

"Best possible education"

"Care and Support"



"Successful lives"



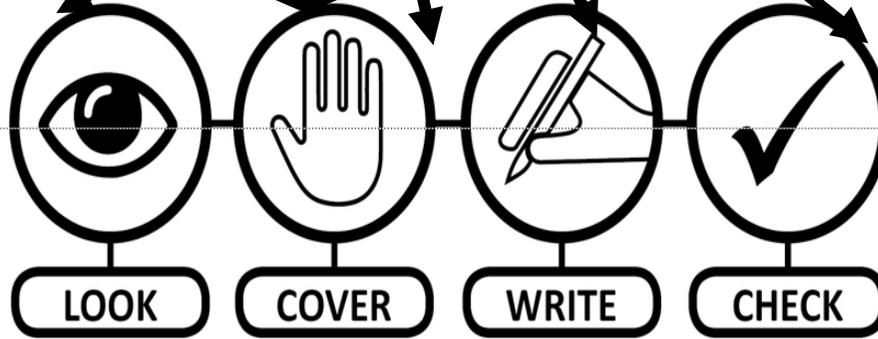
How do I make the best use of my knowledge organiser...

Use it create mind maps and plaster it on my wall

Fill in my knowledge gaps and make the connections between my learning

Use the questions to test my knowledge through memorisation!

If I miss a lesson, I can now catch up!



Self-Quizzing

Create quiz questions on the topics that you need to learn.

Check your answers and keep testing yourself on the questions that you find tricky.

Flash Cards

Use key words or questions with brief answers on the reverse. Try using a free app like Quizlet for a more interactive method.

Mind Mapping

Use images, colours, symbols, keywords, capitals and sub-sections.

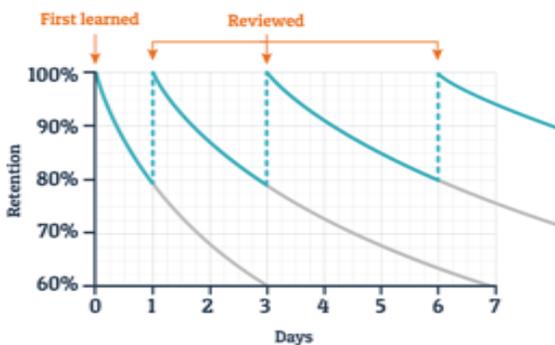
Mnemonics

The first letter of each word is used to create a new word.

The first letters in a list of words are used to form new words that create a story.

The Forgetting Curve

Typical Forgetting Curve for Newly Learned Information



First line shows you will forget information if you do not try to remember it in the first few days

Other lines: You will retain information if you go over it at regular intervals. That is what you need to do to ensure you remember what you learned in lessons.

What is it?

This **curve** shows how information is forgotten when there is **NO** effort made to remember it. But also what happens when you **DO** review your work.

Why is it important?

It means that you will forget things that you don't go over. You **MUST** review new learning regularly.

How can I apply it to my learning?

- Quiz yourself after every few weeks randomly on things you struggle with.
- If you keep getting things right, make the time between each test longer.
- If keep getting things wrong, make time between each test shorter.

Six Guaranteed Top Techniques to Help You Revise

1 Retrieval Practice



- Test yourself on the material that you need to learn.
- Testing yourself will feel difficult and slow at first but it is the best way to memorise.
- Put your books away and then write down as much as you can remember.
- You can also recall or explain things out loud to yourself (active recall)
- Create quiz questions to test yourself.
- Make flashcards with questions and prompts.
- Use past paper exam questions.
- Once you know what you don't know – focus on learning these details.

2 Spaced Practice

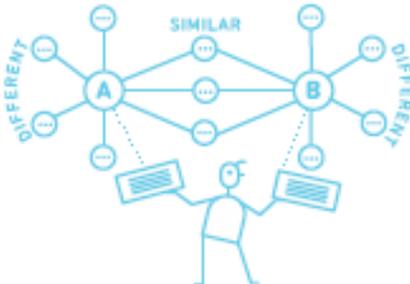
2



- Review the information that you need to learn regularly.
- Try to review new information you have studied once within 24 hours, then again after a week, then again after a month.
- Spreading your revision like this will mean you learn more in less time and will also mean you learn more quickly in lesson time during the year.
- Short regular revision sessions will also help to keep you calm during the exam periods.

3 Elaboration

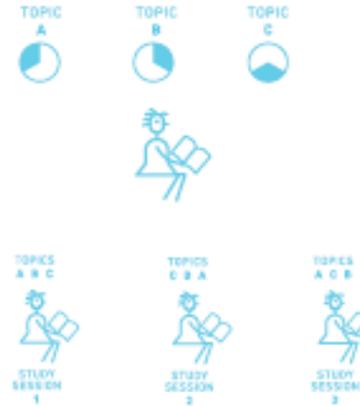
3



- Ask yourself questions while you are studying about how things work and why.
- Make connections between different ideas to explain how they work together.
- Think of two ideas (or characters) and think of ways they are similar and different.
- Describe how the things that you are studying apply to your own experiences and memories.

4 Interleaving

4



- Switch between ideas during a study session. Don't study one idea for too long.
- Go back over the ideas again in different orders to strengthen your understanding.
- Make links between different ideas as you switch between them.
- Don't switch too often! You need to make sure that you fully understand the ideas before moving on.
- Interleaving will feel harder than studying one topic for a long time. Don't give up – it will be more effective!

5 Concrete Examples

5



- Collect examples of exam questions and high quality responses from class, revision guides or websites such as Mr Bruff.com.
- Make links between what you need to learn and the examples that you have collected.
- Identify the qualities that you can emulate in your own responses.

6 Dual Coding

6



- Take information that you are trying to learn and draw visuals to go along with it.
- Try to come up with different ways to represent the information visually.

Contents page -Y10 KO

Subject	Page Number
Maths	5-12
English Literature	13-17
English Language	18-29
Science	
Biology: B1-B4	30-65
Chemistry: C1-C5	66-85
Physics: P1-P4	86-103
Sports Studies	104-109
RE	110-112
Urdu	113
French	114
Art	115
Geography	117-126

4 Methods of Retrieval Practice

Copyright © 2018

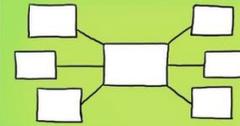
Before you start put away all your books & classroom materials.

Retrieval Practice Examples

- * Exit Tickets
- * Starter quizzes
- * Multiple choice quizzes
- * Short answer tests
- * Free write
- * Think, pair, share
- * Ranking & sorting
- * Challenge grids

BRAIN DUMP

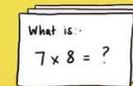
Write, draw a picture, create a mind-map on everything you know about a topic.



Give yourself a time limit, say 3 minutes, then have a look at your books & add a few things you forgot.

FLASHCARDS

Create your own flashcards, question on one side answer on the other. Can you make links between the cards?



You need to repeat the Q&A process for flashcards you fail on more frequently & less frequently for those you answer correctly.

QUIZZING

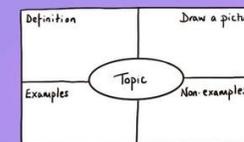
Create practice questions on a topic. Swap your questions with a partner & answer.

Question - What is a metaphor?

- A comparison using 'like, as, than'.
- A comparison where one thing is another.
- A comparison with a human attribute.

KNOWLEDGE ORGANISERS

Complete a knowledge organiser template for key information about a topic.



You can use knowledge organisers to learn new vocab & make links in between subjects or ideas.

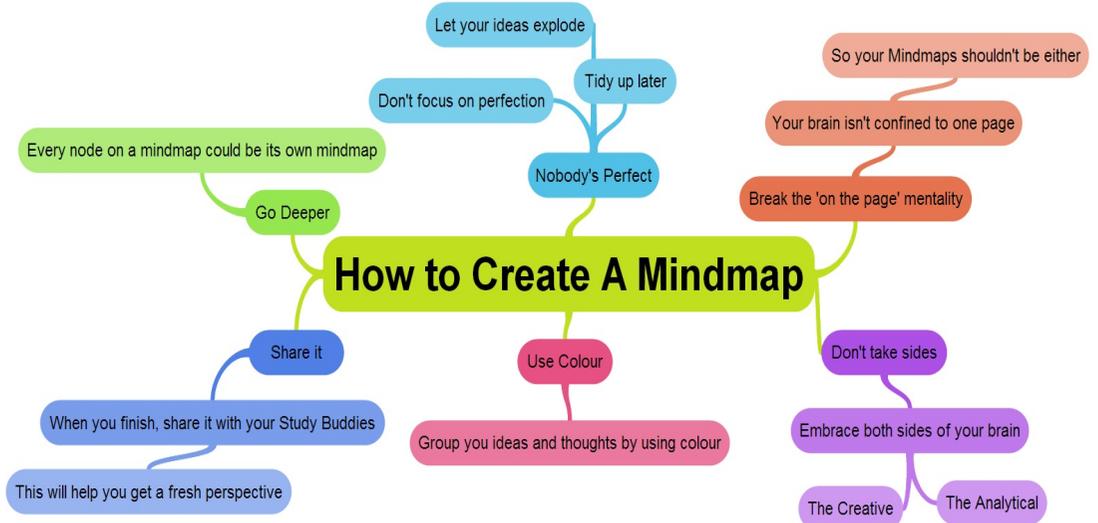
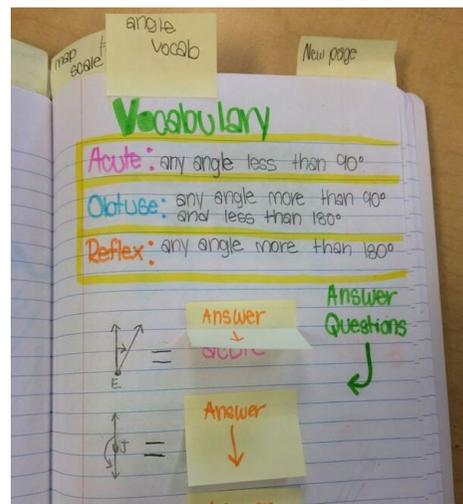
After you have retrieved as much as you can go back to your books & check what you've missed. Next time focus on that missing information

Read only as much as your hand can cover.

Cover what you just read with your hand.

Remember what you've just read.

Retell what you read in your head or to a partner.



Unit 1 – Powers and Roots			
1.1	Square number	The product when an integer is multiplied by itself	Circle the cube number. 9 10 000 333 729
1.2	Cube number	The product when an integer is multiplied by itself twice	
1.3	The first 15 square numbers are	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225	
1.4	The first 5 cube numbers are	1, 8, 27, 64, 125	
Unit 2 – surds and irrational numbers			
No.	Question	Answer	
2.1	A surd is	An irrational root	Work out the value of $\sqrt{2} \times \sqrt{32}$
2.2	$\sqrt{a} \times \sqrt{b}$	\sqrt{ab}	
2.3	$\frac{\sqrt{a}}{\sqrt{b}}$	$\frac{\sqrt{a}}{\sqrt{b}}$	Simplify fully $\frac{\sqrt{8}}{\sqrt{2}}$
2.4	$\sqrt{a} + \sqrt{a}$	$2\sqrt{a}$	
2.5	$\sqrt{a} - \sqrt{a}$	0	Expand and simplify $(3 + \sqrt{2})(5 - \sqrt{2})$
2.6	$\sqrt{a} \times \sqrt{a}$	a	
2.7	$(\sqrt{a} + b)(\sqrt{a} - b)$	$a - b^2$	
Unit 3- Indices			
3.1	$a \times a$	a^2 (“a squared”)	Simplify $2^5 \times 2^3$ Circle your answer. 4^8 2^8 2^{15} 4^{15} Circle the value of 2^4 6 8 16 24
3.2	$a \times a \times a$	a^3 (“a cubed”)	
3.3	$a \times a \times a \times a$	a^4 (“a to the power of 4”)	
3.4	$\sqrt{25}$	“The square root of 25 is 5 or -5”	
3.5	$\sqrt[3]{64}$	“The cube root of 64 is 4”	
3.6	Index	The power	
3.7	$a^b \times a^c$	a^{b+c}	

3.8	When multiplying the same bases with coefficients....	Add the powers and multiply the coefficients	Simplify fully $2x^2y^3 \times 4xy^2$
3.9	$\frac{a^b}{a^c}$	a^{b-c}	Simplify fully $\frac{w^3 \times w^4}{w^2}$
3.10	$(a^b)c$	a^{bc}	Simplify $(5^4)^2$
3.11	a^0	1	Evaluate $9^{-\frac{1}{2}}$
3.12	a^{-b}	$\frac{1}{a^b}$	
3.13	$a^{\frac{b}{c}}$	$\sqrt[c]{ab}$	
Unit 4 – Standard Form			
4.1	Standard form	A way of writing very big or very small numbers using powers of 10	<p>Circle the number that is in standard form.</p> <p>0.25×10^4 6×10^7 38×10^{-3} $4 \times 10^{\frac{1}{2}}$</p> <p>Write in standard form 12 500</p> <p>Write as an ordinary number 3.4×10^{-2}</p> <p>Work out $3 \times 10^5 \times 6 \times 10^{-2}$</p> <p>Write your answer in standard form.</p>
4.2	10^{-2}	0.01	
4.3	10^{-1}	0.1	
4.4	10^0	1	
4.5	10^1	10	
4.6	10^2	100	
4.7	10^3	1000	
4.8	0.0004	4×10^{-4} (the number must be between 1 and 10)	
4.9	40000	4×10^4 (the number must be between 1 and 10)	
Unit 5 - Sequences			
No.	Question	Answer	
5.1	A sequence or series is	A list of numbers that follow a pattern	Here is a sequence. 5 8 11 14 17
5.2	Term	A value in a sequence	Write down the next number in the sequence.

5.3	The term-to-term rule	Is how you find the next term in the sequence	Here are the first five terms of a linear sequence. 9 15 21 27 33 ...
5.4	The nth term rule	Is a formula that can be used to generate any term in the sequence, this is sometimes called the position to term rule	Work out the nth term
5.5	n	The position of a term in the sequence	Match each sequence to its description. One has been done for you
5.6	In a linear or arithmetic sequence	The difference between the terms is always the same	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">1 1 2 3 5 8</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Arithmetic progression</div> </div>
5.7	In a geometric sequence	Multiply by a common ratio to get to the next term	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">1 2 4 8 16 32</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Geometric progression</div> </div>
5.8	In a Fibonacci sequence	Add the two previous terms to get the next term	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">1 2 3 4 5 6</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Fibonacci sequence</div> </div>
5.9	The triangular numbers sequences	A sequence of numbers generated by adding one more than was added to find the previous term. For example, 1, 3, 6, 10, 15, 21, ...	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">1 3 6 10 15 21</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Triangular numbers</div> </div>
			<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">1 4 9 16 25 36</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Cube numbers</div> </div>
			<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">1 8 27 64 125 216</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Square numbers</div> </div>
5.11	In a quadratic sequences	There is a common second difference	Work out the next term of this quadratic sequence. 4 12 24 40 _____
5.12	The nth term rule for geometric sequence is always in the form	axb^{n-1}) The 1st term of a geometric progression is 5 and the common ratio is 2. a) Write down the first four terms of the progression. b) What is the 10th term of the progression?
5.13	a	First term in a geometric sequence	
5.14	b	Common ration	
5.15	Common ratio	The ratio between two consecutive terms in a sequence	
5.16	The nth terms of quadratic sequences are written in the form	$ax^2 + bx + c$	
			The n th term of a sequence is $2^n + 2^{n-1}$ Work out the 10th term of the sequence

Year 10 Higher Powers, Roots & Indices

Topic/Skill	Definition/Tips	Example
1. Square Number	The number you get when you multiply a number by itself .	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225... $9^2 = 9 \times 9 = 81$
2. Square Root	The number you multiply by itself to get another number. The reverse process of squaring a number.	$\sqrt{36} = 6$ because $6 \times 6 = 36$
3. Solutions to $x^2 = \dots$	Equations involving squares have two solutions , one positive and one negative .	Solve $x^2 = 25$ $x = 5$ or $x = -5$ This can also be written as $x = \pm 5$
4. Cube Number	The number you get when you multiply a number by itself and itself again .	1, 8, 27, 64, 125... $2^3 = 2 \times 2 \times 2 = 8$
5. Cube Root	The number you multiply by itself and itself again to get another number. The reverse process of cubing a number.	$\sqrt[3]{125} = 5$ because $5 \times 5 \times 5 = 125$
6. Powers of...	The powers of a number are that number raised to various powers .	The powers of 3 are: $3^1 = 3$ $3^2 = 9$ $3^3 = 27$ $3^4 = 81$ etc.
7. Multiplication Index Law	When multiplying with the same base (number or letter), add the powers . $a^m \times a^n = a^{m+n}$	$7^5 \times 7^3 = 7^8$ $a^{12} \times a = a^{13}$ $4x^5 \times 2x^8 = 8x^{13}$
8. Division Index Law	When dividing with the same base (number or letter), subtract the powers . $a^m \div a^n = a^{m-n}$	$15^7 \div 15^4 = 15^3$ $x^9 \div x^2 = x^7$ $20a^{11} \div 5a^3 = 4a^8$
9. Brackets Index Laws	When raising a power to another power, multiply the powers together. $(a^m)^n = a^{mn}$	$(y^2)^5 = y^{10}$ $(6^3)^4 = 6^{12}$ $(5x^6)^3 = 125x^{18}$
10. Notable Powers	$p = p^1$ $p^0 = 1$	$99999^0 = 1$
11. Negative Powers	A negative power performs the reciprocal. $a^{-m} = \frac{1}{a^m}$	$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$
12. Fractional Powers	The denominator of a fractional power acts as a 'root'. The numerator of a fractional power acts as a normal power. $a^{\frac{m}{n}} = (\sqrt[n]{a})^m$	$27^{\frac{2}{3}} = (\sqrt[3]{27})^2 = 3^2 = 9$ $\left(\frac{25}{16}\right)^{\frac{3}{2}} = \left(\frac{\sqrt{25}}{\sqrt{16}}\right)^3 = \left(\frac{5}{4}\right)^3 = \frac{125}{64}$

13. Surd	A surd is a number exactly using square or cube roots	$\sqrt{3}$ is a surd. $\sqrt{4}$ is not a surd because it is 2
----------	---	--

Topic: Standard Form

Topic/Skill	Definition/Tips	Example
1. Standard Form	$A \times 10^b$ <p style="text-align: center;"><i>where $1 \leq A < 10$, $b = \text{integer}$</i></p>	$8400 = 8.4 \times 10^3$ $0.00036 = 3.6 \times 10^{-4}$
2. Multiplying or Dividing with Standard Form	Multiply: Multiply the numbers and add the powers. Divide: Divide the numbers and subtract the powers.	$(1.2 \times 10^3) \times (4 \times 10^6) = 8.8 \times 10^9$ $(4.5 \times 10^5) \div (3 \times 10^2) = 1.5 \times 10^3$
3. Adding or Subtracting with Standard Form	Convert in to ordinary numbers, calculate and then convert back in to standard form	$2.7 \times 10^4 + 4.6 \times 10^3$ $= 27000 + 4600 = 31600$ $= 3.16 \times 10^4$

Year 10 Higher Powers, Roots & Indices

Topic/Skill	Definition/Tips	Example
1. Square Number	The number you get when you multiply a number by itself .	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225... $9^2 = 9 \times 9 = 81$
2. Square Root	The number you multiply by itself to get another number. The reverse process of squaring a number.	$\sqrt{36} = 6$ because $6 \times 6 = 36$
3. Solutions to $x^2 = \dots$	Equations involving squares have two solutions , one positive and one negative .	Solve $x^2 = 25$ $x = 5$ or $x = -5$ This can also be written as $x = \pm 5$
4. Cube Number	The number you get when you multiply a number by itself and itself again .	1, 8, 27, 64, 125... $2^3 = 2 \times 2 \times 2 = 8$
5. Cube Root	The number you multiply by itself and itself again to get another number. The reverse process of cubing a number.	$\sqrt[3]{125} = 5$ because $5 \times 5 \times 5 = 125$
6. Powers of...	The powers of a number are that number raised to various powers .	The powers of 3 are: $3^1 = 3$ $3^2 = 9$ $3^3 = 27$ $3^4 = 81$ etc.
7. Multiplication Index Law	When multiplying with the same base (number or letter), add the powers . $a^m \times a^n = a^{m+n}$	$7^5 \times 7^3 = 7^8$ $a^{12} \times a = a^{13}$ $4x^5 \times 2x^8 = 8x^{13}$
8. Division Index Law	When dividing with the same base (number or letter), subtract the powers . $a^m \div a^n = a^{m-n}$	$15^7 \div 15^4 = 15^3$ $x^9 \div x^2 = x^7$ $20a^{11} \div 5a^3 = 4a^8$
9. Brackets Index Laws	When raising a power to another power, multiply the powers together. $(a^m)^n = a^{mn}$	$(y^2)^5 = y^{10}$ $(6^3)^4 = 6^{12}$ $(5x^6)^3 = 125x^{18}$
10. Notable Powers	$p = p^1$ $p^0 = 1$	$99999^0 = 1$
11. Negative Powers	A negative power performs the reciprocal. $a^{-m} = \frac{1}{a^m}$	$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$
12. Fractional Powers	The denominator of a fractional power acts as a 'root'. The numerator of a fractional power acts as a normal power. $a^{\frac{m}{n}} = (\sqrt[n]{a})^m$	$27^{\frac{2}{3}} = (\sqrt[3]{27})^2 = 3^2 = 9$ $\left(\frac{25}{16}\right)^{\frac{3}{2}} = \left(\frac{\sqrt{25}}{\sqrt{16}}\right)^3 = \left(\frac{5}{4}\right)^3 = \frac{125}{64}$

13. Surd	A surd is a number exactly using square or cube roots	$\sqrt{3}$ is a surd. $\sqrt{4}$ is not a surd because it is 2
----------	---	--

'An Inspector Calls' by J.B. Priestley: A Knowledge Organiser

Characters		
Inspector Goole	Priestley's mouthpiece; advocates social justice; serves as the Birlings' conscience	Socialist, moralistic, righteous, powerful, intimidating, unconventional, mysterious, imposing, sardonic, omnipotent
Mr. Arthur Birling	Businessman; capitalist; against social equality; a self-made man (new-money)	Capitalist, arrogant, foolish, Panglossian, emasculate, prejudice, ignorant, selfish, stubborn, vainglorious
Mrs. Sybil Birling	Husband's social superior; believes in personal responsibility	Arrogant, cold-hearted, insincere, prejudice, naïve, conformist, bitter, controlling, remorseless
Sheila Birling	Young girl; comes to change views and pities Eva; feels regret	Transformative, remorseful, socialist, pseudo-inspector, sensitive, astute, strong-minded, empowered
Eric Birling	Young man, drinks too much; forces himself on Eva Smith; regrets actions	Rebellious, reckless, immature, insubordinate, compulsive, desperate, disgraced, dualistic, irresponsible
Gerald Croft	Businessman; engaged to Sheila; politically closest to Birling	Aristocratic, evasive, secretive, dishonest, disingenuous, oleaginous, chivalric, privileged, pragmatic
Eva Smith	Unseen in play; comes to stand for victims of social injustice (changes her name to Daisy Renton)	Suffragist, victim, emblematic, allegorical, vulnerable, desperate, socialist, moralistic, principled

Theatrical Stagecraft: Dramatic Devices

Dramatic irony	Birling's speeches, Mrs. Birling's witless implication of Eric
Stage directions	Instructions for the actors; often revealing – such as the lighting change when the Inspector arrives: "Pink and intimate then brighter and harder"
Setting	Constant throughout but subtle changes e.g. lighting; characters on/off stage
Tension	Builds up throughout the play ; interrogation of characters, personal relationships, secrecy
Cliff-hanger	Eric's reappearance in Act 3; the ending allows the audience to make up their minds
Foreshadowing	Symbolism (The Titanic), Mr. Birling's "knighthood", war
Time-lapse	Set in 1912, written in 1945; audience in a privileged position.
The 4th Wall	The Inspector's final speech addressed directly to audience.

Social, Historical and Literary Allusions

"the Titanic"	The Titanic sailed from Southampton and sank in the early hours of 15th April 1912. Priestley clearly wants his audience to see his drama play out against a background of real historical events and he has also chosen a moment in time when Birling's comments appear particularly ironic.
"Nobody wants war"	In reality, economic rivalry between the British Empire and the new German Empire was one of the many causes of the First World War.
"Russia"	The irony here suggests that Russia will have progressed further than other European countries by the 1940s.
"Bernard Shaws and H. G. Wells"	Both the noted Irish playwright George Bernard Shaw (1856-1950) and the father of science-fiction H. G. Wells (1866-1946) were well-known and outspoken socialists.

Plot	
Act 1	Set in April 1912, Brumley, Midlands, UK. The Birling family and Gerald Croft are celebrating Sheila Birling's engagement to Gerald with a dinner. Mr Birling lectures his son, Eric Birling, and Gerald about the importance of every man looking out for himself if he wants to get on in life. Edna (the maid) announces that an inspector has arrived. Inspector Goole says that he is investigating the death of a young woman who committed suicide, Eva Smith. Mr Birling is shown a photograph of Eva, after initially denying recognising the woman in the photo, he remembers firing her in 1910 for organising a strike over workers pay. Sheila recalls also having Eva sacked about her manner when served by her in an upmarket department store. The Inspector reveals that Eva Smith changed her name to Daisy Renton. Gerald reveals to Sheila he had an affair with Daisy Renton.
Act 2	Gerald explains to The Inspector that he had an affair with Eva, but hasn't seen her since he ended their relationship back in Autumn 1911. Sheila gives her engagement ring back to Gerald. The Inspector turns his attention to Mrs Sybil Birling, she confesses that she also had contact with Eva, but Eva gave herself a different name to Mrs Birling. Eva approached a charity chaired by Mrs Birling to ask for help. Eva was desperate and pregnant but help was refused by Mrs Birling because she was offended by the girl calling herself 'Mrs Birling'. She tells Eva that the baby's father should be made entirely responsible. She also tells Inspector Goole that the father should be held entirely responsible and should be made an example of.
Act 3	Eric is revealed as the father. He stole money from Mr Birling's office to provide money to Eva. The Inspector delivers his final speech. After he leaves, the family begin to suspect that he was not a genuine police inspector. A phone call to the Chief Constable confirms this. Next, they phone the infirmary to be informed that no suicide case has been brought in. Mr Birling, Mrs Birling and Gerald congratulate themselves that it was all a hoax and they continue can continue as before. This attitude upsets Sheila and Eric. The phone rings. Mr Birling announces to the family that a girl has just died on her way to the infirmary, a police inspector is coming to question them

Key concepts and context: Think about...

1912	Set just before WWI and the sinking of the Titanic. A moment of rising international tensions and industrial expansion. End of Victorian era saw the demise of the rigid class system. Labour Party, founded in 1900, gaining momentum. The Russian Revolution began in 1917.
1945	People were recovering from six years of warfare, danger and uncertainty. Class distinctions greatly reduced as a result of two world wars. Women had a more valued place in society. Desire for social change. Following WW2, Labour Party won a landslide victory over Winston Churchill and the Conservatives.
Wealth, Power and Influence	The Birlings and the Crofts are representative of the wealthy upper-class. They all misuse their social influence to benefit themselves. Their actions adversely affect the vulnerable people in society.
Blame and Responsibility	Who is to blame for Eva's death? Each of the Birlings contribute to a chain of events leading to the destruction of Eva Smith. What responsibilities do the characters have to each other? To society?
Public v Private	How do the public lives, the facades, of the Birlings juxtapose their private personas? What are their motivations for this? What are the repercussions, and for who?
Morality and Legality	What are the moral and legal laws of the society depicted in the play? How do they interweave? What actions do the characters undertake that are wrong, morally or legally?
Class Politics	How do the ideologies of capitalism and socialism collide in the play? Which characters are representative of which political allegiance? Is there a correlation between a character's political beliefs and their behaviours?
Prejudice	What are the prejudices held by the Birlings? What are their inherent views regarding class and status? How do they act on these prejudices, and what are the consequences?
Young v Old	What differences are evident between the younger and older generation? They react and behave differently throughout the play – why? What are their attitudes towards each other? What do they learn? Which characters change, and how?

ACT	Order of the Inspector's Questioning
Act 1	<i>Sheila and Gerald's engagement is celebrated.</i>
Act 1	<i>Birling says there will be no war; references Titanic</i>
Act 1	<i>Inspector arrives; a young girl has committed suicide.</i>
Act 1	<i>Birling threw her out after strike; Sheila had her fired for laughing.</i>
Act 2	<i>Gerald had an affair with Daisy Renton</i>
Act 2	<i>Mrs. Birling refused to give charity to Eva; blames father.</i>
Act 3	<i>Eric's involvement revealed; possible rape hinted at.</i>
Act 3	<i>Inspector leaves. Gerald returns; met policeman, no Inspector G</i>
Act 3	<i>Telephone rings; an inspector is coming.</i>

Key Notes
Priestley asks his audience to examine their individual and collective responsibility to society. He wants a welfare state .
The hypocrisy of middle-class Edwardian society is uncovered: appearance & reputation matter more than reality & morality .
Priestley criticises the selfishness of capitalism and wants a fairer, socialist future after the horrors of two world wars..
Priestley shows the older generation to be set in their ways, while the young are open to change .
Eva Smith is the embodiment of young, working-class women who were oppressed by the middle/upper classes .
The play demonstrates that when workers do not have full employment rights they cannot fight back

Character Quotes	
Birling's Confidence	'We're in for a time of steadily increasing prosperity'
Birling on society	'The way some of these cranks talk and write now, you'd think everybody has to look after everybody else'
Sheila's recognition	'but these girls aren't cheap labour – they're people'
Sheila's regret	'it's the only time I've ever done anything like that, and I'll never, never do it again to anybody'
Sheila on the inspector	'we all started like that – so confident, so pleased with ourselves until he began asking us questions'
Sheila on Eric	'he's been steadily drinking too much for the last two years'
Inspector on guilt	'I think you did something terribly wrong – and that you're going to spend the rest of your life regretting it'
Mrs Birling defends herself	'she was claiming elaborate fine feelings and scruples that were simply absurd in a girl in her position'
Eric explains	'I'm not very clear about it, but afterwards she told me she didn't want me to go in but that – well, I was in that state when a chap easily turns nasty – and I threatened to make a row'
The inspector says	'but each of you helped to kill her. Remember that'
Inspector's message	'there are millions and millions and millions of Eva Smiths and John Smiths still left with us, with their lives, their hopes and fears, their suffering, and chance of happiness, all intertwined with our lives, with what we think and say and do. We don't live alone.' ¹⁴

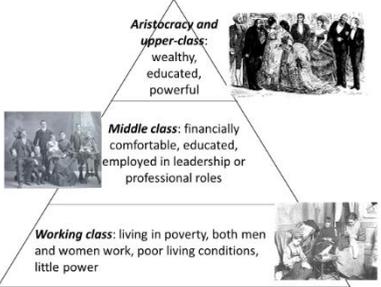
Thematic Quotes

Social responsibility	"We are responsible for each other" <i>Inspector</i> "Public men, Mr Birling, have responsibilities" <i>Inspector</i> "It's what happened to the girl and what we all did to her that mattered." <i>Eric</i>
Capitalism	"These silly capital vs labour agitations." <i>Birling</i> "A man has to make his own way" <i>Birling</i>
Class	"A girl of that class" <i>Mrs Birling</i> "Well, we've several hundred young women there, y'know, and they keep changing." <i>Birling</i>
Age	"the famous younger generation" <i>Birling</i> "What's the matter with that child?" <i>Birling</i> "Just keep quiet, Eric" <i>Birling</i>
Gender & attitudes to women	"I hate those <i>hard-eyed dough-faced women</i> " - <i>Gerald</i> "And you think young women ought to be protected against unpleasant and disturbing things?" <i>Inspector</i> "She had far too much to say, far too much" <i>Birling</i>

An Inspector Calls Knowledge Organiser (GCSE English Literature – AQA)

Characters

<p>Inspector Goole: presents himself as a police inspector investigating the reasons for Eva Smith's suicide.</p> 	<p>Eva Smith: a working-class girl in her early twenties who commits suicide. It becomes clear that her death has been caused by the Birlings' thoughtless actions.</p> 	<p>Mr Arthur Birling is the father of a middle-class family. An arrogant businessman, he aspires to become upper-class and only thinks about money and reputation.</p> 	<p>Mrs Sybil Birling was an upper-class lady but married beneath herself. She is cold and haughty, with little time for others.</p> 	<p>Sheila Birling is initially a childish young lady who is blind to reality. Yet she grows in integrity and empathy as the play progresses.</p> 	<p>Eric Birling is impulsive and reckless, but is also inclined to be empathetic towards others. Like his sister, he transforms by the end of the play.</p> 	<p>Gerald Croft is an aristocrat engaged to Sheila Birling. He appears to be gentlemanly, but is actually hiding hedonistic behaviour. He and Sheila break up during the play.</p> 	<p>Edna is frequently on stage, but speaks little. She is the Birlings' servant and is a constant reminder of how they ignore the working-classes.</p>
--	--	---	--	---	--	---	---

		Plot and character development	Symbols	Quotations	Vocabulary	Historical context
Act 1	Opening Stage Directions	<p>AIC was written in 1945, but set in 1912. The play opens in the Birling family's dining room. They are clearly a wealthy family, but there are hints that not everything is as it seems. The setting is rather oppressive, and gives the impression of entrapment within an upper-class milieu. Priestley also introduces the characters.</p> <p>What is Priestley suggesting about the family here?</p>	<p>The solid furniture symbolises the apparent stability of the family and their place in the social hierarchy. The closed doors and curtained windows suggest blindness to the realities of the world outside this upper-class context. The dining-room is "fairly large", suggesting the family are not as wealthy as they wish to be.</p>	<ol style="list-style-type: none"> Arthur Birling is a "heavy-looking, rather portentous man...with fairly easy manners but rather provincial in his speech." Sybil Birling is "a rather cold woman and her husband's social superior." Sheila Birling is a "pretty girl in her early twenties, very pleased with life and rather excited." Gerald Croft is a "well-bred young man-about-town." Eric Birling is "half shy, half assertive." <p>What do these quotes suggest?</p>	<ol style="list-style-type: none"> Political diatribe: a political attack Microcosm: a small group of people who represent sections of society Façade: an appearance Capitalism: a system of organising society by which businessmen control money and keep it for themselves Socialism: a system of organising society by which money is shared equally Collectivist: the group is more important than the individual Individualist: the individual is more important than the group 	<p>Edwardian social class system:</p> 
	Celebrating the engagement	<p>The family celebrate Sheila and Gerald's engagement, but Eric's tipsiness and Sheila's questioning of Gerald hint at cracks in the family's façade. Gerald's parents are absent, suggesting they disagree with his engagement. Mr B. makes several speeches articulating his capitalist viewpoint. Eric tries to question this, but is silenced by his father. The servant – Edna – circulates throughout as a visual reminder that the upper-classes ignore the working-classes. Then the ladies leave the room.</p>	<p>Engagement ring: not only does this symbolise Sheila and Gerald's engagement, but it also represents Sheila's social success at securing a wealthier husband. It represents stability, affluence, and acceptance into the upper-classes. Mr B's possible knighthood represents progression from middle to upper-class.</p>	<ol style="list-style-type: none"> Sheila: "Oh – it's wonderful! Look – Mummy – isn't it a beauty?" Mr B: "we're in for a time of steadily increasing prosperity." Eric: "What about war?" Mr B: "nobody wants war." Mr B: "as if we were all mixed up together like bees in a hive – community and all that nonsense." <p>What do these quotes suggest?</p>	<ol style="list-style-type: none"> Dramatic irony: the audience know more than the characters Arrogant: self-important, believing that one is superior to others Morality: the code of right and wrong Reputation: how an individual's character is seen by other members of society Discredited: disgraced, having a damaged reputation <p>Find examples from the play for the above.</p>	<p>Life in 1912 meant class divisions and government by the capitalist Conservative Party. Industrial progress meant that Britain was more affluent. However, despite this optimism there were whispers of a possible war. Then the sinking of the Titanic in April 1912 revealed the short-sightedness of the upper-classes, who depended on technology and money. The deaths of many in the third class, and few in the first class, highlighted the unfairness of the class system. The world wars (1914-18, 1939-45) drastically changed society, so by the time AIC was written in 1945, the class system was less rigid and women had more opportunities to work. In 1945 a Labour (socialist) government was voted in and the welfare state established.</p>
	Goole questions Mr Birling	<p>Inspector Goole rings the doorbell, interrupting Mr Birling's capitalist speech and therefore showing how socialism can replace capitalism. The Inspector tells Mr Birling, Gerald and Eric that there has been a suicide: a young woman (Eva Smith) has died. The audience discover that Eva used to work for Mr Birling, but was fired when she was part of a group asking for higher pay.</p>	<p>Eva Smith's name: "Eva" alludes to the Biblical character of Eve, who was the first woman made by God. Therefore Eva represents all women. "Smith" is one of the most common surnames, again indicating that Eva is the embodiment of all working-class women.</p>	<ol style="list-style-type: none"> Mr B: "If we were all responsible for everything that happened to everybody we'd had anything to do with, it would be awkward." Mr B: "If you don't come down sharply on some of these people, they'd soon be asking for the earth." Insp: "It's better to ask for the earth than to take it." Eric: "Why shouldn't they try for higher wages?" <p>What do these quotes suggest?</p>	<ol style="list-style-type: none"> Hypocrisy: pretending to believe in something you don't agree with Obstinate: stubborn, unwilling to change Overbearing: domineering, asserting power over other people Materialistic: interested only in money and things <p>Find examples from the play for the above.</p>	<p>During the Victorian and Edwardian eras, conditions for the working-classes were poor. Health and safety regulations were limited, with many workers being injured, becoming ill or dying as a result of their employment. Pay was low, with employers taking most of the profits. Workers' strikes were not uncommon. Across England many workers went on strike during "The Great Unrest" (1910 and 1914). In 1926, the country was brought to a standstill again during the General Strike.</p>
	Goole questions Sheila	<p>Sheila enters and is shocked to hear about the suicide. We learn that when Eva left the factory, she gained employment in a clothes shop called Millwards. Sheila was shopping there one day, and became angry at Eva; she insisted that Eva were fired. Unlike her father, Sheila shows remorse for what she has done.</p>	<p>The dress Sheila tries on symbolises her desire to conform to a stereotype of femininity which values beauty, fashion, and sophistication above intelligence.</p>	<ol style="list-style-type: none"> Sheila: "But these girls aren't cheap labour – they're people!" Mr B: "We were having a nice little family celebration tonight. And a nasty mess you've made of it now." Inspector: someone's made a "nasty mess" of Eva's life. Sheila: "I felt rotten about it at the time and now I feel a lot worse." <p>What does this reveal about Sheila?</p>	<ol style="list-style-type: none"> Infantilised: treated like a child Moral epiphany: a sudden realisation that one has made a mistake Receptive: willing to listen to others Remorseful: guilty, regretful <p>Find examples from the play for the above.</p>	<p>Expectations of women in a patriarchal society: Middle and upper-class women occupied the domestic sphere – they were expected to marry (preferably a man or equal or higher class), raise children, and run a household. Women were considered to be the 'weaker' sex – not just physically but emotionally and mentally also. It was believed that they should be 'protected' from any aspects of life that were 'distasteful'. Things were, however, starting to change... the Suffragettes were campaigning for votes for women (granted in 1918), and lower-class women were increasingly working.</p>

	Plot and character development	Symbols	Quotations	Vocabulary
Act 2	Goole questions Gerald Start of Act 2. Inspector Goole turns his attention to Gerald, who reveals that he met Eva at the Palace Bar the previous summer. Eva was homeless and penniless, so Gerald gave her a place to live. They had an affair. In the autumn, Gerald ended the relationship and gave Eva some money. She went to stay at the seaside. Sheila returns the engagement ring to him.	The hedonistic behaviour at the Palace Bar reveals the darker side to upper-class behaviour. It shows how hypocritical Gerald is; he expects Sheila to remain innocent, but he seeks out working-class women for entertainment. Eva's changing names	18. Sheila to Mrs B: "You mustn't try to build up a kind of wall between us and that girl." 19. Gerald: "I hate those hard-eyed, dough-faced women." 20. Gerald: "I've suddenly realised – taken it in properly – that she's dead." 21. Gerald: "She was young and pretty and warm-hearted – and intensely grateful." 22. Insp: "Your daughter isn't living on the moon. She's here in Brumley too." 23. Sheila: "You were the wonderful Fairy Prince."	U. Aristocratic: member of the ruling class V. Evasive: avoiding questioning W. Unscrupulous: lacking morality and integrity X. Exploitative: prepared to use other people Y. Vulnerable: weak and easily hurt
	Goole questions Both Gerald and Eric have left the room. Mrs Birling asks to see the photograph of Eva, and Inspector Goole questions her. Reluctantly and haughtily, Mrs Birling admits that she met Eva at her charity (the Brumley Women's Organisation). Eva came to the charity asking for help because she was pregnant; Mrs Birling refused to help on the basis that Eva was unmarried. Sheila becomes increasingly angry with her parents. It soon becomes clear that it the father of Eva's child was Eric.	reveals her desire to reinvent herself after each disaster. As "Daisy" she is innocent, but "Renton" hints at employment as a prostitute. As "Mrs Birling" she attempts to gain respectability and security.	24. Inspector: "Public men...have responsibilities as well as privileges." 25. Mrs B: "Damned impudence!" 26. Mrs B: Eva "only had herself to blame." 27. Mrs B: "I did nothing I'm ashamed of... You have no power to make me change my mind." 28. Mrs B: "I blame the young man... He ought to be dealt with very severely."	Z. Unempathetic: lacking understanding of others AA. Intolerant: unwilling to accept the opinions of others BB. Haughty: proud CC. Callous: uncaring DD. Wilfully blind: deliberately ignoring the truth
Act 3	Goole questions Eric returns at the start of Act 3. He reveals that he met Eva at the Palace Bar after her relationship with Gerald had ended. Eric returned to Eva's flat, and may have pressured her into having sex. Their affair continued, and Eva became pregnant. Eric tried to support her financially, but when Eva found out that he had stolen the money from his father's business, she refused this help.	The fifty pounds Eric steals from his father's business cause his parents to be more angry than the revelation about the sexual assault of Eva. This reveals their skewed morality and focus on money rather than people.	29. Eric: "I was in that state when a chap easily turns nasty." 30. Eric: Eva "was pretty and a good sport." 31. Mrs B: "You stole money?" 32. Eric to Mrs B: "You killed them both - damn you, damn you." 33. Insp: "used her for the end of a stupid drunken evening, as if she was an animal, a thing, not a person."	EE. Euphemism: using a better word to cover up the harsh reality FF. Impulsive: acting without thinking GG. Hedonistic: indulging in pleasurable activities HH. Resentful: holding a grudge II. Disgraced: lost one's good reputation
	The denouement Now that the truth has been revealed, Inspector Goole takes centre stage and explains what we have learnt: that we are all part of one community and should take responsibility for other people. He leaves abruptly. Gerald returns, and suggests that the Inspector was a fraud. After some investigation, it turns out that there was no Inspector Goole on the Brumley police force. Most of the family are relieved, but Eric and Sheila think that this revelation changes nothing. The phone rings. Birling answers and hears that a policeman is on his way; a girl has committed suicide. The play ends, but there is a sense that the Birling family will be doomed to repeat the evening's events until they are able to learn their lesson.	The fixed setting throughout the play reveals the older generation's inability to change their opinions and become more empathetic. This setting becomes a symbol of Eric and Sheila's entrapment, and Sheila looks towards the door at the end as she considers escaping her oppressive upbringing.	34. Insp: "There are millions and millions and millions of Eva Smiths and John Smiths still left with us." 35. Insp: "We are members of one body." 36. Insp: "If men will not learn that lesson, they will be taught it in fire and blood and anguish." 37. Sheila: "The point is, you don't seem to have learnt anything." 38. Mr B: "Look at the pair of them – the famous younger generation who know it all." What do these quotes reveal about the characters?	JJ. Moralistic: excessively concerned with right and wrong KK. Intimidating: imposing, frightening LL. Didactic: teaching MM. Omniscient: knowing everything NN. Strong-minded: determined OO. Malleable: changeable PP. Ambiguous: unclear

Concepts and ideas

Characters	Mr Birling	Mr Birling is the epitome of capitalist businessmen; he is prepared to sacrifice morality in order to gain affluence and social power. Priestley uses dramatic irony to alienate the audience from Mr Birling and his capitalist views. Find a quote to illustrate this.	Themes	Capitalism vs socialism	Priestley criticises the selfishness of capitalism and desires a fairer, socialist future after the horrors of two world wars.
	Eva Smith	Eva Smith is the embodiment of young, working-class women who were oppressed by the middle/upper classes. Priestley creates pathos and sympathy for her predicament, as well as paralleling her with Sheila to show that it social class is only an accident of birth.		Generations	Priestley demonstrates that the older generation are set in their ways, while the younger generation are more malleable and open to change for the future
	Mrs Birling	Mrs Birling symbolises the pride and callousness of the upper-classes, and her coldness towards her family demonstrate the discontent which comes from such haughtiness. Find a quote to show this.		Responsibility	Priestley prompts the audience to examine their individual and collective responsibility to society in order to promote the idea of a socialist welfare state.
	Sheila and Eric	Sheila and Eric represent the possibility for a positive change in society, as they move from blindness to understanding and empathy. Does their sheltered upbringing mean that they are as much victims of society as Eva is? And does Sheila really understand the impact that she has had on another person, or is she upset that she has suddenly been plunged into knowledge of the real world?		Hypocrisy	The hypocrisy of middle-class Edwardian society is uncovered; the façade of respectability matter more than morality.
	Gerald	Gerald embodies the double-standards of the aristocracy, who present a respectable façade but in reality indulge in unscrupulous, hedonistic behaviour. Yet is Gerald the only character who truly feels distressed about Eva's death?		Sinfulness	It has been argued that the characters represent the Seven Deadly Sins. Thus, Priestley uses them to reveal universal character flaws and mankind's tendency to immorality.
	Inspector Goole	Inspector Goole is Priestley's mouthpiece, and is used to articulate Priestley's ideas about the morality and justice of socialism. Yet, ultimately, is Goole too didactic and domineering to gain the audience's trust?		Gender	Through his presentation of Eva and Sheila, Priestley reveals how unfairly women were treated in the Edwardian period. Yet, as Sheila transforms into a determined, outspoken individual, Priestley also shows the potential women have for transforming the society around them.
	Edna	An almost constant presence on stage, Edna reminds the audience that the upper-classes consistently ignore the working-classes. The audience is very much aware that Edna's place in the Birling household is dependent on her continued politeness and respect for her employers.			

Explorations in Creative Reading (GCSE English Language Paper 1 Section A – AQA)

Q	What is the Q asking?	Subject terminology	Excellence criteria	Sentence starters	
Read	5-10 mins to read the source				
1: facts	<p>Read lines... to ... List 4 things you learn about ...</p> <ol style="list-style-type: none"> 1. Re-read the specified lines. 2. Copy 4 facts: do not infer. <p>4 marks – 5 minutes</p>		<ul style="list-style-type: none"> o Focus on facts, not inference or analysis o You can quote the text 		
2: analyse language	<p>Read lines ... to How does the writer use language to present ...?</p> <ol style="list-style-type: none"> 1. Re-read the specified lines. 2. Highlight or underline 3 quotations relevant to the question. You can quickly annotate. 3. Write 3 PEE paragraphs responding to the question. <p>8 marks – 10 minutes</p>	<ol style="list-style-type: none"> 1. Adjective: describes a noun 2. Adverb: describes a verb 3. Alliteration: words start with same sound 4. Allusion: reference to another text or event 5. Colloquial language: informal language 6. Euphemism: replacing an offensive phrase with milder words 7. Hyperbole: over-exaggeration 8. Imagery: visual language 9. Imperative verb: command 10. Juxtaposition: contrasting ideas 11. Metaphor: comparison 	<ol style="list-style-type: none"> 12. Modal verb: shows possibility e.g. could, might 13. Onomatopoeia: words which sound like what they describe e.g. boom 14. Oxymoron: combines contradictory terms e.g. a minor crisis 15. Pathetic fallacy: using the weather to set the emotion or mood 16. Personification: giving an object human characteristics 17. Semantic field: group of words with similar connotations 18. Sibilance: repetition of “s” sound 19. Simile: comparison using “like” or “as” 20. Symbolism: image represents an idea 21. Triple: list of three 22. Verb: action word 	<p>Point</p> <ul style="list-style-type: none"> o Respond directly to the Q using precise vocabulary o Use “in order to” to address key concepts <p>Evidence</p> <ul style="list-style-type: none"> o Select precise evidence o Embed fluently in a sentence <p>Explain / analyse</p> <ul style="list-style-type: none"> o What do the words suggest, imply or symbolise? o Explore more than one word, idea or interpretation o Use subject terminology 	<p>The writer portrays ... as ... in order to suggest that...</p> <p>This is clear when we read “...” Evidence of this is “...”</p> <p>This means that... We learn that... The writer communicates that... The word / language device suggests / conveys... This indicates that... In addition, the word / language device is used because... This reinforces the idea that...</p>
3: analyse structure	<p>Use the whole source. How does the writer structure the text to interest you as a reader?</p> <ol style="list-style-type: none"> 1. Identify 3 or more structural devices, choosing one from the beginning, one from the middle, and one from the end of the text. 2. Write 3 PEEAs responding to the question, thinking beginning, middle, end. <p>8 marks – 10 minutes</p>	<p>Beginning: Narrative perspective</p> <ol style="list-style-type: none"> A. 1st person: told from the character’s perspective (I) B. 2nd person: directed to the reader (you) C. 3rd person: external narrator (he, she, it) D. Limited narrator: doesn’t have full knowledge of the situation E. Omniscient narrator: full knowledge and understanding F. Unreliable narrator: we question the narrator’s credibility <p>Beginning: Introducing Ideas</p> <ol style="list-style-type: none"> G. Establishing setting H. Introducing character(s) I. Establishing an atmosphere 	<p>Middle: shifts in...</p> <ol style="list-style-type: none"> J. Focus K. Place L. Time (flashforward / flashback) M. Narrative perspective N. Atmosphere / mood <p>Ending:</p> <ol style="list-style-type: none"> O. Circular structure: the narrative ends where it begins P. Cliff-hanger: the narrative ends suddenly Q. Resolved ending: loose ends are tied up R. Unresolved ending: loose ends are not tied up <p>Overall structure:</p> <ol style="list-style-type: none"> S. Linear: events are told in the order that they happen, chronologically T. Non-linear: events are not in order U. Motif: a pattern of ideas, images or words repeated throughout the text 	<p>Point</p> <ul style="list-style-type: none"> o Respond directly to the question using precise vocabulary o Use “in order to” to address key concepts <p>Evidence</p> <ul style="list-style-type: none"> o Select precise evidence o Embed fluently in a sentence <p>Explain / analyse</p> <ul style="list-style-type: none"> o Explore the effect of the structural device o Use subject terminology 	<p>The writer structures the text by... in order to... The writer introduces the idea of... The writer focuses on... The writer develops the idea of... The writer draws the extract to a close by...</p> <p>This is evident in the line “...”</p> <p>The structural device is used because... This suggests that... This introduces / develops... This focusses our attention on... The writer zooms in on... because...</p>
4: present a point of view	<p>Read lines ... to ... Having read this section of the text, a student said “.....” To what extent do you agree?</p> <ol style="list-style-type: none"> 1. Re-read the specified lines. 2. Agree/disagree table. 3. Write 4 PEE paragraphs. <p>20 marks – 20 minutes</p>	<p>All language and structural devices</p> <p>Use XXOX to structure your argument:</p> <p>X: strongest agree point X: next agree point O: other side of the argument – if relevant X: final agree point</p>	<div style="border: 2px solid black; padding: 10px;"> <p>Analytical verbs:</p> <ul style="list-style-type: none"> o presents: portrays, conveys o shows: demonstrates, illustrates o suggests: hints, implies, indicates o reveals that...: exposes, clarifies o emphasises: confirms, highlights o creates debate about...: initiates, generates, provokes o explores the idea that...: considers, prompts, questions o challenges the idea that...: confirms o confirms the idea that...: supports, justifies, develops o believes...: perceives, trusts, learns, observes o considers...: appreciates, clarifies, examines o sympathises...: emphasises, senses, pities, understands o discovers...: realises, understands, decides, concludes o develops the idea that...: builds, changes </div>		

Example question:

Write a description for a magazine inspired by this image:



OR

Write the opening of a story about isolation.

24 marks for content and organisation, 16 marks for technical accuracy

Developing your character:

Before the exam, you need to create a fully developed character and know everything about them. When you go into the exam, you can “drop” your character into the image to give you a starting point.

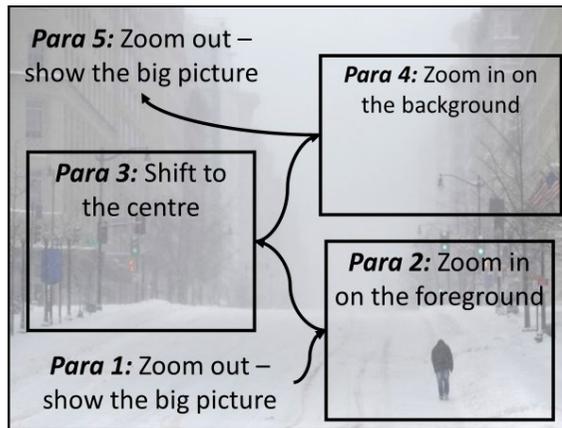
Make sure you know your character’s...

- Family and education background
- Experience of work and employment
- Experience of historical events e.g. World War Two
- Personality and characteristics
- Likes and dislikes (food, clothes....)

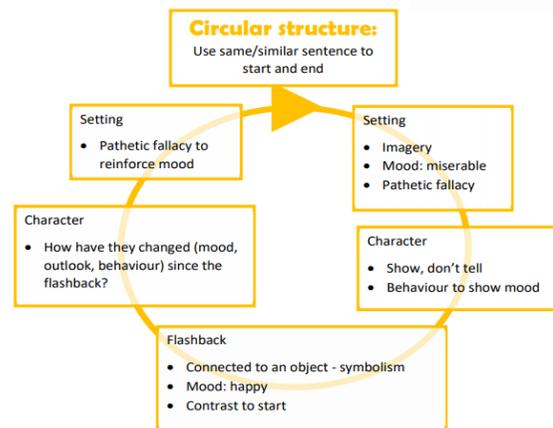
For each of these, ask yourself **why**. E.g. Why does my character become angry easily? Why did my character leave school at 16?

Excellence criteria for self-assessment

Structuring your writing 1: take a journey through the image



Structuring your writing 2: circular structure



Using descriptive language: show, don't tell

We use a range of language devices to show rather than tell the reader what the character is doing. E.g. She was sad. → Her body drooped. Slowly, she wrapped her arms around herself, hoping to stop herself shattering into a million pieces. As her lip began to quiver, a single tear fell.

Use all the language devices listed on the other side of this Knowledge Organiser (see Question 2) to describe:

- Facial expression
- Body language and movement
- Clothing and appearance
- Reactions to other people
- Tone of voice
- Changing weather
- How an object moves
- How an event makes the character feel

Using a range of sentence structures – start with...

1. Two –ing verbs	Raising a hand...
2. Two or three adjectives	Humid and clammy, the air...
3. Two –ly adverbs	Rapidly, quickly, the bird...
4. A preposition (over, under, in)	Under the moon, the river...
5. A simile	Like a...
6. A connective:	First, we..
7. The noun – adjective, adjective - sentence:	The tree – bony, twisted – grew...
8. More, more, more sentence:	The more he cried, the more he felt...
9. The so, so sentence:	It was so small, so tiny...
10. It was one of those days...	It was one of those days when...

Using a range of punctuation

.	End a sentence
,	Separate clauses in a sentence (where you take a breath)
-	Add additional information in an informal way
;	Add additional information – full sentence before and after the ;
:	Introduce a list OR a shocking idea e.g. Morning arrived: disaster!
()	Include additional information that isn't essential to the sentence
?	Pose a question
!	Show shock or surprise (use sparingly)
...	Build tension or leave a gap
'	Indicate possession (Amy's work) or omission (I can't do it)

	Target
Content and organisation: 24 marks	Communication is convincing – it reads like a novel / short story
	Communication is compelling – it is a short story I would be interested in reading
	Tone, style and register are matched to audience – you have written in the style of a novelist
	Extensive and ambitious use of vocabulary
	Sustained crafting of linguistic devices – you have used a range of language devices throughout
	Use of structural features – e.g. circular structure
Technical accuracy: 16 marks	Inclusion of a range of complex ideas – e.g. you explore different moods, emotions, aspects of character
	Paragraphs are linked
	Sentence demarcation is accurate – full stops, commas etc are in the correct place
	Wide range of punctuation used accurately
	Uses the full range of sentence forms for effect
	Secure control of complex grammatical structures
Technical accuracy: 16 marks	High level of accuracy in spelling
	Extensive and ambitious use of vocabulary

Example question:



Statement of opinion, linked to the Sources in Section A. start by drawing an agree/disagree table to generate ideas.

Instructions for which Genre, Audience and Purpose to use

24 marks for content and organisation; 16 marks for technical accuracy (40 marks)

Structuring your writing

Beginnings	Imagine this:....	-Use descriptive language techniques -Juxtapose two views on the same topic -e.g. <i>Imagine this: a world in which social media has ruined young people's mental health due to emphasis on body image.... Now imagine this: a world in which social media boosts mental health because it helps people connect...</i>
	Now imagine this:....	
	One word + amplification	-e.g. <i>Social media. What comes to mind when you hear these words? Well, to many people social media conjures up images of... and...</i>
Middles	Anecdote	-Use descriptive language techniques -Use a personal story to engage your reader -e.g. <i>Josie joined Instagram when she was 14, three years after she started endlessly pestering her parents to get an account. But after just one week, it all went wrong...</i>
	XXOX	X = agree, O = show the other side of the argument (then demolish it)
Endings	Develop your points	Use descriptive language and detailed anecdotes to expand on your ideas <i>e.g. Remember the world we imagined...</i>
	Circular structure: return to the start	Return to the character you described in your opening anecdote. How have they changed? What might they have learned? How has your perspective on this character's situation changed?
	Use collective language and a call to action	<i>e.g. Let's join together in a call to improve social media. Our voices need to be heard so that the technological giants which increasingly control our online interactions will change for the better...</i>
	Offer a solution	<i>e.g. In order to see an improvement in this, we need to...</i>

GAP the question:

Genre	Newspaper article	Include a headline Broadsheet – serious, academic, factual Tabloid – less serious, humorous, focussed more on personal stories and experiences
	Speech	Address the audience directly Use inclusive pronouns (we, us, our) Use anecdotes which the audience will relate to
	Letter	Start with <i>Dear...</i> End with <i>Yours faithfully...</i>
	Blog	Slightly more informal; but not as chatty as the examples <u>you</u> will have read online Include the audience (we, our) Include personal stories and experiences
Audience	Formal	Teacher Headteacher Politician
	Informal	Friends Class at school Year group Family
Purpose	To persuade or argue	You need to provide evidence (facts, statistics, anecdotes) to convince your readers to agree with you
	To inform or describe	Explain your point of view on a topic or detail your experiences

Using a range of sentence structures – start with...

1. –ing verbs	Consider the idea that...
2. Two or three adjectives	Unsettling, worrying and disturbing , the idea...
3. –ly adverbs	Importantly , we must consider...
4. A preposition (over, under)	Above all else...
5. A simile	Like a...
6. A connective	First , we..
7. The noun – adjective, adjective - sentence:	Social media – dangerous and attractive – draws all of us in...
8. More, more, more sentence:	The more you tweet, the more likes you get...

Using a range of punctuation

.	End a sentence
,	Separate clauses in a sentence (where you take a breath)
-	Add additional information in an informal way
;	Add additional information – full sentence before and after the ;
:	Introduce a list OR a shocking idea e.g. Morning arrived: disaster!
()	Include additional information that isn't essential to the sentence
?	Pose a question
!	Show shock or surprise (use sparingly)
'	Indicate possession (Amy's work) or omission (I can't do it)

Excellence criteria for self-assessment

	Target
Content and organisation: 24 marks	Communication is convincing – it reads like an article
	Communication is compelling – it is an article I would be interested in reading
	Tone, style and register are matched to audience – you have written in the style of a journalist
	Extensive and ambitious use of vocabulary
	Sustained crafting of linguistic devices – you have used a range of language devices throughout
	Use of structural features – e.g. circular structure
Technical accuracy: 16 marks	Inclusion of a range of complex ideas – e.g. you explore different points of view and perspectives
	Paragraphs are linked
	Sentence demarcation is accurate – full stops, commas etc are in the correct place
	Wide range of punctuation used accurately
	Uses the full range of sentence forms for effect
	Secure control of complex grammatical structures
	High level of accuracy in spelling
	Extensive and ambitious use of vocabulary

GCSE ENGLISH LANGUAGE: KNOWLEDGE ORGANISER

English Language Paper 1: Section A				English Language Paper 2: Section A			
Q	Type of question	Marks	Minutes / length of answer	Q	Type of question	Marks	Minutes / length of answer
1				1			
2				2			
3				3			
4				4			
English Language Paper 1: Section B – writing to describe / narrate				English Language Paper 2: Section B – Writing to persuade			
5				5			
Language Devices		Definition	Example	Structural devices		Definition	
<i>Imperative verb</i>				Beginning: narrative hook			
<i>Negatives disproven</i>				Beginning: narrative perspective (1 st / 2 nd / 3 rd person)			
<i>Anecdote</i>				Beginning: creating atmosphere / tone			
<i>Alliteration</i>				Middle: shift in focus			
<i>Address reader</i>				Middle: building tension			
<i>Opinions</i>				Ending: cliff-hanger			
<i>Rhetorical question</i>				Ending: unanswered questions			
<i>Emotive language</i>				Examples of connectives:			
<i>Statistics</i>				Showing similarities:			
<i>Triple</i>				Showing differences:			
<i>Pathetic fallacy</i>				Sentence stems for writing a PEEA paragraph:			
<i>Personification</i>				Point			
<i>Adjectives</i>				Evidence			
<i>Adverbs</i>				Explain			
<i>Simile</i>				Analyse			
<i>Senses</i>							
<i>Metaphor</i>							

GCSE ENGLISH LANGUAGE: KNOWLEDGE ORGANISER

English Language Paper 1: Section A				English Language Paper 2: Section A			
Q	Type of question	Marks	Minutes / length of answer	Q	Type of question	Marks	Minutes / length of answer
1	List 4 things about...	4	5 mins / 4 sentences	1	Tick 4 true statements	4	5 mins / 4 ticks
2	How does the writer use language to...	8	10 mins / 3 PEEAs	2	Summarise the similarities / differences between...	8	10 mins / 2 PEELEE paragraphs
3	How does the writer structure the text to interest you as a reader?	8	10 mins / 3 PEEAs (beginning, middle, end)	3	How does the writer of Source A use language to...	12	15 mins / 3-4 PEEAs
4	You will be given a statement from a student. To what extent do you agree?	20	20 mins / 5 PEEAs (XXOXX)	4	Compare how both writers use language to...	16	20 mins / 5 PEEAs

English Language Paper 1: Section B – writing to describe / narrate				English Language Paper 2: Section B – Writing to persuade			
5	Use the picture as a spring board for a description. Create a narrative on the theme of...	40 (24 marks for content; 16 marks for SPAG)	45 mins / 6 paragraphs	5	Respond to a viewpoint on a particular issue. Write a newspaper article / speech / letter to persuade the reader of your point of view.	40 (24 marks for content; 16 marks for SPAG)	45 mins / 6 paragraphs (Intro XXOX Conc)

Language Devices		Definition	Example	Structural devices		Definition
<i>Imperative verb</i>		A command verb	“Unsex me here”	Beginning: narrative hook		How the writer engages the reader e.g. using surprise, beginning in the middle of the story, with a question
<i>Negatives disproven</i>		Explaining why you disagree with the other point of view	Whilst you may believe that cars are better than motorbikes, in reality you should agree with me that...	Beginning: narrative perspective (1 st / 2 nd / 3 rd person)		1 st : I, me, we, 2 nd : you, 3 rd : they, he, she
<i>Anecdote</i>		A short, personal story	A story about why you have lost your homework	Beginning: creating atmosphere / tone		How the writer creates moods or emotions at the start of a text
<i>Alliteration</i>		Words starting with the same sound	“Two truths are told”	Middle: shift in focus		How the writer changes the focus to a different topic, issue, place or character
<i>Address reader</i>		Speaking directly to the reader / listener	Wouldn't you agree that...	Middle: building tension		Increasing the feeling of suspense
<i>Opinions</i>		Your own point of view	I believe that dogs are better than cats because...	Ending: cliff-hanger		Ending the narrative on a moment of tension or suspense
<i>Rhetorical question</i>		A question which doesn't expect an answer	Wouldn't you agree that revision is useful preparation for exams?	Ending: unanswered questions		Generating issues which the reader wants to find the answers for
<i>Emotive language</i>		Words which make the reader feel a strong emotion	Why not help this poor, abandoned, isolated puppy find a new home?	Examples of connectives:		
<i>Statistics</i>		Facts presented as numbers	80% of students agree with me that...	Showing similarities:		Similarly, likewise, in comparison, in addition, furthermore
<i>Triple</i>		A list of three things	English is exciting, enjoyable and enriching	Showing differences:		In contrast, contrastingly, however, on the other hand
<i>Pathetic fallacy</i>		Using the weather to convey the mood	“The rain set early in tonight”	Sentence stems for writing a PEEA paragraph:		
<i>Personification</i>		Giving an object human characteristics	The door groaned as it opened	Point		The writer presents.... as...
<i>Adjectives</i>		Words which describe a noun	Happy, energetic, excited	Evidence		We see this when... / The writer indicates this by saying... / Evidence of this is.... / A quotation to show this is...
<i>Adverbs</i>		Words which describe a verb (often end in -ly)	Quickly, slowly, unfailingly	Explain		This means that... / This suggests...
<i>Simile</i>		A comparison using like or as	As fast as the wind	Analyse		This suggests... / This connotes.... because... / This prompts the reader to consider... / The effect is... / This implies that... / This reinforces the point that...
<i>Senses</i>		Hearing, sight, smell, touch, taste	“The dew of the morning sank chill on my brow”			
<i>Metaphor</i>		A comparison between two things	Eden Rock			

English Language Paper 1: Fiction (Reading)

Steps to Success	Sentence Starters
Question 2: How does the writer use language to ...? (8mks)	
<ul style="list-style-type: none"> • Start by annotating the text and identifying quotations which show deliberate language choices • Comment on 3-4 different quotations in the text • Use subject terminology (see below) when referring to word choices and techniques • Consider the specific effects these language features have on a reader's understanding or appreciation of the text and its content • Consider the writer's intentions and how the reader should respond 	<ul style="list-style-type: none"> • <i>The writer ..., for example ... to create an image of ... making the reader imagine/understand ...</i> • <i>(Author) uses (feature) such as ... which creates a sense of ...</i> • <i>(Author) uses (feature) when describing ... in order to present ... This makes the reader ...</i> • <i>The writer wants to show/emphasise/suggest/make the reader think about...</i> • <i>This idea is further emphasised by ...The writer uses (term) to show (link to question), as shown by (evidence)</i>
Question 3: How does the writer use structure to ...? (8mks)	
<ul style="list-style-type: none"> • Divide the text in to sections (beginning, middle, end) • Annotate the different sections to show the focus and structural features used e.g: narrative voice, tense, shift and sequencing, links • Structure your answer by looking at the beginning, middle, end. • For each section, explain what the structural features is and remember to use quotes • Explain the effect the writer is trying to create <ul style="list-style-type: none"> ○ (what does the author make the reader ○ feel/think/imagine/question? Why does the writer sequence the text in this way?) 	<ul style="list-style-type: none"> • <i>At the beginning the writer focuses on...</i> • <i>In the middle of the text it shifts/progresses/develops ... to focus on...</i> • <i>The contrasts created between ... suggest ...</i> • <i>The continued shift in focus from ... to ... allows us to...</i> • <i>The climax of the piece occurs when...</i> • <i>The first/third person narrator creates...</i> • <i>This makes the reader think/understand/imagine/question/feel... because....</i>

Question 4: To what extent do you agree with the statement about the text? Critically evaluate. (20mks)

- Start by deciding how far you agree with the statement
- Annotating the text to support your decision identifying methods and effects.
- Write an umbrella point clearly stating your opinion giving a reason why
- Comment on 3 to 4 different methods and analyse their effects.
- Use subject terminology (see below) when referring to word choices and techniques
- Evaluate how effective the methods are

- *I partially /wholly agree with the statement that..... **because** ... however....*
- *The writer uses ... for example ...*
- *However*
- *In addition ...*
- *This emphasises/suggests/implies/ indicates*
- *This idea is further emphasised by ...*
- *The writer uses (term) to show (link to question), as shown by (evidence)*

Subject Terminology

Word classes: noun, verb, adjective, adverb, pronoun, preposition

Figurative Language: imagery, metaphor, simile, personification, onomatopoeia, alliteration

Steps to Success: Question 5 Writing to describe or narrate

You will be given a choice of two tasks: they could both be descriptive writing; both could be narrative writing or there could be a choice of one of each. You will be given a picture as a stimulus. **Suggested Timings:**

5 minutes planning

30 minutes writing

5 minutes proofreading

Descriptive writing – structure **NOTE:** *You can adapt this for narrative by focusing on the development of characters and/or actions in each paragraph.*

Paragraph 1: Describe a wide-angle view (pan) of the scene in the third person using adjectives, a simile and one sentence in which you use a semi-colon instead of a full stop to join two independent clauses. Use one key word which you repeat at the beginning, middle and end.

Paragraph 2: Zoom in on a feature/character. Use the senses.

Paragraph 3: Use a preposition to switch the focus to another part of the scene. Develop some action **Paragraph 4:** Zoom in on a character or characters. Start with an ‘ing’ verb (refer to movement) and use a list of 3. Include some snatched dialogue (one or two lines).

Paragraph 5: A single sentence

Paragraph 6: Return to a wide-angle view. How has it changed? Repeat a word or phrase from paragraph one.

Descriptive techniques (to be used in both descriptive and narrative writing):

- Sensory details that appeal to the reader’s senses – what they can see hear, touch and smell or taste. (Atmosphere. Colour. Texture.)
- Wow words: quantifiers and qualifiers in lists (e.g. ‘three excellent students), powerful
- noun/adjectival phrases, ispace openers, vivid vocabulary Imagery such as similes, metaphors and personification
- Lists to build detail

Additional techniques for narrative • Character development

- Dialogue to show character and plot development (some snatched dialogue can also be used in descriptive writing)
- Withholding information for effect
- Clues and hints to build suspense and tension

Arresting sentence styles:

Ambling through the gardens, **she stopped** at the sight of a hairy beast facing her.

- The little blue windup mouse Hugo had taken **fell** from his hand, **skidded** across the counter, and **landed** on the floor with a crack.
- **The more** confused she became, **the more** frustrated she grew.
- **Sighing**, Hattie knew there was no use in trying to explain why she did it.
- **Frightened, terrified, exhausted**, they fled the impending doom.

If the alarm had gone off, **if** the bus had been on time, **if** the road repairs had been completed, **then** his life would not have been destroyed.

English Language Paper 2: Non-Fiction (Reading)

Timing 1 and sequence 45mins (80 marks) 50% of Language GCSE

Steps to Success	Sentence Starters
Question 2: Summarise the differences (or similarities) between the 2 texts (8mks)	
<ul style="list-style-type: none"> • Underline key words in the question. Use these in your answer. • Create a T bar plan • Comment on 3-4 differences/similarities between the two texts • Support ideas with short quotations • Explain what the evidence suggests or implies 	<ul style="list-style-type: none"> • One of the main differences is • · On the other hand ... • · In contrast/Whereas ... • · We/I can infer that ... • · This suggests/implies/indicates/conveys • · This makes us think/imagine
Question 3: How does the writer use language ... (12mks)	
<ul style="list-style-type: none"> • Start by annotating the text and identifying quotations which show deliberate language choices • Comment on 3-4 different quotations in the text • Use subject terminology (see below) when referring to word choices and techniques • Consider the specific effects these language features have on a reader's understanding or appreciation of the text and its content • Consider the writer's intentions and how the reader should respond 	<ul style="list-style-type: none"> • <i>The writer ..., for example ... to create an image of ... making the reader imagine/understand ...</i> • <i>(Author) uses (feature) such as ... which creates a sense of ...</i> • <i>(Author) uses (feature) when describing ... in order to present ... This makes the reader ...</i> • <i>The writer wants to show/emphasise/suggest/make the reader think about...</i> • <i>This idea is further emphasised by ...The writer uses (term) to show (link to question), as shown by (evidence)</i>

Question 4: Compare the attitudes ... (16mks)

- Look for similarities and differences in opinion/thoughts/ideas in both texts.
- Highlight quotations in each source to support your ideas.
- Create a plan which compares the viewpoints/ideas/perspectives and the methods used to present these in each text.
- Write an umbrella point giving a comparative overview
- Comment in detail on at least 2 quotations from each text.
- Analyse the effect of methods in your quotations.

- *Both texts...*
- · *Whilst the writer of source A ... the writer of source B ...*
- · *(Author) feels that ... as shown when he/she says ...*
- · *We see this through his/her use of (method) which suggests ...*
- · *Whereas/On the other hand/In contrast ... (author) feels that ...*
- · *He/She uses ... to show ...*
- · *Overall, both writers show similar/different attitudes to ...*

Technical Terms

Word classes: noun, verb, adjective, adverb, pronoun, preposition

Rhetorical devices: repetition, use of facts, opinions, statistics, quotations, emotive language

Figurative Language: imagery, metaphor, simile, personification, onomatopoeia, alliteration

Sentence forms and types: simple, compound, complex, statement, question, exclamation, directive

Structure: perspective, focus, introduction, paragraph, development, positioning, juxtaposition

Steps to Success: Question 5 Writing to describe or narrate

Sample Task:

'More children should get a job before the age of sixteen. Part-time work would teach children valuable skills that they don't learn in school.'
To what extent do you agree with this statement? Write an article for a broadsheet newspaper in which you explain your point of view.

Suggested Timings:

5 minutes planning

30 minutes writing

5 minutes proofreading

Structure for writing to argue and persuade

Introduction: Start with a hook – introduce ideas. Think of a tone (amusing, serious or shocking). The opening should indicate your point of view. **Use an arresting sentence structure.**

1st main point : Statistics, Emotive language, Alliteration

Imagine

2nd main point : Anecdote, Personal opinion, Expert Opinion 3rd main

Moreover

3rd main point : Counter argument. Present an opposing argument to your main viewpoint. Undermine the counter argument.
Try using a statement followed by 2 bullet points.

In conclusion: Power of 3 and punctuation punch

Techniques to use when writing to argue and persuade

Direct address (you)

Anecdotes

Facts

Opinions (expert and personal)

Rhetorical questions/repetition

Emotive language

Statistics

Three (list of)

Arresting sentence styles:

Pressured and worried, stressed and exhausted, British students can no longer function and succeed under the current system.

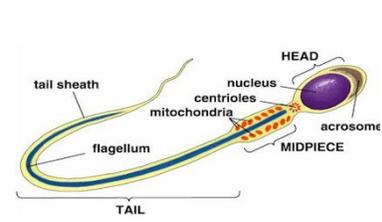
- Students of Britain are **angry: angry** because their efforts are unrewarded.
- **Stressed, undervalued, exhausted,** the British school system is simply failing our students.
- **Greed, blind-ambition, arrogance:** which of these was Macbeth's worst trait?

Section 1: Cell Structure

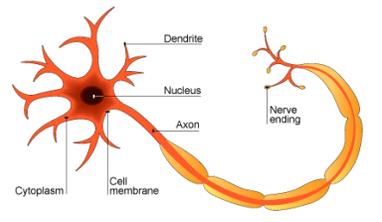
Cell Structure	Function	Eukaryotic		Prokaryotic
		Animal Cells	Plant Cells	Bacterial Cells
1 Nucleus	Contains genetic information that controls the functions of the cell.	Y	Y	
2 Cell membrane	Controls what enters and leaves the cell.	Y	Y	Y
3 Cytoplasm	Where many cell activities and chemical reactions within the cell occur.	Y	Y	Y
4 Mitochondria	Provides energy from aerobic respiration .	Y	Y	
5 Ribosome	Synthesises (makes) proteins .	Y	Y	Y
6 Chloroplast	Where photosynthesis occurs.		Y	
7 Permanent vacuole	Used to store water and other chemicals as cell sap .		Y	
8 Cell wall	Strengthens and supports the cell. (Made of cellulose in plants.)		Y	Y
9 DNA loop	A loop of DNA , not enclosed within a nucleus.			Y
10 Plasmid	A small circle of DNA , may contain genes associated with antibiotic resistance.			Y

Section 2: Specialised Cells

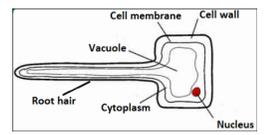
Specialised Cell	How structure relates to function
13 Sperm cell	Acrosome contains enzyme to break into egg; tail to swim; many mitochondria to provide energy to swim.
14 Nerve cell	Long to transmit electrical impulses over a distance.
15 Muscle cell	Contain protein fibres that can contract when energy is available, making the cells shorter.
16 Root hair cell	Long extension to increase surface area for water and mineral uptake; thin cell wall .
17 Xylem cell	Waterproofed cell wall; cells are hollow to allow water to move through.
18 Phloem cell	Some cells have lots of mitochondria for active transport ; some cells have very little cytoplasm for sugars to move through easily.



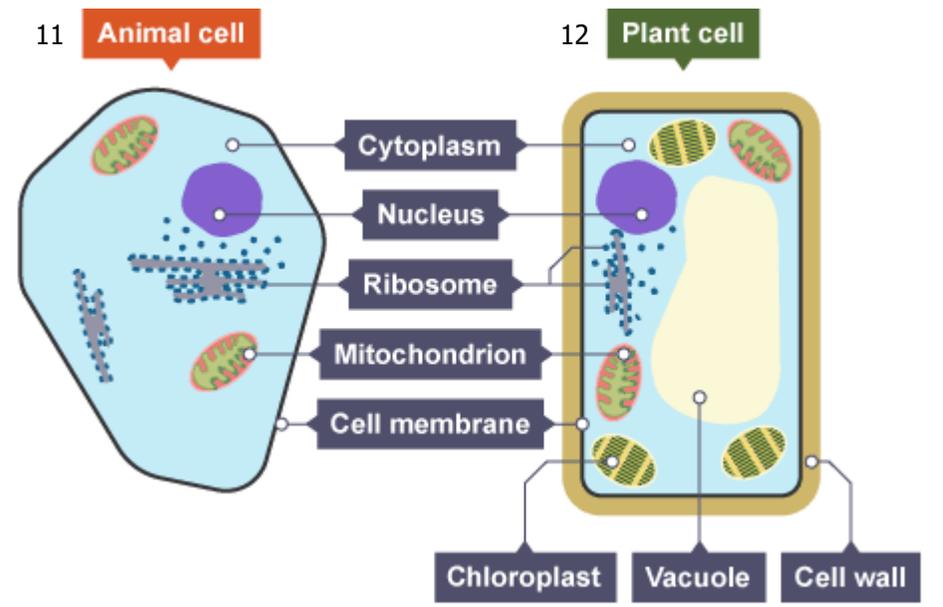
19 – Sperm cell



20 – Nerve cell



21 – Root hair cell

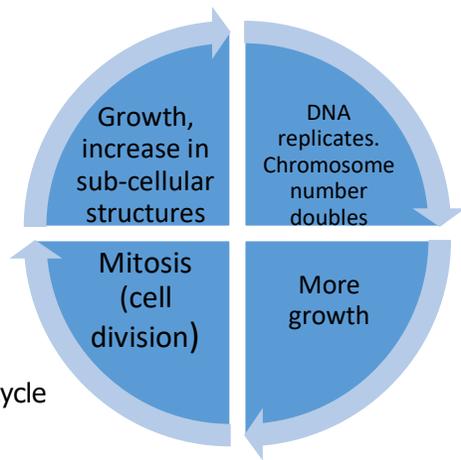


Section 3: Microscopy

22 Magnification	The degree by which an object is enlarged . Magnification = $\frac{\text{size of image}}{\text{size of real object}}$
23 Resolution	The ability of a microscope to distinguish detail .
24 Light microscope	Basic microscope with a maximum magnification of 1500x. Low resolution.
25 Electron microscope	Microscope with a much higher magnification (up to 500 000x) and resolving power than a light microscope. This means that it can be used to study cells in much finer detail.

Section 4: Orders of Magnitude

Unit Prefix	Size in metres	Standard Form
26 Centimetre (cm)	0.01m	10^{-2}m
27 Millimetre (mm)	0.001m	10^{-3}m
28 Micrometre (μm)	0.000001m	10^{-6}m
29 Nanometre (nm)	0.000000001m	10^{-9}m



30 – Cell cycle

Section 5: Mitosis and the Cell Cycle

31	Number of sub-cellular structures (e.g. ribosomes and mitochondria) increase .
32	Number of chromosomes double .
33	One set of chromosomes is pulled to each end of the cell.
34	The nucleus divides .
35	Cytoplasm and cell membranes divide to form two identical cells

Section 7: Transport Across Membranes

Cell Structure	Definition	Uses
41 Diffusion	Spreading out of the particles (gas/solution) resulting in a net movement from an area of higher concentration to an area of lower concentration .	Oxygen and carbon dioxide in gas exchange (leaves and alveoli). Urea from cells into the blood plasma for excretion in the kidney.
42 Osmosis	The diffusion of water from a dilute solution to a concentrated solution through a partially permeable membrane.	Movement of water into and out of cells.
43 Active Transport	The movement of substances from a more dilute solution to a more concentrated solution (against a concentration gradient). Requires energy from respiration.	Absorption of mineral ions (low concentration) from soil into plant roots . Absorption of sugar molecules from lower concentrations in the gut into the blood which has a higher sugar concentration.

Section 6: Stem Cells

Stem Cell	Properties	Uses
36 Embryonic stem cell	Can divide into most types of cell.	Therapeutic cloning – embryonic stem cells produced with same genes as patient. No rejection .
37 Adult stem cell	Can divide into a limited number of cells e.g. bone marrow stem cells can form various blood cells.	
38 Meristem	Found in plants. Can differentiate (divide) into any type of plant cell.	Clone rare species to prevent extinction . Crops with special features can be clones

Pros and Cons of Using Stem Cells

39 Pros	Treatment of diseases such as diabetes, dementia and paralysis.
40 Cons	Ethical and religious objections. Can transfer viruses held within cells.

Section 8: Factors Affecting Diffusion

Factor	Explanation
44 Difference in concentrations (concentration gradient)	The greater the difference in concentrations, the faster the rate of diffusion.
45 Temperature	Particles move more quickly at higher temperatures, so rate of diffusion increases.
46 Surface area of membrane	The greater the surface area the quicker the rate of diffusion.

Section 9: Adaptations of Exchange Surfaces

47	Large surface area
48	Thin membrane to provide a short diffusion path
49	Ventilation (in animals for gas exchange – maintains a concentration gradient)
50	Efficient blood supply (in animals – maintains a concentration gradient)

B1 – KO Quiz

Section 1: cell structure	
1. What is the function of the nucleus?	
2. What is the function of the cell membrane?	
3. What is the function of the cytoplasm?	
4. What is the function of the mitochondria ?	
5. What is the function of the ribosome ?	
6. What is the function of the chloroplast ?	
7. What is the function of the permanent vacuole ?	
8. What is the function of the cell wall ?	
9. What is the function of the DNA loop ?	
10. What is the function of a plasmid?	
11/ 12: Label the following diagrams:	

Section 2: specialised cells?:

13. How does the structure relate to the function in a sperm cell?

14 How does the structure relate to the function in a nerve cell ?

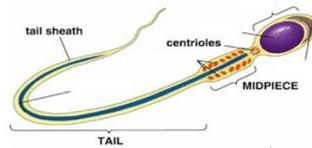
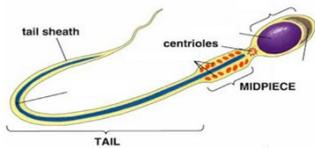
15 How does the structure relate to the function in a muscle cell ?

16 How does the structure relate to the function in a root hair cell?

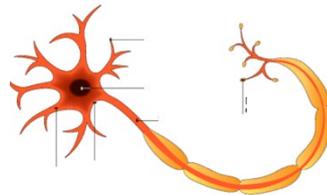
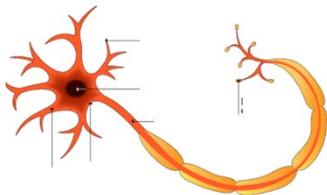
17 How does the structure relate to the function in a xylem cell ?

18 How does the structure relate to the function in a phloem cell?

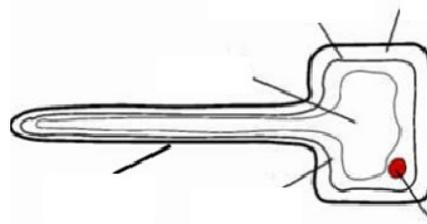
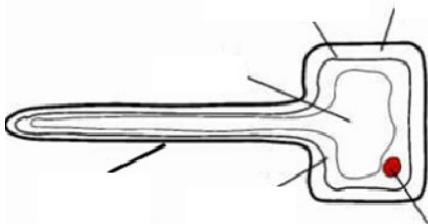
19 Label the tail, mitochondria, nucleus, acrosome, head, flagellum on a sperm cell



20. Label the cytoplasm, cell membrane axon, nucleus, dendrite, and nerve ending on a nerve cell.



21. Label the cell membrane, cell wall, nucleus vacuole, cytoplasm, and root hair on a root hair cell



Section 3: Microscopy	
22 What does magnification mean, what is the equation for it?	
23 what does resolution mean	
24 Give two facts about a light microscope	
25 Give three facts about an electron microscope	
Section 4: orders of magnitude	
26 Give 1 Centimetre (cm) in metres, and in standard form	
27 Give 1 Millimetre (mm) in meters, and in standard form	
28 Give 1 Micrometre (μm) in meters and in standard form	
29 give 1 Nanometre (nm) in meters and in standard form	
Section 5: mitosis and the cell cycle: (30: basic overview, 31-35: detailed)	
30 Give the four basic stages in the mitosis cell cycle	
31 What is the first thing that happens to chromosomes in mitosis ?	
32 What is the second thing that happens to chromosomes in mitosis ?	
33 what is the third thing that happens to chromosomes in mitosis ?	
34 After this, what happens to the nucleus?	

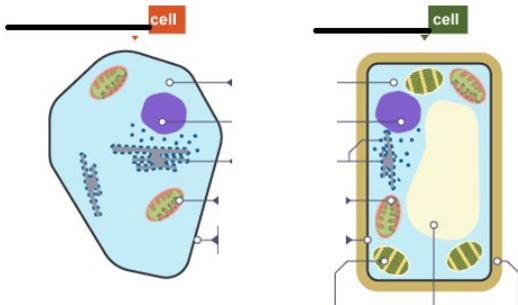
35 After this, what happens to the cytoplasm	
Section 6: stem cells	
36 What are the properties of embryonic stem cell? What are they used for?	
37 What are the properties of adult stem cell? What are they used for?	
38 What are the properties of meristem? What are they used for?	
39 What are the pros of using stem cells?	
40 what are the cons of using stem cells?	
Section 7: Transport across the membrane	
41 Define diffusion, when is it used?	
42 Define osmosis, when is used?	
43 Define active Transport, when is used?	
Section 8: factors affecting diffusion (you need to be able to list the three factors on your own too)	
44 Explain how difference in concentrations (concentration gradient) affects rate of diffusion	

45 Explain how Temperature affects rate of diffusion	
46 Explain how Surface area of membrane affects rate of diffusion	
Section 9: Adaptation of exchange surfaces (you need to be able to list these factors on your own too)	
47 How does Large surface area affect gas exchange?	
48 How does a Thin membrane affect gas exchange?	
49 How does Ventilation affect gas exchange?	
50 How does an Efficient blood supply affect gas exchange?	

B1 – KO Quiz

Section 1: cell structure

1. What is the function of the nucleus?
- 2 What is the function of the cell membrane?
- 3 What is the function of the cytoplasm?
- 4 What is the function of the mitochondria ?
- 5 What is the function of the ribosome ?
- 6 What is the function of the chloroplast ?
- 7 What is the function of the permanent vacuole ?
- 8 What is the function of the cell wall ?
- 9 What is the function of the DNA loop ?
10. What is the function of a plasmid?
- 11/ 12: Label the following diagrams:

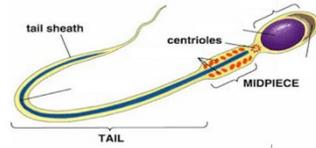


Section 2: specialised cells?:

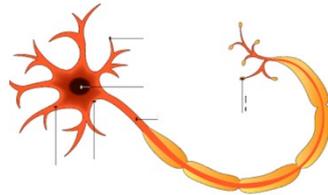
13. How does the structure relate to the function in a sperm cell?
- 14 How does the structure relate to the function in a nerve cell ?
- 15 How does the structure relate to the function in a muscle cell ?
- 16 How does the structure relate to the function in a root hair cell?
- 17 How does the structure relate to the function in a xylem cell ?

18 How does the structure relate to the function in a phloem cell?

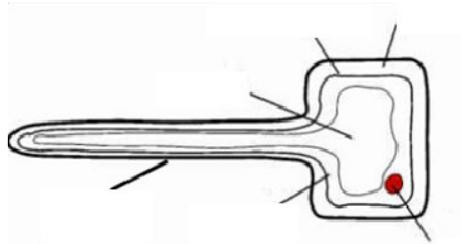
19 Label the tail, mitochondria, nucleus, acrosome, head, flagellum on a sperm cell



20. Label the cytoplasm, cell membrane axon, nucleus, dendrite, and nerve ending on a nerve cell.



21. Label the cell membrane, cell wall, nucleus vacuole, cytoplasm, and root hair on a root hair cell



Section 3: Microscopy

22 What does magnification mean, what is the equation for it?

23 what does resolution mean

24 Give two facts about a light microscope

25 Give three facts about an electron microscope

Section 4: orders of magnitude

26 Give 1 Centimetre (cm) in metres, and in standard form

27 Give 1 Millimetre (mm) in meters, and in standard form

28 Give 1 Micrometre (μm) in meters and in standard form

29 give 1 Nanometre (nm) in meters and in standard form

Section 5: mitosis and the cell cycle: (30: basic overview, 31-35: detailed)

30 Give the four basic stages in the mitosis cell cycle

31 What is the first thing that happens to chromosomes in mitosis ?

32 What is the second thing that happens to chromosomes in mitosis ?

33 what is the third thing that happens to chromosomes in mitosis ?

34 After this, what happens to the nucleus?

35 After this, what happens to the cytoplasm

Section 6: stem cells

36 What are the properties of embryonic stem cell? What are they used for?

37 What are the properties of adult stem cell? What are they used for?

38 What are the properties of meristem? What are they used for?

39 What are the pros of using stem cells?

40 what are the cons of using stem cells?

Section 7: Transport across the membrane

41 Define diffusion, when is it used?

42 Define osmosis, when is used?

43 Define active Transport, when is used?

Section 8: factors affecting diffusion (you need to be able to list the three factors on your own too)

44 Explain how difference in concentrations (**concentration gradient**) affects rate of diffusion

45 Explain how **Temperature** affects rate of diffusion

46 Explain how **Surface area** of membrane affects rate of diffusion

Section 9: Adaptation of exchange surfaces (you need to be able to list these factors on your own too)

47 How does **Large surface area** affect gas exchange?

48 How does a **Thin membrane** affect gas exchange?

49 How does **Ventilation** affect gas exchange?

50 How does an **Efficient blood supply** affect gas exchange?

Biology 2: Organisation

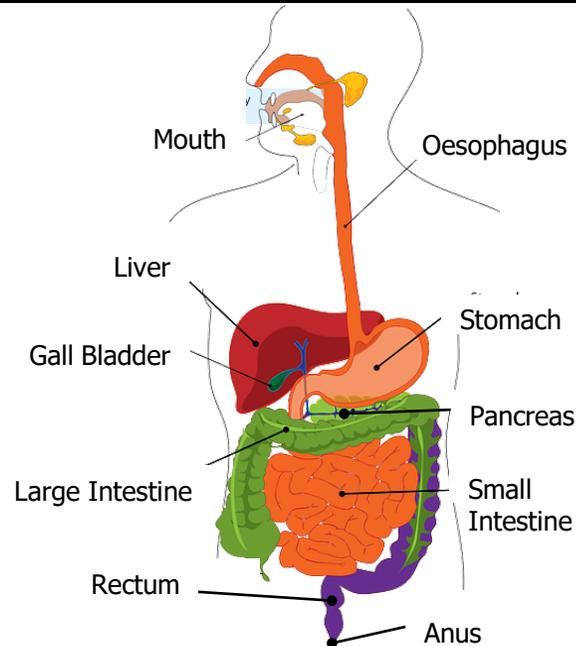
Section 1: Organisation

1 Tissue	A group of cells with a similar structure and function e.g. muscle tissue
2 Organ	A group of tissues performing a specific function e.g. heart, leaf
3 Organ System	A group of organs that perform a specific function e.g. digestive system.

Section 2: Human Digestive System

4 Order of movement of food through the digestive system:

Mouth	Many
Oesophagus	Ordinary
Stomach	Students
Small intestine	Struggle
Large intestine	Learning and
Rectum	Remembering
Anus	Answers



Section 3: Enzymes Key Terms

5 Enzyme	A biological catalyst that can speed up the rate of reaction without being used itself. Made of a large protein molecule .
6 Substrate	The chemical that fits into the active site of an enzyme.
7 Lock and Key Model	Only one type of substrate can fit into the active site of an enzyme, like a key fits into a lock.
8 Denatured	When the active site of an enzyme changes shape and the substrate can no longer fit in . Can be caused by pH or temperature .

Section 4: Testing for Biological Molecules

Molecule	Chemical Test	Positive Result
9 Starch	Add orange/brown iodine solution .	Colour turns to blue/black .
10 Sugar	Add blue Benedict's solution . Place in a boiling water bath for 5 minutes .	Colour turns green/ yellow/ orange/ brick red .
11 Protein	Add blue Biuret solution .	Colour turns to lilac/ purple .
12 Lipid	Add ethanol and decant into water .	Cloudy white emulsion .

Section 5a: Human Digestive Enzymes

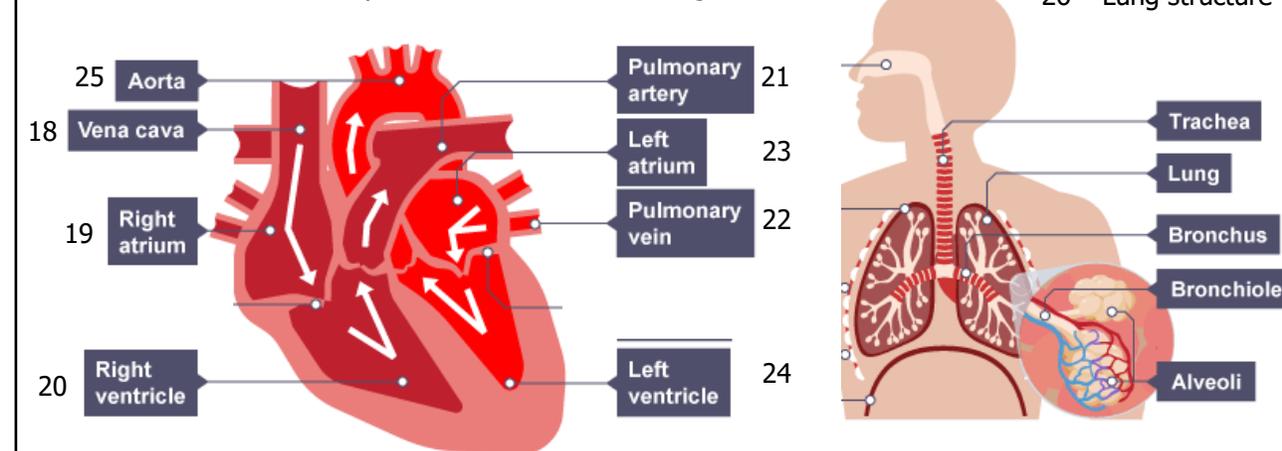
Enzyme	Function	Sites of production	Sites of action
13 Amylase	Breaks starch into sugars .	Salivary glands Pancreas Small intestine	Mouth Small intestine
14 Protease	Breaks proteins into amino acids .	Stomach Pancreas Small intestine	Stomach Small intestine
15 Lipase	Breaks lipids (fats) into fatty acids and glycerol .	Pancreas Small intestine	Small intestine

Section 5b: Other Chemicals

16 Hydrochloric Acid	Acid with pH of 2 produced by the stomach. Unravels proteins .
17 Bile	Emulsifies fats (turns them into droplets to give a greater surface area). It is alkaline so neutralises acid from the stomach . Produced in liver, stored in gall bladder and is released into the small intestine .

Section 6: Heart and Lungs

Orders of numbers is the way in which blood flows through the heart



Section 6a: Structures in the Heart

27 Pacemaker	Group of cells in the right atrium that controls resting heart rate .
28 Right ventricle	Pumps deoxygenated blood to the lungs for gas exchange .
29 Left ventricle	Pumps oxygenated blood to the body . Thick, muscular wall .
30 Valve	Stops blood flowing the wrong way / leaking.

Section 6b: Structures in the Lungs

31 Alveoli	Small sacs where gas exchange occurs. Surrounded by capillaries . Oxygen moves from the alveoli into the capillaries , carbon dioxide moves from the capillaries into the alveoli
32 Trachea and Bronchi	Tubes through which gases move. Lined with cartilage so they don't collapse.

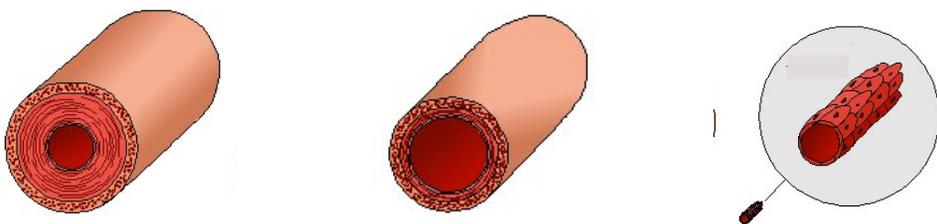
Biology 2: Organisation

Section 7: Heart Disease

33 Coronary Heart Disease Build up of **fatty material in coronary arteries**. Can lead to a **blood clot** and a **heart attack**.

Treatment	What it is	Advantage	Disadvantage
34 Stent	Wire mesh that opens up a blocked artery .	Keeps artery open. Low-risk surgery.	Fatty material can rebuild.
35 Statin	Drug that reduces cholesterol .	Reduces fat being deposited in arteries.	Side effects e.g. liver damage.
36 Heart transplant	Replacement heart from a donor.	Long-term.	Major surgery. Could be rejected.
37 Artificial heart	Man-made heart used while waiting for a transplant .	Not rejected. Keeps patient alive.	Short life-time. Battery has to be transported. Limited activity.
38 Mechanical heart valve	Mechanical replacement of faulty heart valve.	Can last a life-time.	Can damage red blood cells.
39 Biological heart valve	Biological replacement of faulty heart valve.	Don't damage red blood cells.	Valve hardens and may need replacing.

Section 8: Blood Vessels



	40 Artery	41 Vein	42 Capillary
Purpose	Takes blood away from the heart .	Takes blood back to the heart .	Exchange of substances between blood and cells .
Adaptations	Thick wall to withstand high pressure	Thin wall. Valves to prevent backflow of blood .	Wall is one cell thick to allow quick diffusion of substances.

Section 9: Components of the Blood

43 Plasma	Liquid part of the blood. Transports blood cells as well as carbon dioxide, proteins, glucose, hormones and urea .
44 Red Blood Cells	Carries oxygen . Packed with haemoglobin , a protein that binds to oxygen. No nucleus to create extra space for haemoglobin. Biconcave shape to give a large surface area .
45 White Blood Cells	Destroy pathogens . Some can produce antibodies .
46 Platelets	Cell fragments that help to clot wounds .

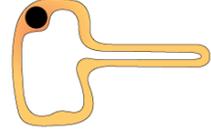
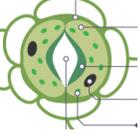
Section 10a: Movement within Plants

47 Transpiration	The loss of water vapour from the leaves by evaporation from cells and then out through the stomata .
48 Transpiration Stream	The movement of water from the roots , up the stem to the leaves .
49 Translocation	The movement of dissolved sugars around the plant.

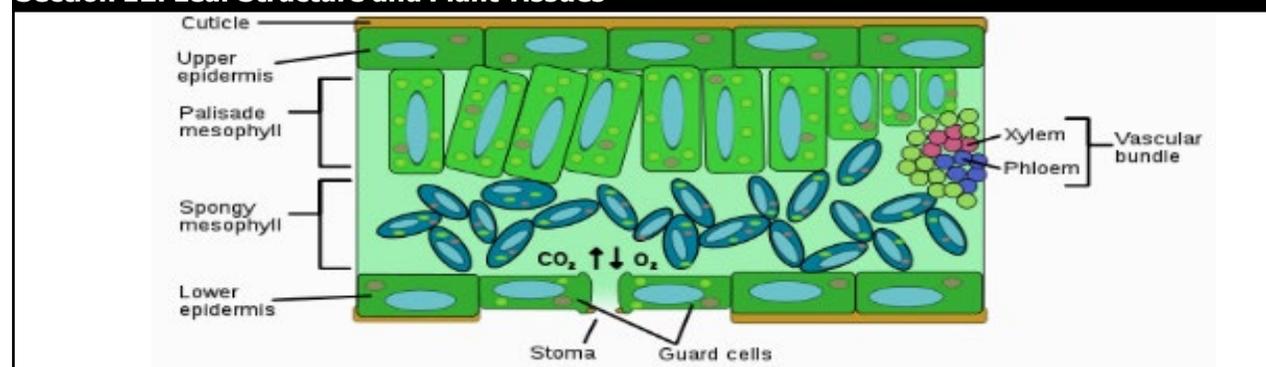
Section 10b: Factors Affecting Transpiration

50 Temperature	Increasing temperature increases the transpiration rate as water evaporates quickly.
51 Humidity	Increasing humidity decreases the rate of transpiration as water evaporates slowly.
52 Wind speed	Increasing wind speed increases the transpiration rate as water evaporates quickly.
53 Light	Increasing light increases the rate of transpiration as stomata open .

Section 11: Cell Adaptations for Movement Within Plants

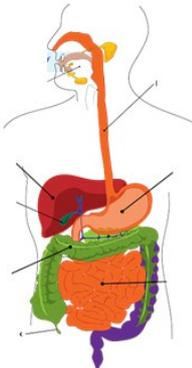
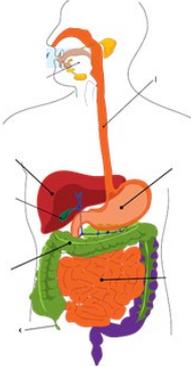
			
54 Root hair cell Extension gives a large surface area to absorb water and minerals .	55 Xylem Vessels are strengthened by lignin to withstand pressure . Cell walls are waterproof .	56 Phloem End of cells contain pores to allow dissolved sugars to move between cells.	57 Guard Cells and Stoma Guard cells can open the stoma to allow gas exchange or close to prevent water loss .

Section 12: Leaf Structure and Plant Tissues



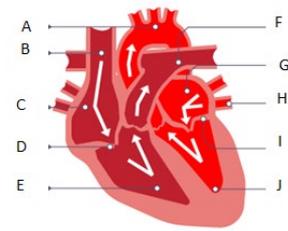
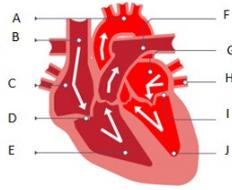
58 Epidermis	Cover the surfaces of the leaf; lets light penetrate .
59 Xylem	Carries water and minerals from the roots around the plant.
60 Phloem	Carries dissolved sugars made through photosynthesis around the plant.
61 Palisade mesophyll	Where most photosynthesis takes place. Cells contain many chloroplasts . Absorbs light .
62 Spongy mesophyll	Some photosynthesis . Has air spaces for diffusion of CO ₂ and O ₂ .
63 Guard cells	Cells that open and close stomata .
64 Stoma	Opening that allows CO₂ and O₂ to diffuse in and out of the leaf.

B2 Knowledge Organiser Quiz

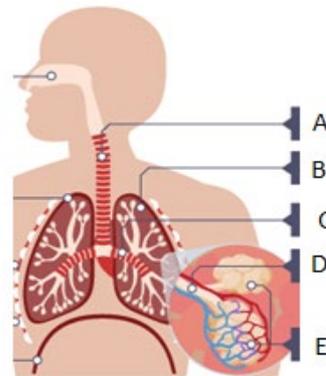
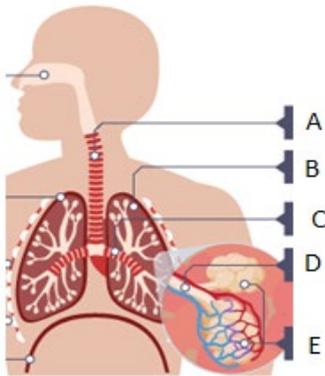
Section 1: organisation	
1 define tissue	
2 Define organ	
3 Define organ System	
Section 2: Human Digestive System	
4 List the order of how food moves through the digestive system	
Label this diagram	
	
Section 3: Enzymes Key terms	
5 Describe what an enzyme is	
6 What is a substrate?	
7 What is the Lock and Key Model?	
8 Describe what denatured means	
Section 4: Testing for biological molecules	

9 Give the chemical test for starch, how would you know there's a positive result?	
10 Give the chemical test for sugars, how would you know there's a positive result?	
11 Give the chemical test for proteins, how would you know there's a positive result?	
12 Give the chemical test for lipids, how would you know there's a positive result?	
Section 5a: Human Digestive Enzymes (you have to know the names of the enzymes independently too)	
13 What is the function of Amylase? Where is produced? Where does it work?	
14 What is the function of Protease? Where is produced? Where does it work?	
15 What is the function of Lipase? Where is produced? Where does it work?	
Section 5b: Other Chemicals	
16 Describe hydrochloric acid	
17 Describe what bile is, what it does and where it is produced	
Section 6: Heart and lungs	

- 18 label the Vena Cava
- 19 label the right atrium
- 20 label the right ventricle
- 21 label the pulmonary artery
- 22 label the pulmonary vein
- 23 Label the left atrium
- 24 label the left ventricle
- 25 label the aorta



26 label the lung structure in the diagram



Section 6: Structures in the heart

27 What is the pacemaker?

28 What does the right ventricle do?

29 What does the left ventricle do?

30 What do valves do?

Section 6b: Structure of the lungs

31 describe the alveoli

32 Describe the trachea and Bronchi

Section 7: Heart disease

33 what is coronary heart disease?

34 What is a stent? What are the advantages of using it? What are the disadvantages of using it?	
35 What are statins? What are the advantages of using them? What are the disadvantages of using them?	
36 What is a heart transplant? What are the advantages of using it? What are the disadvantages of using it?	
37 what is an artificial heart? What are the advantages of using it? What are the disadvantages of using it?	
38 what is a mechanical heart valve? What are the advantages of using it? What are the disadvantages of using it?	
39 What is a biological heart valve? What are the advantages of using it? What are the disadvantages of using it?	
<u>Section 8: Blood vessels</u>	
40 What is the purpose of an artery, how is it adapted to its job?	
41 What is the purpose of a vein, how is it adapted to its job?	

42 What is the purpose of a capillary, how is it adapted to its job?	
Section 9: Components of the blood	
43 What is plasma? What does it do?	
44 Describe red blood cells	
45 Describe white blood cells	
46 What are platelets?	
Section 10a: Movement within plants	
47 what is transpiration?	
48 What is transpiration Stream?	
49 What is translocation?	
Section 10b: Factors affecting transpiration	
50 Explain how temperature affects transpiration	
51 Explain how humidity affects transpiration	
52 Explain how wind speed affects transpiration	
53 Explain how light affects transpiration	

Sections 11: Cell adaptations for movement within plants

54 Sketch and label the root hair cell, explain how the cell and how it is adapted to its function

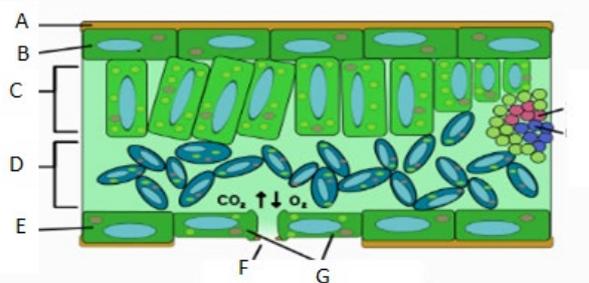
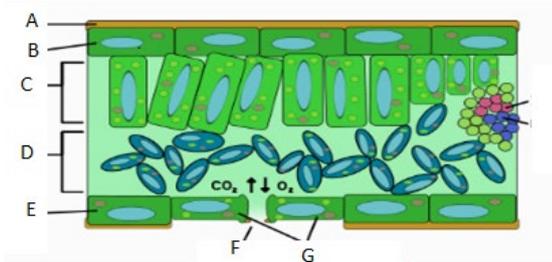
55 Sketch and label the xylem, explain how the cell is adapted to its function

56 Sketch and label the phloem, explain how the cell is adapted to its function

57 Sketch and label the guard cells and stomata, and explain how they are adapted to the function

Section 12: Leaf structure and plant tissues

- 58 Label the epidermis, what does it do?
- 59 Label the xylem, what does it do?
- 60 Label the phloem, what does it do?
- 61 Label the palisade mesophyll, what does it do?
- 62 Label the spongy mesophyll, what does it do?
- 63 Label the guard cells, what does it do?
- 64 Label the stoma, what does it do?



B2 Knowledge Organiser Quiz

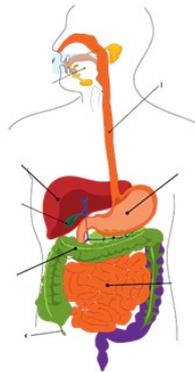
Section 1: organisation

- 1 define tissue
- 2 Define organ
- 3 Define organ System

Section 2: Human Digestive System

- 4 List the order of how food moves through the digestive system

Label this diagram



Section 3: Enzymes Key terms

- 5 Describe what an enzyme is
- 6 What is a substrate?
- 7 What is the Lock and Key Model?
- 8 Describe what denatured means

Section 4: Testing for biological molecules

- 9 Give the chemical test for starch, how would you know there's a positive result?
- 10 Give the chemical test for sugars, how would you know there's a positive result?
- 11 Give the chemical test for proteins, how would you know there's a positive result?
- 12 Give the chemical test for lipids, how would you know there's a positive result?

Section 5a: Human Digestive Enzymes (you have to know the names of the enzymes independently too)

13 What is the function of Amylase? Where is produced? Where does it work?

14 What is the function of Protease? Where is produced? Where does it work?

15 What is the function of Lipase? Where is produced? Where does it work?

Section 5b: Other Chemicals

16 Describe hydrochloric acid

17 Describe what bile is, what it does and where it is produced

Section 6: Heart and lungs

18 label the Vena Cava

19 label the right atrium

20 label the right ventricle

21 label the pulmonary artery

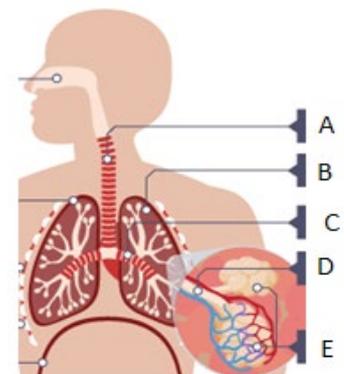
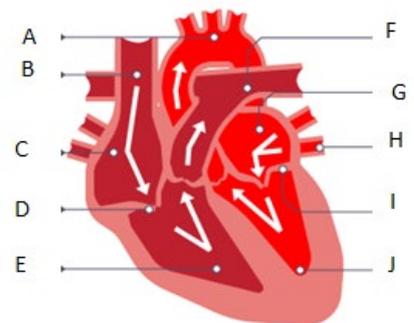
22 label the pulmonary vein

23 Label the left atrium

24 label the left ventricle

25 label the aorta

26 label the lung structure in the diagram



Section 6: Structures in the heart

27 What is the pacemaker?

28 What does the right ventricle do?

29 What does the left ventricle do?

30 What do valves do?

Section 6b: Structure of the lungs

31 describe the alveoli

32 Describe the trachea and Bronchi

Section 7: Heart disease

33 what is coronary heart disease?

34 What is a stent? What are the advantages of using it? What are the disadvantages of using it?

35 What are statins? What are the advantages of using them? What are the disadvantages of using them?

36 What is a heart transplant? What are the advantages of using it? What are the disadvantages of using it?

37 what is an artificial heart? What are the advantages of using it? What are the disadvantages of using it?

38 what is a mechanical heart valve? What are the advantages of using it? What are the disadvantages of using it?

39 What is a biological heart valve? What are the advantages of using it? What are the disadvantages of using it?

Section 8: Blood vessels

40 What is the purpose of an artery, how is it adapted to its job?

41 What is the purpose of a vein, how is it adapted to its job?

42 What is the purpose of a capillary, how is it adapted to its job?

Section 9: Components of the blood

43 What is plasma? What does it do?

44 Describe red blood cells

45 Describe white blood cells

46 What are platelets?

Section 10a: Movement within plants

47 what is transpiration?

48 What is transpiration Stream?

49 What is translocation?

Section 10b: Factors affecting transpiration

50 Explain how temperature affects transpiration

51 Explain how humidity affects transpiration

52 Explain how wind speed affects transpiration

53 Explain how light affects transpiration

Sections 11: Cell adaptations for movement within plants

54 Identify the root hair cell, explain how the cell and how it is adapted to its function

55 Identify the xylem, explain how the cell is adapted to its function

56 Identify the phloem, explain how the cell is adapted to its function

57 Identify the guard cells and stomata, and explain how they are adapted to the function

Section 12: Leaf structure and plant tissues

58 Label the epidermis, what does it do?

59 Label the xylem, what does it do?

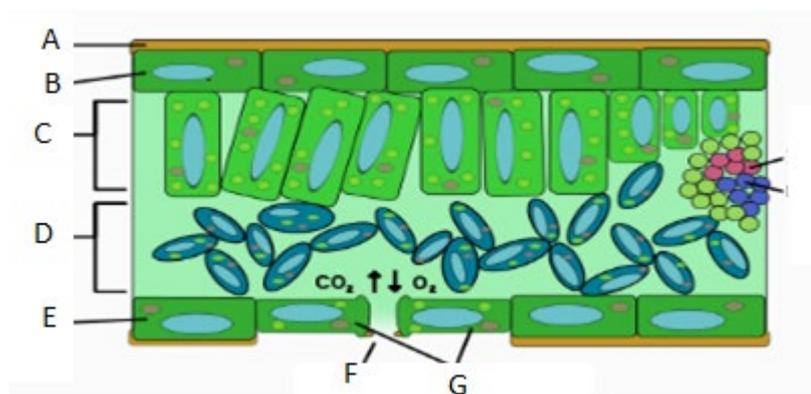
60 Label the phloem, what does it do?

61 Label the palisade mesophyll, what does it do?

62 Label the spongy mesophyll, what does it do?

63 Label the guard cells, what does it do?

64 Label the stoma, what does it do?



Biology 3: Infection and Response

Section 1: Pathogens and Diseases

Disease	Pathogen	How it is spread	Effect	Prevention/ Control
1 Measles	Virus	Droplets from sneezes and coughs	Can be fatal	Vaccination of children
2 HIV	Virus	Sexual contact, needle exchange	Damages some white blood cells	Antiretroviral drugs when infected
3 Tobacco Mosaic Virus	Virus	Direct contact	Mottling of leaves, reduces photosynthesis	
4 Salmonella	Bacteria	Infected food	Fever, abdominal cramps, diarrhoea, vomiting	Vaccination of poultry (chickens).
5 Gonorrhoea	Bacteria	Sexual contact	Discharge from penis/vagina, pain when urinating	Controlled by antibiotics. Spread prevented by condoms.
6 Rose Black Spot	Fungus	Spores carried by water or wind	Leaves turn yellow, fall early. Photosynthesis reduced.	Treated by fungicides or destroying affected leaves.
7 Malaria	Protist	By a vector – mosquito	Fever, can be fatal.	Preventing mosquitos from breeding, using mosquito nets.

Section 2: Non-Specific Defences

8 Trachea and Bronchi
Produces **mucus** to trap pathogens. Contains **cilia** to move mucus for swallowing

9 Nose
Contains **hairs** and **mucus** to trap pathogens

10 Stomach
Contains **hydrochloric acid** to destroy pathogens.

11 Skin
A **physical barrier** to pathogens.

Section 3: Key terms

12 Pathogen	A microorganism that causes disease .
13 Bacteria	A type of pathogen that produces toxins that damage tissues .
14 Viruses	A type of pathogen that lives and replicates within cells and causes cell damage . It is difficult to kill viruses without damaging cells .
15 Antibodies	Some white blood cells (lymphocytes) produce antibodies. These bind to pathogens and destroy them or stick them together .
16 Antitoxins	Some white blood cells (lymphocytes) produce antitoxins. Antitoxins neutralise toxins .
17 Antibiotics	Antibiotics kill bacteria . Specific antibiotics should be used for specific bacteria . Some bacteria are resistant to antibiotics. Do not kill viruses .
18 Painkillers	Painkillers relieve symptoms but don't kill pathogens .
19 Phagocytosis	Some white blood cells (phagocytes) engulf pathogens .

Section 4: Drugs

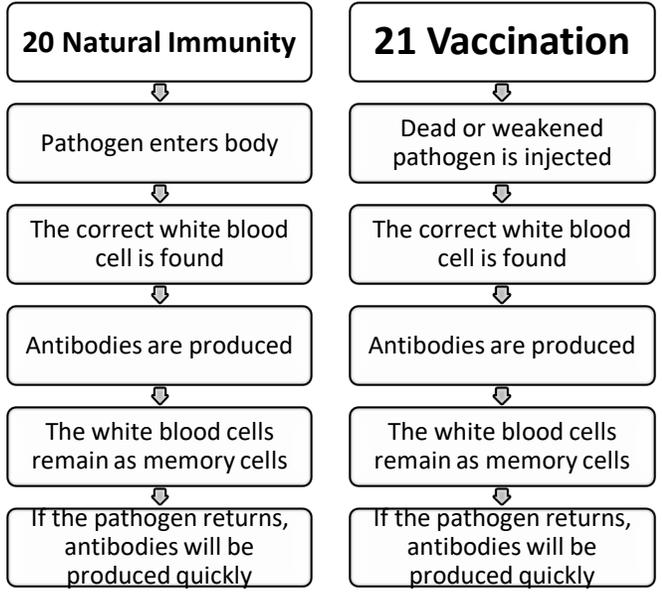
22 Aspirin	Originates from the willow tree.
23 Digitalis	A heart drug . Originates from foxglove plants.
24 Penicillin	Discovered by Alexander Fleming from the Penicillium fungus .
25 New drugs	Most new drugs are synthesised by chemists in the pharmaceutical industry . The starting point may be a chemical extracted from a plant .

Section 5: Clinical Trials

Trial Stage	Purpose
26 1. Preclinical – cells, animals	Test for toxicity and efficacy before testing humans
27 2. Healthy volunteers	Very low doses to test for toxicity .
28 3. Patients	Larger groups. Test for toxicity, efficacy and dose . Placebos may be used in a double-blind trial .

Clinical Trial Key Terms

29 Placebo	A drug with no active ingredients , designed to test if the effects of a drug on a patient are just psychological .
30 Double-blind trial	The volunteers do not know which group they are in, and neither do the researchers, until the end of the trial
31 Toxicity	How harmful the drug is. May have dangerous side effects .
32 Efficacy	How effective the drug is.
33 Dose	The amount of the drug given to the patient.

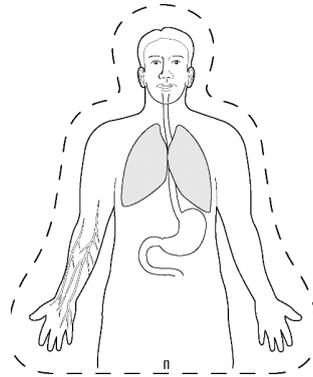
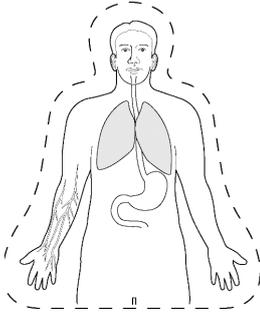


B3 – Knowledge Organiser Quiz

Section 1: Pathogens and diseases	
1 Which pathogen causes measles, how is it spread? What are the effects? How can it be prevented?	
2 Which pathogen causes HIV, how is it spread? What are the effects? How can it be prevented?	
3 Which pathogen causes Tobacco Mosaic Virus, how is it spread? What are the effects? How can it be prevented?	
4 Which pathogen causes Salmonella, how is it spread? What are the effects? How can it be prevented?	
5 Which pathogen causes Gonorrhoea, how is it spread? What are the effects? How can it be prevented?	
6 Which pathogen causes Rose Black Spot, how is it spread? What are the effects? How can it be prevented?	
7 Which pathogen causes Malaria, how is it spread? What are the effects? How can it be prevented?	

Section 2: Non- specific defence

- 8 Label the Trachea and Bronchi, how does it help in non-specific defence?
- 9 Label the nose, how does it help in non-specific defence?
- 10 Label the stomach, how does it help in non-specific defence?
- 11 label the skin, how does it help in non-specific defence?



Section 3: Key terms

12 What is a pathogen?

13 What are bacteria?

14 What are viruses? Why is it difficult to kill them?

15 What are antibodies? How to they work?

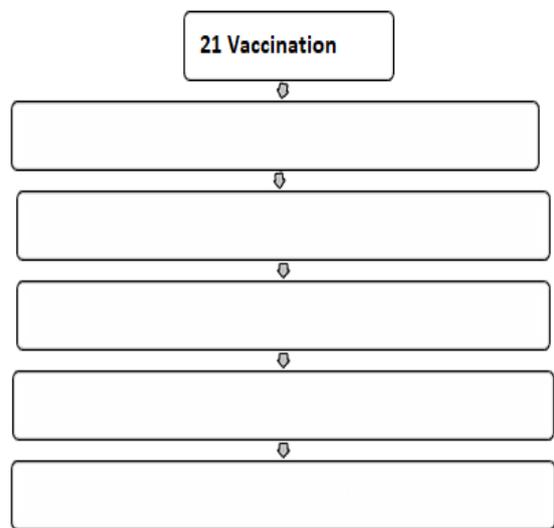
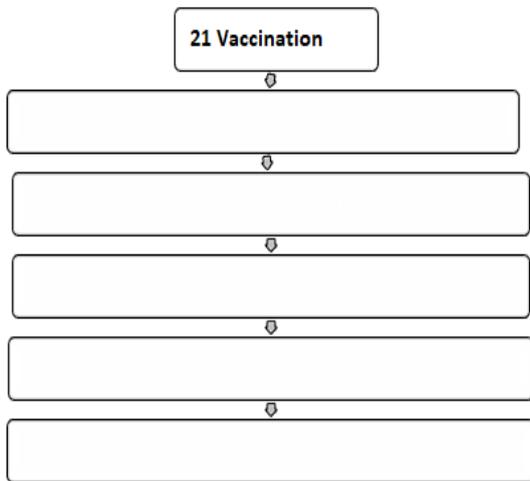
16 What are antitoxins? How to they work?

17 what are antibiotics? How do they work?

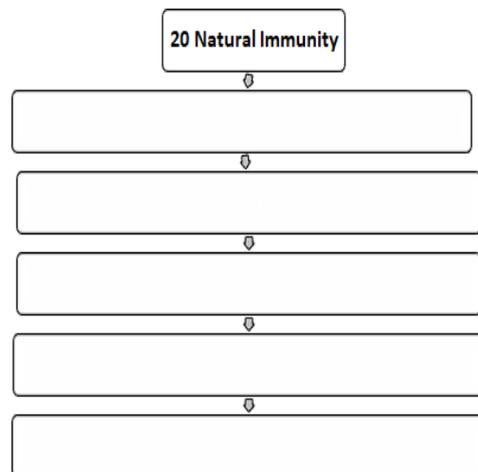
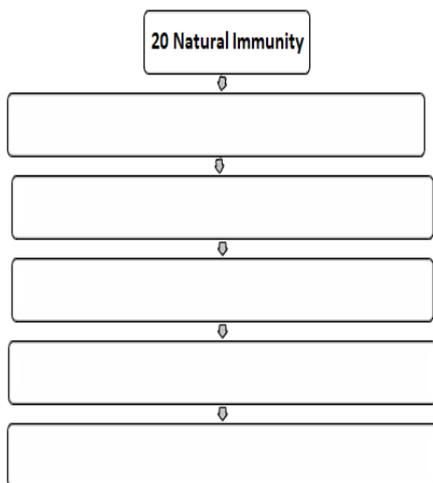
18 What are painkillers? What impact do they have on pathogens?

19 What is phagocytosis?

20: Draw a flow chart to show the steps involved in vaccination



21 Draw the flow chart to show the steps involved in natural immunity



Section 4: Drugs

22 Where is aspirin from?

23 What is digitalis? What does it originate from?

24 Who discovered penicillin? Where is from?

25 Where are most new drugs from?

Section 5: clinical trials	
26 What is the first stage in clinical trials? What is its purpose? 27 What is the second stage in clinical trials? What is its purpose?	
28 What is the third stage in clinical trials? What is its purpose?	
Clinical Trials	
29 Explain the term placebo	
30 Explain the term double blind trail	
31 Describe the term toxicity	
32 Define the term efficacy	
33 Define the term dose	

B3 – Knowledge Organiser Quiz

Section 1: Pathogens and diseases

- 1 Which pathogen causes measles, how is it spread? What are the effects? How can it be prevented?
- 2 Which pathogen causes HIV, how is it spread? What are the effects? How can it be prevented?
- 3 Which pathogen causes Tobacco Mosaic Virus, how is it spread? What are the effects? How can it be prevented?
- 4 Which pathogen causes Salmonella, how is it spread? What are the effects? How can it be prevented?
- 5 Which pathogen causes Gonorrhoea, how is it spread? What are the effects? How can it be prevented?
- 6 Which pathogen causes Rose Black Spot, how is it spread? What are the effects? How can it be prevented?
- 7 Which pathogen causes Malaria, how is it spread? What are the effects? How can it be prevented?

Section 2: Non- specific defence

- 8 Label the Trachea and Bronchi, how does it help in non-specific defence?
- 9 Label the nose, how does it help in non-specific defence?
- 10 Label the stomach, how does it help in non-specific defence?
- 11 label the skin, how does it help in non-specific defence?

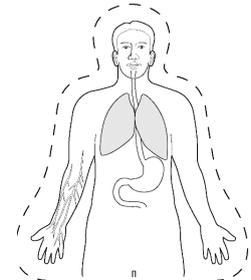


Figure 1 Section 2. Q8-11

Section 3: Key terms

- 12 What is a pathogen?
- 13 What are bacteria?
- 14 What are viruses? Why is it difficult to kill them?
- 15 What are antibodies? How do they work?
- 16 What are antitoxins? How do they work?
- 17 What are antibiotics? How do they work?
- 18 What are painkillers? What impact do they have on pathogens?
- 19 What is phagocytosis?
- 20: Draw a flow chart to show the steps involved in vaccination
- 21 Draw the flow chart to show the steps involved in natural immunity

21 Vaccination

Figure 2 For section 3, question 20

20 Natural Immunity

Figure 3 For section 3, question 21

Section 4: Drugs

22 Where is aspirin from?

23 What is digitalis? What does it originate from?

24 Who discovered penicillin? Where is from?

25 Where are most new drugs from?

Section 5: clinical trials

26 What is the first stage in clinical trials? What is its purpose? 27 What is the second stage in clinical trials? What is its purpose?

28 What is the third stage in clinical trials? What is its purpose?

Clinical Trials

29 Explain the term placebo

30 Explain the term double blind trail

31 Describe the term toxicity

32 Define the term efficacy

33 Define the term dose

Section 1: Photosynthesis Equation

1	Carbon dioxide + water	→	glucose + oxygen
2	$6\text{CO}_2 + 6\text{H}_2\text{O}$	→	$\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

Section 2: Key terms

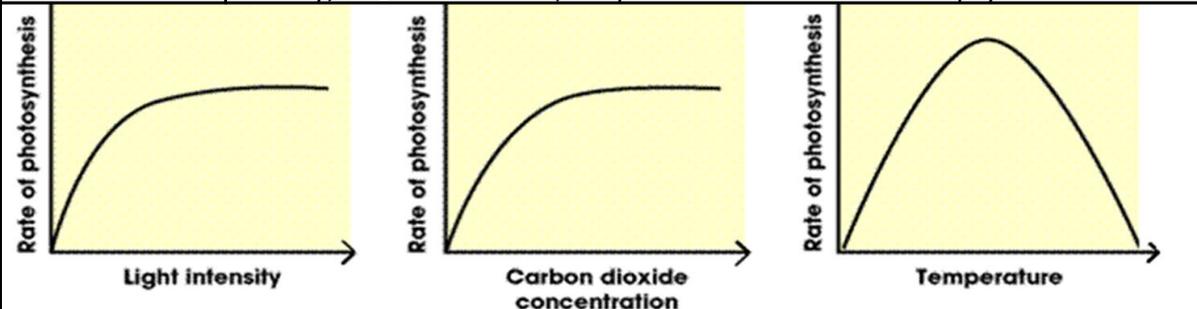
3 Chloroplast	The plant organelle where photosynthesis takes place.
4 Chlorophyll	The green pigment that absorbs energy from light .
5 Endothermic	Photosynthesis takes energy in (in the form of light). It is an endothermic reaction.
6 Diffusion	The spreading out of particles by random motion from where they are in high concentration to a low concentration. Occurs in gases and liquids.

Section 3: Uses of Glucose

7	Used in respiration to provide energy .
8	Converted into starch for storage .
9	Converted into fats and oils for storage .
10	Produce cellulose to strengthen the cell wall .
11	Produce amino acids to make proteins (also needs nitrate ions from the soil)

Section 4: Limiting Factors

12 Limiting Factor	The factor that stops the rate of photosynthesis from increasing; could be light intensity, CO ₂ concentration, temperature or amount of chlorophyll.
--------------------	--



13 Light Intensity Initially light is the limiting factor. When the graph plateaus something else (e.g. CO ₂ concentration, temperature) is limiting the rate.	14 CO₂ concentration Initially CO ₂ concentration is the limiting factor. When the graph plateaus something else (e.g. light intensity, temperature) is limiting the rate.	15 Temperature As temperature increases, the rate of photosynthesis increases. Above the optimum there is a decrease in photosynthesis. Enzymes needed for photosynthesis become denatured.
---	--	---

Section 5: Respiration

16 Energy	Energy in organisms is needed for chemical reactions to build larger molecules, movement and keeping warm .
17 Aerobic Respiration	Aerobic respiration provides energy . It requires oxygen . It is an exothermic reaction (produces heat). In mitochondria . Glucose + oxygen → carbon dioxide + water C₆H₁₂O₆ + 6O₂ → 6CO₂ + 6H₂O
18 Anaerobic Respiration (muscles)	No oxygen needed. Provides less energy than aerobic respiration as glucose not fully oxidised . Occurs during intensive exercise . In cytoplasm . Glucose → lactic acid
19 Lactic Acid	Produced in anaerobic respiration in muscles . Build up of lactic acid causes fatigue . Lactic acid must be taken to the liver by the blood so that it can be oxidised back to glucose .
20 Oxygen Debt	The amount of extra oxygen the body needs after exercise to react with the lactic acid and remove it.
21 Anaerobic Respiration (plant and yeast cells)	No oxygen needed. In yeast cells it is called fermentation – economically important for manufacture of bread and alcoholic drinks . In cytoplasm . Glucose → ethanol + carbon dioxide

Section 5: Response to Exercise

22 Increase in breathing rate	Increases rate at which oxygen is taken into the lungs.
23 Increase in heart rate	Oxygenated blood is pumped around the body at a faster rate. Carbon dioxide is removed at a faster rate.
24 Increase in breath volume	A greater volume of oxygen is taken in with each breath.

Section 6a: Metabolism

25 Metabolism	The sum of all the reactions in a cell or body . Some of these reactions require the energy released from respiration .
---------------	---

Section 6b: Metabolic Reactions

26	Conversion of glucose to starch, cellulose or glycogen.
27	Formation of lipids from glycerol and fatty acids
28	Use of glucose and nitrates to make amino acids (plants only)
29	Respiration
30	Breakdown of proteins to urea

B4 – Knowledge Organiser Quiz

Section 1: photosynthesis equation	
1 Give the word equation for photosynthesis	
2 Give the symbol equation for photosynthesis	
Section 2: Key terms	
3 Define chloroplast	
4 Define chlorophyll	
5 Define endothermic	
6 Define diffusion	
Section 3: Uses of glucose	
7 Give one use of glucose	
8 Give one use of glucose	
9 Give one use of glucose	
10 Give one use of glucose	
11 Give one use of glucose	
Section 4: limiting factors	
12 define limiting Factor	
13 Draw and explain the graph for how light intensity affects photosynthesis	
14 Draw and explain the graph for how Carbon dioxide concentration affects photosynthesis	
15 Draw and explain the graph for how temperature affects photosynthesis	
Section 5: Respiration	
16 what is energy needed for?	
17 Describe aerobic respiration, give the word and symbol equations for aerobic respiration	
18 Describe anaerobic Respiration in muscles, give the word equation.	

19 what is lactic Acid, and what happens to it	
20 What is oxygen debt?	
21 Describe anaerobic respiration in plant and yeast cells, and give the word equation for it.	
Section 5: Response to exercise (you have to be able to list these 3 on your own too)	
22 Explain how increase in breathing rate affects the body during exercise	
23 Explain how Increase in heart rate affects the body during exercise	
24 Explain how Increase in breath volume affects the body during exercise	
Section 6a: Metabolism	
25: What is metabolism?	
Section 6b: Metabolic reactions	
26 Give an example of a metabolic reaction	
27 Give an example of a metabolic reaction	
28 Give an example of a metabolic reaction	
29 Give an example of a metabolic reaction	
30 Give an example of a metabolic reaction	

Points I know	
Sections I need most help with	
Blue pen work	

B4 – Knowledge Organiser Quiz

Section 1: photosynthesis equation

- 1 Give the word equation for photosynthesis
- 2 Give the symbol equation for photosynthesis

Section 2: Key terms

- 3 Define chloroplast
- 4 Define chlorophyll
- 5 Define endothermic
- 6 Define diffusion

Section 3: Uses of glucose

- 7 Give one use of glucose
- 8 Give one use of glucose
- 9 Give one use of glucose
- 10 Give one use of glucose
- 11 Give one use of glucose

Section 4: limiting factors

- 12 define limiting Factor
- 13 Draw and explain the graph for how light intensity affects photosynthesis
- 14 Draw and explain the graph for how Carbon dioxide concentration affects photosynthesis
- 15 Draw and explain the graph for how temperature affects photosynthesis

Section 5: Respiration

- 16 what is energy needed for?
- 17 Describe aerobic respiration, give the word and symbol equations for aerobic respiration
- 18 Describe anaerobic Respiration in muscles, give the word equation.
- 19 what is lactic Acid, and what happens to it
- 20 What is oxygen debt?
- 21 Describe anaerobic respiration in plant and yeast cells, and give the word equation for it.

Section 5: Response to exercise (you have to be able to list these 3 on your own too)

22 Explain how increase in breathing rate affects the body during exercise

23 Explain how Increase in heart rate affects the body during exercise

24 Explain how Increase in breath volume affects the body during exercise

Section 6a: Metabolism

25: What is metabolism?

Section 6b: Metabolic reactions

26 Give an example of a metabolic reaction

27 Give an example of a metabolic reaction

28 Give an example of a metabolic reaction

29 Give an example of a metabolic reaction

30 Give an example of a metabolic reaction

Chemistry Chapter 1 – Atomic structure and the periodic table – atoms, elements, compounds, mixtures, periodic table

Draw and label the structure of the atom.

State the 5 different methods used to separate out mixtures.

Labels the groups, high-light the metals and non-metals, identify the atomic number and relative atomic mass on the below Periodic table.

State the relative mass and relative charge of a proton, electron and neutron.

State the technique used to separate out the below:

1. Ethanol and water

2. Salt and water

3. Sand and ethanol

4. Crude oil fractions

5. Inky water

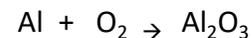
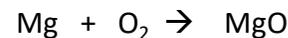
Define the terms:

- Element
- Compound
- Mixture
- Atom
- Molecule

Periodic Table of the Elements

1 H Hydrogen 1.008																	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.064	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 84.798
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine 209	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium Unknown	114 Fl Flerovium [289]	115 Uup Ununpentium Unknown	116 Lv Livermorium [293]	117 Uus Ununseptium Unknown	118 Uuo Ununoctium Unknown
57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967			
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]			

Balance the below equations:



HIGHER TIER: Describe why the radius of the atom increases within a group of elements.

Chemistry Chapter 1 – Atomic structure and the periodic table – periodic table, metals and non-metals

What does the group number and the period tell you about the element.

How many electrons are able to go in the 1st, 2nd, 3rd and 4th shell.

Draw an electron shell diagram for sodium.

State the number of electrons, neutron and protons found in Na, F, Cl, Mg and H.

Describe the pattern Döbereiner noticed in 1829 and the order of his Periodic table.

Describe the pattern Newlands noticed in 1865 and how he ordered the Periodic table.

Describe why Mendeleev's Periodic table is still used today. Include in your answer what he did differently to the previous scientists before him.

Describe Rutherford's theory for the atom and describe the experiment that allowed him to come up with this theory.

State the properties of metals and non-metals.

State the oxide formed from metals

State the oxide formed from non-metals

Describe how you could prove an unknown metal oxide was metal or non-metal.

Chemistry Chapter 1 – Atomic structure and the periodic table – Group 1, 7, 0 and maths skills

Name the elements found in Group 1.

Name the elements found in Group 7.

Name the elements found in Group 0.

Complete the word equations for the below reactions:

Sodium + oxygen →

Lithium + water →

Potassium + iodine →

Sodium + chlorine →

Lithium + fluorine →

State the name of Group 1.

State the name of Group 7.

State the name of Group 0.

Describe how the reactivity changes as you go down Group 1.

Describe how the reactivity changes as you go down Group 7.

Explain why Group 0 is relatively unreactive.

Which of the following displacement reactions will happen? (Tick/circle the ones that will).

Fluorine + sodium chloride → chlorine + sodium fluoride

Astatine + potassium bromide → bromine + potassium astatide

Bromine + potassium iodide → iodine + potassium bromide

Group 1 reacts with water and oxygen to make what?

Group 7 elements react to make what?

State the general trends found in Group 0.

Write these numbers in standard form:

- 100
- 100000
- 1050
- 0.0004
- 0.105
- 18890000
- 0.0000005
- 0.0005009
- 120000800

Convert these numbers from standard form:

- 1×10^{-2}
- 5.5×10^4
- 6×10^6
- 9.87×10^{-4}
- 9.86007×10^3
- 6.1×10^{-3}
- 9×10^{-6}
- 5.007×10^2
- 2×10^0

Explain why Group 1 metals lose an electron.

State the colour and state for the below at room temperature.

Fluorine
Chlorine
Bromine
Iodine
Astatine

Describe some uses of Group 0 elements in everyday life.

Chemistry 1: Atomic Structure and the Periodic Table

Section 1: Key Terms

1 Atom	The smallest part of an element that can exist. All substances are made of atoms. No overall electrical charge. Very small , radius of 0.1nm.
2 Element	An element contains only one type of atom . Found on the Periodic Table. There are about 100 elements.
3 Compound	Two or more elements chemically bonded with each other. Can only be separated into the elements through chemical reactions.
4 Mixture	Contains two or more elements or compounds not chemically bonded . Can be separated using physical methods e.g. by filtration, crystallisation, distillation and chromatography.
5 Filtration	A process that separates mixtures of insoluble solids and liquids .
6 Crystallisation	A process that separates dissolved solids from liquids by evaporating the liquid to leave crystals.
7 Distillation	A process that separates a mixture of liquids based on their boiling points .
8 Chromatography	A process that separates mixtures by how quickly they move through a stationary phase (e.g. paper)
9 Isotope	An atom of the same element with different numbers of neutrons .
10 Relative atomic mass	An average value of mass that takes account of the abundance of the isotopes of the element.

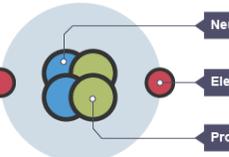
Section 2: Development of Atomic Model

11 Plum Pudding



The plum pudding model shows that the atom is a **ball of positive charge** with **negative electrons embedded** in it. Was **incorrect**.

12 Nuclear Model



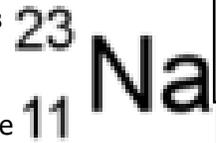
Rutherford's scattering experiment found a central area of positive charge. The nuclear model has a **positive nucleus** and **electrons in shells**. **Chadwick** later discovered **neutrons**. **Bohr** discovered the arrangement of **electrons in shells**.

Section 3: Properties of Sub-Atomic Particles

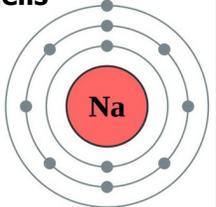
Sub-atomic particle	Mass	Charge	Position in Atom
13 Proton	1	+1	Nucleus
14 Neutron	1	0	Nucleus
15 Electron	Very small	-1	Orbiting in shells

16 **Mass number** – the total number of **protons** and **neutrons**

17 **Atomic number** – the **number of protons** (the number of electrons is the same in an atom)

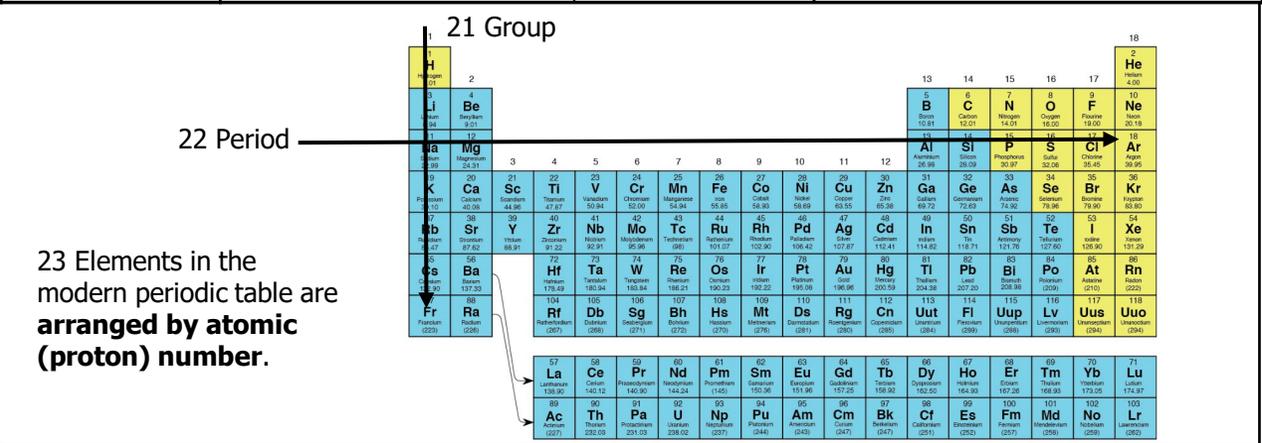


18 **Electron configuration**– Electrons fill the first energy level (shell) first. Maximum electrons: **2 in first shell** **8 electrons in other shells**



Section 4: Periodic Table

16 Group	Elements in the same vertical column are in the same group. Elements in the same group have the same number of electrons in their outer shell , and therefore similar properties .
17 Period	Elements in the same horizontal row . The atomic number increases by one moving across the period.
18 Metal	Elements that react to form positive ions (except Hydrogen). Left and centre of periodic table
19 Non-Metal	Elements that react to form negative ions. Right of periodic table.
20 Mendeleev	Was able to make a relatively accurate periodic table by leaving gaps for undiscovered elements and re-arranging some elements (Mendeleev could only measure relative atomic mass, not atomic number).



21 Group

22 Period

23 Elements in the modern periodic table are **arranged by atomic (proton) number**.

Section 3: Groups of the Periodic Table

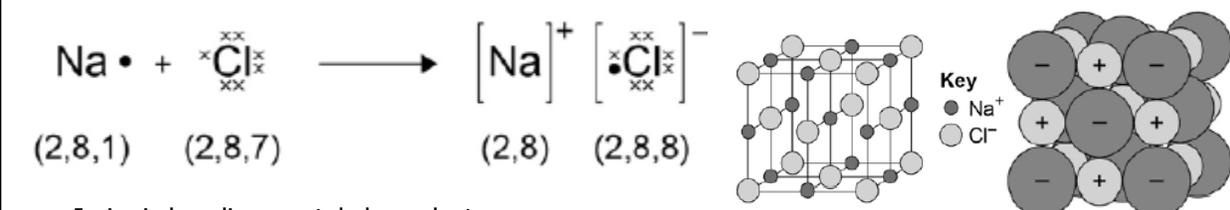
Sub-atomic particle	Properties	Trends	Reactions
24 Group 0 (Noble Gases)	Unreactive and do not form molecules.	Boiling point increases going down the group.	Very unreactive as they have full outer shells .
25 Group 1 (Alkali Metals)	Reactive because they can easily lose one electron.	Reactivity increases going down the group.	With water: Metal + water → Metal hydroxide and hydrogen With oxygen: Metal + oxygen → Metal oxide With chlorine: Metal + chlorine → Metal chloride
26 Group 7 (Halogens)	Non-metals Form molecules	Reactivity decreases going down the group. Boiling point and melting point increase going down the group.	A more reactive halogen can displace a less reactive halogen from a solution of its salt.

Chemistry 2: Bonding, Structure and the Properties of Matter

Section 1: Bonding Key Terms

1 Ion	An atom that is charged because of gain or loss of electrons .
2 Ionic bond	The bond between two oppositely charged ions (metal and non-metal). Occurs because of electrostatic attraction.
3 Electrostatic attraction	The force that holds two oppositely charged ions together. A strong force.
4 Metals	In ionic bonding, metals lose electrons to become positively-charged ions.
5 Non-metals	In ionic bonding, non-metals gain electrons to become negatively-charged ions.
6 Giant lattice	A large 3D structure that contains a lot of bonds .
7 Covalent bond	A bond formed when non-metals share electrons . A strong bond.
8 Molecule	A small group of atoms held together with covalent bonds . Not charged .
9 Polymer	Very large covalent compounds with many repeating units .
10 Metallic bonding	The electrons in the outer shell of metal atoms are delocalised and so are free to move through the whole structure. The sharing of delocalised electrons gives rise to strong metallic bonds .
11 Alloy	A mixture of two or more elements , at least one of which is a metal . E.g. steel

Section 2: Ionic Bonding

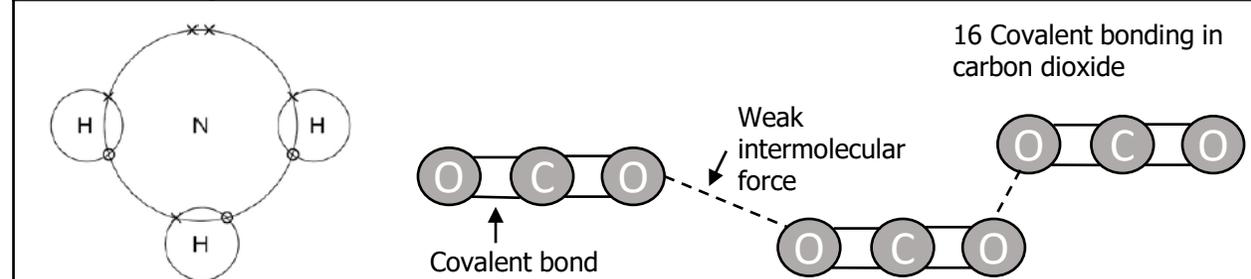


In ionic bonding, metals lose electrons to become positively-charged ions. Non-metals gain electrons to become negatively-charged ions.

12 Two representations of a **giant ionic lattice**. The lines represent ionic bonds.

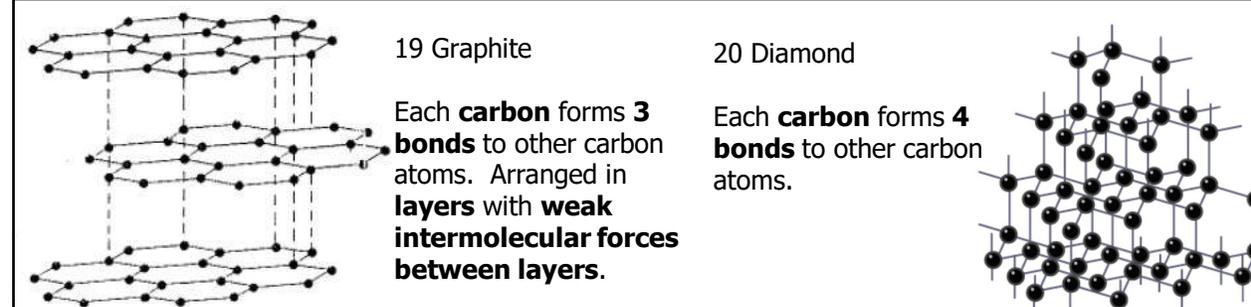
Property	Reason
13 High melting point	There is a strong electrostatic force between the positive and negative ions in the giant lattice . A large amount of energy is needed to overcome this force .
14 Conduct electricity when liquid/ molten	Ions are able to move so there is a flow of charged ions (current).
15 Do not conduct electricity when solid	Ions are in fixed positions so cannot flow.

Section 3: Simple Covalent Molecules



Property	Reason
17 Low melting and boiling points (usually gases or liquids)	There are only weak intermolecular forces between the molecules . Not much energy is needed to overcome these forces.
18 Do not conduct electricity	Covalent molecules are not charged .

Section 4: Giant Covalent Structures Made of Carbon



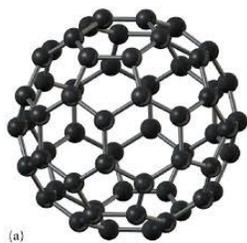
Section 4a: Properties of Graphite

Property	Reason
21 Conducts electricity	Each carbon only forms 3 bonds so one electron is delocalised . These electrons are free to move and carry charge through the structure.
22 Soft and slippery	Only weak intermolecular forces exist between layers , so layers can easily be rubbed off.

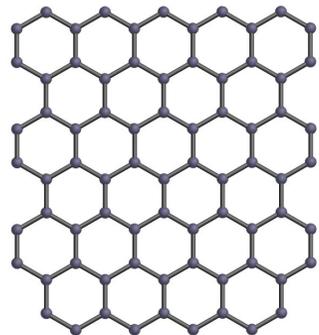
Section 4b: Properties of Diamond

Property	Reason
23 Doesn't conduct electricity	Diamond doesn't contain delocalised electrons or ions .
24 Very hard	Each carbon bonds to 4 other carbon atoms with strong covalent bonds to form a lattice .
25 High melting point	Each carbon bonds to 4 other carbon atoms with strong covalent bonds to form a lattice. A large amount of energy is needed to overcome all these bonds.

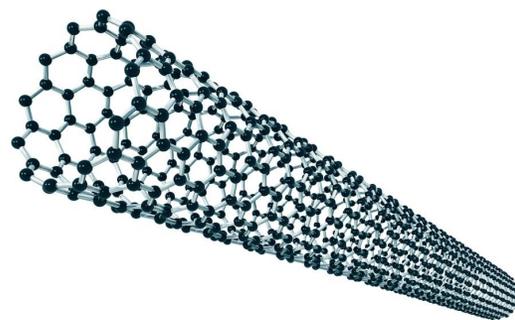
Section 5: Small Carbon-Based Structures



26 Fullerene



27 Graphene



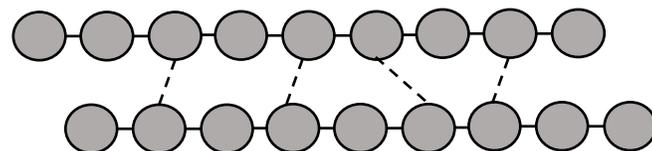
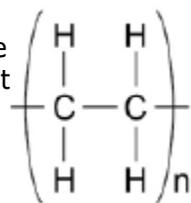
28 Carbon nanotube

Section 1: Properties of Metals

	Structure	Properties	Uses
29 Fullerene	Hollow-shaped. Usually hexagonal rings of carbon atoms. E.g. Buckminsterfullerene (C ₆₀)	Very strong . Hollow so can contain other chemicals within it.	Drug delivery, lubricants.
30 Graphene	A single layer of graphite.	Very strong . Has delocalised electrons so it is able to conduct electricity .	Electronics, composites.
31 Carbon nanotube	Cylindrical tubes of carbon atoms that are very long compared to their diameter.	Very strong, light and flexible . Has delocalised electrons so it is able to conduct electricity .	Nanotechnology, electronics, reinforcing (e.g. tennis rackets).

Section 6: Polymers

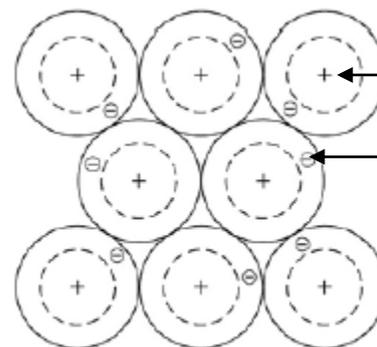
32 A polymer. The lines show covalent bonds. 'n' is a large number.



33 Polymer molecules are held together by intermolecular forces (dashed lines)

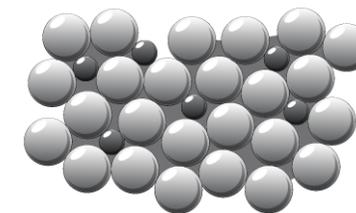
Property	Reason
34 Solid	Usually solid because the intermolecular forces between polymer molecules are relatively strong .

Section 7: Metallic Bonding



Positive metal ion

Delocalised electron



35 A pure metal. It consists of metal ions in layers with delocalised electrons.

36 An alloy. The layers have been distorted by the presence of other elements

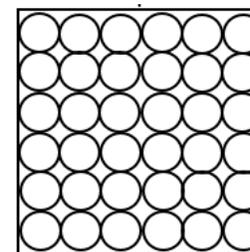
7a Properties of Pure Metals

Property	Reason
37 High melting points	Strong electrostatic forces between the positive ions and delocalised electrons . Requires a large amount of energy to overcome.
38 Conduct electricity	Metals have delocalised electrons . These electrons are able to move through the structure and carry charge.
39 Conduct heat	The delocalised electrons are able to move and transfer thermal energy through the structure.
40 Malleable	The layers are able to slide over each other so the metal can be bent and shaped. The attraction between the positive ions and delocalised electrons prevents the metal from shattering.

7b Properties of Alloys

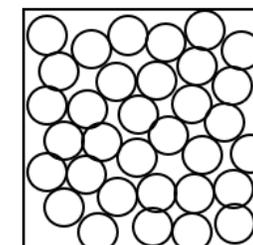
Property	Reason
41 Harder than metals	The layers are distorted by the presence of other elements. This prevents the layers from being able to slide over each other .

Section 8: States of Matter



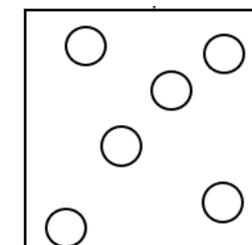
42 Solid

State symbol – (s)



43 Liquid

State symbol – (l)



44 Gas 71

State symbol – (g)

Chemistry Chapter 2 – Structure, bonding and the properties of matter– ionic bonding and properties

Ionic bonding occurs between?

What elements make positive ions?

What elements make negative ions?

Describe what happens to the electrons during ionic bonding.

What charges are formed on Group 1, 2 and 3, 5, 6 and 7 elements when they become ions?

Draw a dot and cross diagram to show an atom turning into an ion for sodium and chlorine.

Draw a dot and cross diagram to sodium chloride.

Describe how the ions are attracted to each other during ionic bonding and what type structure they form.

State key properties of ionic compounds:

Explain why ionic compounds have high melting/boiling points.

Explain why ionic compounds can conduct electricity when molten or dissolved but not in a solid state.

Describe what empirical formula is.

Calculate the empirical formula for the below ions and state the name of the compound formed:

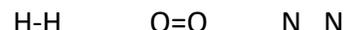
- Na^+ and N^{3-}
- K^+ and O^{2-}
- Mg^{2+} and Cl^-
- K^+ and S^{2-}
- Al^{3+} and O^{2-}
- Ca^{2+} and F^-
- Al^{3+} and Br^-

HIGHER TIER ONLY: Write the empirical formula for the formation of calcium chloride using half equations to show what happens to the electrons.

Chemistry Chapter 2 – Structure, bonding and the properties of matter– covalent bonding, properties, diamond, graphite, graphene, fullerenes and polymers

Covalent bonding occurs between?

State what the lines show and complete the bonds for nitrogen:



Describe common properties of covalent compounds:

Define the term small molecules and give at least 2 examples of small molecules.

Draw a dot and cross diagram to show covalent bonding between:

a. Hydrogen H₂

b. Oxygen O₂

c. Water H₂O

d. Methane CH₄

e. Nitrogen N₂

f. Ammonia NH₃

Explain why small covalently bonded molecules have:

a. Low melting and boiling points

b. Do not conduct electricity.

Draw the repeating unit of poly(ethane).

Describe what bonds link the monomers in polymers.

Describe the general properties of giant covalent structures.

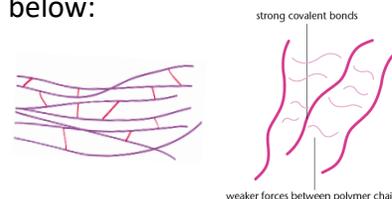
How does cross linking affect the strength of the polymer?

Explain why diamonds are so hard and why they do not conduct electricity. What structure does diamond have?

Describe the difference between intramolecular and intermolecular forces and state where these are found in chains of polymers.

Describe and explain the structure of graphite. Give two uses of graphite and relate these uses to its structure.

Describe the difference in the properties of the 2 polymers below:



State the uses of fullerenes and explain how its uses relate to its structure.

Chemistry Chapter 2 – Structure, bonding and the properties of matter– metallic bonding, properties, alloys, states of matter and maths

Metallic bonding occurs between?

Describe what metallic bonding is.

Draw a labelled diagram to show metallic bonding.

Describe the general properties of metals.

Define the term alloy.

Explain why metals can:

a. Conduct electricity

b. Are malleable

Explain why:

a. Some metals can conduct electricity better than other metals.

b. Metals often have high melting and boiling points.

Draw labelled diagrams to explain the difference between an alloy and a metal.

Draw a diagram to show the changes of stage from a solid, liquid and gas.

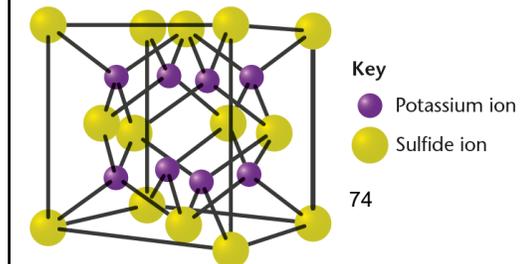
Draw the particle model for solid, liquid and gas.

HIGHER TIER ONLY: State the limitations of the simple model for particle theory.

Explain the positives, negatives and what is best about the ball and stick and close packed models to show structures.

What are the sizes of the radius of an atom and the radius of a nucleus.

Calculate the empirical formula from the image below.



Chemistry chapter 3 – Chemical quantities and calculations – balancing equation, M_r , A_r and gas changes

State the law of conservation of mass.

Calculate the A_r of:

Mg
Li
F
Cl
H

Calculate the M_r of:

H_2O
 O_2
 H_2SO_4
NaCl
MgO

Calculate the amount of water produced when copper sulphate crystals are heated. The starting mass of the copper sulphate crystals was 5.6g and it makes 2.4g of powder. How much water is produced?

Define the term uncertainty and state the calculation.

Balance these symbol equations:

- $Mg + HCl \rightarrow MgCl_2 + H_2$
- $CO + H_2 \rightarrow C_8H_{12} + H_2O$
- $Fe + H_2SO_4 \rightarrow Fe_2(SO_4)_3 + H_2$

Describe what a limiting factor could be during a reaction.

Define the terms:

- Mean
- Medium
- Mode
- Range
- Anomaly

Define the terms:

Relative atomic mass:

State the 3 pieces of equipment we can use to measure the volume of gas released during a practical.

A reaction of 9g magnesium carbonate reacted with excess hydrochloric acid and stops after 5 minutes. The mass of the flask has reduced by 3.2g. Sketch a graph you would be likely to see below.

Calculate (Hint watch out for anomalies):

- Mean for 5.6, 5.2, 5.4 and 5.9
- Range for 9, 11, 20, 15 and 14
- Calculate the percentage uncertainty for 8.9, 15.6, 8.4, 8.7 and 8.2

Relative formula mass:

Describe why mass can appear to be lost during a reaction.

Chemistry chapter 3 – Chemical quantities and calculations – moles and concentration

HIGHER TIER: Define the term mole.

HIGHER TIER: Define Avogadro's constant.

HIGHER TIER: Define the term molar mass.

HIGHER TIER: Calculate the molar mass for 1 mole of:



HIGHER TIER: Calculate the molar mass for 0.5 of a mole of:



HIGHER TIER: Calculate the molar mass for 2 moles of:

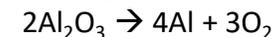


HIGHER TIER: Write the equation linking, moles, mass of chemical and molar mass together with the units.

HIGHER TIER: Using the equation identified calculate:

- Calculate the mass of hydrogen produced by the electrolysis of 6g of water. $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$.

- What mass of aluminium is produced from 100g of aluminium oxide?



- 333g of calcium chloride (CaCl₂) dissolves to form 120g of calcium and 213g of chlorine gas. Work out the balanced equation from the above masses.

Define the terms:

- Concentration
- Solute
- Solvent
- Solution

Draw a diagram to show a dilute and concentrated solution.

Write the equation that links mass, concentration and volume together with the units.

$$1\text{cm}^3 = \underline{\hspace{2cm}} \text{dm}^3$$

Calculate the concentration in g/dm³ of 20g dissolved in 0.5cm³? Show your working out.

Section 1: Bonding Key Terms

1 Law of conservation of mass	No atoms are lost or gained during a chemical reaction . The mass of the products is the same as the mass of the reactants. Some reactions appear to give a change in mass , but this is because a gas may have escaped from the reaction container.
2 Relative atomic mass (A_r)	The average mass of an atom of an element compared to Carbon-12.
3 Relative formula mass (M_r)	The sum of all the atomic masses of the atoms in a formula (e.g. H_2O).
4 Uncertainty	The interval within which the true value can be expected to lie . E.g. $25^\circ C \pm 2^\circ C$ – the true value lies between $23^\circ C$ and $27^\circ C$.
5 Mole (HT)	A measurement for the amount of a chemical. It is the mass (in grams) of 6.02×10^{23} (the Avogadro constant) atoms of an element . Symbol: mol.
6 Balanced equation (HT)	Balanced symbol equations show the number of moles that react . e.g. $Mg + 2HCl \rightarrow MgCl_2 + H_2$ Shows one mole of magnesium reacting with two moles of hydrochloric acid to form one mole of magnesium chloride and one mole of hydrogen.
7 Limiting reactant (HT)	The reactant that is completely used up in a chemical reaction. It limits the amount of product formed.
8 Excess reactant (HT)	The reactant that is not completely used up in a chemical reaction. There is some reactant left at the end.
9 Concentration	A measure of the number of particles of a chemical in a volume . Can be measured in g/dm^3 .
10 Decimetre ³ (dm^3)	A measurement of volume . Contains $1000cm^3$.

Section 2: Calculations and Examples

11 Calculating relative formula mass (M_r)	Add up all the atomic masses in a formula. e.g. H_2O . Mass of hydrogen = 1. Mass of oxygen = 16. $(2 \times 1) + 16 = 18$
12 Percentage uncertainty	Percentage uncertainty = $\frac{\text{Uncertainty}}{\text{Quantity being measured}} \times 100$ e.g. What is the percentage uncertainty of a $50cm^3$ measuring cylinder accurate to $\pm 2cm^3$? Percentage uncertainty = $\frac{2}{50} \times 100 = 4\%$
13 Number of moles	Number of moles = $\frac{\text{Mass of chemical}}{\text{Relative formula mass}}$ e.g. How many moles of water are there in 36g of H_2O ? Number of moles = $\frac{36}{18} = 2$ moles
14 Volume in dm^3	Volume in $dm^3 = \frac{\text{volume of liquid}}{1000cm^3}$ e.g. What is the volume in dm^3 of $500cm^3$ of hydrochloric acid? Volume in $dm^3 = \frac{500}{1000} = 0.5dm^3$
15 Concentration of a solution	Concentration = $\frac{\text{Mass of solute}}{\text{Volume (in } dm^3)}$ e.g. What is the concentration of a solution of hydrochloric acid which contains 100g of hydrochloric acid in $500cm^3$? Concentration = $\frac{100}{0.5} = 200g/dm^3$

Chemistry 4: Chemical Changes

Section 1: Key Terms

1 Metal oxide	Metals react with oxides to produce metal oxides. This is an oxidation reaction.
2 Displacement reaction	A more reactive metal can displace a less reactive metal from a compound .
3 Oxidation	Two definitions: Chemicals are oxidised if they gain oxygen in a reaction. Chemicals are oxidised if they lose electrons in a reaction. (HT)
4 Reduction	Two definitions: Chemicals are oxidised if they lose oxygen in a reaction. Chemicals are oxidised if they gain electrons in a reaction. (HT)
5 Acid	A chemical that dissolves in water to produce H⁺ ions .
6 Base	A chemical that reacts with acids and neutralise them. E.g. metal oxides, metal hydroxides, metal carbonate
7 Alkali	A base that dissolves in water . It produces OH⁻ ions in solution.
8 Neutralisation	When a neutral solution is formed from reacting an acid and alkali . General equation: H⁺ + OH⁻ → H₂O
9 pH	A scale to measure acidity/ alkalinity . A decrease of one pH unit causes a 10x increase in H⁺ ions . (HT)
10 Strong acid (HT)	A strong acid is completely ionised in solution. E.g. hydrochloric, nitric and sulfuric acids.
11 Weak acid (HT)	A weak acid is only partially ionised in solution. E.g. ethanoic, citric and carbonic acids.

Section 2: Reactivity

Element	Reaction	Reactivity
12 Potassium	When potassium is added to water , the metal melts and floats. It moves around very quickly. The metal is also set on fire , with sparks and a lilac flame .	↑
13 Sodium	When sodium is added to water , it melts to form a ball that moves around on the surface. It fizzes rapidly .	
14 Lithium	When lithium is added to water , it floats. It fizzes steadily and becomes smaller.	
15 Calcium	Fizzes quickly with dilute acid .	
16 Magnesium	Fizzes quickly with dilute acid .	
17 (Carbon)		
18 Zinc	Bubbles slowly with dilute acid .	
19 Iron	Very slow reaction with dilute acid .	
20 (Hydrogen)		
21 Copper	No reaction with dilute acid .	

Section 4: Extracting Metals

22 Very unreactive metals	Found naturally in the ground. Don't need extracting .
23 Metals less reactive than carbon	Extracted by reduction with carbon .
24 Metals more reactive than carbon	Extracted by electrolysis .

Section 5: Reactions of Acids

25 With metal	Acid + Metal → Salt + Hydrogen
26 With alkali	Acid + Metal Hydroxide → Salt + Water (Neutralisation reaction)
27 With metal oxide	Acid + Metal Oxide → Salt + Water (Neutralisation reaction)
28 With carbonate	Acid + Metal Carbonate → Salt + Water + Carbon Dioxide (Neutralisation reaction)

Section 6: Making a Soluble Salt

29	Add solid metal, metal carbonate, metal oxide or metal hydroxide to an acid .
30	Add solid until no more reacts .
31	Filter off excess solid.
32	Evaporate to remove some of the water.
33	Leave to crystallise .
34	Remove all water in a desiccator/ oven .

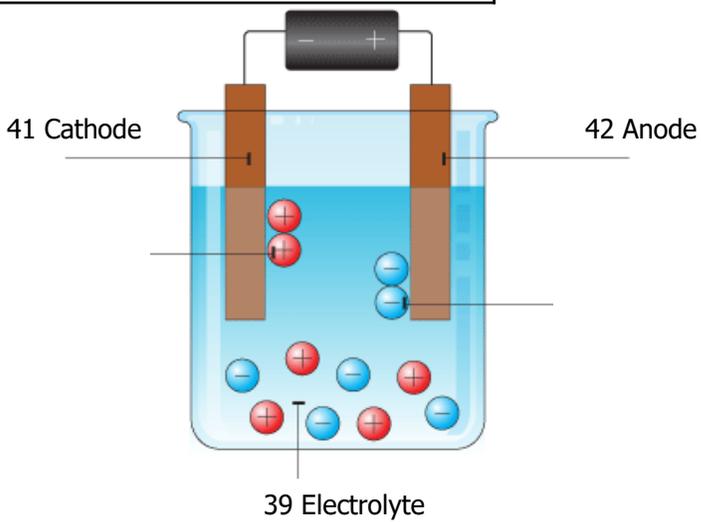
35 Acidic pH 0-6

36 Neutral pH 7

37 Neutral pH 8-14



Chemistry 4: Chemical Changes



- Positive
- Anode
- Negative
- Is
- Cathode

Section 7 Electrolysis key terms

38 Electrolysis	The process of splitting an ionic compound by passing electricity through it.
39 Electrolyte	An ionic compound that is molten (melted) or dissolved in water . The ions are free to move .
40 Electrode	An electrical conductor that is placed in the electrolyte and connected to the power supply .
41 Cathode	The electrode attached to the negative terminal of the power supply .
42 Anode	The electrode attached to the positive terminal of the power supply .

Section 8: What is discharged in electrolysis?

Electrolyte	Cathode	Anode
43 Molten Compound	Metal	Non-metal
44 Dissolved compound (aqueous solution)	The metal if the metal is less reactive than hydrogen . Hydrogen is produced if the metal is more reactive than hydrogen .	Oxygen is produced unless the solution contains halide ions (chloride, bromide, iodide) when the halogen (chlorine, bromine, iodine) is produced.

Section 9: Aluminium Electrolysis

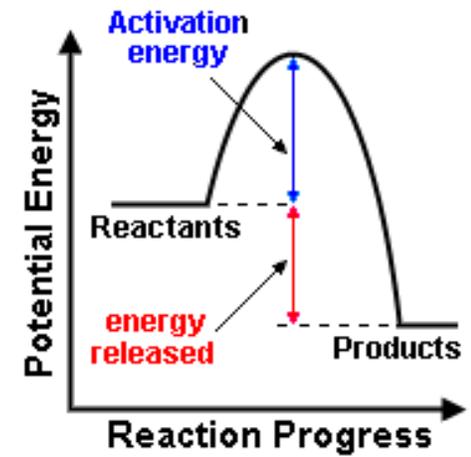
45 Cryolite	Aluminium oxide is dissolved in cryolite to lower its melting point . This saves money on energy costs .
46 Cathode	Positive Al³⁺ ions move to the cathode . Aluminium is produced. Al³⁺ + 3e⁻ → Al
47 Anode	Negative O²⁻ ions move to the anode . Oxygen is made. 2O²⁻ → O₂ + 4e⁻ Wears away as the carbon anode reacts with oxygen to form carbon dioxide .

Chemistry 5: Energy Changes

Section 7 Energy Changes Key Terms

1 Conservation of energy	Energy is not created or destroyed , only transferred from one store to another
2 Exothermic	A reaction that transfers energy to the surroundings so the temperature of the surroundings increases , e.g. combustion and neutralisation reactions. Used in self-heating cans and hand warmers .
3 Endothermic	A reaction that takes in energy from the surroundings so the temperature of the surroundings decreases , e.g. thermal decomposition . Used in sports injury packs .
4 Activation energy	The energy needed for particles to successfully react .
5 Breaking bonds	Energy is needed to break bonds.
6 Forming bonds	Energy is released when bonds are formed.

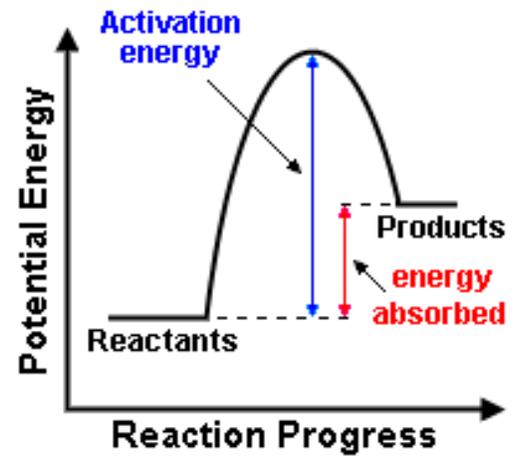
7 Exothermic Energy Profile



Exothermic reaction

9 Energy released from forming bonds is **greater than** the energy needed to break bonds. (HT)

8 Endothermic Energy Profile



Endothermic reaction

10 Energy released from forming bonds is **less than** the energy needed to break bonds. (HT)

Chemistry Chapter 4 – Chemical changes – reactivity series, reduction and oxidation

Write the reactivity series in order from most reactive to the least reactive.

Describe how we use reduction to extract metals from the reactivity series. State the metals can be reduced using carbon.

Describe what reduction and oxidation in in term of oxygen.

HIGHER TIER ONLY: Describe what oxidation and reduction are in terms of electrons.

Describe which metals will react with water and acid and how violent this reaction is.

Complete the table to show which reactions will results in a positive displacement reaction. Represent this with ticks and crosses.

Solution used	Metal being added			
	Magnesium	Zinc	Iron	Copper
Magnesium sulphate				
Zinc sulphate				
Iron sulphate				
Copper sulphate				

Describe why sodium is more reactive than lithium.

HIGHER TIER ONLY: Write the half equation for the extraction of iron.

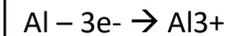
HIGHER TIER ONLY: Write the ionic equation to show the reaction between magnesium and copper chloride solution.

HIGHER TIER ONLY: Write the ionic equation to show potassium and magnesium forming positive ions.

HIGHER TIER ONLY: Write the half equation to show the reaction between magnesium and copper chloride solution.

HIGHER TIER ONLY: Write the balanced ionic equation for the extraction of zinc.

HIGHER TIER ONLY: Identify from these two half equations which is oxidised and which is reduced.





Chemistry Chapter 4 – Chemical changes – metals and acid, soluble salts, neutralisation, pH and strong and weak acids

Write the general word equations for the reactions below:

- Metal + acid →
- Acid + base →
- Metal oxide + acid →
- Metal hydroxide + acid →
- Metal carbonate + acid →

Identify from the formula the acid and write what salts are formed from using them.

HCl
 H_2SO_4
 HNO_3

Describe how to make a crystallised salt from using a metal and acid.

HIGHER TIER ONLY: Describe what redox reaction is and write the half equation for the reaction iron and sulphuric acid.

Describe how we make a soluble salt from an insoluble solid substance .

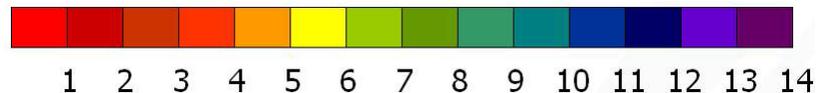
Define the terms:

Acid –

Base –

Alkali -

Using the pH scale below identify what is an acid, alkali and neutral.



Describe what neutralisation is and include the equation.

State 2 methods we could use to identify the pH of a substance.

HIGHER TIER ONLY: Describe the difference between a weak and strong acid and give examples of common acids.

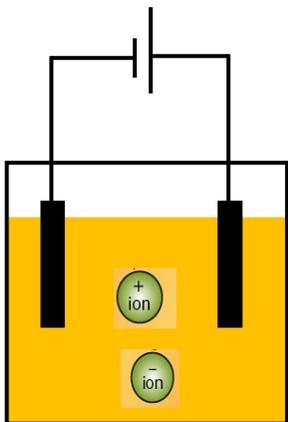
HIGHER TIER ONLY: Describe what happens as the pH decreases by one unit to the concentration of hydrogen ions.

HIGHER TIER ONLY: Describe what concentration is and link this to how we can have a weak but concentrated acid.

Chemistry Chapter 4 – Chemical changes – electrolysis

Describe what electrolysis is.

Label the set up below using the keywords: electrolyte, cation, cathode, anion, anode, D.C power supply and electrode. Draw an arrow to show where the cation and anion migrate to.



HIGHER TIER ONLY: Write the half equation for the electrolysis of sodium chloride solution.

Describe what a simple binary electrolyte is and the state they need to be in for electrolysis to happen.

HIGHER TIER ONLY: Write the half equation for the electrolysis molten copper bromide.

Describe what a preferential discharge is.

Describe what will be discharged at the cathode and anode during the electrolysis of copper sulphate.

Complete the below:

If the ions are halogens then the is produced.

If the ions are not halogens then is produced because ion is discharged.

If the ions are above hydrogen in the reactivity series then is produced.

If the ions are below hydrogen in the reactivity series then is produced.

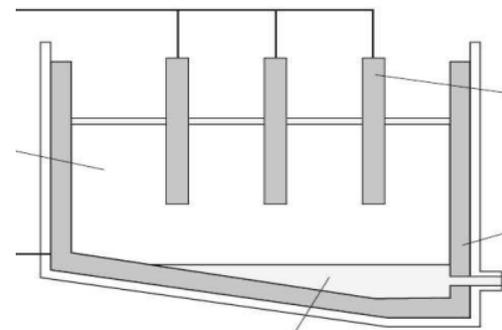
HIGHER TIER ONLY: Describe what OILRIG is.

HIGHER TIER ONLY: Describe which electrode oxidation and reduction occurs during electrolysis.

HIGHER TIER ONLY: Write the half equations at the cathode and anode for the electrolysis of dilute sodium sulphate solution.

State what the ore of aluminium oxide is called and explain why we mix this with cryolite.

Label the below image for the electrolysis of aluminium oxide.



Explain why the carbon anodes need replacing continuously.

HIGHER TIER ONLY: Write the half equations at the cathode and anode for the electrolysis of aluminium oxide.

Chemistry Chapter 4 – Chemical changes – required practical x 2 and maths skills

Describe what order of magnitude is.

Complete the below table:

Conc. of acid in mol/dm ³	Conc. of acid in standard form mol/dm ³	pH
0.1		1
0.01		
0.001		
0.0001		
0.00001		
0.000001		
0.0000001		

Write the variables for the practical for making a pure, dry salt.

Independent variable –

Dependent variable –

Control variables –

Describe a method used to prepare a pure, dry sample of a soluble salt from an insoluble oxide or carbonate.

Explain how to make a purer sample of your salt and why we add the metal in excess.

Draw a diagram to show the set up for the electrolysis of sodium chloride, sodium sulphate, copper (II) chloride and copper (II) sulphate.

Independent variable –

Dependent variable –

Control variables –

State the result you would expect to see for the electrolysis practical and explain why you would expect to see this.

Write a risk assessment for this practical. Include the risk, hazard and control for at least 1 risk.

Chemistry Chapter 5 – Energy changes– endo/exothermic reaction, energy profiles and bond energies

Define the terms:

Endothermic reaction

Exothermic reaction

Activation energy

Give examples for the below reactions:

Endothermic reaction

Exothermic reaction

Describe the 2 outcomes that can occur when particles collide.

Draw and label an energy profile diagram for an exothermic reaction.

Draw and label energy profile diagram for an endothermic reaction.

Complete the sentences below:

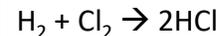
Breaking bonds is an _____ process.
 Making bonds is an _____ process.

HIGHER TIER: Write the equation to calculate the bond energy.

HIGHER TIER: To decide if a chemical reaction is exothermic or endothermic the amount of energy needed to break/make these bonds must be compared. If a negative sign is in front of the total energy released this means the reaction is exothermic.

Calculate the bond energies and state if the reaction is endo or exothermic.

H-H 436kJ/mol	C=O 799kJ/mol
Cl-Cl 242kJ/mol	O=H 463kJ/mol
C≡O 1072kJ/mol	H-Cl 436 kJ/mol



Chemistry Chapter 5 – Energy changes– RP and maths

State the equation to calculate the energy transferred by a fuel. (Hint: it is a physics one).

Decimal form begins when 1 is divided by 10 so written as 0.1 or words as one-tenth.

Complete the below:

One-hundredth is

One-thousandth is

One-ten thousandth is

Write the variables for the practical endothermic and exothermic reactions.

Independent variable –

Dependent variable –

Control variables –

Write a risk assessment for this practical. Include the risk, hazard and control for at least 1 risk.

Describe a method used to investigate the variables that affect temperature change such as metal plus acid plus carbonates, neutralisations and displacements of metals.

State the result you would expect to see for changing the volume of acid.

Explain why heat loss needs to be prevented.

Explain any problems with the solid carbonates that may affect the repeatability of the experiment.

State the type of errors that could occur during this practical and give 1 example.

Physics Chapter 1 – Energy – dissipation, elastic, gravitational and kinetic

State the 9 energy stores.

Define kinetic energy.

Define elastic potential energy.

State how to convert g to kg.

State how to convert cm to m.

State how to convert km to m.

State the equation for kinetic with units.

State the equation for elastic potential energy with units.

State how to convert minutes into seconds.

State how to convert hours into seconds.

Define gravitational potential energy.

Describe how we can increase the kinetic energy store of a moving object.

Describe how we can increase the amount of elastic potential energy stored in a spring.

Calculate the kinetic energy of a moving lorry which is travelling at a steady speed of 90m/s and has a mass of 250g. Show your working out.

State the equation for gravitational energy with units.

Calculate the gravitational potential energy when a ball is dropped from 1.5m with a mass of 0.5g on Earth (9.8N/kg). Show your working out.

Calculate the elastic potential energy when a spring is stretched 10cm with a spring constant of 150N/m. Show your working out.

Describe the energy changes that occur when a ball is thrown up into the air and then caught again at the bottom.



Physics Chapter 1 – Energy – power, work done and maths skills

Define work done.

Define power.

How much power is needed to power a kettle boiling water in 60s with a power of 12W. Show your working out.

Describe the difference between a histogram and a bar chart.

Write the equation for work done., include the units.

Write the 2 equations for power, include the units.

How much power is needed to power a lawn motor in 1 hour which uses 109750 J or energy. Show your working out.

Rearrange the kinetic energy equation to have m as the focus.

More work is done when:

$1W = \text{___} J/s.$

Rearrange the kinetic energy equation to have v as the focus.

Calculate the work done climbing up a flight of stairs to a total distance of 10m. Bob weighs 750N. Show your working out.

Write these numbers to two significant figures:

Describe how friction affects work done.

Define mean.

Define median

Define mode

1120

6082

111

9.899

10.5

525

711

6.43

Physics Chapter 1 – Energy – dissipation, efficiency, resources and global supplies

Describe what energy dissipation means.

State the law of conservation of energy.

Give some advantages and disadvantages for using nuclear energy.

State the 2 energy efficiency calculations.

Describe 2 ways we can use to reduce the transfer of energy.

Define the terms and give examples of:

Non-renewable energy

Renewable energy

Give some advantages and disadvantages for using solar energy.

For every 90J of energy supplied to a motor only 48J of energy is useful. Calculate the efficiency. Show your working out.

Give some advantages and disadvantages for using biofuel energy.

Describe how to reduce the thermal energy loss from the diagram.



Give some advantages and disadvantages for using wind energy.

What factors do governments have to consider when deciding what energy resource to use?

Physics Chapter 1 – Energy – Specific heat capacity and RP

Define specific heat capacity.

Write the equation, including units, for specific heat capacity.

Rearrange the equation to have c as the focus.

Calculate the energy change when the mass of water is 2kg and is heated from 20°C to 100°C. Water has a specific heat capacity of 4200J/kg°C. Show your working out.

Describe a method used to investigate the specific heat capacity of different metals when they are heated for 10 minutes.

Write a risk assessment for this practical. Include the risk, hazard and the control.

Draw and label a diagram showing the equipment set up.

Independent variable –

Dependent variable –

Control variables -

Physics 1: Energy				Section 3: Energy Resources					
Section 1: Energy stores and methods of transfer				Resource	Renewable?	Uses	Advantages	Disadvantages	
1 Chemical store	Energy stored as chemicals waiting to react .			19 Fossil Fuels	Non-Renewable	Electricity, transport, heating	Reliable – electricity can be generated all of the time. Relatively cheap way of generating electricity.	Produces carbon dioxide , a greenhouse gas that causes global warming . Can produce sulphur dioxide , a gas that causes acid rain .	
2 Kinetic store	Energy stored in objects that move .								
3 Gravitational Potential store	Energy stored in objects raised up against the force of gravity .			20 Nuclear Fuel	Non-Renewable	Electricity	Produces no carbon dioxide when generating electricity. Reliable – electricity can be generated all of the time.	Produces nuclear waste that remains radioactive for thousands of years. Expensive to build and decommission power stations.	
4 Elastic Potential store	Energy stored in an object that have been stretched .								
5 Internal store	Energy stored in the movement of particles. It is a combination of the kinetic energy of the particles and the potential energy of particles that are apart from each other. Can be modified by heating or cooling .								
6 Nuclear store	Energy stored in the nuclei of atoms that can fuse (nuclear fusion) or split (nuclear fission).			21 Bio Fuel	Renewable	Heating, electricity	Carbon neutral . Reliable – electricity can be generated all of the time.	Production of fuel may damage ecosystems and create a monoculture .	
7 Magnetic store	Energy stored in magnets that are attracting or repelling .								
8 Electrostatic store	Energy stored in electric charges that are attracting or repelling .			22 Wind	Renewable	Electricity	No CO₂ produced while generating electricity.	Unreliable – may not produce electricity during low wind . Expensive to construct.	
9 Mechanical transfer	Energy transferred when a force moves through a distance .								
10 Electrical transfer	Energy transferred when a charge moves .			23 Hydroelectricity	Renewable	Electricity	No CO₂ produced while generating electricity.	Blocks rivers stopping fish migration . Unreliable – may not produce electricity during droughts .	
11 Radiation transfer	Energy transferred by electromagnetic radiation .								
12 Heat transfer	Energy transferred when an object is heated .			24 Geothermal	Renewable	Electricity, heating	Does not damage ecosystems . Reliable source of electricity generation.	Fluids drawn from ground may contain greenhouse gases such as CO₂ and methane . These contribute to global warming .	
Section 2: Equations to learn									
Calculation	Equation	Symbol equation	Units	25 Tidal	Renewable	Electricity	No CO₂ produced while generating electricity.	Unreliable – tides vary . May damage tidal ecosystem e.g. mudflats.	
13 Kinetic energy store	Kinetic energy = 0.5 x mass x velocity ²	$E_k = 0.5 m v^2$	Energy – Joules (J) Mass – kilograms (kg) Velocity – metres per second (m/s)						
14 Gravitational potential energy store	Gravitational potential energy = mass x gravitational field strength x height	$E_p = m g h$	Energy – Joules (J) Mass – kilograms (kg) Gravitational field strength – Newtons per kilogram (N/kg) Height – metres (m)	26 Waves	Renewable	Electricity	No CO₂ produced while generating electricity.	Unreliable – may not produce electricity during calm seas.	
15 Power	Power = energy transferred ÷ time	$P = \frac{E}{t}$	Power – Watts (W) Energy transferred – Joules (J) Time – seconds (s)						
16 Power	Power = work done ÷ time	$P = \frac{W}{t}$	Power – Watts (W) Work done – Joules (J) Time – seconds (s)	27 Solar	Renewable	Electricity, heating	No CO₂ produced while generating electricity.	Unreliable – does not produce electricity at night . Limited production on cloudy days. Expensive to construct.	
17 Efficiency	Efficiency = $\frac{\text{useful energy output}}{\text{total energy input}}$		Energy – Joules (J)						
18 Efficiency	Efficiency = $\frac{\text{useful power output}}{\text{total power input}}$		Power – Watts (W)	Section 4: Key terms					
				28 Dissipation	Energy becoming spread out instead of in a concentrated store. “Wasted” energy.				
				29 Lubrication	A method of reducing unwanted energy transfers by application of a lubricant (e.g. oil) to reduce friction . Occurs in machines.				
				30 Insulation	A method of reducing energy transfers by the use of insulators (non-conductive material). Occurs in buildings.				
				31 Conservation of energy	The law that states that energy cannot be created or destroyed .				
				32 Specific heat capacity	The energy needed to raise 1kg of a material by 1°C .				

Section 3: Energy Resources				
Resource	Renewable?	Uses	Advantages	Disadvantages
19 Fossil Fuels			Reliable – electricity can be generated all of the time. Relatively cheap way of generating electricity.	
20 Nuclear Fuel		Electricity		
22 Wind		Electricity	No CO₂ produced while generating electricity.	
23 Hydroelectricity	Renewable	Electricity		Blocks rivers stopping fish migration . Unreliable – may not produce electricity during droughts .
24 Geothermal	Renewable	Electricity, heating	Does not damage ecosystems . Reliable source of electricity generation.	Fluids drawn from ground may contain greenhouse gases such as CO₂ and methane . These contribute to global warming .
27 Solar	Renewable		No CO₂ produced while generating electricity.	

Section 2: Equations to learn		
Calculation	Equation	Symbol equation
13 Kinetic energy store		
14 Gravitational potential energy store		
15 Power		

Section 3: Energy Resources				
Resource	Renewable?	Uses	Advantages	Disadvantages
19 Fossil Fuels			Reliable – electricity can be generated all of the time. Relatively cheap way of generating electricity.	
20 Nuclear Fuel		Electricity		
22 Wind		Electricity	No CO₂ produced while generating electricity.	
23 Hydroelectricity	Renewable	Electricity		Blocks rivers stopping fish migration . Unreliable – may not produce electricity during droughts .
24 Geothermal	Renewable	Electricity, heating	Does not damage ecosystems . Reliable source of electricity generation.	Fluids drawn from ground may contain greenhouse gases such as CO₂ and methane . These contribute to global warming .
27 Solar	Renewable		No CO₂ produced while generating electricity.	

Section 2: Equations to learn		
Calculation	Equation	Symbol equation
13 Kinetic energy store		
14 Gravitational potential energy store		
15 Power		91

Physics Chapter 2 – Electricity – circuit symbols, resistance, current and potential difference

Draw the symbols for the below components:

Cell:

Battery:

Switch closed:

Switched open:

Diode:

LED:

Resistor:

Variable resistor:

Fuse:

LDR:

Thermistor:

Lamp/bulb:

Voltmeter:

Ammeter:

Draw a series circuit and include the components: battery, bulb, voltmeter and ammeter:

Draw a parallel circuit and include the components: battery, 2 x bulbs, voltmeter, ammeter and variable resistor:

Describe what current is:

Describe the rule for calculating current in a series and parallel circuit.

Describe what potential difference is:

Describe the rule for calculating potential difference in a series and parallel circuit.

Describe what resistance is and how this affects a circuit:

Describe how to calculate resistance in a series circuit:

Calculate the resistance in the circuit below:



State the equation to calculate resistance (give units).

Calculate the resistance of a car headlamp when the potential difference is 12V and the current is 3A. Show your working out and remember units.

State the equation to calculate charge flow (give units).

Calculate the current when 80C flows in 16 seconds. Show your working out and remember your units.

Physics Chapter 2 – Electricity – I-V graphs, LDR, diode and thermistors.

Describe what Ohm's Law is and give an example of an electrical component that follows this.

Describe how a thermistor works:

Give examples of where we would use thermistors.

Describe why the I-V graph of a filament bulb does not follow Ohm's Law.

Describe how a diode works:

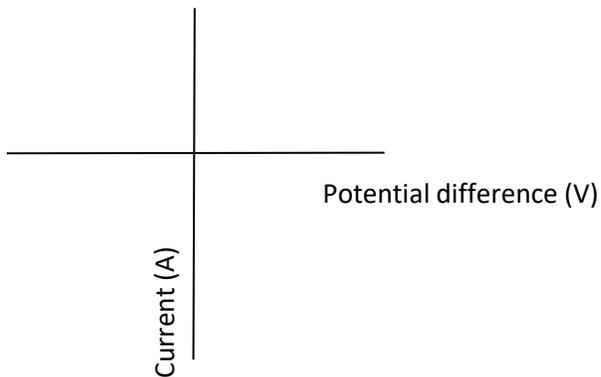
Give examples of where we would use a diode.

Describe how a LDR works:

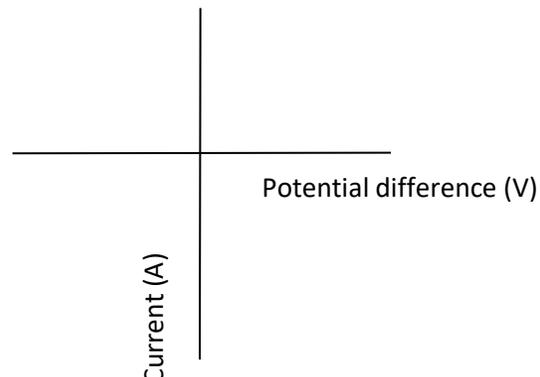
Give examples of where we would use LDR's.

Draw a current – potential difference graph (I-V) for the following components:

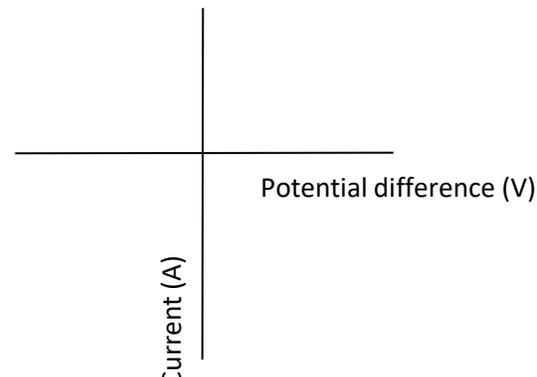
Diode



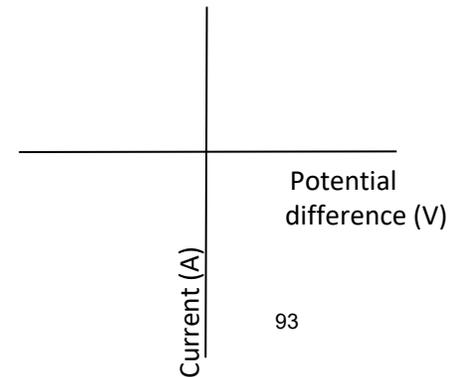
Filament bulb



Resistor at a constant temperature



Thermistor at a high and low temperature

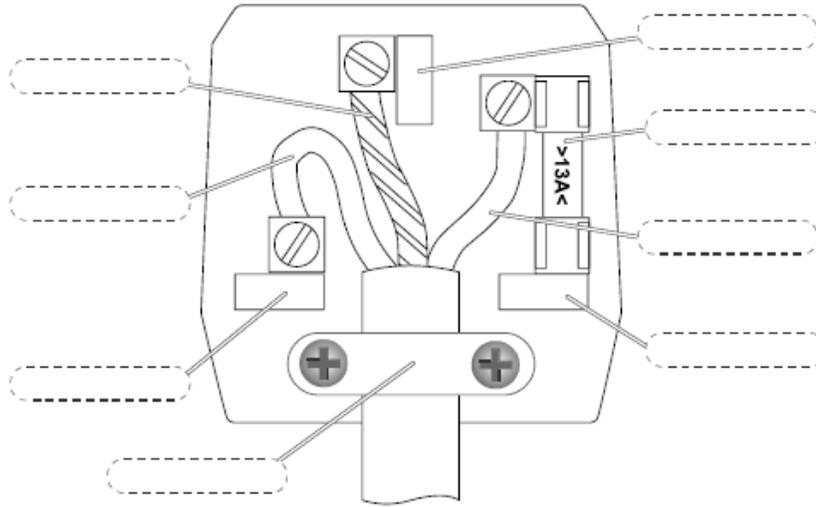


Physics Chapter 2 – Electricity – in the home, transmitting and power

Draw a potential difference graph to show D.C. and A.C current.

Potential difference (V) +

Label the parts of a plug – state the colours of the wires.



Explain why the National grid steps-up the potential difference to 400000V.

Explain the role of transformers in the National Grid including the differences between step-up and step-down.

Describe the difference between A.C and D.C current.

Write the equations to calculate energy transferred for power and time. Include units.

Write the equations to calculate energy transferred for charge flow and potential difference. Include units.

What is the role of the live wire?

What is the role of the neutral wire?

What is the National Grid? Draw a brief diagram to show the National Grid and give the potential differences at each stage.

Write the equation to calculate power. Include units.

Write the equation that links power, current and resistance. Include units.

What is the role of the earth wire?

Convert 1kW to Watts and 1 hour to seconds.

Physics Chapter 2 – Electricity –maths skill and 2 x required practical.

Calculate the energy transferred for an electric oven with a power rating of 2.5kW that is switched on for 45 minutes.

Calculate the potential difference across the device when it transfers a total of 1800 J of energy with a charge of 75 C.

Calculate the power of an electric heater that takes a current of 4 A when connected to a 230 V supply.

Calculate:
a. The current of the lamp when it has power of 36W when connected to a 12 V supply.

a. The resistance of the lamp.

Describe a method used to investigate the I-V characteristics for a filament lamp, a diode and a resistor at a constant temperature. Include a diagram of your set up.

Independent variable –
Dependent variable –
Control variables -

Write a risk assessment for this practical. Include the risk, hazard and control for at least 1 risk.

Describe a method used to investigate how the resistance of a piece of copper wire changes when its length is changed. Include a diagram of your set up.

Independent variable –
Dependent variable –
Control variables -

How does the resistance of the wire change with length and explain why.

Physics 2: Electricity

Section 1: Circuit Symbols

1		switch (open)	9		lamp
2		switch (closed)	10		fuse
3		cell	11		voltmeter
4		battery	12		ammeter
5		diode	13		thermistor
6		resistor	14		LDR
7		variable resistor			
8		LED			

Section 2: Equations to learn

	Equation	Symbol equation	Units
15	Charge flow = current x time	$Q = I \times t$	Charge flow - coulomb (C) Current - amperes (A) Time - seconds (s)
16	Potential difference = current x resistance	$V = I \times R$	Potential difference - volts (V) Current - amperes (A) Resistance - ohms (Ω)
17	Power = potential difference x current	$P = V \times I$	Power - watt (W) Potential difference - volts (V) Current - amperes (A)
18	Power = current ² x resistance	$P = I^2 \times R$	Power - watt (W) Current - amperes (A) Resistance - ohms (Ω)
19	Energy transferred = power x time	$E = P \times t$	Energy = joules (J) Power - watt (W) Time - seconds (s)
20	Energy transferred = charge flow x potential difference	$E = Q \times V$	Energy = joules (J) Charge flow - coulomb (C) Potential difference - volts (V)

Section 4: V, I and R in Series and Parallel

Components connected in...	Current	Potential Difference	Resistance
27 Series	The current is the same at every point in the circuit and in every component.	The total potential difference of the power supply is shared between the components.	The more resistors, the greater the resistance . The total resistance of two components is the sum of the resistance of each component. $R_{total} = R_1 + R_2$
28 Parallel	The total current through the whole circuit is the sum of the currents through the separate components .	The potential difference across each component is the same .	Adding more resistors in parallel decreases resistance . The total resistance of two resistors is less than the resistance of the smallest individual resistor .

Section 6: The Three Core Cable

32 Live	Brown colour. Current flows to the appliance. Potential difference between this and other wires should be 230V .
33 Neutral	Blue colour. Current taken away from appliance. Potential difference should be 0V .
34 Earth	Yellow and green colour. Potential difference of 0V . Carries charge to Earth if live wire touches the metal casing of an appliance.

Section 3: Key Terms

21 Electric current	The flow of electric charge .
22 Potential difference	The potential difference between two points in an electric circuit is the work done when a coulomb of charge passes between the points . Potential difference causes charge to flow
23 Resistance	Resistance is caused by anything that opposes the flow of electric charge .
24 Charge	Anything charged that is able to move within a circuit. Electrons or ions .
25 Series	A circuit with only one route for charge to take.
26 Parallel	A circuit with only more than one route for charge to take.

Section 5: IV Graphs

	29 Fixed Resistor (Ohmic Conductor) Current and potential difference are directly proportional . Resistance is constant .
	30 Filament Lamp Resistance of a filament lamp is not constant . As temperature increases, resistance increases. Ions within the lamp vibrate more , increasing collisions with electrons.
	31 Diode/ LED The current through a diode flows in one direction only . The diode has a very high resistance in the reverse direction .

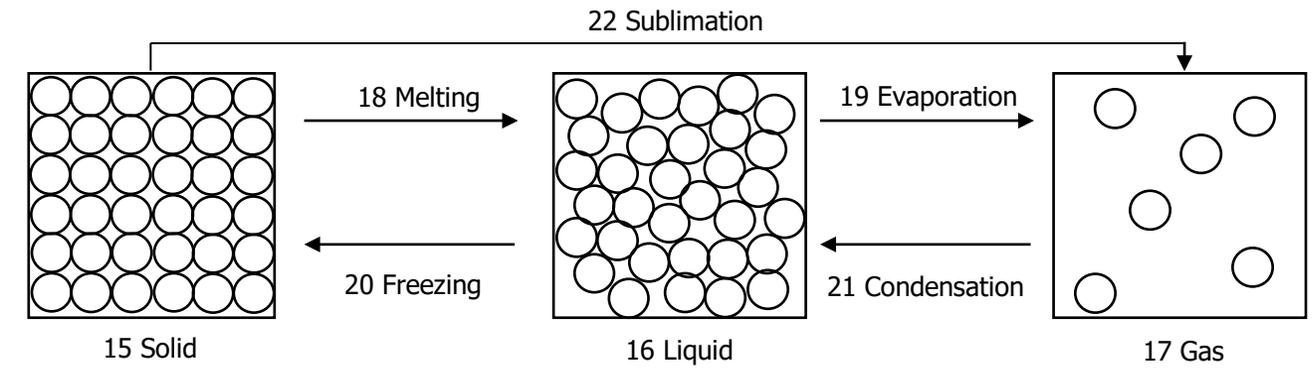
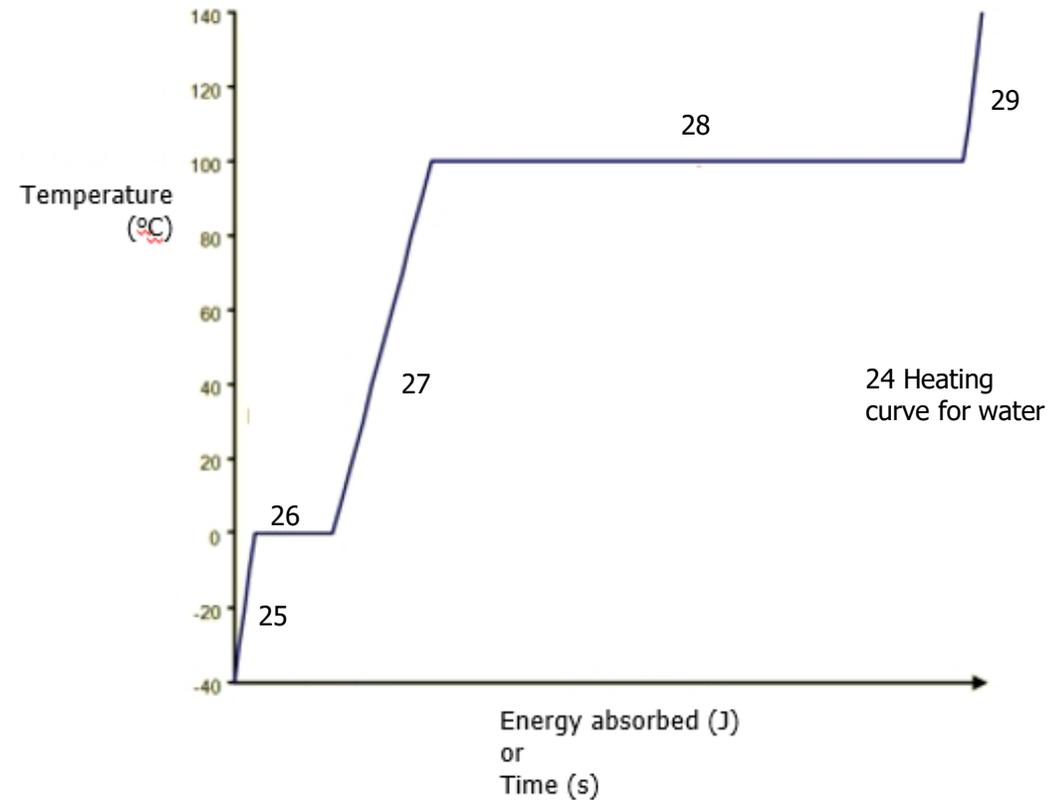
Section 7: Mains Electricity

35 Alternating Current	The current regularly changes direction e.g. mains electricity
36 Direct Current	The current flows in one direction only e.g. batteries .
37 Mains Electricity	UK mains is an alternating current of 230V and at a frequency of 50Hz .
38 National Grid	A series of cables and transformers linking power stations to consumers.
39 Step-up Transformer	Increases the potential difference for transmission across power cables. This reduces the current and therefore less heat is lost from the cables. This makes the National Grid efficient .
40 Step-down Transformer	Reduces the potential difference from the cables to 230V for use by consumers.

Physics 3: Particle Model of Matter

Section 1: Key Terms

1 Density	How much mass a substance contains compared to its volume . Solids are usually dense because the particles are closely packed.
2 State of matter	The way in which the particles are arranged – solid, liquid or gas.
3 Change of state	When a substance changes from one state of matter to another (e.g. melting is the change from a solid to a liquid). Energy changes the state, not the temperature.
4 Physical change	A change that can be reversed to recover the original material. E.g. a change of state.
5 Chemical change	A change that creates new products . It cannot be reversed . E.g. a chemical reaction.
6 Internal energy	The energy stored inside a system by the particles (atoms and molecules) that make up the system. Internal energy is the total kinetic energy and potential energy of all the particles .
7 Kinetic energy	Energy stored within moving objects (e.g. particles).
8 Potential energy	Energy stored in particles because of their position . The further apart particles are, the greater the potential energy .
9 Specific heat capacity	The specific heat capacity of a substance is the amount of energy required to raise the temperature of one kilogram of the substance by one degree Celsius .
10 Temperature	The average kinetic energy of the particles .
11 Specific latent heat	The amount of energy required to change the state of one kilogram of the substance with no change in temperature .
12 Latent heat of fusion	Energy required to change state from solid to liquid .
13 Latent heat of vaporisation	Energy required to change state from liquid to vapour .
14 Gas Pressure	The force exerted by gases on surface as the particles collide with it. As temperature increases, gas pressure increases if the volume stays constant.



Section 3: Explaining a heating curve

25 Solid	Particles are closely packed, fixed and arranged in regular layers. As more energy is absorbed the kinetic energy and therefore the internal energy of the material increases.
26 Melting	Temperature doesn't change. Energy is used to weaken the forces between particles. As more energy is absorbed the potential energy and therefore the internal energy of the material increases.
27 Liquid	Particles are touching but no longer arranged regularly. They are able to move. As more energy is absorbed the kinetic energy and therefore the internal energy of the material increases.
28 Evaporation	Temperature doesn't change. Energy is used to weaken the forces between particles. As more energy is absorbed the potential energy and therefore the internal energy of the material increases. 97
29 Gas	Particles move randomly. As more energy is absorbed the particles move more quickly and the temperature increases.

Section 2: Equations to learn

Calculation	Equation	Symbol equation	Units
23 Density	Density = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{v}$	Density = kilograms / metre ³ (kg/m ³) Mass = kilograms (kg) Volume = metres ³ (m ³)

Physics Chapter 3 – Particle model of matter – particle model, changes of state, internal energy and motion in gases.

Draw the particle model of matter to show solid, liquids and gases.

Draw the triangle showing the changes of states and state the name of the change.

Describe why changes of states occurs in:

1. Liquid cooling into a solid
2. Liquid turning into a gas

Define the terms:

Sublimation

Evaporation

Melting

Freezing

Boiling

Condensation

Deposition

Define internal energy

Describe how a temperature change can affect internal energy.

Describe the properties of solids, liquids and gases.

Define gas pressure and describe the affect of temperature on a gases pressure when the mass and volume of gas is kept constant.

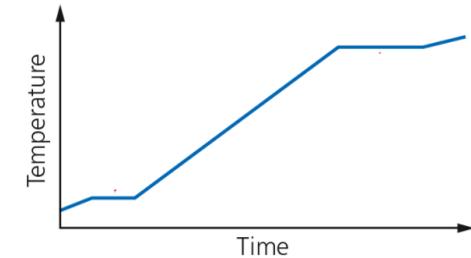
Sketch a graph to show a temperature time graph for heating water. (starting as ice) Label your graph to show the changes of state and the state.

Physics Chapter 3 – Particle model of matter – specific heat capacity and latent heat

Define specific heat capacity.

Define specific latent heat.

Describe what this graph is showing.



Write the equation, including units, for specific heat capacity.

Write the equation, including units, for specific latent heat.

Define the terms:

Latent heat of fusion

Latent heat of vaporisation

Rearrange the equation to have c as the focus.

Rearrange the equation to have L as the focus.

A change in thermal energy of 21kJ was supplied to a 5kg block of ice and its temperature raised from -21°C to -9°C . Calculate the specific heat capacity of the ice. Show your working out.

Calculate the energy change for when water turns from ice to water when it has a mass of 100g and a latent heat of $344\,000\text{ J/kg}$. Show your working out.

Use both equations. Calculate the energy transferred when 350g of ice cubes at 0°C are changed to steam at 100°C . Show your working out.

Physics Chapter 3 – Particle model of matter – density, RP and maths skill

Define density.

Write the equation, including the units, for density.

Calculate the density of a block of aluminium that is 560kg with a volume of 5m^3 . Show your working out.

Calculate the density of a block of wood which a length of 4cm, height of 4cm and a width of 4cm. The mass is 8g. Show your working out.

Calculate the density of a cork which has a mass of 8.2g and displaces 15cm^3 of water. Show your working out.

Describe a method used to investigate the density for both regular (e.g. a cube) and irregular (e.g. a fork) shaped objects.

Independent variable –

Dependent variable –

Control variables -

Write a risk assessment for this practical. Include the risk, hazard and control for at least 1 risk.

Sketch a graph to show the heating of paraffin wax for when it changes state from a solid to a liquid and then heating continues. Label the graph.

Physics Chapter 4 – Atomic structure – atomic structure, development of the atom, irradiation and contamination

Draw the structure of the atom with labels.

Describe what ionisation is.

Describe Ernest Rutherford model of the atom.

Define the terms:
Contamination

Irradiation

Explain why atoms have no overall charge.

Describe how an electron can move energy levels – you must include moving closer and further away from the nucleus).

Explain how the gold foil experiment led to Rutherford's model of the atom.

Explain the effects of irradiation on body cells.

Define the term isotope

Describe J . J. Thompson model of the atom.

Describe the role Niels Bohr and Chadwick had in the model of the atom.

State the uses of irradiation.

Use the symbols X, A, Z to represent an atom.

Describe why it is important to peer review experimental findings.

Physics Chapter 4 – Atomic structure – decay, types of decay

Describe what nuclear decay is and how this can lead to nuclear radiation.

Define the term radioisotope.

How do we measure radioactivity and what are the units.

State the 4 types of nuclear radiation/decay.

State the properties of alpha decay including, : the charge, the mass, the penetrative ability, how we “stop” this decay, strength of ionisation, the distance it can travel and the effect of a electric field.

State the properties of beta decay including, : the charge, the mass, the penetrative ability, how we “stop” this decay, strength of ionisation, the distance it can travel and the effect of a electric field.

State the properties of gamma decay including, : the charge, the mass, the penetrative ability, how we “stop” this decay, strength of ionisation, the distance it can travel and the effect of a electric field.

Describe uses of radioactive sources.

Physics Chapter 4 – Atomic structure – nuclear equations, half life and maths skill

State what happens to the mass number and the atomic number during alpha decay.

Define the term half life.

Complete the table: **(HIER TIER IS NET DECLINE)**

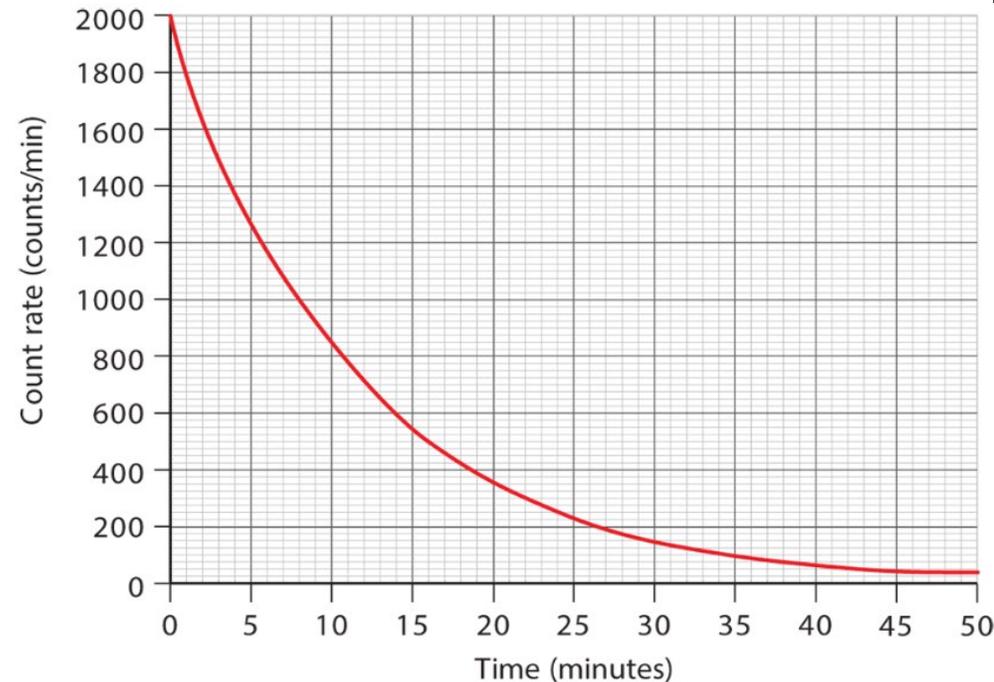
Number of half-lives passed	Fractional decrease in activity	Net decline
0	1/1	1:1

Complete alpha decay for:

- ${}_{92}^{238}\text{U} \rightarrow \text{T} + {}_2^4\text{He}$
- ${}_{96}^{251}\text{Cf} \rightarrow \text{Cm} + \text{He}$

State what happens to the mass number and the atomic number during beta decay.

Calculate the half life from the graph:



Calculate the below (show your working out):

A sample of cobalt-60 has an activity of 2000 Bq. What will the activity be after 10 years? Cobalt-60 has a half-life of 5 years.

The radioactive isotope sodium-25 has a half-life of 1 minute. What fraction of it remains after 3 minutes?

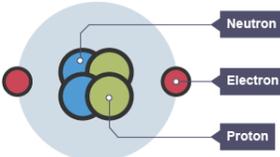
Complete beta decay for:

- ${}_{6}^{14}\text{C} \rightarrow \text{N} + {}_{-1}^0\text{e}^{-}$
- ${}_{55}^{137}\text{Cs} \rightarrow \text{Ba} + {}_{-1}^0\text{e}^{-}$

Section 1: Key Terms

1 Atom	The smallest part of an element that can exist. All substances are made of atoms. No overall electrical charge. Very small , radius of 0.1nm.
2 Element	An element contains only one type of atom . Found on the Periodic Table. There are about 100 elements.
3 Isotope	An atom of the same element with different numbers of neutrons .
4 Radioactive decay	When an unstable nucleus changes to become more stable and gives out radiation. Random .
5 Activity	The rate at which decay occurs . Measured in becquerels (Bq) .
6 Count rate	Number of decays recorded each second by a Geiger-Muller tube.
7 Half life	The time it takes for the number of nuclei of the isotope in a sample to halve Or, The time it takes for the count rate (or activity) from a sample containing the isotope to fall to half its initial level .
8 Contamination	The unwanted presence of materials containing radioactive atoms e.g. within liquids, with the body/ on the skin.
9 Irradiation	When an object is exposed to radiation . The object does not become radioactive itself.
10 Ionisation	Radiation can ionize by removing electrons from atoms to form ions . If this happens in DNA it could lead to a mutation that causes cancer .
11 Peer review	The checking of scientific results by other scientific experts .

Section 2: Development of Atomic Model

12 Plum Pudding		The plum pudding model shows that the atom is a ball of positive charge with negative electrons embedded in it. Was incorrect .
13 Nuclear Model		Rutherford's scattering experiment found a central area of positive charge. The nuclear model has a positive nucleus and electrons in shells . Later, neutrons were discovered and included in the nucleus.

Section 3: Properties of Sub-Atomic Particles

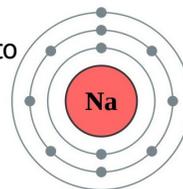
Sub-atomic particle	Mass	Charge	Position in Atom
14 Proton	1	+1	Nucleus
15 Neutron	1	0	Nucleus
16 Electron	Very small	-1	Orbiting in shells

17 **Mass number** – the total number of **protons** and **neutrons**



18 **Atomic number** – the **number of protons** (the number of electrons is the same in an atom)

19 **Energy levels:**
Absorption of radiation may lead to electrons moving further from the nucleus (higher energy level).
Emission of radiation may lead to electrons moving closer to the nucleus (lower energy level).



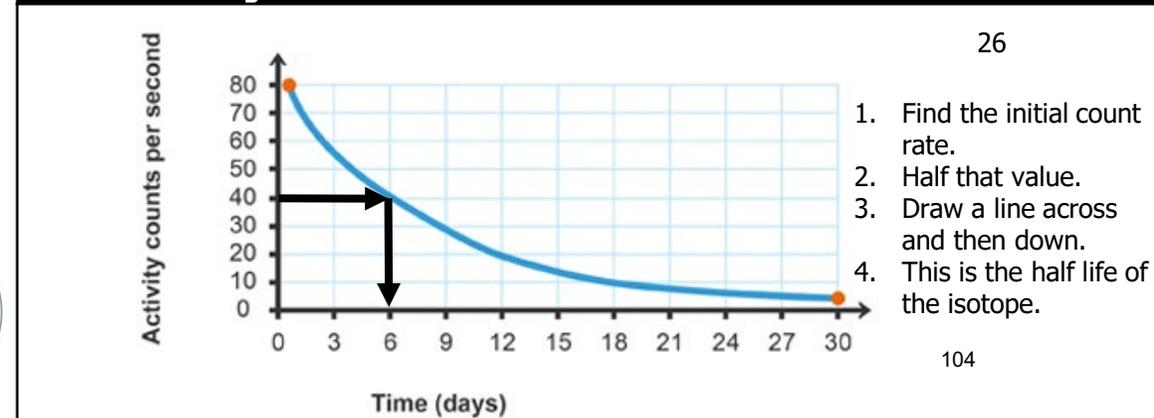
Section 4: Nuclear Radiation

Radiation	Range in air	Absorbed by	Ionizing Power	Product emitted when nuclei decays
20 Alpha	Short – up to 5cm	Paper and skin	Very High	2 protons and 2 neutrons
21 Beta	Medium – about 1m	About 5mm of aluminium .	Medium	Electron
22 Gamma	Unlimited – spreads out in air from the source	Several centimetres of lead .	Low	Electromagnetic wave

Section 5: Nuclear Decay Equations

	${}^{219}_{86}\text{Rn} \rightarrow {}^{215}_{84}\text{Po} + {}^4_2\text{He}$
23 Alpha decay	In alpha decay a helium nucleus (2 protons and 2 neutrons) is emitted. The new element formed has: - A mass number that has decreased by 4. - An atomic number that has decreased by 2.
	${}^{14}_6\text{C} \rightarrow {}^{14}_7\text{N} + {}^0_{-1}\text{e}$
24 Beta decay	In beta decay a neutron turns into a proton. An electron is emitted. The new element formed has: - A mass number that stays the same. - An atomic number increases by 1.
25 Gamma ray	There are no changes to the nucleus when gamma rays are emitted.

Section 6: Finding Half Life



BTEC REVISION NOTES

<p>TOP TIPS</p> <p>EXPLAIN – GIVE A REASON FOR SOMETHING</p> <p>DISCUSS – WRITE ABOUT SOMETHING FROM DIFFERENT POINTS OF VIEW LIKE WRITING ABOUT THE ADVANTAGES AND DISADVANTAGES</p> <p>NAME/GIVE – GIVE A SHORT ANSWER</p> <p>DESCRIBE – WRITE ABOUT WHAT SOMETHING IS LIKE</p> <p>CALCULATE – YOU WILL NEED TO DO SOME MATHS TO WORK OUT YOUR ANSWER AND SHOW HOW YOU DID IT</p> <p>INTERPRET – YOU NEED TO USE THE INFORMATION GIVEN TO WORK OUT THE ANSWER</p>	<p>PHYSICAL FITNESS</p> <p>Cardiovascular (Circulatory) System move blood around the body and is made up of</p> <ol style="list-style-type: none"> 1. Blood vessels 2. The heart 3. Blood <p>Respiratory system moves air into and out of the body. It is made of</p> <ol style="list-style-type: none"> 1. The lungs 2. The airways <p>The two systems together make up the The Cardiorespiratory System</p> <p>The oxygen we breathe and the nutrients we eat are transported around the body in the blood. Our cells use them to make energy. The cardiorespiratory system also allows the body to breathe out waste products like carbon dioxide.</p>	<p>PHYSICAL FITNESS</p> <p>AEROBIC ENDURANCE – The ability of the cardiorespiratory system to work efficiently, supplying nutrients and oxygen to working muscles during sustained (long lasting) physical activity.</p> <p>MUSCULAR ENDURANCE – The ability of the muscular system to work efficiently and continue to contract over a period of time against a light to moderate load. E.g a tennis player holding their racket and playing throughout the game.</p> <p>MUSCULAR STRENGTH – The maximum force (strength) that can be generated (made) by a muscle or muscle group.</p> <p>FLEXIBILITY – Being able to move a joint fluidly (smoothly) through its complete (whole) range of movement</p> <p>SPEED – $\text{Speed (m/s)} = \frac{\text{distance (m)}}{\text{Time (s)}}$</p> <p>There are three types of speed</p> <ol style="list-style-type: none"> 1. Accelerative speed – sprints up to 30 m 2. Pure speed- sprints up to 60 m 3. Speed endurance- sprints with a short recovery period (rest) in between <p>BODY COMPOSITION – The relative ratio (amount) of fat mass to fat-free mass in the body</p>	<p>SKILL – RELATED FITNESS</p> <p>BALANCE – The ability to maintain centre of mass over a base of support</p> <ol style="list-style-type: none"> 1. Static Balance – a still balance like a hand stand 2. Dynamic Balance – a moving balance like a cartwheel <p>POWER – The product (result) of speed x strength e.g. you need power to drive the ball in golf</p> <p>AGILITY – The ability of a sports performer to quickly and precisely (exactly) move or change direction without losing balance or time</p> <p>COORDINATION - The smooth flow of movement needed to perform a motor task efficiently (wasting as little energy as possible) and accurately (without going wrong)</p> <p>REACTION TIME – The time that it takes for a sports performer to respond to a stimulus and initiate (start) their response.</p> <p>Each sport needs different types of physical and skill-related fitness. You need to be able to identify the types of fitness needed for different sports. To do this, think about what the sports performers need to do in that sport.</p>																													
<p>TRAINING PROGRAMMES AND PRINCIPLES</p> <p>TRAINING PROGRAMME – a programme of exercise designed to improve performance.</p> <p>There are four basic principles (guidelines) that a coach can follow</p> <p>Frequency – How often to train per week</p> <p>Intensity – How hard to train</p> <p>Time – How long to train</p> <p>Type – What training method (way of exercising) should be used to improve the type of fitness needed for the sport.</p> <p>There are also seven more principles of training that a coach needs to think about</p> <p>SPECIFICITY – Training should be linked to the sport, activity or physical/skill-related fitness goal</p> <p>INDIVIDUAL DIFFERENCES/NEEDS – The programme should be designed to meet individual training goals and needs e.g. a fitter person would have a harder training programme</p> <p>VARIATION – It is important to do different activities in training to the performer doesn't get bored</p> <p>REST AND RECOVERY -A sports performer needs to rest to allow their body to recover. During recovery the body repairs any damage caused by exercise</p> <p>PROGRESSIVE OVERLOAD - In order to progress (improve), training needs to be demanding enough to cause the body to adapt(change) to improve performance</p> <p>ADAPTATION – How the body reacts to training loads by increasing its ability to cope with those loads</p> <p>REVERSIBILITY – If training stops or the intensity of training is not sufficient (enough) to cause adaptation, training effects will be reversed.</p>	<p>HEART RATE</p> <p>HEART RATE – The number of times the heart beats per minute (bpm)</p> <p>MAXIMUM HEART RATE – also called HR max</p> <p>HR max = 220 – age (years)</p> <p>e.g. the maximum heart rate of a 25 year old is</p> <p>HR max = 220 – age = 220 – 25 = 195 bpm</p> <p>HEART RATE TARGET ZONES</p> <p>Heart rate needs to be high enough to cause adaptation and improve fitness The target zone recommend to improve cardiorespiratory fitness is</p> <p>TARGET ZONE = 60%-85% of HR max (a person's maximum heart rate)</p> <p>WORKING OUT TARGET ZONES</p> <ol style="list-style-type: none"> 1. Calculate maximum heart rate (HR max) or they might give it to you HR max = 220 – age (years) 2. Find upper training threshold = HR max X 0.85 3. Find lower training threshold = HR max X 0.60 4. Write down the lower heart rate followed by the higher heart rate to show the target zone <p>e.g. 220 – 25 (age) = 195 bpm 195 x 0.85 = 165.75 = 166 bpm (upper training threshold) 195 x 0.60 = 117 bpm (lower training threshold)</p> <p>Target zone = 117 bpm – 166 bpm</p>	<p>BORG (6-20) RATING OF PERCEIVED EXERTION SCALE or the BORG (6-20) RPE Scale</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><td>6</td><td>No exertion at all</td></tr> <tr><td>7</td><td>Extremely light</td></tr> <tr><td>8</td><td></td></tr> <tr><td>9</td><td>Very light</td></tr> <tr><td>10</td><td></td></tr> <tr><td>11</td><td>Light</td></tr> <tr><td>12</td><td></td></tr> <tr><td>13</td><td>Somewhat hard</td></tr> <tr><td>14</td><td></td></tr> <tr><td>15</td><td>Hard</td></tr> <tr><td>16</td><td></td></tr> <tr><td>17</td><td>Very hard</td></tr> <tr><td>18</td><td></td></tr> <tr><td>19</td><td>Extremely hard</td></tr> <tr><td>20</td><td>Maximal Exertion</td></tr> </table> <p>The numbers on the scale represent the different levels of exercise intensity. The BORG (6-20) can be used to estimate a person's heart rate HR (bpm) = RPE x 10 e.g. a performer says they are working extremely hard and give a RPE scale rating of 19 their estimated heart rate is HR (bpm) = RPE X 10 = 19 X 10 = 190 bpm (beats per minute)</p> <p>You can also estimate a RPE scale/Borg scale rating from a heart rate (bpm) e.g. a performer's heart rate is 154 (bpm) RPE scale = HR (bpm) ÷ 10 = 154 ÷ 10 = 15.4 = 15 RPE Scale</p>	6	No exertion at all	7	Extremely light	8		9	Very light	10		11	Light	12		13	Somewhat hard	14		15	Hard	16		17	Very hard	18		19	Extremely hard	20	Maximal Exertion
6	No exertion at all																															
7	Extremely light																															
8																																
9	Very light																															
10																																
11	Light																															
12																																
13	Somewhat hard																															
14																																
15	Hard																															
16																																
17	Very hard																															
18																																
19	Extremely hard																															
20	Maximal Exertion																															

BTEC REVISION NOTES

TRAINING AND SAFETY

Fitness training methods are different ways of exercising. Each training method improves a different type of physical or skill-related fitness.

Advantages and Disadvantages

Each fitness training method has advantages and disadvantages like

VARIETY – is the training method interesting enough?

INTENSITY – is it easy to vary the intensity?

PURPOSE – does the training method improve the type of fitness you want it to?

COST – Does the training method needs lots of expensive equipment?

SPORT SPECIFIC – can the training method be changed to suit different sports?

SAFETY – Can the training method cause injury. e.g. an advantage of stretching is that it increase flexibility. A disadvantage of stretching is that it can cause muscle soreness.

SAFETY –

Use equipment safely

Use training methods in the right way

Warm-up = (gentle exercise + stretching) to increase heart rate and help prevent injury

and **cool down** = (gentle exercise + stretching) to decrease heart rate and stop muscles becomes sore.

FITNESS TRAINING METHODS

SPEED TRAINING – going as fast as you can for a short distance and then having lots of rest.

HOLLOW SPRINTS – do more than one sprint with a jog or walk in between called the hollow period

INTERVAL TRAINING – do a period of work and a period of rest and recovery. To work on Speed you need periods of higher intensity (close to maximum) for a short time. You can increase the number of rest or recovery periods. E.g. run for 15 seconds as fast as you can and then recover for 3 minutes.

ACCELERATION SPRINTS – you keep increasing the pace over a short distance. You can start either standing still or rolling (easy jogging) and slowly get faster. In between each acceleration sprint you rest by walking or jogging slowly. You can make acceleration sprints harder by doing

HILL SPRINTS

RESISTANCE DRILLS

COACHES NEED TO MATCH TRAINING METHODS TO SPORTS AND USE THE PRINCIPLES OF TRAINING TO GUIDE THEIR PLANNING.

FITNESS TRAINING METHODS

FLEXIBILITY TRAINING – STRETCHING IS A FITNESS TRAINING METHOD

STRETCHING IMPROVES FLEXIBILITY

STATIC STRETCHING – is when you stretch a muscle and hold it in one position. There are 2 types of static stretching.

1. **ACTIVE** – This is where you use your own muscles to hold the stretch
2. **PASSIVE** – This is where you use someone or a piece of equipment to help you hold the stretch.

BALLISTIC STRETCHING – Is when you make fast movements (bounces). A disadvantage of this type of stretching is have it can strain (pull) your muscles or make them sore.

PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION (PNF)

You need a partner for PNF stretching

1. The performer stretches the muscle as far as it can go.
2. A partner helps hold the muscle in that position while the performer pushes back against the partner for 6-10s.
3. The performer relaxes.
4. So the partner can push the stretch a little further.

Muscles have a stretch reflex that stops them stretching too far. PNF works by stopping that reflex so the muscle can be stretched further. It improves mobility, strength and flexibility. It can help people to recover from injuries.

FITNESS TRAINING METHODS

AEROBIC ENDURANCE TRAINING - Increasing how long you can exercise for

CONTINUOUS TRAINING – is where you keep doing the same exercise without any rest for at least 30 minutes. You keep at a steady pace and at moderate (medium) intensity so you don't go too fast.

FARTLEK TRAINING – involves changes in intensity with no rest. You can change the intensity by

1. changing the speed
2. changing the steepness of the ground
3. adding weight

Advantages are that you can make it hard or easy to match a performers INDIVIDUAL NEEDS. You can use it in lots of different activities like running, cycling and rowing.

INTERVAL TRAINING – This involves periods of working and resting. Work usually ranges between 30 seconds and 5 minutes. Rest period can include sit down, stand still, walk or jog. To improve aerobic endurance you need to have longer more intense periods of working and shorter breaks. VO2 max = the maximum amount of oxygen uptake. It is the largest amount of oxygen that your body can use every minute. Measured in ml of oxygen per kg of body mass per minute (ml/kg/min). The intensity of training can be measured as a percentage of VO2 max.

CIRCUIT TRAINING – You can adapt a circuit to work on aerobic endurance for example using exercises like skipping and shuttle runs. You can increase the time spend at each station and the frequency of training.

FITNESS TRAINING METHODS

STRENGTH TRAINING

FREE WEIGHTS – are weights that are not attached to a machine

You can use free weights to improve **MUSCULAR STRENGTH AND MUSCULAR ENDURANCE**

You can target particular muscles

You can injury yourself if your technique is wrong

There are two types of exercise with **free weights**

CORE EXERCISES – These work muscles that make the spine and pelvis stable

ASSISTANCE EXERCISES – These work muscles that are specific to a sport or exercise

Always do **core before assistance** exercises

Change between **upper and lower** body exercises

Change between **push and pull** exercises

Weight training is done in **REPS** – one specific exercise and **SETS** – the number of reps you do without a rest

1RM – one repetition maximum – is the heaviest amount you can lift in one rep

The intensity of training can be described as a percentage of 1RM

MUSCULAR STRENGTH	STRENGTH ENDURANCE	ELASTIC STRENGTH
High loads and low reps	Low loads and high reps	Medium loads and medium reps
90% 1RM and 6 reps	50-60% 1RM and 20 reps	75% 1RM and 12 reps

FITNESS TRAINING METHODS

STRENGTH TRAINING

CIRCUIT TRAINING FOR STRENGTH

You can use circuit training to improve muscular strength, power and muscular endurance. You can also adapt a circuit to work on skills like agility and coordination or to work on aerobic endurance.

In circuit training you do different exercises one after another.

- Each exercise is called a station.
- You normally have 6-10 different stations.
- All the stations make up one circuit.
- You need to put the exercises in an order that doesn't work the same muscles straight after each other to stop the muscles getting too tired.

PLYOMETRICS FOR EXPLOSIVE POWER AND MUSCULAR STRENGTH.

The exercises are linked to the sport

The performer uses **maximal force** (as much power as possible). This force is needed to lengthen and then quickly shorten the muscle for example two footed jumping over hurdles.

The working muscle lengthens when you land this is the **eccentric action**

The working muscle shortens quickly when you jump this is the **concentric action** Used by sprinters, hurdlers, and team games where jumping is important like netball, volleyball and basketball. The disadvantage is that is can make muscles sore.

BTEC Knowledge Organiser Test:

1. There are 6 physical fitness components, complete the words below. (6 marks)

B.....

A.....

S.....

S.....

F.....

M.....

2. There are 5 skill related fitness components, complete the words below. (5 marks)

C.....

R.....

A.....

B.....

P.....

3. Match the correct training zone, to the correct training intensity. (3 marks)

Aerobic Zone 95%-100%

Speed Zone 85%-95%

Anaerobic Zone 60%-85%

4. A) Tim is 32 years old. What would be his maximum heart rate? Show your working in the box. (2 marks)

MHR

5. What does RPE stand for? (1 mark)

.....

6. $RPE \times 10 = \text{Heart rate}$. Work out the following people RPE. (3 marks)

JIM RPE 17

Sally RPE 14

Steve RPE 13

7. Progressive overload makes your training harder. What are the 4 ways this can be done? Fill in the blanks. (4 marks)

F.....

I.....

T.....

T.....

8. For each training method below, write in the correct component of fitness. (6 marks)

PNF Training

Free Weights

Circuit Training

Hollow Sprints

Fartlek Training

Plyometric Training.....

9. Circle the test that could be used for body composition. (1 mark)

BIA 35m Sprint Vertical jump

10. What is the hand grip test measured in? (1 mark)

Seconds Reps KgW

11. Describe one pre-test procedure for the sit and reach test. (1 mark)

.....

1.	Key terms
worship	Showing love and praise to God
liturgical worship	Set patterns, words and actions for public or group worship.
informal worship	Worship in less traditional ways; may be in places other than a church building and involve modern music and poetry; can be led by lay members of the congregation rather than a priest
private worship	Worship done by one person or family while alone; e.g. prayer, reading the Bible, silent reflection
prayer	Communication with god, alone or as part of public or group worship
The Lord's Prayer	A set prayer used in many Christian services, taught by Jesus to his disciples
set prayers	Prayers that have fixed words e.g. the Lord's Prayer
informal prayer	Prayer that is not part of liturgy or set prayers e.g. meditation, your own prayers to God, silent reflection
private prayer	Praying alone, as encouraged by Jesus
infant baptism	Sacrament to welcome a child into the Christian community
believer's baptism	Sacrament to welcome an adult converting to Christianity to the church community
The Eucharist	Another name for the sacrament of Holy Communion, where Christians eat bread and wine in memory of Jesus at the Last Supper

2.	Topics and general information
Topic	Information
Worship	<p>Worship in Christianity are acts done to praise God – to honour God, show faith in Him (show you believe in Him) and commitment to Him</p> <p>Christians worship in lots of different ways</p> <p>The way they worship might depend on which denomination of Christian they are.</p> <p>Prayer is an example of worship, not the same thing. There are lots of other ways to worship, not just praying, including going on pilgrimage, reading the Bible, taking part in the Eucharist and so on</p>
Prayer	<p>Prayer is communicating with God in a variety of ways for example saying the Lord's Prayer which is the prayer that Jesus taught the disciples</p> <p>Christians pray for different reasons such as; for help for themselves or others, to thank God, confess their sins and ask for forgiveness or simply to praise God</p>
Sacraments	<p>The term sacrament is the external and visible sign of an inward and spiritual grace. Sacraments are often rituals used by Christians to show belief in God.</p> <p>There are seven sacraments that Roman Catholics, Orthodox Christians and some Anglicans believe in are; Baptisms, Eucharist, Reconciliation,</p> <p>The vast majority of Christians believe in the sacraments of baptism and the Eucharist.</p>

3.	Topics and general information
Topic	Information
Baptism	<p>Baptism is a practised by almost all Christian Churches (although in different forms), so it could be considered the most important of all sacraments.</p> <p>Baptism serves two main purposes: cleansing of original sin and rite of passage (welcoming ceremony) into the religion. Baptism is mentioned in the Bible; Jesus was baptised by his cousin John.</p> <p>The Baptism service follows a different structure in different Churches but all use water which symbolises being clean and free from sin.</p>

5.	Key terms
Holy Communion	Sacrament to remember the Last Supper and Jesus' death and sacrifice of his life on the cross to save us from sin, hell and death
sacrament	A Christian ceremony that shows believers God's grace (e.g. baptism and the Eucharist)
pilgrimage	A journey made to a holy place to show devotion to God
Iona	Scottish island where Christians go to focus fully on God away from their busy lives, and live in a Christian community for a time
Lourdes	Place in France Christians go to seek a miracle cure for illness or disability, or the strength to cope with it

4.	Topics and general information
Topic	Information
Pilgrimage	<p>A pilgrimage is a journey made for religious reasons, alone or with other Christians, to a sacred (holy) place. It is both a spiritual and physical journey.</p> <p>Christians go on pilgrimage to; grow closer to God and strengthen their faith, express sorrow for sin and be forgiven, seek a cure for illness and experience a holy place, to follow in the footsteps of important people or to learn about their religion</p> <p>Often Christians come back from pilgrimage with a renewed enthusiasm for living a Christian life and may also feel cleansed from sin</p>
Eucharist	<p>Eucharist (Holy Communion) is the sacrament that uses bread and wine to remember the sacrifice of Jesus on the cross and his resurrection from death</p> <p>Most Christians consider it the most important act of worship because it recalls the Last Supper of Jesus as told in Matthew 26:17 – 30</p> <p>During the service Christians give thanks to God for his great love in sending Jesus to save people from sin and enabling them to experience God's love for all eternity.</p> <p>Generally, in a Eucharist service the following happens: Prayers for forgiveness, Bible is read, Bible is explained, prayers said over the bread and wine. eat bread. drink wine</p>

What is benefit/purpose of Christian worship?

Explain the importance of the Eucharist for Christians?

Briefly describe the process of Holy Communion (Eucharist)?

How does performing pilgrimage bring a person closer to God?

Describe one sacrament other than Holy Communion and explain the impact it has upon a Christian's life today?

URDU	English	URDU	English
ڈاؤن لوڈ	to download	ایک یو ٹیوب چینل	a Youtube channel
پیک کھولیں	To de-stress / relax	ناولوں	novels
میری تشویش کو بھول جاؤ	to forget my worries	گھنٹے خرچ	to spend hours
موجودہ تناؤ سے	for / since	پڑھنے	reading

Fancy Phrases ۱۔ کیا میں اس پر جوش ہوں... کے بارے میں ۲۔ مجھے اچھا محسوس ہوتا ہے۔ ۳۔۔۔۔۔ پھیلائیں، ۴۔ مجھے لگتا ہے کہ یہ ہے... ۵۔ جہاں تک میں فکر مند ہوں...

Module 3: تفریحی وقت کی شناخت اور ثقافت

adjectives

کم فعال/دلچسپ /مشکل /اچھا کھلاڑی/بوریت/ بُرا تیز /چست/ تھکا ہوا/ صحت مند/مفید /دلچسپ/کمزور/خوفناک /تکبر/تخلیقی/سنجیدہ/ پہلوان/ چالاک/ منظم/ جلد باز/ ایماندار/

intensifiers

یہ بھی/بہت/کافی/ایک چھوٹا/زیادہ/بلکہ انتہائی/تو/تقریباً/بہتر/اچھی طرح

time phrases

گزشتہ کل/جب میں نے تھا... سال

آج/ہر دن/عام طور پر موجودہ

مستقبل کل/بعد میں

- Subtopics**
- sport
 - Books
 - Films
 - TV
 - Technology
 - Cinema

- Connectives**
- سب سے **FIRST** پہلے -- **THEN** پھر **FOR** -- کے لئے **FOR**

Key questions to answer

کیا آپ ایک کھلاڑی ہیں؟
کیا آپ موسیقی پسند کرتے ہیں؟
اختتام ہفتہ پر آپ کیا کرنا پسند کرتے ہیں؟
کیا آپ کے پاس ایک موبائل فون ہے؟
ٹیکنالوجی اہم ہے؟
آپ کی پسندیدہ فلم/کتاب/کھیل گروپ کیا ہے؟
اگلے ہفتے کے آخر میں آپ کے منصوبے کیا ہیں؟
آپ نے پچھلے ہفتے کے آخر میں کیا کیا؟

- Key grammar:**
- opinions
 - Conditional tense
 - tenses
 - Direct object pronouns
 - Past + present

Infinitive	English	present	perfect (I have done)	imperfect (I was / used to)	future (I will do)	conditional (I would do)
چلانیں	to play	میں کھیلتا ہوں	جے ادا کرتا ہے	میں کھیلتا رہا تھا	میں کھیلتا جاؤں گا	میں کھیلتا جاؤں گا
پڑھیں	to read	میں پڑھ رہا ہوں	میں نے پڑھا ہے	میں پڑھ رہا تھا	میں پڑھتا ہوں	میں پڑھتا ہوں
جانے کے لئے	to go	میں جا رہا ہوں	میں چلا گیا	میں جا رہا تھا	میں جاؤں گا	میں جاؤں گا
کیا	to do	میں کر	جے کیا	میں کر رہا تھا	میں کروں گا	میں کروں گا
ہے	to have	رہا ہوں	میرے پاس	میں نے	ہوں گا	ہوں گا

Garder la forme	To keep fit		
Je suis en forme.	<i>I'm fit.</i>	je fais de l'exercice régulièrement	<i>I exercise regularly</i>
Pour garder la forme, ...	<i>To keep fit ...</i>		
je mange sainement	<i>I eat healthily</i>	Je mangeais/buvais/ faisais ...	<i>I used to eat/drink/ do ...</i>
je ne bois que de l'eau	<i>I only drink water</i>	Je pourrais manger/ boire/faire ...	<i>I don't eat/drink/ do ...</i>
je ne mange pas de sucreries	<i>I don't eat sweet things</i>	Je pourrais faire un régime.	<i>I could go on a diet.</i>
je ne mange pas beaucoup de graisses	<i>I don't eat much fat</i>		
je fais beaucoup d'exercice	<i>I do lots of exercise</i>		

Quand et comment?	When and how?		
d'habitude	<i>usually</i>	régulièrement	<i>regularly</i>
également	<i>equally/also</i>	sainement	<i>healthily</i>
finalement	<i>finally</i>	seulement	<i>only</i>
généralement	<i>generally</i>	tellement	<i>so</i>
lentement	<i>slowly</i>	uniquement	<i>solely</i>
heureusement	<i>fortunately</i>	bien	<i>well</i>
malheureusement	<i>unfortunately</i>	mal	<i>badly</i>
personnellement	<i>personally</i>	mieux	<i>better</i>
rapidement	<i>quickly</i>	toujours	<i>always</i>

La dépendance	Addiction		
Les cigarettes coûtent cher.	<i>Cigarettes are expensive.</i>	Ils nous montrent le mauvais exemple.	<i>They set a bad example.</i>
Ses vêtements sentent la fumée.	<i>His/Her clothes smell of smoke.</i>	Ça me donne confiance.	<i>It gives me confidence.</i>
C'est dégoûtant.	<i>It's disgusting.</i>	Il est mort d'un cancer des poumons.	<i>He died of lung cancer.</i>
C'est déstressant.	<i>It's relaxing.</i>	C'est difficile d'arrêter.	<i>It's difficult to stop.</i>
Le problème le plus grave, c'est ...	<i>The most serious problem is ...</i>	Je fume depuis (quatre ans).	<i>I've been smoking for (four years).</i>
le tabagisme	<i>smoking</i>	Je suis devenu(e) dépendant(e).	<i>I got hooked/addicted</i>
l'alcool (m)	<i>alcohol</i>	C'est presque impossible de ...	<i>It's almost impossible to ...</i>
le SIDA	<i>AIDS</i>	à mon avis	<i>in my opinion</i>
la drogue	<i>drugs</i>	selon moi	<i>in my opinion</i>
l'anorexie (f)	<i>anorexia</i>	je pense que ...	<i>I think that ...</i>
Ils ne remarquent pas quand ils ont trop bu.	<i>They don't notice when they've had too much to drink.</i>	je trouve que ...	<i>I find that ...</i>
Ce n'est pas bon pour la santé.	<i>It's not good for your health.</i>	je suis pour/contre ...	<i>I'm for/against ...</i>
C'est du gaspillage.	<i>It's a waste.</i>	parce que ...	<i>because ...</i>
Ça coupe l'appétit.	<i>It suppresses your appetite.</i>		

Pour changer la situation	To change the situation
Je me douche au lieu de me baigner.	<i>I take a shower instead of a bath.</i>
Je partage la voiture avec trois autres.	<i>I share the car with three others.</i>
J'ai recyclé mon portable.	<i>I recycled my mobile.</i>
On a installé des containers pour le verre.	<i>We installed containers for glass.</i>
On a construit un petit parc.	<i>We made a little park.</i>
On a créé un espace vert/une zone piétonne.	<i>We created a green space/a pedestrian precinct.</i>
On recyclera/utilisera/éteindra ...	<i>We will recycle/use/switch off ...</i>
On ne gaspillera pas ...	<i>We won't waste ...</i>

Les problèmes mondiaux	World problems		
Le plus grand problème du monde, c'est ...	<i>The biggest problem in the world is ...</i>	la paix	<i>peace</i>
le SIDA	<i>AIDS</i>	la sécurité	<i>safety</i>
le terrorisme	<i>terrorism</i>	les médicaments (m)	<i>medicine</i>
le réchauffement de la planète	<i>global warming</i>	On devrait ...	<i>We should ...</i>
la faim	<i>hunger</i>	On pourrait ...	<i>We could ...</i>
la guerre	<i>war</i>	Il faut ...	<i>We must ...</i>
la pauvreté	<i>poverty</i>	collecter de l'argent	<i>collect money</i>
l'Afrique (f)	<i>Africa</i>	combattre le SIDA	<i>fight AIDS</i>
l'Inde (f)	<i>India</i>	donner de l'argent aux bonnes causes	<i>give money to charity</i>
les pays (m) en voie de développement	<i>developing countries</i>	écrire au gouvernement	<i>write to the government</i>
les produits issus du commerce (m) équitable	<i>fair trade products</i>	faire quelque chose	<i>do something</i>
la famine	<i>famine</i>	organiser des événements	<i>organise events</i>
		patraîner un enfant	<i>sponsor a child</i>

Les problèmes locaux	Local problems		
Ce qui est bien/nul, c'est ...	<i>The good/bad thing is ...</i>	le camion	<i>lorry</i>
On ne peut pas respirer à cause de la pollution.	<i>You can't breathe because of the pollution.</i>	la criminalité	<i>crime</i>
Il n'y a qu'un bus par jour.	<i>There's only one bus a day.</i>	la circulation	<i>traffic</i>
		la zone piétonne	<i>pedestrian precinct</i>
Il n'y a plus de cinéma.	<i>There's no longer a cinema.</i>	les distractions (f)	<i>entertainment</i>
		les embouteillages (m)	<i>traffic jams</i>
Le club des jeunes est fermé.	<i>The youth club is closed.</i>	les heures (f) de pointe	<i>rush hour</i>
Il n'y a ni poubelles ni centres de recyclage.	<i>There are neither rubbish bins nor recycling points.</i>	les transports (m) en commun	<i>public transport</i>
On jette des déchets par terre.	<i>Rubbish is thrown on the ground.</i>	le quartier	<i>district, part of town</i>
Les jeunes n'ont rien à faire.	<i>Young people have nothing to do.</i>	la maison individuelle	<i>detached house</i>
On ne voit personne.	<i>You don't see anyone.</i>	la maison jumelle	<i>semi-detached house</i>
La police ne vient jamais.	<i>The police never come.</i>	l'FLM (habitation à loyer modéré) (f)	<i>council flat/house</i>
Il n'y a aucun travail.	<i>There's no work.</i>	bruyant(e)	<i>noisy</i>
Beaucoup de gens sont au chômage.	<i>Lots of people are unemployed.</i>	dangereux/euse	<i>dangerous</i>
		pollué(e)	<i>polluted</i>
		propre	<i>clean</i>
		rapide	<i>fast</i>
		sale	<i>dirty</i>
		tranquille	<i>quiet</i>

L'environnement	The environment		
Il faut ...	<i>We must ...</i>	détruire la couche d'ozone	<i>destroy the ozone layer</i>
éteindre la lumière	<i>switch off the light</i>	empoisonner la terre	<i>poison the earth</i>
baisser le chauffage central	<i>turn down the central heating</i>	utiliser trop les voitures	<i>use cars too much</i>
acheter des produits bios/verts	<i>buy organic/ environmentally friendly products</i>	le carton	<i>cardboard</i>
recycler	<i>recycle</i>	le frigo	<i>fridge</i>
Il ne faut pas ...	<i>We mustn't ...</i>	les gaz (m) d'échappement	<i>exhaust fumes</i>
gaspiller l'énergie	<i>waste energy</i>	le journal	<i>newspaper</i>
laisser le robinet ouvert	<i>leave the tap running</i>	le recyclage	<i>recycling</i>
utiliser trop d'emballages	<i>use too much packaging</i>	le sac en plastique/toile	<i>plastic/cloth bag</i>
		le verre	<i>glass</i>
		la boîte	<i>can, tin</i>



Year 10 Animals

Keywords	Definition
Assessment Objectives	4 different criteria's that you need to meet throughout your project.
Observe	Study an image carefully
Annotation	A note by way of explanation or comment added to a text or image
Pencil Pressure	How hard or light you press
Artist Response	Creating work inspired by an artist and references their style
Colour theory	Using colour to represent emotion or expression
Realism	When art accurately depicts reality
Abstract	A subjective representation/interpretation of a theme
Monoprint	A print that is unique and only achieved once
Saturation	The depth and brightness of colour
Refine	Make minor changes to correct, clarify and perfect
Contemporary	Belonging or occurring in the present
Mark making	The way you create marks using media
Tonal Drawing	Drawing with a range of tones and value are

Key Information that I learnt
 Art Techniques through media experimentation
 How to create a tonal drawing and detailed observational drawing
 Create a final piece that incorporates past artists/techniques
 I can use observational skills to replicate and recreate images and subject matter
 Evolve and record a creative journey

Techniques and Media

Brusho



Acrylic paint



Monoprint



Pencil Crayon



Watercolour



Chalk/Charcoal



Art that will Inspire me
 Henry Moore
 Starla Michelle
 Nicola Henley
 Dave White
 Iain McArthur



Year 10 Animals

Art Marking System			
	Level	Marks	9-1
Convincingly	Exceptional Ability	24	9
Clearly	Exceptional Ability	23	9
Adequate	Exceptional Ability	22	9
Just	Exceptional Ability	21	9
Convincingly	Highly Developed	20	8
Clearly	Highly Developed	19	8
Adequate	Highly Developed	18	8
Just	Highly Developed	17	7
Convincingly	Consistent Ability	16	7
Clearly	Consistent Ability	15	6
Adequate	Consistent Ability	14	6
Just	Consistent Ability	13	5
Convincingly	Moderate Ability	12	5
Clearly	Moderate Ability	11	4
Adequate	Moderate Ability	10	4
Just	Moderate Ability	9	4
Convincingly	Some Ability	8	3
Clearly	Some Ability	7	3
Adequate	Some Ability	6	3
Just	Some Ability	5	2
Convincingly	Minimal Ability	4	2
Clearly	Minimal Ability	3	2
Adequate	Minimal Ability	2	1
Just	Minimal Ability	1	1

A01 EXPLORE
 BEGIN TO LINK A THEME TO ARTISTS
 WRITTEN ANALYSIS
 LINK ARTISTS WORK TO IDEAS AND ARTWORK

A02 EXPERIMENT WITH A RANGE OF MEDIA
 LINKING TECHNIQUES TO ARTISTS AND THEMES
 TEXTILES CLAY
 WATERCOLOUR PEN AND INK

A03 IDEAS
 IDEAS LINKING TO ARTISTS WORK
 ALL ARTWORK LINKING TOGETHER PLANS, DESIGNS IN A RANGE OF DIFFERENT MEDIA
 OBSERVATIONAL DRAWINGS
 PLANS
 EXPLANATIONS
 ANNOTATION

A04 FINAL
 MEANINGFUL PIECE OF WORK INFORMED BY RESEARCH
 SHOW UNDERSTANDING
 RESPONSE LINKS
 LINK BETWEEN VISUALS AND ARTISTS PRESENTATION RELEVANT

Using Acrylics

Small pile of paint - lots to pick up and slower to dry. Colour mixed over large area of palette - quick to dry and not much paint to pick up.

Do not start with the details!!! It will take you twice as long!

Start with the background colours with a larger brush. Make sure you colour match these first few colours. Then you can start adding darker values, lighter tints and details with the smaller brushes.

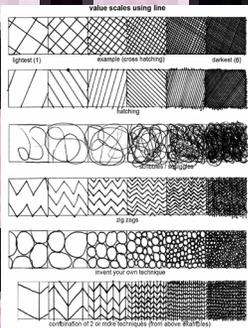
To blend, you want to mix three colours on your palette:
 • Starting colour
 • Mid colour
 • End colour
 Lay down the starting colour, then add dabs of the mid colour next to it and blend lightly into each other - do the same with the end colour next to the mid colour. Use short, careful strokes

Too dry: Start with the background colours with a larger brush. Make sure you colour match these first few colours. Then you can start adding darker values, lighter tints and details with the smaller brushes.

Too wet: Damp to a point + plenty of paint on the brush.

ANNOTATION Artist Page

1. Present the artist's name in an interesting font- look for the original signature
2. Find 3 relevant facts about artist?
3. What inspired them?
4. What materials did they use?
5. Find 5 adjectives to describe their work
6. Do you like their work? Explain



Mark making is a term used for the creation of different patterns, lines, textures and shapes. This may be on a piece of paper, on the floor, outside in the garden or on an object or surface



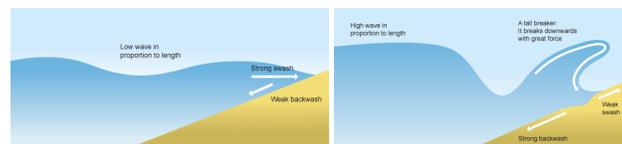
1. Choose 2 pieces of art that you have created and evaluate what was successful and unsuccessful about each piece
2. Can you explain which media you enjoyed using most and what advice would you give to someone else using it?
3. Choose two artists and evaluate their techniques and how they have inspired you
4. Write at least 2 paragraphs reflecting on the project. Include how you would improve next time, what skills you have evolved and what has inspired you
5. Did you use your booklets to track your progress? Add notes to your booklet that will help you with your next project e.g. creating a mind map should also be informative, visually attractive and reflect the theme

Key Information: The UK has a range of diverse landscapes

1	Key terms	Definitions
	Deposition	Occurs when material transported by the sea is dropped due to the sea losing energy
	Erosion	The wearing away and removal of material by a moving force
	Longshore drift	Zig zag movement of sediment along the shore caused by swash and backwash
	Mass movement	The downhill movement of weathered material under the force of gravity
	Transportation	The movement of eroded material
	Wave fetch	The distance the wind blows over the surface of the sea

Key Information: The coast is shaped by a number of physical processes

Constructive waves	Destructive waves
Powerful swash, Weaker backwash Long wave length, Low wave height Gentle beach	Weak swash, Strong backwash Short wave length, Higher wave height Steep beach



3	Weathering	The breakdown of rocks caused by the day-to-day changes in the atmosphere. Weathering attacks the top of the cliff.
	Freeze-thaw	Water collects in cracks. At night this water freezes and expands. The cracks get larger. In the day the temperature rises and the ice melts (thaws). The repeated freezing and thawing weakens the rock = breaks apart
	Biological weathering	Plant roots grow in cracks in the rocks and break them apart. Animals burrow into weak rocks and break it apart.
	Chemical weathering	Carbon dioxide and sulphur dioxide mix with rainwater to produce acid rain. This reacts with rocks. e.g. $\text{rainwater} + \text{CO}_2 = \text{carbonic acid}$. $\text{Carbonic acid} + \text{calcium carbonate}$ (in rocks such as limestone) = calcium bicarbonate which is soluble = rock dissolves.

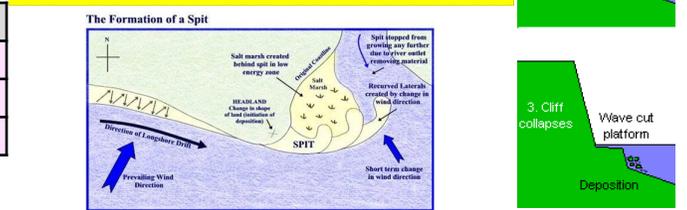
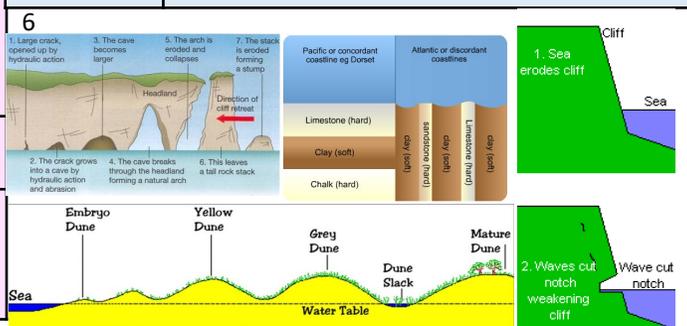
Mass movement	Downward movement of material under the influence of gravity
Sliding	Land moves downhill along a line of weakness
Slumping	Rotational slip of saturated soil and weak rock
Rock falls	Fragments of rock break away from the cliff face

GCSE Physical Landscapes in the UK – Coasts Knowledge Organiser

4		Erosion and Transportation	
Erosion	The wearing away or removal of rocks.		<p>Land</p> <p>Shoreline</p> <p>Surf Zone</p> <p>Sea</p> <p>Direction of longshore drift</p> <p>Direction of prevailing wind</p> <p>updrift</p> <p>downdrift</p>
Hydraulic Action	The force of the waves hitting the cliffs removes material		
Abrasion	Material in the sea hits against the cliffs and removes rocks and soil, like sandpaper.		
Solution	Chemicals in the water dissolve the cliff.		
Attrition	Material in the sea crash into each other and break into smaller pieces.		

Key Information: Distinctive coastal landforms are the result of rock type, structure and physical processes

5	Key terms	Definitions
Arch		A wave eroded passage through a headland
Bar		When a spit grows across a bay to create a lagoon
Beach		The zone of deposited material that extends from the low water line to the limit of storm waves
Cave		Large hole in the cliff caused by waves forcing their way into cracks in the cliff
Cliff		A steep high rock face formed by weathering and erosion along the coastline
Headlands and bays		Headlands are promontories of resistant rock and bays lie in between where these have been eroded back
Sand dunes		Coastal sand hill above the high tide mark
Spit		A finger of sediment extending from the shore caused by deposition
Stack		An isolated pillar of rock left when an arch has collapsed
Wave cut platform		A rocky level shelf representing the base of retreated cliffs



Swanage – erosional features	Durdle Door (arch) Durlston Head (headland) Durlston Bay (bay) Old Harry (stack)	Studland sand dunes Poole Harbour – spit
------------------------------	---	---

Key Information: Different management strategies can be used to protect coastlines from the effects of physical processes

7	Beach nourishment	The addition of new material to a beach artificially. Cheap (£500,000 per 100 metres), easy to maintain, constant maintenance, sand from seabed destroys organisms
	Beach reprofiling	Changing the profile or shape of the beach
	Dune regeneration	Action taken to build up dunes and increase vegetation to strengthen the dunes and prevent excessive coastal retreat. Maintains natural environment, cheap, time consuming, areas off limit, limited area £200 – £2000 per 100 metres
	Gabion	Steel wire mesh filled with boulders. £50,000 pre 100 metres. Cheap, improves cliff management, unattractive, last 5 – 10 years
	Groyne	Wooden barrier built out into the sea to stop longshore drift. £150,000 each, cheap, widen beach, unattractive, causes problems down the coast
	Hard engineering	Use of concrete and large artificial structures to defend the coast
	Managed retreat	Allowing cliff erosion to occur as nature takes its course. Cheap, natural process, loss of land, relocation of people
	Rock armour	Large boulders dumped on the beach as part of the coastal defences. £20,000 per 100 metres, quick to build, expensive to transport rock, rocks might not blend in
	Sea wall	A concrete wall to reflect the energy of the sea and prevent erosion. £5000 - £10,000 a metre, effective barrier, promenade on top, expensive, high maintenance
	Soft engineering	Managing erosion by working with natural processes

8

Example of a coastal management scheme : Lyme Regis, Dorset England (coastal town popular with tourists)

Reasons for management	Unstable cliffs Powerful waves from the south west cause rapid erosion Sea wall has breached many times causing destruction to properties
Management strategy	Lyme Regis Environmental Improvement scheme set up in 1990s. Phase 1 & 2 included: New sea wall and promenade Cliff stabilisation Sand and shingle beach to absorb wave energy Phase 4 New sea wall for extra protection Cliffs stabilised to protect peoples homes Total cost: £43 million (phase 3 did not go ahead due to costs)

Resulting effects and conflicts	Positives: New beaches have increased visitor numbers and seafront businesses are doing well. New defences have withstood stormy winters and the harbour is better protected. Negatives: Increased visitor numbers have created conflicts due to traffic congestion and litter. Some think the new defences spoil the natural landscape and the new sea wall interferes with natural processes causing further erosion downstream.
---------------------------------	---

<p>1.1 Define deposition?</p> <p>1.2 What is erosion?</p> <p>1.3 What is longshore drift?</p> <p>1.4 Define mass movement?</p> <p>1.5 What is transportation?</p> <p>1.6 Define the term fetch?</p>	<p>3.1 Identify the three types of weathering.</p> <p>3.2 Define mass movement</p> <p>3.3 Describe chemical weathering</p> <p>3.4 Describe the process of a rockfall</p> <p>3.5 Describe a landslide</p> <p>3.6 How do landslides differ from slumping?</p> <p>3.7 Describe biological weathering</p> <p>3.8 Describe the process of freeze-thaw weathering</p>	<p>5.1 What are headlands and bays?</p> <p>5.2 Define a spit.</p> <p>5.3 Define a wave cut platform</p> <p>5.4 Define a beach.</p>	<p>7.1 What is dune regeneration and is it an example of soft or hard engineering?</p> <p>7.2 Identify a disadvantage of sea walls.</p> <p>7.3 Describe the strategy of groynes, which process do they interrupt.</p> <p>7.4 Give a disadvantage to managed retreat.</p> <p>7.5 How does building sea walls help to manage flooding?</p> <p>7.6 Give an advantage and disadvantage to beach nourishment.</p>
---	---	--	--

<p>2.1 Name the two types of waves</p> <p>2.2 Describe the properties of a constructive wave</p> <p>2.3 Describe the properties of a destructive wave</p> <p>2.4 Identify two differences between constructive and destructive waves</p> <p>2.5 Which wave erodes material from the beach?</p> <p>2.6 Which wave has the strongest swash?</p>	<p>4.1 Name the 4 types of erosion.</p> <p>4.2 Name the 4 types of transportation.</p> <p>4.3 Describe the process of longshore drift.</p> <p>4.4 Define attrition</p> <p>4.5 Define hydraulic action</p> <p>4.6 Describe how traction differs from saltation.</p> <p>4.7 Which type of erosion is also a type of transportation?</p>	<p>6.1 Describe the formation of a wave cut platform.</p> <p>6.2 Describe the formation of a spit.</p> <p>6.3 Describe the formation of a stack starting from the crack in the cliff face.</p> <p>6.4 Describe the sequence of dune formation beginning with an embryo dune.</p>	<p>8.1 Name the area of coast used as your example of coastal management.</p> <p>8.2 Why was management of the coast necessary?</p> <p>8.3 What was done as part of phase 1 and 2?</p> <p>8.4 What happened to phase 3?</p> <p>8.5 Describe phase 4.</p> <p>8.6 Identify two positives of the scheme.</p> <p>8.7 Identify two negatives of the scheme.</p>
---	---	--	--

1. The shape of river valleys changes as rivers flow downstream

The long profile is the gradient of the river from source to mouth

The cross profile is the side to side cross section of a river channel or valley

Lateral erosion is sideways erosion of a river on the outside of a meander bend
Vertical erosion is downward erosion of a river bed

Course	1. Upper Course	2. Middle Course	3. Lower Course
Gradient	Steep gradient	More gentle gradient	Flat gradient
Velocity	Low velocity	Faster velocity	Fastest velocity
Features	Water falls, gorges, and rapids	Meanders, Ox bow lakes, floodplains	Floodplains, deltas, estuaries
Channel	Narrow and shallow channel	Wider and deeper channel	Widest and deepest channel

2. Fluvial processes - Processes relating to river erosion, transportation and deposition

Types of erosion	
Abrasion	Rocks carried by the river wear down the river bed and banks
Attrition	Rocks smash together and break into smaller pieces
Hydraulic Action	Force of the river causes air to be trapped in cracks and weakens the bank
Types of transportation	
Saltation	Particles bouncing down the river bed
Solution	Soluble particles are dissolved into the river
Suspension	Fine solid material held in the water while it is moving
Traction	Rolling of boulders and pebbles along the river bed

3. Fluvial landforms result from different physical processes

Upper Course	
Gorge	Narrow steep sided valley formed as waterfall retreats
Interlocking spurs	Series of ridges on alternate sides of the valley the river winds round
Waterfall	Sudden descent of a river over a vertical or step slope in its bed
Middle course	
Meander	Pronounced bend in a river
Ox bow lake	Arc shaped lake cut off from a meander
Lower course	
Estuary	Tidal mouth of the river where it meets the sea
Levees	Embankments of sediment along a river
Floodplain	The flat area forming the valley floor on either side of a river channel

The formation of a waterfall

The waterfall retreats back upstream to create a gorge

A plunge pool forms, an over deepened area is created by erosion such as hydraulic action of the softer rock

The overhang collapses as it is weakened by erosion and weathering, and is pulled down by gravity

Collapsed rocks used as abrasive erosion tools

Previous positions of waterfall

GCSE Physical landscapes in the UK – Rivers Knowledge Organiser

Areas of deposition (yellow) and Areas of erosion (red)

4. EXAMPLE of river valley in UK - River Tees landforms

Upper course	V-Shaped valley Highforce Waterfall Gorge.
Middle course	Features include meanders and ox-bow lakes. . The meander near Yarm encloses the town.
Lower course	floodplains & levees near Darlington. Mudflats at the river's estuary.

5. Causes of Flooding

A flood hydrograph is a graph showing the discharge of a river, related to rainfall over a period of time

- Rising limb : the increase in river discharge as river flows into the river
- Peak discharge : the highest discharge
- Lag time : the time difference between peak rainfall and peak discharge
- Falling limb : the decrease in river discharge as river returns to normal level

<p>Physical factors affecting the flood risk</p> <ul style="list-style-type: none"> Precipitation – torrential, continuous, sudden snow melt Geology – permeable, impermeable Relief – steep / gentle slopes 	<p>Human factors affecting the flood risk</p> <ul style="list-style-type: none"> Urbanisation – building towns and cities - impermeable Deforestation – cutting down trees –Agriculture – ploughing patterns, disappearing fields
---	---

6. Key definitions

Hard engineering	Building of artificial structures to reduce, disrupt or stop the impact of river processes
Discharge	The quantity of water that passes a given point within a given period of time
Flood	Occurs when river discharge exceeds river channel capacity and water spills over the floodplain
Flood risk	The predicted frequency of floods in an area
Precipitation	Moisture falling from the sky as rain, hail, sleet or snow
Soft engineering	The use of the natural environment surrounding the river to work with the natural processes

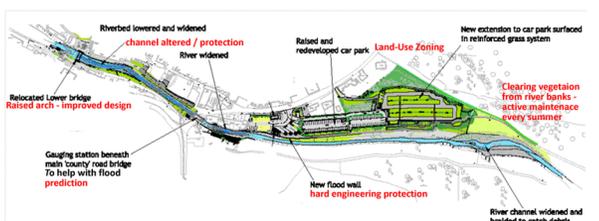
7. Management strategies – Hard and soft engineering

Dam and reservoir (Hard engineering)	A barrier built across a river to interrupt the flow and create a manmade lake. Regulates flow, provides HEP, boosts tourism, cost, displacement of people, interferes with nature
Embankments (Hard engineering)	Raised banks constructed along the river. Holds more water, habitats for wildlife, cheaper, unnatural, stops access to river
Flood plain zoning (Soft engineering)	Land that is near the river and often floods is not built on. Low cost, green space, traditional meadows protected, less housing areas, difficult to get planning permission
Flood relief channels (Hard engineering)	Artificial channels which are used when the river is close to flood. Decrease flood risk, provide leisure area, displacement of people, creates problems downstream, disturbs habitats
Flood warning (Soft engineering)	Providing reliable advance information about possible flooding. Plan what to do, cheap, ensures safety, only effective if heeded, still floods
Channel straightening (Hard engineering)	Removing meanders to make the river straighter. Speeds up river, improves navigation, increases flood risk downstream, expensive, unnatural
Planting trees (Soft engineering)	Reduces water in river, new habitats, cheap, changes appearance, loss of potential grazing land
River restoration (Soft engineering)	Return river to original course. Natural process, creates new habitats, aesthetically pleasing, loss of agricultural land, expensive

8. An example of a flood management scheme in the UK

Boscastle, Cornwall

Why the scheme was needed	<ul style="list-style-type: none"> 16/8/04 – 3 metre wall of water moved at 60km / hr through the village 20 businesses and 4 bridges destroyed. Loss of tourism Some injuries, no deaths No defences Steep valley, land upstream deforested, low arched bridge, impermeable rock, unprecedented rainfall
The management strategies	<ul style="list-style-type: none"> Old arched bridge replaced with one with higher arch Embankment strengthened Channel deepened and widened Gauge put in Flood wall built Car park raised and permeable surface put in Dead vegetation removed
Social, economic and environmental issues	<ul style="list-style-type: none"> Social – disruption to residents, safer, 1 in 75 chance of a flood, spoil character of the village Economic – less risk of flooding so lower insurance costs, £4 million a year, increased tourism Environmental – vegetation and river management, habitat improved, engineered to look natural



<p>1.1 What is the gradient in the upper course of the river?</p> <p>1.2 Where is the fastest velocity found?</p> <p>1.3 In which section of the river do waterfalls form?</p> <p>1.4 Describe the river channel in the upper course of the river.</p> <p>1.5 Describe the river channel in the lower course of the river.</p> <p>1.6 In which section of the river are floodplains found?</p> <p>1.7 Describe the gradient in the lower course of the river.</p> <p>1.8 Where are meanders found?</p>	<p>3.1 What is an ox-bow lake?</p> <p>3.2 What is a gorge?</p> <p>3.3 What is a meander?</p> <p>3.4 What is a levee?</p> <p>3.5 In what section of the river are estuaries found?</p> <p>3.6 In what section of the river are interlocking spurs found?</p> <p>3.7 Describe the formation of a waterfall.</p> <p>3.8 Describe the formation of an ox-bow lake.</p>	<p>5.1 What is the rising limb on a flood hydrograph?</p> <p>5.2 what does lag time mean?</p> <p>5.3 What is peak discharge?</p> <p>5.4 Would the peak discharge be higher in an area of permeable or impermeable rock?</p> <p>5.5 Would deforestation make for a short lag time or long lag time?</p> <p>5.6 Name two physical factors affecting flooding.</p> <p>5.7 Name two human factors affecting flooding.</p>	<p>7.1 What is flood plain zoning and is it an example of soft or hard engineering?</p> <p>7.2 Describe a disadvantage to flood plain zoning.</p> <p>7.3 Describe the strategy of river straightening.</p> <p>7.4 Give a disadvantage to river straightening.</p> <p>7.5 How does building a dam help to manage flooding?</p> <p>7.6 Give an advantage and disadvantage to dam building.</p>
--	--	---	--

<p>2.1 Name the four types of transportation.</p> <p>2.2 Name the four types of erosion (one is also a type of transportation).</p> <p>2.3 Describe traction.</p> <p>2.4 Describe attrition.</p> <p>2.5 what is saltation?</p> <p>2.6 Is suspension a type of erosion or type of transportation?</p>	<p>4.1 Name the three river features found in the upper course of the river.</p> <p>4.2 Name the waterfall on the River Tees.</p> <p>4.3 Name two features found in the middle course of the river.</p> <p>4.4 What is different about the meander near Yarm?</p> <p>4.5 Name two features found in the lower course of the river.</p> <p>4.6 Name the town in the lower course of the river.</p>	<p>6.1 Define the word flood.</p> <p>6.2 What is precipitation?</p> <p>6.3 Define hard engineering.</p> <p>6.4 Define soft engineering.</p>	<p>8.1 Name the town in Cornwall where we looked at the example of a river management scheme.</p> <p>8.2 Explain why the scheme was needed?</p> <p>8.3 What year did the floods happen?</p> <p>8.4 Describe three strategies done as part of the scheme.</p> <p>8.5 Describe an economic advantage to the scheme.</p> <p>8.6 Describe a social disadvantage to the scheme.</p> <p>8.7 Describe a further advantage of the scheme.</p>
--	---	---	---

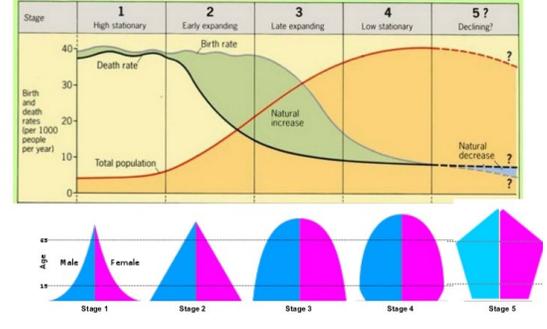
1 KI : There are global variations in economic development and quality of life

Key terms	Definitions
Birth rate	Number of births in a year per 1000 of the population
Death rate	Number of deaths in a year per 1000 of the population
Demographic Transition Model	A model showing how populations change over time in terms of their birth rates, death rates and total population size
Development	The progress of a country in terms of economic growth, technology and welfare
Gross National Income (GNI)	Gross national income divided by the size of the population
Human Development Index (HDI)	Development measure using GDP per capita, life expectancy and adult literacy. Given as an index figure
Infant mortality	Average number of deaths of infants under 1 year of age per 1000 live births per year
Life expectancy	Average number of years a person might be expected to live
Literacy rate	Percentage of people who have basic reading or writing skills
Access to safe water	Percentage of people with access to clean water
People per doctor	Number of people per doctor

Classification of countries	
LIC – Low Income Countries	US \$1045 or less GNP 30 countries
NEE – Newly Emerging Economy	80 countries. Number increasing due to globalisation
HIC – High Income Country	US\$ 12,736 or more 80 countries

2 Population Structures & the DTM

The population structures change as countries develop and progress through the demographic transition model. The typical stages of the pyramids are show below...



GCSE The Changing Economic World Knowledge Organiser

Indicator	3	Limitations
LICs	Not higher death rate as have younger population	
Birth rate	Useful except where government policies	
Infant Mortality Rate	Decreasing in HICs. Increasing in LICs. Close link to wealth, access to services. Data can be inaccurate	
Life Expectancy	Rising in HICs though may decrease due to obesity	
Gross National Income	Blunt tool. No measure of how much \$1 will buy. Hides variations	
HDI	Most useful indicator. Economic and social element. Data can be unreliable. Does not account for subsistence economy, corrupt governments etc.	
Causes of uneven development	4	
Physical	Climate Poor farming land Extreme weather	Few raw materials Lack of safe water Natural hazards
Economic	Poor trade links Debt Lack of education	Primary economy Corrupt government Poor health and water quality
Historical	Colonialisation	Conflict
Consequences of uneven development	5	
Disparities in wealth and health	HICs – higher income, better health care, higher life expectancy, lower IMR NEE – wealth not evenly distributed LICs depend on HICs for aid. Borrow from world bank causing debt North America 35% of global wealth, Africa 1%	
International migration	Migration to countries with higher development e.g. Mexico to USA Depends on push and pull factors. Money sent home	

6 KI : Various strategies exist for reducing the global development gap

Key terms	Definitions
Development gap	Difference in standards of living and wellbeing between LICs and HICs
Fair trade	When producers in LICs are given a better price for the goods they produce
Intermediate technology	Simple, easily learned and maintained technology used in a range of economic activities serving local needs in LICs
Microfinance loans	Very small loans given to people in LICs to help start a small business

Strategy for reducing the development gap	7
Investment	Governments, organisations of companies invest in big projects. Provides employment and income leading to development. TNCs from NEEs and HICs inject FDI leading to multiplier effect
Industrial development and tourism	HEP helps economic growth in Africa and Asia. Brings employment, income and opportunities. Investment occurs in housing, education and infrastructure. Move from primary products as issues with overproduction and import taxes. Manufacturing goods lead to more profit. Tourism leads to investment and more income. Vulnerable to recession.
Aid	Gift (not repaid). Can be funding for development e.g. infrastructure which boosts economy and leads to an increase in quality of life. From countries / IMF / World Bank. UK spends 0.7% GDP on aid
Intermediate technology	Combines sophisticated ideas with cheap readily available materials. Local knowledge and tools used eg. Afridev handpump, solar ovens
Fair Trade	Prevents exploitation with realistic prices and better working conditions. Increases standard of living, health care and education.
Debt relief	Writing off debts / making repayments lower and terms longer. IMF / World Bank Highly Indebted Poor Countries Initiative helped 41 countries (mainly in Africa) control their finances, show no government corruption and agree to spend saved money on education, healthcare and decreasing poverty. Tanzania now has free education and Uganda has safe water for 2 million people. African countries are over US\$300 billion in debt
Microfinance loans	Provided by investors in HICs to entrepreneurs in NEEs and LICs. Many borrowers are women e.g. Grameen Bank in Bangladesh. Vital cash to escape cycle of poverty
EG of how tourism in a LIC can reduce the development gap	Case Study : Jamaica 8
Reasons for tourism	Jamaica's tropical climate means it is hot all year round with plenty of sunshine. There are beautiful beaches, such as Montego Bay, deep sea fishing at Port Antonio, caves at Cockpit County.
How has it helped?	In 2014, 24% of Jamaica's GDP was from tourism. Income from tourism is \$2 billion. The taxes paid to the Jamaican government due to the tourism industry provide money which helps Jamaica to develop. The money can be spent on services such as health care and education. Tourism provides 200,000 jobs to people in Jamaica. Tourism has led to new and/or improved infrastructure (e.g. ports, roads, airports, hotels)
Concerns	Some businesses are owned by foreign companies and so the profits end up abroad. Profits that stay in Jamaica go to a few individuals. Most people remain poor. Some tourism staff are foreigners and their wages are sent home. Tourist destinations attract Jamaicans from poor inland areas where businesses lose out. Tourists have affected the environment – coral reefs have been damaged by water sports and increased development and air travel has caused pollution.



<p>1.1 Define birth rate.</p> <p>1.2 What do the letters GNI stand for?</p> <p>1.3 Define life expectancy.</p> <p>1.4 What is HDI?</p> <p>1.5 Identify 3 indicators of HDI.</p>	<p>3.1 Why is HDI the most useful indicator?</p> <p>3.2 What is the limitation with using GNI as an indicator?</p> <p>3.3 How can infant mortality rate be used as indicators of a country's development?</p>	<p>5.1 Describe why there are disparities in wealth and health between countries.</p>	<p>7.1 How does investment help a country to develop?</p> <p>7.2 Describe two ways tourism can help a country to develop.</p> <p>7.3 What is aid?</p> <p>7.4 What are microfinance loans?</p> <p>7.5 Describe two benefits of Fairtrade.</p>
<p>2.1 Describe death rate in stage 1 of the DTM.</p> <p>2.2 Describe the total population in stage 2.</p> <p>2.3 Describe what is happening to birth rate in stage 3.</p> <p>2.4 What is the population beginning to do by stage 5?</p>	<p>4.1 Identify 2 physical causes of uneven development.</p> <p>4.2 Identify 2 economic causes of uneven development.</p> <p>4.3 Identify 2 historical causes of uneven development.</p>	<p>6.1 Define the development gap.</p> <p>6.2 What is Fairtrade?</p> <p>6.3 Describe what microfinance is.</p>	<p>8.1 Why do people visit Jamaica?</p> <p>8.2 What is the significance of 24%</p> <p>8.3 How many jobs does tourism provide in Jamaica?</p> <p>8.4 How does tourism help Jamaica to develop?</p> <p>8.5 Identify 2 negatives.</p>

1 KI : Some LICs and NEEs are experiencing rapid economic development which leads to significant social, environmental and cultural change

Key terms	Definitions
Industrial structure	Relative proportion of the workforce in different sectors of the economy
International aid	Money, goods and services given by the government of one country or a multilateral institution to help the quality of life and economy of another country
Transnational Corporations (TNCs)	A company that has operations in more than one country





NIGERIA CASE STUDY **2**

Location and Importance of the country regionally and globally

- West Africa, North of the Equator
- Largest population of Africa – 184 million
- NEE – 3rd largest manufacturing economy in Africa
- Largest economy in Africa
- By 2020 should be one of the top economies
- Youthful educated population – skilled workforce for manufacturing and services

Wider political, social, cultural and environmental context

- 1960 Gained independence from the UK
- 1967 – 1970 Civil war followed by 28 years of military government.
- 1998 - Now stable democratic government
- 500 ethnic groups – South is Christian (Igbo and Yoruba), North is Muslim (Hausa). Some ethnic boundaries broken by rapid urbanisation
- South is Tropical Rainforest (Cocoa and oil palm crops) and North is Savanna (Peanuts grown)
- Issues in the north with extremist group Boko Haram – want Sharia law and own government. 17,000 dead.

Changing industrial structure. Balance between different sectors of the economy

- 60% live on less than US\$1.25 a day. Growing inequality
- GDP 2006 – US\$110 billion, GDP 2015 US\$560 billion
- Money earned from Services 52%, Manufacturing 7%, Oil and gas 14%, Agriculture 22%, Other 5%
- Nollywood – 3rd largest film industry in the world
- 70% employed in agriculture
- Rapid increase in telecommunications and retail
- Manufacturing increasing – processed food, leather, textiles, soap, detergents

How manufacturing can simulate economic development

- Oil found in 1950s. 14% GDP, 95% export earnings
- Produces 2.7% of world's oil which is higher quality than oil from the Middle East
- Overdependence on oil -- prices fell in 2015
- Oil processing led to chemical by products leading to growth in chemical industries such as soaps, detergents and plastics
- Dangote Cement (Nigerian company) has expanded into 13 countries in Africa
- All led to increased standard of living, FDI, jobs, taxes, multiplier effect, manufactured goods.
- Less imports needed and Nigerian TNCs have more influence in the region

Advantages and Disadvantages of TNCs

- Advantages : investment, jobs, expertise / skills, international links, new technology, multiplier effects, export revenues
- Disadvantages : leakage of profits, lower wage levels, environmental damage, can withdraw investment, exert political influences, poor working conditions, management jobs go to foreigners

GCSE The Changing Economic World Case Studies Knowledge Organiser

Role of TNCs in relation to industrial development

3

- Niger delta – oil. Royal Dutch Shell, Exxon Mobil, Chevron, Total and Agip
- Platforms and pipelines installed. Oil shipped to Europe and USA to be refined. Most profit leaked
- Nigerian National Petroleum Corporation – joint ventures with TNCs
- 40 TNCs – mostly UK, Europe and USA
- Damage to wetland and coastal ecosystems which people rely on

TNC Examples

4

SHELL OIL

- Anglo Dutch company.
- Huge investment
- 65000 directly employed and 250,000 indirectly employed
- 91% of contracts with Nigerian companies
- Issues – oil spills, oil flares (toxic fumes), militant groups disrupting supplies, oil theft and sabotage

Changing political and trading relationships within the wider world

5

- Part of OPEC, African Union, UN, OCOWAS(Economic Community of West African States) and CEN-SAD (Community of Sahel Saharan States)
- Trading relationship with UK for over 300 years.
- Exports : oil, gas, rubber, cocoa and cotton
- Imports : machinery, chemicals, transport equipment, phones, rice and wheat
- Main imports from China and there is growing Chinese investment in Nigeria
- China Railway Construction Corporation building US\$12 billion 1200km railway
- China invested US\$10 billion in exploration and drilling a new oil field
- South Africa investing in business and banking
- American companies investing and operating here too – GE, Walmart, Microsoft








International Aid – types and impacts on the receiving country

6

- ODA – Official Development Assistance – can be multilateral (World Bank / IMF) or bilateral (from one country)
- Voluntary aid – can be short term emergency relief or long term development assistance
- 2009 – 2013 : 60 million mosquito nets distributed
- UK gives US\$300 million year of aid
- Receives 4% of aid given to Africa
- Most successful projects are community based
- Problems include government corruption, government diverting money, donors have political influence, promoting commercial self interest

Environmental impacts on economic development

7

- Oil pollution
- Air pollution
- Water pollution
- Loss of habitats
- Destruction of forests
- Chemical waste
- Desertification
- Traffic congestions
- Squatter settlements
- Waste disposal

Effects of economic development on quality of life for the population

8

- Rated 152/187 countries in terms of HDI. Improving and is increasing quickly
- New jobs mean more income and increased quality of life
- Large differences between north and south; rural and urban; educated and uneducated
- Lack of access to safe water, sanitation and reliable electricity supply
- Oil wealth not used effectively.
- Overdependence on oil may become an issue as oil prices fall and new technology such as fracking develop
- Key challenges include continuing stable government, pollution of the Niger delta, tsetse fly affecting commercial livestock, desertification, religious conflict between north and south, Boko Haram extremist group

<p>1.1 What does TNC stand for?</p> <p>1.2 What is a TNC?</p> <p>1.3 Define international aid.</p>	<p>3.1 Describe what has happened in the Niger Delta.</p> <p>3.2 What has the environmental damage been?</p>	<p>5.1 What are Nigeria's main imports and exports.</p> <p>5.2 Who does Nigeria have a 300 year trading relationship with?</p> <p>5.3 Who has invested in Nigeria?</p>	<p>7.1 Identify 2 environmental impacts of economic development.</p>
<p>2.1 Describe 2 reasons why Nigeria is important to Africa.</p> <p>2.2 Which extremist group does Nigeria have a problem with?</p> <p>2.3 70% of Nigerians are employed in which sector of the economy?</p> <p>2.4 There has been a rapid increase in.....</p> <p>2.5 95% of Nigeria's export earnings are dependent on?</p> <p>2.6 Identify 2 advantages of TNCs.</p> <p>2.7 Identify 2 disadvantages of TNCs.</p>	<p>4.1 Name the TNC case study from the Niger Delta.</p> <p>4.2 How many people are employed directly and indirectly?</p> <p>4.3 What % of contracts are with Nigerian companies?</p> <p>4.4 Identify 2 issues.</p>	<p>6.1 Describe the different types of aid.</p> <p>6.2 Which projects are most successful?</p> <p>6.3 Identify 3 problems with aid helping developing.</p>	<p>8.1 Describe the challenges facing Nigeria.</p> <p>8.2 Where are there still gaps in development?</p> <p>8.3 HDI and quality of life have.....</p>

1 KI : A growing percentage of the world's population lives in urban areas	
Key terms	Definitions
Mega cities	Urban area with population in excess of 10 million people
Migration	When people move from one area to another
Natural increase	Birth rate minus death rate
Urbanisation	The process by which an increasing percentage of the country's population comes to live in towns and cities
Global pattern of urban change	<ul style="list-style-type: none"> • More than 50% of world's population live in urban areas • By 2030 it is expected to be more than 60% • By 2050 expected to be more than 70% • In 1950 there were 4 megacities • Now there are more than 20
Urban trends worldwide	<ul style="list-style-type: none"> • Highest rate of urbanisation in LICs due to rural to urban migration and high rates of natural increase (birth rate much higher than death rate) • Lower rates in HICs as already urbanised and have aging population • Some NEEs in South America following HICs pattern • Largest increase in India, China and Nigeria – by 2050 urban areas will have grown by 37%
Emergence of megacities	<ul style="list-style-type: none"> • Asia – huge population. Massive rural to urban migration. Rates fluctuate • China – Pearl River Delta – 120 million people as merging Hong Kong, Shenzhen and Guangzhou • Most megacities will be in China and India

The World's Megacities Are Set for Major Growth

Population growth of the world's top 15 megacities (millions, 2011-2025)



2 KI : Urban growth creates opportunities and challenges for cities in LICs and NEEs	
Key terms	Definitions
Economic opportunities	Chances for people to improve their standard of living through employment
Pollution	Presence of chemicals, noise, dirt etc which have harmful or poisonous effects on an environment
Sanitation	Measures designed to protect public health e.g. clean water
Social opportunities	Chances for people to improve their quality of life
Squatter settlement	An area of poor quality housing lacking in amenities which develops spontaneously and illegally
Traffic congestion	Occurs when there is too great a quantity of traffic for roads to cope with

GCSE Urban Issues and Challenges – Urbanisation and Rio Knowledge Organiser

Case study : Rio	3	Urban growth creates opportunities and challenges for cities in LICs/NEEs
Location and importance regionally, nationally and internationally		Regionally – large companies, most visited area in s. hemisphere, major commercial & administrative centre Nationally – Capital until 1960, major port, 2 nd most important industrial centre 5% country's GDP, major tourist centre. 5 ports Internationally – Olympics in 2016, 2014 soccer world cup, UNESCO world heritage site, cultural capital famous internationally for tourists re dance & music/ Rio Festival, has Christ the redeemer 1 of the 7 wonders of the world
Causes of growth		Natural increase – youthful population and most migrants are young Rural to urban migration. Push factors – low wages, changing climate, poor services, land shortages, degraded land. Pull factors – well paid jobs, urban lifestyle, higher standard of living, friends and family, education, medical care.

4 Opportunities	
Social	
Health & Education	<ul style="list-style-type: none"> • Health- In the favela of Sante Marta it has few roads and the main means of access is an over crowded cable car. So medical staff take health kits into peoples homes. As a result infant mortality has fallen & life expectancy has increased. • Education- The authorities have tried to improve access to education by: Encouraging locals to volunteer help in school; Making money available to pay for free lessons in volleyball, football, swimming & squash in Rocinha favela, Opening a private university the favela
Access to Resources	<ul style="list-style-type: none"> • Energy- The electricity supply to Rio has been improved by installing 60km of new power lines, new hydro-electric complex
Crime	<ul style="list-style-type: none"> • In 2013 Pacifying Police Units (UPPs) were established to reclaim favelas from drug dealers.
Traffic	<ul style="list-style-type: none"> • New toll roads into the city centre have been made, and making coast roads one way during rush hours to improve traffic flow helps to reduce congestion & air quality.
Economic	How urban areas can provide economic development <ul style="list-style-type: none"> • The policy to improve the city's favelas has improved quality of life. • Growing economic prosperity has attracted many large companies. • Events such as the Olympics have boosted the tourism sector that have created a range of new economic opportunities.

5 Challenges & Solutions	
Managing Urban Growth	
Providing clean water, sanitation systems & energy	<ul style="list-style-type: none"> • Energy- A power plant has been set up near the university of Rio using methane gas (biogas) from rotting rubbish. This will help because the whole city suffers blackouts frequently due to a shortage of electricity. Many people living in the poorer parts get electricity by illegally tapping into the main supply which is risky & unsafe. • Water supply - Around 12% of the population didn't have access to running water. Estimated 37% of water lost through leaky pipes, fraud & illegal access. • Waste -. Most waste from favelas gets dumped and pollutes the water systems which causes diseases like cholera and encourage rats
Providing access to services (education & health care)	<ul style="list-style-type: none"> • Health Care – in 2013 only 55% of the city had a local family health clinic. Services for pregnant women & elderly were very poor. • Education - education in Brazil is compulsory for 6-14 year olds. In Rio only half continue education beyond 14. Many drop out of school and some get involved in drug trafficking.
Managing Environmental Issues (Waste disposal, air & water pollution, traffic congestion)	<ul style="list-style-type: none"> • Waste-Overseas aid has helped reduce sewage. 12 new sewage works have been built since 2004 • Traffic – It's the most congested city in South America. There is bad congestion because roads can only be built on coastal low lands, tunnels are needed through mountains, cars have increased by 40% in 10 years. • Waste- Many of the 55 rivers entering Guanabara bay are heavily polluted.
Unemployment & Crime	<ul style="list-style-type: none"> • Crime – murder, kidnapping, carjacking & armed assault occur regularly. Street crime is still a problem, especially at night. • Unemployment – Favelas having 20% unemployment (low), many work in the irregular informal economy, poorly paid & generating no tax.



6 Self-help schemes – Rocinha	
	<ul style="list-style-type: none"> • Buildings upgraded to brick and tile. • Set up own shops and small industries - the 'informal sector'. • Authorities now accepted the existence of favelas and added electricity, paved and lit some streets and added water pipes.
Favela Bairro Project:	City authorities set aside £200 million to improve 60 of the 600 favelas. The plan included: <ul style="list-style-type: none"> • Replacing wood buildings and those built on dangerous slopes with larger (5x4m) brick houses • Laying water pipes and electricity cables • Improving sanitation, • Providing health and sports facilities, • Using local residents as labour (provided jobs)

<p>1.1 How many people live in a mega city?</p> <p>1.2 Define the term migration.</p> <p>1.3 What is natural increase?</p> <p>1.4 Define urbanisation.</p> <p>1.5 Where do more than 50% of the population live?</p> <p>1.6 Where is experiencing the fastest rate of urbanisation?</p> <p>1.7 Why?</p>	<p>3.1 Identify 2 reasons why Rio is important regionally.</p> <p>3.2 Identify 2 reasons why Rio is important nationally.</p> <p>3.3 Identify 2 reasons why Rio is important internationally.</p> <p>3.4 Name 2 reasons why Rio's population is increasing.</p> <p>3.5 Identify 2 push factors.</p> <p>3.6 Identify 2 pull factors.</p>	<p>5.1 What % of the city had access to a doctor?</p> <p>5.2 What age did many children drop out of school.</p> <p>5.3 Describe the issue with the water supply.</p> <p>5.4 What is the result of most favelas dumping their waste?</p> <p>5.5 What % have cars increased by and what has this led to?</p> <p>5.6 How many new sewage works have been built?</p> <p>5.7 Describe the issues with crime.</p> <p>5.8 What % of people are unemployed?</p>
<p>2.1 What are economic opportunities?</p> <p>2.2 Define the term pollution.</p> <p>2.3 What is sanitation?</p> <p>2.4 Define the term squatter settlement.</p> <p>2.5 Describe traffic congestion.</p>	<p>4.1 Describe the impact of medical staff taking kits into peoples homes.</p> <p>4.2 Identify 2 ways access to education has been improved.</p> <p>4.3 Describe how access to resources has improved.</p> <p>4.4 Explain how the UPPs have helped.</p> <p>4.5 Identify one economic opportunity.</p>	<p>6.1 How have buildings been upgraded?</p> <p>6.2 What have authorities done to improve live?</p> <p>6.3 Describe the Favela Barro Project.</p> <p>6.4 How much was spent?</p> <p>6.5 Identify 2 improvements that were made.</p>