carry blood back to the heart from the body.<br/>           Carry deoxygenated blood.<br/>           Blood is under low pressure.<br/>           Thin muscle and elastic wall.<br/>           Have valves to prevent back flow of blood.            </li> <li> <b>Capillaries</b><br/>           Carry blood to cells.<br/>           Links arteries and veins<br/>           Very thin walls – one cell thick<br/>           Small vessel<br/>           Narrow lumen            </li> </ol> | <p><b>Coronary arteries:</b><br/>The blood vessels that supply oxygenated blood to the heart muscle.</p> <p><b>Coronary heart disease (CHD):</b><br/>When the heart's blood supply is blocked or interrupted by a build-up of fatty substances in the coronary arteries.</p> <p><b>Stages of CHD:</b></p> <ul style="list-style-type: none"> <li>Fatty cholesterol plaques develop over time</li> <li>Hard outer layer of plaque can crack</li> <li>Platelets form blood clots around the cracks</li> <li>Artery narrows even more</li> <li>Blood flow blocked – oxygen doesn't reach the heart muscle, so the muscle dies.</li> </ul> <p><b>Treating CHD:</b></p> <ul style="list-style-type: none"> <li><b>Stents</b> – a metal mesh placed in a blocked or partially blocked artery. They are used to open up the blood vessel by the inflation of a tiny balloon.</li> <li><b>Statins</b> – drugs used to lower blood cholesterol levels and improve the balance of HDLs and LDLs in the blood.</li> </ul> <p><b>Treating heart failure:</b></p> <ul style="list-style-type: none"> <li>Heart transplant</li> <li>Artificial heart</li> <li>Replacement valves</li> </ul> |

| <b>Lesson 12</b><br><b>Blood</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Lesson 13</b><br><b>Lungs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Lesson 14</b><br><b>Non-Communicable Diseases</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p><b><u>Functions of blood:</u></b></p> <ul style="list-style-type: none"> <li>• Transports oxygen and nutrients to cells</li> <li>• Transports carbon dioxide from cells back to lungs</li> <li>• Transports waste products from cells</li> <li>• Transports heat, water, salts, white blood cells and hormones around the body.</li> </ul> <p><b><u>Components of blood:</u></b></p> <p><b>Red blood cells</b></p> <ul style="list-style-type: none"> <li>• Carry oxygen.</li> <li>• Biconcave shape to absorb oxygen</li> <li>• No nucleus</li> </ul> <p><b>White blood cells</b></p> <ul style="list-style-type: none"> <li>• Fight disease</li> <li>• Some carry out phagocytosis</li> <li>• Some produce antibodies &amp; anti-toxins</li> </ul> <p><b>Platelets</b></p> <ul style="list-style-type: none"> <li>• Cell fragments</li> <li>• Stick cells together around cuts to clot blood.</li> </ul> <p><b>Plasma</b></p> <ul style="list-style-type: none"> <li>• Liquid part of blood</li> <li>• Substances dissolve into plasma such as carbon dioxide, glucose and proteins</li> </ul> | <div data-bbox="837 327 1314 794" data-label="Image"> <p>The diagram illustrates the human respiratory system. At the top, the trachea (windpipe) leads into two bronchi (bronchus) that branch into the lungs. The lungs are shown with internal branching structures (alveoli). The heart is located between the lungs. Below the lungs is the diaphragm, a muscular partition. Ribs are shown on the sides, and intercostal muscles are located between the ribs. Arrows indicate the path of air entering and leaving the lungs.</p> </div> <p>The job of the breathing system is to move air in and out of the lungs.</p> <ul style="list-style-type: none"> <li>• Breathing air into the lungs= inhalation</li> <li>• Breathing air out of the lungs = exhalation</li> </ul> <p><b><u>Gas Exchange:</u></b></p> <ul style="list-style-type: none"> <li>• Gas exchange occurs in the alveoli of the lungs.</li> <li>• Here oxygen passes into the blood by diffusion.</li> <li>• At the same time carbon dioxide passes from the blood into the alveoli to be breathed out.</li> <li>• Alveoli are adapted for efficient gas exchange by having: a large surface area, thin, moist membranes and a good blood supply.</li> </ul> | <p><b><u>Health:</u></b></p> <p>A state of mental physical wellbeing</p> <p><b><u>Non-communicable disease:</u></b></p> <ul style="list-style-type: none"> <li>• A medical condition or disease that is non-infectious (cannot be passed on from one person to the next)</li> <li>• E.g. Cardiovascular disease, diabetes, asthma</li> </ul> <p><b><u>Causes of non-communicable disease:</u></b></p> <p>Combination of genetic and environmental factors. Lifestyle factors such as smoking, alcohol abuse, unhealthy diets and physical inactivity.</p> <p><b><u>Risk factors for non-communicable diseases:</u></b></p> <ul style="list-style-type: none"> <li>• Cardiovascular disease – Obesity, poor diet, smoking, physical inactivity.</li> <li>• Type 2 diabetes – Obesity, poor diet, physical inactivity.</li> <li>• Lung disease – smoking</li> <li>• Cancer – Poor diet, obesity, smoking, alcohol abuse, UV exposure, physical inactivity</li> </ul> <p><b><u>Correlation:</u></b></p> <p>A correlation shows a link between two variables, for example one may increase whilst the other also increases.</p> <p><b><u>Causal mechanism:</u></b></p> <p>A causal mechanism proves the link between the two variables through a biological process. For example, there is a causal link between smoking and getting lung cancer.</p> |

## Lesson 15

### Cancer

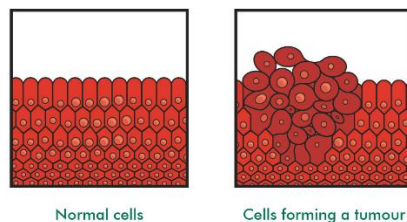
#### Risk factors for cancer:

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

#### Tumour:

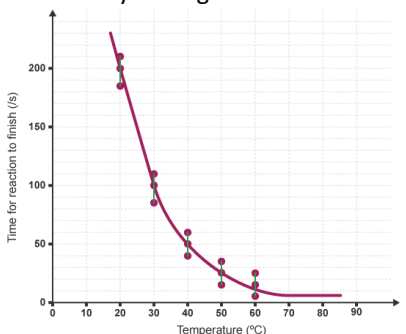
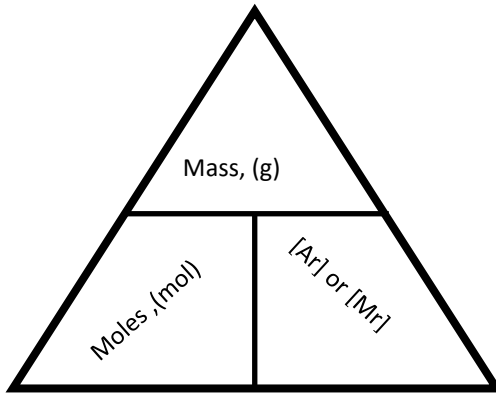
A mass of cells caused by uncontrolled cell growth and division.

Most cancers are the result of mutations – changes in genetic material

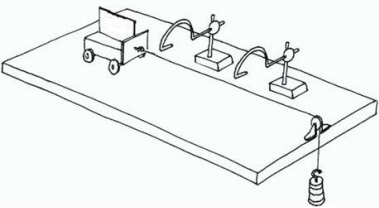
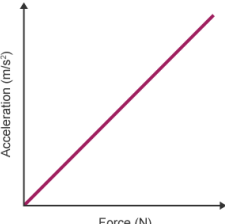
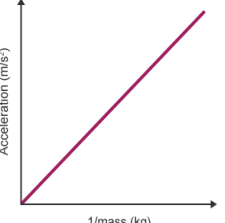
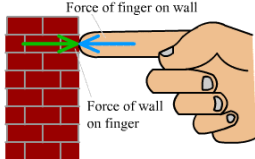


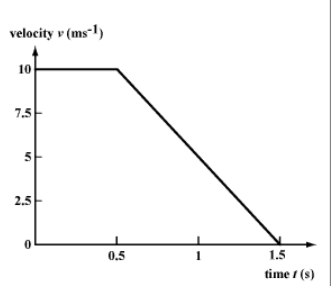
Two types of tumour:

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

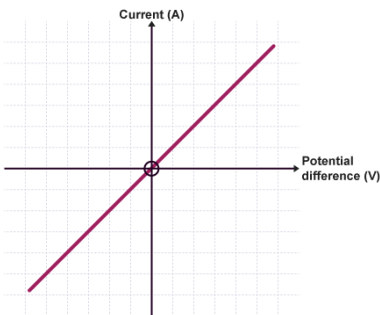
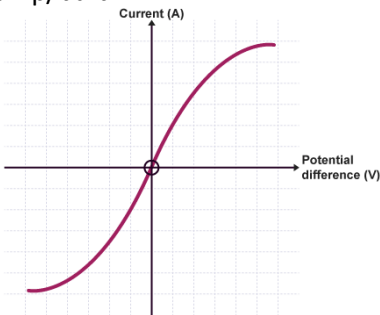
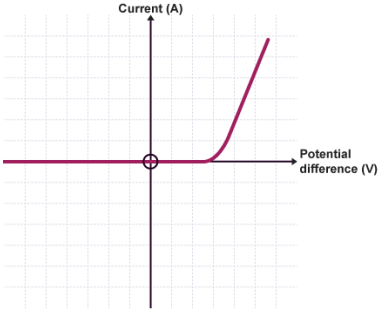
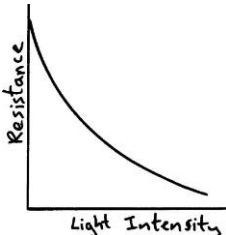
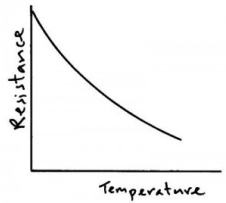
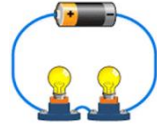
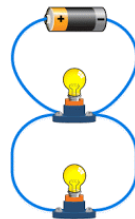
| <b>Lessons 1 &amp; 2</b><br><b>Conservation of mass &amp; relative Formula mass</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Lessons 3 &amp; 4</b><br><b>Percentages , uncertainty, mean and range</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Lessons 5</b><br><b>Moles</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <ul style="list-style-type: none"> <li>Atoms are the smallest parts of pure substances called elements.</li> <li>Atoms cannot be created or destroyed.</li> <li>The number of atoms present in the reactants are the same as the number in the products.</li> <li>Due to the law of conservation we have to balance symbol equations by putting numbers in front of the formula.</li> <li>Due to the law of conservation we can calculate unknown reactants or products.</li> </ul> <p>Magnesium + Oxygen      Magnesium Oxide<br/> 10g    +    5g    =    ?<br/> <b>Answer = 15 g</b></p> <ul style="list-style-type: none"> <li>No substances can enter or leave a <b>closed system</b>.</li> <li>Substances can enter or leave a <b>non-enclosed system</b>.</li> <li>An element is a pure substance the only contains <u>one</u> type of atom.</li> <li>A compound contains atoms from different elements chemically joined in a <u>fixed</u> composition.</li> <li>The [Ar] is the relative atomic mass and is the number of protons added to neutrons</li> <li>The [Mr] if the relative formula mass and is the [Ar] of each element in a compound added together.</li> </ul> | <ul style="list-style-type: none"> <li>Calculate the percentage of a total value</li> <li>Calculate the percentage of an atom in a compound using the [Mr]</li> <li>The <b>Mean</b> is the <b>average</b> of the numbers a calculated "central" value of a set of numbers.</li> <li>Work out the mean of the following set of data .<br/> 7.5 , 6.5 , 4.8 , 5.7 , 6.2<br/> Add them together:<br/> <math>7.5 + 6.5 + 4.8 + 5.7 + 6.2 = 30.7</math><br/> Divide 30.7 by the number of values:<br/> <math>30.7 \div 5 = \underline{6.14}</math></li> <li>The resolution of a measuring instrument is the smallest change in a quantity that gives a change in the reading that can be seen.</li> <li>Uncertainty is the interval within which the true value of a quantity can be expected to lie.</li> <li>Range = largest value - smallest value</li> <li>Uncertainty = Range <math>\div</math> 2</li> </ul>  | <ul style="list-style-type: none"> <li>Chemical amounts are measured in <b>MOLES</b>.</li> <li>The MOLE is a unit like centimetres, (cm), grams , (g) or Metres ,(M).</li> <li>The MOLE has its own symbol too, its <b>mol</b>.</li> <li>A Mole measures the <b>number of particles</b> in the mass of a substance.</li> <li>The number of atoms, molecules or ions in ONE MOLE of a substance is called the <b>Avogadro constant</b>.</li> <li><b>Avogadro constant</b> = <math>6.02 \times 10^{23}</math></li> <li>Number of particles = Avogadro constant <math>\times</math> mol</li> </ul> <p style="text-align: center;">Moles ,(mol) = Mass , (g)<br/> [Ar] or [Mr]</p>  <ul style="list-style-type: none"> <li>The mass of one mole of a substance is equal to the [Ar] or [Mr] in grams.</li> </ul> |

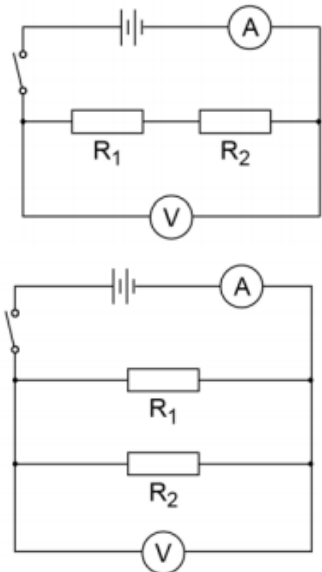
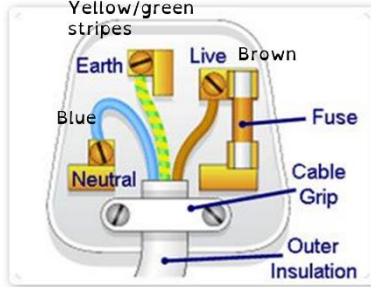
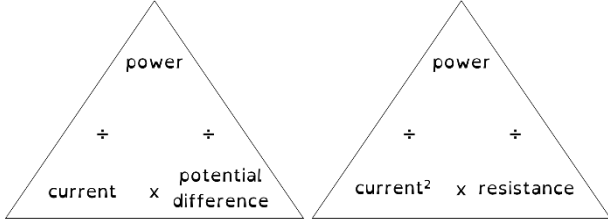
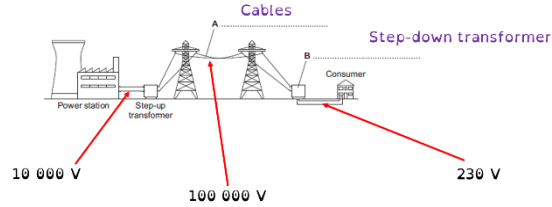
| <p><b>Lesson 6</b><br/><b>Reacting masses</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>Lessons 7</b><br/><b>Concentration</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <ul style="list-style-type: none"> <li>• <b>20g of magnesium reacts with oxygen to produce Magnesium Oxide . How much Magnesium Oxide will be produced ?</b></li> <li>• Step 1 Write the balanced symbol equation<br/> <math display="block">2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}</math></li> <li>• Step 2 Calculate the masses in reaction<br/> <math display="block">48\text{g} + 32\text{g} \rightarrow 80\text{g}</math></li> <li>• Step 3 work out what 1g produces by dividing through by 48g<br/> <math display="block">\frac{48\text{g}}{48\text{g}} + \frac{32\text{g}}{48\text{g}} \rightarrow \frac{80\text{g}}{48\text{g}}</math> <math display="block">= 1\text{g} + 0.67\text{g} \rightarrow 1.67\text{g}</math></li> <li>• Step 4 work out what 20 g of magnesium produces .<br/> X through by 20<br/> <math>(20 \times 1\text{g}) + (20 \times 0.67\text{g}) \rightarrow (20 \times 1.67\text{g})</math><br/> <math>20\text{g} + 13.4\text{g} \rightarrow \underline{\underline{33.4\text{g}}}</math></li> </ul> | <ul style="list-style-type: none"> <li>• A <b>solution</b> forms when a <b>solute dissolves</b> in a <b>solvent</b>.</li> <li>• The <b>concentration</b> of a solution is a measure of how 'crowded' the solute particles are.</li> <li>• The more concentrated the solution, the more particles it contains in a given <b>volume</b>.</li> <li>• The <b>concentration</b> of a <b>solution</b> can be shown in <math>\text{g/dm}^3</math> or <math>\text{mol/dm}^3</math>.</li> <li>• Volume is measured in <math>\text{dm}^3</math>.</li> <li>• <math>1 \text{ dm}^3</math> is the same as 1 litre or a <math>1000 \text{ cm}^3</math>.</li> <li>• A solution with a concentration of <math>0.5 \text{ g/dm}^3</math> ,has 0.5 grams dissolved in <math>1 \text{ dm}^3</math>.</li> <li>• Concentration = <math>\frac{\text{Mass, (g)}}{\text{Volume, (dm}^3\text{)}}</math></li> </ul> <div data-bbox="857 804 1314 1169" data-label="Diagram"> </div> |

| <b>Lessons 1 &amp; 2</b><br><b>Newton's first and second laws</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Lessons 3 &amp; 4</b><br><b>Newtons second law required practical</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Lessons 5 &amp; 6</b><br><b>Newtons third law and inertia</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p><b>Newton's First Law:</b><br/>If the resultant force acting on an object is zero and:</p> <ul style="list-style-type: none"> <li>the object is stationary – the object will remain stationary</li> <li>the object is moving – the object will continue to move at the same speed and in the same direction. So the object continues to move at the same velocity.</li> </ul> <p>If the forces are not balanced the object will accelerate (change direction or velocity) in the direction of the resultant force.</p> <p><b>Newton's Second Law</b><br/>resultant force = mass <math>\times</math> acceleration</p> $F = m a$ <ul style="list-style-type: none"> <li>force (<math>F</math>) is measured in newtons (N)</li> <li>mass (<math>m</math>) is measured in kilograms (kg)</li> <li>acceleration (<math>a</math>) is measured in metres per second squared (<math>m/s^2</math>)</li> </ul> <p>The equation shows that the acceleration of an object is:</p> <ul style="list-style-type: none"> <li>proportional to the resultant force on the object</li> <li>inversely proportional to the mass of the object</li> </ul> <p>In other words, the acceleration of an object increases if the resultant force on it increases, and decreases if the mass of the object increases.</p> <p><b>Inertial mass – Higher:</b> The ratio of force over acceleration is called inertial mass. Inertial mass is a measure of how difficult it is to change the velocity of an object.</p> <p><b>Example:</b></p> <p>Calculate the force needed to accelerate a 22 kg cheetah at 15 <math>m/s^2</math>.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <math display="block">F = m a</math> <math display="block">F = 22 \times 15</math> <math display="block">F = 330 N</math> </div> | <p>Physics practical 6: <u>Acceleration</u><br/><b>Method: what did you do?</b></p>  <ol style="list-style-type: none"> <li>Connect the light gates to the datalogger and configure it to measure acceleration.</li> <li>Attach the bench pulley to the end of the bench.</li> <li>Tie a length of string to the toy car or trolley. Pass the string over the pulley and attach the weight stack to the other end of the string.</li> <li>Release the toy car or trolley – the data logger will calculate acceleration.</li> <li>Carry out this experiment by either changing the mass of the trolley or the force acting on the trolley (weight stack).</li> </ol> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Acceleration is directly proportional to the force exerted on the object.</p> </div> <div style="text-align: center;">  <p>Acceleration is inversely proportional to the mass of the object. This means that a graph of acceleration against 1/mass should produce a straight line that passes through the origin</p> </div> </div> | <p><b>Newton's Third Law</b><br/>According to Newton's Third Law of motion, whenever two objects interact, they exert equal and opposite forces on each other. 'every action has an equal and opposite reaction'.</p> <p>Examples of force pairs</p> <p><b>Pushing a pram:</b> There are contact forces between the person and the pram. The person pushes the pram forwards and the pram pushes the person backwards</p> <p><b>Car tyre on a road:</b> There are contact forces between the tyre and the road: The tyre pushes the road backwards and the road pushes the tyre forwards</p> <p><b>A satellite in Earth orbit</b><br/>There are non-contact gravitational forces between Earth and the satellite: The Earth pulls the satellite and the satellite pulls the Earth.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <div style="text-align: center; margin-top: 20px;">  </div> <p><b>Higher tier Only</b><br/>The tendency of objects to continue in their state of rest or of uniform motion is called inertia.</p> <ul style="list-style-type: none"> <li>Inertial mass is a measure of how difficult it is to change the velocity of an object.</li> <li>Inertial mass is defined by the ratio of force over acceleration.</li> </ul> |

| <p><b>Lessons 6 &amp; 7</b><br/><b>Stopping Distance and reaction times</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>Lessons 8</b><br/><b>Braking energy</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p><b>Lessons 9</b><br/><b>Momentum (higher tier only)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <p><b>Stopping distances</b><br/>stopping distance = thinking distance + braking distance</p> <ul style="list-style-type: none"> <li><b>thinking distance</b> is the distance a vehicle travels in the time it takes for the driver to apply the brakes after realising they need to stop</li> <li><b>braking distance</b> is the distance a vehicle travels in the time after the driver has applied the brake</li> </ul>  <div data-bbox="481 639 725 823"> <p>Thinking distance =<br/>0-0.5 seconds</p> <p>Braking distance =<br/>0.5-1.5 seconds</p> </div> <p><b>Thinking distance can be affected by:</b></p> <ul style="list-style-type: none"> <li>Reaction times which vary from person to person. Typical values range from 0.2 s to 0.9 s. Reaction time can be affected by tiredness, drugs, alcohol and distractions (mobile phone, passengers).</li> <li>The speed of the vehicle. The greater the speed the greater the thinking distance.</li> </ul> <p><b>Braking distance of a vehicle can be affected by:</b></p> <ul style="list-style-type: none"> <li>Adverse road and weather conditions and poor condition of the vehicle. Adverse road conditions include wet or icy conditions. Poor condition of the vehicle is limited to the vehicle's brakes or tyres.</li> <li>Mass of the vehicle. The greater the mass the greater the braking distance.</li> <li>Speed of the vehicle. The greater the speed the greater the braking distance.</li> </ul> | <ul style="list-style-type: none"> <li>When a force is applied to the brakes of a vehicle, work done by the friction force between the brakes and the wheel reduces the kinetic energy of the vehicle and the temperature of the brakes increases.</li> <li>The greater the speed of a vehicle the greater the braking force needed to stop the vehicle in a certain distance.</li> <li>The greater the braking force the greater the deceleration of the vehicle. Large decelerations may lead to brakes overheating and/or loss of control.</li> </ul> <p><b>Example question:</b><br/>At the end of a race a car is travelling at 5.2 m/s. The brakes are applied causing the car to slow down and stop.<br/>The brakes apply a constant force of 855 N in the opposite direction to the car's motion. The mass of the car is 950 kg<br/>Calculate the braking distance travelled by the car.<br/>[6 marks]</p> <p><b>You could also be asked to work out the energy transferred, braking force or braking distance using the equation:</b><br/><b>Work done = Force X distance from the energy topic.</b></p> <div data-bbox="1086 758 1384 1265"> <p>Calculate acceleration using <math>F=ma</math> <math>a = -855/950</math> (1)<br/> <math>a = -0.9 \text{ (m/s}^2\text{)}</math> (1)<br/> <i>Substitute values into equation <math>v^2 - u^2 = 2as</math></i><br/> <math>0^2 - 5.2^2 = 2 \times (-0.9) \times s</math><br/> <i>for this mark, sign of "a" must be opposite to sign of "u"</i><br/> <i>i.e., allow: <math>0^2 - (-5.2)^2 = 2 \times 0.9 \times s</math> (1)</i><br/> <math>s = -27.07 / -1.8</math> (2)<br/> <math>s = 15.0 \text{ (m)}</math><br/> <i>an answer of 15.0 (m) scores 6 marks.</i></p> </div> | <p>Momentum is a property of moving objects and is defined by the equation: <b>momentum = mass x velocity</b><br/> <math>[p = m v]</math></p> <ul style="list-style-type: none"> <li>momentum, <math>p</math>, in kilograms metre per second, kg m/s</li> <li>mass, <math>m</math>, in kilograms, kg</li> <li>velocity, <math>v</math>, in metres per second, m/s</li> </ul> <p><b>Example</b><br/>A lorry has a mass of 7,500 kg. It travels south at a speed of 25 m/s. Calculate the momentum of the lorry.<br/> <math>P = m v</math><br/> <math>P = 7500 \text{ kg} \times 25 \text{ m/s}</math><br/> <math>P = 187\,500 \text{ kg m/s}</math></p> <p><b>The Principle of Conservation of momentum</b><br/>In a closed system:<br/> <b>total momentum before an event = total momentum after the event</b><br/> A 'closed system' is something that is not affected by external forces. Momentum is conserved in collisions and explosions.</p> <p>(c) Skater A bumps into another skater, Skater B. Skater B is stationary.<br/> The skaters move off together in a straight line.<br/> Explain what happens to the velocity of each of the skaters.<br/> Use the idea of conservation of momentum.</p> <p>(c) (total) momentum before (collision) = (total) momentum after (collision) 1</p> <p>either<br/> momentum of skater A decreases and momentum of skater B increases<br/> <i>allow (total) momentum is shared between skater A and skater B</i> 1</p> <p>velocity of skater A decreases and velocity of Skater B increases 1</p> <p>or<br/> momentum of skater A decreases and so velocity of skater A decreases (1)<br/> momentum of skater B increases and so velocity of skater B increases (1) [7]</p> |

| <b>Lesson 1</b><br><b>Introduction to circuits</b>                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Lessons 2 &amp; 3</b><br><b>Current, p.d. and resistance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Lesson 4</b><br><b>Required Practical – Resistance and the length of a wire</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <div data-bbox="168 335 716 909"> </div> <ul style="list-style-type: none"> <li><b>Charge</b> is a property of materials.</li> <li>It can be positive or negative and is measured in coulombs. Electrons have a negative charge.</li> <li>Metals have a “sea” of delocalised/free “conduction electrons”.</li> <li>These electrons can move through the material, causing a current.</li> <li><b>Insulators</b> do not have free electrons.</li> </ul> | <p><i>charge flow = current x time</i><br/>           Charge in Coulombs, C<br/>           Current in Amperes, A<br/>           Time in seconds, s</p> <div data-bbox="974 478 1198 646"> </div> <p><i>energy transferred = charge x potential difference</i><br/>           Energy transferred in Joules, J<br/>           Charge in Coulombs, C<br/>           Potential difference in Volts, V</p> <div data-bbox="974 821 1198 989"> </div> <p><i>potential difference = current x resistance</i><br/>           Potential difference in Volts, V<br/>           Current in Amperes, A<br/>           Resistance in Ohms, <math>\Omega</math></p> <div data-bbox="974 1173 1198 1340"> </div> | <ul style="list-style-type: none"> <li><b>Resistance</b> is a measure of how hard or easy it is for a current to flow.</li> <li>The more resistance:               <ul style="list-style-type: none"> <li>The lower the current will be for a given p.d.</li> <li>The higher the p.d. will be needed for a particular current to flow.</li> </ul> </li> <li>You will investigate <b>the relationship between the length of a wire and its resistance</b>.</li> </ul> <div data-bbox="1590 710 1904 997"> </div> <ul style="list-style-type: none"> <li><b>Independent variable:</b> Length of wire in metres</li> <li><b>Dependent variable:</b> Resistance of wire in <math>\Omega</math></li> <li><b>Control variable:</b> Current, temperature, material of wire</li> </ul> |

| <b>Lessons 5 &amp; 6</b><br><b>Required Practical – I-V Characteristics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Lesson 7</b><br><b>Non-ohmic components</b>                                                                                                                                                                                                                                                                                                                                                                                            | <b>Lessons 8 &amp; 9</b><br><b>Series and Parallel circuits</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |        |          |         |                 |                         |      |                           |                                                       |            |                               |                                                |
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| <ul style="list-style-type: none"> <li>You will investigate <b>the relationship between current and potential difference for circuit components</b></li> <li><b>Ohm's law</b> states that the current through a resistor is directly proportional to the potential difference across it, at constant temperature.</li> <li>A graph is <b>directly proportional</b> if a line of best fit is a straight line through the origin.</li> </ul> <p>Resistor:</p>  <p>Filament lamp/bulb:</p>  | <p>Diode/LED:</p>  <ul style="list-style-type: none"> <li>Some components have a resistance that depends on an environmental factor.</li> </ul> <p>LDR:</p>  <p>Thermistor:</p>  | <ul style="list-style-type: none"> <li>In a series circuit, you have one component after another. All of the components are connected together by the same 'loop' of wire.</li> </ul>  <ul style="list-style-type: none"> <li>A parallel circuit is one where components are connected in separate loops – sometimes called branches.</li> <li>Each component is placed along a different path.</li> </ul>  <table border="1" data-bbox="1413 951 2040 1326"> <thead> <tr> <th></th><th>Series</th><th>Parallel</th></tr> </thead> <tbody> <tr> <td>Current</td><td>Same everywhere</td><td>Shared between branches</td></tr> <tr> <td>P.d.</td><td>Shared between components</td><td>Same in each branch (and equal to p.d. of the supply)</td></tr> <tr> <td>Resistance</td><td>Sum of individual resistances</td><td>Less than the resistance of any one resistance</td></tr> </tbody> </table> |  | Series | Parallel | Current | Same everywhere | Shared between branches | P.d. | Shared between components | Same in each branch (and equal to p.d. of the supply) | Resistance | Sum of individual resistances | Less than the resistance of any one resistance |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Series                                                                                                                                                                                                                                                                                                                                                                                                                                    | Parallel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |        |          |         |                 |                         |      |                           |                                                       |            |                               |                                                |
| Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Same everywhere                                                                                                                                                                                                                                                                                                                                                                                                                           | Shared between branches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |        |          |         |                 |                         |      |                           |                                                       |            |                               |                                                |
| P.d.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Shared between components                                                                                                                                                                                                                                                                                                                                                                                                                 | Same in each branch (and equal to p.d. of the supply)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |        |          |         |                 |                         |      |                           |                                                       |            |                               |                                                |
| Resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Sum of individual resistances                                                                                                                                                                                                                                                                                                                                                                                                             | Less than the resistance of any one resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |        |          |         |                 |                         |      |                           |                                                       |            |                               |                                                |

| <b>Lesson 10</b><br><b>Required Practical – Resistance in series and parallel</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Lessons 11 &amp; 12</b><br><b>The 3-pin plug and mains electricity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Lessons 13 &amp; 14</b><br><b>Electrical power and The National Grid</b> |        |     |      |       |                                               |         |      |                       |       |                      |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <ul style="list-style-type: none"> <li>You will investigate how <b>combinations of resistors in series and parallel behave</b></li> </ul>  <ul style="list-style-type: none"> <li>In series, current must flow through both resistors. It is harder to flow through both than to flow through either resistor individually, so the resistance increases.</li> <li><b>In series:</b> <math>R_{total} = R_1 + R_2</math></li> <li>In parallel, current can flow through both resistors at the same time. More current flows in the circuit than if only one of the resistors was there. As the p.d. remains constant, this means the total resistance must have decreased.</li> </ul> |  <table border="1" data-bbox="790 603 1384 1005"> <thead> <tr> <th>Name of wire</th><th>Colour</th><th>Job</th></tr> </thead> <tbody> <tr> <td>Live</td><td>Brown</td><td>Supplies the alternating potential difference</td></tr> <tr> <td>Neutral</td><td>Blue</td><td>Completes the circuit</td></tr> <tr> <td>Earth</td><td>Green/Yellow stripes</td><td>Safety (can prevent shocks or fires)</td></tr> </tbody> </table> <ul style="list-style-type: none"> <li><b>A fuse</b> is a thin wire in a glass tube designed to melt at a specific current.</li> <li><b>Earthing</b> means connecting the metal case of an appliance directly to the earth using a low resistance cable.</li> <li>The <b>UK mains supply</b> is an <b>alternating current</b> supplied at a p.d. of <b>230 V</b> and a frequency of <b>50 Hz</b>.</li> </ul> | Name of wire                                                                | Colour | Job | Live | Brown | Supplies the alternating potential difference | Neutral | Blue | Completes the circuit | Earth | Green/Yellow stripes | Safety (can prevent shocks or fires) | <p>power = potential difference x current<br/>power = current<sup>2</sup> x resistance</p>  <p>Power in Watts, W</p> <ul style="list-style-type: none"> <li>The National Grid is the system of cables and transformers that bring electricity to homes and businesses.</li> </ul>  <ul style="list-style-type: none"> <li>Transformers increase (step up) or decrease (step down) the potential difference of the electricity supply.</li> <li>If the potential difference goes up the current goes down. (As power = current x p.d.)</li> <li>If the current goes down, less energy is lost as heat in the wires.</li> <li>(As power = current<sup>2</sup> x resistance, half the current means ¼ the energy lost!)</li> </ul> |
| Name of wire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Colour                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Job                                                                         |        |     |      |       |                                               |         |      |                       |       |                      |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Live                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Brown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Supplies the alternating potential difference                               |        |     |      |       |                                               |         |      |                       |       |                      |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Neutral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Blue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Completes the circuit                                                       |        |     |      |       |                                               |         |      |                       |       |                      |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Earth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Green/Yellow stripes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Safety (can prevent shocks or fires)                                        |        |     |      |       |                                               |         |      |                       |       |                      |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |