Name:		Form:	

Knowledge is power. Information is liberating. Education is the premise of progress, in every society, in every family.

Kofi Annan

Year 10 Term 1 Knowledge Organiser Booklet

Contents:

Year 10 Term 1 Knowledge Organiser Booklet

How do I use the Knowledge Organiser booklet for independent home learning?

Every day you should be studying from your Knowledge Organiser (KO) booklet for home learning, as a minimum expectation.

The timetable on page 4 in this KO booklet tells you which subjects you should be studying and on which days. It doesn't matter if you don't have that subject on that day, you just follow the timetable.

Key instructions:
- Produce your home learning in your knowledge organiser exercise book.
- Start a new page for each subject.
- Bring your knowledge organiser booklet and exercise book to school with you every day.
- Your parents/carers should sign completed home learning every evening at the top of each page in your knowledge organiser exercise book.
- Your knowledge organiser exercise book will be checked regularly in form time and in lessons.
- Failure to complete knowledge organiser home learning will result in an after-school detention, where the missed home learning will be caught up.
- You will be regularly quizzed in lessons on knowledge from your knowledge organisers, to support the retention of this key information.

How does Knowledge Organiser home learning work?

The knowledge organiser for each subject contains the foundation knowledge that is required for that topic for that specific part of the year. Your aim is to make sure that by the end of the topic you are able to retain all of the knowledge from each subject knowledge organiser.

For each subject you should follow one of the two methods, and you should do one page of knowledge organiser home learning per subject. You are self-quizzing and self-assessing your knowledge against that in the KO booklet for each subject. **You are not just taking notes or copying out.**

Method 1
- Read the knowledge organiser for about 5 minutes
- Cover the knowledge organiser up
- Write down as much as you can remember in black/blue pen
- Add all that you couldn't remember or any corrections in green pen.

Method 2
- Read the knowledge organiser for about 5 minutes
- Use/write exam style questions
- Answer the questions in black/blue pen
- Correct/improve your answers in green pen

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Each day complete one page of your knowledge organiser exercise book to evidence your home learning

Week 1	Subject 1	Subject 2	Signature
Monday	English	Maths	
Tuesday	Science	ICT **or** Comp Sci	
Wednesday	LfL	Option 1	
Thursday	Option 2	Option 3	
Friday	English	Maths	

Week 5	Subject 1	Subject 2	Signature
Monday	English	Maths	
Tuesday	Science	ICT **or** Comp Sci	
Wednesday	LfL	Option 1	
Thursday	Option 2	Option 3	
Friday	English	Maths	

Week 2	Subject 1	Subject 2	Signature
Monday	Science	ICT **or** Comp Sci	
Tuesday	LfL	Option 1	
Wednesday	Option 2	Option 3	
Thursday	English	Maths	
Friday	Science	ICT **or** Comp Sci	

Week 6	Subject 1	Subject 2	Signature
Monday	Science	ICT **or** Comp Sci	
Tuesday	LfL	Option 1	
Wednesday	Option 2	Option 3	
Thursday	English	Maths	
Friday	Science	ICT **or** Comp Sci	

Week 3	Subject 1	Subject 2	Signature
Monday	LfL	Option 1	
Tuesday	Option 2	Option 3	
Wednesday	English	Maths	
Thursday	Science	ICT **or** Comp Sci	
Friday	LfL	Option 1	

Week 7	Subject 1	Subject 2	Signature
Monday	LfL	Option 1	
Tuesday	Option 2	Option 3	
Wednesday	English	Maths	
Thursday	Science	ICT **or** Comp Sci	
Friday	LfL	Option 1	

Week 4	Subject 1	Subject 2	Signature
Monday	Option 2	Option 3	
Tuesday	English	Maths	
Wednesday	Science	ICT **or** Comp Sci	
Thursday	LfL	Option 1	
Friday	Option 2	Option 3	

Week 8	Subject 1	Subject 2	Signature
Monday	Option 2	Option 3	
Tuesday	English	Maths	
Wednesday	Science	ICT **or** Comp Sci	
Thursday	LfL	Option 1	
Friday	Option 2	Option 3	

You are expected to study the subjects shown on your timetable each day.
Each day complete one page of your knowledge organiser exercise book to evidence your home learning

Year 10 Term 1 Knowledge Organiser Booklet

Week 9	Subject 1	Subject 2	Signature
Monday	English	Maths	
Tuesday	Science	ICT **or** Comp Sci	
Wednesday	LfL	Option 1	
Thursday	Option 2	Option 3	
Friday	English	Maths	

Week 13	Subject 1	Subject 2	Signature
Monday	English	Maths	
Tuesday	Science	ICT **or** Comp Sci	
Wednesday	LfL	Option 1	
Thursday	Option 2	Option 3	
Friday	English	Maths	

Week 10	Subject 1	Subject 2	Signature
Monday	Science	ICT **or** Comp Sci	
Tuesday	LfL	Option 1	
Wednesday	Option 2	Option 3	
Thursday	English	Maths	
Friday	Science	ICT **or** Comp Sci	

Week 14	Subject 1	Subject 2	Signature
Monday	Science	ICT **or** Comp Sci	
Tuesday	LfL	Option 1	
Wednesday	Option 2	Option 3	
Thursday	English	Maths	
Friday	Science	ICT **or** Comp Sci	

Week 11	Subject 1	Subject 2	Signature
Monday	LfL	Option 1	
Tuesday	Option 2	Option 3	
Wednesday	English	Maths	
Thursday	Science	ICT **or** Comp Sci	
Friday	LfL	Option 1	

Week 15	Subject 1	Subject 2	Signature
Monday	LfL	Option 1	
Tuesday	Option 2	Option 3	
Wednesday	English	Maths	
Thursday	Science	ICT **or** Comp Sci	
Friday	LfL	Option 1	

Week 12	Subject 1	Subject 2	Signature
Monday	Option 2	Option 3	
Tuesday	English	Maths	
Wednesday	Science	ICT **or** Comp Sci	
Thursday	LfL	Option 1	
Friday	Option 2	Option 3	

Year 10 Term 1 Knowledge Organiser Booklet

Reading Log

Use this reading log to record the books that you read and how long you have spent reading them during this term

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Books read (title and author	Time spent reading	Signature
1										
2										
3										
4										
5										
6										
7										

Year 10 Term 1 Knowledge Organiser Booklet

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Books read (title and author	Time spent reading	Signature
8										
9										
10										
11										
12										
13										
14										
15										

Key Quotations
"Oh! But he was a tight-fisted hand at the grindstone, Scrooge…a squeezing, wrenching, grasping, scraping, clutching, covetous old sinner! Hard and sharp as flint, from which no steel had ever struck out generous fire; secret, and self-contained, and solitary as an oyster."
"The cold within him froze his old features, nipped his pointed nose, shrivelled his cheek, stiffened his gait; made his eyes red, his thin lips blue; and spoke out shrewdly in his grating voice. A frosty rime was on his head, and on his eyebrows, and his wiry chin. He carried his own low temperature always about with him; he iced his office in the dog-days; and didn't thaw it one degree at Christmas. External heat and cold had little influence on Scrooge. No warmth could warm, no wintry weather chill him. No wind that blew was bitterer than he, no falling snow was more intent upon its purpose, no pelting rain less open to entreaty. Foul weather didn't know where to have him. The heaviest rain, and snow, and hail, and sleet, could boast of the advantage over him in only one respect."
"No beggars implored him to bestow a trifle, no children asked him what it was o'clock, no man or woman ever once in all his life inquired the way to such and such a place, of Scrooge."
"It was cold, bleak, biting weather: foggy withal: and he could hear the people in the court outside, go wheezing up and down, beating their hands upon their breasts, and stamping their feet upon the pavement stones to warm them. The city clocks had only just gone three, but it was quite dark already-- it had not been light all day--and candles were flaring in the windows of the neighbouring offices, like ruddy smears upon the palpable brown air. The fog came pouring in at every chink and keyhole, and was so dense without, that although the court was of the narrowest, the houses opposite were mere phantoms. To see the dingy cloud come drooping down, obscuring everything, one might have thought that Nature lived hard by, and was brewing on a large scale."
"He had so heated himself with rapid walking in the fog and frost, this nephew of Scrooge's, that he was all in a glow; his face was ruddy and handsome; his eyes sparkled, and his breath smoked again."
"'…a few of us are endeavouring to raise a fund to buy the Poor some meat and drink, and means of warmth. We choose this time, because it is a time, of all others, when Want is keenly felt, and Abundance rejoices. What shall I put you down for?' 'Nothing!' Scrooge replied."
"The ancient tower of a church, whose gruff old bell was always peeping slily down at Scrooge out of a Gothic window in the wall, became invisible, and struck the hours and quarters in the clouds, with tremulous vibrations afterwards as if its teeth were chattering in its frozen head up there."
"Foggier yet, and colder. Piercing, searching, biting cold."
The fog and frost so hung about the black old gateway of the house, that it seemed as if the Genius of the Weather sat in mournful meditation on the threshold.
'If he wanted to keep them after he was dead, a wicked old screw,' pursued the woman, 'why wasn't he natural in his lifetime? If he had been, he'd have had somebody to look after him when he was struck with Death, instead of lying gasping out his last there, alone by himself.'
"…as I hope to live to be another man from what I was, I am prepared to bear you company, and do it with a thankful heart."

Year 10 Term 1 Knowledge Organiser Booklet

Key Quotations
"Marley's face. It was not in impenetrable shadow as the other objects in the yard were, but had a dismal light about it, like a bad lobster in a dark cellar. It was not angry or ferocious, but looked at Scrooge as Marley used to look: with ghostly spectacles turned up on its ghostly forehead. The hair was curiously stirred, as if by breath or hot air; and, though the eyes were wide open, they were perfectly motionless. That, and its livid colour, made it horrible; but its horror seemed to be in spite of the face and beyond its control, rather than a part of its own expression."
"Darkness is cheap, and Scrooge liked it."
"The chain he drew was clasped about his middle. It was long, and wound about him like a tail; and it was made (for Scrooge observed it closely) of cash-boxes, keys, padlocks, ledgers, deeds, and heavy purses wrought in steel."
"Old Fezziwig…rubbed his hands; adjusted his capacious waistcoat; laughed all over himself, from his shoes to his organ of benevolence; and called out in a comfortable, oily, rich, fat, jovial voice:"
"It was a strange figure-like a child: yet not so like a child as like an old man, viewed through some supernatural medium, which gave him the appearance of having receded from the view, and being diminished to a child's proportions."
"'Why did I walk through crowds of fellow-beings with my eyes turned down, and never raise them to that blessed Star which led the Wise Men to a poor abode! Were there no poor homes to which its light would have conducted me!'"
"The school is not quite deserted,' said the Ghost. 'A solitary child, neglected by his friends, is left there still.' Scrooge said he knew it. And he sobbed"
"In easy state upon this couch, there sat a jolly Giant, glorious to see, who bore a glowing torch, in shape not unlike Plenty's horn, and held it up, high up, to shed its light on Scrooge, as he came peeping round the door."
"The Phantom slowly, gravely, silently approached. When it came, Scrooge bent down upon his knee; for in the very air through which this Spirit moved it seemed to scatter gloom and mystery."
"in the busy thoroughfares of a city, where shadowy passengers passed and repassed; where shadowy carts and coaches battled for the way, and all the strife and tumult of a real city were."
"There was an eager, greedy, restless motion in the eye, which showed the passion that had taken root, and where the shadow of the growing tree would fall."
"the relentless Ghost pinioned him in both his arms, and forced him to observe what happened next."
"…though Scrooge pressed it down with all his force, he could not hide the light: which streamed from under it, in an unbroken flood upon the ground."

Year 10 Term 1 Knowledge Organiser Booklet

Important Exam Information
- Paper 1 Section B
- Extract question - No choice of question 45 minutes

Characters (AO1):

1. Ebenezer Scrooge:
Miserly, mean, bitter, materialistic, indifferent, unsympathetic, indifferent, cold, selfish, isolated, cynical, charitable, value driven, generous, happy, sociable, t ransformed.

2. Marley's Ghost:
Materialistic, self-centred, terrifying, haunting, exhausted, direct, reformed, regretful, hopeful, selfless, wise.

3. Bob Cratchit:
Uncomplaining, tolerant, courteous, deferential, patient, civil, eager, pleasurable, good humoured, playful, caring, tender, cheerful, loving, forgiving.

4. Fred: Warm-hearted, empathetic, cheerful, optimistic, even-tempered, insightful, determined, generous, forgiving, jovial, enthusiastic, caring

5. Ghost of Christmas Past: Contradictory, strong, gentle, quiet, forceful, questioning, mysterious

6. Ghost of Christmas Present: Compassionate, abundant, generous, cheerful, jolly, friendly, severe, sympathetic

7. Ghost of Christmas Future : Mysterious, silent, ominous, intimidating, frightening, resolute

8. Tiny Tim: Frail, ill, good, religious

Key Themes (AO1):
- Christmas Spirit
- Redemption
- Poverty
- Social responsibility
- Supernatural
- Family
- Loneliness and isolation Time
- Education

Key Quotations (AO1):

Stave One
'He was as tight-fisted as a grind stone' - about Scrooge 'His face was ruddy and handsome, his eyes sparkled' -Fred (presented as the opposite to Scrooge)
'I wear the chain I forged in life' Ghost of Marley

Stave Two
'It wore a tunic of the purest white... from the crown of its head there sprung a bright clear jet of light' Ghost of Christmas Past
'A lonely boy was sat reading near a feeble fire' Scrooge as a young boy
'" Your lip is trembling,' said the Ghost, 'And what is that upon your cheek?' first sign of emotion from Scrooge

Stave Three
'There sat a jolly Giant, who wore a glowing torch.it was clothed in one simple green robe' - Ghost of Christmas Present
'God bless us everyone!' Tiny Tim's positive attitude 'Tell me Tiny Tim will live.' - Scrooge showing compassion.

Stave Four
'The phantom slowly, gravely, silently approached' Ghost of Christmas Yet to Come
'I fear you more than any spectre I have seen' - Scrooge 'Tell me I may sponge away the writing on this stone!' -Scrooge desperate to change his ways 'I will honour Christmas in my heart' Scrooge

Stave Five
'I'll raise your salary Bob and endeavour to assist your struggling family' - Scrooge changing his ways.
'to Tiny Tim, who did NOT die, he [Scrooge] was a second father' - Scrooge changing his ways 'Wonderful party, wonderful games, wonderful unanimity, won der ful happiness!' repetition shows Scrooge's joy at the end.

Sentence starters:

Point (AO1): Use the words from the question and include a method used by the writer.

Evidence (AO1): For example: This is seen when '...'

Analysis (AO2): This word/method '...' implies/suggests...
It makes us realise/think/feel/imagine...
Furthermore, the word '...' is crucial because.

Link (AO3): This could represent/symbolise the . in society/it may represent Dickens view that.

'A Christmas Carol' Knowledge Organiser

Tips for use: create mind maps, flash cards, ask someone to test you, look, cover, write, check

Context (AO3):

Dickens' Life
1. Charles Dickens was born on February 7, 1812 in Hampshire into a middle class family.
2. His Father was imprisoned for debt leading to poverty for the family.
3. Dickens was put to work at Warren's Blacking Factory.
4. Dickens found employment as an office boy in an attorney's office.

5. A Christmas Carol was written in 1843 **Industrial Revolution**

1. From 1780 factory owners in Britain began to use coal-fired steam engines to power the machines in big factories, bringing great fortune.
2. Transition from traditional farming methods to machinery led to Industrial revolution.
3. People flocked from the countryside to the cities. London's population between 1800 and 1900 from 1 million to 6 million people. This led to over crowding and hunger, disease and crime. There were no proper drainage / sewage systems.
Many families had to share one tap / toilet. Children suffered the most and were exploited by factory owners who forced them to work long hours in dangerous conditions.

Charity
1. Industrial revolution led to a gap between the rich and poor with many struggling to survive relying on the generosity of those better off than themselves.
2. Some philanthropists were keen to enhance the lives of the workers. Cadburys tried to provide quality homes and improve lifestyles of workers at their factory in Bournville.

Education
1. Dickens believed strongly in the importance of education.
2. As part of his campaign against the treatment of the poor, Dickens worked with a friend called Angela Burdett-Coutts.
3. In 1840s, she & Dickens became involved in the Ragged Schools. The aim was to provide poor children with basic education.
4. Dickens believed that it is through education that one can leave poverty.

Religion
1. Christianity held a strong influence in Victorian Britain, especially amongst the middle / upper classes.
2. Good Christians believed in a strict moral code - attending church regularly, avoiding alcohol and exercise sexual restraint.
3. Dicken's view on Christianity was different. He believed that to be a good Christian people should seek out opportunities to do good deeds for other people.
4. Sabbatarianism   when people spent Sunday going to church and resting. Dickens was opposed to this because it meant that the working poor were denied enjoyment on their one day off.
5. Poorer people didn't have ovens at home so often food cooked by bakers. Sabbatarianism meant that many people couldn't get a hot meal on Sundays because the bakers were shut.

Plot (AO1):

Preface: Charles Dickens write a note to his readers to explain that he wants to introduce an entertaining idea to them.

Stave One
1. Introduced to Ebenezer Scrooge on Christmas Eve. He is a lonely miser obsessed with money. He won't pay to heat the office properly - meaning Bob Cratchit is very cold.
2. We learn Jacob Marley, Scrooge's business partner, died exactly 7 years earlier.
3. Scrooge is irritated that Christmas Day seems to be interrupting his business.
4. Scrooge is visited by his nephew Fred, who invites his uncle to Christmas dinner. Scrooge refuses.
5. Scrooge is visited by two charity workers, asking for donations. Scrooge refuses and exclaims he wants to be left alone.
6. Scrooge allows Bob to have Christmas Day off.
7. Scrooge, when he is home, is visited by the Ghost of Jacob Marley - warning him he will be visited by three more ghosts to help him change his ways.

Stave Two
1. Scrooge is visited by the Ghost of Christmas Past who takes him to witness his past.
2. Scrooge is taken first to his schoolboy years and he is reminded how his friends would go home from Christmas while he was left at school.
3. We see him with his sister, who one year took him home for the holidays.
4. Next we are shown Scrooge as a young apprentice, working for Fezziwig. Dickens describes the Christmas ball Fezziwig organised for his employees.
5. Finally, Scrooge is taken to see his ex fiancee, Belle. We see the scene when they break up, as money has taken over Scrooge's life.
6. Scrooge cannot bear to see any more and struggles with the spirit.

Stave Three
1. Scrooge is then visited by the Ghost of Christmas Present.
2. The spirit shows Scrooge how the Cratchit family celebrate Christmas. Scrooge asked if Tiny Tim will life. The spirit explain unless there are changes, he will die. The spirit reminds Scrooge of his earlier words: 'If he is to die, he had better do it, and decrease the surplus population'
3. Scrooge is then taken to see how others celebrate Christmas: miners, lighthouse workers, sailors on a ship.
4. He is then taken to Fred's house at Christmas, where they are playing games.
5. The spirit then begins to age, and see under the spirit's robes two children: Want and Ignorance.
6. The Ghost of Christmas Future then appears.

Stave Four
1. The Ghost of Christmas Future is described.
2. The spirit takes Scrooge to see a group of businessmen discussing someone who has died.
3. Scrooge is then taken to see Old Joe, where he is in the process of buying property of the dead man - which have been stolen.
4. Scrooge then returns to Bob Cratchit's house, where it is revealed Tiny Tim has died.
5. Scrooge is then taken to the graveyard and is shown a grave stone and realises this is for him.
6. Scrooge falls to his knees and begs that he will change his ways.

Stave Five
1. Scrooge wakes up in his own bed.
2. Scrooge wonders how much time has passed and calls to a boy. He then sends the boy to the poulterer for the prize turkey to give to Bob Cratchit,
3. Scrooge meets one of the charity collectors from earlier and whispers to him that he will give a large donation.
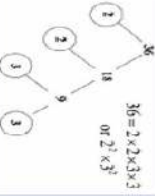4. Scrooge then goes to Fred's house and is welcomed in. He enjoys the dinner and party.
5. On Boxing Day, Scrooge arrives early to work, and plays a trick on Bob. Scrooge then tells him he is going to raise his salary and promises to help Bob's struggling family.
6. Scrooge is described to have completely changed and becomes a 'second father' to Tiny Tim - 'who did not die.'

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Number

Topic/Skill	Definition/Tips	Example
Integer	A whole number that can be positive, negative or zero.	$-3, 0, 92$
Sum	To find the total, or sum, of two or more numbers means add the numbers together 'add', 'plus', 'sum'	$3 + 2 + 7 = 12$
Difference	To find the difference between two numbers means you subtract one number from the other	$10 - 3 = 7$
Product	To find the product of two numbers means you multiply them.	$3 \times 6 = 6 + 6 + 6 = 18$
BIDMAS	An acronym for the order you should do calculations in. BIDMAS stands for 'Brackets, Indices, Division, Multiplication, Addition and Subtraction'. Indices are also known as 'powers' or 'orders'. With strings of division and multiplication, or strings of addition and subtraction, and no brackets, work from left to right.	$5^2 = 25$, where the 2 is the index/power. $12 \div 4 \div 2 = 1.5, not\ 6$
Terminating decimal	A decimal number that has an end.	$0.78, 12.056$
Recurring Decimal	A decimal number that has digits that repeat forever. The part that repeats is usually shown by placing a dot above the digit that repeats, or dots over the first and last digit of the repeating pattern.	$\frac{1}{3} = 0.333... = 0.\dot{3}$ $\frac{77}{610} = 0.128333... = 0.128\dot{3}$ $\frac{1}{7} = 0.1428571428... = 0.\dot{1}4285\dot{7}$
Factor	A number that divides exactly into another number without a remainder. It is useful to write factors in pairs	The factors of 18 are: 1,2,3,6,9,18 The factor pairs of 18 are: 1,18 / 2,9 / 3,6
Multiple	The result of multiplying a number by an integer. The times tables of a number.	The first five multiples of 7 are: 7,14,21,28,35
Lowest Common Multiple (LCM)	The smallest number that is in the times tables of each of the numbers given.	The LCM of 3, 4 and 5 is 60 because it is the smallest number in the 3, 4 and 5 times tables.

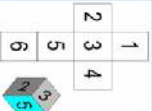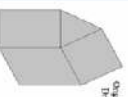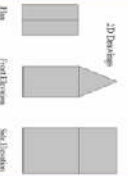| Topic/Skill	Definition/Tips	Example
Highest Common Factor (HCF)	The biggest number that divides exactly into two or more numbers	The HCF of 6 and 9 is 3 because it is the biggest number that divides into 6 and 9 exactly.
Prime Number	A number with exactly two factors. A number that can only be divided by itself and one. The number 1 is not prime, as it only has one factor, not two.	The first ten prime numbers are: 2,3,5,7,11,13,17,19,23,29
Product of Prime Factors	Finding out which prime numbers multiply together to make the original number. Use a prime factor tree. Also known as 'prime factorisation'.	$36 = 2 \times 2 \times 3 \times 3$ or $2^2 \times 3^2$
Significant figure	The significant figures of a number are the digits which carry meaning (i.e. are significant) to the size of the number. The first significant figure of a number cannot be zero. In a number with a decimal, trailing zeros are not significant.	In the number 0.00821, the first significant figure is the 8. In the number 2.740, the 0 is not a significant figure. 0.00821 rounded to 2 significant figures is 0.0082. 19357 rounded to 3 significant figures is 19400. We need to include the two zeros at the end to keep the digits in the same place value columns.
Truncation	A method of approximating a decimal number by dropping all decimal places past a certain point without rounding.	3.14159265... can be truncated to 3.1415 (note that if it had been rounded, it would become 3.1416).
Error Interval	A range of values that a number could have taken before being rounded or truncated. An error interval is written using inequalities, with a lower bound and an upper bound. Note that the lower bound inequality can be 'equal to', but the upper bound cannot be 'equal to'.	0.6 has been rounded to 1 decimal place. The error interval is: $0.55 \leq x < 0.65$ The lower bound is 0.55. The upper bound is 0.65.
Estimate	To find something close to the correct answer.	An estimate for the height of a man is 1.8 metres.
Approximation	When using approximations to estimate the solution to a calculation, round each number in the calculation to 1 significant figure.	$\frac{348 + 692}{0.526} \approx \frac{300 + 700}{0.5} = 2000$ *Note that dividing by 0.5 is the same as multiplying by 2*

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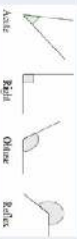
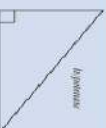| Topic/Skill	Definition/Tips	Example
Square Number	The number you get when you **multiply a number by itself**.	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225... $9^2 = 9 \times 9 = 81$
Square Root	The number you multiply by itself to get another number. The reverse process of squaring a number.	because $6 \times 6 = 36$, $\sqrt{36} = 6$
Cube Number	The number you get when you **multiply a number by itself and itself again**.	1, 8, 27, 64, 125... $2^3 = 2 \times 2 \times 2 = 0$
Cube Root	The number you multiply by itself and itself again to get another number. The reverse process of cubing a number.	$\sqrt[3]{125} = 5$
Multiplication Index Law	When **multiplying with the same base (number or letter), add the powers.** $a^m \times a^n = a^{m+n}$	because $5 \times 5 \times 5 = 125$ $7^5 \times 7^3 = 7^8$
Division Index Law	When **dividing with the same base (number or letter), subtract the powers.** $a^m \div a^n = a^{m-n}$	$a^{12} \div a = a^{11}$ $4x^5 \times 2x^0 = 6x^{15}$ $20a^{11} \div 5a^3 = 1a^8$
Brackets Index Laws	When raising a power to another power, multiply the powers together. $(a^m)^n = a^{mn}$	$15^7 \div 15^4 = 15^3$ $x^9 \div x^2 = x^7$
Notable Powers		$(y^2)^3 = y^{10}$ $(6^3)^4 - 6^{12}$ $(5x^6)^3 = 125x^{10}$ $9999^0 = 1$
Negative Powers	A negative power performs the reciprocal. $a^{-m} = \dfrac{1}{a^m}$	$3^{-2} = \dfrac{1}{3^2} = \dfrac{1}{9}$
Standard Form	$A \times 10^b$ where $1 \leq A < 10$, $b = integer$	$8400 = 8.4 \times 10^3$ $0.00036 = 3.6 \times 10^{-4}$
HIGHER ONLY Fractional Powers	The denominator of a fractional power acts as a 'root'. The numerator of a fractional power acts as a normal power. $a^{\frac{m}{n}} = \left(\sqrt[n]{a}\right)^m$	$2^{2/3} = \left(\sqrt[3]{27}\right)^2 = 3^2 = 9$ $\left(\dfrac{25}{16}\right)^{\frac{3}{2}} = \left(\dfrac{\sqrt{25}}{\sqrt{16}}\right)^3 = \left(\dfrac{5}{4}\right)^3 = \dfrac{125}{64}$
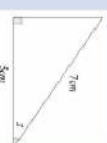
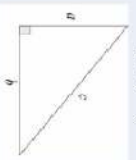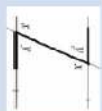| Topic/Skill	Definition/Tips	Example
Standard Form	$A \times 10^b$ where $1 \leq A < 10$, $b = integer$	$8400 = 8.4 \times 10^3$ $0.00036 = 3.6 \times 10^{-4}$
HIGHER ONLY Rational Number	A number of the form $\dfrac{p}{q}$ where **p and q are integers** and $q \neq 0$.	$\dfrac{4}{9}$, 6, $1\frac{1}{3}$, $\sqrt{25}$ are examples of rational numbers.
HIGHER ONLY Surd	The irrational number that is a root of a **positive integer** whose value cannot be determined exactly. A number that cannot be written in this form is called an 'irrational' number	π, $\sqrt{2}$ are examples of an irrational numbers. $\sqrt{2}$ is a surd because it is a root which cannot be determined exactly.
HIGHER ONLY Rules of Surds	Surds have infinite non-recurring decimals. $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$ $\sqrt{\dfrac{a}{b}} = \dfrac{\sqrt{a}}{\sqrt{b}}$ $a\sqrt{c} \pm b\sqrt{c} = (a \pm b)\sqrt{c}$ $\sqrt{a} \times \sqrt{a} = a$	$\sqrt{48} = \sqrt{16} \times \sqrt{3} = 4\sqrt{3}$ $\sqrt{2} = 1.41421356...$ which never repeats. $2\sqrt{5} + 7\sqrt{5} = 9\sqrt{5}$ $\sqrt{7} \times \sqrt{7} = 7$
HIGHER ONLY Rationalise a Denominator	The process of rewriting a fraction so that the **denominator** contains only **rational numbers**.	$\dfrac{\sqrt{3}}{\sqrt{2}} = \dfrac{\sqrt{3} \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \dfrac{\sqrt{6}}{2}$ $\sqrt{\dfrac{25}{36}} = \dfrac{\sqrt{25}}{\sqrt{36}} = \dfrac{5}{6}$ $\dfrac{6}{3+\sqrt{7}} = \dfrac{6(3-\sqrt{7})}{(3+\sqrt{7})(3-\sqrt{7})} = \dfrac{18-6\sqrt{7}}{9-7} = \dfrac{18-6\sqrt{7}}{2}$

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Shape
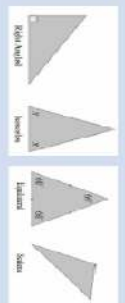
Topic/Skill	Definition/Tips	Example
Net	A pattern that you can cut and fold to make a model of a 3D shape.	
Properties of Solids	Faces = flat surfaces Edges = sides/lengths Vertices = corners	A cube has 6 faces, 12 edges and 8 vertices.
Plans and Elevations	This takes 3D drawings and produces 2D drawings. Plan View: from above Side Elevation: from the side Front Elevation: from the front	
Types of Angles	Acute angles are less than 90°. Right angles are exactly 90°. Obtuse angles are greater than 90° but less than 180°. Reflex angles are greater than 180° but less than 360°.	Acute Right Obtuse Reflex
Angle Notation	Can use one lower-case letters, eg. θ or x. Can use three upper-case letters, eg. RAC.	
Angles at a Point	Angles around a point add up to 360°.	$a + b + c + d = 360°$

Topic/Skill	Definition/Tips	Example
Hypotenuse	The longest side of a right-angled triangle. Is always opposite the right angle.	
Adjacent	Next to	
Trigonometric Formulae	Use SOHCAHTOA. $\sin\theta = \dfrac{O}{H}$ $\cos\theta = \dfrac{A}{H}$ $\tan\theta = \dfrac{O}{A}$ When finding a missing angle, use the 'inverse' trigonometric function by pressing the 'shift' button on the calculator.	Use 'Opposite' and 'Adjacent', so use 'tan' $\tan 35 = \dfrac{x}{11}$ $x = 11\tan 35 = 7.70cm$ Use 'Adjacent' and 'Hypotenuse', so use 'cos' $\cos x = \dfrac{5}{7}$ $x = \cos^{-1}\left(\dfrac{5}{7}\right) = 44.4°$

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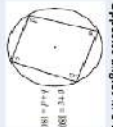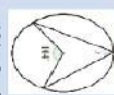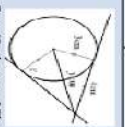
Topic/Skill	Definition/Tips	Example
Regular	A shape is regular if all the sides and all the angles are equal.	
Names of Polygons	3-sided = Triangle 4-sided = Quadrilateral 5-sided = Pentagon 6-sided = Hexagon 7-sided = Heptagon/Septagon 8-sided = Octagon 9-sided = Nonagon 10-sided = Decagon	
Sum of Interior Angles	where n is the number of sides. $(n-2) \times 180$	Sum of Interior Angles in a Decagon = $(10-2) \times 180 = 1440°$
Size of Interior Angle in a Regular Polygon	You can also use the formula: $\dfrac{(n-2) \times 180}{n}$	Size of Interior Angle in a Regular Pentagon = $\dfrac{(5-2) \times 180}{5} = 108°$
Size of Exterior Angle in a Regular Polygon	You can also use the formula: $180 - Size\ of\ Interior\ Angle$ $\dfrac{360}{n}$	Size of Exterior Angle in a Regular Octagon = $\dfrac{360}{8} = 45°$
Pythagoras' Theorem	For any right angled triangle: $a^2 + b^2 = c^2$ Used to find missing lengths. a and b are the shorter sides, c is the hypotenuse (longest side).	$a = y, b = 8, c = 10$ $a^2 = c^2 - b^2$ $y^2 = 100 - 64$ $y^2 = 36$ $y = 6$
Trigonometry	The study of triangles.	

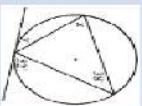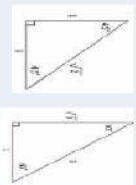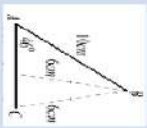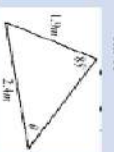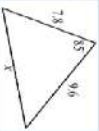| Topic/Skill	Definition/Tips	Example
Angles on a Straight Line	Angles around a point on a straight line add up to 180°.	
Opposite Angles	Vertically opposite angles are equal.	
Alternate Angles	Alternate angles are equal. They look like Z angles, but never say this in the exam.	
Corresponding Angles	Corresponding angles are equal. They look like F angles, but never say this in the exam.	
Co-interior Angles	Co-interior angles add up to 180°. They look like C angles, but never say this in the exam.	
Angles in a Triangle	Angles in a triangle add up to 180°.	
Types of Triangles	Right Angle Triangles have a 90° angle in. Isosceles Triangles have 2 equal sides and 2 equal base angles. Equilateral Triangles have 3 equal sides and 3 equal angles (60°). Scalene Triangles have different sides and different angles. Base angles in an isosceles triangle are equal.	
Angles in a Quadrilateral	Angles in a quadrilateral add up to 360°.	
Polygon	A 2D shape with any straight edges.	

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Topic/Skill	Definition/Tips	Example
HIGHER ONLY Circle Theorem 7	**Alternate Segment Theorem**	$x = 52°$ $y = 38°$
HIGHER ONLY	(trig values table)	
HIGHER ONLY Sine Rule	Use with non right angle triangles. Use when the question involves 2 sides and 2 angles. For missing side: $$\frac{a}{\sin A} = \frac{b}{\sin B}$$ For missing angle: $$\frac{\sin A}{a} = \frac{\sin B}{b}$$ There is an **ambiguous case** (where there are two potential answers) To find the two angles, use sine to find one, and then subtract your answer from **180** to find the other answer.	$$\frac{x}{\sin 85} = \frac{5.2}{\sin 46}$$ $$x = \frac{5.2 \times \sin 85}{\sin 46} = 3.75cm$$ $$\sin\theta = \frac{\sin 85}{2.4}$$ $$\sin\theta = \frac{1.9 \times \sin 85}{2.4} = 0.789$$ $$\theta = \sin^{-1}(0.789) = 52.1°$$

Topic/Skill	Definition/Tips	Example
HIGHER ONLY Circle Theorem 1	Angles in a semi-circle have a right angle at the circumference.	$y = 90°$ $x = 180 - 90 - 33 = 52°$
HIGHER ONLY Circle Theorem 2	Opposite angles in a cyclic quadrilateral add up to 180°.	$x = 180 - 83 = 97°$ $y = 180 - 92 = 88°$
HIGHER ONLY Circle Theorem 3	The angle at the centre is **twice** the angle at the circumference.	$x = 104 \div 2 = 52°$
HIGHER ONLY Circle Theorem 4	**Angles in the same segment are equal.**	$x = 42°$ $y = 31°$
HIGHER ONLY Circle Theorem 5	A tangent is perpendicular to the radius at the point of contact.	$y = 5cm$ (Pythagoras' Theorem)
HIGHER ONLY Circle Theorem 6	Tangents from an external point at equal in length.	$x = 90°$
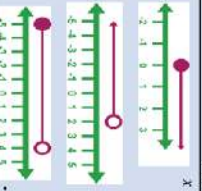
Topic/Skill	Definition/Tips	Example
HIGHER ONLY Cosine Rule	Use with non right angle triangles. Use when the question involves **3 sides and 1 angle.** For missing side: $a^2 = b^2 + c^2 - 2bc\cos A$ For missing angle: $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$	$x^2 = 9.6^2 + 7.8^2 - (2 \times 9.6 \times 7.8 \times \cos 85)$ $x = 11.8$ $\cos \theta = \dfrac{7.2^2 + 8.1^2 - 6.6^2}{2 \times 7.2 \times 8.1}$ $\theta = 50.7°$
HIGHER ONLY Area of a Triangle	Use when given the **length of two sides** and the included angle. $Area\ of\ a\ Triangle = \dfrac{1}{2}ab\sin C$	$A = \dfrac{1}{2}ab\sin C$ $A = \dfrac{1}{2} \times 7 \times 10 \times \sin 25$ $A = 14.8$

Algebra

Topic/Skill	Definition/Tips	Example
Expression	A mathematical statement written using symbols, numbers or letters.	$3x + 2$ or $5y^2$
Equation	A statement showing that **two expressions are equal**	$2y - 17 = 15$
Identity	An equation that is true for all **values of the variables** An identity uses the symbol: $\equiv$	$2x \equiv x+x$
Formulae	Shows the relationship between **two or more variables**	Area of a rectangle = length x width or A= LxW
Simplifying Expressions	**Collect "like terms".** Be careful with negatives. x^2 and x are not like terms.	$2x + 3y + 4x - 5y - 3 - 6x - 2y + 3$ $3x + 4 - x^2 + 2x - 1 - 5x - x^2 + 3$
Expand	To expand a bracket, **multiply** each term in **the bracket** by the expression **outside** the bracket.	$3(m + 7) = 3x + 21$
Factorise	The reverse of **expanding.** Factorising is writing an expression as a product of terms by **'taking out' a common factor.**	$6x - 15 = 3(2x - 5)$, where 3 is the common factor.
Solve	To find the **answer/value of something.** Use inverse operations on both sides of the equation (balancing method) until you find the value for the letter.	Solve $2x - 3 = 7$ Add 3 on both sides $2x = 10$ Divide by 2 on both sides $x = 5$
Inverse	Opposite	The inverse of addition is subtraction. The inverse of multiplication is division.
Rearranging Formulae	**Use inverse operations on both sides** of the formula (balancing method) until you find the expression for the letter.	Make x the subject of $y = \dfrac{2x-1}{z}$ Multiply both sides by z $yz = 2x - 1$ Add 1 to both sides $yz + 1 = 2x$ Divide by 2 on both sides $\dfrac{yz+1}{2} = x$ We now have x as the subject.

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Topic/Skill	Definition/Tips	Example
Writing Formulae	Substitute letters for words in the question.	Bob charges £3 per window and a £5 call out charge. $c = 3N + 5$ Where N=number of windows and C=cost
Substitution	**Replace letters with numbers.** Be careful of $5x^2$. You need to square first, then multiply by 5.	$a = 3, b = 2$ and $c = 5$. Find: 1. $2a - 2 \times 3 = 6$ 2. $3a - 3 \times 3$ $2 \times 2 - 5$ 3. $7b^2 - 5 - 7 \times 2^2 - 5 - 23$
Inequality	An inequality says that two values are **not equal**. $a \neq b$ means that a is not equal to b.	$7 \neq 3$ $x \neq 0$
Inequality symbols	$x > 2$ means x is **greater than** 2 $x < 3$ means x is **less than** 3 $x > 1$ means x is **greater than or equal to 1** $x \leq 6$ means x is **less than or equal to 6**	State the integers that satisfy $-2 < x \leq 4$. $-1, 0, 1, 2, 3, 4$
Inequalities on a Number Line	Inequalities can be shown on a number line. **Open circles** are used for numbers that are less than or greater than ($<$ or $>$) **Closed circles** are used for numbers that are less than or equal or greater than or equal ($\leq$ or $\geq$)	$x > 0$ $x < 2$ $-5 \leq x < 4$
Quadratic	A quadratic expression is of the form $$ax^2 + bx + c$$ where a, b and c are numbers, $a \neq 0$	Examples of quadratic expressions: x^2 $3x^2$ $3x + 7$ Examples of non-quadratic expressions: $2x^3 - 5x^2$ $9x - 1$
Factorising Quadratics	When a quadratic expression is in the form $x^2 + bx + c$ find the two numbers that **add to give b and multiply to give c.**	$x^2 + 7x + 10 = (x + 5)(x + 2)$ (because 5 and 2 add to give 7 and multiply to give 10) $x^2 + 2x - 8 = (x + 4)(x - 2)$ (because -4 and -2 add to give +2 and multiply to give -8)
Difference of Two Squares	An expression of the form $a^2 - b^2$ can be factorised to give $(a + b)(a - b)$	$x^2 - 25 = (x + 5)(x - 5)$ $16x^2 - 81 = (4x + 9)(4x - 9)$

Topic/Skill	Definition/Tips	Example
Solving Quadratics using the Quadratic Formula	A quadratic in the form $ax^2 + bx + c = 0$ can be solved using the formula: $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ Use the formula if the quadratic does not factorise easily.	Solve $3x^2 + x - 5 = 0$ Answer: $a = 3, b = 1, c = -5$ $$x = \frac{-1 \pm \sqrt{1^2 - 4 \times 3 \times -5}}{2 \times 3}$$ $$x = \frac{-1 \pm \sqrt{61}}{6}$$ $x = 1.14$ or -1.47 (2 d.p.)
Simultaneous Equations	A set of **two or more equations**, each involving **two or more variables** (letters). The solutions to simultaneous equations **satisfy both/all of the equations.**	$2x + y = 7$ $3x - y = 8$ $x = 3$ $y = 1$
Variable	A symbol, usually a letter, which **represents a number which is usually unknown.**	In the equation $x + 2 = 5$, x is the variable.
Coefficient	A **number** used to multiply a variable. It is the number that comes before/in front of a letter.	$6z$ 6 is the coefficient z is the variable

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Topic/Skill	Definition/Tips	Example
Factorising Quadratics when $a \neq 1$	When a quadratic is in the form $$ax^2 + bx + c$$ 1. Multiply a by c = ac. 2. Find two numbers that add to give b and multiply to give ac. 3. Re-write the quadratic, replacing bx with the two numbers you found. 4. Factorise in pairs – you should get the same bracket twice 5. Write your two brackets – one will be the repeated bracket, the other will be made of the factors outside each of the two brackets.	Factorise $6x^2 + 5x - 4$ 1. $6 \times -4 = -24$ 2. Two numbers that add to give +5 and multiply to give -24 are -8 and -3 3. $6x^2 + 8x - 3x - 4$ 4. Factorise in pairs: $2x(3x + 4) - 1(3x + 4)$ 5. Answer = $(3x + 4)(2x - 1)$
Completing the Square (when $a = 1$)	A quadratic in the form $x^2 + bx + c$ can be written in the form $(x + p)^2 + q$ 1. Write a set of brackets with x in and half the value of b. 2. Square the bracket. 3. Subtract $\left(\frac{b}{2}\right)^2$ and add c. 4. Simplify the expression. You can use the completing the square form to help find the maximum or minimum of quadratic graph.	Complete the square of $y = x^2 - 6x + 2$ Answer: $(x - 3)^2 - 3^2 + 2$ $= (x - 3)^2 - 7$ The minimum value of this expression occurs when $(x - 3)^2 = 0$, which occurs when $x = 3$ When $x = 3, y = 0 - 7 = -7$ Minimum point = $(3, -7)$
Completing the Square (when $a \neq 1$)	A quadratic in the form $ax^2 + bx + c$ can be written in the form $p(x + q)^2 + r$ Use the same method as above, but factorise out a at the start.	Complete the square of $4x^2 + 8x - 3$ Answer: $4[x^2 + 2x] - 3$ $= 4[(x + 1)^2 - 1^2] - 3$ $= 4(x + 1)^2 \, 4 - 3$ $= 4(x + 1)^2 - 7$
Solving Quadratics by Factorising ($a \neq 1$)	Factorise the quadratic in the usual way. Solve = 0 Make sure the equation = 0 before factorising.	Solve $2x^2 + 7x - 4 = 0$ Factorise $(2x - 1)(x + 4) = 0$ $x = \frac{1}{2}$ or $x = -4$

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Quantitative Chemistry 1

Balanced symbol equations	Represent chemical reactions and have the same number of atoms of each element on both sides of the equation	Subscript numbers show the number of atoms of the element to its left. / Normal script numbers show the number of molecules.
The reactant that is completely used up	Limits the amount of product that is made	Less moles of product are made.
Whenever a measurement is taken, there is always some uncertainty about the result obtained	Can determine whether the mean value falls within the range of uncertainty of the result	1. Calculate the mean 2. Calculate the range of the results 3. Estimate of uncertainty in mean would be half the range / Example: 1. Mean value is 46.5s 2. Range of results is 44s to 49s = 5s 3. Time taken was $46.5s \pm 2.5s$
Chemical amounts are measured in moles (mol)	Mass of one mole of a substance in grams = relative formula mass	One mole of $H_2O = 18g$ (1 + 1 + 16) / One mole of $Mg = 24g$
Avogadro constant	One mole of any substance will contain the same number of particles, atoms, molecules or ions.	6.02×10^{23} per mole / One mole of H_2O will contain 6.02×10^{23} molecules / One mole of $NaCl$ will contain 6.02×10^{23} Na^+ ions
$\text{Number of moles} = \dfrac{\text{mass (g)}}{A_r} \text{ or } \dfrac{\text{mass (g)}}{M_r}$	How many moles of sulfuric acid molecules are there in 4.7g of sulfuric acid (H_2SO_4)? Give your answer to 1 significant figure.	$\dfrac{4.7}{98} = 0.05$ mol (M_r of H_2SO_4)
Conservation of mass	No atoms are lost or made during a chemical reaction	Mass of the products equals the mass of the reactants.

Quantitative Chemistry 2

M_r	The sum of the relative atomic masses of the atoms in the numbers shown in the formula	The sum of the M_r of the reactants in the quantities shown equals the sum of the M_r of the products in the quantities shown. / $2Mg + O_2 \rightarrow 2MgO$ / 48g + 32g = 80g / 80g = 80g
Mass appears to increase during a reaction	One of the reactants is a gas	
Mass appears to decrease during a reaction	One of the products is a gas and has escaped	Magnesium + oxygen → magnesium oxide / Calcium carbonate → carbon dioxide + calcium oxide

Chemical equations show the number of moles reacting and the number of moles made

$Mg + 2HCl \rightarrow MgCl_2 + H_2$

One mole of magnesium reacts with two moles of hydrochloric acid to make one mole of magnesium chloride and one mole of hydrogen

If you have a 60g of Mg, what mass of HCl do you need to convert it to $MgCl_2$?

A_r: Mg = 24 so mass of 1 mole of Mg = 24g

M_r: HCl (1 + 35.5) so mass of 1 mole of HCl = 36.5g

So 60g of Mg is 60/24 = 2.5 moles

Balanced symbol equation tells us that for every one mole of Mg, you need two moles of HCl to react with it.

So you need 2.5x2 = 5 moles of HCl

You will need 5 x 36.5g of HCl= 182.5g

Measured in mass per given volume of solution (g/dm³)	$\text{Conc.} = \dfrac{\text{mass (g)}}{\text{volume (dm}^3)}$	HT only / Greater mass = higher concentration. / Greater volume = lower concentration.
The balancing numbers in a symbol equation can be calculated from the masses of reactants and products	Convert the masses in grams to amounts in moles and convert the number of moles to simple whole number ratios.	

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Quantitative Chemistry 3

Yield is the amount of product obtained	*It is not always possible to obtain the calculated amount of a product*	The reaction may not go to completion because it is reversible.
		Some of the product may be lost when it is separated from the reaction mixture.
		Some of the reactants may react in ways different to the expected reaction.

| Percentage yield is comparing the amount of product obtained as a percentage of the maximum theoretical amount | *% Yield = $\dfrac{\text{Mass of product made} \times 100}{\text{Max. theoretical mass}}$* | A piece of sodium metal is heated in chlorine gas. A maximum theoretical mass of 10g for sodium chloride was calculated, but the actual yield was only 8g. *Calculate the percentage yield.* |
| | | Percentage yield = 8/10 x 100 = 80% |

| A measure of the amount of starting materials that end up as useful products | *Atom economy = $\dfrac{\text{Relative formula mass of desired product from equation}}{\text{Sum of relative formula mass of all reactants from equation}} \times 100$* | High atom economy is important or sustainable development and economic reasons |

Calculate the atom economy for making hydrogen by reacting zinc with hydrochloric acid:

$$Zn + 2HCl \rightarrow ZnCl_2 + H_2$$

M_r of H_2 = 1 + 1 = 2
M_r of Zn + 2HCl = 65 + 1 + 1 + 35.5 + 35.5 = 138

Atom economy = $^{2}/_{138} \times 100$
= $^{2}/_{138} \times 100$ = 1.45%

This method is unlikely to be chosen as it has a low atom economy.

Chemical Changes 1

Metals and oxygen	*Metals react with oxygen to form metal oxides*	magnesium + oxygen → magnesium oxide 2Mg + O₂ → 2MgO
Reduction	*This is when oxygen is removed from a compound during a reaction*	e.g. metal oxides reacting with hydrogen, extracting low reactivity metals
Oxidation	*This is when oxygen is gained by a compound during a reaction*	e.g. metals reacting with oxygen, rusting of iron

Ionic half equations (HT only)

| *Ionic half equations show what happens to each of the reactants during reactions* | For example:
The ionic equation for the reaction between iron and copper (II) ions is:
Fe + Cu²⁺ → Fe²⁺ + Cu
The half-equation for iron (II) is:
Fe → Fe²⁺ + 2e⁻
The half-equation for copper (II) ions is:
Cu²⁺ + 2e⁻ → Cu |

Reactivity series (most reactive → least reactive):

potassium — K
sodium — Na
calcium — Ca
magnesium — Mg
aluminium — Al
carbon — C
zinc — Zn
iron — Fe
tin — Sn
lead — Pb
hydrogen — H
copper — Cu
silver — Ag
gold — Au
platinum — Pt
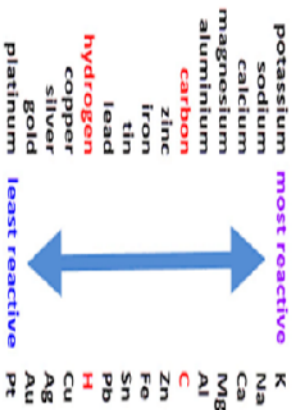
Oxidation **Is** **L**oss (of electrons) **R**eduction **Is** **G**ain (of electrons)

For displacement reactions		
Metals form positive ions when they react	*The reactivity of a metal is related to its tendency to form positive ions*	The reactivity series arranges metals in order of their reactivity (their tendency to form positive ions).
Carbon and hydrogen	*Carbon and hydrogen are non-metals but are included in the reactivity series*	These two non-metals are included in the reactivity series as they can be used to extract some metals from their ores, depending on their reactivity.
Displacement	*A more reactive metal can displace a less reactive metal from a compound.*	Silver nitrate + Sodium chloride → Sodium nitrate + Silver chloride

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Chemical Changes 2

Reactions with acids	metal + acid → metal salt + hydrogen	magnesium + hydrochloric acid → magnesium chloride + hydrogen
		zinc + sulfuric acid → zinc sulfate + hydrogen

HT ONLY: Reactions between metals and acids are redox reactions as the metal donates electrons to the hydrogen ions. This displaces hydrogen as a gas while the metal ions are left in the solution.

Metals less reactive than carbon can be extracted from their oxides by reduction.

Extraction using carbon

Unreactive metals, such as gold, are found in the Earth as the metal itself. They can be mined from the ground.

For example:
zinc oxide + carbon → zinc + carbon dioxide

sodium hydroxide + hydrochloric acid → sodium chloride + water

calcium carbonate + sulfuric acid → calcium sulfate, + carbon dioxide + water

Neutralisation

Acids can be neutralised by alkalis and bases

An alkali is a soluble base e.g. metal hydroxide.
A base is a substance that neutralises an acid e.g. a soluble metal hydroxide or a metal oxide.

Acid name	Formula	Salt name
Hydrochloric acid	HCl	Chloride
Sulfuric acid	H2SO4	Sulfate
Nitric acid	HNO3	Nitrate

Chemical Changes 3

Soluble salts	Soluble salts can be made from reacting acids with solid insoluble substances (e.g. metals, metal oxides, hydroxides and carbonates).
Production of soluble salts	Add the solid to the acid until no more dissolves. Filter off excess solid and then crystallise to produce solid salts.

You can use universal indicator or a pH probe to measure the acidity or alkalinity of a solution against the pH scale.

Acids	Acids produce hydrogen ions (H^+) in aqueous solutions.
Alkalis	Aqueous solutions of alkalis contain hydroxide ions (OH^-).

In neutralisation reactions, hydrogen ions react with hydroxide ions to produce water:

$$H^+ + OH^- \rightarrow H_2O$$

pH scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 — acidic, neutral, alkaline

Strong acids	Completely ionised in aqueous solutions e.g. hydrochloric, nitric and sulfuric acids.
Weak acids	Only partially ionised in aqueous solutions e.g. ethanoic acid, citric acid.
Hydrogen ion concentration	As the pH decreases by one unit (becoming a stronger acid), the hydrogen ion concentration increases by a factor of 10.

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Energy Transfers 1

Exothermic	Endothermic
Energy / Time / Reactants / Products / Activation energy	Energy / Time / Reactants / Products / Activation energy
Products are at a lower energy level than the reactants. When the reactants form products, energy is transferred to the surroundings. The temperature of the surroundings increases because energy is released during the reaction.	Products are at a higher energy level than the reactants. As the reactants form products, energy is transferred from the surroundings to the reaction mixture. The temperature of the surroundings decreases because energy is taken in during the reaction.

Exothermic	Endothermic
Energy is transferred to the surroundings so the temperature of the surroundings increases	Energy is taken in from the surroundings so the temperature of the surroundings decreases
• Combustion • Hand warmers • Neutralisation	• Thermal decomposition • Sports injury packs

Activation energy

Chemical reactions only happen when particles collide with sufficient energy

The minimum amount of energy that colliding particles must have in order to react is called the activation energy.

Reaction profiles

Show the overall energy change of a reaction

Chemical Changes 4

Lead ions Pb²⁺ / Bromide ions Br⁻ / Molten lead (II) bromide

Process of electrolysis	
Splitting up using electricity	When an ionic compound is melted or dissolved in water, the ions are free to move. These are then able to conduct electricity and are called electrolytes. Passing an electric current though electrolytes causes the ions to move to the electrodes.

Electrode		
Anode	Cathode	The positive electrode is called the anode. The negative electrode is called the cathode.

Where do the ions go?		
Cations	Anions	Cations are positive ions and they move to the negative cathode. Anions are negative ions and they move to the positive anode.

At the negative electrode

Metal will be produced on the electrode if it is less reactive than hydrogen. Hydrogen will be produced if the metal is more reactive than hydrogen.

At the positive electrode

Oxygen is formed at positive electrode. If you have a halide ion (Cl⁻, I⁻, Br⁻) then you will get chlorine, bromine or iodine formed at that electrode.

The ions discharged when an aqueous solution is electrolysed using inert electrodes depend on the relative reactivity of the elements involved.

Less Reactive than Hydrogen gives the metal

More reactive than hydrogen will give hydrogen gas

Extracting metals using electrolysis

Metals can be extracted from molten compounds using electrolysis.

This process is used when the metal is too reactive to be extracted by reduction with carbon.

The process is expensive due to large amounts of energy needed to produce the electrical current.
Example: aluminium is extracted in this way.

Higher tier: You can display what is happening at each electrode using half-equations:

At the cathode: $Pb^{2+} + 2e^- \rightarrow Pb$

At the anode: $2Br^- \rightarrow Br_2 + 2e^-$

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Energy Transfers 2

The energy change of reactions (HT only)

Breaking bonds in reactants	*Endothermic process*	
Making bonds in products	*Exothermic process*	

Overall energy change of a reaction

Exothermic	Energy released making new bonds is greater than the energy taken in breaking existing bonds.
Endothermic	Energy needed to break existing bonds is greater than the energy released making new bonds.

Bond energy calculation

Calculate the overall energy change for the forward reaction

$N_2 + 3H_2 \rightleftharpoons 2NH_3$

Bond energies (in kJ/mol): H-H 436, H-N 391, N≡N 945

Bond breaking: 945 + (3 x 436) = 945 + 1308 = 2253 kJ/mol

Bond making: 6 x 391 = 2346 kJ/mol

Overall energy change = 2253 - 2346 = -93kJ/mol

Therefore reaction is exothermic overall.

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Trilogy Physics topic 4: Atomic Structure

Keywords	Definition
1. Atom	Very small constituent of matter with a radius of about 0.1 nm (or 1 x 10⁻¹⁰ m). An atom has no overall electrical charge.
2. Element	A substance in which all the atoms have the same atomic number.
3. Isotope	Atoms with the same number of protons, but different numbers of neutrons.
4. Ion	At atom with a net electrical charge due to the gain or loss of an electron
5. Ionisation	When an atom gains or loses an electron
6. Compound	Two or more different atoms bonded together
7. Nucleus	The centre of an atom. Contains protons and neutrons.
8. Proton	A positively charged particle found in the nucleus.
9. Neutron	A neutral particle found in the nucleus. Has no charge.
10. Electron	A negatively charged particle found in energy levels (shells) around the nucleus.
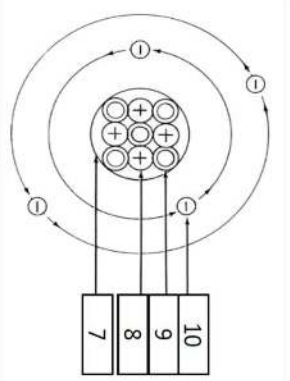
Properties of sub-atomic particles.

Particle	Relative mass	Relative charge	Location
Proton	1	+1	Nucleus
Neutron	1	0	Nucleus
Electron	0	-1	Shells

Key

relative atomic mass

atomic symbol — name

atomic (proton) number

4		
He		
2		

1	
H	hydrogen
1	

Using the periodic table

Number of...	Is the...	Found by...
Protons	Atomic (proton) number	Smaller number on periodic table
Neutrons	Difference between the atomic mass and atomic number	Big number – small number
Electrons	Atomic (proton) number	Smaller number on periodic table

History of the atom

Discovery	By	Model	Diagram
Solid particle called atom	John Dalton	Particle: solid spheres	1
The electron	JJ Thompson	Plum pudding: positive 'cake' with negative 'plums'	2
Nucleus	Rutherford	Nuclear. Positive nucleus surrounded by electrons	3
Neutron	James Chadwick	Nuclear. Now with protons and neutrons in nucleus	
Energy levels (shells)	Niels Bohr	Planetary. Electrons now orbit in different shells	4
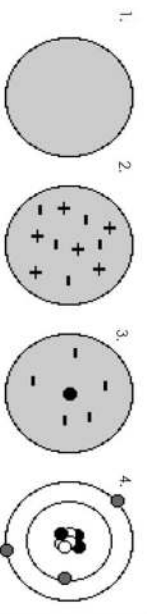
Trilogy Physics topic 4: Atomic Structure

Radioactive decay keyword.

Keywords	Definition
Unstable	The ability for a nucleus to decay
Radioactive decay	The random process of radiation being released by a nucleus. A different element is formed.
Nuclear radiation	The energy and particle released when an unstable nucleus decays.
Activity	How quickly a radioactive sample decays.
Becquerel	The unit of activity
Geiger-Muller tube	A device to measure the count rate of a radioactive source
Count rate	The number of radioactive decays per second
Ionising power	How well it knocks off electrons and damages cells
Half life	The half-life of a radioactive isotope is 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.
Radioactive contamination	Unwanted hazardous materials containing radioactive atoms.
Peer review	When the findings of one expert are double checked by another expert to make sure they are correct
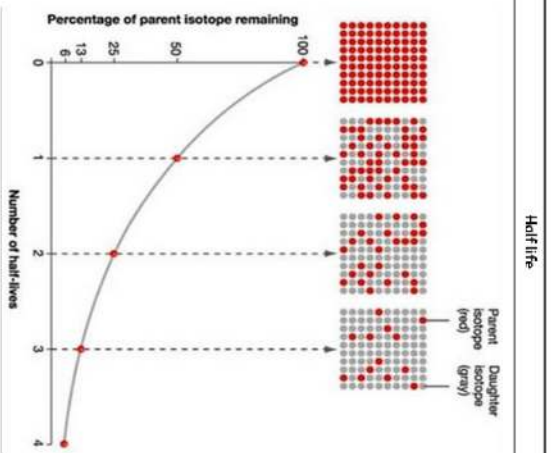
Ionising radiation

Name	Symbol	Made of	Charge	Range in air	Penetration	Ionising Power
1 Alpha	α	Helium nucleus 4/2 He	+2	5 cm	Stopped by paper or skin	High
2 Beta	β	Fast moving electron 0/-1 e	-1	Up to 1 m	Stopped by thick aluminium	Medium
3 Gamma	γ	Electromagnetic wave	N/A	Very long	Stopped by thick lead	Low

Half life

Percentage of parent isotope remaining

Number of half-lives

Parent isotope (red)
Daughter isotope (gray)

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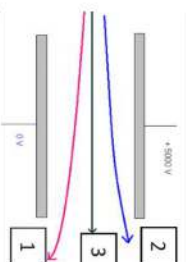
Trilogy Physics topic 6: Waves

Keywords	Definition
Transverse wave	A wave where the oscillations are perpendicular to the direction of energy transfer.
Longitudinal wave	A wave where the oscillations are parallel to the direction of energy transfer.
Oscillations	Vibrations about a fixed point
Mechanical wave	A vibration that travels through a substance (e.g. sound)
Frequency	The number of wave fronts passing a fixed point every second (measured in Hertz, Hz)
Period	The time for one complete wave
Wavelength	The wavelength of a wave is the distance from a point on one wave to the equivalent point on the adjacent wave (measured in metres, m)
Amplitude	The amplitude of a wave is the maximum displacement of a point on a wave away from its undisturbed position (measured in metres, m)

Period and frequency

$$T = \frac{1}{f}$$

T	Period (seconds, s)
f	Frequency (Hertz, Hz)

Wave equation

$$v = f\lambda$$

v	Wave speed (metres per second, m/s)
f	Frequency (Hertz, Hz)
λ	Wavelength (metres, m)
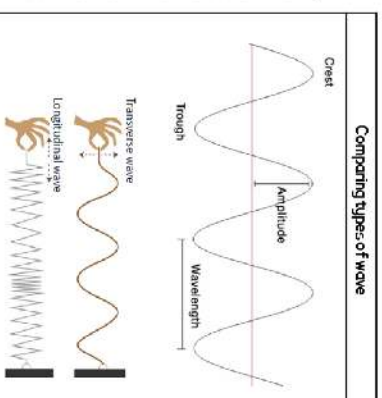
Refraction

When a wave travels into a different medium refraction will occur due to a change in speed of the wave.

A light wave will 'bend' towards the normal when it goes from air into glass.

Electromagnetic Spectrum

Low Frequency — Long Wavelength ... High Frequency — Short Wavelength

	Name	Uses
1	Radio	Radio and TV
2	Microwaves	Satellite communication, cooking food
3	Infrared	Electric heaters, cooking food, infrared cameras
4	Visible light	Fibre optic communication
5	Ultraviolet	Energy efficient lamps, sun tanning
6	X-rays	Imaging bones
7	Gamma rays	Radiotherapy, medical imaging

Comparing types of wave

Crest, Trough, Amplitude, Wavelength
Longitudinal wave
Transverse wave

Pathogens are microorganisms that cause infectious disease

	Description	Examples
Viruses	DNA or RNA surrounded by a protein coat. Viruses live and reproduce inside cells causing damage.	e.g. cold, influenza, measles, HIV, tobacco mosaic virus
Bacteria (prokaryotes)	No membrane bound organelles (no chloroplasts, mitochondria or nucleus). Cell wall. Single celled organisms. Bacteria may produce toxins that damage tissues and make us fell ill.	e.g. tuberculosis (TB), Salmonella, Gonorrhoea
Protists (eukaryotes)	Membrane bound organelles. Usually single celled or multi-cellular.	e.g. dysentery, sleeping sickness, malaria
Fungi (eukaryotes)	Membrane bound organelles, cell wall made of chitin. Single celled or multi-cellular.	e.g. athlete's foot, thrush, rose black spot

Pathogens may infect plants or animals and can be spread by direct contact, water or air.

Pathogen	Disease	Symptoms	Method of transmission	Control of spread
Virus	Measles	Fever, red skin rash.	Droplet infection from sneezes and coughs.	Vaccination as a child.
Virus	HIV	Initially flu like symptoms, serious damage to immune system.	Sexual contact and exchange of body fluids.	Anti-retroviral drugs and use of condoms.
Virus	Tobacco mosaic virus	Mosaic pattern on leaves.	Enters via wounds in epidermis caused by pests.	Remove infected leaves and control pests that damage the leaves.
Bacteria	Salmonella	Fever, cramp, vomiting, diarrhoea.	Food prepared in unhygienic conditions or not cooked properly.	Improve food hygiene, wash hands, vaccinate poultry, cook food thoroughly.
Bacteria	Gonorrhoea	Green discharge from penis or vagina.	Direct sexual contact or exchange of body fluids.	Use condoms. Treatment using antibiotics.
Protists	Malaria	Recurrent fever.	By an animal vector (mosquitoes).	Prevent breeding of mosquitoes. Use of nets to prevent bites.
Fungus	Rose black spot	Purple black spots on leaves.	Spores carried via wind or water.	Remove infected leaves. Spray with fungicide.

Plants have several ways of defending themselves from pathogens and animals

Physical	Mechanical	Chemical
Thick waxy layer, cell walls stop pathogen entry	Thorns, curling up leaves to prevent being eaten	Antibacterial and toxins made by plant
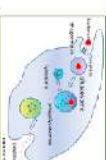
Nitrate ions needed for protein synthesis – lack of nitrate = stunted growth.

Magnesium ions needed to make chlorophyll – not enough leads to chlorosis – leaves turn yellow.

The human body has several non specific ways of defending itself from pathogens getting in

Nose	Nasal hairs, sticky mucus and cilia prevent pathogens entering through the nostrils.
Trachea and bronchus (respiratory system)	Lined with mucus to trap dust and pathogens. Cilia move the mucus upwards to be swallowed.
Stomach acid	Stomach acid (pH 1) kills most ingested pathogens.
Skin	Hard to penetrate waterproof barrier. Glands secrete oil which kill microbes.

White blood cells are part of the immune system

Pathogens are identified by white blood cells by the different proteins on their surfaces ANTIGENS.

Phagocytes	Phagocytosis	Phagocytes engulf the pathogens and digest them.
Lymphocytes	Antibody production	Specific antibodies destroy the pathogen. This takes time so an infection can occur if a person is infected again by the same pathogen, the lymphocytes make antibodies much faster.
Lymphocytes	Antitoxin production	Anti toxin is a type of antibody produced to counteract the toxins produced by bacteria.

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Traditionally drugs were extracted from plants and microorganisms

Digitalis	Extracted from foxglove plants and used as a heart drug	
Aspirin	A painkiller and anti-inflammatory. Herring from the willow bark.	
Penicillin	Discovered by Alexander. Penicillium mould and used as an antibiotic	

Most new drugs are synthesised by chemists in the pharmaceutical industry.

Preclinical trials – using cells, tissues and live animals who receives the new drug or placebo until the end of the trial. This avoids bias.

Double blind trial: patients and scientists do not know who receives the new drug or placebo until the end of the trial. This avoids bias.

New drugs are extensively tested for:

Dose	The most suitable amount to take
Toxicity	Check that the drug is not poisonous
Efficacy	Make sure the drug works

Clinical trials use healthy volunteers and patients

	Stage 1	Stage 2	Stage 3	Stage 4
	Healthy volunteers try small dose of the drug to check it is safe and to record any side effects	A small number of patients try the drug at a low dose to see if it works	A larger number of patients; different doses are trialled to find the optimum dose	A double blind trial will occur. The patients are divided into groups. Some will be given the drug and some a placebo.

A placebo can look identical to the new drug but contain no active ingredients

Antibiotics have greatly reduced deaths from infectious bacterial disease

antibiotics	e.g. penicillin	Kill infective bacteria inside the body. Specific bacterial infections require specific antibiotics.
Painkillers and other medicines	e.g. aspirin, paracetamol, ibuprofen	Drugs that are used to treat the symptoms of a disease. They do not kill pathogens
		Antibiotics cannot be use to kill viruses. It is difficult to develop drugs to kill viruses without harming body tissues because viruses live and reproduce inside cells

Bacteria can mutate – Sometimes this makes them resistant to antibiotic drugs.

Vaccination

Used to immunise a large proportion of the population to prevent the spread of a pathogen

	Small amount of dead or inactive form of the pathogen	1st injection by pathogen	White blood cells detect pathogens in the vaccine. Antibodies are released into the blood.
		Re infection by the same pathogen	White blood cells detect pathogens. Antibodies are made much faster and in larger amounts.

A person is unlikely to suffer the symptoms of the harmful disease and it's spread in a population is prevented

GCSE BIOLOGY ONLY

Monoclonal antibodies

1. A mouse is injected with pathogen
2. Lymphocytes produce antibodies
3. Lymphocytes are removed from the mouse and fused with rapidly dividing mouse tumour cells
4. The new cells are called hybridomas
5. The hybridomas divide rapidly and release lots of antibodies which are then collected

Identical copies of one types of antibody produced in laboratory

Specific to one binding site on the antigen. Can target specific chemicals or cells in the body

Monoclonal antibodies can be used in a variety of ways

	Diagnosis	Detecting pathogens	Detecting molecules	Treatment
	e.g. pregnancy test – measure quantities of chemicals in the blood	Used to provide optimum temperatures for	Can detect very small quantities of chemicals so it can be seen inside cells or tissues	Bound to radioactive substance, toxic drug or chemical. Cancer cells are targeted to normal body cells are unharmed
			Fluorescent dye can be attached so it can be seen inside cells or tissues	

Photosynthesis

Plants make use of light energy from the environment to make food (glucose)	The plant manufactures glucose from carbon dioxide and water using energy transferred from the environment to the chloroplasts by light

Carbon dioxide + Water → Oxygen + Glucose

$$CO_2 + H_2O \xrightarrow{light} O_2 + C_6H_{12}O_6$$

Plants use the glucose produced in photosynthesis in a variety of ways

Respiration, stored as insoluble starch, fats or oils for storage, cellulose for cell walls, combine with nitrates from the soil to form amino acids for protein synthesis

Factors affecting the rate of photosynthesis

Factor	How the rate is affected	Limiting factors (why the rate stops going up)
Temperature	As the temperature of the environment the plant is in increases, rate of photosynthesis increases (up to a point) as there is more energy for the chemical reaction.	Photosynthesis is an enzyme controlled reaction. If the temperature increases too much, then the enzymes become denatured and the rate of reaction will decrease and stop.
Light intensity	Light intensity increases as the distance between the plant and the light sources increases. As light intensity increases so does the rate of photosynthesis so more energy is available for the chemical reaction.	At point X another factor is limiting the rate of photosynthesis. This could be carbon dioxide concentration, temperature or the amount of chlorophyll.
Carbon dioxide concentration	Carbon dioxide is needed for plants to make glucose, the rate of photosynthesis will increase when a plant is given higher concentrations of carbon dioxide (up to a point).	At point X another factor is limiting the rate of photosynthesis. This could be the light intensity, temperature or the amount of chlorophyll
Amount of chlorophyll	Chlorophyll is a photosynthetic pigment that absorbs light and allows the reaction between water and carbon dioxide to occur (photosynthesis)	Another factor could limit the rate of photosynthesis. This could be light intensity, temperature or the carbon dioxide concentration

Graph lines A and B: If carbon dioxide concentration is increased from 0.01% to 0.1% then a large increase in rate occurs up to a point.

Graph lines C and D: If temperature is increased by 10°C then a slight increase in rate of photosynthesis occurs.

Graph line A: Rate could be limited by temperature and/or amount of chlorophyll. Plant tissue can be damaged when carbon dioxide concentrations exceed 0.1%

Light intensity obeys the inverse square law. This means that if you double the distance between the plant and the light source you quarter the light intensity

Control conditions in greenhouses to reduce limiting factors can improve crop yields

Heating	Used to provide optimum temperatures for maximum plant growth.
Artificial lighting	Enhances the natural sunlight especially overnight and on cloudy days.
Extra carbon dioxide	Gas can be pumped into the air inside the greenhouse.

Growers must balance the economics of additional costs of controlling the conditions to maximise photosynthesis with making a profit.

Disease and bioenergetics glossary

Key term	Definition
Communicable disease	Disease caused by pathogens that can be passed from one organism to another
Non-Communicable disease	Not infectious and cannot be passed from one organism to another
Pathogens	Microorganisms that cause disease
Viruses	Pathogens that are much smaller than bacteria and can only reproduce inside the living cells of other organisms
Vaccine	Dead or inactive pathogenic material used in vaccination to develop immunity to a disease in a healthy person
Bacteria	Single-celled prokaryotic organisms
Preclinical testing	Is carried out on a potential new medicine in a laboratory using cells, tissues, and live animals
Clinical trials	Test potential new drugs on healthy and patient volunteers
Placebo	A medicine that does not contain the active drug being tested, used in clinical trials on new medicines
White blood cells	Blood cells involved in the immune system of the body. They engulf pathogens and make antibodies and antitoxins
Sexually transmitted disease (STD)	Transmitted from an infected person to an uninfected person by unprotected sexual contact
Hybridomas	Cells created during the production of monoclonal antibodies by the fusion of an antibody-specific lymphocyte and a tumour cell

Key term	Definition
Glucose	A simple sugar
Endothermic reaction	A reaction that takes in energy from the environment
Limiting factors	Limit the rate of a reaction, for example photosynthesis
Photosynthesis	The process by which plants make food using carbon dioxide, water, and light
Aerobic respiration	An exothermic reaction in which glucose is broken down using oxygen to produce carbon dioxide and water and release energy for the cells
Exothermic reaction	A reaction that transfers energy to the surroundings
Glycogen	Carbohydrate store in animals
Anaerobic respiration	An exothermic reaction in which glucose is broken down in the absence of oxygen to produce lactic acid in animals and ethanol and carbon dioxide in plants and yeast. A small amount of energy is transferred for the cells
Lactic acid	The end product of anaerobic respiration in animal cells
Oxygen debt	The extra oxygen that must be taken into the body after exercise has stopped to complete the aerobic respiration of lactic acid
Metabolism	The sum of all the reactions taking place in a cell or the body of an organism

Aerobic respiration

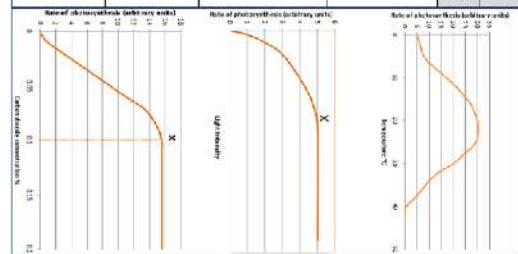*Respiration with oxygen. Occurs inside the mitochondria continuously. Exothermic reaction*

Glucose is oxidised by oxygen to transfer the energy the organism needs to perform it's functions.

glucose + oxygen → carbon dioxide + water

$$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$$

The incomplete oxidation of glucose causes a build up of lactic acid and creates an oxygen debt.	*Aerobic respiration releases a large amount of energy from each glucose molecule*	*Anaerobic respiration releases a much smaller amount of energy than aerobic respiration.*

animal cell — mitochondria, cytoplasm

plant cell

Metabolism is the sum of all the reactions in a cell or the body

Conversion of glucose to starch, glycogen and cellulose.	The formation of lipid molecules from a molecule of glycerol and three molecules of fatty acid.
The use of glucose and nitrate ions to form amino acids which in turn are used to synthesise proteins.	
Respiration	
Breakdown of excess proteins to form urea for excretion.	

The energy transferred by respiration in cells is used by the organism for the continual enzyme controlled processes of metabolism.

An organism will receive all the energy it needs for living processes as a result of the energy transferred from respiration.

For chemical reactions	To build larger molecules from smaller one.
For keeping warm	To keep a steady body temperature in a cold environment.
For movement	To enable muscles to contract in animals.

Anaerobic respiration

Respiration when oxygen is in short supply. Occurs during intensive exercise. Exothermic reaction

During hard exercise, muscle cells are respiring so fast that blood cannot transport enough oxygen to meet their needs.

Glucose is partially oxidised to produce lactic acid which builds up in muscle tissue causing them to become painful and fatigued.

glucose → lactic acid

The end products are ethanol and carbon dioxide. Anaerobic respiration in yeast cells is called fermentation. Exothermic reaction

glucose → ethanol + carbon dioxide

This process is economically important in the manufacture of alcoholic drinks and bread.

During exercise the human body reacts to increased demand for energy

Heart rate increases	To pump oxygenated blood faster to the muscle tissues and cells.
Breathing rate and breath volume increase	This increases the amount of oxygen entering the blood stream.

The extra amount of oxygen required to remove all lactic acids from cells is called the oxygen debt

Lactic acid builds up in the muscle cells during exercise → Blood flows through the muscle cells and transports the lactic acid to the liver → The liver oxidises the lactic acid and converts the lactic acid back to glucose

Year 10 Term 1 Knowledge Organiser Booklet

2.1 – Algorithms - Computational Thinking

What is Computational thinking?

The thought processes involved in formulating a problem and its solution(s), so that a computer, human or machine can effectively carry out

1

How do you think computationally?

To effectively solve problems you need to....

- Decompose
- Abstract
- Algorithmic thinking
- Create algorithms

1

KEY TERMS

Algorithm: Steps to provide a solution to a problem, usually represented in flowcharts or pseudocode

Decompose: Breaking down a large problem into smaller sub-problems

Abstraction: Representing 'real world' problems in a computer using variables and symbols and removing unnecessary elements from the problem

Algorithmic Thinking: Identifying the steps involved in solving a problem.

Sequence: Completing steps in the order which they must happen

Selection: Where a choice is made in a program depending on a condition or outcome

Iteration: Act of repeating or looping specific sections of code

2

Flowcharts

Displays an algorithm in diagram form using symbols and arrows to show to flow of information

3

Pseudocode

A structured use of English used to define the steps needed to solve a problem.


```
WHILE TRUE:
temp = ""
IF temp > than 20c THEN:
    Open window AND heaters OFF
ELSE
    Close windows AND heaters ON
TIME = ""
IF TIME = 13.00 THEN
    Sprinklers on
ELSE
    Sprinklers off
Continue
BREAK
```

3

2.1 – Algorithms – 4. Flowcharts
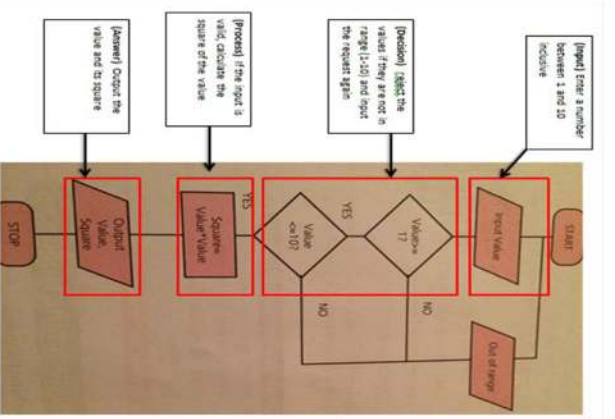
Always start and end with this

START/STOP

Use when there is an input or output required e.g. user inputs their name, program displays their name

INPUT/OUTPUT

Decision

YES   No

Is A>10 ?

When a **choice** has to be made in the program

To do something in the program e.g. a calculation

PROCESS

Sequence that performs a specific task. You can use this within your flowchart to show more detail in a specific section

SUB ROUTINE

Flow lines – show the flow of information in the algorithm

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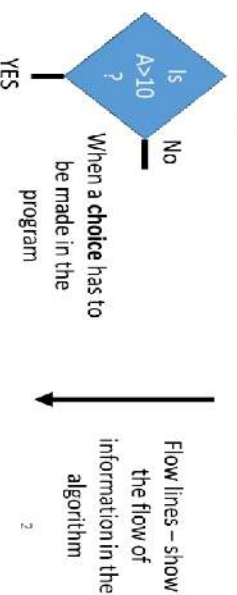
2.1 – Algorithms – 5. Pseudocode

Pseudocode uses English.

It mimics how your code may look in the programming language BUT it DOESN'T have to be exact

Some useful terms you could use.

START
IF
ELIF
ELSE
FOR
WHILE TRUE
ENDIF
END

Here are some symbols to use

Comparison operators

== Equal to
!= Not equal to
< Less than
<= Less than or equal to
> Greater than
>= Greater than or equal to

Arithmetic Operators

+ Add
- Subtract
/ Divide
* Multiply
MOD will return the remainder for the division

The OCR Pseudocode guide has more information if you wish to do more research.

```
WHILE TRUE:
temp = ""
IF temp > than 20c THEN
    Open windows AND heaters OFF
ELSE
    Close windows AND heaters ON
TIME = ""
IF TIME = 18.00 THEN
    Sprinklers on
ELSE
    Sprinklers off
    Continue
BREAK
```

This repeats, it reads the temp of a greenhouse. If greater than 20 degs then open windows and turn heaters off ELSE close windows and heaters on

It checks the time if the time is 6pm then turn sprinklers on otherwise keep sprinklers off

2.1 – Sorting Algorithms – Bubble, Insertion & merge

Key vocabulary	
Bubble sort	Works by repeatedly going through the list to be sorted, comparing each pair of adjacent elements. If the elements are in the wrong order they are swapped, else they are left in position.
Insertion sort	Sorts data one element at a time. The algorithm takes one data item from the list and places it in the correct location in the list. This process is repeated until there are no more unsorted items in the list. More efficient than bubble sort.
Merge sort	This is a two-stage sort. Firstly the list is split in half into sub lists repeatedly. The algorithm stops splitting the lists when each list has only 1 element in it. The second stage involves repeatedly merging the lists in order until there is only one sub list remaining.

Figure 1 - Bubble sort example

Figure 2 - Insertion sort example

Figure 3 - Merge sort example

2.1 – *Sorting Algorithms - Binary and Linear searches*

Key vocabulary	
Linear Search	Data may be in any order to complete a linear search. Each item is inspected in turn to see whether it is what is being searched for. If an item is found, then True is returned, else the next element is inspected until all items have been searched. If nothing is found by the end of the algorithm then False is returned.
Binary Search	If a list is sorted (numerical or alphabetical order) then a more efficient algorithm can be used. It works by repeatedly dividing the list into half and searching in the appropriate half.

Figure 1 - Linear search example
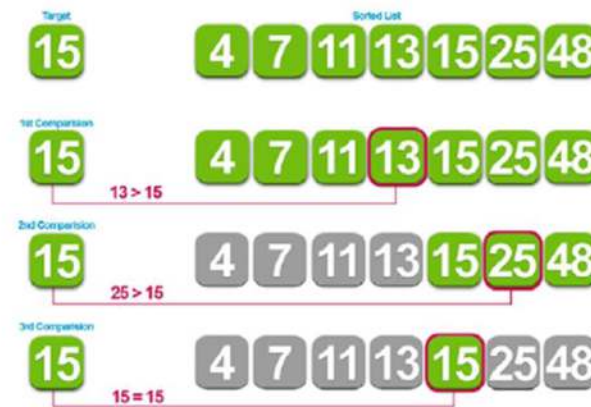
Figure 2 - Binary search example

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2.2 Programming Techniques

Key term	Definition
Variable	A named value which can be changed as the program is running.
Selection	One of the three basic logic structures in computer programming. A question is asked, and depending on the answer, the program takes one of two courses of action, after which the program moves on to the next event.
Iteration	Repetition of a mathematical or computational procedure. In computer programming 'iteration' is used to loop around and around a piece of code until a condition is met.
String Manipulation	Functions that can alter characters in a string: x.upper – changes all to uppercase x.lower – changes all to lowercase x.length- returns the number of characters x.[i] – extracts character in position i x.substring (a,b) – Extracts a string starting at position a with length b
File handling	How a program can access data and change data in an external file. Open Read Write Close
Casting	Used in programming to change the data type.
Debugging	The process of removing bugs from your programs There are three main types of error: Syntax error Logic error Runtime error

Key term	Definition
Constant	A named value which cannot be changed as the program is running.
Sequence	Sequence is one of the three basic logic flows in computing programming. Sequence means to set down instructions one after another for the computer to execute in turn
Data types	Programming languages store data as different types. For example: Character String Integer Boolean Real (Float)
Integer	Refers to a number data type which will only store whole numbers.
Real	A number that is allowed to have decimal points. Also referred to as float.
Boolean	This is a data type and refers to an expression or variable that can have only a true or false value e.g. on/off, true/false, male/female
Character and string	A single letter, number or symbol Used to represent text, it is a collection of characters

2.2 Programming Techniques

Boolean Operators	AND OR NOT
Array	A data structure that can store a collection of data values all under one name. One dimensional arrays are like lists Two dimensional arrays are like a list of lists
Procedure	A set of instructions under one name

Arithmetic operators	> greater than >= greater than or equal < less than <= less than or equal = equal (in Python written ==) <> not equal (in Python !=) ^ or ** Exponentiation DIV Quotient MOD or % Remainder
Sub program	Used to simplify code and save time.
Function	Similar to procedures but always return a value.

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2.2 Programming Techniques

Constant
Value STORED IN A **MEMORY LOCATION** that **never changes WITHIN A PROGRAM**

Variable
Value STORED IN **MEMORY LOCATION** that **can change WITHIN IN A PROGRAM**

Sequence:
Completing steps in the order which they must happen

Selection:
Where a choice is made in a program depending on a condition or outcome

Iteration:
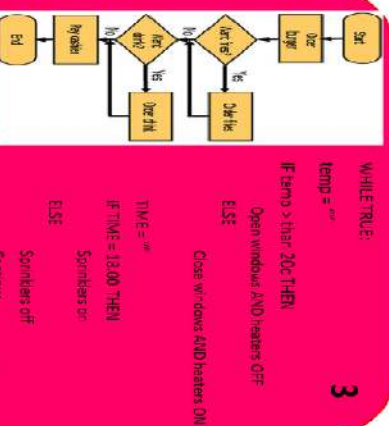Act of repeating or looping specific sections of code

Count controlled Iteration: Repeats a set number of times

Condition controlled: Repeats until a condition is met or something in the program changes

Syntax Error
An error in the rules/grammar of the language E.g. missing colon / spelling mistake

Logic Error
The program is written to do something other than what the programmer intended
E.g. Resetting only the first 9 elements in an array instead of all 10.

Run Time Error:
More difficult to spot as it can run a program without reporting an error. E.g. runs but Doesn't give an output. Or the program hangs or becomes inactive

Data Types

Real /Float
Number with decimal Point

Integer
Number without a decimal Point

String
A series of characters /TEXT

Character
A single letter or symbol

Date/Time
Date and Time in any format

Boolean
Yes no, true false value

Casting
Changing the data type

Other Info

Concatenate
To join different data types together

 # Comments
Use these to add comments in to your code to explain what you have done

Validation: a computer check to ensure that the data entered is sensible and reasonable. It does not check the accuracy of data.

2.2 Programming Techniques

Comparison Operators

==	Equal to
!=	Not equal to
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to

Arithmetic Operators

+	Addition eg x=6+5 gives 11
-	Subtraction eg x=6-5 gives 1
*	Multiplication eg x=12*2 gives 24
/	Division eg x=12/2 gives 6
MOD	Modulus eg 12MOD5 gives 2
DIV	Quotient eg 17DIV5 gives 3
^	Exponentiation eg 3^4 gives 81

Array/List
A list is just what it sounds like – a single variable with a list of values

Food = ["Pizza", "Pasta", "Chips"]

Method	Description
append(value)	Add a new value to the end of a list
insert(index,value)	Inserts a value at a point in the list and moves other items along one
pop(index)	Removes a particular index value from a list
remove(value)	Removes a given value from a list

2.2 Programming Techniques

- File handling operations:
  - open
  - read
  - write
  - close

- Two-dimensional (2D) arrays are indexed by two subscripts, one for the row and one for the column.
- Example:

rating

rating[0][2] = 2   row   col
rating[1][3] = 8

reviewer (first index)	*movie (second index)*			
	0	1	2	3
0	4	6	2	5
1	7	9	4	8
2	6	9	3	7

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L01: Understand the tools and techniques that can be used to Initiate and plan solutions

There are four phases of the project life cycle.

1. Initiation
2. Planning
3. Execution
4. Evaluation.

Each phase has tasks that must be completed before the next phase can be started.

Table 1.1 Tasks to be completed during each phase

Phase	Tasks
Initiation	Gather user requirements and constraints from client
	Define the success criteria and objectives
	Consider legislative implications
	Create feasibility report
	Complete phase review
Planning	Define constraints
	Create project plans and resource tasks
	Produce initial designs
	Create test plans
	Complete phase review
Execution	Use project plan to monitor project
	Create deliverable product
	Test deliverable product
	Complete phase review
Evaluation	Release deliverable product to client
	Create user documentation
	Final phase/project review

The advantages of following a project life cycle are that:

- it provides a structured approach
- it showsclearly defined tasks to be carried out in each phase
- the inputs and output sof each phase are defined.
- the roles and responsibilities of each project team memberare defined
- resources are allocated at the start of the project
- the project progress can be monitored to make sure the final product is delivered to the client on time.

1.1.1 The phases of the project life cycle

Initiation phase

The resources are the things that are needed to complete the project. These may include hardware and software and different specialist roles such as programmers and testers. Constraints include:
- the timescale for the completion of the project
- the budget for the project
- security requirements, including legislative implications
- the hardware/software that should be used during the development of the final product
- the hardware/software that the final product should be compatible with.

The feasibility report defines the successcriteria and objectives. The project manager will rank the questions and constraints is considered and a way forward isrecommend - Go, No Go.

Planning phase

The constraints and requirements that were defined in the feasibility report are used to create the project plans and resource lists are created for the whole project.

Initial designs for the product are created. These could be sections for a user interface, a database structure or page plans.

The productwill need to be tested during creation and after it has been completed. Initial test plans are created

Execution phase

The longest phase in the project life cycle

The project manager will use the project plan(s) to monitor the project.

The project mustbe kept on track so that the final product is delivered to the client on time—this is the time constraint.

The deliverable product is created and tested using the test plans that were created in the planning phase.

Evaluation phase

The deliverable product is released to the client. The product will have been thoroughly tested to make sure it works correctly and meets all the defined user requirements.

User documentation is created. This could include installation and user guides. A final phase/project review is carried out, which focuses on
- the success of the project against the defined successcriteria and user requirements
- deviations from the original project plans and why these happened
- the processes and resources used and the effects of these on the project
- the maintainability of the product.

L01: Understand the tools and techniques that can be used to Initiate and plan solutions

2 The interaction and iteration between the phases of the project life cycle.

Phase	Interaction with:	Iteration with:
Initiation	Planning	
Planning	Execution	Initiation
Execution	Planning	Planning
Evaluation	Evaluation	Execution

Iteration and Interaction:
- occur between all the stages of the project life cycle, except between the evaluation and initiation stages
- can only occur between any given stage and the stage before or after it.

The exception to this is the evaluation stage, as there is no stage afterthis.
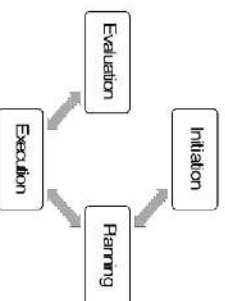
1.5.1 The purpose of planning tools

Some planning tools are used to create documentation to keep the project on track and monitor progress. They can be used during press reviews and can show:
- tasks/processes
- time allocated to each task
- task dependencies
- workflow
- milestones
- resources needed

Some planning tools can be used to create initial designs for the final product.

Planning tools include:
- Gantt charts.
- PERT (Project Evaluation and Review Technique)
- charts
- critical paths
- visualisation diagrams.
- flow charts
- mind maps
- task lists

Formal Planning tools		Informal planning tools	
Gantt chart - show each task as a block time and show: • how long each task should take • the order in which the task should be completed • concurrent tasks • dependencies between tasks • milestones • company time	PERT chart – PERT stands for Project Evaluation and Review Technique. A PERT chart: • usesboxes or rectangles to represents tasks and milestones • uses lines between the tasks to show dependent tasks and time allocation • represents concurrent tasks with two lines out of a task • can be used to show the critical path.	Flow chart - Are used to show the steps, decisions and outputs in a process. • Centre is used to create a simple diagram of all the steps that need to be carried out in a project. • Set out each task in the proposed sequence- the order in which the tasks have to be completed. • Give no indication of the timescale for each task	Mind map - Can also be called splider diagrams. • Start with a target or goal, known as a central idea or node. • Other tasks branch off the central node. • Branches can have words on them. • Branches are the lines that link the tasks or subtasks.
	Critical path - Show the longest path that the project should take to be completed. • Show the shortest time that a project can be completed in, if all goes to plan. • We work out by adding up the allocated time for all the dependent tasks, including contingency time. • Are used by the project manager to monitor the project to make sure every task is running to schedule.	Task list – Show what tasks have to be completed, the start and end dates, and the duration. • Include all the tasks that must be completed during a project. • Some tasks may need breaking down into sub-tasks. • Should be in a logical order, the tasks must flow from the initiation phase to the end of the evaluation phase. • Can show the resources that will be needed for each task or sub-task.	Visualisation diagram - Are a rough drawing or sketch of what the final product will look like. • Are used to visually plan the layout of a static product. • Can be used for a product that has a timeline, such as a video. • Can show the format and layout of outputs from a product such as a report. • A graph is a visualisation diagram for numerical data.

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L01: Understand the tools and techniques that can be used to initiate and plan solutions

1.3 The inputs and outputs of each phase of the project life cycle

Initiation Phase input	Initiation phase output	Planning phase inputs	Planning phase outputs	Execution phase inputs	Execution phase outputs	Evaluation phase inputs	Evaluation phase outputs
User requirements: • Define what the client wants the product to achieve. • Are created between the client and the project manager. • Can be general or specific. **User constraints:** • Are given to the project manager by the client. • Depend on the type of product being created and the assets being used. • May need to be revisited during the creation of the product. • Are comprised of four constraints: timescale, budget, hardware, software.	**Feasibility report:** • Is created during the initiation stage. • Answers the questions asked during the project. • Forms the basis for completion of the project. • Can also include different proposed solutions for the client. • Considers the client-defined constraints and the requirements that have been set. • Answers the question Go, No Go? **Legislation implications:** • Depend on the type of product being created and the assets being used. • Could be produced based on the type of product, to be used during the project to check the legislation hasn't been updated.	**Project plan:** • Is created by the project manager, tested. • Bugs or errors found are corrected. • Includes tasks, resources needed, milestones, contingency time, workflow and end date. **Test plan:** • During the planning phase will be related to checking user requirements are being met. **Constraints list:** • Created from the client-defined constraints provided in the initiation phase of the constraints. • Is constantly referred to during the project lifecycle. • Referred to during the phase reviews to make sure that all the constraints are being met.	**Deliverable product:** • The product is fully checked against the constraints list and defined requirements. • The product is installed on to the client's computer system. • It is checked again to check its working as intended. • Provides detailed information about each completed. **Test results:** • Tests are carried out during creation and when completed. • Test results will be recorded and checked to make sure that every part of the product has been tested. • The results of any retests are recorded.	**Release of deliverable product:** • The product is released to the client. • When the project team is happy, the product is released to the client. **User documentation:** • Created before the product is released to the client. • The type of user documentation will depend on the type of product. Examples of user documentation: • A user guide showing how to use the product. • An installation guide, which could be used in the future if the product needs to be reinstalled. • Test plans showing the results of all testing carried out. • Security details, which show the built-in security and, for example, how to set up new users with access details.		

Part of the interaction between phases is the inputs and outputs for each phase.

Phase	Inputs	Outputs
Initiation	User requirements User constraints	Feasibility report Legislation implications Phase review
Planning	Feasibility report Application implications	Project plan Test plan Constraints list Phase review
Execution	Project plan Test plan Constraints list	Deliverable product Test results Phase review
Evaluation	Test results	User documentation Release of deliverable product Final review report

Flow chart		Mind map		Task list	
Start point		Nodes		Tasks	
End point		Sub-nodes		Sub-tasks	
Decisions		Branches/connecting lines		Start date	
Processes		Key words		End date	
Connecting lines		Colours		Duration	
Direction arrows		Images		Resources	

1.5.2 Components of the planning tools

Gantt chart		Visualisation diagram		PERT chart	
Dates/days along the top		Multiple images/graphics		Nodes/sub-nodes	
Tasks down the left side		Time/duration lines		Size and position of images/graphics	
Blocks to represent the time allocated to each task		Task sequences		Position and style of text	
Milestones as diamonds/triangles		Dependent tasks		Fonts	
Dependent tasks		Concurrent tasks		Annotations	
Concurrent tasks		Can show critical path		Colours/themes	

Planning tool	Advantages	Disadvantages
Gantt chart	• Can show estimated time schedule • Tasks are shown against a time schedule • Comments can be added • Resources for each task can be shown	• Can be too simple for a complex project • Task time is estimated so some plan may be unrealistic • Task dependencies can be difficult to identify at the start of a project
PERT and Critical Path	• Can show slack time so resources can be reallocated • Ensures timescales to be planned • Tasks can be scheduled as dependent or concurrent	• Can be confusing • Needs skill and knowledge to create • Can be limited in large and complex projects
Visualisation diagram	• Information and data can be quickly understood • Emerging trends and patterns can be quickly spotted • Non-specialists can understand the data/numbers being shown	• Not appropriate for large and complex projects.
Flow chart	• Can be useful for simple projects with a small number of tasks and decisions. • No specialist project-planning knowledge needed to understand the flow chart.	• Does not show time allocated for each task. • Tasks show sequentially so doesn't show concurrent tasks
Mind map	• Easy to add ideas/tasks at any time • Can provide focus on the tasks and the links between them • Shows dependent tasks	• No time schedule • Can be difficult for others to understand • Doesn't show concurrent tasks
Task list	• Can provide focus on the tasks to be completed. • No tasks will be missed out.	• Should be used for large or complex projects.

Strengths	Weaknesses
Real-time changes can be made	Some project-planning software is very expensive
Project plans can be shared electronically	There is a possibility that a simple project can become very complicated
Project plans can include allocated resources	Can be time-consuming to set up a project
Reports can be generated, for example to show the resources needed to complete each task	May need some knowledge, training or experience to use the software

Project management software

Project management software can be used to create Gantt and PERT charts, including defining the critical path. The tools required, for example to link tasks or define milestones, are built into the software.

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L03: Understand how data and information can be collected, stored and used

3.1 Data and information

Data → Information → Knowledge

Data is raw facts and figures before they have been processed.

The main points about data are:
- Data has no meaning
- Data is raw facts and figures before they have been processed
- Data can be made up of letters, numbers, symbols, graphics and sound.

Information is a collection of words, numbers, dates, images, sounds etc. put into context i.e. to give them meaning.

Changing data into information - A structure is needed in order for data to become information. In the table below the second and third columns contain either 'Yes' or 'No' but without headings there is no meaning.

Knowledge is the ability to understand information and to then form judgements, opinions, make predictions and decisions based on that understanding.

Data Type		Examples
Alphanumeric or Text – This allows you to type in text, numbers and symbols		Forename; James; Surname Smith; Address: 73, High Street; Postcode: CV34 5TR; Car Registration: BH16 9JV; Telephone Number: 01926 123456*
Real Number - This allows a whole number or a decimal number		15; 213.25
Integer number – These are whole numbers		1990
Currency – automatically formats the data to have a £ or $ or euro symbol in front of the data and also ensures there are two decimal places.		£5.75; $54.99
Percentage – includes decimal places and % sign		20%
Date/Time – The real/date data entry is 1-31 for day (28 or 30 in appropriate months) and 1-12 for month. Otherwise a date can easily exist, for example, it would not allow 31/02/06 to be entered, it forces the data into a long, medium or short date/time		Long Date: 20 February 2006; Medium Date: 20-Feb-06; Short Date: 20/02/06; Long Time: 18:21:23; Medium Time: 06:21 PM; Short Time: 18:21
Alphanumeric - The data type will automatically increase by 1 as records are added to the database		Record 1:1; Record 2:2
Logical, Boolean, Yes/No - This data type is often referred to as different things, you may hear it called 'logical', or 'boolean' or 'yes/no'. All it means is that the data is restricted to one of only two choices.		Yes/No; Male/Female; e.g./cold; On/Off
Fraction – usually included in spreadsheets – enables partial fractions to show the results of the calculations.		7/8
Decimal – shows an exact number using a decimal place.		22.75
limited choice – restricts a user choice.		Radio button; Drop-down list
Object		Graph or chart

3.4 Different storage methods and the appropriateness of the use of these in context

Magnetic storage

Magnetic storage includes particles or domains to store data. Examples of magnetic storage are:
- Hard disk
- Magnetic tape
- Floppy disk (now obsolete)
- Advantages – large storage capacity (TB), cheaper than other storage
- Disadvantages – Not as portable as other media, magnetic fields can damage and data can be damaged and slower to access data than flash.

Optical Storage

- Optical storage includes CDs, DVDs and Blu-Ray disks
- A laser beam burns tiny dark pits onto the surface of an optical disk.
- No pit represents data bit of 1.
- Advantages – Portable compared to hard disk and inexpensive.
- Disadvantages – disk can be damaged easily and the storage capacity is lower to write than other media

Solid state/Flash

- Solid state media/flash includes USB memory sticks, solid state drives (SSD) and SD/Memory cards (in cameras)
- Solid state media has no moving electronic switches
- If the switch is open it represents a 1, if it is closed, it represents a 0.
- Advantages –very portable compared to the other storage devices
- It is less likely to be damaged and faster to access data
- Disadvantages – expensive compared to other media and have a limited number of erase/write cycles.

The cloud refers to software, services and storage drives that run on the internet rather than being stored and accessed from a physical storage device
- It has a very large storage capacity.
- It is made up of a lot of servers that store data and information
- It is accessed through a web browser, such as Mozilla Firefox or Google Chrome, or through an app.

3.3 The methods used to collect data and store data/information, and the IT used to support data collection

Collecting data method	Explained	Advantages	Disadvantages
Questionnaires	Whichever style (or styles) of questions you use, it is important that they are easy to understand, cover every possible answer, are unbiased (they do not lead respondents to give a particular answer) and unambiguous (they have a clear meaning). You must also ensure that they are appropriate to your survey.	Large numbers of people can be asked to fill in the same question/data/survey	If this is a questionnaire/survey an online, people need the technology to be able to complete it
Emails can be sent that include:	An interactive form to be completed and returned to the sender. The collected data and information can be automatically imported into a spreadsheet or database asking as the form contains the same field in the same order. A link to an online survey, where the process is the same as that for a questionnaire.	The same email can be sent to many people at the same time	Emails may be diverted into the spam/junk folders by the email provider
Sensors	A sensor is a device that responds to a change or input from the environment. Inputs can include light, heat or motion. The output is usually a signal that is converted to a human-readable display or transmitted electronically over a network for reading or further processing.	Once set up, do not need human intervention as the data collected can be sent electronically.	Sensors may stop working, for example if there is a power cut
Interviews	An interview is a conversation between two people where questions are asked, usually one to one 'face to face'. The data and information gathered during the interview will need to be manually input into the software being used to store and process it.	Questions can be modified based on the answers given to previous questions	Can be time consuming and costly to carry out
Consumer panels	A consumer panel is a group of people who give feedback through a series of questions. Examples include feedback on a new product/service (for instance a website or advert) or an initial design/mock-up of a new product.	The cost of consumer panel feedback can be low if online feedback methods are used	If there is not a range of people on the panel the feedback could be based towards one specific type of person
Loyalty schemes	A loyalty scheme is a points-based rewards programme offered by a business to its customers. Members can gain points each time they use the business.	A loyalty scheme can help keep customers using the business	Some people feel that the data collected about them by using a loyalty scheme can be an invasion of privacy.
Statistical reports	Statistics can be found on websites, but the validity of the website must be checked. The statistics can be analysed to gather further data and information. Trends and patterns can be spotted.	If a trusted source is used, then the statistics are readily available, cover a range of topics and are reliable.	May not have been collected for the same purpose so may not provide clear and full data

Factual information is called **quantitative** data. Information collected about opinions and views is called **qualitative** data.

Primary research (field research) includes gathering new data that has not been collected before. For example, surveys using questionnaires or interviews with groups of people in a focus group.

Secondary research (desk research) involves gathering existing data that has already been produced. For example, research using the internet, newspapers and company reports.

	Primary information			Secondary information	Desk research
A	Questionnaires and surveys		F	Articles	
B	Observations		G	Books	
C	Consumer trials		H	Newspapers	
D	Hall tests		I	Internet	
E	Focus groups		J	CD/DVD	

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3.3.2 Information technology used to support data collection

Barcode readers
- Barcode readers are used to scan barcodes.
- Every product has a unique identifiable barcode.
- The barcode stores data about the product.
- Barcodes can help retailers identify products and use the information for stock control.

QR codes
- QR codes are two-dimensional barcodes that store data.
- They are made up of black modules arranged in a square pattern on a white background.
- They can hold more data and be read faster than a standard barcode.

Web based survey
- Web-based surveys are surveys that are located on the internet.
- They can be sent as a link or URL contained in an email.
- To access and complete them a device - such as a smart phone, tablet or computer connected to the internet - must be used.
- When the survey has been completed, the responses are submitted.
- The submitted responses are automatically saved and stored, usually in a spreadsheet or database.

Mobile technology
- Mobile technology is any device that can be transported by the user.
- Mobile devices provide the user with instant access to information via the internet.

Wearable technology
- Wearable technology refers to smart electronic devices that can be worn.
- It includes activity trackers, smart watches and headsets.
- It is a good example of the Internet of Things.

3.5 The use of data, the applications and interaction of data stores, and the benefits and drawbacks of the use of data

3.5.1 Big Data
Big Data is data sets that are so big or complex that traditional data processing software cannot deal with them. Big Data is usually measured in terms of petabytes (1024 terabytes) or exabytes (1024 petabytes). Big Data really is big!

Big Data is about how data is collected, processed and stored. Trends and patterns can be found by analysing Big Data. Little or no stores can interact with Big Data stores. Big Data stores can also interact to form even bigger data stores.

3.5.2 Applications and interaction of data stores

Law enforcement
- ANPR checks the number plate of every vehicle it sees and interacts with the DVLA to check:
  - who is the owner of the vehicle
  - if they have a current driving licence
  - if the car is taxed and insured
  - if the vehicle has a current MOT

Education
- Schools can use data to analyse how well students are doing and how much progress they are making.
- Many colleges and universities offer MOOCs.
- The data and information entered by students as they are completing the course is collected.
- This is processed and analysed to provide students with a grade when they have completed the course.

Shopping
- Retailers capture information and data every time a shopper uses their loyalty card.
- Data can be collected at the checkout or from online shopping baskets.
- This provides details of every product sold. Manufacturers can use this data to target marketing, advertising and special offers.

Lifestyle
- Lifestyle applications include:
  - cars that can automatically call for help
  - solar panels on houses feeding power back into the National Grid
  - connected houses.
- Social media also collects, processes and analyses data and information from users.

3.5.3 The benefits and drawbacks of the use of data

Benefits of using data	Drawbacks of using data
1. Large amounts of data can be found using a range of data stores.	1. It is not always possible to know that the data is correct. If it has been gathered by someone else.
2. Searches can be made to find the specific data required.	2. Errors in the data can have negative impacts on people.
3. Time does not need to be spent collecting new data.	3. It may not be possible to get the specific data required.
4. Data can be shared by teams carrying out the same tasks.	4. Data must be kept up to date, with the data owners being informed when updates are made.
5. A range of different analyses can be carried out on data.	5. Incorrect data can lead to incorrect results. GIGO.
6. Data stores can interact to share data, for example the police and DVLA.	6. Sensitive data must be securely stored with good data-security measures.

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1. The Trinity

Christians believe that there is only one God. The Nicene Creed explains that there is one being - God - experienced as three persons, Father, Son and Holy Spirit, who are all equal and all eternal.

'We believe in one God, the Father, the Almighty...we believe in one Lord Jesus Christ, the only Son of God, eternally begotten of the Father, God from God...begotten not made, of one Being with the father...We believe in the Holy Spirit, the Lord, the giver of life, who proceeds from the Father and the Son'

Oneness of God
Believing in one God is called monotheism. Christians believe this because:
- Teachings in the Old and New Testament of one God
- First of the 10 commandments which are rules about belief and behaviour
- Teachings of the Church as seen in the Creeds

> God the Father helps Christians to understand His power and creativity. He cares and loves his creation.

> God the Holy Spirit helps Christians to understand the presence of God in the world.

> God the Son helps Christians to understand the love of God, through Jesus' life and death.

Christian attitudes
Many Christians find the Trinity a difficult concept but believe in the different aspects of one God. There are some Christian groups that do not accept the Trinity as stated in the creed. They are:
- Church of Latter Day Saints (Mormons) *three separate beings united as one God*
- Jehovah's witnesses *Only one true God, Jesus was created by God and so God's son and Holy Spirit is Gods power.*
- Unitarians *Only one God, Jesus was a man and no difference between God and Holy Spirit.*

How the Trinity is used in belief and worship
- The Nicene Creed is repeated during Eucharist weekly
- Catholics show their belief in the Trinity by crossing themselves when they enter a Church.
- Priests begin their sermons with 'In the name of the Father, and of the Son and of the Holy Spirit'
- Baptisms and marriages are performed in the name of the Trinity

2. Creation
All Christians believe that God was responsible for the creation of the universe.

Christians attitudes
Literalist – Bible is taken word for word
Conservatives – Writers of the Bible were inspired by God and guided by God
Liberals – Bible is a book of words about God but not words of God. The Bible provides a metaphor or symbolism for Christians.

Creation in the New Testament
John's Gospel records creation in the New Testament:
'In the beginning was the Word, and the Word was with God, and the Word was God' (John 1:1)
Meaning everything was made through the Word and that without the Word 'nothing was made'. John identifies the Word with Jesus, the Son, meaning creation was made by the Trinity.

Importance for Christians today
- Beliefs about Gods creation is that they show God's goodness
- God created human beings in his image, meaning that humans occupy a unique place in creation
- Represents the huge responsibility given to humans to care for God's creation (Stewardship)

Genesis 1	Genesis 2 & 3
Day 1 – Created heaven and earth, light and day Day 2 – separated the earth from the sky Day 3 – created dry land, plants and trees Day 4 – created sun, moon and stars Day 5 – created fish and birds Day 6 – created animals and humans	- God created the heavens and the earth - Formed man from dust and breathed life into him - Made trees and the Garden of Eden - Made a companion for Adam from his rib - Ate the forbidden fruit from the Garden and condemned to suffer.

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3. Incarnation

The incarnation is the Christian belief that God became a human being in Jesus. It is believed that due to Adam and Eve's original sin in the Garden of Eden. God and humans could only have a partial relationship. Through the death and resurrection of Jesus, the power of sin was cancelled so it is possible for humans to have a relationship with God and enter heaven. Jesus had two natures, human natures and divine nature. The virgin birth is important as it shows Jesus as the Son of God, if Jesus had been conceived through sex and not the Holy Spirit then Jesus was not incarnate, just a man.

Biblical basis

Matthews Gospel – Talks of the virgin birth and the birth of Jesus
Luke's Gospel – Talks of the visit from Angel Gabriel and the story of Shepherds informed of the birth of Jesus
John's Gospel – identifies Jesus as the Word of God. He firstly refers to Jesus as the creator of everything and light and life of the world. John continues clearly references Jesus as God in human form: the incarnation:

'The Word became flesh and made his dwelling among us. We have seen his glory, the glory of One and Only who came from the Father full of grace and truth' (John 1:14)

The importance and significance of the incarnation

- It shows that God cared so much about the world that he send his Son to show humans what God is like and to teach how to live
- It is the basis of Christian faith
- In Jesus, Christians can see what God is like
- Through the incarnation, God began the process of salvation from sin

Christian Beliefs

5. The nature of salvation

Sin is an action that breaks God's law. Sin makes it difficult to have a relationship with God. Sin can be original sin (inherited from Adam and Eve) or personal sin (consequence of a persons actions). Many Christians believe that those who die with unforgiven sin will not be able to enter heaven.
Salvation means being saved from sin. This is essential to have a relationship with God while on earth to achieve a place in heaven.

Role of Jesus in salvation

When Jesus died on the cross, his death paid for human sins and gave people the chance of salvation. When people believe in Jesus they believe that they receive God's grace, which helps them to lead a good Christian life.
'For God did not send his Son into the world to condemn the world, but to save the world through him' (John 3:17)
Christians sometimes use the term atonement to describe the role of Jesus. Atonement means reconciliation between humans and God. Christians can receive the salvation offered by Jesus' death by:
- Receiving the sacrament of baptism and confirmation
- Receiving the sacrament of the Eucharist
- Leading a Christian life

Why is salvation from sin important to Christians?
- Without salvation a persons sin can prevent them from a relationship with God and send them to hell or purgatory after death
- Salvation is the only way to eternal life
- Salvation from sin was the purpose of the life, death and resurrection of Jesus.

Different Christians understanding of atonement

Roman Catholic view	Evangelical Protestant view	Liberal Protestant view
Jesus sacrificed his life in an act of love to show his fathers love for humanity. Salvation comes from receiving the sacraments.	'Penal substitution theory' - God's justice meant that he needed to punish human sin but Jesus acted as a substitute for us. Salvation comes through faith in Jesus as the saviour	Jesus bought about atonement by acting as a moral example for humanity, through his teaching and life. Salvation comes through living the Christian life and following the teachings/example of Jesus

4. The last days of Jesus' life

Differences in the records of the Gospels

- Johns Gospel claims that Jesus' body was anointed with spices before it was placed inside the tomb.
- Matthews gospel claims that there was a violent earthquake on the Sunday morning, an angel came and rolled the stone away from the tomb entrance.
- Matthew claims that the guards of the tomb were paid to say that the disciples had stolen the body
- Johns Gospel claims that Mary Magdalene found the tomb empty. She then met Jesus and mistook him for a gardener.

The importance of these events in understanding the purpose of the life of Jesus Christ

- The Last Supper is the basis of the Eucharist, the most important form of Christian worship
- Christians believe that Jesus' death brought about salvation from sin
- The resurrection is the basis of the Christian belief in life after death and the promise that death is not the end.
- The ascension reminds Christians that Jesus has gone to heaven to prepare a place for them so they don't fear death.

The Last Supper	The night before his crucifixion (Maundy Thursday) Jesus shared a meal with his disciples. Jesus broke bread and drank wine and gave instruction to do this in remembrance of him. *'Then he too the cup, gave thanks and offered it to them, saying, 'Drink from it, all of you. This is the new covenant in my blood which is poured out for you.'* (Luke 22:20)
The betrayal and arrest	Judas handed Jesus over to the Roman army for silver. There was a fight between the disciples and the chief priests who came to arrest him. Jesus ordered there to be no violence and was arrested.
The trial	Jesus was taken to trial who condemned him for claiming to be 'the Christ, the son of God', which they regarded as blasphemy. Pontius Pilate offered the release of a prisoner, the crowd chose another so Jesus was condemned to crucifixion, the soldiers laid a crown of thorns on his head and mocked him. The disciples ran away, only the women followers stayed by Jesus.
The crucifixion	Jesus and Simon of Cyrene carried the cross and Jesus was crucified on it on Friday. Jesus was taunted by the bystanders. The crucifixion lasted over 3 hours before Jesus died in agony.
The resurrection	Early on the Sunday morning, women went to anoint the body with spices. When they entered the tomb it was empty. The women were then visited by two men who told them that Jesus had risen which they passed onto the disciples. Jesus then appeared to the disciples.
The ascension	St Luke records that 40 days after the resurrection, Jesus told the remaining disciples to stay and receive the Holy Spirit then he was taken up from them into a cloud and two men in white appeared to tell them that Jesus had been taken into heaven (Acts 1:4-11)

Christian Beliefs

6. Christian eschatology

Resurrection of the body
Some Christians believe that when people die their soul remains in the grave until the time when God will end the world. This is known as the Last Day, which will follow the Second Coming of Jesus. At this time, the dead will be raised and both the living and the dead will be given resurrection bodies. Everyone will appear in front of God for the final judgment. Some believe that those who have repented their sins will go to heaven. All others will go to hell as they have rejected God's love. Many believe this because of Jesus' body which physically rose from the dead.

Immortality of the soul
Many Christians believe that people are made of body and soul. They believe that the soul is non-material and immortal. They believe that when the body dies, the soul leaves the body to live with God. They believe in this because after the ascension, Jesus became a spirit and went to the spirit world.

Purgatory
Catholic Christians believe that purgatory is the place where those Christians who have died with unforgiven sins go to be purified of their sins so that they can go to heaven.

Heaven and hell
All Christians believe in heaven as a perfect place in the company of God. There are different attitudes about heaven and hell amongst Christians:
- Most Christians believe that all Christians will eventually go to heaven and that good followers of any religion may go to heaven
- Some Christians believe that only good Christians will go to heaven but bad Christians and everyone else will go to hell
- Some believe that all good people go to heaven whatever they believe
- Other Christians believe that there is no hell, only levels of heaven

What does the Bible say about life after death?
A major Bible teaching on life after death comes from St Paul in 2 Corinthians 5:1-10, where he says:
- Christians know that if their body is destroyed they will have a non-physical home in heaven
- Christians long to be in heaven which is their goal
- Christians do all they can to please God on earth
- They do this as they know that everyone will appear before God to be judged on the good or bad they have done.

Why are these teachings important to Christians today
- Christians will try to live a good life (Parable of the sheep and the goats)
- Christians will seek salvation/atonement and avoid committing sin
- Give Christians' lives meaning and purpose. They will be rewarded for their good deeds which makes it all worthwhile.

7. Evil and Suffering

Natural evil	Moral evil
Suffering not caused by humans. E.g. earthquakes, floods, volcanoes, tsunamis	Suffering caused by humans. E.g. rape, burglary, murder, war

Why evil raising questions about God
- If God is omnipotent(all-powerful) he must be able to remove suffering from the world
- If God is omnibenevolent (all-good), he must want to remove evil and suffering from the world as they cause such unhappiness
- If God was omniscient (all-knowing), he must have known there would be evil and suffering when he created the world
- If there is evil then God cannot exist or it is not the God we thought it was

8. Responses to evil and suffering.

Biblical responses	- There is no point in worrying about evil and suffering because we will never understand Gods reasons for it - Job remained faithful to God even though he was tested by the devil and rewarded by God for his steadfast faith. -Psalms teach that suffering is intended to be part of life and show many examples of good religious people who have suffered.
Theoretical responses	- God created humans with free will and humans have made the choices for themselves - Life is a preparation for paradise, to improve their souls they need to face suffering (Vale of soul making) - Good can come out of evil
Practical responses	- Jesus showed a practical response to suffering as he healed the sick, fed the hungry, challenged those who were evil and even raised the dead. - Pray for those who suffer - Offer practical help for those who suffer e.g. become doctors, nurses, social workers, charity workers etc. - Christian churches organise food banks, campaigns and charity groups.

Christian Crime and Punishment

1. Justice
The Nature of Justice
Justice means rewarding the good and punishing the bad, making sure that what is right is what happens in society. The way to make sure there is justice in society is to have laws which organise the behaviour of individuals and to protect the weak from the strong.

Non-Religious attitudes to Justice
Atheists and Humanists believe that justice is important because justice makes sure that:
-People are rewarded for their labour: People would not work if they weren't sure that they would be paid and people would not make things if others could just take them away)
 The weak are protected from the strong (if there were no laws on stealing, murder and rape life would be horrible!).
-Humanist apply the Golden Rule "do as you would have others do to you", therefore treat everybody with respect and humanly.

Why is Justice important for Christians?
-Christians believe God is Just and requires his people to act justly too. "And what does the Lord require of you? To act justly and to love mercy and to walk humbly with your God" (Micah 6:8)
-Christians therefore support and uphold the justice system. They also see justice as being more than punishment, it is about mercy as well.

Why Christians believe Justice is important for the victim
-The victims can be reassured that the person who has hurt them will be punished. fairly
-The person who hurt them will be unable to hurt others in the same way, which may bring them comfort.
-Justice is an important step towards achieving closure.
-For Christians who are victims, the bible teaches them to avoid revenge and instead overcome evil with good and try to forgive those at fault, they have to trust in God to avenge them justly.

2. Crime
The Nature of Crime
A crime is an act against the law. In the UK, laws are made either by Parliament or by judges. Types of crime include:
- Violent Crime - Ranges from minor assaults to murder.
- Cyber Crime - which is a crime committed using the internet and involves such crimes as hacking people's bank accounts to steal money from them.
 Some crimes are seen as more serious than other types of crimes.

Causes of Crime
-Poverty – Many people convicted of shoplifting were stealing it to feed themselves or their families.
-Upbringing – In a survey from 2011, 24% of people stated they had been in car at some point. 29% of prisoners had experienced abuse.
-Drugs – Some research studies have found that a lot of acquisitive crimes (crimes where the criminal wants to acquire someone else's property, is committed by users of heroin and crack cocaine.
-Low Self Esteem - Criminals in prison for drug offences and those with extensive criminal histories were found to have significantly lower self-esteem than the average person.
-Hate – Sometimes people commit criminal acts out of hate because of prejudice.
-- Mental Illness - Crime is committed sometimes when someone's judgement is affected by their mental health.
-Civil Disobedience - Crime happens when some people disobey laws they think are unfair.
-Boredom – Some people commit crime because they have nothing else to do.

Christian Attitudes to Crime
Christians believe it is wrong to commit crimes and there are serious consequences for society if crime is left unpunished, but revenge isn't the right response to crime. The bible teaches (parable to the Adulterous Woman), that love and understanding should be shown where crime is involved. Although Christians support the use of imprisonment, many believe in helping to rehabilitate criminals so they can achieve a crime free life,. Many Christians will support groups who offer support to criminals when released from prison e.g. Prison Fellowship and Street Pastors.

3. Christian Attitudes to good, evil and suffering
Many Christians believe the word good means acting correctly in accordance with God's will. The bible teaches that god should be done discreetly.

"When you give to the needy, do not let your left hand know what your right hand is doing, so that your giving may be in secret. Then your father, who sees what is done in secret, will reward you" (Matthew 6:3-4)

Bad actions are those which go against God and are immoral, God will always judge people by their actions.

"Those who have done good will rise to live, and those who have done evil will rise to be condemned" (John 5:29)

Christians believe evil is an abuse of free will, which God gave all humans.

Non-Religious attitudes to Evil and Suffering
Many atheists and humanists believe that a good God would have designed a world without natural evils. They cannot believe in a God that would create such horrible diseases, and believe that evil and suffering are either the fault of humans misusing their free will or the fault of accidental nature. non=Religious philosophers express the problem like this:
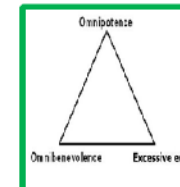
- If God is omnipotent (all-powerful), he must be able to remove evil and suffering from the world
- If God is omnibenevolent (all-good/loving), he must want to remove evil and suffering from the world
- It follows, that if God exists, there should be no evil or suffering in the world.

Christian answer to why people suffer
Christians would say there is no easy answer as to why people suffer, many Christians themselves suffering themselves. Christians try to model God's love and help those who are suffering, empathising with the situation, therefore its more important how a Christian responds than trying to explain why suffering happens (parable of the sheep and the goats).
For I was hungry and you gave me something to eat, I was thirsty and you gave me something to drink, I was a stranger and you invited me in, I needed clothes and you clothed me, I was sick and you looked after me, I was in prison and you came to visit me..... Whatever you did for one of the least of these brothers and sisters of mine, you did for me"
(Matthew 25:35-36, 40).

4. Attitudes to Punishment
The Nature of Punishment
Punishment is a penalty inflicted on an offender for breaking the law. Different types of punishment include:
- **Imprisonment**: Courts can take away the offender's freedom and send them to prison for a fixed period of time.
- **Suspended sentence**: Courts can impose a term of imprisonment and then order that they will not be sent to prison as long as they do not reoffend
- **Community Service Order**: Offender is required to do unpaid work in the community and to remain in contact with their probation officer.
- **Fine**: A monetary penalty
- **Compensation Order**: Order the offender to pay the victim compensation for personal injury, loss or damage
- **Restitution Order**: Forces the offender to return anything they gained by committing the crime
- **Hospital order**: People with mental health problems can be detained in a secure hospital.

Christian Teachings about Punishment
There are different views amongst Christians about how and why criminals are punished, for some punishment should be retribution, for others its about justice and for others its about being humanitarians, as well as punishment the criminal should be helped to change there ways and become a better person. Many Christians think this is more inline with Jesus' teachings on mercy. The bible highlights the need for justice and that punishments should always be fair.
Anyone who sets aside one of the least of these commands and teaches others accordingly will be called least in the kingdom of heaven".
(Matthew 5:19)

You have heard it said, "Eye for an eye, and tooth for tooth", but I tell you, do not resist an evil person. If anyone slaps you on the right cheek, turn to them the other cheek also". (Matthew 5: 38-39)

Christians believe in justice and that God will judge based on his intimate knowledge of a person.
Christians believe society has just laws and that there must be just and fair punishments to support these laws. For someone to be found guilty there must be a fair trial.

Why punishment can be regarded as Justice
Punishment can be seen as justice because part of justice is making sure that the good are rewarded and the lawbreakers are punished. Some people, especially victims of crime, regard punishment as a form of justice:
Retributive Justice - A theory of justice which considers that punishment should be proportionate to the crime. This is not revenge like 'an eye for an eye'.In other words, the severity of punishment must reflect the severity of the crime.
Why punishment might be needed in society
Imagine what life would be like if there were no laws such as driving on one side of the road or laws for murder or rape. If society needs laws, it also needs punishment in order to make sure that all members of society obey those laws and that the rest of society are protected from those who break the laws.

Christian Crime and Punishment

The aims of punishment
The main aim of punishment is to try to make sure that everyone obeys the law, but there are some other aims:
- To protect law-abiding members of society from the lawbreakers
- The deter law-abiding citizens from committing crimes
- To reform and rehabilitate criminals so that they do not break the law in the future
- To make criminals pay for their actions and give the victims of crime a sense of retribution

Retribution	Retribution is the theory that criminals should pay for their crimes. Many people think this should be the main reason for punishment because: - It makes criminals pay for their crimes in proportion to the severity of the crimes they have committed. - It makes criminals suffer for what they have done wrong. Criminals make their victims suffer, so the criminals should also suffer - It actually punishes the criminal. The dictionary definition of punish is to 'make an offender suffer for what they have done', and this is exactly what retribution does.
Deterrence	Deterrence is the theory that punishment should put people off committing crime. Many people think that deterrence should be the main reason for punishment because the main aim of punishment is to stop people from committing crimes. The idea of deterrent punishment is that punishment should be so severe that no one will dare commit crimes. - If someone knows they will have their hand cut off if they are caught stealing, then they will not steal - If people know that they will be executed if they are found guilty, they will not murder.
Reformation	Reformation is the theory that criminals should be taught not to commit crimes again. - Many people believe that the only way to stop crime is to reform the criminals so that they will become honest law-abiding citizens who will not want to commit crimes again - Many people believe that most criminals commit crimes because of how they have been brought up and need to be taught how to live a life without crime. - Reformation punishment often involve giving criminals education and qualifications so that they can find a job
Protection	Protection is the theory that punishment should protect society from criminals and their activities. Many people think: - Capital punishment is a good punishment for murderers and terrorists because they are dead and cannot threaten people - Long prison sentences are a good m punishment for people as they keep them out of society - Community service can be a good punishment for hooligans and vandals because it keeps them off the streets

Christian attitudes to the aims of punishment
In the old testament punishment could be severe but the new testament focuses on forgiveness and helping sinners come back to the right way of living, because anyone could be tempted to sin. Elizabeth Fry a C18th prison reformer said "Punishment is not for revenge but to lessen crime and reform the criminal".

5. Forgiveness

The Nature of Forgiveness
Forgiveness is a conscious, deliberate decision on the part of a victim to release the feelings of resentment or vengeance they have towards a person who has harmed them.

Christian beliefs about forgiveness
A core Christian belief is that Jesus died in order that everybody can receive God's forgiveness, if they truly repent. God's nature is forgiving and therefore Christians believe they should be too. The bible teaches that people should forgive their enemies and those who hurt them as shown in the Lord's Prayer.

Why and how offenders are forgiven by the community
At any given time, there are around 65,000 people in prison and 60% of prisoners reoffend within a year of being released back into society. The community needs to forgive offenders and help them to **reintegrate** into law-abiding society so they feel they are apart of it and will not need to return to a life of crime.

There are examples of business owners and charities who work with offenders to help bring them back into the community.
Business - Timpson (the key-cutting and shoe repair business) goes into prisons and offers training workshops and starts employing prisoners on day-release schemes. In 12 years, only 3 people have reoffended.
Charities - Nacro offers information and advice to ex-offenders, serving prisoners, families and friends through a helpline

Without support ex-offenders might have difficulty integrating into the community and might resume their criminals activities.

Restorative Justice
Restorative justice gives victims of crime a chance to explain to the offender how they have been affected by the crime. It is important for criminals because:
- It makes them realise the effects of their crime
- It brings them face to face with their victims
- It makes them realise that actions can have terrible consequences

Christian attitudes towards Restorative Justice
Restorative Justice is important for criminals because it helps them to take responsibility for their actions and repair the harm caused. Jesus taught that it is very important to forgive and be reconciled with people who offend (Sermon on the Mount). Many Christian organisations are involved in trying to reform the justice system and use restorative justice to help both victims and criminals e.g. Prison Fellowship has a programme called Sycamore Tree which teaches prisoners about the principles of restorative justice.

6. Treatment of Criminals

Human Rights
The Universal Declaration of Human Rights was proclaimed by the United Nations in 1948. It set out fundamental human rights to be universally protected which all members of the United Nations agreed to. These rights include:
- Freedom from torture and degrading treatment
- The right to liberty - people are free to do anything that is not against the law
- The right to a fair trial - trials are made in public and judgements are made by impartial people
- The right to not be punished for something that was not a crime when you did it
- Freedom of thought, conscience and religion

Christian attitudes to the treatment of criminals
The bible teaches that laws are needed for society to run smoothly and peacefully and punishing people who break the law is part of justice. Jesus also teaches the importance of treating prisoners kindly and that visiting prisoners is one of the actions of the righteous and will be rewarded in heaven. The bible also teaches that Christians should speak up for the destitute and that everyone should be judged fairly, which is reflected in the UK criminal justice system "innocent until proven guilty".

Christianity and the use of torture
Christians believe in human rights, therefore most would agree that torture is wrong and should be opposed, however in extreme situations some Christians might say torture is necessary e.g. if it saves the lives of many from a terrorist act.

Christianity and Fair Trial
Christians recognise that society needs a justice system but every accused person must have access to a fair trial and a trial by jury, so convictions are based on evidence.

Humanist and Atheist Attitudes
Humanists believe that criminals should be treated justly and humanely as this helps to ensure that innocent suspects are treated this way too.
Humanists have always been in favour of the Human Rights and are supporters of the United Nations Declaration of Human Rights. Most atheists would agree with the Humanist attitudes, but some atheists think that convicted criminals should not be able to use human rights legislation for such things as stopping them from being deported as it would split them from their spouse and children or to allow them to vote while in prison. Such atheists are also likely to approve of government agencies using torture to prevent terrorist attacks.

7. The Death Penalty

The Nature of Purpose of Capital Punishment
Capital Punishment is punishment which takes away the criminals life. There are several methods of Capital Punishment still in use around the world, such as lethal injection, electrocution, hanging, firing squad, stoning and decapitation (cutting off someone's head).

102 countries around the world have abolished the death penalty for all crimes, and was abolished in the UK in 1970. Seven have abolished it but retain it for special circumstances. The USA, Japan and Singapore are the only countries to retain it. These countries believe that it's purpose is to deter people from committing murder, to protect society from dangerous people and to act as retribution for those who have taken a life.

There is always a risk innocent people may be wrongfully convicted and therefore executed and the death penalty doesn't give the chance for a criminal to reform.

Christian attitudes and teachings about Capital Punishment

There are Old testament teachings that support the death penalty, sending a clear message to society as well as punishing the criminal.
"Whoever sheds human blood, by humans shall their blood be shed" (Genesis 9:6).
"Anyone who strikes a person with a fatal blow is to be put to death" (Exodus 21:12).
However what is the aim of punishment? In the New testament Jesus taught forgiveness "Love your enemies and pray for those who persecute you" (Matthew 5:38-39).
This has caused debate amongst Christians just like in society about the use of the death penalty or not.

Amnesty Internationals say capital punishment is cruel, inhuman and degrading and campaigns against its use. However some people believe situations ethics should be applied.

Humanist and Atheist attitudes to Capital Punishment

Most Humanists disagree with Capital Punishment because…	Some Atheists would agree with Capital Punishment because…
Murdered who know they are going to be killed if caught are more likely to kill more people to avoid being caught.	If people know that they will lose their life if they murder someone, it will act as a deterrent and there will be fewer murders.
Human life is the most important thing there is, so no one has the right to take it. Executing murderers demonstrates that society does not regard life as important.	Human life is the most important thing there is, and the value of human life can only be shown by giving those who take human life the worst possible punishment, which is the death penalty.

The Ten Obligatory Acts

Sunni Muslims refer to their faith as 'the house of Islam' by which they mean their home. A house needs foundations and for Muslims, this is the Qur'an. The 'House of Islam' is supported by the 5 pillars. The Ten Obligatory Acts were developed by the Twelve Imams of Shi'a Islam.

	Act	Description
1	Salah	Praying 5 times a day
2	Sawm	Fasting during Ramadan
3	Hajj	Pilgrimage to Mecca
4	Zakah	Alms given
5	Khums	Tax set at 20% for causes decided by Shia leaders
6	Jihad	Striving in the way of Allah
7	Amr bil ma'roof	Encouraging good actions
8	Nahi anil munkar	Discouraging evil actions
9	Tawalla	Association with good people eg those who follow the ahl al -bayt
10	Tabarra	Dissociation with evil people

Shi'a Muslims believe that these Acts are important because:
- The Acts were established by Muhammad, Ali and the Imams
- Allah will punish those who do not fulfil the acts
- By observing the four practical pillars, a Muslim is following the example of the Prophet Muhammad, following his example if the way to lead a good Muslim life
- By fulfilling the acts a Shi'a Muslim feels confident that on the Day of Judgement, Allah will allow him or her into heaven

Shahadah –

'There is no God but Allah and Muhammad is the Prophet of Allah'

Shahadah means 'to observe, witness, testify', The first part shows the belief of Tawhid, that there is only one God. The second element shows the belief in Risalah. It confirms Muhammad's humanity and that he was a servant of Allah.

Faithful Muslims will repeat this statement thousands of times during their lifetime. In particular they will:
- Repeat it several times each day in betweengetting up in the morning and going to bed at night
- Whisper it into the ear of their new-born baby
- Teach it as a matter of urgency to each of their children
- Hope and pray that it will be the last words to cross their lips before they die
- When someone reverts to Islam

The Shahadah is important because....
- It's a promise that they have made and so reminds Muslims of the commitment they have made of Islam.
- There are no ceremonies like baptism or confirmation in Islam. All a revert needs to do is recite the Shahadah in front of Muslim witnesses to be a Muslim
- It highlights the belief that Allah and Muhammad must come before anything else in their lives.
- Shows that Islam rejects Christian beliefs about Jesus being the Son of God - Muhammad is nothing more than a prophet

Shahadah in Shi'a Islam

Just like in Sunni Islam, Shi'a Muslims recite the Shahadah in Arabic to revert to Islam. However there are two important differences:
- Shi'as add "And I bear witness that Ali is a friend of Muhammad" at the end of the Shahadah to show their belief that Ali is the leader of the believers along with God and Muhammad.
- Shahadah is not one of the Ten Obligatory Acts for Shi'as, whereas it is the first of the five pillars for Sunnis.

Living the Muslim life

Salah – 2nd pillar

History of Salah
Salah is the five times a day ritual prayer of Islam. Salah as it is known today began with Muhammad. According to the Muslim biographies, Muhammad began a system of morning and evening prayers. By 628CE the ritual prayer of salah was established at five times a day, with Muhammad indicating how to perform the ritual on the basis of revelations as recorded in the Qur'an.

'Set up regular prayers; for such prayers are enjoined on believers at stated times (Surah 4:103)

Prayer times: To follow the second pillar of Islam (salah). Sunni Muslims are required to pray 5 times a day. The prayers take place at set times, and they are worked out from the times of sunrise to sunset. This means that they will change slightly each day.

Fajr	Asr	Isha
Just before sunrise	Afternoon	Night
Zuhr	Maghrib	
Just after midday	Just after sunset	
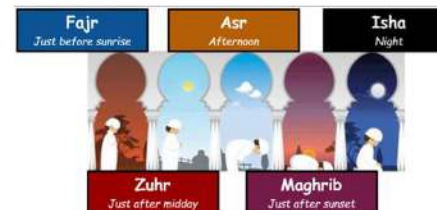
Wudu: It is important that Muslims are spiritually clean before they pray. This is achieved by ritual washing. Mosques have two special rooms for washing, one for men and one for women.

"You who believe, when you are about to pray, wash your faces and your hands up to the elbows, wipe your heads wash your feet up to the ankles and, if required was your whole body." Qur'an 5:6

Direction: All mosques have a mihrab, this is a semi-circular niche built into the qibla wall. This shows the exact direction or Makkah from the mosque. Muslims face this in order to pray.

In the mosque: Prayers are led by an Imam, who is positioned at the front of the congregation. Men and women pray in separate spaces. The voice of the imam is often broadcast in the women's prayer room at the same time, so that he can lead their prayers along with the men's.

Salah at home: Muslims are allowed to pray at home. They must perform wudu before prayer but they do not need a special room in their house to pray. Muslims will use a prayer mat, which they position so it is facing Makkah, in the same way as it would in a mosque. Muslims women can often find it useful to pray at home, especially if they have children to look after.

Jummah prayer: The midday prayer every Friday is considered to be special, and it is called the Jummah prayer. Once the prayer is complete, the imam will deliver a sermon (Khutba) that reminds Muslims of their obligations and duties to God. Although Friday is not a day of rest, Muslims must leave their work or close their business in order to attend Jummah prayer, and then return to work afterwards. All male Muslims are expected to attend a mosque for this prayer, and woman may do so if they wish.

The Rak'ah: The daily prayers are made up of a number of rak'ah, this is a set sequence of actions and recitations.

Private prayer:
- Du'a is not part of a formal or set prayer and can be offered at any time, place and be any length.
- Recitation of the Qur'an. This is read aloud in a soft melodious manner to reach and touch the heart as a reminder of the words of Allah. The Qur'an can be read home, the mosque or anywhere else and Muslims will usually then reflect and meditate on its meaning.
- Subhah (prayer beads) to utter forms of praise and glorification of Allah, to seek protection or forgiveness. Usually after each prayer Muslims remain seated and the subhah as an aid to say subhanallah (Glory be to Allah), Al-humduli-llah (Thanks be to Allah), and Allahu Akbar (God is great) 33 times each.

Significance of salah
- Prayer has its own importance as one of the Five Pillars. However, for Muslims it is more than that, it is what God has commanded them to do. Prayer creates a greater awareness of God, which in turn motivates them to do God's will.
- Prayer also unites Muslims worldwide because they all pray in the same way. A Muslim can go into any mosque anywhere in the world and be able to participate with fellow Muslims. In addition, reciting from the Qur'an during the prayers reminds Muslims of its importance.
- The actions of bowing and prostrating remind them that God is greater and more important than they are.

Similarities between Christian and Muslim worship	Differences between Christian and Muslim worship
- Weekly worship includes a sermon - Worship involves the whole congregation saying a prayer - Involve praying for the needs of others	- In Islam men and women worship separately - Face Makkah for worship - Must perform wudu before worship.

Living the Muslim life

Zakah & Khums – 4th pillar

Zakah: Muslims believe that wealth is a blessing from Allah and should be used responsibly. Both Shi'a and Sunni Muslims believe it is their duty to give part of their wealth to those in need. Zakah is a pillar of Islam and is compulsory for all Muslims and means they have to pay 2.5% of their wealth to charitable causes. Zakah is calculated based on a person's income, savings and jewellery. Zakah only applies to people who have more than a certain amount, known as Nisab. Muslims keep anything below the value of Nisab for themselves and pay Zakah on everything above the value of Nisab. The Nisab is set at approximately the value of 87 grams of gold, or 63 grams of silver. Muslims pay Zakah once a year.

In Islamic countries, Muslims pay Zakah to the government, whereas in non-Islamic countries, Muslims pay it to the mosque. In both cases the contributions are kept anonymous and people aren't told what their money is spent on.

Khums: Khums is calculated purely on a person's savings and makes up 20% of what someone has saved. In the past, Shi'a Muslims paid Khums to the Imam, the Muslim leader after Muhammad and starting with Ali, who Shi'a's believe was chosen by Muhammad to lead after his death. Shi'a Muslims believe that the final Imam – the 12th – has not yet been sent by Allah and therefore they pay Khums to their leader, the Grand Ayatollah. Khums is only paid by Shi'a Muslims and in addition to Zakah once a year.

Qur'an:
- Zakah and Khums allow Muslims to serve others and Muhammad said "the upper hand if better than the lower hand," meaning that it is more important to give than to receive.
- Muslims believe Zakah is a form of worship and the Qur'an states; "pay the prescribed alms so that you may be given mercy."
- All acts of charity will be rewarded by Allah: "Pay the prescribed alms and lend God a good loan. Whatever you store up you will find with God, better and with greater Reward."
- Failure to use wealth in the right way can lead to serious consequences: "If you use your wealth to bar people from the path of God, this will be a source of intense regret and you will be herded towards hell."

Benefits of Zakah and Khums: Zakah and Khums are seen as purifying to Muslims. Paying it means that the heart of the person is purified from selfishness and greed. Through them, wealth is also distributed to benefit the whole community and everyone in the Ummah (Muslims community). After paying Zakat or Khums, the rest of a Muslim's wealth is considered to be blessed by Allah.

One of the meanings of Islam is peace and it is important for Muslims to create a harmonious society that does not forget the less fortunate. Zakah and Khums improve the quality of life for the less fortunate, for example providing access to education.

Zakah can be used for relieving poverty, helping the homeless, helping those in debt, providing comfort for travellers and paying ransom for prisoners of war.

Sawm – 3rd pillar

Ramadan: Ramadan is the ninth month of the Muslim Year, but that does not mean that it happens in September. Muslims traditionally follow a lunar calendar which is slightly shorter than the solar year, it means that Ramadan will be slightly earlier (by about ten days) in the Western calendar every year.

Ramadan begins when the new moon is sighted in the night sky. Fasting is compulsory during daylight hours and so Muslims will get up while it is still dark so they can eat. This first meal of the day is known as sehri and must be finished before the first prayer, which is called Fajr and it is said just before the sun comes up

Fasting: During daylight hours, Muslims are not allowed to eat, drink, smoke or have sex. It is a month when they try to live especially good lives, so they will often try to give up any bad habits and stop doing things they know are wrong. Ramadan is believed to be a holy month when the Devil is not allowed to tempt human beings. This means that Muslims have no excuse to act badly. Even if Muslims don't usually say the five daily prayers, they often make the effort to do so during Ramadan – Fajr (just before sunrise), Zuhr (after midday), Asr (mid afternoon), Maghrib (just after sunset) and Isha (when it is completely dark).

Just after sunset, the Maghrib prayer marks the end of the fast and Muslims can finally eat. This meal is known as Iftar. It is traditional to break the fast with water and dates because that is what Muhammad (pbuh) used to do. Many people like to gather at home or at a mosque to share the meal together.

> O ye who believe! Fasting is prescribed to you as it was prescribed to those before you that ye may learn self-restraint for a fixed number of days' (Surah 2:183)

Exceptions: All adult Muslims have the duty to fast but they are excused if they are:
- physically or mentally ill
- very elderly
- travelling
- a pregnant woman
- a menstruating woman or a breast-feeding mother

Of these, the elderly, the ill and the breast-feeding mothers should pay for a poor person to be fed for all the days they are not fasting. Travellers should make up the days they have missed at a later date. Some children, fast for a shorter length of time to help train themselves.

Charity: One of the positive elements to feeling hungry during the day is that is serves as a reminder that the poor feel that way all the time if they cannot afford to eat properly. This greater awareness inspires many Muslims to find ways to help the poor. This may include inviting the poor to share their meal that breaks the fast at sunset. Many Muslims choose to pay Zakah during Ramadan.

Night of Power: Ramadan is also important because it is the month in which the Qur'an was revealed to Muhammad on the Night of Power or Lyilat ul-Qadr in Arabic. It is not known exactly on which day this happened, but it is believed to have been during the last ten days of the month and on one of the odd-numbered dates, so it is celebrated on the 27th. Some Muslims will spend all ten days living in seclusion or staying up all night to read the Qur'an to remember Muhammad.

The Nights importance is explained in the Qur'an:
"What will explain to you what the Night of Glory is? The Night of Glory is better than a thousand months." Qur'an 97:2-3. This means that observing the Night of Power gives Muslims the benefits of worshipping for a thousand months. Because of this, Muslims try to keep awake throughout the night on each of the possible dates, devoting themselves to prayers and studying the Qur'an.

Beliefs about the Night of Power:
- Prayers on that night are the best prayers
- Prayer in the mosque on the Night of Power can bring about forgiveness of all a person's sins
- There is a tradition that reciting Surahs 29 & 30 during the 23rd night of Ramadan will ensure admission into paradise
- Praying on this night brings religious insight
- Meditating and retreating to the mosque for the last 10 days of Ramadan can bring a special closeness to and relationship with Allah

Living the Muslim life

Hajj – 5th pillar

A pilgrimage is a journey made for religious reasons. Hajj, the fifth pillar of Islam is a pilgrimage to Makkah in Saudi Arabia that Muslims should make once in their lifetime as longs as they are healthy and wealthy enough to do so. Hajj takes place in the last month of the Islamic calendar. During this time around 3 million Muslims take part in pilgrimage.

Hajj starts and ends at the ka'aba. This is a cube shaped building built by the prophet Ibrahim as a shrine to God. Over the years the people of Makkah (who worshipped many gods), used the Ka'aba to store their idols. However, the prophet Muhammad restored it to the worship of God alone.

Pilgrims must be:
- Muslim. Non-Muslims are not allowed
- Of sound mind
- Physically fit and able to take the strains and rigour of the journey
- In a position to provide for any loved ones they have left behind
- Able to pay for Hajj without having to resort to dishonest ways of raising money

'That they may witness the benefits appointed, over the cattle which he has provided for them; then eat ye thereof and feed the distressed ones in want. Then let them complete the rites prescribed for them, perform their vows and circumambulate the ancient house' (Surah 22:29)

Significance of Hajj: Hajj has great significance for Muslims. Even though it is a requirement to go on Hajj once in a lifetime, many Muslims go a number of times, especially those who live close to Makkah. Once someone has completed Hajj, they can be referred to as a Hajji.
Hajj is important to Muslims because:
- Reminds Muslims of their faith
- Spiritual transformation
- Unity and equality
- Inner peace
- Forgiveness
- Spiritual self-discipline
- Teaches sincerity and humility
- Become more aware of God

Stage of Ihram	Before Hajj begins, pilgrims enter a sacred state called Ihram. This involves performing ritual washing, praying and putting on Ihram clothing. For men this is two sheets of white cloth that they wrap around their body. The white cloth is a sign of equality and purity. Women wear clothes of a single colour that cover the whole of their body apart from their face.
Tawaf (circling the Ka'bah)	The Ka'bah is an ancient stone building set in the centre of the Grand Mosque in Makkah. Muslims will perform the 'Tawaf' which means walking around the Ka'bah 7 times in an anti-clockwise direction. Preferably running the first three & walking the last four. As they circle they pray 'Here I am Oh Lord, at your service. Praise & blessings to you.' They start their circuit at the corner where the black stone is. If possible they should try to kiss or touch this stone. Although the stone is seen as sacred, the origins of it are unclear. Some believe it is a meteorite; others believe it was given to Adam by God to erase his sin & allow him a path to heaven; others believe it was brought from a nearby mountain by the angel Jibril, or that it came from paradise. The circling symbolises unity- worshipping One God together at that moment.
Safa and Marwa	The Hajj moves on to walk seven times between the hills of Safa and Marwa. During each quarter-mile walk Muslims recite prayers. The walk signifies Hagar's search for water and perseverance before God. Hagar and her son Ishmael were left in the desert by her husband Ibrahim at God's command. Hagar went in search of water, frantically running in between the Mountains 7 times. When she returned Ismail had kicked his heels into the sand and a spring had appeared - provided by God in reward for her persistence. Pilgrims can still visit this spring, at the Zamzam well. There are steps leading down to it, in a chamber under the courtyard of the Sacred Mosque. Many pilgrims drink it, wash with it, and take some of the water home with them.
Arafat & Muzdalifah	The Hajj moves to the Mount of Mercy on the Plain of Arafat where Muhammad preached his last sermon. This is the heart and soul of the Hajj. Pilgrims will stand from midday to sunset reaching out to Allah, feeling His presence and forgiveness. Muslims pray for others when they are at Arafat because they believe that their prayers are more effective there since they are submitting to Allah & are especially close to him. After sunset the Hajj then moves on to Muzdalifah for the evening & night prayers. A rough pebbled plain where pilgrims will rest, eat and collect 49 stones for the following day.
Mina	Pilgrims set out to Mina where they will throw seven stones at each of the three pillars there which represent the devil & temptation. After being cleansed by God at Arafat they want to hit these symbolic pillars of wrong with right actions. The 'stoning of the devil' is followed by the festival of Id ul-Adha (the festival of sacrifice). A sacrifice of a goat or a sheep is made, in memory of when Ibrahim was going to sacrifice his son Ishmael for his love of God.
Return to Makkah	After Id-ul-Adha the Hajjis shave their head as a symbol that they have changed from this pilgrimage. Pilgrims then change back to their normal clothes. This symbolises a fresh start - the state of Ihram is lifted and they can resume normal life. On returning to Mecca Hajjis complete another seven circuits of the Kab'ah before leaving for home.

Topics	I've got it!	Bits and bobs!	Oh dear!	Questions I still have
The Ten Obligatory Acts				
Shahadah				
Salah				
Sawm				
Zakah and Khums				
Hajj				
Jihad				
Celebrations and commemorations				

Jihad

- to struggle or to strive

The prophet Muhammad said that there are two types of Jihad. The concept of Jihad comes from the Qur'an and it is mentioned several times.

Greater jihad is a personal inward struggle of all Muslims to live in line with the teachings of their faith. This means they must observe the Five Pillars of Islam.	Lesser jihad is seen as the outward struggle to defend Islam from threat. In the early days of the faith, this was important when Muslims were being persecuted and they needed to protect their freedom to practise their faith.

Greater Jihad means:
- Struggle to perform all of the five pillars properly
- Struggle to follow the Shari'ah exactly
- Struggle to both discover and follow the perfect example of the Prophet Muhammad
- The struggle to be 'pleasing to Allah' so that one will be allowed into paradise.

Lesser Jihad means:
Having removed the evil from themselves, Muslims can then begin the work of removing evil from society. They should target injustices such as:
  Underdevelopment
- Unfair trading
- Lack of education
  Lack of welfare state
- The gap between rich and poor
Muslims aim to produce a perfect Muslim society before they are in a position to target non-Muslim societies and bring them into Islam.

Different ideas about Jihad:
Some groups like IS and Boko Haram, believe that they have a duty to fight non-muslims so that Islam can dominate the world. They also kidnap and torture people, endorse suicide bombings and teaches that anyone who dies as a martyr will go straight to paradise.

The majority of Muslims believe that this is a wrong interpretation of jihad and that nothing can ever justify terrorism. They would emphasise the importance of peace - which is one of the meanings of the term 'Islam' - and say that lesser jihad does not permit terrorism.

> 'Those who believe, and suffer exile and strive with might and main in God's cause with their goods and their persons, have the highest rank in the sight of God. These are the people who will achieve salvation (Surah 9:20)

Celebrations and commemorations

Id-ul-Adha: festival commemorating the devotion of Ibrahim and Isma'il.	Id-ul Fitr: festival to celebrate the end of Ramadan.
Id-ul-Adha is the festival of sacrifice and commemorates the story of Ibrahim and Isma'il. Ibrahim had a dream in which Allah commanded him to sacrifice his son Isma'il. When Ibrahim to Isma'il about his dream, he agreed to give his life for Allah. When Ibrahim was ready to kill Isma'il, Allah intervened and praised them both for their faith. Id-ul-Adha reminds Muslims that they should give Allah their full devotion and the festival was started by Prophet Muhammad. It is celebrated ten weeks after Id-ul-Fitr and the end of Hajj. Traditionally Muslims sacrifice sheep and cattle (UK Muslims buy Halal meat), in memory of Ibrahim and Isma'il and share the meat with the poor or give to charity. Muslims wear new clothes on Id-ul-Adha and families go to the mosque to offer a special prayer and listen to a sermon. Muslims from all backgrounds hug each other and say "Id Mubarak" which means 'have a blessed Id'. This symbolises that all Muslims are one big community.	Id-ul-Fitr celebrates the end of Ramadan and Muslims express their gratitude to Allah for helping them through a month of fasting and bringing blessings to all Muslims. Prophet Muhammad started off the tradition of celebrating Id-ul-Fitr and Muslims give gifts to family and friends and invite each other to eat a special meal. Muslims wear new clothes and families go to the mosque to offer a special prayer and listen to a sermon. Muslims from all backgrounds hug each other and say "Id Mubarak" which means 'have a blessed Id'. This symbolises that all Muslims are one big community. Each family is expected to give money to charity to show that every member of Muslim society is valued and protected. "Today I have perfected your religion for you, completed My blessing upon you, and chosen as your religion Islam." Surah 5:3
Id-ul-Ghadeer: Shi'a festival commemorating the Prophet Muhammad's choice of Ali as a leader of Muslims.	**Ashura: Shia commemoration of Imam Hussain's martyrdom.**
Id-ul-Ghadeer is a commemoration of the time Muhammad officially declared that Ali was going to be his successor and is therefore only celebrated by Shi'a Muslims, as Sunni Muslims don't believe this was Muhammad's intention. Ghadeer is a pond, where Shi'a Muslims believe Muhammad's decision to appoint Ali as the next leader was made. Id-ul-Ghadeer takes place on the 18th day of the month of Dhu al-Hijjah and Shi'a Muslims fast on this day. They also go to the mosque and listen to poetry being read out. Shi'a Muslims refer to this festival as "the greatest Id." 'Whomsoever's master I am, Ali is also his master. O' God, love those who love him, and be hostile to those who are hostile to him'. (Muhammad)	Ashura takes place on the 10th day of the month of Muharram. It commemorates the anniversary of the martyrdom (being killed for your beliefs) of Prophet Muhammad's grandson, Imam Hussain, who was murdered in Karbala in Iraq. Hussain had refused to accept the leadership of Yazid because he was an oppressive ruler who went against Muhammad's teachings. Yazid forced Hussain, his relatives and companions out of the city of Madinah and sent an army after them into the desert. Hussain was eventually trapped and starved and Yazid's army murdered them all. Shia Muslims commemorate this event by going to the mosque every night, from the 1st day of the month of Muharram until the 10th. Shi'a Muslims wear black to symbolise mourning until 40 days after Ashura, when mourning officially ends. Every year, millions of Muslims visit Karbala to see the shrine of Hussain and many Muslims give blood in memory of Hussain's death.

Possible exam questions:

a) Outline 3 of the Ten Obligatory Acts (3 marks)
a) Outline 3 rules for sawm during Ramadan (3 marks)
a) Outline 3 parts of hajj (3 marks)

b) Explain two reasons why salah is important to Muslims (4 marks)
b) Describe the similarities between Muslim worship and that of another religion (4 marks)
b) Explain two reasons why the Night of Power is important to Muslims (4 marks)

c) Explain two reasons why Zakah is important to Muslims. In your answer you must refer to a source of wisdom and authority (5 marks)
c) Explain two reasons why hajj is important to Muslims. In your answer you must refer to a source of wisdom and authority (5 marks)
c) Explain two reasons why there are different understandings of jihad among Muslims. In your answer you must refer to a source of wisdom and authority (5 marks)

d) 'Religious celebrations cause nothing but trouble'. Evaluate this statement considering arguments for and against. In your answer you should:
Refer to Muslim points of view
Reach a justified conclusion

d) 'The shahadah is the most important of the Five Pillars' Evaluate this statement considering arguments for and against. In your answer you should:
Refer to Muslim points of view
Refer to non-religious points of view and Situation Ethics
Reach a justified conclusion

Living the Muslim life

Year 10 Term 1 Knowledge Organiser Booklet

Key terms and definitions	
Contrast	Difference and variety i.e. Dark against light
Composition	A formal element in art. The placement and arrangement of your artwork and how shapes relate within it. i.e. The layout and positioning of your work
Mark- Making	Different patterns, lines, textures and shapes made with a pencil i.e. scribble, cross- hatching
Proportion	Comparison of size. The relative size of parts of a whole i.e. Are the eyes the right size for the face?
Formal Elements	Formal Elements are parts used to make a piece of art work. The 8 elements are Line, Form, ,Shape, Tone, Pattern, Texture, Colour and Composition
Block colour	Apply one even coat of colour to a surface without any imperfections
Texture	Is a formal element which has an actual surface quality i.e. adding sawdust to paint or creating an illusion of a surface i.e. furry, scratchy etcetera
Shape	Is a formal element in art; it is an enclosed space. Shapes are limited to 2 dimensions which are length and width
Graduated Shading	Shading with a pencil/ pencil to create depth. Where dark gradually turns into light without any imperfections
Guidelines	Creating a series of lines to draw within so everything is the same size i.e. A title in your sketchbook so you can get all your letters the same size
Primary Colour	A group of colours which all other colours are made from: Red , Yellow and Blue
Secondary Colour	A colour resulting from mixing two primary colours together i.e. Red and Yellow = Orange
Blending	Gently bringing together two or more colours to create the softening of lines i.e. shading blue and yellow together to create blue graduating to green graduating to yellow.
Definition	To make something "Stand out" and become obvious
Depth	Creating 3 dimensions by using graduated shading
Form	Creating a drawing of object which has the appearance of length, width & depth i.e. Creating a 3 dimensional effect

Key terms and definitions	
Tone	Is an formal element in art and literally means light and dark

Mixed Media Theme 1 Culture and Civilisation

Culture and Civilisation pose a wealth of artistic reference from across the globe. Traditions, beliefs and faiths are celebrated in many different ways. From the intricacies of Indian Shadow puppets to the decorative Inca tribal carvings on Easter Island to the powerful statues of the terracotta army. Day of the dead, Chinese New Year and Venetian decorative masks festoon festivals. More contemporary culture such as New Wave Punk, Pride and the Notting Hill carnival boast both political and colourful statements. Embracing the theme produce work in two or three dimensions on culture and civilisation

Mixed Media Theme 2 Natural Form

Natural forms has been a recurring theme amongst artists over the centuries. The American painter Georgia O Keefe captured the natural beauty and fluidity of flowers in simple but effective forms. The botanical artist Basilius Besler produced a monumental picture book of plants using copper plate printing to capture and document every detail, Whilst William Morris and William De Morgan produced highly decorative and ornate floral designs for wall papers and fabrics. Antoine Joseph Dezallier d'Argentville and Ernst Haeckel had a passion for shells and crustaceans which were produced in highly detailed etchings tinged with colour washes. Using the theme of Natural Forms produce work in two or three dimensions using and artist of your choice

Year 10 Term 1 Knowledge Organiser Booklet

Key term	Definition	Key term	Definition
Devised Drama	frequently called collective creation - is a method of theatre-making in which the script or performance score originates from collaborative, often improvisatory work by a performing ensemble	**Stimulus / Stimuli**	In a drama, stimuli are resources that are used to establish the context, focus and purpose of the dramatic topic being presented. Materials used as stimuli can be visual or aural in nature and can represent various genres and forms of either Western theatre or theatre traditions from other cultures.
Konstantin Stanislavski	It's very easy to over-simplify the method of Konstantin Stanislavski, one of the greatest and most influential of modern theatre practitioners. The main thing to remember is that he takes the approach that the actors should really inhabit the role that they are playing. So the actor shouldn't only know what lines he needs to say and the motivation for those lines, but also every detail of that character's life offstage as well as onstage. In this way we can establish Stanislavski as a director and practitioner whose productions are naturalistic.	**Units and Objectives**	An objective is the reason for our actions. What are we trying to achieve? Life, people and circumstances constantly put up barriers in our way. Each of these barriers presents us with the objective of getting through them. You shouldn't try to express the meaning of your objective in terms of a noun, always use a verb, eg 'I wish to...' The super-objective is an over-reaching objective, probably linked to the overall outcome in the play. We use the word super-objective to characterise the essential idea, the core, which provided the impetus for the writing of the play. A character's objectives are likely to be stages in the journey towards the super-objective. If that journey is perceived as a clear path to the super objective, then you have your through line.
Naturalism	Naturalism is a movement in European drama and theatre that developed in the late 19th and early 20th centuries. It refers to theatre that attempts to create an illusion of reality through a range of dramatic and theatrical strategies.	**Given Circumstances**	The given circumstances are the information about the character that you start off with and the play as a whole. How old is the character? What's their situation in the play and in relation to the other characters? Are there any notes provided about the play and its characters? Such notes and stage directions may not tell you everything you need to build a character but they are the starting point from which you'll work to examine the other questions
Truth	Stanislavski stated that truth on stage was different from truth in real life. This was an important factor in acting, especially so in realism where the aim of the actor was to create the appearance of reality or 'truth' on stage.	**Improvisation**	Improvisation is a crucial part of the rehearsal process and Stanislavski wanted the actor to reach far into themselves in creating the role. If all the actors in a production took their emotions into the inner circle of attention, it's easy to see that a production could lose cohesion. It's the director's job to keep that cohesion, at the same time as drawing out as much truth in performance as possible from each performer.

Year 10 Term 1 Knowledge Organiser Booklet

Emotion Memory	Is when an actor draws on their experiences in their memory of how they might move when in a particular situation?	**Magic If**	Stanislavski said that the character should answer the question, 'What would I do if I was in this situation?' Also known as the 'magic if', this technique means that the actor puts themselves into the character's situation. This then stimulates the motivation to enable the actor to play the role.
Subtext	The script of a play could be called the text. The subtext is the actual meaning and motivation behind the lines that are spoken and the actions taken. For example, the heroine might say to the hero, "I love you" and we might assume that it is the happy ending fairy tale moment. But the delivery would be very different if she was worried that he was about to walk out on her.	**Tempo rhythm**	Stanislavski felt that an inner and an outer tempo and rhythm were vital if you were to enact movements truthfully and link them to the expression of emotions and feelings. He linked tempo to the speed of an action or feeling and the rhythm to the intensity or depth of the experience.

Year 10 Term 1 Knowledge Organiser Booklet

KNOWLEDGE ORGANISER – PE BTEC Unit 1: Fitness for sport and exercise

Skill related fitness components:

Balance = The ability to maintain your centre of mass over a base of support. Static balance means being balanced without movement. Dynamic balance means staying balanced while moving.

Agility = The ability of a sports performer to quickly and precisely move or change direction without losing their balance.

Coordination = The smooth flow of movement needed to perform a task efficiently and accurately. It often involves being able to use 2 or more body parts together.

Reaction Time = The time taken for a sports performer to respond to a stimuli and the start their response.

Power = The work done in a unit of time. It is the ability to apply a combination of strength and speed. Power = Force (kg) x Distance (m)/time (min or s)

This is expressed as kilogram-metres per min (kgm/min) or kilogram-metres per second (kgm/s)

YOU MUST KNOW THESE DEFINITIONS

Memory Aid
Ben and
Cameron Raced
The Pony

QUICK TASK - MATCH UP THE CLASSIC SPORTING EXAMPLE WITH THE DEFINITION

EXTENSION TASK - HOW WOULD A GAMES PLAYER USE EACH OF THESE COMPONENTS OF FITNESS?

EG A FOOTBALLER, OR A BASKETBALLER??

KNOWLEDGE ORGANISER – PE BTEC Unit 1: Fitness for sport and exercise

Physical related fitness components:

Aerobic endurance = It is the ability of the cardio-respiratory system to efficiently supply nutrients and oxygen to working muscles during sustained physical activity. It is used mainly for low intensity exercise that lasts for a long time.

Muscular strength = The maximum force a muscle or muscle group can produce. (Measured in N or KG)

Muscular endurance = It is the ability of a muscle or group of muscles to keep contracting over a period of time against light to moderate load. It is the ability of the muscles to keep repeating the same action and keep working efficiently.

Flexibility = Having an adequate range of motion in all joints of the body. It is the ability to move a joint through its complete range of movement.

Speed = The ability to perform a movement or cover a distance in a short period of time = distance/time taken. Measured in metres per second.3 types of speed – acceleration (up to 30m), pure speed (upto 60m) and speed endurance (sprints with a short recovery time in between)

Body composition = This is the relative ratio of fat mass to fat-free mass (vital organs, muscle, bone) in the body.

YOU MUST KNOW THESE DEFINITIONS

Memory Aid
An Eagle Made
Money From
Selling
Blackcurrants

QUICK TASK - MATCH UP THE CLASSIC SPORTING EXAMPLE WITH THE DEFINITION

EXTENSION TASK - HOW WOULD A GAMES PLAYER USE EACH OF THESE COMPONENTS OF FITNESS?

EG A FOOTBALLER, OR A BASKETBALLER??

KNOWLEDGE ORGANISER – PE BTEC Unit 1: Fitness for sport and exercise

TRAINING METHODS

Flexibility training:

Firstly active stretching, which is performed independently where the performer applies internal force to stretch and lengthen the muscle. The second is passive stretching, also known as assisted stretching, which requires the help of another person or an object such as a wall. The other person/object applies external force causing the muscle to stretch.

• static: there are two types of static flexibility training.

• Ballistic: this is where the performer makes fast, jerky movements through the complete range of motion, usually in the form of bobbing or bouncing. Ballistic stretching is specific to the movement pattern of the sport/activity to be performed. It needs to be undertaken with care as the technique can cause muscle soreness and strains.

• Proprioceptive Neuromuscular Facilitation (PNF) technique: this is used to develop mobility, strength and flexibility. The technique may be performed with the help of a partner or alternatively by using an immovable object (as resistance to inhibit movement).

Strength, muscular endurance and power training

circuit training: this is where different stations/exercises are used to develop strength, muscular endurance and power. The stations/exercises use different muscle groups to avoid fatigue.

Free weights: = use of barbells or dumb-bells to perform different types of dynamic exercises Resistance machines - push and pull

Use when training for strength (low reps and high loads), use when training for endurance (high reps and low loads)

Training for strength endurance (50-60% 1RM and 20 reps – repetitive movements in very close succession, like in gymnastics) Training for maximum strength (90% 1RM and 6 reps – producing a single movement against a resistance/load), reps, sets, rest period.

• Plyometrics: this type of training develops sport-specific explosive power and strength. It is used by sports performers such as sprinters, hurdlers, and netball, volleyball and basketball players. Plyometric exercises need maximal force as the muscle lengthens (eccentric action) before an immediate maximal force as the muscle shortens (concentric action). Types of exercises include lunging, bounding, incline press-ups, barrier hopping and jumping. This type of training needs to be performed carefully because it can cause muscle soreness.

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Exercise intensity and how it can be determined:

Exercise intensity: how hard an individual is training.

Heart rate: the amount of beats your heart makes in 1 minute.

The lower and upper rate you should be training between for aerobic endurance is: Lower = 60% and upper = 85%

Maximum heart rate (HR max) = 220 – age (Years)

RPE (rating of perceived exertion) is another The RPE (rating of perceived exertion) can be used to predict the exercise HR (heart rate) of an individual by:

RPE x 10 = HR(bpm)

Training = a well planned programme to improve performance, skill, game ability and fitness, that uses scientific principles.

F

Frequency = how often you train. You could increase from training twice a week to training three times a week.

Intensity = how hard you train. Intensity can be prescribed using HR or RPE

Time = how long you train for. You could increase the time you train from 20 minutes to 25 minutes.

Type = type of activity. How you train. The appropriate method/s of training should be selected according to your needs and goals. For example if you wanted to increase muscular strength you may choose to do weight training

FITNESS PRINCIPLES

Progressive Overload – In order to progress, training needs to be demanding enough to cause the body to adapt, improving performance. Overload can be achieved by using the FITT principles

Adaption = this occurs during the recovery period after the training session is complete. Adaption is how your body increases its ability to cope with training loads

Reversibility = any improvement in fitness that takes place as a result of training will be reversed when a person stops. If you are unable to train due to injury or illness fitness levels will decrease. Also known as de-training. If muscles get smaller then this is known as atrophy.

Individual differences/needs = the programme should be designed to meet your training goals, needs, ability, level of fitness, skill level, and exercise likes/dislikes.

Specificity = training should be specific to the individual's sport, activity or physical/skill related fitness goals to be developed

Variation = boredom can lead to a decrease in motivation to train so try to make training fun.

Rest and recovery = these are essential to allow the body to repair and adapt, with renewal of body tissues. If your body doesn't get a chance to recover then the rate of progression can be reduced.

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KNOWLEDGE ORGANISER – PE BTEC Unit 1: Fitness for sport and exercise

Body composition
Skin Fold Calliper

Cardiovascular fitness
Multi Stage Fitness Test
12 Minute Cooper Run

Flexibility
Sit and Reach

Muscular endurance
60 Second Press up Test

Muscular strength
1 Rep Max Test
Hand Grip Dynamometer

Validity
"refers to the test measuring what it claims to measure"

Reliability
"requires that the test should produce similar results each time the test is taken"

FITNESS TESTING

Agility
Illinois Agility Test

Balance
Stork Test

Coordination
Alternate hand throw test

Power
Vertical Jump Test

Reaction time
Ruler Drop Test

Speed
30 metre sprint test

KNOWLEDGE ORGANISER – PE BTEC Unit 1: Fitness for sport and exercise

TRAINING METHODS

Speed training:

• hollow sprints: a series of sprints separated by a 'hollow' period of jogging or walking.

• acceleration sprints. This is where the pace is gradually increased from a standing or rolling start to jogging, then to striding, and then to a maximum sprint. Different drills can be used, such as resistance drills and hill sprints. Rest intervals of jogging or walking are used in between each repetition.

• interval training: the individual performs a work period followed by a rest or recovery period. For speed training, the work intervals will be shorter and more intense – performed at a high intensity, close to maximum. Increase the number of rest periods and increase work intensity to develop speed.

Aerobic endurance training:

• continuous training: this is training at a steady pace and moderate intensity for a minimum period of 30 minutes.

• fartlek training: this is where the intensity of training is varied by running at different speeds or over different terrain. The training is continuous with no rest period.

• interval training: this is where the individual performs a work period followed by a rest or recovery period.

• circuit training: this is where different stations/exercises are used to develop aerobic endurance. The station order/order of exercises is important to ensure different muscle groups are used to avoid fatigue. The number of stations, time spent at each station, number of circuits, rest period between exercises and number of circuit sessions per week can be varied.

Memory Aid
Fat Cow Can't Swim Without A Float, It Panics

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Choreographic Processes

Key term	Definition	Key term	Definition
Choreography	The creation of dance, making a dance	Choreographic Processes	How a choreography is developed and created
Stimulus	The idea, theme, starting point of a choreography	Research	The process of finding out and gathering information relating to the stimulus
Improvisation	The process of generating dance actions, phrases and ideas	Collaboration	A process that can happen during improvisation – choreographer will work with the dancers to generate ideas
Select and discard	The sorting process – keeping what is effective and taking out what is not until you have motif phrases that effectively show intention	Motif	An action or phrase that is generated during improvisation and selection. A motif will repeat and develop numerous times in a choreography
Development	The process of using choreographic devices to repeat motifs in interesting ways	Choreographic devices	The tools that are applied to motifs to develop them so that the motif maintains interest – they are action, dynamics, space and relationships
Structuring	The process of deciding the order, sections and arrangement of the choreography	Transition	Moments that link one section of the dance to another to make it complete
Refine	The process of polishing the choreography so that it is as effective as possible, this will involve making small adjustments and changes	Rehearsal	The process of preparing the choreography for performance. This should not involve making changes, but should focus on ensuring all dancers know every detail. Rehearsal cycle and rehearsal skills should be used in this phase

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Dance Structures

Key term	Definition	Key term	Definition
Structure and Form	The organisation of a choreography, the order, sections, and arrangement of motif phrases	Binary	A dance with two parts / sections (AB)
Ternary	A dance with three parts / sections where the first part is developed (ABA)	Rondo	A dance with a verse / chorus structure the verses are different and the choruses are developed (ABACADA)
Theme and Variation	A dance with one main motif phrase that continually repeats and develops (A1A2A3A4)	Narrative	A structure that tells a story progressing through from beginning to middle to end
Episodic	A structure that contains a series of scenes (episodes) that are linked by a theme or idea	Logical Sequence	Often found in narrative choreography this is the natural order and flow of dance sections to create a choreography that makes sense

Choreographic Devices – ACTION

Key term	Definition	Key term	Definition
Choreographic Devices	The tools that are applied to motifs to develop them so that the motif maintains interest – they are action, dynamics, space and relationships	Repetition	Doing the motif again in the exact same way
Fragmentation	Breaking the motif into single actions (fragments) and putting it back together in a new order	Opposition	Switching the side of the body the actions are danced on for e.g. starting the motif with the left arm if it originally began on the right. When combined with facing can create MIRRORING

Retrograde	Performing the motif phrase backwards (like it is being rewound)	Reversal	Performing the motif phrase in the reverse order
Highlight	Making one element, feature or part of the choreography stand out on purpose	Climax	A dramatic moment in a choreography, similar to highlight but usually at the end of a section or the end of the dance
Different body part	Developing the motif so that it uses a different body part for example performing an arm gesture with a leg instead	Turn into gesture	Making all of the actions in a motif become purely gestural

Choreographic Devices – DYNAMICS

Key term	Definition	Key term	Definition
Choreographic Devices	The tools that are applied to motifs to develop them so that the motif maintains interest – they are action, dynamics, space and relationships	Speed	Changing how sudden or sustained the action is – how long it takes to perform
Energy	Changing how heavy or light the action is – the amount of effort in the action	Continuity	Changing how legato or staccato the action is – making the actions flow more or less

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Choreographic Devices – SPACE

Key term	Definition	Key term	Definition
Choreographic Devices	The tools that are applied to motifs to develop them so that the motif maintains interest – they are action, dynamics, space and relationships	Personal space / general space	Changing the amount of space the motif uses by keeping it on the spot or making it travel
Direct pathway / Flexible pathway	Changing how a motif travels by using straight lines or curving arcs	Levels	Changing the level the motif is performed on – low, middle, high
Size of action	Changing the amount of space a motif uses	Formation	Changing the placement, pattern or arrangement of the dancers
Spatial proximity	Changing how close together or far apart dancers are placed	Facings	Changing the position of the dancer in relation to the front
Direction	Changing the way the motif travels in relation to the front	Placement on stage	Changing where in the space a motif is performed (CS, DS, US, SL, SR, DSL, USL, DSR, USR, CSL, CSR)

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Choreographic Devices – RELATIONSHIPS

Key term	Definition	Key term	Definition
Choreographic Devices	The tools that are applied to motifs to develop them so that the motif maintains interest – they are action, dynamics, space and relationships	Unison	All dancers perform the motif at the same time
Simple canon	One dancer performs the motif, stops, then next dancer performs the same motif	Overlapping canon	One dancer performs a motif, the next dancer performs the same motif starting before the first dancer has finished – like a Mexican Wave
Simultaneous canon	Each dancer performs the same motif phrase but starts it at a different point. For example if a phrase has 8 actions in it one dancer might start on action 1 and end on action 8 but another might start on action 5 and end on action 4	Accumulative canon	One dancer begins the motif phrase. Other dancers are 'picked up' into the phrase as it is being danced. For example dancer 1 starts on action 1, dancer 2 picks up on action 2 etc.
De-accumulative canon	The opposite of accumulation – dancers 'drop off' the phrase one at a time	Contact	Developing the motif to include touch, lifts, balances and partner work
Manipulation	Developing the motif to include one dancer affecting other dancer WITHOUT touching them. One dancer controls the actions of another	Question and answer	One dancer performs a motif movement or phrase whilst her partner is still. The partner then responds with their own motif movement or phrase in reply that is DIFFERENT, whilst the first dancer is still
Complementary	Developing the motif to include moments that are similar but not identical	Contrasting	The opposite to complementary, developing the motif to include moments that are different
Number of dancers	Developing the motif to include more or less dancers in solos, duets, trios, quartets and ensembles		

What is an Ecosystem?

An ecosystem is a system in which organisms interact with each other and with their environment.

Ecosystem's Components

| Abiotic | These are **non-living**, such as air, water, heat and rock. |
| **Biotic** | These are **living**, such as plants, insects, and animals. |

| Flora | **Plant life** occurring in a particular region or time. |
| Fauna | **Animal life** of any particular region or time. |

Food Web and Chains

Simple **food chains** are useful in explaining the basic principles behind ecosystems. They show only one species at a particular trophic level. **Food webs** however consists of a network of many food chains interconnected together.

Nutrient cycle

Plants take in **nutrients** to build into new organic matter. Nutrients are taken up when animals eat plants and then returned to the soil when animals die and the body is broken down by **decomposers**.

| Litter | This is the **surface layer** of vegetation, which over time breaks down to become **humus**. |
| **Biomass** | The total mass of living organisms per unit area. |
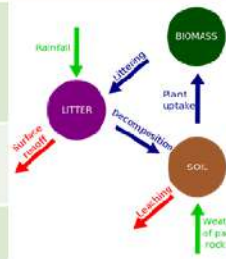
Biomes

A biome is a **large geographical area of distinctive plant and animal groups**, which are adapted to that particular environment. The climate and geography of a region determines what type of biome can exist in that region.

	Coniferous forest
	Deciduous forest
	Tropical rainforests
	Tundra
	Temperate grasslands
	Tropical grasslands
	Hot deserts

The **most productive biomes** – which have the greatest biomass- grow in climates that are **hot and wet**.

Biome's climate and plants

Biome	Location	Temperature	Rainfall	Flora	Fauna
Tropical rainforest	Centred along the Equator.	Hot all year (25-30°C)	Very high (over 200mm/year)	Tall trees forming a canopy; wide variety of species.	Greatest range of different animal species. Most live in canopy layer
Tropical grasslands	Between latitudes 5°-30° north & south of Equator.	Warm all year (20-30°C)	Wet + dry season (500-1500mm/year)	Grasslands with widely spaced trees.	Large hoofed herbivores and carnivores dominate.
Hot desert	Found along the tropics of Cancer and Capricorn.	Hot by day (over 30°C) Cold by night	Very low (below 300mm/year)	Lack of plants and few species; adapted to drought.	Many animals are small and nocturnal: except for the camel.
Temperate forest	Between latitudes 40°-60° north of Equator.	Warm summers + mild winters (5-20°C)	Variable rainfall (500-1500m /year)	Mainly deciduous trees; a variety of species.	Animals adapt to colder and warmer climates. Some migrate.
Tundra	Far Latitudes of 65° north and south of Equator	Cold winter + cool summers (below 10°C)	Low rainfall (below 500mm/ year)	Small plants grow close to the ground and only in summer.	Low number of species. Most animals found along coast.
Coral Reefs	Found within 30° north – south of Equator in tropical waters.	Warm water all year round with temperatures of 13°C	Wet + dry seasons. Rainfall varies greatly due to location.	Small range of plant life which includes algae and sea grasses that shelters reef animals.	Dominated by polyps and a diverse range of fish species.

Unit 1b

The Living World

AQA

Tropical Rainforest Biome

Tropical rainforest cover about **2 per cent** of the Earth's surface yet they are home to **over half of the world's plant and animals**.

Interdependence in the rainforest

A rainforest works through **interdependence**. This is where the plants and animals **depend on each other** for survival. If one component changes, there can be **serious knock-up effects** for the entire ecosystem.

Distribution of Tropical Rainforests

Tropical rainforests are centred along the **Equator** between the Tropic of Cancer and Capricorn. Rainforests can be found in South America, central Africa and South-East Asia. **The Amazon** is the world's largest rainforest and takes up the majority of northern South America, encompassing countries such as Brazil and Peru.

Rainforest nutrient cycle

The **hot, damp conditions** on the forest floor allow for the **rapid decomposition** of dead plant material. This provides plentiful nutrients that are easily absorbed by plant roots. However, as these nutrients are in high demand from the many fast-growing plants, they do not remain in the soil for long and stay close to the surface. If vegetation is removed, the soils quickly become **infertile**.

CASE STUDY: UK Ecosystem: Epping Forest, Essex

This is a typical English lowland deciduous woodland. **70% of the area** is designated as a **Site of Special Scientific Interest (SSI)** for its biological interest, with **66%** designated as a **Special Area of Conservation (SAC)**.

Components & Interrelationships		Management
Spring	Flowering plants (producers) such as bluebells store nutrients to be eaten by consumers later.	- Epping has been managed for centuries. - Currently now used for recreation and conservation. - Visitors pick fruit and berries, helping to disperse seeds. - Trees cut down to encourage new growth for timber.
Summer	Broad tree leaves grow quickly to **maximise photosynthesis**.	
Autumn	Trees shed leaves to **conserve energy** due to sunlight hours decreasing.	
Winter	Bacteria **decompose** the leaf litter, releasing the nutrients into the soil.	

Layers of the Rainforest

Emergent	Highest layer with trees reaching 50 metres.
Canopy	Most life is found here as it receives **70% of the sunlight and 80% of the life**.
U-Canopy	Consists of trees that reach **20 metres high**.
Shrub Layer	Lowest layer with **small trees** that have adapted to living in the shade.

Climate of Tropical Rainforests

- Evening temperatures rarely fall below **22°C**.
- Due to the **presence of clouds**, temperatures rarely rise above **32°C**.
- Most afternoons have heavy showers.
- At night with no clouds insulating, temperature drops.
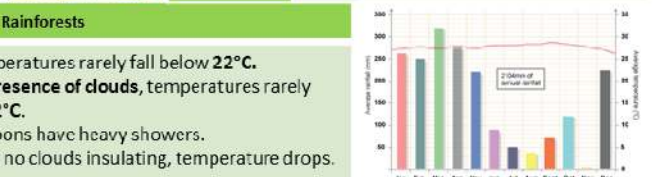
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Tropical Rainforests: Case Study Malaysia

Malaysia is a LIC country is south-east Asia. 67% of Malaysia is a tropical rainforest with 18% of it not being interfered with. However, Malaysia has the fastest rate of deforestation compared to anywhere in the world

Adaptations to the rainforest

Orangutans	Large arms to swing & support in the tree canopy.
Drip Tips	Allows heavy rain to **run off leaves easily**.
Lianas & Vines	**Climbs** trees to reach sunlight at canopy.

Rainforest inhabitants

Many tribes have developed sustainable ways of survival. The rainforest provides inhabitants with...
- **Food** through hunting and gathering.
- **Natural medicines** from forest plants.
- **Homes and boats** from forest wood.

Issues related to biodiversity

Why are there high rates of biodiversity?

- **Warm and wet climate** encourages a wide range of vegetation to grow.
- There is **rapid recycling of nutrients** to speed plant growth.
- Most of the rainforest is **untouched**.

Main issues with biodiversity decline

- **Keystone species** (a species that are important of other species) are extremely important in the rainforest ecosystem. Humans are threatening these vital components.
- **Decline in species** could cause tribes being unable to survive.
- **Plants & animals** may become **extinct**.
- Key medical **plants** may become **extinct**.

What are the causes of deforestation?

Logging
- Most widely reported cause of destructions to biodiversity.
- Timber is harvested to create **commercial items** such as furniture and paper.
- **Violent confrontation** between indigenous tribes and logging companies.

Agriculture
- Large scale 'slash and burn' of land for ranches and palm oil.
- Increases **carbon emission**.
- **River saltation** and soil erosion increasing due to the large areas of **exposed land**.
- Increase in palm oil is making the **soil infertile**.

Mineral Extraction
- **Precious metals** are found in the rainforest.
- Areas mined can experience **soil and water contamination**.
- **Indigenous people** are becoming **displaced** from their land due to roads being built to transport products.

Tourism
- **Mass tourism** is resulting in the building of hotels in extremely **vulnerable areas**.
- Lead to **negative relationship** between the government and indigenous tribes
- Tourism has **exposed animals** to human **diseases**.

Energy Development
- The **high rainfall** creates ideal conditions for **hydro-electric power (HEP)**.
- The **Bakun Dam** in Malaysia is key for creating energy in this developing country, however, both people and environment have suffered.

Road Building
- **Roads** are needed to bring supplies and **provide access to** new mining areas, settlements and energy projects.
- In Malaysia, logging companies use an **extensive network of roads** for heavy machinery and to transport wood.

Impacts of deforestation

Economic development

+ Mining, farming and logging creates employment and tax income for government.
+ Products such as palm oil provide valuable income for countries.
- The loss of biodiversity will reduce tourism.

Soil erosion

- Once the land is exposed by deforestation, the soil is more **vulnerable to rain**.
- With no roots to bind soil together, soil can easily **wash away**.

Climate Change

- When rainforests are cut down, the climate becomes **drier**.
- Trees are carbon 'sinks'. With greater deforestation comes more greenhouse emissions in the atmosphere.
- When trees are burnt, they **release more carbon in the atmosphere**. This will enhance the greenhouse effect.

Sustainability for the Rainforest

Uncontrolled and unchecked exploitation can cause irreversible damage such as loss of biodiversity, soil erosion and climate change.

Possible strategies include:
- **Agro-forestry** - Growing trees and crops at the same time. It prevents soil erosion and the crops benefit from the nutrients.
- **Selective logging** - Trees are only felled when they reach a particular height.
- **Education** - Ensuring those people understand the consequences of deforestation
- **Afforestation** - If trees are cut down, they are replaced.
- **Forest reserves** - Areas protected from exploitation.
- **Ecotourism** - tourism that promotes the environments & conservation

Cold Environments: Case Study - Svalbard

Svalbard is a Norwegian Territory in the Arctic Ocean and the most northerly inhabited group of islands in the world. Much of Svalbard experiences a polar climate, with 60% covered by glaciers. 2700 people inhabit the 5 major islands.

What are cold environments?

They experience temperatures that are at or below 0°C for long periods of time. Most extreme ones, such as Antarctica are below zero all year round. Less extreme, such as Iceland, have very cold winters.

Major characteristics of polar areas

- **Climate** – Winter temps often below -50°C. Low precipitation.
- **Soils** – Permanently covered by ice so frozen
- **Plants** – some plants such as moss and lichens found on edges of ice

Climate of Svalbard

- Very little rainfall with less than 350 mm per year.
- Temperate are below freezing each day from October to May each year
- In Summer months (June September) raise above zero but reach a maximum average of 7°C.

Major characteristics of tundra area

- **Climate** – Less extreme. Winter temps -20°C. Brief summers can be warm. Snow can be high near the coast.
- **Soils** – Frozen permafrost but top layer melts in the summer. Become waterlogged

Adaptations to the cold environments

Bearberry Plant	- **Low-growing** (5-15cm) to survive strong winds - Stems have **thick bark** for stability - **Hairy stems** to retain heat
Polar bear	- **Small extremities** (ears) to reduce heat loss - **Thick body fat** layer for hungry summer - **Thick camouflaged** fur for heat retention

Cold Environment Interdependence

Different parts of the ecosystem are closely linked together and depend on each other, especially in a such a harsh environment.
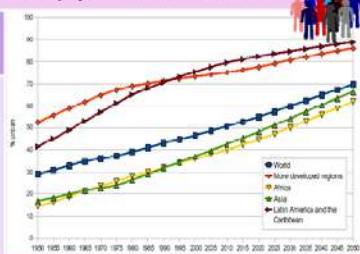
Opportunities and challenges in Cold Environments

Opportunities
- There are valuable minerals such as coal that can be extracted.
- Energy developments provide the people of Svalbard with power. Geo-thermal could be a future option.
- Fishing in the Barrents Sea. Cod is caught and exported around the world.
- Svalbard attract tourists, especially adventure tourists and cruise ships.

Challenges
- The extreme temperatures make it difficult for people to work outside, especially in the winter.
- Much construction is limited to the summer months when it is light enough and temperatures aren't as harsh
- Services have to be provided over ground so that heat from pipes doesn't melt the permafrost
- Access is difficult. Roads are limited so the majority of people use snowmobiles.

Why are cold environments fragile?

Off-roading in Alaska	Oil extraction
Off-roading is a popular tourist activity. Tyre tracks damage to melted permafrost	Rich reserves of oil are in high demand. To extract oil roads have to be built. This damages the ecosystem

Why do cold environments need protecting?

Many indigenous people live in them. They rely on wildlife and survive by hunting and fishing	Home to many species of animals and plants e.g. Polar bear and Arctic fox
Important laboratories for scientific research such as the effects of climate change	Their beauty attracts tourists which bring benefits for cold environment countries

Strategies to reduce risks

- **Technology** – Trans-Alaskan pipeline moves oil across Alaska above ground so not to met the permafrost. Also earthquake proof.
- **Government Action** – USA has set up a range of treaties to protect Alaska since oil was discovered.
- **International agreements** – the Antarctic Treaty set up in 1959 to protect Antarctica for scientific research and control tourism.
- **Conservation Groups** – WWF work in Canada to manage ecosystems

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What is Urbanisation?

This is an increase in the amount of people living in urban areas such as towns or cities. In 2007, the UN announced that for the first time, more than 50 % of the world's population live in urban areas.

Where is Urbanisation happening?

Urbanisation is happening all over the word but in LICs and NEEs rates are much faster than HICs. This is mostly because of the rapid economic growth they are experiencing.

Causes of Urbanisation

Rural - urban migration (1)	The movement of people from rural to urban areas.

Push	Pull
• Natural disasters • War and Conflict • Mechanisation • Drought • Lack of employment	• More Jobs • Better education & healthcare • Increased quality of life. • Following family members.

Natural Increase (2)	When the birth rate exceeds the death rate.

Increase in birth rate (BR)	Lower death rate (DR)
• High percentage of population are child-bearing age which leads to high fertility rate. • Lack of contraception or education about family planning.	• Higher life expectancy due to better living conditions and diet. • Improved medical facilities helps lower infant mortality rate.

Types of Cities

Megacity	An urban area with over **10 million people** living there.

More than two thirds of current megacities are located in either NEEs (Brazil) and LICs (Nigeria). The amount of megacities are predicted to increase from 28 to 41 by 2030.

Sustainable Urban Living

Sustainable urban living means being able to live in cities in ways that do not pollute the environment and using resources in ways that ensure future generations also can use then.

Water Conservation

This is about reducing the amount of water used.
- Collecting rainwater for gardens and flushing toilets.
- Installing water meters and toilets that flush less water.
- Educating people on using less water.

Energy Conservation

Using less fossil fuels can reduce the rate of climate change.
- Promoting renewable energy sources.
- Making homes more energy efficient.
- Encouraging people to use energy.

Creating Green Space

Creating green spaces in urban areas can improve places for people who want to live there.
- Provide natural cooler areas for people to relax in.
- Encourages people to exercise.
- Reduces the risk of flooding from surface runoff.

Waste Recycling

More recycling means fewer resources are used. Less waste reduces the amount that eventually goes to landfill.
- Collection of household waste.
- More local recycling facilities.
- Greater awareness of the benefits in recycling.

Unit 2a

AQA

Urban Issues & Challenges

Sustainable Urban Living Example: Freiburg

Background & Location

Freiburg is in west Germany. The city has a population of about 220,000. In 1970 it set the goal of focusing on social, economic and environmental sustainability.

Sustainable Strategies

- The city's waste water allows for rainwater to be retained.
- The use of sustainable energy such as solar and wind is becoming more important.
- 40% of the city is forested with many open spaces for recreation, clean air and reducing flood risk.

Integrated Transport System

This is the linking of different forms of public and private transport within a city and the surrounding area.

Brownfield Site

Brownfield sites is an area of land or premises that has been previously used, but has subsequently become vacant, derelict or contaminated.

Traffic Management

Urban areas are busy places with many people travelling by different modes of transport. This has caused urban areas to experience different traffic congestion that can lead to various problems.

Environmental problems

- Traffic increases air pollution which releases greenhouse gases that is leading to climate change.

Economic problems

- Congestion can make people late for work and business deliveries take longer. This can cause companies to loose money.

Social Problems

- There is a greater risk of accidents and congestion is a cause of frustration. Traffic can also lead to health issues for pedestrians.

Congestion Solutions

- Widen roads to allow more traffic to flow easily.
- Build ring roads and bypasses to keep through traffic out of city centres.
- Introduce park and ride schemes to reduce car use.
- Encourage car-sharing schemes in work places.
- Have public transport, cycle lanes & cycle hire schemes.
- Having congestion charges discourages drivers from entering the busy city centres.

Traffic Management Example: Bristol

In 2012 Bristol was the most congested city in the UK. Now the city aims to develop it's integrated transport system to encourage more people to use the public transport. The city has also invested in cycle routes and hiring schemes.

Greenbelt Area

This is a zone of land surrounding a city where new building is strictly controlled to try to prevent cities growing too much and too fast.

Urban Regeneration

The investment in the revival of old, urban areas by either improving what is there or clearing it away and rebuilding.

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Enquiry: How popular was the Weimar Republic by 1929?	
The First World War	Fighting lasted four years, from 1914 to 1918. The cost of the war meant that the German government's debts trebled from 50 billion marks to 150 billion marks.
The German revolution, 1918-19	Kaiser Wilhelm's government lost control of the country to strikers and rioters. In many towns, workers and soldiers set up their own, unofficial councils.
Kaiser Wilhelm	The last German Emperor. Reigned from 15 June 1888 to 9 November 1918.
Abdication	A leader, like a king, queen or emperor, giving up their throne or position. The Kaiser abdicated on 9 November.
Republic	A country where power is held by the people and those elected rather than a monarch (king).
Constitution	The rules which set out how a country is run.
The armistice	The formal agreement between Germany and the Allies to end the First World War (a truce). On 11 November, Ebert's representative, Matthias Erzberger, signed the armistice.
The Weimar Republic	The name for the new democratic government in Germany. Due to violence in Berlin, the National Assembly met in the more peaceful town of Weimar, about 250 km away.
The Government	The Chancellor (head of government) and the Cabinet (important ministers).
The Parliament	Made up of two houses: the Reichstag and the Reichsrat. Normally all laws had to pass through both houses.
Democratic	Article 1 of the constitution confirmed that Germany was to be ruled by the people.
Proportional representation	Every party was allocated one representative for each 60,000 votes in its favour.
Coalition government	Often, no single party had a clear majority. Coalition partners had to agree, often resulting in a lack of clear, strong policies. They frequently argued and fell apart.
Article 48	The constitution was weak in a crisis/emergency. The solution was that Article 48 of the constitution allowed the chancellor to ask the president to pass a necessary law by decree (without the support of the Reichstag). Commonly used by around 1930.
The Treaty of Versailles, 1919	A peace treaty. Once the armistice was signed, the Allied leaders (The USA, Great Britain and France) decided the terms of the peace.
Diktat	Dictated/forced peace.
War guilt	Article 231 of the treaty stated that Germany had caused, and were therefore to blame, for the war.
Reparations	Compensation. Germany had to pay reparations to the Allies. In 1921, these were decided at 136,000 million marks (£6.6 billion).
Dolchstoss – the stab in the back	The stab in the back. Many Germans did not believe their army had been defeated in the war. Critics of the treaty said the army was betrayed by politicians – that they had been 'stabbed in the back'.
The 'November Criminals'	The treaty was so harsh that people hated the leaders of the new German republic who signed it. They became known as the 'November Criminals' because they surrendered in November 1918.

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Extreme right-wing	Political parties such as the NSDAP (Nazi Party) who opposed the Weimar Republic.
Extreme left-wing	Political parties such as the KPD (Communist Party) who opposed the Weimar Republic and was supported by workers.
Moderate parties	Non-extreme parties such as the SPD (Social Democrats) and ZP (Centre Party).
The Spartacist Revolt	A left-wing uprising by the Spartacist League, who supported the Communist Party. It was funded by the Soviet Union (Russia). They named themselves after the head of a slaves' revolt in Ancient Rome – Spartacus. Led by Rosa Luxemburg and Karl Liebknecht.
The Freikorps	The regular armed forces (the Reichswehr) could not stop the revolt. Demobilised (unemployed) soldiers were organised into units (called Free Corps). Estimated at 250,000 men by March 1919.
The Kapp Putsch	A right-wing uprising. By 1920, Ebert's government were struggling to control the Freikorps. Fearing unemployment, the Freikorp turned their arms against the republic. Five thousand armed men marched on Berlin and set up a new government that invited the Kaiser back.
Wolfgang Kapp	A nationalist politician who led the Kapp Putsch.
The Ruhr coalfields	In December 1922, Germany failed to send coat to France from the Ruhr (an area of Germany) coalfields, as they were supposed to do under the reparations agreement. In retaliation the French sent troops to confiscate raw materials, manufactured goods and industrial machinery.
Passive resistance	The German government urged workers to go on strike and there was even some sabotage.
Inflation	People had to pay more money to buy what they needed.
Hyperinflation	Extreme inflation caused by the government printing more money despite less income.
Gustav Stresemann	In August 1923, President Ebert appointed Gustav Stresemann as his new chancellor and foreign secretary. He resigned the chancellorship in November 1923, but remained as foreign secretary until 1929.
Rentenmark	In November 1923, Stresemann set up a new currency. The supply of these notes was limited. The currency had real value.
The Dawes Plan, 1924	The Allies wanted to resolve Germany's non-payment of reparations. A plan was agreed that reparations were temporarily reduced to £50 million per year and US banks agreed to give loans to German industry.
The Young Plan, 1929	This reduced the total reparations debt from £6.6 billion to £2 billion and Germany was given a further 59 years to pay.
The Lacarno Pact, 1925	A treaty between Germany, Britain, France, Italy and Belgium. It was agreed by Germany, on equal terms. This increased the trust of many Germans in the Weimar Republic.
The League of Nations	A new international body in which powerful countries discussed ways of solving the world's problems without resorting to war. Germany was accepted as a member in September 1926.
Kellogg-Briand Pact	An agreement between 62 nations. Another sign that the Weimar Republic was respected.
Unemployment	The number of people without jobs. In 1926 it was 2 million. In 1928 it was 1.3 million.

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Work and wages	The working week in 1925 was 50 hours. In 1927 it was 46 hours. Wages increased.
New women	Women had more financial, political and social independence. They bought more clothes, smoke and drank more and some took advantage of liberal sexual attitudes.
Bauhaus	A design college in Berlin. The Bauhaus style focused on the beauty of technology.
Otto Dix	A German painter who painted scenes that were very critical of German society.
Fritz Lang	A German director who directed a German film called Metropolis.
Enquiry: Why had Hitler gained power by 1933?	
The German Worker's Party (DAP)	Founded in Munich in Feb 1919 by Anton Drexler. Hitler joined on 19 Sep 1919. Hitler was attracted by the party's ideas.
The Nazi Party (NSDAP)	In 1921, Hitler took control of the DAP and reshaped it into the Nazi Party (the National Socialist German Workers' Party). This name was suggested by Hitler and appealed to many.
The Twenty-Five Point Programme	A document explaining the policies of the DAP. This criticised Weimar politicians, democracy and Jews.
Propaganda	In Jan 1920, Hitler was the head of party propaganda. This is information that influences or controls public attitudes. E.g. newspapers, posters, radio and film.
Nationalism	A political view that policies should make the country stronger and more independent.
Socialism	A political view that a country's land, industries and wealth should be controlled by the government and belong to the workers.
Hitler's personal appeal	Hitler was popular with supporters because of his public speaking skills. He rehearsed, was persuasive, and had publicity photos and paintings taken.
Swastika and straight armed salute.	The NSDAP's characteristic logo.
The SA (Sturmabteilung)	Stormtroopers. A private group run like a military force (paramilitary). Many were unemployed, ex-soldiers or students. They dressed in brown uniforms so also known as 'Brownshirts'. Paraded to show force and order and used violence against other parties.
Putsch	A violent uprising to overthrow existing leaders.
Landsberg Prison	Hitler was found guilty of treason and sentenced to five years in this prison.
Mein Kampf	'My struggle'. A bestselling book written by Hitler while he was in prison. Hitler's view on the German race (which he called the Aryan race) very clear.
Totalitarianism	A belief that the government should hold all power and that democracy was a weak system.
Lebensraum	'Living space'. Hitler's idea that Germany needed to invade other countries and expand.
SS	The Schutzstaffel ('Protection Squad'). Hitler took more control over the SA and set up this new security group who he

	trusted.
The Bamberg Conference, 1926	The Nazi Party was divided. Hitler called this national meeting to bring it under Hitler's control.
The Wall Street Crash	In October 1929, share prices fell on the stock exchange in New York, USA. This led to investors losing $4,000 million. German banks collapsed and so did German industry.
Unemployment	In September 1929 German unemployment was 1.3 million. In January 1933 it was 6.1 million. Many types of people suffered. Factory workers, savers and university graduates. This led to more crime.
Heinrich Bruning	Chancellor from 1930 to 1932, and leader of the Centre Party. He raised taxes on the middle class and reduced benefits for the working class. Many Germans were left poorer. He was given the nickname 'the hunger Chancellor'.
Article 48	Bruning was unpopular and the Reichstag did not support him. He passed his laws by decree (using Article 48 to pass emergency laws with the President).
The KPD	'The Communist Party'. Supported by 15% of voters in 1932.
Electorate	People with the right to vote. The Nazis were popular with different sections of society.
Decrees	Laws introduced by the president without the support of the Reichstag.
President Hindenburg	President of Germany from 1925 to 1934.
Ernst Thalmann	Leader of the KPD party.
Von Schleicher	An army general that encouraged ring-wing parties to join together. This new government was known as 'the Cabinet of Barons'.
Military dictatorship	Government by a single military ruler who has complete power.
Von Papen	A wealthy politician who replaced Bruning as Chancellor. Believed he could control Hitler.

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Key Vocabulary	Definition
Why could the Plains Indians survive on the Plains?	
The Great Plains	Huge natural grassland that once stretched from north to south through the middle of the USA. In the early 1800s this land was left for the Indians to live on.
Plains Indians	Lots of different American Tribes made up the Plains Indians.
Tribe	Groups of people who are linked by social, economic, religious, or blood ties, with a common culture and dialect, typically having a recognized leader.
Nomadic	A travelling lifestyle. The Indians followed the buffalo migrations through the summer and autumn.
Bands	Each tribe was divided into bands, and these could be hundreds of people or 20-30 people. Some bands made their own decisions.
Horses	Essential to Plains Indians. Needed to hunt and to travel in search of food.
Buffalo	A heavily built wild ox with backward-curving horns. Used for food, fuel, clothing, shelter, ornaments, gifts and toys. Deep respect was shown for the buffalo.
Hunting	Process where Plains Indians searched for and killed animals (usually buffalo) for food and resources.
Warrior societies	Such s the, Where young men proved their bravery and skills in fighting each other. For example the White Horse Riders, the Strong Hearts and the Crow Owners.
Stampedes	A dangerous charge of animals
Rawhide	The skin of the Buffalo that could be used to make items such as Tipis
Polygamy	Having more than one wife or husband at a time
Medicine man	A deeply spiritual healer who was used to help the Plains Indians
Property	Land or building that belongs to one particular person
Wakan Tanka	An example of one of the spirits
Dances	A selection of special ritual dance, e.g. sun dance/ghost dance
Counting Coup	This is a special type of fighting in which a warrior would attempt to hit or touch (rather than kill) an enemy. It demanded skill and bravery and was respected and honoured by the tribe.
scalps	Collected as trophies of their success in battle.
Frontier	Border between two countries.
Territory	A portion of land which belonged or was assigned to a group
Permanent Indian Frontier	President Jackson promised that the Indians could keep the land west of the Mississippi River. It would be 'Indian Territory'.
Trade & Intercourse Act	Law to regulate trade and other deals between the US government and the Plains Indians

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Appropriations Act	29th February 1851. Funded the moving of American Indians onto reservations in Oklahoma.
Enquiry: Why did Whites migrate and what problems did they face?	
Push factors	Something that would make somebody want to move away from and area
Pull factors	Something that would attract somebody to and area
Manifest Destiny	The belief that it was God's will for white people to take possession of the whole of the USA and make it productive and civilised. It was also seen as a scientific law.
Migration	The movement of people e.g. from east to west
Economic depression	In 1837 to the mid-1840s many banks collapsed, people lost their savings, businesses failed and thousands lost their jobs. These problems gave people good reasons to migrate West.
Donner Party	A group of 300 migrants who wanted to travel across the Oregon Trail in May 1846. They took a short cut that led to many deaths.
Hastings Cut-off	Wrote a guidebook with a shortcut off the Oregon Trail. He had not taken the route himself.
Brigham Young	The new leader of the Mormons who believed God had called on the Mormons to migrate to Salt Lake Valley, south of the Oregon Trail. It was outside US territory at the time.
Leadership	
Oregon Trail	First travelled on in 1825 by Jedidiah Smith. This was an established route across the Rocky Mountains that led to the West. It was 3,200 km long.
Mormon Trail	The successful route taken by the Mormons which many travelled after their success.
Salt Lake City	Place where the \Mormons settled. The Mormons worked together to one central plan, under strict leadership.
Treaty	The Plains Indians would end fighting, allow migrants to travel, allow railroad companies to build, allowed the government to construct forts/roads. The US government would protect the Indians and pay them an annuity.
Vigilante	A group of ordinary citizens who punish suspected law breakers themselves, rather than relying on the official justice system.
Subsidy	A sum of money paid from US government funds as compensation for what the Plaiins Indians had agreed to
Genocide	The deliberate killing of a large group of people.
Prospectors	Someone who searches for gold. Or other precious metals.
Bullion	Gold or silver in bulk before it has been made into other objects such as coins or jewellery
US Marshall	Someone who searches for gold. Or other precious metals.
Lynching	Where a group of people take the law into their own hands, and execute someone that they suspected of a crime – usually by hanging.
Homesteaders	People who had taken up the Homestead act to have 160 acres. It cost just $10 to register/file a claim to a plot of homestead land. You had to work and live on the land for five years, build a house and plant crops. 'Prove up' with $30.
Ploughing	To turn the soil reading for planting seed and crops

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Natural hazards	Issues that happen naturally that made farming difficult e.g floods, droughts and winters on the great plains
Enquiry: To what extent was there conflict and tension?	
Fort Laramie	Where tribes were organised into a Council. The aim was that tribes would agree to a treaty, and that there would be safe passage and access for migrants across the Plains Indians lands.
Reservations	An area of land 'reserved' for the use of American Indians. This was managed by the federal government
Militia	A military force raised by the civilian population to help the army in times of emergency
Courts	Power was taken from tribal chiefs, such as Sitting Bull. The US government set up special councils among the tribes. They could be easily threatened or bribed.
Lawlessness	There were laws. The problem was law enforcement. Many people did not obey the law.
Highway robbery	The stopping and robbery of a vehicle e.g horse and cart.

Year 10 Term 1 Knowledge Organiser Booklet

Education Post-16: GCSE Foundation Tier French Knowledge Organiser

Key Phrases

- à la fois - at the same time
- j'en ai marre de ... - I'm fed up of...
- je vais passer mon bac - I'm going to take the baccalauréat (French equivalent of A Levels)
- je voudrais un emploi à temps complet / partiel - I'd like a full time/part-time job
- j'ai beaucoup de devoirs à faire - I have lots of homework to do
- j'ai l'intention de quitter le collège à l'âge de seize ans - I intend to leave school at the age of 16
- je voudrais étudier / devenir ... - I'd like to study/to become...
- poser sa candidature - to apply for
- travailler à l'étranger - to work abroad
- quand je serai plus âgé(e) - when I am older
- après avoir quitté le collège - after having left school
- ça m'a plu - I liked it
- ça ne m'intéresse pas - it doesn't interest me
- c'est une perte de temps - it's a waste of time

Tricky Pronunciation: Practise these with your teacher!

ça ne m'intéresse pas	it doesn't interest me
se débrouiller	to cope
malheureusement	unfortunately
j'étudie	I study
le stage	work experience
travailler	to work

False Friends

passer un examen	to take an exam
réussir un examen	to pass an exam
les notes (f)	marks
décevant(e)	disappointing
la formation	training
avoir mal au cœur	to feel sick

Tricky spellings

ça m'énerve	it gets on my nerves	Check the accents and the 'ç'.
travailleur (euse)	hardworking	Check that this is distinct from 'travailler'.
se débrouiller	to cope	Check the vowels and the 'll'.

Key Questions

1. Qu'est-ce que tu voudrais faire l'année prochaine ? What would you like to do next year?
2. Tu voudrais faire une année sabbatique ? Expliquez les avantages et les inconvénients. Would you like to take a year out? Explain the advantages and disadvantages.
3. Est-ce que tu voudrais faire un apprentissage ? Would you like to do an apprenticeship?
4. Quelles matières vas-tu étudier ? Which subjects are you going to study?
5. Tu as fait un stage en entreprise ? Have you done work experience?
6. Quels sont tes points forts et tes points faibles ? What are your strong points and weak points?
7. Quels sont tes loisirs ? What are your hobbies?
8. Quels sont tes projets pour l'avenir ? What are your plans for the future?
9. Dans dix ans, où seras-tu ? In 10 years, where will you be?

Useful Grammatical Structures

- Personalise opinions, e.g. je crois que (I believe that), je dirais que (I would say that), je trouve que (I find that); on dit que (it is said that).
- Use si (if), e.g. Si je travaille dur, je réussirai mon bac (If I work hard I will pass my baccalauréat).
- Use the future tense to express future plans. Either use the immediate future (aller + infinitive), e.g. je vais jouer, il va jouer, elle va jouer, nous allons jouer, ils / elles vont jouer; or form the future tense by using the infinitive of the verb plus the following endings: je jouerai, il jouera, elle jouera, nous jouerons, ils / elles joueront.
- Remember that the following constructions all take avoir: j'ai le droit de (I have the right to); j'ai envie de (I want to); j'ai raison (I'm right); j'ai tort (I'm wrong); j'ai besoin de (I need to); j'ai faim (I'm hungry); j'ai chaud (I'm hot); j'ai froid (I'm cold); j'ai peur (I'm frightened); j'ai mal au cœur (I feel sick).
- Express after having done something by using the perfect infinitive: this is the past participle of the verb and either avoir or être. e.g. après avoir joué au foot (after having played football); après avoir fini mes études (after having finished my studies); après être arrivé(e) au collège (after having arrived at school).

Education Post-16: GCSE Foundation Tier French Knowledge Organiser

Key Ideas

- Continuer ses études ou non
- Faire un apprentissage – avantages et inconvénients
- Faire une année sabbatique – avantages et inconvénients
- Points forts et faibles
- Qualités
- Loisirs
- Travail à l'avenir
- Projets pour l'avenir

Key Verbs

Infinitif	Présent	Passé	Futur
faire – to do	je fais / il fait / elle fait nous faisons / ils / elles font	j'ai fait / il a fait / il a fait nous avons fait / ils / elles ont fait	je ferai / il fera / elle fera nous ferons / ils / elles feront
être – to be	je suis / il est / il est nous sommes / ils / elles sont	j'ai été / il a été / elle a été nous avons été / ils / elles ont été	je serai / il sera / elle sera nous serons / ils / elles seront
croire – to believe	je crois / il croit/elle croit nous croyons / ils / elles croient	j'ai cru / il a cru / elle a cru nous avons cru / ils / elles ont cru	je croirai / il croira / elle croira nous croirons / ils croiront / elles croiront
aller – to go	je vais / il va / elle va nous allons / ils / elles vont	je suis allé(e) / il est allé / elle est allée nous sommes allé(e)s / ils sont allés / elles sont allées	j'irai / il ira / elle ira nous irons / ils / elles iront
avoir – to have	j'ai / il a / elle a nous avons / ils / elles ont	j'ai eu / il a eu / elle a eu nous avons eu / ils/elles ont eu	j'aurai / il aura / elle aura nous aurons / ils/elles auront

Key Vocabulary

Les noms

l'amélioration (f)	improvement
l'annonce (f)	advertisement (for a job)
l'apprentissage (m)	apprenticeship
la confiance en soi	self-confidence
le conseil de classe	progress meeting (at school)
le diplôme	qualification
le domaine	area
l'emploi (m)	job
l'entreprise (f)	business/firm
l'entretien (m)	interview
la filière professionnelle	vocational course
la formation professionnelle	training
le lycée	sixth form (college)
le réseau social	social network
le stage	work placement
le travail d'équipe	teamwork

Les adjectifs

ancien(ne)	former
décevant(e)	disappointing
diplômé(e)	qualified
effrayé(e)	frightened
étonné(e)	astonished
élevé(e)	high
libre	free
ravi(e)	delighted
salarié(e)	salaried

Les verbes

chercher	to look for
compter sur	to rely on
se débrouiller	to cope
gagner	to earn
passer	to take (an exam)
se renseigner	to get information
suivre	to follow

Year 10 Term 1 Knowledge Organiser Booklet

Global Issues GCSE Foundation Tier French Knowledge Organiser

Key Verbs

Infinitif	Présent	Passé	Futur
faire - to do	je fais; il fait; nous faisons	j'ai fait; il a fait; nous avons fait	je ferai; il fera; elle fera; nous ferons
être - to be	je suis; il est; elle est; nous sommes	j'ai été; il a été; elle a été; nous avons été	je serai; il sera; elle sera; nous serons
avoir - to have	j'ai; il a; elle a; nous avons	j'ai eu; il a eu; elle a eu; nous avons eu	j'aurai; il aura; elle aura; nous aurons
falloir - must	il faut		
devoir - to have to	je dois; il doit; elle doit; on doit; nous devons		

False Friends

utiliser	to use

Useful Grammatical Structures

- Use **modifiers** to modify an adjective. Examples include: assez **(quite)**; plutôt **(rather)**; un peu **(a bit)**.
- Use **intensifiers** to intensify an adjective. Examples include: vraiment **(really)**; très **(very)**; particulièrement **(particularly)**; totalement; complètement **(completely)**; si **(so)**.
- Use **connectives and conjunctions** to make longer sentences. Examples include: parce que **(because)**; car **(as/because)**; mais **(but)**; cependant **(however)**; quand **(when)**.
- Use the **perfect tense with avoir or être** to describe past events. Examples include: j'ai visité **(I visited)**; je suis allé(e) **(I went)**; je suis arrivé(e) **(I arrived)**; j'ai vu **(I saw)**; j'ai voyagé **(I travelled)**; j'ai mangé **(I ate)**; j'ai bu **(I drank)**.

Key Questions

Qu'est-ce que tu fais pour protéger l'environnement ?
What do you do to protect the environment?

Comment est la circulation dans ta ville ?
What is the traffic like in your town /city?

Qu'est-ce que tu vas faire dans le futur pour protéger l'environnement ?
What are you going to do to protect the environment in the future?

Utilises-tu les transports en commun ?
Do you use public transport?

Est-ce qu'il y a beaucoup de SDF dans ta ville ?
Are there many homeless people in your town/city?

Global Issues GCSE Foundation Tier French Knowledge Organiser

Key Ideas

- Les problèmes de l'environnement
- Ce qu'il faut faire pour l'environnement
- Ce qu'il y a dans ton quartier
- Comment ta vas aider l'environnement
- La pauvreté
- Comment aider les pauvres

Key Phrases

pour protéger l'environnement	to protect the environment
je vais prendre une douche	I'm going to have a shower
je voudrais éteindre la lumière	I'm going to switch the light off
j'utilise moins la voiture	I use the car less
il y a trop de...	there are too many...
il n'y a pas assez de...	there are not enough...
il faut...	we must...
il y a trop de chômage	there is too much unemployment

Key Vocabulary

Les noms

le bain	bath
la boîte (en carton)	(cardboard) box
le centre de recyclage	recycling centre
le chômage	unemployment
le chauffage central	central heating
les déchets (m)	rubbish
la douche	shower
l'environnement (m)	environment
l'inondation (f)	flood
les ordures (f)	rubbish
la pauvreté	poverty
le pétrole	oil
la piste cyclable	cycle lane
la poubelle	dustbin
le réchauffement de la Terre	global warming
le robinet	tap
le sac en plastique	plastic bag
le sans-abri/le SDF	homeless person

Les adjectifs

pollué(e)	polluted

Les verbes

allumer	to switch on
cultiver	to grow
détruire	to destroy
disparaître	to disappear
éteindre	to switch off
faire du recyclage	to recycle
gaspiller	to waste
jeter	to throw (away)
protéger	to protect
sauver	to save
utiliser	to use

Tricky Pronunciation

recycler	to recycle
gaspiller	to waste
utiliser	to use
la piste cyclable	cycle lane

Tricky spellings

gaspiller	to waste	Check for the double 'T'
disparaître	to disappear	Check for the "hat" on the 'T'

Year 10 Term 1 Knowledge Organiser Booklet

Life at School/College GCSE Foundation Tier French Knowledge Organiser

Key Phrases
- **il faut / il ne faut pas + infinitive** - it is necessary to/it is not necessary to
- **on doit / on ne doit pas + infinitive** - on must/one mustn't
- **il est interdit de + infinitive** - It is forbidden to
- **je n'ai pas de confiance en moi** - I have no confidence in myself
- **je suis pour l'uniforme scolaire** - I am for the school uniform
- **je suis contre l'uniforme scolaire** - I am against the school uniform
- **j'ai raison** - I'm right
- **j'ai tort** - I'm wrong
- **les problèmes les plus graves sont** ... the most serious problems are...
- **plus ... que / moins ... que** - more ... than/less ... than
- **tôt / tard** - early/late
- **sauf** - except
- **pire** - worse
- **mieux** - better

Key Ideas
- Règlements scolaires
- Problèmes scolaires
- Différences entre la journée scolaire en France et la journée scolaire en angleterre
- Mon collège idéal
- L'uniforme scolaire
- Les devoirs

Key Verbs

Infinitif	Présent	Passé	Futur
faire – to do	je fais; il / elle fait; nous faisons	j'ai fait; il / elle a fait; nous avons fait	je ferai; il / elle fera; nous ferons
être – to be	je suis; il / elle est; nous sommes	j'ai été; il / elle a été; nous avons été	je serai; il / elle sera; nous serons
avoir – to have	j'ai; il / elle a; nous avons	j'ai eu; il / elle a eu; nous avons eu	j'aurai; il / elle aura; nous aurons
savoir – to know (a fact)	je sais; il / elle sait; nous savons	j'ai su; il / elle a su; nous avons su	je saurai; il / elle saura; nous saurons
devoir – to have to	je dois; il / elle doit; nous devons	j'ai dû; il / elle a dû; nous avons dû	je devrai; il / elle devra; nous devrons

Key Vocabulary

Les noms

les affaires (f)	belongings/possessions
l'ambiance (f)	atmosphere
les bijoux (m)	jewellery
le bruit	noise
la coiffure	hairstyle
l'intimidation (f)	bullying
le maquillage	make-up
la mode	fashion
le prix	prize
la punition	punishment
la récompense	reward
les règlements (m)	rules
la rentrée	start of the new school year
la retenue	detention
le souci	worry
le temps libre	free time
les vêtements (m)	clothes
de marque	designer clothes

Les adjectifs

bruyant (e)	noisy
démodé(e)	old-fashioned
faux / fausse	false
pénible	annoying/painful
propre	clean
sale	dirty
stressant(e)	stressful
vrai(e)	true

Les verbes

écrire	to write
faire de son mieux	to do one's best
mâcher	to chew
porter	to wear
savoir	to know (a fact)
se moquer de	to make fun of

Life at School/College GCSE Foundation Tier French Knowledge Organiser

Key Phrases
- **il faut / il ne faut pas + infinitive** - it is necessary to/it is not necessary to
- **on doit / on ne doit pas + infinitive** - on must/one mustn't
- **il est interdit de + infinitive** - It is forbidden to
- **je n'ai pas de confiance en moi** - I have no confidence in myself
- **je suis pour l'uniforme scolaire** - I am for the school uniform
- **je suis contre l'uniforme scolaire** - I am against the school uniform
- **j'ai raison** - I'm right
- **j'ai tort** - I'm wrong
- **les problèmes les plus graves sont** ... the most serious problems are...
- **plus ... que / moins ... que** - more ... than/less ... than
- **tôt / tard** - early/late
- **sauf** - except
- **pire** - worse
- **mieux** - better

Tricky Pronunciation: Practise these with your teacher!

en retard	late	Don't pronounce the last letter.
il faut	it is necessary to	Make sure this is distinct from 'il fait.'
on doit / la coiffure	one must/ hairstyle	Check the 'oi' sound.
le prix / mieux /	price/better/ jewellery	Don't pronounce the 'x'.
l'avantage	advantage	No 'd' in french.
le temps libre	free time	Don't pronounce the 'ps'; check the nasal vowel.
bien équipé	well-equipped	Pronounce the final 'e'.

Tricky spellings

il faut	it is necessary to	Make sure this is distinct from 'il fait'.
régulièrement	regularly	Check the accents.

False Friends

le directeur/la directrice	headteacher
passer un examen	to take an exam
réussir un examen	to pass an exam
la journée scolaire	school day
sale	dirty
durer	to last

Key Questions
1. **Tu as trop de devoirs ?** Do you have too much homework?
2. **Décris les règlements scolaires.** Describe the school rules.
3. **Quels sont les problèmes les plus graves au collège, à ton avis ?** What are the most serious problems at school, in your opinion?
4. **Tu es pour ou contre l'uniforme scolaire ?** Are you for or against school uniform?
5. **Décris ton collège idéal.** Describe your ideal school.
6. **Quelles sont les différences principales entre la vie scolaire en France et la vie scolaire en Angleterre ?** What are the main differences between school Life in France and school Life in England?

Useful Grammatical Structures
- Be aware of **grammatical markers** which help you to work out whether a noun is singular or plural. Most plurals add 's'; however, there are exceptions, e.g. le bateau / des bateaux ; une souris / des souris.
- Use the **infinitive** after these key constructions; **il faut** (you should); **il ne faut pas** (you shouldn't); **on doit /on ne doit pas** (one must/one mustn't); **il est interdit de** (it is forbidden to).
- Use **relative pronouns** to link sentences together: e.g. **qui** (who/which); **que** (that/which); **dont** (whose); **où** (where).
- Use **negatives** to negate a sentence. Place them around the verb, e.g. je **ne** joue **pas** au foot (I don't play football); je **ne** joue **jamais** au foot (I never play football).

Year 10 Term 1 Knowledge Organiser Booklet

Me, my family and friends GCSE Foundation Tier French Knowledge Organiser

Key Verbs

Infinitif	Présent	Passé	Futur
faire – to do	je fais; il fait; elle est; nous faisons	j'ai fait; il a fait; elle a fait; nous avons fait	je ferai; il fera; elle fera; nous ferons
être – to be	je suis; il est; elle est; nous sommes	j'ai été; il a été; elle a été; nous avons été	je serai; il sera; elle sera; nous serons
avoir – to have	j'ai; il a; elle a; nous avons	j'ai eu; il a eu; elle a eu; nous avons eu	j'aurai; il aura; elle aura; nous aurons
aller – to go	je vais; il va, elle va; nous allons	je suis allé(e); il est allé; elle est allé(e); nous sommes allé(e)(s)	j'irai; il ira; elle ira; nous irons
sortir – to go out	je sors, il sort, elle sort, nous sortons	je suis sorti(e), il est sorti, elle est sorti(e), nous sommes sorti(e)(s)	je sortirai, il sortira, elle sortira, nous sortirons

Key Questions

- Il y a combien de personnes dans ta famille ? How many people are there in your family ?
- Tu t'entends bien avec ta famille ? Do you get on with your family?
- Comment est ta personnalité ? What is your personality like?
- Tu peux décrire un membre de ta famille ? Can you describe a member of your family?
- Qu'est-ce-qu' un bon ami / une bonne amie ? What is a good friend (m/f)?
- Qu'est-ce-que tu aimes faire avec ta famille ? What do you like doing with your family?
- Qu'est-ce-que tu vas faire avec tes amis le week-end prochain ? What are you going to do with your friends next weekend?
- Quelle est ton opinion sur le mariage ? What is your opinion on marriage?
- Voudrais-tu des enfants dans le futur ? Would you like children in the future?

Useful Grammatical Structures

- Use **modifiers** to modify an adjective. Examples include: assez (quite); plutôt (rather); un peu (a bit)
- Use **intensifiers** to intensify an adjective. Examples include vraiment (really); très (very); particulièrement (particularly); totalement (totally); complètement (completely); si (so)
- Use **connectives and conjunctions** to make longer sentences. Examples include parce que (because); car (as/because); mais (but); cependant (however); quand (when)
- Use the **perfect tense with avoir or être** to describe past events. Examples include: je suis allé(e) (I went); je suis arrivé(e) (I arrived); j'ai visité; j'ai vu (I saw); j'ai voyagé (I travelled); j'ai mangé (I ate); j'ai bu (I drank)

Me, my family and friends GCSE Foundation Tier French Knowledge Organiser

False Friends

l'enfant (m)	child

Tricky Pronunciation - practise these with your teacher!

la famille	family
les cheveux (m)	hair
les yeux (m)	eyes
la fille	girl/daughter
le fils	son
vieux / vieil / vieille	old
gentil / gentille	kind

Tricky Spellings

je m'appelle	my name is	Check: two p's and -elle at the end
la famille	family	Check: two l's
vieux / vieil / vieille	old	Check the vowel combination
je m'entends avec	I get on with	Check the s at the end of entends

Key Phrases

je m'appelle	my name is
j'ai ...ans –	I have ...years (age)
dans ma famille il y a	in my family there is/are
je m'entends avec –	I get on with
je ne m'entends pas avec	I don't get on with
je me dispute avec	I argue with
j'ai les cheveux....	I have hair... (description of hair colour, style etc.)
mon père / ma mère est....	my father/mother is...
mon meilleur ami / ma meilleure amie est...	my best friend (m/f) is...
mes parents sont	my parents are...
un bon ami / une bonne amie est	a good friend (m/f) is...
à mon avis le mariage c'est...	in my opinion marriage is...

Key Ideas

- La composition de ta famille
- Les relations avec ta famille et tes amis
- Les qualités d'un bon ami / d'une bonne amie
- Ce que tu fais avec ta famille et tes amis
- Ton opinion du mariage

Me, my family and friends GCSE Foundation Tier French Knowledge Organiser

Key Vocabulary

Les noms

l'amour (m)	love
la barbe	beard
le beau-père	step-father/father in law
la belle-mère	step-mother/mother in law
les cheveux (m)	hair (on head)
le copain / la copine	friend, mate
le demi-frère	half-brother/step-brother
la demi-sœur	half-sister/step-sister
la femme	wife
la fille	daughter
le fils	son
le frère	brother
la grand-mère	grandmother
le grand-père	grandfather
les grands-parents (m)	grandparents
les lunettes (f)	glasses/spectacles
le mari	husband
la mort	death
la naissance	birth
le nom	name/surname
l'oncle (m)	uncle
le / la partenaire	partner
le petit ami	boyfriend
la petite amie	girlfriend
la petite -fille	granddaughter
le petit-fils	grandson
le prénom	first name

les rapports (m) — relationships

le sens de l'humour	sense of humour
la sœur	sister
la tante	aunt
les yeux (m)	eyes

Les adjectifs

aimable	kind
aîné(e)	elder
bavard(e)	chatty/talkative
beau / belle / bel	beautiful
bête	stupid/silly
bouclé(e)	curly
célibataire	single
court(e)	short
égoïste	selfish
fâché(e)	angry
frisé(e)	curly
généreux / généreuse	generous
gentil / gentille	kind/nice
gros / grosse	fat
heureux / heureuse	happy
injuste	unfair
jeune	young
joli(e)	pretty
laid(e)	ugly
long / longue	long
méchant(e)	naughty/nasty
mi-long	medium length
mort(e)	dead
né(e) le...	born on the...
paresseux / paresseuse	lazy
pénible	annoying
raide	straight
séparé(e)	separated
sportif / sportive	sporty
sympa	kind/nice
de taille moyenne	medium height
timide	shy
tranquille	quiet/calm
triste	sad
travailleur / travailleuse	hard-working
unique (fils / fille unique)	only (child)
vieux / vieil / vieille	old

Les verbes

s'appeler	to be called
avoir...ans	to be...years old
dire	to say/tell
se disputer	to argue
s'entendre avec	to get on with
se faire des amis	to make friends
se marier	to get married/to marry
partager	to share
sortir	to go out

Year 10 Term 1 Knowledge Organiser Booklet

Social Issues GCSE Foundation Tier French Knowledge Organiser

Key Ideas
- Description d'une alimentation saine/malsaine
- Les dangers de la cigarette/de l'alcool
- L'importance du sport pour la santé
- Les sans-abris dans ta ville
- Une association caritative que tu connais

Key Vocabulary

Les noms

l'alcool (m)	alcohol
l'alimentation (f)	food
l'association caritative (f)	charity
le bonheur	happiness
la drogue	drugs
l'égalité	equality
la forme	fitness
la maladie	illness
les matières grasses (f)	fats
l'obésité (f)	obesity
l'odeur (f)	smell
le repas	meal
la santé	health
les sans-abris (m)	homeless people
le sommeil	sleep
le tabac	tobacco
le travail bénévole	voluntary work

Les adjectifs

équilibré(e)	balanced
fatigué(e)	tired
gras(se)	fatty
malade	ill
malsain(e)	unhealthy
sain(e)	healthy
sucré(e)	sugary
varié(e)	varied

Les verbes

(s')arrêter	to stop
combattre	to combat
se détendre	to relax
dormir	to sleep
se droguer	to take drugs
éviter	to avoid
faire un régime	to be on a diet
fumer	to smoke
rester	to stay
se sentir	to feel
tuer	to kill

Key Verbs

Infinitif	Présent	Passé	Futur
faire – to do	je fais; il/elle fait; nous faisons	j'ai fait; il/elle a fait; nous avons fait	je ferai; il/elle fera; nous ferons
être – to be	je suis; il/elle est; nous sommes	j'ai été; il/elle a été; nous avons été	je serai; il/elle sera; nous serons
avoir – to have	j'ai; il/elle a; nous avons	j'ai eu; il/elle a eu; nous avons eu	j'aurai; il/elle aura; nous aurons
manger – to eat	je mange; il/elle mange; nous mangeons	j'ai mangé; il/elle a mangé; nous avons mangé	je mangerai; il/elle mangera; nous mangerons
aller – to go	je vais; il/elle va; nous allons	je suis allé(e); il/elle est allé(e); nous sommes allé(e)(s)	j'irai; il/elle ira; nous irons
fumer – to smoke	je fume; il/elle fume; nous fumons	j'ai fumé; il/elle a fumé; nous avons fumé	je fumerai; il/elle fumera; nous fumerons
dormir – to sleep	je dors; il/elle dort; nous dormons	j'ai dormi; il/elle a dormi; nous avons dormi	je dormirai; il/elle dormira; nous dormirons

Key Phrases

Pour le petit-déjeuner/le déjeuner/le dîner, d'habitude, je prends...	For breakfast/lunch/dinner, I usually have...
C'est bon/mauvais pour la santé	It's good/bad for your health
Ça contient beaucoup/trop de...	It contains a lot of/too much...
Pour garder la forme, il faut faire/manger/boire/éviter...	To keep fit, you have to do/eat/drink/avoid...
Le tabac/L'alcool cause...	Tobacco/Alcohol causes...
Il provoque l'obésité/une perte de poids/un gain de poids	It causes obesity/weight loss/weight gain
Mon oncle a arrêté de fumer il y a six mois	My uncle quit smoking six months ago
Il faut faire du sport régulièrement pour se détendre	You must play sport regularly to relax
Il y a beaucoup de sans-abris dans ma ville	There are many homeless people in my town
Je suis membre d'une association caritative qui s'appelle...	I am a member of a charity called...

Social Issues GCSE Foundation Tier French Knowledge Organiser

Key Questions
- Que faut-il faire pour garder la forme ?
- Au-tu une alimentation saine ? Pourquoi (pas) ?
- Est-ce que tu fumes ? Pourquoi (pas) ?
- Quels sont les dangers de la cigarette/de l'alcool ?
- Selon toi, pourquoi est-ce que c'est important de faire du sport ?
- Que penses-tu de la situation des sans-abris ?
- Est-ce que tu connais des associations caritatives ?

Useful Grammatical Structures
- Use **modifiers** to modify an adjective.
  Examples include: assez (quite); plutôt (rather); un peu (a bit).
- Use **intensifiers** to intensify an adjective.
  Examples include: vraiment (really); très (very); particulièrement (particularly); totalement (totally); complètement (completely); si (so).
- Use **comparatives** to compare two or more items.
  Examples include plus/moins/aussi sain que... (more/less/as healthy as...)
- Use **connectives and conjunctions** to make longer sentences.
  Examples include parce que (because); car (as/because); mais (but); cependant (however); quand (when).
- Use a range of **negatives**.
  Examples: je ne mange pas de viande (I don't eat meat); je ne mange plus de chocolat (I no longer eat chocolate); je ne bois jamais de coca (I never drink coke).
- Use the **perfect tense with avoir or être** to describe past events.
  Examples include: je suis allé(e) (I went); j'ai mangé (I ate); j'ai fait (I did); j'ai travaillé (I worked); j'ai bu (I drank); j'ai aidé (I helped).
- Use the **future tense** to describe future intentions.
  Examples include: je mangerai moins de chocolat (I will eat less chocolate).

False Friends

la fumée	smoke
le médecin	doctor
le travail	work
garder	to keep
rester	to stay

Tricky Spellings

l'alcool	alcohol	No 'h'
équilibré(e)	balanced	Check the accents
nous mangeons	we eat	Remember to add 'e' before the ending

Tricky Pronunciation
Practise these with your teacher!

l'alcool	alcohol
l'alimentation	food
l'association caritative	charity
le sommeil	sleep
le tabac	tobacco
le travail bénévole	voluntary work
équilibré(e)	balanced
fumer	to smoke
trop	too (much/many)

Year 10 Term 1 Knowledge Organiser Booklet

Travel and Tourism GCSE Foundation Tier French Knowledge Organiser

Key Ideas
- Pourquoi on aime partir en vacances
- Les destinations de vacances – normalement / l'année prochaine / dernière
- Les types de vacances qu'on aime
- Rester en Angleterre ou partir à l'étranger
- Les avantages et inconvénients de différents types d'hébergement / transport
- Les activités qu'on fait en vacances (opinions)
- Comment sont tes vacances de rêve ?

Key Verbs

Infinitif	Présent	Passé	Futur
faire – to do	je fais/ il fait/ elle fait nous faisons/ ils font elles font	j'ai fait/ il a fait/ elle a fait/nous avons fait/ ils ont fait/ elles ont fait	je ferai/ il fera/ elle fera nous ferons/ ils feront/ elles feront
être – to be	je suis/ il est/ elle est nous sommes/ils sont/ elles sont	j'ai été/ il a été/ elle a été/ nous avons été/ ils ont été/ elles ont été	je serai/ il sera/ elle sera nous serons/ ils seront/ elles seront
avoir – to have	j'ai/ il a/ elle a nous avons/ ils ont/ elles ont	j'ai eu/ il a eu/ elle a eu/ nous avons eu/ils ont eu/ elles ont eu	j'aurai/ il aura/ elle aura nous aurons/ ils auront / elles auront
aller – to go	je vais/ il va/ elle va nous allons/ ils vont / elles vont	je suis allé(e)/ il est allé/ elle est allée nous sommes allé(e)s/ ils sont allés/elles sont allées	j'irai/ il ira/ elle ira nous irons/ils iront /elles iront
prendre – to take	je prends; il/elle prend; nous prenons	j'ai pris; il/elle a pris; nous avons pris	je prendrai; il/elle prendra; nous prendrons

Key Phrases

J'aime / je n'aime pas aller en vacances parce que...	I like/dislike going on holiday because...
Je trouve les vacances relaxants / stressantes	I find holidays relaxing/stressful.
Je n'aime pas aller en vacances en famille	I don't like going on holiday with my family.
Personnellement je préfère les vacances culturelles	Personally I prefer cultural holidays.
D'habitude on reste dans un gîte	Usually we stay in a holiday home.
Dans un gîte on a plus de liberté	Staying in a holiday home gives you more freedom.
Pendant les grandes vacances...	During the summer holidays...
Il faisait chaud chaque jour	It was hot every day.
L'avantage de prendre l'avion c'est que c'est rapide	The advantage of taking the plane is that it's fast.
J'ai visité plusieurs sites touristiques et j'ai pris beaucoup de photos	I visited lots of tourist spots and I took lots of photos.
J'ai goûté la cuisine locale	I sampled the local cuisine
Pour mes vacances de rêve je voudrais aller au Maroc	For my dream holiday I would like to go to Morocco.

Key Vocabulary

Les noms:

à l'étranger	abroad
l'aéroport	airport
l'avion	aeroplane
le camping	campsite
la crème solaire	suncream
un coup de soleil	sunburn
la cuisine locale	the local cuisine
le gîte	holiday home
l'hôtel	hotel
le maillot de bain	swimwear
la plage	beach
le séjour	stay
le temps	the weather
les vacances (f)	holidays
la voiture	car
le voyage	journey

Les adjectifs:

beau / belle	beautiful
ennuyeux / ennuyeuse	boring
fatigant(e)	tiring
intéressant(e)	interesting
lent(e)	slow
passionnant(e)	exciting
stressant(e)	stressful

Les verbes:

nager	to swim
bronzer	to sunbathe
faire chaud / froid	to be hot/cold (weather)
perdre	to lose
rester	to stay
voyager	to travel

Travel and Tourism GCSE Foundation Tier French Knowledge Organiser

Key Questions
1. Aimes- tu aller en vacances ? | Do you like going on holiday ?
2. Quels sont les avantages et inconvénients :
   a) des différents types d'hébergement ? (les hôtels / les gîtes etc.) | What are the advantages and disadvantages of: different types of accommodation (hotels/ holiday homes)
   b) des différents moyens de transport ? (l'avion / la voiture) | different means of transport (plane/car)
   c) des différentes destinations ? (la ville / la campagne etc.) | different destinations (town/countryside)
3. Où vas-tu en vacances normalement ? | Where do you normally go on holiday?
4. Préfères- tu rester en Grande-Bretagne ou aller à l'étranger ? | Do you prefer staying in Great Britain or going abroad?
5. Décris-moi une journée typique. | Describe a typical day.
6. Qu'est-ce que tu as fait pendant les grandes vacances l'année dernière ? | What did you do last year during the summer holidays?
7. Parle-moi de tes vacances de rêve. | Talk to me about your dream holiday.

Useful Grammatical Structures
- Use the **perfect tense** with avoir or être to describe past events. Examples include: je suis allé(e) (I went); j'ai visité (I visited); j'ai fait (I did); j'ai dormi (I slept); j'ai bu (I drank).
- Use **modifiers** to modify an adjective.
- Use **intensifiers** to intensify an adjective. Examples include vraiment (really); très (very); particulièrement (particularly); totalement (totally); complètement (completely); si (so).
- Use **comparatives** to compare two or more items. Examples include plus/moins/aussi sain que... (more/ less/as healthy as...)
- Use **connectives and conjunctions** to make longer sentences. Examples include parce que (because); car (as/because); mais (but); cependant (however); quand (when).

False Friends

l'Amérique	the continents of North and South America (not just the USA)
une journée	a day
la location	the rental
rester	to stay

Tricky Pronunciation

ennuyeux / ennuyeuse	boring
je préfère	I prefer
le gîte	holiday home
le temps	weather
le maillot de bain	swimwear
un coup de soleil	sunburn

Tricky Spellings

les vacances	holidays	Make sure that this is feminine. It is always plural.
ennuyeux / ennuyeuse	boring	Make sure that this is feminine. It is always plural.
passionnant(e)	exciting	Check the double 's', double 'n' and ending.
préféré(e)	favourite	Check the accents.

Year 10 Term 1 Knowledge Organiser Booklet

Key Phrases

hay que/no hay que + infinitivo	it is necessary to/you should; it is not necessary to/you shouldn't
se debe/no se debe + infinitivo	one must/one must not
está prohibido + infinitivo	it is forbidden
no tengo confianza en mí mismo/a	I do not have confidence in myself.
estoy a favor del uniforme escolar	I am in favour of the school uniform.
estoy en contra del uniforme escolar	I am against the school uniform.
tengo la razón	I am right.
me equivoco	I am wrong.
los problemas más serios son	the most serious problems are
mejor	better
por	worse
excepto	except
temprano/tarde	early/late
más... que/menos... que	more... than/less... than

Tricky Pronunciation: Practise these with your teacher!

hay que	it is necessary to	Make sure you don't pronounce the 'h'.

False Friends

el director/la directora	headteacher
aprobar un examen	to pass an exam
la jornada escolar	school day
durar	to last

Tricky spellings

el comportamiento	behaviour	Check the accent on the 'a'.
el examen	exam	Check the "h" between the first 'o' and the first 'i'.
está prohibido	it is forbidden	

Key Questions

1 ¿Tienes demasiados deberes?
Do you have too much homework?

2. Describe las reglas de tu colegio.
Describe the school rules.

3. Para ti, ¿cuáles son los problemas más serios de tu colegio?
What are the most serious problems at school, in your opinion?

4. ¿Estás a favor o en contra del uniforme escolar?
Are you for or against school uniform?

5. Describe tu instituto ideal.
Describe your ideal school.

6. ¿Cuáles son las principales diferencias entre la rutina escolar de España y la de Inglaterra?
What are the main differences between school life in Spain and school life in England?

Useful Grammatical Structures

- Be aware of grammatical markers which help you to work out whether a noun is singular or plural. Most plurals add '-s' at the end of the noun.
- Use the infinitive after these key constructions: hay que (you should); no hay que (you shouldn't); se debe/ no se debe (one must/one mustn't); está prohibido (it is forbidden to).
- Use relative pronouns to link sentences together e.g. que (that/which); donde(where); cuando (when).
- Use negatives to negate a sentence. Place them before the verb e.g. no juego a fútbol (I don't play football); nunca juego a fútbol (I never play football).

Key Ideas

- Las reglas del colegio.
- Los problemas escolares.
- Las diferencias entre los institutos de España y los de Inglaterra.
- Mi instituto ideal.
- Mi uniforme escolar.
- Los deberes.

Key Vocabulary

Los sustantivos

el acoso (escolar)	(school) bullying
el alumno	pupil, student
los apuntes	notes
la biología	biology
el bolígrafo	pen
la clase	classroom
el comportamiento	behaviour
los deberes	homework
la escuela	school
el examen	examination
el permiso	permission
el recreo	break, recess, playtime, recreation
la rutina	routine

Los adjetivos

desobediente	disobedient
educativo/a	educational
obligatorio/a	compulsory
privado/a	private
sobresaliente	outstanding

Los vestuarios | changing rooms

Los verbos

aprender	to learn
aprobar	to approve, to pass (an exam)
comportarse	to behave
charlar	to chat
entender	to understand
explicar	to explain
preguntar	to ask a question
suspender	to fail (exam/subject)

Key Verbs

Infinitivo	Presente	Pasado (Pretérito)	Futuro
hacer – to do	yo hago ; él/ella hace ; nosotros/as hacemos	yo hice ; él/ella hizo ; nosotros/as hicimos	yo haré ; él/ella hará ; nosotros/as haremos
ser – to be	yo soy ; él/ella es ; nosotros/as somos	yo era ; él/ella era ; nosotros/as éramos	yo seré ; él/ella será ; nosotros/as seremos
estar – to be	yo estoy ; él/ella está ; nosotros/as estamos	yo estuve ; él/ella estuvo ; nosotros/as estuvimos	yo estaré ; él/ella estará ; nosotros/as estaremos
tener – to have	yo tengo ; él/ella tiene ; nosotros/as tenemos	yo tuve ; él/ella tuvo ; nosotros/as tuvimos	yo tendré ; él/ella tendrá ; nosotros/as tendremos
deber – to have to	yo debo ; él/ella debe ; nosotros/as debemos	yo debí ; él/ella debía ; nosotros/as debíamos	yo deberé ; él/ella deberá ; nosotros/as deberemos
saber – to know (a fact)	yo sé ; él/ella sabe ; nosotros/as sabemos	yo supe ; él/ella supo ; nosotros/as supimos	nosotros/as deberemos
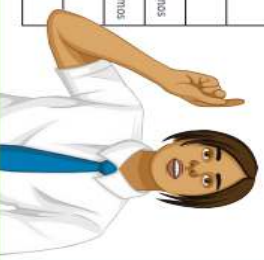
Year 10 Term 1 Knowledge Organiser Booklet

Me, My Family and Friends: GCSE Foundation Tier Spanish Knowledge Organiser

Key Phrases

me llamo	my name is
tengo ...años	I am ...years old
en mi familia hay	in my family there is/are
me llevo bien con	I get on with
me llevo mal con	I don't get on with
discuto con	I argue with
tengo el pelo...	I have... hair... (description of hair colour, style etc)
mi padre/madre es...	my father/mother is...
mi mejor amigo/a es...	my best friend (m/f) is...
mis padres son...	my parents are...
un buen amigo/una buena amiga es...	a good friend (m/f) is...
en mi opinión el matrimonio es...	in my opinion marriage is...

Key Questions

1. ¿Cuántas personas hay en tu familia? How many people are there in your family?
2. ¿Te llevas bien con tu familia? Do you get on with your family?
3. ¿Cómo es tu personalidad? What is your personality like?
4. ¿Puedes describir algún miembro de tu familia? Can you describe a member of your family?
5. ¿Cómo es un buen amigo/ una buena amiga? What is a good friend (m/f)?
6. ¿Qué te gusta hacer con tu familia? What do you like doing with your family?
7. ¿Qué vas a hacer con tus amigos el fin de semana que viene? What are you going to do with your friends next weekend?
8. ¿Cuál es tu opinión sobre el matrimonio? What is your opinion on marriage?
9. ¿Te gustaría tener hijos en el futuro? Would you like children in the future?

Key Verbs

Infinitivo	Presente	Pasado (Pretérito)	Futuro
hacer - to do	yo hago ; él/ella hace : nosotros/as hacemos	yo hice ; él/ella hizo : nosotros/as hicimos	yo haré ; él/ella hará : nosotros/as haremos
ser - to be	yo soy ; él/ella es ; era : nosotros/as somos	yo era ; él/ella era : nosotros/as éramos	yo seré ; él/ella será : nosotros/as seremos
estar - to be	yo estoy ; él/ella está ; nosotros/as estamos	yo estuve ; él/ella estuvo : nosotros/as estuvimos	yo estaré ; él/ella estará ; nosotros/as estaremos
tener - to have	yo tengo ; él/ella tiene ; nosotros/as tenemos	yo tuve ; él/ella tuvo : nosotros/as tuvimos	yo tendré ; él/ella tendrá ; nosotros/as tendremos
salir - to go out	yo salgo ; él/ella sale ; nosotros/as salimos	yo salí ; él/ella salió : nosotros/as salimos	yo saldré ; él/ella saldrá; nosotros/as saldremos

False Friends

los parientes	relatives
molestar	to bother

Tricky Pronunciation: Practise these with your teacher!

el adolescente	teenager	
el hermanastro/la hermanastra	stepbrother/stepsister	
el hermano/La hermana	brother/sister	Don't pronounce the 'h'.
llevarse bien/mal con	to get on (well/badly) with someone	The letters 'll' are pronounced like the 'y' in the word 'yes'.
me llamo	my name is	The letters 'll' are pronounced like the 'y' in the word 'yes'.

Tricky Spellings

egoísta	selfish	Check the accent on the 'i'.
la madrastra	stepmother	Check both 'r' after the letters 'd' and 't'.
el padrastro	stepfather	Check both 'r' after the letters 'd' and 't'.
pelirrojo/a	red-haired	Check the 'rr' between 'i' and 'o'.

Me, My Family and Friends: GCSE Foundation Tier Spanish Knowledge Organiser

Key Ideas

- La composición de tu familia.
- La relaciones con tu familia y tus amigos/as.
- Las cualidades de un buen amigo/ una buena amiga.
- Lo que vas a hacer con tu familia y tus amigos/.
- Tu opinión sobre el matrimonio.

Useful Grammatical Structures

- Use **modifiers** to modify an adjective. Examples include: bastante (quite); un poco (a bit).
- Use **intensifiers** to intensify an adjective. Examples include: realmente (really); muy (very); particularmente (particularly); totalmente (totally); completamente (completely).
- Use **connectives and conjunctions** to make longer sentences. Examples include: porque (because); ya que (as/because); cuando (when); pero (but); sin embargo (however); aunque (although).

Key Vocabulary

Los sustantivos

el abuelo	grandfather
el adolescente	teenager
el anciano/la anciana	old person
el aspecto	appearance, looks
la barba	beard
el bigote	moustache
la boda/el casamiento	wedding
el compañero	friend, mate
la disputa	argument
la edad	age
la felicidad	happiness
las gafas	glasses
el hermanastro	stepbrother
el hijo (único)	(single) child
el invitado	guest
el jubilado	OAP, pensioner
la madrastra	stepmother
el marido	husband
el matrimonio	marriage, married couple
el miembro	member
la mujer	wife, woman
el nieto	grandchild
el novio	boyfriend
el padrastro	stepfather
los parientes	relatives
las pecas	freckles
la pelea	fight
el pelo	hair
el primo	cousin
el tío	uncle
el vecino	neighbour

Los adjetivos

alegre	happy
amable	kind
amistoso/a	friendly
antipático/a	unpleasant
calvo/a	bald
casado/a	married
castaño/a	chestnut, brown
comprensivo/a	understanding
corto/a	short
egoísta	selfish
gracioso/a	funny
guapo/a	good-looking
joven	young
jubilado/a	retired
liso/a	straight (hair)
maleducado/a	rude
moreno/a	dark (-haired, -skinned)
pelirrojo/a	red-haired
perezoso/a	lazy, idle
rizado/a	curly
rubio/a	blonde
simpático/a	kind, nice, pleasant
soltero	single (not married)
travieso/a	naughty, mischievous

Los verbos

besar	to kiss
casarse	to get married
conocer	to know, be familiar with, get to know
cuidar	to look after
dar las gracias	to thank
discutir	to discuss
enamorarse	to fall in love
encontrar(se)/ quedar con alguien	to meet with someone
fastidiar	to annoy, to bother
llamarse	to be called
llevarse bien/mal con	to get on (well/badly) with someone
molestar	to bother
nacer	to be born
pasear	to go for a walk
pelear(se)	to fight
romper	to break
salir	to go out
tener ganas	to feel like
tener... años	to be... years old

Year 10 Term 1 Knowledge Organiser Booklet

Travel and Tourism GCSE Higher Tier Spanish Knowledge Organiser

Key Questions

1.	¿Te gusta ir de vacaciones?	Do you like going on holiday?
2.	¿Cuáles son las ventajas y los inconvenientes de... a) los diferentes tipos de alojamiento? (los hoteles/los albergues, etc.) b) los diferentes tipos de transporte? (el avión/el coche) c) los diferentes destinos? (la ciudad/el campo, etc.)	What are the advantages and disadvantages of... different types of accommodation (hotels/holiday homes)? different means of transport (plane/car)? different destinations (town/countryside)?
3.	¿Dónde vas de vacaciones normalmente?	Where do you normally go on holiday?
4.	¿Prefieres quedarte en Gran Bretaña o viajar al extranjero?	Do you prefer staying in Great Britain or going abroad?
5.	Describe un día típico.	Describe a typical day.
6.	¿Qué hiciste el año pasado en las vacaciones de verano?	What did you do last year during the summer holidays?
7.	Háblame de las vacaciones de tus sueños.	Talk to me about your dream holiday.

Useful Grammatical Structures

- Use modifiers to modify an adjective. Examples include bastante (quite), un poco (a bit)
- Use intensifiers to intensify an adjective. Examples include realmente (really); muy (very); particularmente (particularly); totalmente (totally); completamente (completely)
- Use connectives and conjunctions to make longer sentences. Examples include porque (because); ya que (as/because); pero (but); sin embargo (however); cuando (when); although (aunque)

Tricky Spellings

el avión	airplane, aeroplane	Check the accent
la cámara de fotos	camera	Check the accent

Tricky Pronunciation — Practise these with your teacher!

alojarse	to lodge, to stay
bañarse	to bathe, to swim
llevar	to take

Travel and Tourism GCSE Higher Tier Spanish Knowledge Organiser

Key Ideas

- Por qué me gusta ir de vacaciones
- Los destinos de vacaciones normalmente/ el año pasado/el año que viene
- Los tipos de vacaciones que me gustan
- Quedarse en Inglaterra o viajar al extranjero
- Las ventajas y los inconvenientes de los diferentes tipos de alojamiento/ transporte
- Las actividades que se hacen de vacaciones (opiniones)
- ¿Cómo son las vacaciones de tus sueños?

Los verbos

alojarse	to lodge, to stay
bañarse	to bathe, to swim
caminar	to walk
descansar	to rest
esquiar	to ski
estar de vacaciones	to be on holiday
llevar	to take
pasar	to spend time, to go through, to pass
reservar	to book, to reserve
sacar fotos	to take photos
tomar el sol	to sunbathe
viajar	to travel

Key Vocabulary

Los sustantivos

el aeropuerto	airport
la agencia de viajes	travel agent's
el aire acondicionado	air conditioning
el albergue juvenil	youth hostel
el alojamiento	accommodation
el avión	airplane, aeroplane
el barco	boat
el billete (de ida/de ida y vuelta)	ticket (single/return)
la cama de matrimonio	double bed
la cámara de fotos	camera
el camping	camp site, camping
el coche	car
el crucero	cruise
la maleta	suitcase
el mar	sea
la media pensión	half board
la montaña	mountain
la playa	beach
la pensión completa	full board
la tienda de campaña	tent
el viaje	trip, journey
el vuelo	flight

Los adjetivos

aburrido/a	boring
bonito/a	beautiful
cansado/a	tiring
emocionante	exciting
estresante	stressful
interesante	interesting
lento/a	slow

Key Phrases

Me gusta/No me gusta ir de vacaciones porque...	I like/dislike going on holiday because...
Encuentro las vacaciones relajantes/ estresantes.	I find holidays relaxing /stressful.
No me gusta ir de vacaciones con mi familia.	I don't like going on holiday with my family.
Personalmente prefiero las vacaciones culturales.	Personally, I prefer cultural holidays.
Normalmente nos quedamos en una casa de alquiler.	Usually, we stay in a holiday home.
Alojarse en una casa de alquiler te da más libertad.	Staying in a holiday home gives you more freedom.
Durante las vacaciones de verano...	During the summer holidays,...
Hizo mucho calor todos los días.	It was hot every day.
La ventaja de coger un vuelo es que es más rápido.	The advantage of taking the plane is that it's fast.
Visité muchos lugares turísticos y saqué muchas fotos.	I visited lots of tourist spots and I took lots of photos.
Probé la comida local.	I sampled the local cuisine
Para mis vacaciones ideales me gustaría ir a...	For my dream holiday, I would like to go to...

Infinitivo	Presente	Pasado (Pretérito)	Futuro
hacer – to do	yo hago ; él/ella hace ; nosotros/as hacemos	yo hice ; él/ella hizo ; nosotros/as hicimos	yo haré ; él/ella hará ; nosotros/as haremos
tener – to have	yo tengo ; él/ella tiene ; nosotros/as tenemos	yo tuve ; él/ella tuvo ; nosotros/as tuvimos	yo tendré ; él/ella tendrá ; nosotros/as tendremos
ir – to go	yo voy ; él/ella va; nosotros/as vamos	yo fui ; él/ella fue ; nosotros/as fuimos	yo iré ; él/ella irá ; nosotros/as iremos
ser – to be	yo soy ; él/ella es ; nosotros/as somos	yo era ; él/ella era ; nosotros/as éramos	yo seré ; él/ella será ; nosotros/as seremos
estar – to be	yo estoy ; él/ella está ; nosotros/as estamos	yo estuve ; él/ella estuvo ; nosotros/as estuvimos	yo estaré ; él/ella estará ; nosotros/as estaremos
viajar – to travel	yo viajo ; él/ella viaja; nosotros/as viajamos	yo viajé ; él/ella viajó ; nosotros/as viajamos	yo viajaré ; él/ella viajará ; nosotros/as viajaremos

Year 10 Term 1 Knowledge Organiser Booklet

| Key terms and definitions		Key terms and definitions	
Areas of Outstanding Natural Beauty (AONB)	In England, Wales, and Northern Ireland) an area of countryside designated by a government agency as having natural features of exceptional beauty and therefore given a protected status	**Listed buildings**	A listed building, or listed structure, is one that has been placed on one of the four statutory lists maintained by Historic England in England, Historic Environment
Sites of Special Scientific Interest (SSSI)	A formal conservation designation. Usually, it describes an area that's of particular interest to science due to the rare species of fauna or flora it contains - or even important geological or physiological features that may lie in its boundaries	**Protected areas**	A protected area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values
		Green belt	An area of open land around a city, on which building is restricted
Heritage Coast	A heritage coast is a strip of coastline in England and Wales, the extent of which is defined by agreement between the relevant statutory national agency and the relevant local authority	**National Parks**	An area of countryside, or occasionally sea or fresh water, protected by the state for the enjoyment of the general public or the preservation of wildlife.
Services	a system supplying a public need such as transport, communications, or utilities such as electricity and water	**World Heritage Sites**	A natural or man-made site, area, or structure recognized as being of outstanding international importance and therefore as deserving special protection. Sites are nominated to and designated by the World Heritage Convention
Synthesising	To combine so as to form a new, complex product		
Infrastructure	The basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise	**Environmentally Sensitive Area (ESA)**	An area officially designated as containing landscapes or wildlife that would be threatened by unrestricted development
Ordnance survey maps	An Ordnance Survey map is a detailed map produced by the British or Irish government map-making organization.		
Web based maps e.g. satellite	Web mapping is the process of using the maps delivered by geographic information systems (GIS) in World Wide Web.	**Protection orders**	A restraining order or protective order is an order used by a court to protect a person, business, company, establishment, or entity, and the general public, in a situation involving alleged domestic violence, assault, harassment, stalking, or sexual assault
Sequencing	Arrange in a particular order		
Terrain	A stretch of land, especially with regard to its physical features	**Utility**	an organization supplying the community with electricity, gas, water, or sewerage

What is the Product Lifecycle?

All products have a life span – this is short for some products or, in the cases of popular products, quite extensive (long). The Product Lifecycle is a set of stages that a product will go through in its lifetime. It is important to note that not all products go through all stages of the lifecycle.

Label this diagram of the Product Lifecycle…
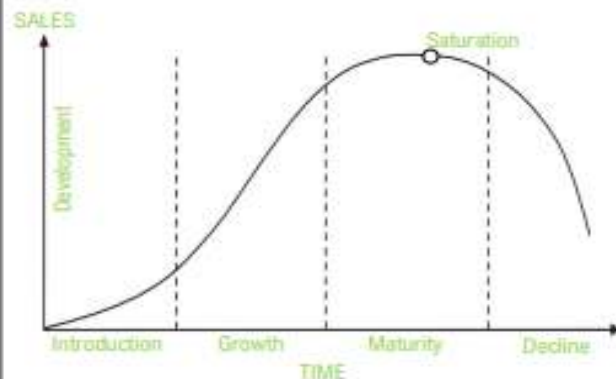
Explain each stage of the Product Lifecycle…

☆ **Development** – Sometimes called Research and Development, this is the stage before the product is released where the business will be designing and testing the product as well as completing their market research.

☆ **Introduction** – At this stage, the product is launched into the market. Businesses might be advertising the new product a lot at this stage to increase awareness and might include introductory offers.

☆ **Growth** – If the launch of the product is a success, it will enter this stage – remember not all products go through all stages of the lifecycle – some may decline and never grow! At the growth stage, sales of the product will increase.

☆ **Maturity** – At this stage, most customers have tried or bought the product. New competitors might be on the scene. Sales are at their highest, but the rate of growth is now slow.

☆ **Decline** – In this final stage, sales decline. Continuing this trend will mean that the product will be withdrawn from the market. If businesses are aware of the Product Lifecycle though, they will be able to extend the life of a product once they have identified it is in decline.

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R064 Learning Outcome 3

What is an Extension Strategy?

An Extension Strategy is the name given to the action a business takes when it identifies a product is entering the decline stage of the Product Lifecycle. These actions aim to extend the life of a product, by keeping the product within the maturity stage, and should improve sales.

What Extension Strategies can businesses use?

Businesses could **advertise** their product to remind customers that it exists and to encourage them to purchase it. The **price** of the product could be **reduced**, or the product could be **updated** to encourage new sales. Businesses might choose to explore **other markets** – like targeting a **different audience** or selling in another country, this would expose the product to new customers. The **packaging** of the product could be updated to get customers' attention.

What is Product Differentiation?

As the name suggests, Product Differentiation refers to what is DIFFERENT or what STANDS OUT about the product or service a business is launching.
Being clear about what is different about a product will help it compete.

How can Product Differentiation be achieved?

- Businesses should try to build a strong brand image for their goods or services.
- Businesses should focus on the function, cost and appearance of their products (the Design Mix).

To stand out, business could offer improved/better:
- Design mix (see above)
- Location
- Product Features
- Product Functions
- Better services (delivery etc.)
- After sales services (extended guarantees etc.)
- Design/Appearance of their products
- Identify a clear USP for their product

Differentiation is about the product itself, not the price etc.

What is a USP?

USP stands for Unique Selling Point.

This is a specific thing that a business identifies about their product or service that is different (unique). Businesses identify a USP for their products or services to help them DIFFERENTIATE from others on the market.

How can identifying a USP for a product help sales?

If a business identifies a USP for a product or service, they can use this within their advertising. If the market already has existing products or services being sold, having a USP will help a new product stand out and will give customers a reason to change their habits and purchase the new product.

What does 'External Factors on Product Development' mean?

External Factors are the things that are out of a business's control that they must consider when developing new products or services. If a business intends to sell in other countries, these external factors could be different for each country they choose to sell in.

Explain the three categories of External Factors that could affect Product Development. Give examples for each.

☆ **Technological Developments** – technology is changing and updating at a fast pace. Businesses must keep up to date with these developments or they'll be left behind by competitors. Technology could make it easier to manufacture products, for example, or could change customers' preferences.

☆ **Economic issues** – unemployment, recession, boom and other economic factors may affect how a business's product is developed and how successful the product is overall. In times of high unemployment, for example, people are more likely to be purchasing essential items and will avoid luxuries. If a business sells luxury items, this is going to have an impact on their sales and they need to be aware of this (produce less, advertise more, differentiate).

☆ **Legal Issues** – businesses need to make sure they understand different laws when producing and selling products and ensure they do not break any of these laws. Laws could have an impact on the way a product is manufactured or could change the designs of some products to ensure they meet safety standards within a particular country. Businesses must also ensure they do not copy other people's/business's ideas (Copyright/Patents) when developing new products. Meeting legal obligations could cost the business more to produce a product but will ensure the business is less likely to break laws and therefore should avoid having legal cases against them.