Y9 The Giver Absolute

Concepts

Conformity

Having to fit in with everyone else.

Social Responsibility

Looking out for others particularly those that are disadvantaged..

Morality

Principles around how we distinguish between right and wrong or good and bad behaviour.

Individuality

Qualities that make you different from others.

Humanity

The things that make us human – our ability to feel love, pain and be individuals.

Injustice

When a result is viewed as being unfair. It may be based in bias and prejudice.

Terminology

Figurative Language
Technique such as similes metaphors personification and allusion.

Narrative Voice
The perspective a story is told from

.Writer's Craft
The choices a writer makes when producing their written work.

Allusion
An expression designed to call something else to mind with mentioning it explicitly.

Sensory Imagery
A description that involves one or more of the five senses.

Archetypal
Very typical of a certain kind of person or thing.

Vocabulary

1. **Utopia** – an ideal, perfect place to live.
2. **Dystopia** – a miserable society, the opposite of a utopia. This can be the result of environmental destruction, or corrupt leadership.
3. **Hierarchy** – a system where people are ranked one above the other, like a pyramid.
4. **Oppression** – describes how people in power use it in a cruel or unjust manner.
5. **Tyranny** – describes where a leader rules cruelly or harshly through fear.
6. **Totalitarian rule** – describes a system where a leader tries to have total control over their people. Criticism of the leadership is banned and harshly punished.
7. **Social criticism** – analysis of problems to do with the way society is organised.
8. **Radical** – extreme or drastic
9. **Revolution** – a sudden, complete change.
10. **Suppress** – to stop an activity that people had previously done.
11. **Exiled** – cast out by people in power.

Techniques

Euphemism (making something sound softer than it really is)
Hypophora (a technique in rhetoric where a speaker asks a question and then immediately answers it)
Metaphor (describing something as something else in order to draw a comparison between the two).

Year 9 Prose Support

Freytag's Pyramid (Story Mountain)

Features of an effective short story

-Writing in first person.
-A clear resolution (ending).
-An obvious problem.
-Limiting characters to between one and three.
-A hook (e.g. a shocking statement) to open.
- A twist to end.
-Writing in past tense.

Ambitious vocabulary from the models to steal for your story:

Harmony – a situation where people are peaceful and in agreement: There was harmony in the classroom.
Scowl – an annoyed expression: He scowled at me when I told him off.
Shrouded– covered up. A shroud also is a sheet that wraps up a dead body: Black clouds shrouded the sun.
Vexation – a state of feeling angry/annoyed: I felt great vexation when I received a detention. I was vexed.
Abrupt– sudden and unexpected. Can also be a rude way of speaking that is sharp and short: He told me abruptly that I was late. He was abrupt.
Puckered – tightly gathered: He puckered his lips for a kiss.
Gaily-coloured– asking to gain information: He inquired what the correct answer was.
Insignia– a symbol, marking membership of an official group: There was an insignia on her army coat.
Quotient– a set amount: The salesperson had achieved her quotient of sales.
Interred– buried: His body was interred in a tomb.
Decree – an order: The government gave a decree that books were banned.
Ecstasy – overwhelming happiness: I was in ecstasy when I won the lottery.
Solemn– serious and formal: The politician spoke solemnly about the tragedy.
To no avail – without any success: I tried to change her mind, but to no avail.

Synonyms

Said		Sad	Happy	Bad	Movement
muttered		melancholy	elated	horrendous	swept
chuckled		devastated	ecstatic	despicable	flounced
guffawed		wilt	joyous	tyrannical	stormed
hissed		crestfallen	euphoric	fiendish	marched
questioned		vexed	gleeful	malevolent	slithered
remarked		despondent	jubilant	insolent	darted
exclaimed		solemn	benevolent	deceitful	crept
screamed		remorseful	infatuated	reckless	inched
Barked			exhilarated		sashayed
purred					
spat					
growled					

English Language Component 1: Section A Reading 20th Century Literature

Take 1 hour for this section: there are five questions to answer worth 40 marks. Read the text in sections as you answer the questions.

Q	Description	Mins	Example Question	How to answer this question
1	**List five things** question (5 marks) AO1 identify explicit and implicit information and ideas	5	Read lines 1-7. List five things you learn about Ruby Lennox in these lines.	1. Read and highlight the **key focus** from the question 2. **Rule off** the **lines** where the section of text ends. 3. **Read** the relevant section and highlight elements that help you answer the question 4. **Keep it simple** -write down the things you learn in a few words/simple sentences. You can write more than five things. **You CAN use one word answers.** **Timings are a mark a minute.**
2	**What impressions does the writer create OR How does the writer show** question (5 marks) AO2 explain, comment on and analyse how writers use language to achieve effects and influence readers.	7.5	Read lines 8-23. What impressions does the writer create of the Lennox family in these lines? OR How does the writer show the narrator's thoughts and feelings in these lines?	**-The approach to these question are very similar.** **-Spend just over a minute per mark.** **-Track chronologically through the section of the text.** 1. Read and highlight the **key focus** from the question 2. **Rule off** the **lines** where the section of text starts and ends. **3. Read** the relevant section and track through the text for evidence to help you answer the question. Highlight short quotes to answer the question. Aim to select and write about **5 quotations for a five mark answer** and **8 to 10 for a 10 mark answer. These should be as short as possible.** **4. Use 'evidence-suggests-because'** – to answer the question - two sentences as a maximum for each quote. Write BRIEFLY about the **effects** of the **particular words/techniques** or **structural** features on the reader – how does this language feature help to create the impression/show the thing that the question asks about? **Here is the first part of an example answer to this question – quotes in bold.** *The writer shows the fire spreading and becoming serious through the contrast between the **mother "snoring in her bed"** while the iron was getting **"hotter and hotter".** The repetition of **"hotter"** suggests the iron is becoming more dangerous because the mother has forgotten it. The adjective **'scorching'** suggests extreme heat, coupled with the dangerous verbs **'"sizzle and burn".** The flames are personified as they **"were happy for a time",** suggesting through the phrase "for a time" that they soon got bored and then spread further. This is intensified as the flames **"found the carpet",** further personifying the fire as having malicious intent and spreading through the house.* **6 quotes accurately commented upon -= 6 marks so far.**
3 & 4	**What impressions does the writer create OR How does the writer show question** (10 marks) AO2 explain, comment on and analyse how writers use language and structure to achieve effects and influence readers	15 mins each	Read lines 24-35. What impressions does the writer create of the woman in these lines? OR How does the writer show the fire spreading and becoming very serious in these lines?	
5	**To what extent** or **How far do you agree** question (10 marks) AO4 evaluate texts critically and support this with appropriate textual reference.	15	Read lines 50 to the end OR consider the passage as a whole "In the last 20 lines of this passage, Patricia becomes a real heroine." How far do you agree with this view?	**This question is asking you to evaluate a text. There will always be evidence to agree with the view, and you may also find evidence to disagree with the view.** 1. Read and highlight **the key focus** of the question **2. Read** the relevant section (it might be the whole text) and **track through the text** to **select evidence** that supports your point of view 3. Aim to select and write about **8 -10 quotations** **4. Begin by stating how far you agree** with the view and then **support this with a range of 'evidence-suggests-because'**

English Language Component 1: Section A Reading 20th Century Literature

Take 1 hour for this section: 10 minutes to read and 50 minutes to write your answers. There are five questions to answer worth 40 marks.

Questions 2, 3, 4 and 5 – Commenting on Language/structure -Look out for the following in texts and comment on the effect the writer creates by using them. It is explaining the effect that is important.

Constructing Evidence, Suggests, Because'	
What is suggested related to the question...	*Ruby is presented as... Drama is created when...*
How is this delivered by the writer? Embed the evidence from the text in support of what you've said.	*Put a comma after the evidence and use quotation marks, '...'*
Explain, why the evidence is significant to what is suggested by the writer.	*This implies/ suggests/ conveys...*

2. Sentence types

Declarative: a statement eg: *John was a liar.*

Exclamatory:: expresses surprise, shock or anger eg: *What a liar he is!*

Interrogative: a question eg: *What do you mean John has lied to us?*

Imperative: a command eg: *"Stop lying."*

Word Classes

Nouns: the name of a person, place or thing.

Verbs: the action word within the sentence eg: *sprinting*

Deontic Modal Verbs: Suggest certainty: **must/shall/will**

Epistemic Modal Verbs: Suggest possibility: *could/might/may*

Adverbs: the word that describes the verb eg: *hysterically*

Adjectives: the word that describes the noun eg: *tranquil*

Figurative Language

Simile: when a writer compares 2 things using as or like eg: *My feet were as cold as ice.*

Metaphor: when a writer compares 2 things directly eg: *My feet were block of ice.*

Personification: when an inanimate object is given human attributes eg: *The fragile arms of the trees swayed desperately in the storm.*

Symbolism: When one thing is used to stand for something else – *e.g – The fire is a symbol of the man's rage.*

Structural Features

Direct Speech/Dialogue: the language that is spoken aloud by characters

Repetition: words, phrases and images that are repeated for impact.

Contrast or juxtaposition: When 2 contrasting ideas are placed close together.

Foreshadowing: when the author hints at what is to come.

Flashback/forward: when the author skips forward or backward in the story.

Internal narration: When the author shifts the focus to the thoughts and feelings of the character rather than an external description of the action/events.

Listing: when the author lists events in close successive order. This can create pace and tension at key moments in the text.

Semantic Field: words in the same topic – *e.g a semantic field of fire would be* ***burn / flame / scorch.***

All questions: Upscale your explanations of quotes through critical verbs:

Critical Verbs - upscale your analysis of the writer's intentions
highlights/ establishes / intensifies/ heightens / cements
Reader's response: Shocks/horrifies/disgusts/surprises/astonishes/amazes/intrigues/entices/confuses/perplexes/ overwhelms/frustrates/inspires

Question 5 always asks you to evaluate a text. Here are some phrases that will help you to evaluate how successful a writer has been.

Evaluative phrases using critical verbs	
The author is deliberately highlighting	This phrase intensifies the idea that...
The writer establishes the notion that	The tension is heightened when...

Top band students often identify subtle shifts in tone to help them evaluate texts:

Describing tone in narrative:
Describing tone – This might be created by the narrator's word choice or by the word choice of characters through direct speech: cheerful / joyful / lighthearted/ comical/ nostalgic (looking back to the past with fondness) / optimistic Sombre (deeply serious/sad) / angry / aggressive / melancholic / depressing / pessimistic/ resentful / panicked / menacing / tense
Shifts in tone: The _____tone shifts to...when.../heightens when.../drops to...when...

English Language Paper 1: Writing Section

English Language Component 1: Section B Writing Creative Prose

Take 45 minutes for this section. Remember to plan your story for 5 minutes, write for 35 minutes and use the last 5 minutes to proof read your work for accuracy.

AO5: 60% or 24 marks
- ✓ Communicate clearly, effectively and imaginatively, selecting and adapting tone, style and register for different forms, purposes and audiences
- ✓ Organise information and ideas, using structural and grammatical features to support coherence and cohesion of texts

AO6: 40% or 16 marks
- ✓ Use a range of vocabulary and sentence structures for clarity, purpose and effect, with accurate spelling and punctuation.

1. What the examiner is asking you to do

Top tip: Keep your story to a short timescale.

Produce a piece of creative writing in 45 minutes

1. **You are being asked to write a short narrative/story.**
2. **You will be given a choice of 4 titles. <u>Read them carefully and decide which one your in-class narrative most convincingly fits with.</u>**
3. **Spend 5 minutes thoroughly writing out your plan. <u>How will you make your narrative fit the question?</u> Try to follow the narrative structure opposite.**
4. **Spend 35 minutes writing. Aim for 450 words – 2.5 sides on average.** As you know, the best narratives are realistic but something has to happen.
5. **Spend 5 minutes at the end checking through your writing very carefully.** Read each word carefully. If it doesn't 'sound' right, change it. Think to yourself, 'How could I upgrade my writing?' Pay attention to your VSSSP.

2. What the tasks look like

Choose one of the following titles for your writing:

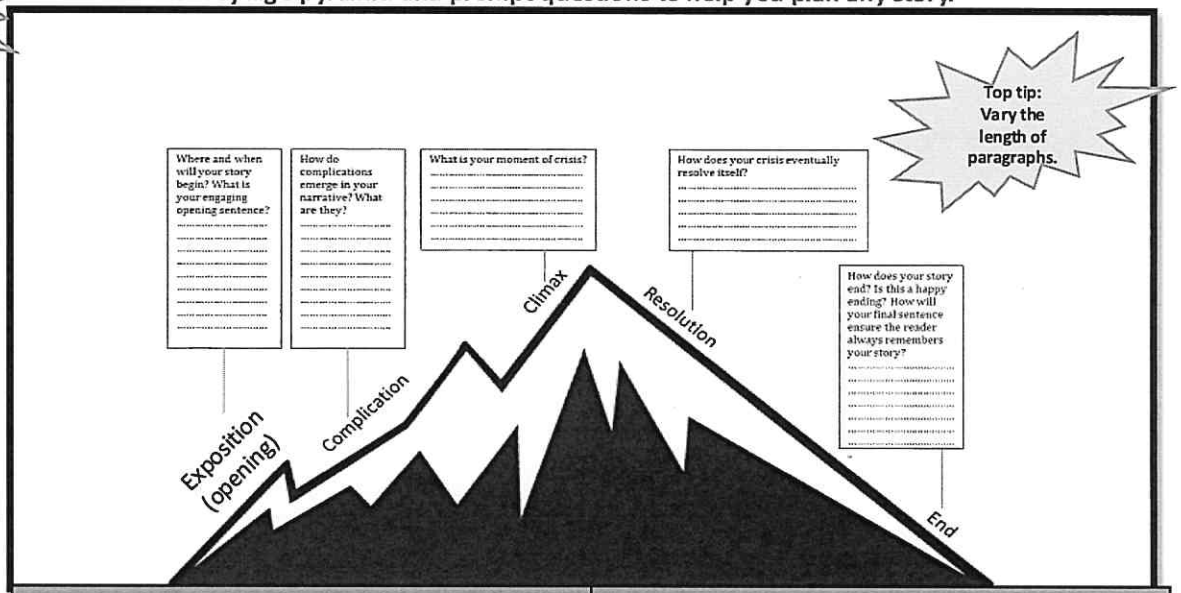
Either

a) A memorable weekend
b) Write about a time when you had to make a difficult decision
c) Write a story which begins: "You are not staying here on your own. Get in the car now," my mum said in that voice which did not allow any argument.
d) Write a story which ends: I feared the worst but the teacher could not stop herself from laughing.

3. How to structure a story

Use the Freytag's pyramid and prompt questions to help you plan any story.

Top tip: Vary the length of paragraphs.



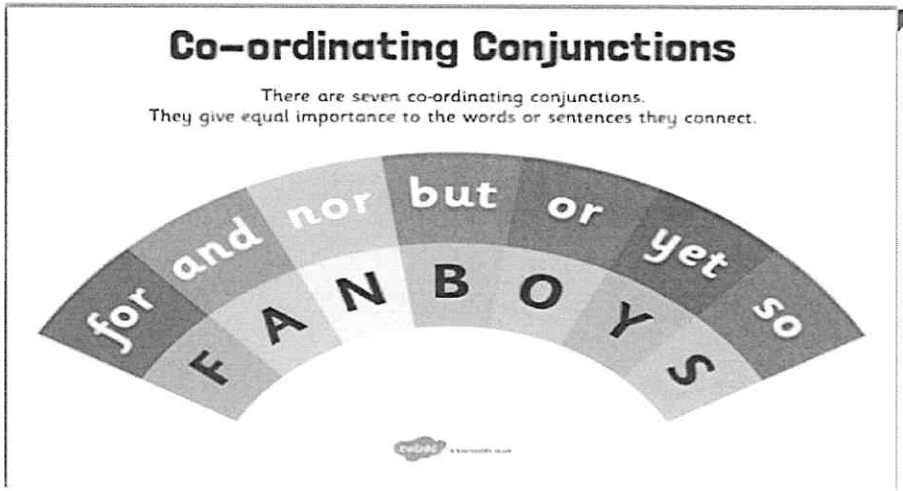
Effective Openings: hook the reader in	Interesting Conclusions: wrapping things up
✓ Begin with a precise description of setting	✓ Return to something at the beginning with a twist and come full circle
✓ Start with some dramatic dialogue	✓ End on a moral or lesson learnt
✓ Use an intriguing sentence that puzzles the reader	✓ End with the direct thoughts and feelings of the narrator
✓ Directly address the reader	✓ Repeat a key phrase or sentence from earlier
✓ Start in the middle of the action before flashing back	✓ **Link back to your title**
✓ Begin by hinting at what is going to happen	

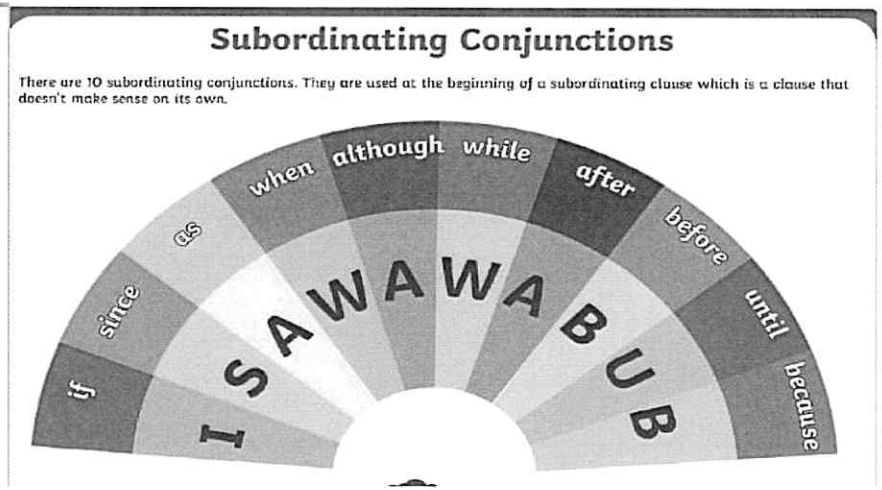
SPAG Absolute

Word Classes		Punctuation	
Proper noun	A naming word - Chris, East Anglia, Nimbus3000 - needs a capital initial letter.	**Capital letter**	An upper case letter used after a full stop to begin a sentence or to indicate a proper noun.
Concrete Noun	A thing you can see -you can put 'the' or 'a' before a noun e.g 'the table'.	**Full stop**	. Used to mark the end of a sentence.
Abstract Noun	The name of something you can't see e.g: hate/love/creativity/passion. Again, can put 'the' or 'a' in front: The love I feel...	**Comma** **Commas need to be used for:**	**- lists** e.g: I bought several things from the shop: books, pens and pencils. **-before a FANBOYS conjunction to join two independent clauses in a compound sentence.** The cat sat on the mat and the dog barked. **- sentences which start with a fronted adverbial (ISPACED) starts** Because it was raining, we ran for cover. **- embedded clauses where the clause could be removed** The boy, who I disliked intensely, pulled my hair.
Adjective	A word that is used to describe a noun e.g. 'The tall teacher talked to the class.'	**Colon**	: Used to precede lists, expansions or explanations e.g: I bought several things from the shop: books, pens and pencils.
Verb	A word used to describe an action, state or occurrence. What is being done? E.g: hit/jump/feel/believe	**Semi colon**	; Used to join two related independent clauses e.g: I ate too much pizza; I felt very sick. Also to separate longer items in a list.
Modal verb	Verbs used to express possibility or certainty (may/might/must/will/shall).	**Dash**	Used after an independent clause or parenthetically, instead of commas for an embedded clause. Used to emphasise the clause after the dash. You are late – this is the third time!
Adverb	A word that is used to modify a verb e.g. 'He ran quickly.'	**Brackets**	() Used to indicate an afterthought/sarcasm in a lower tone, like an 'aside' to the reader which can be taken out to leave a grammatically complete sentence. The old man (who smelled like cheese) sat next to me on the bus.
Pronoun	A word that can replace a noun: I, you, he, she, it, they, them, we.	**Exclamation mark**	! Used at the end of an exclamatory sentence to show strong emotion.
Preposition	A preposition is a word that tells you where or when something is in relation to something else. (at, in, on, after, before, under, inside and outside).	**Question mark**	? Used to indicate an interrogative sentence or rhetorical question.
Determiner	A determiner comes before a noun and helps to define it. E.g. a boy (a, an/the/those/these)	**Apostrophe**	' Used to show ownership (Sam's bag) or missing letters 'They're late'.
		Ellipsis	... Can be used to create suspense e.g: I couldn't believe my eyes... or to show the trailing off of a sentence e.g: 'I wonder...' she said.

Sentences	
Main clause	A clause that can stand alone as a sentence. Contains a subject (the person or thing doing the action) and a verb (the action). e.g. 'The cat sat on the mat'.
Subordinate clause	A clause that depends on an independent clause to make sense e.g. 'The cat sat on the mat despite hating the texture'. Often uses a subordinating ISAWAWABUB conjunction (if, since, as, when, although, while, after, before, until and because.)
Fronted subordinate clause	As above – but the subordinate clause comes at the front of the sentence: e.g: Despite hating the texture, the cat sat on the mat.' Also can be called a 'fronted adverbial'.
Relative clause	Relative clauses use a relative pronoun or relative adverb to give us more information, usually about a specific word or phrase (that, which, who, whom, whose when, where, why). Relative clauses that contain non essential information need parenthetical commas and can also be called embedded clauses: e.g: The boy, who I disliked intensely, pulled my hair. The sentence should make sense if the clause was removed and the meaning should be intact.
Simple sentence	Contains just one main clause. Makes complete sense.
Compound sentence	Two main clauses joined together with a co-ordinating FANBOYS conjunction (for/and/nor/but/or/yet/so). The cat sat on the mat and the dog barked.
Complex sentence	A main clause plus a subordinate clause. The subordinate clause ay come after the main clause or before (when it would be a fronted subordinate clause). 'The cat sat on the mat without turning around'.
Fronted adverbial	Words, phrases or fronted subordinate clauses at the start of sentences which tell us when, where or how something is done (they describe the verb) Can remember them using ISPACED. E.g: Because it was raining, we ran for cover.
Expanded noun phrases	A phrase that contains a determiner (the/a) and a noun (table – e.g the table) and one or more adjectives (the black table). Can also contain a prepositional phrase e.g: The black table with wonky legs.

Co-ordinating and subordinating conjunctions





Their/They're/There Hear/Here Your/You're Was/Were

Ask yourself these two simple questions:

Does the word after it belong to 'them'?

↓

Is it short for 'they are'?

↓

For everything else, it's

their
they're
there

Your
pizza

Your = you own it

It is yours.

You're
pizza

You're = you are

You are pizza!

'WAS' is used if you are talking about ONE person or thing (I, he/she/it):

'WERE' is used if you are talking about TWO OR MORE people/things (we/they/you):

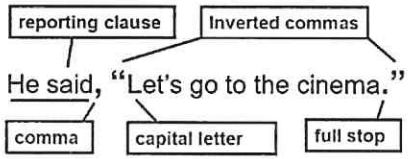
'You' is always 'were',

Punctuating Direct Speech

Reporting clause before the direct speech

The reporting clause of direct speech is the short clause that indicates who is talking. It is the clause that is outside of the inverted commas. It is therefore **not** the words being spoken.

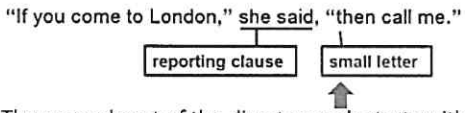
We can write the reporting clause either **before** or **after** the direct speech. If the reporting clause is **before** the direct speech, we write it as follows:



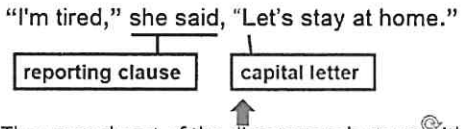
Grammar rules – If the reporting clause is **before** the direct speech:

We write a comma (,) before the direct speech.
We write the exact words inside the inverted commas.
The first letter is a capital letter.
We write a full stop (.) before the closing inverted commas.
We might also use a ? Or a ! Before the closing inverted commas.

Sometimes we break up the direct speech into 2 parts:



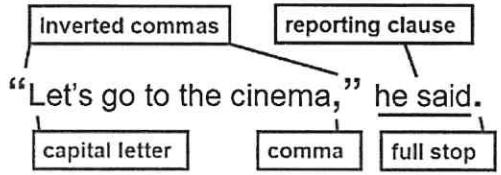
The second part of the direct speech starts with a small letter if it is the same sentence as the first part of the direct speech.



The second part of the direct speech starts with a capital letter if it is a new sentence.

Notice that the first part still ends with a , (unless you need a ? Or a !)

Reporting clause after the direct speech



If the reporting clause is after the direct speech:

We write the exact words inside the inverted commas.
The first letter is a capital letter.
We write a comma (,) before the closing inverted commas. We might also use ? or !
We write a full stop (.) at the end of the reporting clause.

New speaker, new line

If someone else speaks, we start a new line.

"Your book is over there," said the teacher.
"Thanks!" replied Johnny.

Using Fronted Adverbial openings - ISPACED

Ing words		Similes	Prepositions		Adverbs		Conjunctions	Ed words
Walking	Shivering	Like a mouse	Over	On top of	Hastily	Quickly	First	Excited
Skipping	Screaming	Like a cheetah	Above	On	Calmly	Slowly	Later on	Delighted
Running	Growling	Like a statue	Beneath	Underneath	Casually	Gently	Suddenly	Pleased
Crawling	Shouting	Like a tree	Below	Under	Cautiously	Shyly	Immediately	Amazed
Creeping	Gasping	Like a predator	Through	Between	Softly	Nervously	Finally	Astonished
Jumping	Whispering	Like a monster	Inside	Beside	Neatly	Messily	After that	Shocked
Leaping	Yelling	Like a villain	By	Across	Angrily	Busily	Before long	Scared
Escaping	Talking	As quiet as a	Before	After	Spitefully	Loudly	Since	Puzzled
Bursting	Moaning	As loud as a	During	At	Ominously	Honestly	Whereas	Dazed
Grasping	Whimpering	As still as a	In	Off	Foolishly	Crazily	As	Surprised
Grabbing	Thinking	As fast as a	By	To	Moodily	Readily	Next	Worried
Seizing		As timid as a	About		Amazingly		Whenever	Petrified
Clutching		A bright as a			Expectantly		Despite	Horrified
Picking		As slowly as a			Generously		Until	Exhausted
Shaking		As noisy as a			Chaotically		So	
Hiding		As calmly as a			Unexpectedly		Eventually	
Sleeping		As angry as a			Intelligently			

Remember to use a comma before the main clause: Creeping through the forest, I trembled with fear.

REVIEWS

What IS a review?

A review is an evaluation of a given topic. If you are asked to write a review, you must give a range of personal opinions on the given subject and evaluate the positives/negatives of the thing you are reviewing. The reader should then have a clear idea of whether they would enjoy the thing you have reviewed, or not.

Reviews are often on books/films/restaurants or places.

A review can be positive, negative or mixed.

What is being tested?

- How you engage a reader, the quality of your ideas and how well you present them.
- Your ability to be evaluative when writing.
- Your ability to use sentencing, grammar and vocabulary.
- Your ability to develop ideas and write about two sides.

Choosing what to review

If you are given a choice of what to review, e.g – a film of your choice, choose something you can say a lot about. Think about films that accompany novels you've studied in school if you can't think of anything else. By reviewing the film or book of a GCSE Literature text, you are also giving yourself the chance to use all the wonderful vocabulary you've learned to describe those characters/events etc.

Structuring a review:

You will need:

- **A catchy title. If you can't think of one straight away, write a boring title ('A review of....') and come back to it!**
- An **introduction** which makes your opinion clear from the start.
- An **overview of the plot or the subject matter** (e.g, if reviewing a place, details about what there is to see/do etc), not giving away any endings for films/books.
- A summary of the **high and low points** for you.
- **Who would enjoy** the thing you are reviewing.
- Whether you would **recommend** it.

Top Tips:

A review should allow the reader to understand what you are reviewing in detail – so a book review needs to give **details** about the plot, and a place review needs to tell them all about the place. If not, you'll lose marks as the review won't be hitting its purpose.

You can make up details. The examiner won't know or care if you do as it's about your writing skills at the end of the day. Obviously just don't be silly!

Reviews should be entertaining, so:

- Use a **pun** in your title: E.g – when reviewing A Christmas Carol: *High Spirits in A Christmas Carol.*
- Use **parenthesis** to give asides to your reader and build a relationship. Do this through **embedded clauses, brackets or dashes:**

The plot (which I'm sure you are vaguely familiar with) centers around a miserly misanthropist called Scrooge.
On meeting Marley's ghost – a grim prediction of Scrooge's future – the plot really gets exciting.
The Cratchits, who are symbols of the hardworking poor, are overlooked by Scrooge.

Example questions for practice:

Write a review for a teenage magazine of a book, film or TV programme/series that you have enjoyed in the last year and why it might appeal to others of your age. [20]
Write a review of your school or college based on your experiences there. [20]

Y9 Rhetoric /Spoken language Assessment Absolute

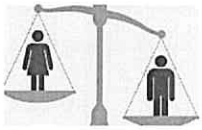
Concepts from Y8 'Rhetoric' unit

Rhetoric

The art of persuasion, getting people to believe what you want them to.

Patriarchy

A society in which men hold power over women..



Injustice

When a result is viewed as being unfair. It may be based in bias and prejudice.

Democracy

A system of government where people vote their elected representatives into parliament.

Propaganda

Exaggerated ideas spread by the government or a political party to promote their ideas in a heavily biased way.

Spoken Language Assessment Criteria

Assessment criteria	✔
Pass criteria	
Is audible	P
Uses Spoken Standard English*	P
Expresses straightforward ideas/information/ feelings	P
Makes an attempt to organise and structure his or her presentation	P
Makes an attempt to meet the needs of the audience	P
Listen to questions/feedback and provides an appropriate response in a straight forward manner	P
Merit criteria	
Is audible	M
Uses Spoken Standard English*	M
Expresses challenging ideas/information/ feelings using a range of vocabulary	M
Organises and structures his or her presentation clearly and appropriately to meet the needs of the audience	M
Achieves the purpose of his or her presentation	M
Listens to questions/feedback responding formally and in some detail	M
Distinction criteria	
Is audible	D
Uses Spoken Standard English*	D
Expresses sophisticated ideas/ information/feelings using a sophisticated repertoire of vocabulary	D
Organises and structures his or her presentation using an effective range of strategies to engage the audience	D
Achieves the purpose of his or her presentation	D
Listens to questions/feedback, responds perceptively and if appropriate elaborates with further ideas and information	D

Key word	Definition
Alliteration	Repeating the same sound at the start of consecutive words. *Today is a terrible tragedy.*
Anecdote	A short amusing or interesting story about a real incident or person. *Let me tell you a story….*
Antithesis	Putting two opposites together in clauses that mirror each other grammatically: *"One small step for man, one giant leap for mankind".*
Direct address	Use of a pronoun (you) to address the audience. *You need to listen.*
Emotive language	Words or phrases that encourage the reader or audience to feel a particular emotion. *Innocent, vulnerable children suffer cruel deaths in war.*
Epiphora	Ending each sentence with the same words. *I want change, you want change, we all want change!*
Ethos	Credibility. *"I have thirteen years experience as a teacher, so I know what I'm talking about."*
Hyperbole	Exaggeration to emphasise a point or idea. *This is the worst idea in the world.*
Hypophora	A question followed by the answer: *Should we do it? Of course we should!*
Logos	Using logic and reasoning as your appeal: facts and figures. *70% of students I surveyed agreed with me.*
Pathos	Pathos is the emotional influence of the speaker on the audience. Its goal is to make the audience feel something. *Can be created through emotive language (see above)*
Purpose	The reason the writer is writing. *E.g – to argue, to entertain or to persuade.*
Rhetorical question	A question that doesn't require an answer, but is instead used to make a point. *What do you think you're doing?*
Tricolon	Use of a list of three, or repetition of something three times, to emphasise a point. *It's unneccessary, cruel and wrong.*
Verbal irony	Saying the opposite of what you mean. It can be used to bring humour or express frustration: *"Lovely weather we're having!" (when it's raining).*

Further Knowledge

The study of rhetoric began in Ancient Greece and has continued to be important around the world today with political leaders, civil rights activists and those trying to get out of doing homework.

There are many devices used to strengthen different aspects of your rhetoric which can be identified in many different speakers work. Aristotle, Hitler and Malala all use the same aspects of rhetoric in their writings!

Rhetoric is everywhere: in the news, on the radio, in adverts. Be aware that every thing you hear may contain rhetoric. Keep a critical ear and be aware of how you're unknowingly being persuaded.

SPEECHES/TALKS

What IS a speech/talk?

A talk (or speech) is exactly what you would say if you were delivering a speech. You need to write as though your content will be listened to, so addressing the audience is crucial. Make sure you hit the right tone depending on who they are.

What is being tested?

- How you engage an audience, the quality of your ideas and how well you present them.
- Your ability to hit the right **TONE** for your audience/purpose.
- Your ability to use sentencing, grammar and vocabulary .
- Your ability to develop ideas and write about two sides.

Structuring a talk

Start with something to interest your listener and address them directly (direct address):

- *How many of you would ….. (rather/wish/believe that/dislike...) ?*
- *Imagine a world where...*
- *Did you know that...?*
- *How many of us can honestly say that...*
- *I'm sure you agree it's a fact that...*
- *How important is your future? Do you care about it? Then care about it enough to...*

In the middle:

- *And we all know that – especially you _____!*

At the end:

- *Thank you for listening. Are there any questions?*
- *Ladies and gentlemen, thank you for your time today.*

Some additional techniques you could include:

- *Including the audience – using personal pronouns (I, you, we)*
- *Assumption of agreement – "we all know", "everyone thinks"*
- *Ridicule – "only an idiot could possibly think"*
- *Strong opinionated statement – "this needs to happen. End of"*

You could use the Seven Part Structure to develop your ideas:

First (topic) sentence:

A brilliant way to banish boredom in the holidays is to volunteer.

Second sentence (use a statistic): *Charity shops up and down the country are crying out for enthusiastic, philanthropic individuals to staff their stores.*

Third/fourth sentence (develop the `stats sentence`):

Most charities absolutely depend on these shops to make money for their causes, and therefore it is crucial that people like you and I give up our time to give back to the community and raise these vital funds.

Fifth sentence: (personal anecdote):

Last summer, I spent many worthwhile weekends helping in my local Cancer Research shop, and the skills I learned there will help me for the rest of my life. From serving customers to dressing displays and taking stock, the job prepared me brilliantly for the world of work and I had a brilliant experience. Not only that – I made friends who I probably never would have met had I not volunteered.

Sixth sentence (rhetorical question):

What do you have to lose by giving just a few hours of your time for a brilliant cause?

Seventh sentence (offer a suggestion):

Simply call in at your local charity shop and ask if they need help, or pick up the phone. They will be absolutely delighted to hear from you!

Example questions for practice:

You are asked to give a talk to people in your class about your ambitions and what you hope to achieve in the next 10 years. **Write what you would say in your talk.** [20]

Students often complain about being bored and having nothing to do through the long school summer holidays. You have been asked to give a talk to you class giving your views, with suggestions and recommendations for making the most of school holidays. **Write what you would say.** [20]

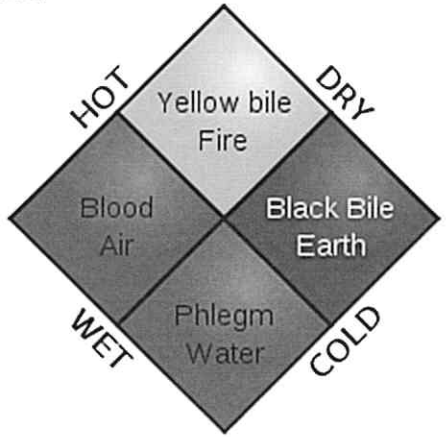
History

Year 9

Topic Medieval Medicine 1250-1500

Timeline		
1.	1348	The Black Death
2.	1440	Printing Press

Key individuals		
1.	Hippocrates	Ancient Greek doctor who looked for natural causes of disease. He developed the Theory of the Four Humours, wrote the Hippocratic Oath and encouraged clinical observation.
2.	Galen	Doctor who worked in Ancient Rome. His ideas were the basis of medical training in the Medieval period. Developed the Theory of Opposites and drew detailed diagrams of the human anatomy.
3.	Johannes Gutenberg	Inventor of the Printing Press
4.	The Church	The Catholic Church controlled medical learning, it chose which books were copied and distributed. Supported the Theory of the Four Humours and strongly discouraged any criticism of it. Taught that disease was sent by God as a punishment for sin.

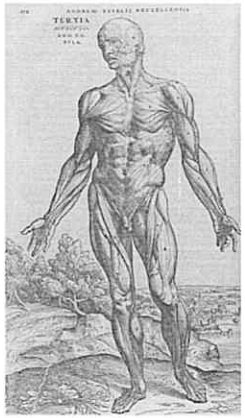


Key words		
1.	Malnutrition	An illness caused by lack of food
2.	Famine	Food shortage, usually due to bad harvest
3.	Theory of the Four Humours	Developed by Hippocrates. The belief that everyone has four humours in their body (blood, phlegm, black bile, yellow bile) and when they become unbalanced, the person falls ill.
4.	Theory of Opposites	Developed by Galen. Treatment based on balancing the humours by giving the patient the 'opposite' of their symptoms e.g. too much phlegm, eat hot chilli's.
5.	Physician	Someone who practices medicine (doctor). A medieval physician went to university to complete a medical degree and would diagnose illness.
6.	Astrology	Studying the alignment of planets and stars. This was considered important when diagnosing illness
7.	Leprosy	Begins as a painful skin disease, followed by paralysis and eventually death.
8.	Supernatural	The belief that God/Gods were responsible for causing and curing ill-ness
9.	Miasma	Bad air that was believed to be filled with harmful fumes.
10.	The Articella	Medical textbook used in European universities. Included some translated works of Hippocrates and Galen
11.	Blood letting	Removing some of a patients blood– common treatment for imbalanced humours.
12.	Purging	Give something to the patient to make them vomit or a laxative to clear out the digestive system.
13.	Apothecaries	Mixed and sold herbal remedies
14.	Regimen Sanitatis	Set of instructions provided by physicians to help a patient maintain good health e.g. take moderate exercise.
15.	Quarantine	Separating the sick from the healthy to stop the spread of disease.
16.	Hippocratic Oath	Doctors swore to respect life and prevent harm, doing the best for their patients. Created by Hippocrates.
17.	Clinical obser-vation	Studying the symptoms, making notes, comparing with similar cases then diagnosing and treating. Encouraged by Hippocrates.
18.	Anatomy	Study of the human body.
19.	The Black Death	The bubonic plague killed about 1/3 of Britain's population.

History

Year 9

Timeline		
1.	1440	The Printing Press was invented by Johannes Gutenberg.
2.	1536	Dissolution of the monasteries in England, under the command of King Henry VIII.
3.	1537	Vesalius published his first work *Six Anatomical Tables.* It showed parts of the human body, labelled in four different languages.
4.	1543	Vesalius published his most famous book, *De Humani Corporis Fabrica,* or *On the Fabric of the Human Body.*
5.	1546	Henry VIII re-founded Saint Bartholomew's hospital in London, which was originally founded in 1123.
6.	1628	William Harvey published Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus (Anatomical Exercise on the Motion of the Heart and Blood in Animals). This outlined how blood flows around the body.
7.	1653	Harvey's book was published in English.
8.	1660	The Royal Society met for the first time at Gresham College in London.
9.	1662	The Royal Society received its royal charter from King Charles II.
10.	1665	The Royal Society began publishing their journal *Philosophical Transactions.*
11.	1665-66	The Great Plague.
12.	1660s-70s	Thomas Sydenham worked as a highly respected doctor in London. He believed observing a patients symptoms was more reliable than relying on medical textbooks when diagnosing patients.
13.	1685	Charles II died. His physicians continued to use methods such as bleeding and purging to treat him, showing little change.



THE ROYAL SOCIETY

Topic: Renaissance Medicine

Key words		
1.	Secular	Not religious or in any way connected to spiritual beliefs.
2.	Alchemy	An early for of chemistry. Alchemists tried to turn one material into another.
3.	Printing press	A machine used to print text or pictures. The letters were moveable so that many copies of the same text could be printed.
4.	Dissolution of the monasteries	Henry VIII split from the Catholic Church in 1533 and created the Church of England. In 1536 he got rid of religious institutions such as monasteries and confiscated their land.
5.	Circulation	The flow of blood around the body.
6.	Astrology	The study of the movements and relative positions of planets interpreted as having an influence on human affairs and the natural world.
7.	The Great Plague	Lasted from 1665 to 1666, was the last major epidemic of the bubonic plague to occur in England. The Great Plague killed an estimated 100,000 people—almost a quarter of London's population—in 18 months.
8.	Miasma	A name for 'bad air', that people believed was filled with harmful fumes, which caused illness.
9.	Quarantine	A place of isolation in which people who have been exposed to infectious or contagious disease are placed.
10.	Quack Doctor	Someone with no medical qualifications, who sold their services as a doctor or apothecary.
11.	Royal Society	An association founded in England by Charles II in 1660 to promote research in the sciences.
12.	Anatomy	the branch of science concerned with the bodily structure of humans, animals, and other living organisms, especially as revealed by dissection.

Key people		
1.	**Andreas Vesalius**	The most famous anatomist of the Renaissance period. He studied medicine in Paris in 1533, and went on to be a lecturer in surgery at Padua University. Vesalius was able to dissect human bodies as opposed to animals, and therefore found around 300 mistakes in Galen's work on the anatomy.
2.	**William Harvey**	Harvey was born in England in 1578. He studied medicine at both Cambridge and Padua University. In 1615 he became a lecturer of anatomy, and by 1618 was a royal doctor for James I. Harvey disproved Galen's theories of how blood flows around the human body. He proved that veins and arteries work together in one system to circulate blood around the body.
3.	**Thomas Sydenham**	Nicknamed 'the English Hippocrates'. He was a well respected London doctor in the 1660s and 1670s, and was very influential in moving British medicine away from the ideas of Hippocrates and Galen. He refused to rely on medical books for diagnosing patients, and felt that it was important to observe their symptoms.
4.	**Charles II**	Had a keen interest in science. The Royal Society was established in 1660, and in 1662 Charles II gave it a royal charter to show his support of the establishment.

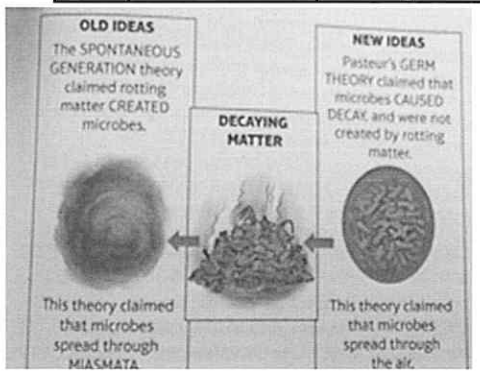
History

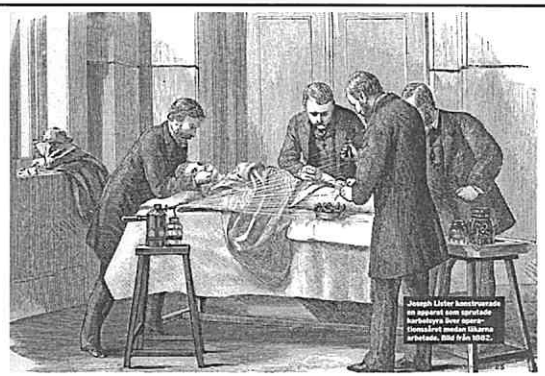
Year : 9

Topic : Industrial Medicine 1750-1900

Timeline		
1.	1796	Jenner discovers Smallpox vaccination
2.	1799	Humphrey Davey discovers aesthetic properties of Laughing Gas (Nitrous Oxide)
3.	1842	Edwin Chadwick writes his report on living conditions
4.	1846	Use of Ether as an anaesthetic in surgery
5.	1847	James Simpson discovers chloroform as an anaesthetic
6.	1847	Ignaz Semmelweiss orders his students to wash their hands before surgery (but only after they had been in the morgue).
7.	1848	First Public Health Act
8.	1852	The government makes smallpox vaccination compulsory
9.	1854	Florence Nightingale improves hospitals in the Crimean war
10.	1854	John Snow makes the link between cholera and dirty water
11.	1854	Hannah Greener dies of chloroform overdose
12.	1857	Queen Victoria publicly advocates use of Chloroform after birth of her eighth child.
13.	1859	Nightingale publishes 'Notes on Nursing'.
14.	1861	Louis Pasteur's Germ theory
15.	1867	Joseph Lister begins using carbolic Acid spray in surgery- antiseptic.
16.	1870	John Tyndall gives a lecture linking Pasteur's, Lister's and his own work on germs
17.	1870's	Dr Henry Bastian continues to promote spontaneous generation
18.	1875	Second Public Health Act– compulsory
19.	1881	Robert Koch discovers the bacteria which causes anthrax
20.	1889	Isolation hospitals set up
21.	1895	William Rontgen discovers X-rays

Key words		
1.	Anaesthetic	Drugs given to make someone unconscious before or after surgery
2.	Antiseptic	Chemicals used to destroy bacteria and prevent infection
3.	Bacteriology	The study of bacteria
4.	Spontaneous Generation	The idea that germs were caused as a result of decay
5.	Germ Theory	The idea that germs cause disease (or decay)
6.	Vaccine	A weakened version of a similar disease is injected to cause the body to develop immunity to that disease.
7.	Smallpox	A dangerous disease causing fever that was beaten by vaccination
8.	Cholera	A bacterial infection caused by drinking water
9.	Epidemic	A widespread outbreak of a disease
10.	Sanitation	Providing disposal of human waste and dispensing clean water to improve public health
11.	Chloroform	A liquid whose vapour acts as an anaesthetic and produces unconsciousness
12.	Medical Officer	A person appointed to look after the public health of an area
13.	Laissez-Faire	French term to 'leave be'. Governments attitude towards getting involved with the lives of the population.
14.	Aseptic surgery	Surgery where microbes are prevented from entering the wound in the first place rather than being killed by antiseptics.





History Year : 9 Topic : Modern Medicine 1900 to present.

Timeline		
1	1896	First medical use of X-rays.
2	1909	Japanese scientist, Hata created the first 'magic bullet' named Salvarsan 606.
3	1911	National Insurance Act introduced.
4	1928	Alexander Fleming identified penicillin in his laboratory.
5	1929	Fleming published his findings
6	1932	Gerhard Domagk discovered prontosil.
7	1939	Florey & Chain revived Fleming's research into penicillin.
8	1941	Florey & Chain trialled penicillin on a human with some success.
9	1942	US pharmaceutical companies began to mass produce penicillin.
10	1942	Government introduced the diphtheria vaccination.
11	1948	The National Health Service was established.
12	1950	Government introduced the poliomyelitis & whooping cough vaccinations.
13	1950	British Medical Research Council prove there is a link between smoking and lung cancer.
14	1951	Franklin & Wilkins created images of DNA using x-rays.
15	1953	Crick & Watson discovered the double helix structure of DNA.
16	1956	Jonas Salk's polio vaccination was introduced in the UK.
17	1956	Clean Air Act introduced following London's Great Smog of 1952.
18	1956	First successful kidney transplant in the USA, between identical twins.
19	1957	John C. Sheehan creates a chemical copy of penicillin, this drug could now target different diseases.
20	1961	Government introduced tetanus vaccination.
21	1962	A more effective polio vaccination was introduced.
22	1963	First successful lung transplant.
23	1967	First successful liver and heart transplants.
24	1968	Government introduced measles vaccination.
25	1968	Another Clean Air Act was introduced.
26	1970	Government introduced rubella vaccination.
27	1984	The last case of someone contracting polio in the UK.
28	1990	Human Genome Project was launched.

Key words		
1	Hereditary	A disease caused by genetic factors—it can be passed from parents to their children.
2	DNA	Deoxyribonucleic acid—carries genetic information, this information determines characteristics such as hair and eye colour.
3	Antibiotic	Any treatment that destroys or limits the growth of bacteria in the human body.
4	NHS	The National Health Service—launched by the government in 1948. Provided medical care for the whole population of Britain and was funded by National Insurance contributions.

Key people		
1	Francis Crick & James Watson	Discovered the DNA had a double helix structure.
2	Franklin & Wilkins	X-ray photos of DNA .
3	Jonas Salk	Developed and discovered one of the first polio vaccinations.
4	Howard Florey & Ernst Chain	Worked together at Oxford University, and were pioneers in the mass production of penicillin.
5	Aneurin Bevan	The Labour Minister of Health between 1945-51. He oversaw the creation and implementation of the National Health Service in 1948.
6	Alexander Fleming	Discovered the bacteria 'penicillin'.
7	Paul Ehrlich	His laboratory discovered arsphenamine (Salvarsan), the first effective medicinal treatment for syphilis. He popularized the concept of a magic bullet.

Common technologies used to make a diagnosis.		
Blood tests (since 1930s)	Blood pressure monitoring (since 1880s)	Endoscopes (since 1900s)
ECGs (since 1900s)	Blood sugar monitoring (since 1960s)	MRI scans (since 1970s)
X-rays (since 1890s)	Ultrasound scans (since 1940s)	CT scans (since 1970s)

	New technology	Treatment made possible
Medical treatments	Advanced x-rays	Can target and shrink tumours (radiotherapy).
	Smaller, cheaper machines	Dialysis and heart bypasses.
	Robotics	Better prosthetic limbs.
Surgical treatments	Microsurgery	Organ transplants.
	Laparoscopic (key hole) surgery	Can operate inside the body through a tiny cut = quicker healing.
	Robotic surgery	More precise operations such as brain surgery.

Geography – Cities and Urbanisation 2

Leisure

12. Keywords

Leisure - free time spent doing an activity that people enjoy, can be physical like football
Conflict – people having differing opinions
Local resident – a stakeholder who lives in the vicinity of the leisure facility
Honeypot site – a naturally attractive place that can be damaged by visitors
Second home – homes purchased by affluent people as a holiday home
Services – a system that supplies a need, like healthcare or education
Facilities – a building that is provided to the public
National Park – a rural area which is protected from damage and urbanisation
Leisure management – planning and delivering a leisure facility/service

13. Urban leisure

Leisure users: want easy access to facilities, ample free parking opportunities, restaurants and fast food nearby. For example, Mansfield Town Football Club spectators
Local residents: want traffic control, police on match days, no parking in front of their homes.

14. Rural leisure

Leisure users: want to walk, hike, mountain bike, canoe, visit pubs and restaurants in rural areas like Castleton.
Local residents: want designated parking facilities for visitors, curfew for pubs, litter monitored, information and signage to limit footpath erosion and environmental damage.

Leisure – Tour de France

15. Sunday 6th July 2014

The Tour started in the UK, with the second leg finishing in Sheffield.

16. Advantages

- Two official spectator hubs, free entry, a big screen with race coverage, entertainment, refreshments, and toilets.
- From 3rd to 6th, French market, cycling activities, and outdoor cinema, generated £7.5million.
- The Tour needs 4,500 hotel beds.
- 180 countries watched, 18.6 million adults watched worldwide and the final part.
- The tour bought Sheffield £15m.
- 2/3 of the visitors said they would return, adding another £24 million to the region's economy or £3.4 million into Sheffield.

17. Disadvantages

- The tour cost Sheffield an estimated £900,000 to secure a finish, funded by taxpayers via local contributions.
- Roads on the race route in Sheffield were closed for 10 to 12 hours on race day, approximately 7.30am to 7.30pm. The area near the finish line - Attercliffe Common, and around the Motorpoint Arena - will be closed for around 36 hours.
- The Tour sends a pack with a long list of jobs to complete, for example removing street furniture for the run in to a race.

Retail

18. Keywords

Retail – selling goods or services to consumers.
Catchment area - The area from which shops get it's customers. Varies in size depending on the type of shop and goods it sells.
Convenience goods – Low cost items that consumers buy frequently e.g. groceries sold by supermarkets.
Comparison goods - More expensive items that consumers buy less often e.g. clothes, TVs, washing machines etc.
Range - The distance that a consumer is willing to travel to buy a product.
Threshold - The minimum population size needed to create demand for an item or service. Depends on value of product and how often that item or service is purchased.
Competition - The variety of shops in an area.

19. Retail hierarchy

The retail hierarchy ranks retailers based upon the **carrying capacity** for certain types of retail stores and the **distances shoppers are willing to travel** to retail destinations **(catchment area)**

20. Online shopping: Using apps and websites to purchase goods and services e.g. Amazon and Kayak
Average weekly sales in the UK are worth £2billion/week

21. Positive impacts

- Online reviews inform consumers
- Convenient (always open), free shipping
- Saves time – no need to parking a car
- Ability to perform comparison, better deals

22. Negative impacts

- Return fees, sales tax and other fees
- Chance of fraud
- Shipping issues
- Lack of interaction in online shopping
- Cannot see or feel merchandise
- Complicated returns

Retail Case Studies

23. Meadowhall

- Meadowhall is a shopping centre in Sheffield, South Yorkshire, 3 miles north-east of Sheffield, 2 miles south-west of Rotherham.
- The shopping centre was built by Bovis on the site previously occupied by a steelworks.
- Opened 4th September 1990, 139,355 m², over 280 stores.
- Includes: leisure centre, cinema, crèche and attractions for children, free car parks 12,000 spaces, under-cover shopping.
- Attracted 19.8 million in its first year, now attracts 30 million/year.
- Located at junction 34 of the M1 motorway, a Supertram stop, 15 minutes from the city centre, used as a park and ride for CBD, the interchange has a large bus station with links to South Yorkshire, and a multi-platform railway station which has several routes.
- £300m expansion May 2016, 1,000 jobs created, comprising 330,000 sq. ft of space, the new Leisure Hall added a range of dining and entertainment experiences.

24. Crystal Peaks

- Crystal Peaks is a shopping centre and retail park in Sheffield, South Yorkshire, England, 8 miles south-east of Sheffield city centre, 10 miles south of Rotherham town centre.
- Built in 1988, 56,000 m².
- Next, Burton, Dorothy Perkins, Boots, medical centre, veterinary surgery, gym
- Crystal Peaks tram stop is located in Waterthorpe on the Sheffield Supertram system, consists of two platforms, designated bus station on site of the Shopping Centre to the City Centre, Dore, Halfway, Hallamshire Hospital, Fulwood and other places.
- New mall was added to the West of the centre in 1998, Sainsbury's was relocated to the lower mall in 2006 and further extensions to the North Walk and East Mall were completed in early 2007.

25. Impacts of online shopping and out-of-town retail parks

Lots of empty shops > less choice for customers > less money in business rates > local authority has less money to improve town centre > derelict buildings vandalised > poor quality retail environment > people choose to shop in another town > lower footfall and less mon ey spent in shops > more shops close and the cycle repeats.

26. Responding and improving the CBD

Pedestrianised shopping streets, traffic calming, street entertainment, improving signs for pedestrians, providing street furniture such as flower beds and benches, cheaper short-stay parking, creating park-and-ride schemes, special events e.g. Christmas markets, allowing pop-up shops.

Cities and Urbanisation Practice Questions

1. How can urban leisure cretae conflict?
2. How can rural leisure create conflict?
3. Explain how a major sporting event can be managed.
4. Explain how a major sporting event may cause conflict.
5. Explain how technology has caused retail change in the UK.
6. Explain why consumers would travel further for a comparison good.
7. Why might consumers choose an out-of-town retail park over shopping in the CBD?
8. How can a CBD start to attract more consumers?

Geography – Cities and Urbanisation 1

Formation of Cities

1. Keywords

Urban – locations with a high population e.g. towns and cities

Rural – locations with a low population e.g. villages and hamlets

Urbanisation – process of people moving to towns and cities

Counter-urbanisation – process of people moving out of cities, often to suburbs or rural areas

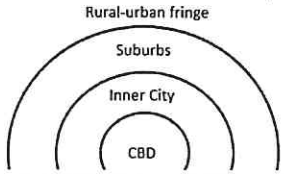
2. How do cities form?

CBD: Multipurpose zone with leisure and recreation (parks and sports ground), residential (houses and flats), transport (road and rail networks), business and commerce (offices, shops and banks) and industry (factories, warehouses and small production centres).

Inner city: Terraced houses in a grid like pattern, originally built to house factory workers (many now closed down), pattern of unemployment here as factories close down, regeneration has occurred here and investors buy these houses and improve them to appeal to young professional who need access to the CBD, this is gentrification.

Suburbs: Mostly residential, larger than inner city terraces, most have a garden, typically detached or semi-detached, land prices are generally cheaper than CBD and inner city, facilities like schools, places of worship, parks and supermarkets are present, can become home to commuters.

Rural-urban fringe: the land on the edge of an urban area where the urban area ends and the rural area begins. A mixture of land uses, some housing, golf courses, allotments, business parks and airports. Often causes conflict, for example, building Terminal 5 at Heathrow on the outskirts of London was a source of controversy.



Migration

3. Keywords

Migration – movement of people from one place to another

Economic migrant – person who has moved from one place to another for work

Immigration – moving into a country

Emigration – movement out of a country

Gentrification – poor urban area changed by wealthier people moving in

4. Why do migrants move to new countries?

Push factors: limited services, political instability, high crime rates, flooding, poor access to water.

Pull factors: high wages, further education, tech job opportunities, accessible services.

Gentrification: typically, in inner cities, run-down areas with weak economies and few opportunities. Wealthy people/developers purchase land/buildings for cheap prices, regenerate them and sell for higher prices. The improves the reputation and economy of the area. This can price-out the original inhabitants as they cannot afford the new rent prices in the gentrified area.

5. Why do migrants move within the UK?

Counter-urbanisation: In the UK, many people are migrating from CBDs and inner cities to the rural-urban fringe.

Push factors: Old, expensive housing, pollution, shortage of land, expensive to build with limitations, poor vehicles access.

Pull factor: New housing estates are built, with retail parks, industrial estates, business parks, science parks, airports, motorways and ring roads.

Commuter settlements: Areas on the rural-urban fringe that have good transport access to a near-by city. People live in the quiet, rural areas but work in the high-paying city. This is able to happen due to roads, public transport like trains and teleworking as any people opt for flexi-working and can work from home.

Sustainable cities

6. Keywords

Infill – construction in an urban space that 'fills gaps'

Urban sprawl – town physically expanding

Green belt – green area around a town or city

Sustainable settlement – a place where people live and work and have access to services and education

Pedestrianisation – an area of the city where traffic is banned, so the area is all paved for people to walk.

7. How can a city be sustainable?

Transport: Frequent and reliable services that use green energy e.g. train, tram, bus. This should reduce the reliance on cars and enable people to walk or cycle, or use a cheap public transport option.

Multi-purpose zones: a settlement should have a range of housing from flats to multi-bedroom detached home so residents can move to bigger/smaller spaces when required, without having to move to a new city.

Employment: A range of job opportunities from Saturday jobs for students, to high-paying professional jobs. Needs a range of education from primary schools to university.

Leisure: For a city to be fully sustainable, people also need fun and entertainment within their city. Cinema, theatre, gyms, tennis clubs, football stadiums and concerts all contribute to the sustainability of the city.

8. Challenges

Affluence and deprivation: Disparity between affluence and deprivation can limit sustainability as some residents have large homes with lots of bedrooms, a drive and large garden when the next street has small, terraced houses without drives or garden. All cities have inequalities like this, but the challenge to reach sustainability is reducing this inequality.

Multicultural communities: A community with people of different ethnicities, religions and cultures should be sustainable, but the challenges can come if segregation occurs. Councils must then encourage integration through using a range of languages in informative leaflets/posters, providing facilities like community centres and ensuring services for different cultures are available e.g. female doctors.

Regeneration

9. Keywords

Regeneration – the long-term upgrading of existing urban, rural, industrial and commercial areas to bring about social and economic change

Urban renewal – the process of redeveloping an area within a city, with the goal of creating new infrastructure and increasing tax revenue.

Greenfield site – location never built on

Brownfield site – location which has been built on, being redeveloped

10. How has Park Hill been regenerated?

1957: Construction started, designed by Jack Lynn and Ivor Smith

1961: Construction complete – hailed as the most ambitious inner-city development of their time. Nicknamed 'Streets in the Sky'.

1980: Park Hill had become dilapidated and was no longer a popular place to live. Poor noise insulation, badly lit walkways and plenty of passages and alleys.

1998: Park Hill is Grade II* listed, remains Europe's largest listing.

2007: Park Hill is taken on by Urban Splash.

Today: Park Hill still has its brutalist architecture, but with Sheffield steel on the fire escape, floor-to-ceiling windows in the apartments and colourful blocks to brighten the appearance. Flats sell out quickly and are a competitive price

11. What type of land should developers use?

Greenfield advantages: need to clean up the site from previous land uses therefore can be cheaper, existing road networks are not in place, so planning is not restricted, more space available for gardens, sites on the edge of the city are often close to major motorways so good access.

Greenfield disadvantages: puts pressure on the countryside surrounding major cities, gaining planning permission may be difficult as rural areas often have stakeholders that want the area to remain natural, environmental issues must be offset and considered in planning by creating green spaces, increasing impermeable surfaces must be offset so drainage and flood water storage must be considered in planning.

Brownfield advantages: It is more sustainable as existing developed land is being used, city expansion is avoided as the site is already within the city - this stops the loss of countryside and reduces journey times as the city is more compact, road networks already exist, as do electricity and gas networks, although these may need updating and it is easier to gain planning permission as councils are keen to reuse the brownfield sites.

Brownfield disadvantages: Developers are limited by access and size of development, design has to be compromised due to infrastructure.

Cities and Urbanisation Practice Questions

1. Define the terms urbanisation and counter urbanisation.
2. What is the difference between a brownfield and greenfield site?
3. Give three reasons why people often prefer to live in rural areas.
4. Define three functions of urban areas.
5. What is a greenbelt and why is it needed?
6. Why has car ownership and internet access influenced counterurbanisation?
7. Explain two ways a city can be sustainable.
8. Explain one challenge a city may fact when trying to become sustainable.
9. If you were to construct a business in a city, would you build on a greenfield site or brownfield site? Explain your choice.
10. Use an example you have studies, describe how an urban area can be rapidly regenerated.

1.1.1 Architecture of the CPU

The purpose of the CPU:

- ❑ The fetch-execute cycle

- — Data and instructions **FETCHED** from main memory.
- — They are then **DECODED** and **EXECUTED.**
- — This is carried out in a continuous cycle.

Common CPU components and their function:

- ❑ ALU [Arithmetic and Logic Unit]
- ❑ CU [Control Unit]
- ❑ Cache
- ❑ Registers

- — **ALU** performs calculations and logic checks.
- — It may take several F-E-Cycles for a calculation to be finished.
- — Intermediate results are stored in the **Accumulator.**
- — **Cache** is VERY FAST memory.
- — Instructions that are carried out frequently are stored there so that they don't have to be FETCHED (saving time).
- — **Registers** = small amounts of high speed memory contained within the CPU.
- — Registers store data that is needed during the F-E-C.

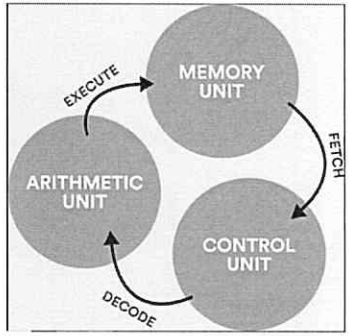
Von Neumann Architecture:

- ❑ MAR (Memory Address Register)
- ❑ MDR (Memory Data Register)
- ❑ Program Counter
- ❑ Accumulator

MAR – Holds the address of the current instruction that is to be fetched from the memory, or the address in the memory to which data is to be transferred.

MDR – Holds the contents found at the address held in the MAR, or data which is to be transferred to primary memory.

REVISION NOTE: You should learn what each register does and its role in the fetch execute cycle.



John Von Neumann was a Hungarian mathematician who developed the idea that a computer could be used for many purposes and not just one.
- This was called the **stored program concept**.
- A processor based on **Von Neumann's architecture** would use memory to store data and instructions and would use the **fetch execute cycle** to retrieve and process instructions.

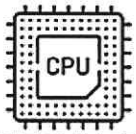
Accumulator – Holds the data while it is being processed.

PC – Holds the memory address of the next instruction to be fetched from primary memory.

1.1.2 CPU Performance

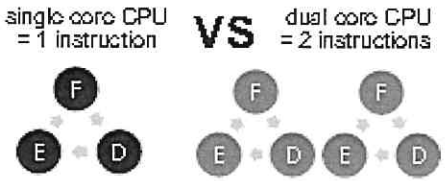
How common characteristics of CPUs affect their performance:

- ❑ Clock speed
- ❑ Cache size
- ❑ Number of cores



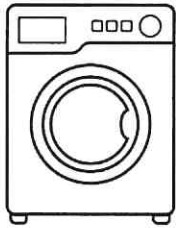
- Each processing unit inside a CPU is called a **CORE.**
- **Each core can carry out the fetch execute cycle.**
- The more cores a CPU has, the more instructions it can process in a given time. (i.e. **Parallel Processing**)

- The **Clock** coordinates all the computer's components.
- It sends out a pulse that synchronises each component – the **FREQUENCY** of this is know as **CLOCK SPEED**.
- It is measured in **HERTZ.**
- The higher the frequency, the more instructions can be processed in a given time



Cache is very fast (and expensive) memory that can store frequently used data or instructions.

1.1.3 Embedded Systems



The purpose and characteristics of embedded systems
Example of embedded systems:

- **Embedded Systems** are small computer systems built inside larger devices or pieces of equipment.
- they are designed to do one task (rather than a range of tasks).
- Embedded systems have a simple user interface.
- In addition, the software used to control or run the system is also basic.

As they are a dedicated to a single task, embedded systems are usually easier to design, cheaper to produce, and more efficient at doing their tasks than a general purpose computers.

Which of these is NOT an Embedded systems?

DOES ONE TASK

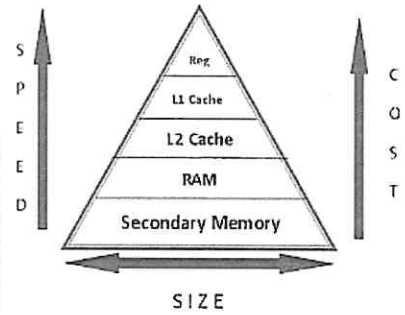
DOES ONE TASK

DOES MANY TASKS

1.2.1 Primary Storage (Memory)

The need for primary storage
The difference between RAM and ROM
The purpose of RAM in a computer system
The purpose of ROM in a computer system
Virtual memory

This shows speed vs capacity of primary/secondary storage



Primary storage is used to store programs and data currently used by the computer. When a user needs to run a program, its is loaded from disk to primary storage.
Another term for primary storage is **RAM** or **Random Access Memory.** It is given this name because data can be stored anywhere within the available memory.
RAM is **Volatile** (i.e. any data stored in RAM is lost when the device is powered off).
ROM or **Read Only Memory** is **non-volatile** (i.e. any data stored in RAM is not lost when the device is powered off) – it is stored **permanently.**
ROM can be used to stored the **BIOS** (i.e. the program that boots up and loads the **Operating System** when the computer turned on).
VIRTUAL MEMORY is used when the computer is short of RAM. This involves the hard disk being used as memory instead of RAM.
This is not ideal as the speed of hard disk is MUCH slower than RAM.

1.2.2 Secondary Storage

The need for secondary storage
Common types of storage:
- ❑ Optical
- ❑ Magnetic
- ❑ Solid state




REVISION NOTE
When recommending a methods of secondary storage, always consider the context in which the data is being used

OPTICAL STORAGE includes CD, DVD and Blu-ray.
Data is written to optical storage media using laser.
The capacity of this type of media ranges from 640 megabytes (CD) to 50 gigabytes (Blu-ray).
Since it involves the use of moving parts access/data transfer speeds are slower than for other types of media.

Examples – CD, DVD, Blu-ray

Magnetic storage media include hard drive and tape and can have a huge capacity (100's of terabytes).
Magnetic storage media devices involve the use of moving parts.
This means that they have comparatively slow data read and write speeds and can be prone to damage.

Examples – Hard Drive, Magnetic tape, external hard drive

SOLID STATE media is also known as electrical or flash storage.
Solid state has the fastest transfer speed out of all the three types of media, since it features no moving parts.
This also makes it more robust than other forms of storage and addition they consume less power.
However this form of storage offers lower capacity than other forms of media and is still comparatively expensive

Examples – Solid State, Flash drive, SD card

Criteria for choosing secondary storage

Criteria	Meaning
Cost	How much does it cost per GB of storage?
Capacity	How much is there to store files?
Speed	How fast can it read/write data?
Portability	Can it be carried easily or is it a device that is hard or impractical to carry/move?
Durability	How robust is it? Will it break or damage easily?
Reliability	How likely to fail is it? How long will it last?

1.2.3 Units

The units of data storage:

- ❑ Bit
- ❑ Nibble (4 bits)
- ❑ Byte (8 bits)
- ❑ Kilobyte (1,000 bytes or 1KB)
- ❑ Megabyte (1,000 KB)
- ❑ Gigabyte (1,000 MB)
- ❑ Terabyte (1,000 GB)
- ❑ Petabyte (1,000 TB)

How data needs to be converted into a binary format to be processed by a computer

Data capacity and calculation of data capacity requirements

Computer are electrical devices; their components are made up of millions of circuits. Each circuit contains switches which can be Either 'on' or 'off'. These can be represented by values 1 and 0. **This is called BINARY.**

ALL data is stored and processed in binary form – this includes text, images, sound and video.

1.2.4 Data Storage

Numbers

- ❑ How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice -versa
- ❑ How to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur
- ❑ How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa
- ❑ How to convert binary integers to their hexadecimal equivalents and vice versa
- ❑ Binary shifts

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1

To convert 25 to binary:

- ✓ Start with the column nearest 25 (i.e. 16 or 2^4)
- ✓ Put a one in that column
- ✓ Check each remaining column, adding either a 1 or 0 onto the end of our number
- ✓ In this case **16 + 8 + 1 = 25** ($2^4 + 2^3 + 2^0$)
- ✓ So... 25 in binary is**11001**

To convert 101010 into decimal:

- ✓ Work which column the left digit is in (i.e. 32 or 2^5)
- ✓ Work left to right – add up the column value each time there is a 1
- ✓ For example: 32 + 8 + 2 = **42**)

Hex	Dec
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	10
B	11
C	12
D	13
E	14
F	15

Converting to/from Hex

EBF6 5200 809

To convert decimal to hex:

- ✓ First convert the number to binary:

I.e. 25 in binary = **00011001**

- ✓ Then split the number into two groups of 4 bits:

I.e. **0001 1001**

- ✓ Then convert each group of 4 bits to HEX:

I.e. **0001 = 1**
1001 = 9

Then join (don't add) both digits together:

I.e. 1 + 9 = **19**

To convert hex to decimal, just work through this process backwards

Binary arithmetic
Use binary shift to:

- **Multiply**

00110111 x 2 = 01101110
[Left shift by 1]

- **Divide**

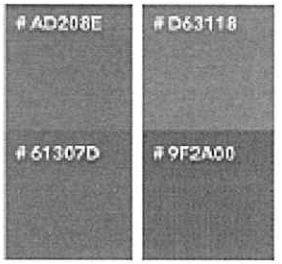
00110111 / 2 = 00011011
[Right shift by 1]

Rules for binary addition		
00 + 00 =	0	No remainder
00 + 01 =	1	No remainder
01 + 01	1 0	Carry 1
10 + 01	1 1	Carry 1

If there are insufficient bits to store the answer, this causes **OVERFLOW**

Hexadecimal numbers can be represented in fewer digits then in binary making them easier for humans to remember and more economical in terms of storage

Hexadecimal has many uses in computing:
- **assembly language,**
- to store a **MAC Address**
- representing colour codes



2.1.1 Computational Thinking

Principles of computational thinking:

- ❑ Abstraction
- ❑ Decomposition
- ❑ Algorithmic thinking

Abstraction
Removing any unnecessary detail from a problem in order to solve it. Identifies the information that can be removed from the problem without changing it.
Using symbols, variables etc. to represent a 'real world' problem in a computer program...
...and removing/hiding unnecessary elements

Decomposition
Breaking a large problem down with no known solution into smaller steps and stages.
smaller problems are easier to solve:

- they can be solved independently of the other problems
- they can be tested independently
- then combined to produce the full problem

Algorithmic Thinking
Algorithmic thinking is a way of getting to a solution through the clear definition of the steps needed – nothing happens by magic.

2.1.2 Designing, creating and refining algorithms

Identify the inputs, processes, and outputs for a problem
Structure diagrams
Create, interpret, correct, complete, and refine algorithms using:

- ❑ Pseudocode
- ❑ Flowcharts
- ❑ Reference language/high-level programming language

Pseudocode – simplified, not language specific style used to design algorithms.

- Pseudocode uses short English words/statements to describe an algorithm.
- It would generally look a little more structured than just writing English sentences.
- However it is very flexible.
- It is less precise than using a reference language, or a programming language.

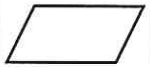
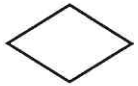
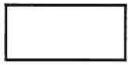
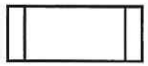
Example Pseudocode:

```
IF Age is equal to 14 THEN
  Stand up
ELSE Age is equal to 15 THEN
  Clap
ELSE Age is equal to 16 THEN
  Sing a song
ELSE
  Sit on the floor
END
```

```
mark = input("Input mark")
if mark < 50 then
      print("Fail")
elseif mark < 70 then
      print("Pass")
elseif mark < 90 then
      print("Merit")
else
      print("Distinction")
endif
```

Algorithm – the series of steps to solve a problem or perform an action. Can be represented using a **flowchart** or **Pseudocode**.

Flowchart – a diagram that shows the inputs, outputs and processes in an algorithms.

	**Terminal** Start/Stop		**Input/output** Requires input from the user or outputs on screen
	Line Show flow of data		**Decision** Often a yes or no question
	**Process** Goes on behind the scenes		**Sub Program** Reusable code, can be called at any time.

Exam Reference Language – a more formal 'code like' way of writing algorithms that is used within the examination.

- This looks like pretend code.
- It's defined in a more formal way to represent an algorithm.
- It looks much more like a programming language – but will not "compile".
- It can be read more easily by programmers.
- It can be easier to then write the program in a chosen language, e.g. Java, Python, VB.

2.1.2 Designing, Creating And Refining Algorithms

Identify common errors
Trace tables

Common Errors
Syntax errors –where the program code syntax is not correct. For example not using a capital letter, a space or colon. These errors stop a program running.
Logic errors – incorrect code that causes the program to run but, produce an incorrect output or result.

Trace Tables
A trace table is used to test algorithms and programs for logic errors that appear when an algorithm or program executes.
The trace table simulates the steps of algorithm/ program.
Each stage of the algorithm/program are executed step by step.
Inputs and outputs, variables and processes can be checked for the correct value when the stage is completed.

Let's trace the following algorithm:

```
START
a ← 5
b ← 1
c ← a + b
a ← c
b ← c
c ← c + a + b
END
```

1. This algorithm includes three variables: a, b and c. They are added to the top of the trace table:

a	b	c

2. Starting at the top row of the table and working left to right, input the variable information. If completed correctly, the trace table should look like this:

a	b	c
5	1	6
6	6	18

2.1.3 Searching And Sorting Algorithms

Standard searching algorithms:
- Binary search
- Linear search

Standard sorting algorithms:
- Bubble sort
- Merge sort
- Insertion sort

Linear search – Each item in the list is checked in order from the start of the list until the item is found.
- A linear search allows us to search for values even if the values are not in order.
- Linear search:
- Check the first value
- IF it is the value you are looking for
  - Celebrate and stop
- ELSE move to the next value and check
- REPEAT UNTIL you have checked all the elements and not found the value you are looking for

Insertion Sort – each items is take in turn, compare to the items in a sorted list and placed in the correct position.
Element 1 is a 'sorted' list.
The rest of the elements are an 'unsorted' list.
Compare the first element in the 'unsorted' list to each element in the sorted list.
IF it is smaller, put it in in front of that element (move the others along).
ELSEIF it is larger, compare with the next.
ELSEIF there are no more elements in the 'sorted' list put it in the final position.
REPEAT UNTIL all element in the 'unsorted' list are in the 'sorted' list

Binary Search – An ordered list (i.e. smallest to largest) is split into two each time a comparison is made.
- The list needs to be in order for a binary search
- Take the middle value.
- Compare to the value you are looking for.
- IF it is the value you are looking for.
  - Celebrate, and stop.
- ELSEIF it is larger than the one you are looking for.
  - Take the list to the left of the middle value.
- IF it is smaller than the one you are looking for.
  - Take the list to the right of the middle value.
- REPEAT with the new list.

Bubble Sort – moving through a list repeatedly, swapping elements that are in the wrong order.
Take the first element and second element from the list
Compare them
IF element 1 > element 2 THEN
  Swap then
ELSE
  Do nothing
Repeat: Move along the list to the next pair
  IF no more elements: Go to 1
  ELSE: Got 2
Until: you have moved through the entire list and not made any changes

Merge Sort – a list is split into individual lists, these are then combined (two lists at a time).
- Compare the first element in both lists.
- Put the smallest into a new list.
- Compare the next element of 1 list with the second element of the 2nd list.
- Put the smallest into a new list.
- Repeat until merged.

R093: Creative iMedia in the media industry

1.1 Media Sectors

Description:
The main means of mass communication (broadcasting, publishing and the internet). The industry itself branches out into "Traditional" and "New" Media.

Traditional Media

Definition:
Traditional Media is the non-digital methods that have been used for a long time as a means of creating awareness of products. Traditional Media existed before the internet.

Sectors:
TV (Television)
Radio
Film
Print Publishing

New Media

Definition:
This relates to On-Demand content that is accessed using the internet with digital devices such as computers and smartphones. New Media may include interactive elements were the user is able to control what happens.

Sectors:
Interactive Media
Video Games
Internet
Digital Publishing

Media Products across different sectors

Media Products are used to influence and entertain. They are used across many different sectors of society and many types of businesses. Many companies use multiple media products across both New and Traditional Media. For example: Estate Agents may have billboards (print publishing), Website posts (digital imaging) and leaflets (print publishing).

Areas where traditional media has evolved

Special effects	Digital Games
Digital imaging and graphics	Websites
Social Media	Multimedia
eBooks	Augmented Reality
Virtual Reality	3D technology
Digital Audio Broadcasting	

Interactive Media

Interactive Media covers any type of media that allows the user to interact with it. For example: Websites allow the user to navigate between pages by clicking on buttons or links and animated adverts which allow the user to click to find out more.

Key Terms and Definitions:

Media	The means of communication such as Radio and TV.
Multimedia	Combines different forms such as text, audio, images, animation and video into a single product.
Distribution	The act of sharing the information across Media products.
Streaming	The technology of transmitting audio and video files in a continuous flow over an internet connection.
Downloading	Copying from one computer system to another, typically over the internet

R093: Creative iMedia in the media industry

1.1 Media Products

Description:
A media product is an item used to communicate information to a specific audience. There are different formats that can be used for this purpose.

Digital Imaging and Graphics

A product that uses technology to create images in digital form. This may involve the use of graphic tablets, cameras or specific software such as Adobe Photoshop®.

Music

Music products include albums and singles sold on CD, streaming or broadcast over the radio. It also incorporates soundtracks.

Video

Videos are products that contain moving images. They are mainly used on traditional TV broadcasts although online streaming with services such as Netflix® and YouTube® are increasingly common.

Animation

This refers to a series of still images that are combined together to in a logical order to create a moving picture. Animation can be created frame by frame or using stop-motion animation.

Audio

The use of voice overs in advertisements and podcasts. These also include sound effects used in film and video such as glass breaking.

Visual Effects (VFX)

These are effects that are created post-production using computers. VFX are mostly used to create video that would be too dangerous, expensive or difficult to create in real life. Green screens are heavily used when creating VFX and actors may wear motion capture suits to map their movements.

Special Effects

These include effects that happen live on set during filming. Examples of these are: explosions and artificial rain. This also incorporates wounds and prosthetics used in films.

Digital Games

A wide range of products including online games and console games that are designed to entertain or inform.

Comics and Graphic Novels

Comics and graphic novels are image based storytelling. These can be digital or print published and can incorporate digital graphics. Comics are individual issues or strips of images, whereas graphic novels are collections of comics or longer form stories.

Apps

Applications, or apps, are computer programs or software that is designed for a specific purpose. They are designed to run on a particular device such as smart phone, tablet or smart watch. Apps have many uses including games, banking or social media.

Multimedia

Multimedia products combine a range of assets such as images, text, sound and video to make one final product. They enable the user to interact with several technologies at once.

eBooks

These are non-editable digital books, they are viewed a piece of hardware called an eReader or using a specialist app on other digital devices. eBooks are limited to greyscale display but do allow for the user to adjust the font size. On some apps you can also change the typeface. They are mostly used for novels or textbooks.

Social Media

Social media websites and applications enable users to create and share content. They provide the ability to connect with people all over the world and participate in social networking.

Websites

Websites are made up of a range of multimedia elements, these are combined together to create one site that can be accessed via the internet.

Augmented Reality (AR)

The use of augmented reality became popular when smart phones became more available to the public. AR allows the user to visualise a product or character superimposed onto real life environments.

Virtual Reality (VR)

Virtual reality has become popular in the gaming industry as well as in training environments. It requires the user to wear a headset that alters their perception of their surroundings. They have a 360^0 view of an environment, which is generally programmed or uses video capture to allow the user to complete tasks that they would not normally be able to complete such as combat training or full immersion in a game.

1.2 Job roles in the Media Industry

R093: Creative iMedia in the media industry

Senior

Campaign Manager

A campaign manager is responsible for planning and managing marketing campaigns. This will involve coordinating the release of trailers, billboards, print advertising, television adverts and more.

Creative Director

The creative director manages a team of graphic designers, illustrators, copywriters, photographers and other members of the creative team. They help to shape and develop the final product and will liaise with the client to ensure their requirements are met.

Director

The director will oversee filming. They work with storyboard artists, actors and crew members such as video editors and sound editors. Production can take years to go from a script to final screening.

Editor

The editor controls the content of print publications such as books, magazines, newspapers and websites. They plan, organise and review materials to ensure they are suitable for publication.

Production Manger

A production manager will liaise with different departments, their role will include pre-production which includes scheduling and budgets. This role requires vast industry experience and the understanding of the production process.

Creative

Animator

Animators usually work in the production phase and traditionally create a series of images that are combined to give the illusion of movement. Many animations are now made in 3D using specialist software. They may also create stop-motion animation using models that are moved between each frame.

Content Creator

Content creators are responsible for creating the content that is found on websites, blogs or social media. This will include text, video and audio for a specific audience.

Copywriter

A copywriter is responsible for creating engaging text that will be used for marketing purposes. For example they will write the content for print adverts, radio adverts, product descriptions or social media posts.

Graphic Designer

A graphic designer creates visuals for a variety of media products. They work in both production and pre-production, starting with rough drawing and ending with finalised artwork.

Illustrator/Graphic Artist

They create the drawings or images for a range of products such as books, magazines and greetings cards. They tend to use either pencils, pens and paper or a graphics tablets with a stylus pen.

Script Writer

They write and develop the scripts for film, radio and computer games, they may create new stories or adapt existing works.

Photographer

They capture high quality images to help communicate a message. These images are often used in the fashion, beauty, life style or advertising sectors. They may be involved in the editing and post-production phases as well.

Technical

Camera Operator

The camera operator is responsible for filming what is happening. This may be for TV, film, documentaries or adverts. They need to consider framing of the subjects, movement and the composition of each shot.

Game Developer

May include programmers, who write code for games published on PCs, consoles and smartphones, or artists, who create 2D and 3D artwork for use in digital games.

Sound Editor

The sound editor is responsible for creating, enhancing and mixing music, sound effects and dialogue and synchronising within the video due to them being recorded separately. These sounds may be used in film, advertising, games or online videos.

Audio Technician

They are responsible for setting up, operating and maintaining the audio recording equipment such as microphones and mixers.

Video Editor

Video editors have a predominant role in the post-production part of filming. They edit the footage to ensure the final product is suitable.

Web Developer

They are broken down into 2 sections, front-end developer and back-end developer. Front-end create and maintain websites using programming languages. Back-end developers are responsible for the programming that makes the website work, for example the credit card orders and the stock databases.

R094: Visual Identity and Digital Graphics

1.1 Purpose of Visual Identity

Description:
A Visual Identity gives customers or users a feeling and perception of a brand, product or service

What is the purpose of a visual identity?

The purpose of visual identity is:

- To create an emotional impression on viewers
- To inform viewers about the nature of the brand and the services and products offered
- To unify the many different aspects of a business through consistent visuals

Why do we need a good visual identity?

1. It enhances brand recognition, using the logo, name and other visual elements.
2. It increases the trust in the brand and business because if the consumers see high quality visual identity they are more likely to trust the business.
3. It creates a sense of business continuity and brand consistency, this will give a degree of familiarity and continuity.
4. It drives sales. If your graphics, website, social media posts and promotional material send a uniform message about your brand identity and its core values, you are more likely to cash in.
5. It builds a better relationship with the customer. The target audience may relate to the visual identity more if they find it appealing and easy to understand.
6. Its sets the brand apart from the competition. A distinctive visual identity creates an eye-catching, striking and memorable branding effect that helps you distinguish yourself from your competition.

1.1 Visual Identity Design Style

Description:
The Visual Identity Design Style is the style the company use to represent their product.

Business Type and Brand Values

The visual identity design style should reflect the type of business or organisation that it represents. It should communicate the values and core principles of the brand.
For example a kids holiday club would create a visual identity that communicates a feeling of fun, activity and creativity. They may use bright colours to attract children and a playful decorative font. Whereas a luxury hotel would use more muted style with a logo that is simple but elegant and colour schemes that give reassurance and trust. The font style may be more formal to communicate a traditional atmosphere.

Brand Positioning

The brand position in the market place can also have an effect on the visual identity.
The style may change depending on whether they position themselves in the economy, mid-range or luxury market.
For example a economy brand of beans will often have a standard font and minimal graphics on its label whereas a luxury brand's label will be more stylish with specialist fonts and highly crafted images.

1.1 Components of Visual Identity

Description:
Visual identity is essentially a brand's visual language. As such, its individual elements are, like words, the building blocks that allow the messenger to create meaning. Here, we'll look at the separate elements that come together to form a cohesive visual identity.

Three Main Components

The following three components are the main parts you would find in a visual identity:
Logo - these are the words or images that represent the brand
Brand name - identifies what the name of the brand is and tells you what the product is
Slogan/Strapline - this a short memorable phrase about the product or business

Layout and Complexity

The layout needs to be considered so that it is appropriate for the target audience and purpose.

Typography

The style of the text used, what size it will be and what colour. There are many different fonts available and each will have a different effect on the viewer and be more attractive to different consumers

Colour Palette

This relates to the particular group of colours or colour scheme that is to be used across all products. It is normally recommended that no more than 3 colours are used. When used correctly colours can have a powerful impact on the viewer

Graphics

This includes photos, images, illustrations, shapes and symbols. These can have a huge impact on how well the visual identity is recognised for example; the Lego brick and Coca-Cola bottle are very recognisable images.

Topic: Rounding, Estimating and Conversions		Year 9	TERM 1

What do I need to know?

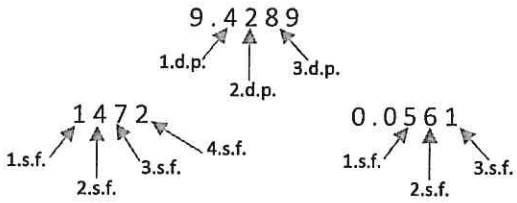
- To round to the nearest whole number and a given number of decimal places and significant figures
- Use rounding approximations to estimate a calculation
- Know key metric conversions of length, area, volume and capacity

How do I recognise this topic?

- Key words: Round, estimate, approximate, decimal place, significant figure, units.

Step by Step Guide / General Tips

- When rounding – 5 or more, let it soar ↑
  – 4 or less, let it rest ↓
- Decimal places (d.p.) are the digits after the decimal point
- We count significant figures (s.f.) from the first non-zero digit.
- When estimating a calculation we round every number to 1.s.f.



Worked Example

Rounding to nearest whole number and decimal places

Round 2.3581 to..

e.g. Nearest whole number

2.3581

2|.3581 — 5 or above? No

= 2

e.g. one decimal place

2.3581 (1.d.p.)

2.3|581 — 5 or above? Yes

= 2.4

e.g. Two decimal places

2.3581 (1.d.p., 2.d.p.)

2.35|81 — 5 or above? Yes

= 2.36

e.g. three decimal places

2.3581 (1.d.p., 2.d.p., 3.d.p.)

2.358|1 — 5 or above? No

= 2.358

Rounding to the nearest significant figure

Round the following to one significant figure:

e.g. 1472 (1.s.f.)

1|472 — 5 or above? No

= 1000

e.g. 0.0561 (1.s.f.)

0.05|61 — 5 or above? Yes

= 0.06

Round the following to two significant figures:

e.g. 1472 (1.s.f., 2.s.f.)

14|72 — 5 or above? Yes

= 1500

e.g. 0.0561 (1.s.f., 2.s.f.)

0.056|1 — 5 or above? No

= 0.056

Estimate the following calculations

e.g. Estimate 45 x 34

Round to 1.s.f: 45 x 34 → 50 x 30

= 1500

e.g. Estimate $\frac{36 \times 22}{2.37}$

Round to 1.s.f: $\frac{36 \times 22}{2.37} \rightarrow \frac{40 \times 20}{2} \rightarrow \frac{800}{2} = 400$

e.g. Estimate 129 + 42 x 4.5

1. Round each number to 1.s.f.
2. Use BIDMAS to estimate

≈ 100 + 40 x 5
= 100 + 200
= 300

e.g. Estimate $\sqrt{50}$

What is the closest square number to 50?

Square numbers:
1, 4, 9, 16, 25, 36, 49, 64
50 is closest to 49

e.g. $\sqrt{50} \approx \sqrt{49} = 7$

Metric Conversions

Length
1 cm = 10 mm
1 m = 100 cm
1 km = 1000 m

Mass
1 kg = 1000 g
1 tonne = 1000 kg

Capacity
1 cl = 10ml
1 litre = 1000 ml
1 litre = 100 cl

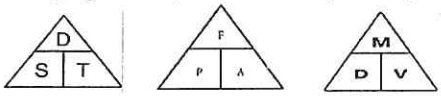
Topic: Accuracy and Bounds		Year 9	TERM 1

What do I need to know?

- Use approximations to estimate the value of a calculation and check your answer.
- Correctly use inequality signs including $\leq \geq \neq \approx <>$
- Use inequality notation to specify error intervals due to truncation or rounding.
- Identify upper and lower bounds and use them to calculate maximum and minimum figures.

How do I recognise this topic?

- Look for the following key words: **round, estimate, approximate, significant, error interval, bound, limit.**
- Look for the use of the symbols $\leq \geq \neq \approx <>$
- Questions may include calculations involving the triangles:
- You may need to find a **maximum** or **minimum** value.



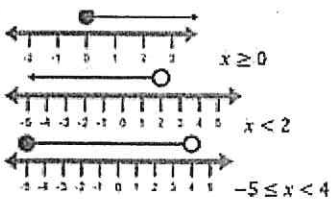
General Tips

- An inequality says that two values are **not equal.** $a \neq b$ means that a is not equal to b.
- 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** ($\leq or \geq$)
- To **approximate** means to find a reasonable estimate of an answer by rounding.

To find the **upper and lower bound**, follow these steps:

1. Half the degree of accuracy specified.
2. Add to get the upper bound.
3. Subtract to get the lower bound.

Worked Example



Find the lower and upper bound of 450 to the nearest 10.

1. Half the degree of accuracy = 10 ÷ 2 = 5.
2. Upper bound = 450 + 5 = 455.
3. Lower bound = 450 − 5 = 445.

Find the lower and upper bound of 5.7 to 1 decimal place.

1. Half the degree of accuracy = 0.1 ÷ 2 = 0.05.
2. Upper bound = 5.7 + 0.05 = 5.75.
3. Lower bound = 5.7 − 0.05 = 5.65.

Estimate 62.88 × 28.97

Step 1 Round to the nearest ten

62.88 → 60

28.97 → 30

Step 2 Multiply the rounded numbers.

60 × 30 = 1,800

So, a good estimate for the product is 1,800.

An average clementine weighs 74g to the nearest gram.
A net contains 12 clementines.
The net weighs 20g to the nearest gram.

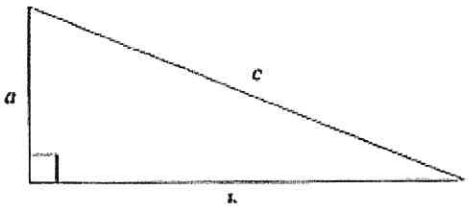
What is the maximum possible weight of the net of clementines.

Clementine max = 74.5

net max = 20.5

12 × 74.5 + 20.5

914.5 g



a = 5.3 cm correct to the nearest mm
b = 8.2 cm correct to the nearest mm

Calculate the lower bound for c.
You must show all your working.
Give your answer to 3 significant figures.

a: 5.2, 5.3, 5.4 → 5.25, 5.35

b: 8.1, 8.2, 8.3 → 8.15, 8.25

$\sqrt{(5.25)^2 + (8.15)^2}$

$a^2 + b^2 = c^2$

9.69 cm

Topic: Compound Measures		Year 9	TERM 1

What do I need to know?

- The formulas for speed, density and pressure
- Rearrange the formulas to find a different component
- How to apply the measures to a graph or object.

How do I recognise this topic?

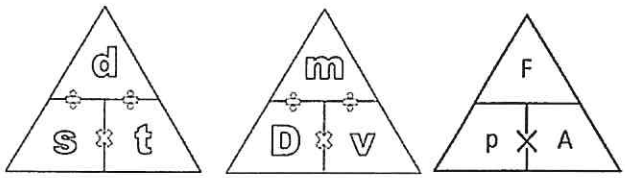
- For speed, when you have measures of length and time in a question
- For density, when you have measures of mass and volume in a question
- For pressure, when you have measures of force and area in a question

Step by Step Guide

Step 1: Identify the correct formula and draw the triangle

Step 2: Cover with you finger the part you are trying to calculate.

Step 3: Apply the correct calculation. E.g. If you are trying to find Distance, then do the speed multiplied by the time.



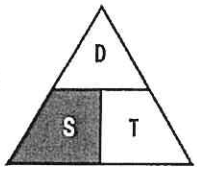
Worked Examples

Speed, Distance and Time

1) Peter travels 74 miles in 5 hours. Find the average speed. Give your answer correct to 1 dp.

Distance ÷ Time

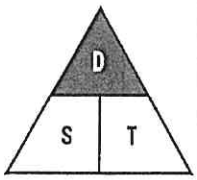
$\frac{74}{5} = 14.8mph$



2) Sophie travelled at constant speed of 61 km/h for 2 hours. Find the distance Sophie has travelled.

Speed x Time

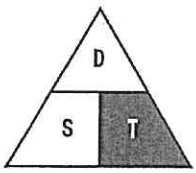
61 x 2 = 122km



3) Zoe travelled at constant speed of 25 km/h over a distance of 75 km. Find the time of Zoe's journey.

Distance ÷ Speed

$\frac{75}{25} = 3hours$

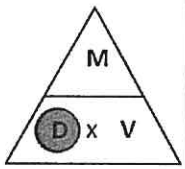


Density

1) A block of glass has a mass of 40g, and a volume of 15 cm³. Work out the density. Give your answer correct to 2 dp.

Mass ÷ Volume

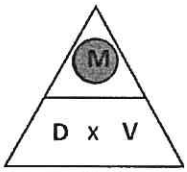
$\frac{40}{15} = 2.67g/cm^3$



2) A block of wood has a volume of 88 cm³, and a density of 0.45 g/cm³. Work out the mass. Give your answer correct to 2 dp.

Density x Volume

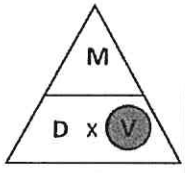
0.45 x 88 = 39.60g



3) A block of metal has a mass of 108g, and a density of 5.2 g/cm³. Work out the volume. Give your answer correct to 2 dp.

Mass ÷ Density

$\frac{108}{5.2} = 20.77cm^3$

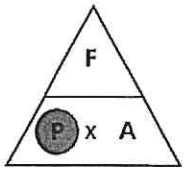


Pressure

1) A force of 108 Newtons is applied across an area of 4.5m² Work out the pressure.

Force ÷ Area

$\frac{108}{4.5} = 24N/m^2$



2) The area of contact is 16cm² and the pressure exerted is 10N/cm². Find the force.

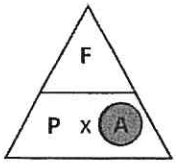
Pressure x Area

10 x 16 = 160N

3) The object exerts a force of 420N on the floor and the pressure on the floor is 20N/cm². Find the area.

Force ÷ Pressure

$\frac{420}{20} = 21cm^2$



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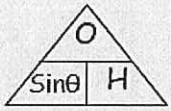
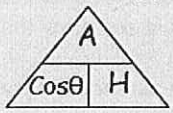
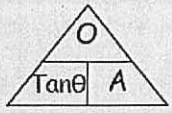
Topic: Trigonometry		Year 9	TERM 1

What do I need to know?

- Label a right angle triangle with the key words "hypotenuse", "opposite" and "adjacent".
- Calculate unknown lengths of a right angle triangle using trigonometry.
- Calculate unknown angles of a right angle triangle using trigonometry.
- Recall and apply the exact trigonometric values.
- Learn the formula to the right.

SOH	CAH	TOA
$Sin\,\theta = \frac{Opp}{Hyp}$	$Cos\,\theta = \frac{Adj}{Hyp}$	$Tan\,\theta = \frac{Opp}{Adj}$
		

How do I recognise this topic?

- Involves a right angle triangle and another angle that is not 90°.
- Involves the maths functions "sin", "cos" and "tan".

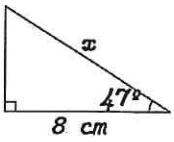
Step by Step Guide

1. Label the triangle with the key words.
2. Choose the appropriate trigonometric ratio.
3. Draw the formula triangle.
4. Cover what you need and use the triangle to work it out.
5. If working out an angle, press "shift" on the calculator before the appropriate trigonometric ratio.

Worked Example

Calculate a Length

Calculate the value of x.



Give your answer correct to 1 decimal place.

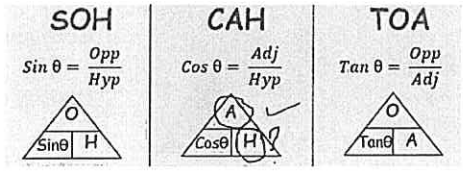
The answer is 11.7 cm

We use cos because we are involving the adjacent (8 cm) and the hypotenuse (x) of the triangle.

$$\cos 47 = \frac{8}{x}$$

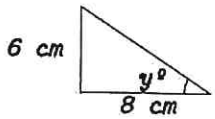
$$x = \frac{8}{\cos 47}$$

$$x = 11.7$$



Calculate an Angle

Determine the value of y.



Give your answer correct to 1 decimal place.

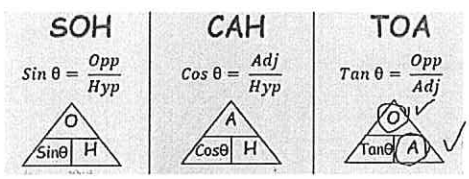
The answer is 36.9°

We use tan because we are involving the opposite (6 cm) and the adjacent (8) of the triangle.

$$\tan y = \frac{6}{8}$$

$$y = \tan^{-1}\left(\frac{6}{8}\right)$$

$$y = 36.9$$



All Saints Absolutes Year 9 German / Term 1a - Identity and relationships with others

Quiz 1.1 – saying who is in your family

In my family there are 4 people	In meiner Familie **gibt es** 4 Personen
There is my mum, my dad and me.	**Es gibt** meine Mutter, meinen Vater und mich.
Also we have a dog	**Außerdem** haben wir einen Hund
I have a brother but I don't have a sister	Ich habe **einen Bruder** aber ich habe **keine Schwester**
However I would like a sister	Jedoch **möchte ich** eine Schwester
My brother is called Benny	Mein Bruder **heißt** Benni

Quiz 1.2 – describing personality

I am very patient	**Ich bin** sehr geduldig
I am not at all shy	**Ich bin** gar nicht schüchtern
She is really kind	**Sie ist** wirklich lieb
He is extremely lazy	**Er ist** unheimlich faul
We are friendly and helpful	**Wir sind** freundlich und hilfsbereit
They are adventurous	**Sie sind** unternehmungslustig

Quiz 1.3 – saying who you get on with

I get on well with my mum	Ich verstehe mich gut mit mein**er** Mutter
I get on well with my dad	Ich verstehe mich gut mit mein**em** Vater
I don't get on well with my brother	Ich **komme** nicht gut mit meinem Bruder **aus**
because we often fall out	, **weil** wir uns oft s**treiten**
because he annoys me / because she always has time for me	denn er nervt mich / denn sie hat immer Zeit für mich
I like spending time with my family	Ich verbringe **gern** Zeit mit mein**er** Familie

Quiz 1.4 – describing your family situation

My parents are divorced	Meine Eltern sind **geschieden**
My mum and dad are separated	Meine Mutter und mein Vater sind **getrennt**
My mum is a single parent	Meine Mutter ist **Alleinerziehende**
I only live with my mum / my dad	Ich wohne **nur** mit Mutti / mit Vati
My mum and my step dad live together	Meine Mutter und mein Vater **leben zusammen**
My mum / dad has remarried	Meine Mutti / Mein Vati hat wied**er geheiratet**

Quiz 1.5 – future plans

In the future I will get married	In der Zukunft **werde** ich **heiraten**
In 10 years time I would like to have 2 children	In zehn Jahren **möchte** ich Kinder **haben**
I would like to live with my girlfriend / with my boyfriend	Ich **möchte** mit meiner Freundin / mit meinem Freund **zusammenleben**
In 5 years I want to live abroad	In fünf Jahren **will ich** im Ausland **wohnen**
Marriage is a waste of money	Heiraten ist eine Geldverschwendung
I want to stay single	Ich **will** ledig/single **bleiben**

Parallel texts

In my family **there are** four people.	In meiner Familie **gibt es** vier Personen.
There's my mum, my step dad,	Es gibt meine Mutter, meinen Stiefvater,
my sister and and me.	meine Schwester und mich.
In addition have we a dog, who Boris is called.	**Außerdem** haben wir einen Hund, **der** Boris **heißt.**
I love my little family.	Ich liebe meine kleine Familie.
In my opinion, get on I very well	**Meiner Meinung nach** verstehe ich mich sehr gut
with my mum **because** she always time for me has.	mit meiner Mutter, **weil** sie immer Zeit für micht **hat.**
However is my step dad quite mean and stupid	**Jedoch** ist mein Stiefvater ziemlich gemein und blöd
therefore have I not a good relationship to him	**daher** habe ich keine gute Beziehung zu ihm
In the future **want I** to marry and	In der Zukunft **will ich** heiraten und
I **will** 2 or 3 children **have.**	ich **werde** 2 oder 3 Kinder haben.
In 10 years **when I older am**	In 10 Jahren, **wenn ich älter bin,**
want I a fantastic career to have as I would like to	**will ich** eine tolle Karriere haben denn ich möchte
lots of money earn.	viel Geld verdienen

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Key skills

1. Use 'haben' and 'sein' confidently
2. Know how to use quantifiers with adjectives
3. Communicate coherently
4. Conjugate present tense verbs
5. Use the future tense

All Saints Absolutes Year 9 German / Term 1b – Identity and relationships with others

Quiz 2.1 – key family verbs

Ich **besuche** oft meine Großeltern	I often **visit** my grandparents
Ich **feiere** gern meinen Geburtstag	I like **celebrating** my birthday
Ich werde in 10 Jahren **heiraten**	I will **get married** in 10 years
Ich **streite** ziemlich oft mit meinem Bruder	I **argue** quite often with my brother
Wir **sprechen** oft über Probleme	We often **talk** about problems
Wir **teilen** ein Schlafzimmer, obwohl es nervig ist	We **share** a bedroom, although it's annoying

Quiz 2.2 – key family verbs

Ich **rufe** meine Mutter immer **an**	I always **ring** my mum
Ich **gehe** an Wochenende mit Freunden **aus**	I **go out** at the weekend with friends
Ich **lade** viele Freunde und Familie **ein**	I **invite** lots of friends and family
Ich **komme** sehr gut mit meinem Vater **aus**	I **get on well** with my dad
Ich **kümmere** mich um meinen kleinen Bruder	I **take care of** my little brother
Wir **vertrauen** uns	We **trust** each other

Quiz 2.3 - DIV WAZ DUM JO T

daher	**therefore (v2)**	um...zu	in order to...
ich denke, daß	I think that (vs)	**meiner Meinung nach**	**in my opinion (v2)**
vielleicht	**perhaps (v2)**	**jedoch**	**however (v2)**
weil/ wenn	because/if (vs)	obwohl	although (vs)
außerdem	**in addition (v2)**	**trotzdem**	**nevertheless (v2)**
zum Beispiel	**for example (v2)**		
da	because (vs)		

Quiz 2.4 – using key verbs "haben" and "sein"

haben = to have	***sein = to be***
ich habe	ich bin
du hast	du bist
er / sie hat	er / sie ist
wir haben	sie sind
Sie / sie haben	Sie / sie sind

Quiz 2.5 – Steps to Success

Um mich zu entspannen	In order to relax
Meiner Ansicht nach ist meine Familie super	In my opinion my family is super
Im Großen und Ganzen finde ich meine Familie ausgezeichnet	All in all I find my family excellent
Wenn ich Zeit habe gehe ich mit Freunden aus	If I have time I go out with friends
Ehrlich gesagt	Honestly speaking...

Parallel texts

Zu Hause	
Wenn ich zu Hause bin, besuche ich oft meine	If I at home am, visit if often my
Großeltern, weil wir eine gute Beziehung haben.	grandparents, because we a good relationship have.
Außerdem sprechen wir oft über Probleme.	In addition speak we often over problems.
Jedoch streite ich ziemlich oft mit meinem Bruder,	However argue I quite often with my brother,
da er total nervig ist.	because he totally annoying is.
Auf der anderen Seite komme ich sehr gut mit	On the other side get I very well with
meinem Vater aus und wir vertrauen uns.	my dad on and we trust each other.
Am Wochenende gehe ich mit Freunden aus,	At the weekend go I with friends out,
obwohl es teuer ist.	although it expensive is.
Morgen habe ich Geburtstag	Tomorrow have I birthday
vielleicht werde ich mit Freunden feiern	perhaps will I with friends celebrate
daher werde ich viel Spaß haben.	therefore will I lots of fun have.
Vielleicht werden wir in die Stadt gehen,	Perhaps will we in the town go,
um einkaufen zu gehen.	in order shopping to go.
Ehrlich gesagt möchte ich	Honestly speaking would like I
ein neues T-Shirt kaufen	a new T shirt buy
denn das Wetter sehr schön ist.	because the weather very nice is.

Zu Hause	
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Year 9 French Half-Term 1 – Relationships with Family & and Future Plans

Quiz 1.1 – saying who is in your family

In my family, **there are** four people	Dans ma famille, **il y a** quatre personnes
Including my mum, my dad and me	**Y compris** ma mère, mon père et moi
I have a brother **who is called** Luc	**J'ai** un frère **qui s'appelle** Luc
He is (has) ten years old / she is (has) ten years old	Il a 10 ans / elle a 10 ans
Unfortunately, I don't have any brothers and sisters	**Malheureusement, je n'ai pas de** frères et soeurs
I am **an only child.**	Je suis **fils/fille unique**

Quiz 1.2 – describing people's personalities

I am **very** lazy	Je suis **très** paresseux (m)
I am **not** hard working	Je **ne** suis **pas** travailleur
He is **really** kind	Il est **vraiment** aimable
She is **quite** happy	Elle est **assez** heureuse
We are **extremely** chatty	Nous sommes **extrêmement** bavards
They are **a bit** naughty	Ils sont **un peu** méchants
They are naughty (girls)	Elles sont méchant**es**

Quiz 1.3 – using avoir (to have) for looks, age and pets

I have blue eyes	**J'ai** les yeux bleus
I don't have a dog	**Je n'ai pas de** chien
He has hair browns	**Il a** les cheveux bruns
She has hair blonds	**Elle a** les cheveux blonds
We have a cat	**Nous avons** un chat
They have (are) 12 years (old)	**Ils ont** douze ans
They (girls) have a big family	**Elles ont** une grande famille

Quiz 1.4 – getting on with people

I get on well with **my mum**	Je m'entends bien avec **ma mère**
I get on badly with **my dad**	Je m'entends mal avec **mon père**
Because he / she is **too** strict	Car il / elle est **trop** stricte
He / she respects **me**	Il /elle **me** respecte
He / she treats me **like** an adult	Il / elle me traite **comme** une adulte
We have **the same interests**	Nous avons **les mêmes intérêts**

Parallel texts

In my family **there are** three people, **including** my dad, my mum and me. My dad **is called** Jean and he has 40 years and hair brown. **At home**, we have a dog but **unfortunately** I don't have a cat. **In my opinion** I am very happy and a bit intelligent. **I think that** my dad is really kind, **however** my mum is quite lazy. I get on **particularly** well with my mum because she me treats like an adult, **however** I get on badly with my dad because he is **too** strict. **In the future** I would like to marry and have two children. **In addition** I hope to have a career because I want an apartment of luxury. My ideal partner **would be** rich and he **would have** eyes blue.	Dans ma famille, **il y a** trois personnes **y compris** mon père, ma mère et moi. Mon père **s'appelle** Jean et il a quarante ans et les cheveux bruns. **À la maison**, nous avons un chien mais **malheureusement** je n'ai pas de chat. **À mon avis**, je suis très heureuse et un peu intelligente. **Je pense que** mon père est vraiment gentil, **cependant** ma mère est assez paresseuse. Je m'entends **particulièrement** bien avec ma mère vu qu'elle me traite comme une adulte, **toutefois** je m'entends mal avec mon père car il est **trop** stricte. **À l'avenir**, je voudrais me marier et avoir deux enfants. **En plus**, j'espère avoir une carrière parce que je veux un appartement de luxe. Mon partenaire idéal **serait** riche et il **aurait** les yeux bleus!
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Key skills

1. **Use 'avoir and 'être' confidently**
2. **Know how to use quantifiers with regular/irregular adjectives**
3. **Communicate coherently through speaking and writing**
4. **Conjugate present tense verbs**
5. **Use the future tense**

Year 9 French Half-Term 2 – Relationships with Family & and Future Plans

Quiz 2.1 – future plans and ideal partner

In the future, **I would like** to get married	Dans le futur, **je voudrais** me marier
In the future, **I would like** to have two children	A l'avenir, **j'aimerais** avoir deux enfants
I want a luxury apartment	**Je veux** un appartement de luxe
I intend to travel **abroad**	**J'ai l'intention de** voyager **à l'étranger**
I will stay single	**Je vais** rester célibataire
I hope to have a job	**J'espère** avoir une carrière
My ideal partner **would be** rich	Mon partenaire idéal **serait** riche
My ideal partner (f) **would have** blue eyes	Ma partenaire idéale **aurait** les yeux bleus

Quiz 2.2 - key family verbs

I **chat** to my family.	Je **tchatte** avec ma famille.
I **look like** my dad.	Je **rassemble à** mon père.
My sister **helps me** to do my homework.	Ma soeur **m'aide à** faire mes devoirs.
My family **discusses** lots of things.	Ma famille **discute** beaucoup de choses.
I like **to communicate** with my friends.	J'aime **communiquer** avec mes amis.
We **argue** often.	Nous nous **disputons** souvent.

Quiz 2.3 - using negatives

I **don't** talk	je **ne** parle **pas**
I **no longer** talk	je **ne** parle **plus**
I **never** talk	je **ne** parle **jamais**
I talk (about) **nothing**	je **ne** parle **rien**
no one talks	**personne ne** parle

Quiz 2.4 - steps to success

I would say that	je dirais que
as far as I'm concerned	en ce qui me concerne
due to the fact that	dû au fait que
I must admit that	je dois admettre que
if I had the money	si j'avais de l'argent

Parallel texts

Normalement je m'entends vraiment bien avec ma mère car elle est compréhensive. Je dirais qu'elle est plus intelligente que mon beau-père aussi. Il est un peu difficile car il me critique toujours et il n'aime pas me soutenir quand je veux sortir On se dispute quelquefois dû au fait que je ne fais pas mes devoirs et c'est un grand problème chez nous. Je me sens content la plupart du temps dans ma famille.	Normally I get on really well with my mum because she is understanding. I would say that she is more intelligent than my step-dad as well. he is a bit difficult because he me criticises always and he doesn't like me to support when I want to go out. We argue sometimes due to the fact that I don't do my homework and it's a big problem at ours. I feel happy the majority of the time in my family.
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Key skills

1. **Use 'avoir and 'être' confidently**
2. **Know how to use quantifiers with regular/irregular adjectives**
3. **Communicate coherently through speaking and writing**
4. **Know challenging reading and listening vocabulary**
5. **Use the future tense**

PAPER 1ALL SAINTS ABSOLUTE 2.1 GCSE Physical Education – Components of Fitness		
Component of fitness	Definition	Practical examples
1. Cardiovascular endurance	The ability to continuously exercise without tiring.	Cross country running, to continue till the end of the race, Swimming 800m, road walking, cross-country skiing, cycling, invasion games and outdoor activities.
2. Muscular endurance	The ability of the muscle or group of muscles in the body to repeatedly contract or keep going without rest.	In boxing to continue to throw hard punches for the entire round. Rower, to row for a long time and not tire to win the race/ gain a pb. Cross country running, cycling, swimming, rugby, football and hockey.
3. Speed	This is the ability of the body/ limbs to move quickly.	For a footballer to quickly sprint down the wing after a forward pass, to outwit the defending player, gaining an advantage.
4. Strength	The ability of a muscle to exert force for a short period of time.	A Handball player will require strength to effectively block a playmaker to prevent them from scoring a goal. A Rugby player will need strength to successfully tackle a player to the ground in Rugby to prevent a try. Sprinting, games activities such as rugby and American football, cycling and rowing. A gymnast holding the crucifix position (static), A rower in a race (dynamic). Cricket throw or hit the ball further. Weightlifter being able to lift a heavier weight than your opponents.
5. Power	This is a combination of strength and speed.	Having good power will enable a high jumper to apply strength explosively to gain a higher jump Triple jump in athletics, games activities such as rugby, sprinting, throwing events in athletics.
6. Flexibility	This is the amount or range of movement that you can have around a joint.	Gymnastics, dance, table tennis, tennis and games activities such as hockey and football.
7. Agility	How quickly you can change direction under control and maintaining speed, balance and power.	A football player will need agility to successfully dodge a defender when on the attack. Trampolining and gymnastics, netball and rugby, volleyball and basketball.
8. Balance	This is the ability to keep your body mass or centre of mass over a base of support.	A Gymnast requires balance to allow them to perform a complex move, such as a somersault and land this on the beam without falling off. Games players such as netball, rugby and hockey, athletics activities such as the pole vault, dance activities.
9. Co-ordination	This is the ability of repeating a pattern or sequence of movements with fluency and accuracy. Doing more than one task at a time effectively	Dance, tennis and other racquet sports, gymnastics, team games such as football and netball, martial arts such as karate. Moving different limbs/body parts to make a tackle in football **OR** running **AND** passing a football **OR** use hands **AND** eyes to catch the ball in cricket **OR** putting a racket in the right place to hit the ball. Use both feet to score in football = TV
10. Reaction time	The ability to respond to a stimulus quickly.	For a goal keeper to rapidly respond to a ball to improve the chances of saving the ball from going in/ gain an advantage over your opponents. Having good reaction time will allow a 100m athlete to respond quickly to the gun. This will provide them with an advantage over their opponents to gain a personal best and win the race.

ABSOLUTE 2.1 GCSE Physical Education – Fitness Testing

Component of fitness	Fitness test	Equipment	Prior to the test	Test procedures
Muscular Endurance	1 minute Press-up Test	Stop watch, mat, assistant, pen and paper.	Warm up. Set the timer for a minute/ check stop watch is on 0.	Assistant to count how many Press-ups in one minute. Half press-ups or full press-ups can be attempted, however cannot switch between them. Write down your results at the end.
	1 minute Sit-up Test	Stop watch, mat, assistant, pen and paper.	Warm up. Set the timer for a minute/ check stop watch is on 0.	Assistant to count how many sit-ups in one minute. Assistant can hold the participants feet. Participant must not swing arms. Write down your results at the end.
Aerobic Endurance	Multi stage fitness test	Flat non-slip surface/ 30-metre tape measure/ Marking Cones/ The Multi-Stage Fitness Test/ CD Player or app.	Warm up. Measure 20 meters and place two cones out.	Press start on the recording. It will start with 3 beeps. Participants must reach the end of the 20m before the beep. They will continue until they can no longer keep up with the beeps. Record the level.
	12 minute cooper run	Track or swimming pool that has been measured. E.g. running track 400m. Stop watch, assistant, pen and paper.	Perform a warm up Ensure assistant is ready.	Complete as many laps as possible around 100m track in 12 minutes/You need a stop watch to time and count how many laps you complete/Multiply the number of laps by 100 to find out the distance in metres
Speed	30 m Sprint	Stop watch, assistant, tape measure, cones, pen and paper.	Warm up. Measure 30 meters and place two cones out.	Assistant stands at the finish with a stop watch. When they shout go, the participant will run as fast as they can to the other end and stop the timer. Repeat 3 times. Record the best score.
Flexibility	Sit and reach	Box/ Metre ruler/ Assistant.	Warm up and stretch your hamstrings. Take shoes off and place heels on the box.	Legs need to be straight / knees flat on floor/ No footwear / bare feet. Reach as far forward as possible. Move slowly / no bouncing. Maintain position for two seconds
Agility	Illinois Agility test	Flat non-slip surface/ 8 cones/ Stopwatch/ Assistant.	Warm up. Measure out a box 10m by 5m with 4 cones placed in the centre of the box Ensure the participant knows the route.	Lie face down by the start of the cone. On go run the course as quick as you can. Stop the stop watch when you pass the finish line. Record the results.
Power	Vertical Jump Test	Vertical jump board or Wall,/Tape measure/ Chalk/ Assistant	Warm up Prepare the test.	The athlete chalks the end of their fingertips. The athlete stands side onto the wall, keeping both feet remaining on the ground, reaches up as high as possible with one hand and marks the wall with the tips of the fingers (Mark 1). The athlete from a static position jumps as high as possible and marks the wall with the chalk on his fingers (M2). The assistant measures and records the distance between M1 and M2. Record the results.
	Standing Long Jump/ Broad Jump	Tape measure, assistant.	Warm up. Prepare the test.	Stand with your feet behind the line. Swing your arms and try and jump as far as possible. Take the reading from the **back of your foot**. Repeat 3 times. Record the longest distance in recorded.
Reaction Time	Ruler Drop	Ruler	Elbow at 90 degrees/ with the assistant holding the ruler parallel to the wall.	Elbow at 90 degrees/ with the assistant holding the ruler parallel to the wall. The assistant drops the ruler, and you have to catch it with your thumb and index finger. Mark the distance on the ruler.
Strength	Grip Dynamometer 1 rep max	Grip dynamometer/ Assistant/ Stop watch.	Perform a warm up. Calibrate the grip dynamometer to your age. Hold parallel to your body.	Hold parallel to your body. The athlete using their dominant hand applies as much grip pressure as possible on the dynamometer. The assistant records the maximum reading (kg). The athlete repeats the test 3 times. The assistant uses the highest recorded value to assess the athlete's performance.
Balance	Stalk stand	Stop watch/ Warm dry location (Gym) Assistant	Warm up. Remover shoes Hands on hips, lift right leg and place sole of right foot against the side of the left kneecap	On GO your partner will start the stopwatch and performer raises heel of left foot to stand on toes Aim is to hold this position for as long as possible – repeat with other leg Four attempts – 2 on each leg and record the best time achieved
Coordination	Alternate-hand wall-toss test	1 tennis ball, tape measure, cone, smooth wall, pen and paper.	A mark on the floor 2 metres from the wall, the subject then stands behind the line and faces the wall.	Stand two metres away from a smooth wall. Assistant shouts "GO" and starts the stopwatch. The athlete throws a tennis ball with their right hand against the wall and catches it with the left hand, throws the ball with the left hand and catches it with the right hand. This cycle of throwing and catching is repeated for 30 seconds. The assistant counts and records the number of catches.

Physical Education – Types of training

Continuous training

1. Continuous training

Involves a steady but regular pace at a moderate intensity (aerobic) which should last for at least 20 minutes- 2 hours.

Ensures there is no build up of lactic acid because oxygen is present

i.e. running 30 minutes, walking 40 minutes, swimming 20 minutes, rowing 35 minutes.

Used by a **marathon runner**, rower, cyclist, footballers.

Continuous training

2. Fartlek training – Referred to as **'speed play'**

This is a form of continuous training, due to having no rests

Improves both aerobic and anaerobic system (endurance and speed)

Involves a variety of changing intensities over different distances, terrains, speeds and gradients

i.e. 1 lap at 50% max, 1 lap walking, 1 lap at 80% (aerobic and anaerobic used)

Used by **games players – Hockey players, Footballers to develop their aerobic and anaerobic performance,**

Interval training

3. Weight/Resistance training – A form of training that uses progressive resistance against a muscle group.

It improves both strength and Muscular endurance

Muscular strength: High weight x low repetitions e.g. Bicep curls 10 reps X 40 kg (80 % 1RM)

Muscular endurance: Low weight x high repetitions e.g. Bicep curls 20 reps x 15 kg (60 % 1RM)

E.g. Rugby players would need weights to improve their strength when tackling.

E.g. Weight lifters, to be able to lift a heavier weight.

E.g. Rowers to improve their endurance to go for longer.

Interval training

4. Interval training - Involves **periods of work followed by periods of rest**. *i.e. Sprint for 20 metre + walk back to start.*

Used by a **200m sprinter, Footballer, Handballer, Netball player.**

This can be adapted to improve speed or endurance. E.g. to train for endurance an athlete would perform long interval training. E.g. 400m X8 reps X3 sets.

Interval training

5. Plyometrics training

Involves high-impact exercises that develop **power**. *i.e. bounding/hopping and Jumping.*

e.g. squat jumps, Single leg hops, bounding, box jumps, depth jumps.

Used by **long jumpers, 100 m sprinters basketball players**, High Jumpers.

Interval training

6. Circuit training - A series of exercises completed one after another.

Improves most components of fitness e,g, speed, strength, muscular endurance.

Each exercise is called a station. Each station should work a different area of the body to avoid fatigue. It involves repetitions of exercises, the bodyweight is usually the resistance, each station is timed, there is a rest period between each station.

i.e. 10 x press ups, 10 x sit ups, 10 x squats, 10 x shuttle runs, lunges, box jumps.

Interval training

7. HIIT Training

These are High Intensity Interval Training activities where short bursts of speed and recovery are used throughout the session. Involves rest.

Exertion levels are high (7/10)for between 30 secs and 3 mins.

Work output is much shorter than recovery time

Helps burn fat and develop the cardio respiratory system.

Examples might be Body pump, High Impact Aerobics, Spinning

Frequency 	How often training takes place.	*Increase training from once a week to two*
Intensity 	How hard the exercise is.	*Increase resistance from 10kg to 15kg or increase incline on the treadmill.*
Time 	The length of the session.	*Increase training session from 45 minutes to 55 minutes.*
Type	The method of training used.	*Change to from interval training to Fartl ek training.*

Training Zones

1. Calculating Maximum Heart Rate (MHR)
220-age=
e.g. 220-14 = 206

2. Aerobic Zone: When training to improve our cardiovascular endurance you will need to ensure you are working in the aerobic zone. This is 60-80 % of you MHR

3. e.g. If I am 20 years of age my Max HR will be 200. Therefore I will need to ensure my HR does not exceed 160 and must be above the minimum threshold of 60% therefore over 120 bpm.

4: Anaerobic Zone: When training to improve our speed or anaerobic fitness we will need to train in our Anaerobic zone above 85 MHR

5. e.g. if I am 14 years old. My Max HR would be 206. If I need to develop my anaerobic endurance id will need to work above 206 bpm. Therefore above 175 bpm.

4 Principles of training [SPOR]

Principles of training - **Guidelines** that ensure **training is effective** and results in **positive adaptations**. These principles are used when planning an Exercise/ training Programmes

1. Specificity
(Specificity) training should be **relevant / suited / appropriate / targeted** to (**one of:**) performer's sport / performer's needs / energy system used / muscle groups used / area of the body / fitness component / stroke.

- Muscles e.g. Build biceps do bicep curls
- Type of fitness e.g. To improve strength do weights/ To improve power do plyometrics
- Skills e.g. to improve dribbling in Basketball work on your technique

- Developed e.g. *A long jumper would need to perform **plyometrics'**, such as box jumps. ….to develop their power, which will create a larger jump*

2. Progression: training should become **gradually / slowly** more demanding **OR** a **gradual / slow** increase in intensity

Using overload in a progressive way over the course of a programme. Once adaptations have happened overload needs to be applied to make gains again. Training gradually becomes more difficult / challenging, Because body has made adaptations / got stronger, Must be gradual to avoid injury.

e.g. lifting more in week 12 than in week 2 of the programme.
e.g. doing more sessions in a week.
e.g. Gradually progress the sessions by 10 minutes at a time.

3. Overload: Working the body harder than normal
This is required to put the body under stress so that we can improve our component of fitness or skill. Work harder than normal / puts body under stress, So that fitness adaptations / improvements will occur. Links with FITT principle
Increase frequency / intensity / duration or time of training / or change type of training

e.g. bench press 50kg x 10 repetitions and increase to 55kg x5 repetitions.
Links with FITT- Frequency- Lift weights for longer/ Intensity- work harder e.g. 50kg instead of 40kg/ Time- longer training sessions.

4. Reversibility
If training is not regular, adaptations will be reversed. This can happen when:

- Suffering from illness and cannot train
- Injury
- Working too hard (too much overload applied without progression)
- After an off-season.

All Saints' absolute 2.3 Preventing injury in physical activity and training

Warm up: The five components of a warm-up are as follows.

1. Pulse raising. This includes exercises that slowly increase heart rate and gradually increase body temperature, for example jogging, cycling, skipping or gentle running.

2. Mobility. Exercises that take the joints through their full range of movement (ROM), for example arm swings, hip circles, ankle rotations, heel flicks, open/close the gate/lunges/rotations/groin walk.

3. Stretching. This can include developmental stretches, gradually increasing the difficulty of each stretch or dynamic stretches that include more ballistic movements (for example, lunges) or static stretches where the body remains still or static while stretching. Examples of stretches include open and close the gate, groin walk for more dynamic exercises and slowly trying to touch your toes for more static stretches.

TIP: Ensure when providing an example, it must be sport specific. For example a 100m Sprinter will perform jogging around a track twice (800m) gradually increasing the speed to enable more blood/oxygen to be delivered to the working muscles)

4. Dynamic movements. This involves movements that show a change of speed and direction, for example shuttle runs, skipping, running in and out of cones, zig zag running, high knees, heel flicks, agility ladders.

5. Skill rehearsal. This involves practising or rehearsing common movement patterns and skills that will be used in the activity, for example dribbling drills for football or passing drills for netball.

Physical benefits of a warm-up (why we perform a warm up)

1. The warm-up enables the body to prepare for exercise and decreases the likelihood of injury and muscle soreness.
2. Increase heart rate (release of adrenalin). Increased respiratory rate.
3. Increase flexibility of muscles and joints.
4. Increase pliability of ligaments and tendons.
5. There is also a release of adrenaline that will start the process of speeding up the delivery of oxygen to the working muscles.
6. An increase in muscle temperature will help to ensure that there is a ready supply of energy and that the muscle becomes more flexible to prevent injury.
7. Increase speed of muscle contractions.

Cool down

The key components of a cool-down are:

1. **Low - moderate (medium) intensity exercises – gradually** lower the pulse rate and the heart rate and reduce the body's temperature, for example easy movement exercises or light running/jogging.

2. **Stretching** – includes steady and static stretches, for example hamstring stretch, quadriceps stretch.

Physical benefits of a cool-down

The cool-down is crucial in: You must use the word **gradually (HR, Blood pressure, breathing rate and temperature) to gain the mark.**

1. Cool-downs also prevent/**reduce** blood pooling in the veins, which can cause dizziness.
2. Helping the body's transition back to a resting state or speeds up recovery.
3. **Gradually** lowering heart rate or maintains elevated heart rate, returns pulse back to a resting state.

4. Gradually lowering or maintains elevated body/muscle temperature - slowly returns body temperature back to normal.

5. Circulating blood and oxygen, Reducing the risk of blood pooling, Maintains circulation of blood / oxygen flow to muscles that have been working .

6. Gradually reduces blood pressure.

7. Gradually reducing /maintains elevated breathing (respiratory) rate. Number of breaths taken is slowly reduced.

8. Help **reduce** the risk of fainting, nausea and light headedness.

9. Increasing the removal of waste products such as lactic acid. The oxygen can more effectively be flushed through the muscle tissue and will oxidise any lactic acid, which needs to be dispersed.

10. **Reducing** the risk of muscle soreness (or delayed onset of muscle soreness – DOMS) and stiffness. Less likely to feel aches and pains.

11. **Reduces risk of damage to joints.** Aiding recovery by stretching muscles, i.e. lengthening and strengthening muscles for next workout/use. Maintenance stretches to return muscle to normal length. Lengthening and strengthening muscles for next work-out .

Developed points:

For example a Footballer would perform low intensity exercises, to gradually lower HR and get more oxygen to the working muscles to flush out the lactic acid. This will allow them to not be as sore after the competition. Therefore allowing them to train sooner.

Topic 1.1 Life Stages & Development

Life Stage	Age
Childhood	4-10
Adolescence/young person	11-18
Young Adulthood	19-45
Middle Adulthood	46-65
Older adulthood	65+

PIES: physical, intellectual, emotional and social development

Physical Development	Growth patterns and changes in mobility of the large and small muscles in the body that happen throughout life.
Intellectual development	How people develop their thinking skills, memory and language.
Emotional development	How people develop their identity and cope with feelings.
Social development	How people develop friendships and relationships.

1a: Development

Gross motor skills: The larger movements of arms, legs, feet or the entire body using the large muscles for walking, running, skipping and jumping.

Fine motor skills: Smaller actions using the smaller muscles, such as grasping an object between the thumb and finger when holding a paintbrush or pencil.

Primary sexual characteristics: Characteristics that are present at birth.

Secondary sexual characteristics: Physical characteristics and signs that indicate the change from childhood towards adulthood.

Puberty: The process of bodily changes that occur during adolescence, as a child grows into an adult capable of sexual reproduction.

Menopause: ceasing of menstruation

Cognitive development: The construction of thought processes, including remembering, problem solving and decision making, from childhood through to adulthood.

1b: Development

Language development: The process by which children come to understand and communicate.

Attachment: strong emotional bond between a child and their primary care giver

Self-confidence: how much we feel valued, loved and accepted

Self-image: the way and individual sees themselves, both physically and mentally

Peer group: A group of people, usually of the same age, who have similar interests, background, and social status. A peer group can influence the behaviour of group members.

Lifestyle: Involves the choices made that affect health and development.

1c: Factors

Factors: influences on the way a person develops. Factors may relate to a person's physical make up, social and cultural experiences and economic situation.

Social factors: The facts and experiences that influence a person's personality, attitudes and lifestyle.

Relationships: the way in which two or more people or things are connected, or the state of being connected

Inclusion: the action or state of including or of being included within a group or structure

Exclusion from education: when an individual has been excluded from an educational setting permanently, due to not changing poor behaviour over time.

Discrimination: the unjust or prejudicial treatment of different categories of people, especially on the grounds of ethnicity, age, sex, or disability

Bullying: seek to harm, intimidate, or coerce

Topic 1.1 Life Stages and Development

Physical factors: Factors that can impact on physical, social and psychological health and well-being include a range of conditions, illnesses or diseases. These may be genetically inherited or associated with ageing.

Diet: food and drink considered in terms of its qualities, composition, and its effects on health

Nutrition: the process of providing or obtaining the food necessary for health and growth

Lifestyle: Involves the choices made that affect health and development.

Genetic inheritance: the genes a person inherits from their parents.

Mental Health: a person's condition with regard to their psychological and emotional well-being

Disability: a physical or mental condition that limits a person's movements, senses, or activities

Sensory impairment: Sensory impairment is the common term used to describe Deafness, blindness, visual impairment, hearing impairment and Deafblindness, not smell or touch though.

Emotional factors: how someone's thoughts and feelings could influence their behaviour and development.

Anxiety: apprehensive uneasiness or nervousness

Fear: an unpleasant emotion caused by the threat of danger, pain, or harm

Grief: intense sorrow, especially caused by someone's death

Attachment: Emotional bond between child and parent.

Economic factors: A person's wealth which can include their wages (income) and possessions and how this can impact their behaviour and development.

Income: How much money someone earns

Employment: the state of having paid work

Debt: a sum of money that is owed or due

Educational experiences: amount of knowledge, skills and understanding developed/gained through time spent in school

Cultural factors: The set of beliefs, moral values, traditions, language and laws held in common by a nation, a community or other defined group.

Culture: Relating to the ideas, customs and social behaviour of a society.

Community: a group of people living in the same place or having a particular characteristic in common

Religion: a particular system of faith and worship

Gender Identity: an individual's personal sense of having a particular gender

Sexual Orientation: a person's identity in relation to the gender or genders to which they are sexually attracted

Environmental factors: factors relating to or arising from a person's surroundings. This is linked to our living conditions such as housing needs, pollution etc.

Pollution: the presence in or introduction into the environment of a substance which has harmful or poisonous effects

Neighbourhood: the area surrounding a particular place, person, or object

Environment: the surroundings or conditions in which a person, animal, or plant lives or operates

Access to services: the availability of health services within an area

B1 – Cell Biology

. DEFINITIONS

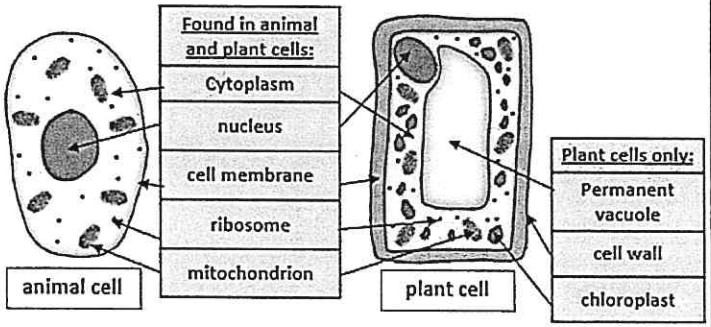
okaryote – smaller cells that do not have a ıcleus

ıkaryote – larger cells that have a nucleus ıd many sub-cellular structures

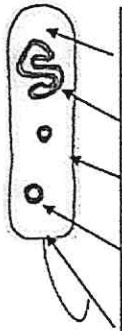
agnification – how much bigger something oks than it actually is

esolution - is the ability to distinguish etween two separate points. The higher the solution the easier it will be to see between e two points.

2. Cell Structure – EUKARYOTES (plant and animal)



3. Cell Structure – PROKARYOTES (bacteria)



cytoplasm	Where chemical reactions take place.
DNA	Loop of DNA which is not contained in a nucleus.
cell wall	Supports and strengthens the cell, not made from cellulose.
plasmid	Small rings of DNA; contain additional genes
cell membrane	Controls the movement of substances in and out of the cell.

4. SUB-CELLULAR STRUCTURES

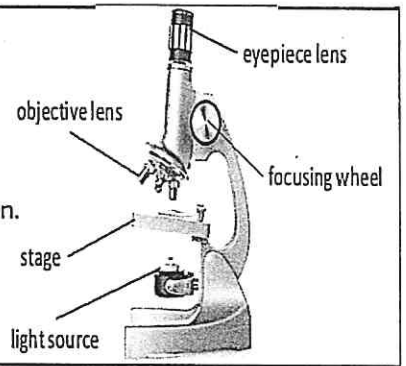
Name	Function of sub-cellular structure
Cytoplasm	Where chemical reactions take place.
Nucleus	Contains genetic material and controls cell activities.
ell membrane	Controls the movement of substances into and out of the cell. Partially permeable.
Ribosome	Site of protein synthesis..
litochondrion	Site of respiration, where energy is released.
Permanent Vacuole	Contains cell sap, to keep the cell turgid (firm).
Cell wall	Supports and strengthens the cell (made of cellulose).
Chloroplast	Site of photosynthesis. Contain chlorophyll, which absorbs sunlight.

5. MICROSCOPE- required practical

1. Place the slide on the stage
2. Turn to the lowest power objective lens
3. Look through the eyepiece, turn the coarse-focusing dial to focus
4. Use the fine focusing dial to bring the cells to clear focus.
5. Repeat with a higher power objective lens to give greater magnification.
6. Draw the cell, record the magnification

$$magnification = \frac{image\ size}{actual\ size}$$

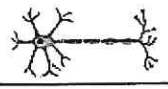
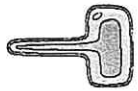
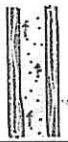
mm → µm	x 1000
µm → mm	÷1000



Feature	Light (optical) microscope	Electron microscope
Radiation	Light rays	Electron beams
Maximum magnification	Lower	Higher
Resolution	Lower	Higher

Prefix	Multiple	Standard form
milli (mm)	1 mm = 0.001 m	$x\,10^{-3}$
micro (µm)	1 µm = 0.000 001 m	$x\,10^{-6}$
nano (nm)	1nm = 0.000 000 001 m	$x\,10^{-9}$

SPECIALISED CELLS are adapted to carry out a particular function

Cell	Diagram	Function	Adaptation
Nerve (animal)		*carry electrical impulses*	• long branched connections, to carry impulses over large distances
Sperm (animal)		*carries father's DNA, to fertilise the egg*	• streamlined with a long tail, to swim. • large number of mitochondria, to provide energy
Muscle (animal)		*contracts to allow movement*	• contains many mitochondria, to provide energy.
Root hair (plant)		*absorb water and minerals from soil*	• hair-like projections to increase the surface area, to increase rate of water and mineral uptake
Xylem (plant)		*carry water and minerals*	• cell walls toughened by lignin to support the plant • cells with no end walls for easy movement of water
Phloem (plant)		*carry dissolved sugars*	• living cells which have end walls with pores (holes) to allow easy movement of sugar solution

7. STEM CELLS

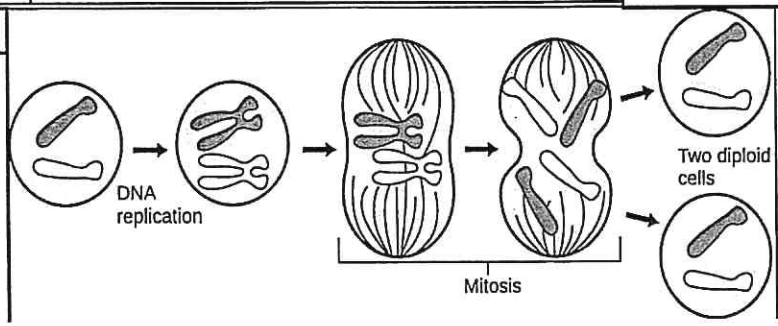
Undifferentiated cell of an organism, which divide to form more cells of the same type and can differentiate to form many other cell types.

Stem cell type	Function	Advantages/disadvantages
Human Embryonic stem cells	***Can differentiate into most cell types***	• Can produce more cell types than adult stem cells • Can be a risk of infection • Ethical/religious issues to using embryos
Adult bone marrow stem cells	***Can only form some types of human cells e.g. blood cells***	• Simple procedure • Only a few types of cells can be formed.
Meristems (plants)	***Can differentiate into any plant cell type throughout the life of the plant.***	• Quick and cheap • Clone rare species to prevent extinction • Clone crop plants with pest/disease resisitance

Treatment with stem cells may be able to help conditions such as diabetes and paralysis.

. MITOSIS AND THE CELL CYCLE

ells divide in a series of stages; the cell cle. During the cell cycle the genetic aterial is doubled and then divided into o identical cells. Mitosis occurs in growth, pair and cell replacement.



Stage 1- Growth- Increase the number of sub-cellular structures e.g. ribosomes and mitochondria

Stage 2- DNA synthesis- DNA replicate, forming two copies of each chromosome.

Stage 3- Mitosis:

- One set of chromosomes is pulled to each end of the cell
- The nucleus divides
- The cytoplasm/cell membrane divide, forming two cells that are identical to the parent cell.

9. CELL TRANSPORT

Cell ansport:	Definition:	Examples of cell transport:
ffusion: o energy equired	**Movement of particles in a solution or gas from a higher to a lower concentration**	• O_2 and CO_2 in gas exchange • Urea from cells into the blood plasma.
smosis: o energy equired	**Movement of water from a dilute solution to a more concentrated solution, through a partially permeable membrane**	• Plants absorb water from the soil by osmosis through their root hair cells.
Active ansport: NERGY equired	**Movement of particles from lower concentration (a dilute solution) to a higher concentration(a more concentrated solution)**	• Movement of mineral ions into roots of plants • The movement of glucose from lower concentrations in the gut into the blood.

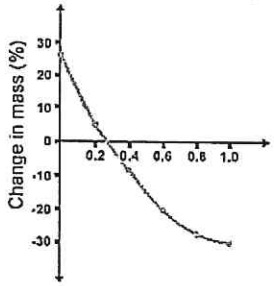
FACTORS INCREASING THE RATE OF DIFFUSION

Greater concentration gradient
Higher temperature
Larger surface area of the membrane (surface area to volume ratio)

10. OSMOSIS REQUIRED PRACTICAL

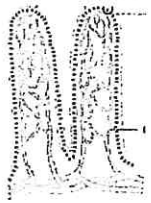
1. Set up 5 boiling tubes, with 5 different concentrations of sugar solutions.
2. Cut 5 pieces of potato, the same size using the cork borer & cut off the ends.
3. Blot with paper towel to remove excess moisture.
4. Record the mass of each potato tube, using a top pan balance, then place each potato into a different test tube.
5. After 30 minutes take out the potato tubes and blot with paper towel to remove excess moisture.
6. take and record the new mass and length of each potato.
7. Record the change in mass and the change in length in your tables (if it has gone down it will have a negative value).
8. Calculate change in mass: **change in mass = final mass – original mass**
9. Repeat 3 times for each concentration and calculate a mean
10. Calculate % change in mass: **% change = change in mass ÷ original mass**
11. Plot a graph with concentration of solution on the x-axis and % change in mass on the y-axis.
12. Draw a line of best fit – it will be a curve
13. Where the graph crosses the x-axis, this is the concentration inside the potato because there is no change in mass.

Independent variable = concentration of sugar solution
Dependent variable = mass of potato
Control variables = size of potato, type of potato, time, temperature, same volume of solution

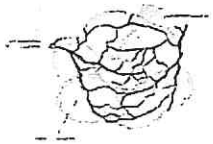


11. ADAPTATIONS OF EXCHANGE SURFACES FOR DIFFUSION

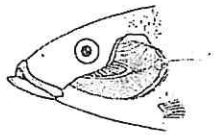
Small Intestines
- *Villi – increase surface area*
- *Good blood supply – to maintain concentration gradient*
- *Thin membranes – short diffusion distance.*



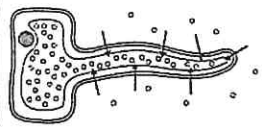
Lungs
- *Alveoli – increase surface area*
- *Good blood supply – to maintain concentration gradient*
- *Thin membranes – short diffusion distance.*



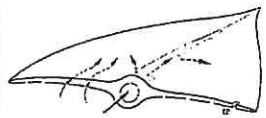
Fish gills
- *Gill filaments and lamella – increase surface area*
- *Good blood supply – to maintain concentration gradient*
- *Thin membranes – short diffusion distance.*



Roots
- *Root hair cells- increase surface area*
- *Long and thin - cover more area of soil*



Leaves
- *Large surface area*
- *Thin leaves, for short diffusion path*
- *Stomata on the lower surface to let O_2 and CO_2 in and out.*



C1 Knowledge Organiser

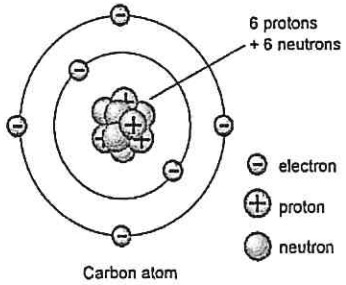
Atoms, Elements, Compounds & Isotopes.

1. DEFINITIONS

- An **element** is made up of one type of atom.
- A **compound** are two different elements chemically joined together.
- A **mixture** are two elements or compounds not chemically joined together.
- **Isotopes** are atoms which have the same number of protons but a different number of neutrons.
- **Ions** are atoms with a positive or negative charge
- Mixtures can be separated by processes such as:
- **Filtration** – separating an insoluble solid from a liquid, e.g. sand and water.
- **Simple distillation** – separating two liquids depending on their boiling point e.g. Ethanol (boiling point at 78°C) and water (boiling point at 100°C)
- **Chromatography** – Separating small amount of soluble substances by running a solvent along a material such as absorbent paper

2. STRUCTURE OF ATOM

Name of particle	Relative Mass	Relative charge
Proton	1	+1
Neutron	1	0
Electron	Very small	-1



Carbon atom

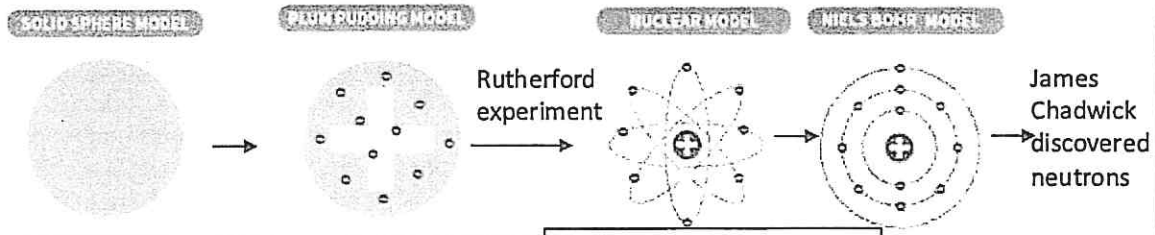
- Atoms have the same number of protons and electrons.
- Atoms have no overall charge.
- The **atomic number = the number of protons**
- For an atom, number of protons = number of electrons
- **Mass number = number of protons + number of neutrons**

so number of neutrons = mass number – atomic number

(Mass number) 23
(Atomic number) 11 Na

Eg Sodium atom has 11 protons, 11 electrons and 12 neutrons

3. DEVELOPMENT OF THE ATOM



Initially the atom was believed to be a **solid tiny sphere** that could not be divided.

The plum pudding model is a **ball** of **positive** charge with negative **electrons embedded** randomly

Nuclear model:
Positive charge in the nucleus
Negative electrons orbiting the nucleus
Atom is mainly empty space
Mass of atom concentrated in the nucleus.

Niels Bohr discovered:
Electrons orbit the nucleus at **specific distances**

Rutherford experiment:

Alpha particles were fired at gold foil and the results of the experiment and what it proved was:

- Most alpha particles travelled straight through showing the atom was mainly empty space
- Some alpha particles were deflected showing the mass was concentrated in the centre
- Some alpha particles were deflected showing the centre of the atom (nucleus) was positive. This led to the discovery of a nucleus and protons

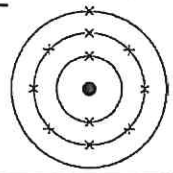
4. CALCULATING RELATIVE ATOMIC MASS

The relative atomic mass of an element is an average value that takes account of the abundance of the isotopes of the element. To calculate this, use the formula below:

$$\frac{(Mass\ of\ isotope\ 1\ x\ its\ abundance) + (Mass\ of\ isotope\ 2\ x\ its\ abundance)}{Total\ abundance}$$

5. ELECTRONIC STRUCTURE

- The **first** shell can hold **2 electrons**
- The **second and third** shells can hold up to **8 electrons.**
- The electronic structure of sodium is shown on the right.



6. THE PERIODIC TABLE

- The elements in the modern periodic table are arranged in order of **atomic number.**
- Elements with similar properties are in vertical columns known as **groups.**
- Elements in the same group in the periodic table have the same number of electrons in their outer shell eg group 4 atoms have 4 electrons in their outer shell
- Metals are found on the left of the periodic table, non-metals are found in the top right.
- **Metal** atoms **lose** electrons to get a full outer shell and form **positive ions**
- **Non-metal** atoms **gain** electrons to get a full outer shell and form **negative ions**

7. DEVELOPMENT OF THE PERIODIC TABLE

The early periodic table was arranged by **atomic weight.**

Mendeleev **left gaps** for elements that he thought had **not been discovered** and in some places changed the order to match up elements which reacted similarly E.g. Te and I

Elements with properties predicted by Mendeleev were discovered and filled the gaps.

Groups are the vertical columns down

Periods → are the rows across

Key: relative atomic mass, atomic symbol, name, atomic (proton) number

1	2											3	4	5	6	7	0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac^ actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	[285] Cn copernicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[294] Ts tennessine 117	[294] Og oganesson 118

8. GROUP 0

- The elements in group 0 of the periodic table are called the **noble gases.**
- They are inert (unreactive) because their atoms have a full outer shell of electrons (are stable).
- The boiling points of the noble gases **increase** as you go down the group.

9. GROUP 1

Elements in group are known as the **alkali metals**

In group 1, the **reactivity of the elements increase going down the group** because:

The outer electron gets **further away** from the nucleus

The **attraction** between the outer electron and the nucleus **gets weaker.**

Therefore, the outer electron is more easily **lost.**

If an atom **loses** an electron it forms a **positive ion.**

Metals in group 1 react with water to form the metal hydroxide and hydrogen.

You'd observe the metal floating and moving on the water and fizzing. Potassium sets on fire and produces a lilac flame

Metals in group 1 react with oxygen to form the metal oxide.

Metals in group 1 react with chlorine to form the metal chloride.

7 Li lithium 3
23 Na sodium 11
39 K potassium 19
85 Rb rubidium 37
133 Cs caesium 55
[223] Fr francium 87

10. GROUP 7

The elements in group 7 of the periodic table are known as the **halogens**

They all have **7 electrons in their outer shell.**

Group 7 elements are non-metals and consist of molecules made of **pairs of atoms** (diatomic) eg Cl_2, Br_2

As you go down Group 7, **the melting point and boiling point increase.**

In group 7, the reactivity of the elements **decrease down the group** as:

The outer shell gets **further away** from the nucleus

The **attraction** between the outer electrons and the nucleus **gets weaker**

Therefore, the ability for the atom to **gain** another electron is reduced (remember all atoms want a full outer shell – therefore, a group 7 element needs to **gain** an electron.

If an atom **gains** an electron it forms a **negative ion**

A more reactive halogen can displace a less reactive halogen from an aqueous solution of its salt. This is a **displacement reaction**

e.g. Sodium Bromide + Chlorine → Sodium Chloride + Bromine

19 F fluorine 9
35.5 Cl chlorine 17
80 Br bromine 35
127 I iodine 53
[210] At astatine 85
[294] Ts tennessine 117

P1 Energy

ox 1: Energy stores

nergy Store	Example
netic	Energy stored in moving objects
ravitational	Energy stored in objects at a height
hemical	Energy stored in fuels, foods and batteries
ectrostatic	Energy stored between charged particles
agnetic	Energy stored in magnetic fields
astic	Energy stored in stretched and squashed objects
uclear	Energy stored in the nucleus of an atom
ıermal	Energy stored due to an objects temperature

ox 2: Energy Transfers

nergy Transfer	Example
echanically	Energy transferred due to a force
eating...	Energy transferred due to temperature differences
ıdiation	Energy transferred as a wave
ectrically	Charges moving due to a potential difference

Box 3: Units to learn

Energy – Joules (J)
Work Done – Joules (J)
Power – Watts (W)
Distance – Metres (m)
Time – Seconds (s)
Mass – Kilograms (kg)
Spring Constant – N/m
Specific Heat Capacity – J/kg°C
Gravitational Field Strength – N/kg

Box 5: Calculation prefixes

Prefix	How to convert	Standard form
Kilo (k)	x1,000	$x\,10^{3}$
Mega (M)	x1,000,000	$x\,10^{6}$
Giga (G)	x1,000,000,000	$x10^{9}$
Centi (c)	/100	$x10^{-2}$
Milli (m)	/1000	$x10^{-3}$
Micro (μ)	/1,000,000	$x10^{-6}$
Nano (n)	/1,000,000,000	$x10^{-9}$

Box 4: Definitions to learn

System – A group of objects
Closed system – The amount of energy in the system is constant
Wasted Energy – Energy that is dissipated (spread out) and stored in less useful ways
Specific Heat Capacity – The amount of energy required to raise the temperature of one kilogram of the substance by one degree Celsius.
Power – Rate of energy Transfer (1W = 1 Joule per second)
Conservation of Energy - Energy cannot be created or destroyed – only transferred usefully, stored or dissipated.
Non-renewable energy resource - These will run out. It is a finite reserve. It cannot be replenished.
Renewable energy resource - Replenish as they are being used

Box 6: How to reduce energy loss

Lubrication – Reduces friction, so less energy dissipated due to heating.
Insulation – Low thermal conductivity – lower rate of energy transfer.
Efficient – Wastes a lower proportion of the energy provided.

ox 7: Describing energy changes

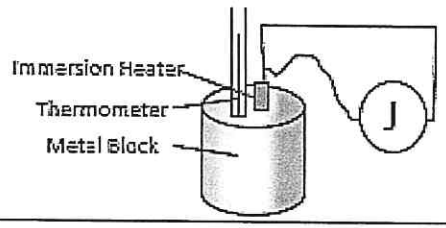
escribing a mass being lifted by a battery owered motor

efore being turned on, a battery has chemical nergy. When turned on, the chemical store is ecreased by electrical working to turn the motor. his causes the mass to raise by mechanical work nd increase its gravitational store.

ox 9: Specific Heat Capacity

ore Practical – Specific Heat Capacity

Measure mass of sample using a top pan balance
Plug in an immersion heater and joulemeter
Measure the temperature before switching on
Switch immersion heater on for 5 minutes
Measure the temperature after 5 minutes
Measure the energy from the joulemeter
Use the equation: Specific heat capacity = energy/(mass* temperature change) to calculate the
Insulate to reduce energy loss = more accurate result.



Box 8: Energy resources

Energy resource	What is it?	Positive	Negative
Fossil Fuels (coal, oil and gas)	Burnt to release thermal energy used to turn water into steam to turn turbines	Easy to transport, relatively cheap	Extraction can cause problems: fracking can lead to tremors. Carbon Dioxide released → Greenhouse gas → Leads to Global Warming
Nuclear	Uranium fuel undergoes Nuclear Fission	No CO_2 produced. Lots of energy produced from small amounts of fuel.	Non-renewable. Radioactive waste remains dangerous for a long time. Possibility of disaster (Eg Chernobyl)
Biofuel	Fuel from living organisms	As plants grow, they absorb CO_2: 'carbon neutral'.	Land used for fuel crops instead of farming (in developing countries). Habitats destroyed to use land for fuel crops.
Tides	"Tidal Barrage" traps water from tides to use to generate electricity.	Predictable due to consistency of tides. No greenhouse gases produced.	Expensive to set up. A barrage (dam) is built across a river estuary, flooding habitats and causing problems for ships and boats.
Waves	Up and down motion turns turbines	No waste products.	Can be unreliable depends on wave output as large waves can stop the pistons working.
Hydroelectric	Falling water spins a turbine	No waste products. Very reliable.	Habitats, farmland and houses can be flooded when dam is built.
Wind	Movement causes turbine to spin which turns a generator	No waste products.	Unreliable – wind varies. Visual and noise pollution. Dangerous to migrating birds.
Solar	Directly heats objects in solar panels or sunlight captured in photovoltaic cells	No waste products.	Unreliable due to light intensity (Eg: Night time or cloudy days). Making and installing solar panels expensive.
Geothermal	Hot rocks under the ground heats water to produce steam to turn turbine	No greenhouse gases produced.	Limited to a small number of countries. Geothermal power stations can cause earthquake tremors.

B1 – Cell Biology

1. DEFINITIONS

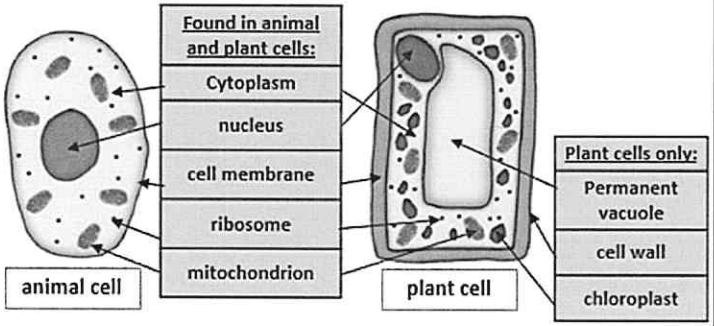
Prokaryote – smaller cells that do not have a nucleus

Eukaryote – larger cells that have a nucleus and many sub-cellular structures

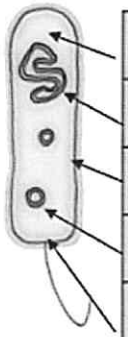
Magnification – how much bigger something looks than it actually is

Resolution - is the ability to distinguish between two separate points. The higher the resolution the easier it will be to see between the two points.

2. Cell Structure – EUKARYOTES (plant and animal)



3. Cell Structure – PROKARYOTES (bacteria)



cytoplasm	Where chemical reactions take place.
DNA	Loop of DNA which is not contained in a nucleus.
cell wall	Supports and strengthens the cell, not made from cellulose.
plasmid	Small rings of DNA; contain additional genes
cell membrane	Controls the movement of substances in and out of the cell.

4. SUB-CELLULAR STRUCTURES

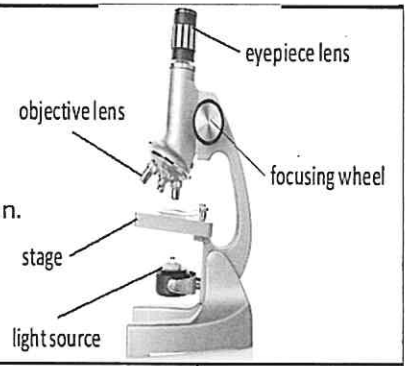
Name	Function of sub-cellular structure
Cytoplasm	Where chemical reactions take place.
Nucleus	Contains genetic material and controls cell activities.
Cell membrane	Controls the movement of substances into and out of the cell. Partially permeable.
Ribosome	Site of protein synthesis..
Mitochondrion	Site of respiration, where energy is released.
Permanent Vacuole	Contains cell sap, to keep the cell turgid (firm).
Cell wall	Supports and strengthens the cell (made of cellulose).
Chloroplast	Site of photosynthesis. Contain chlorophyll, which absorbs sunlight.

5. MICROSCOPE- required practical

1. Place the slide on the stage
2. Turn to the lowest power objective lens
3. Look through the eyepiece, turn the coarse-focusing dial to focus
4. Use the fine focusing dial to bring the cells to clear focus.
5. Repeat with a higher power objective lens to give greater magnification.
6. Draw the cell, record the magnification

$$magnification = \frac{image\ size}{actual\ size}$$

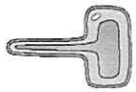
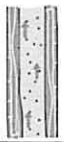
mm → µm x 1000
µm → mm ÷1000



Feature	Light (optical) microscope	Electron microscope
Radiation	Light rays	Electron beams
Maximum magnification	Lower	Higher
Resolution	Lower	Higher

Prefix	Multiple	Standard form
milli (mm)	1 mm = 0.001 m	$x10^{-3}$
micro (µm)	1 µm = 0.000 001 m	$x10^{-6}$
nano (nm)	1nm = 0.000 000 001 m	$x10^{-9}$

6. SPECIALISED CELLS are adapted to carry out a particular function

Cell	Diagram	Function	Adaptation
Nerve (animal)		*carry electrical impulses*	• long branched connections, to carry impulses over large distances
Sperm (animal)		*carries father's DNA, to fertilise the egg*	• streamlined with a long tail, to swim. • large number of mitochondria, to provide energy
Muscle (animal)		*contracts to allow movement*	• contains many mitochondria, to provide energy.
Root hair (plant)		*absorb water and minerals from soil*	• hair-like projections to increase the surface area, to increase rate of water and mineral uptake
Xylem (plant)		*carry water and minerals*	• cell walls toughened by lignin to support the plant • cells with no end walls for easy movement of water
Phloem (plant)		*carry dissolved sugars*	• living cells which have end walls with pores (holes) to allow easy movement of sugar solution

7. STEM CELLS

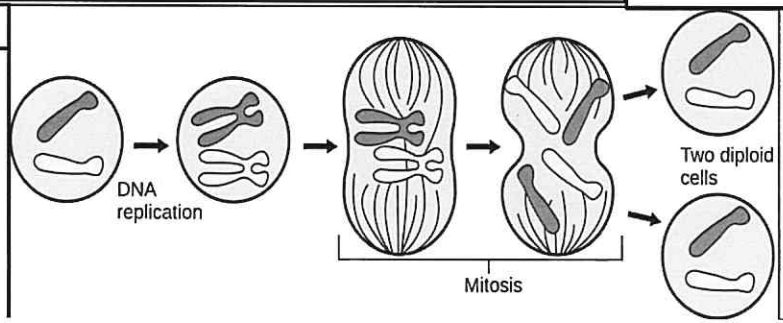
Undifferentiated cell of an organism, which divide to form more cells of the same type and can differentiate to form many other cell types.

Stem cell type	Function	Advantages/disadvantages
Human Embryonic stem cells	***Can differentiate into most cell types***	• Can produce more cell types than adult stem cells • Can be a risk of infection • Ethical/religious issues to using embryos
Adult bone marrow stem cells	***Can only form some types of human cells e.g. blood cells***	• Simple procedure • Only a few types of cells can be formed.
Meristems (plants)	***Can differentiate into any plant cell type throughout the life of the plant.***	• Quick and cheap • Clone rare species to prevent extinction • Clone crop plants with pest/disease resisitance

Treatment with stem cells may be able to help conditions such as diabetes and paralysis.

8. MITOSIS AND THE CELL CYCLE

Cells divide in a series of stages; the cell cycle. During the cell cycle the genetic material is doubled and then divided into two identical cells. Mitosis occurs in growth, repair and cell replacement.



<u>Stage 1- Growth-</u> Increase the number of sub-cellular structures e.g. ribosomes and mitochondria

<u>Stage 2- DNA synthesis-</u> DNA replicate, forming two copies of each chromosome.

<u>Stage 3- Mitosis:</u>

- One set of chromosomes is pulled to each end of the cell
- The nucleus divides
- The cytoplasm/cell membrane divide, forming two cells that are identical to the parent cell.

9. CELL TRANSPORT

Cell transport:	Definition:	Examples of cell transport:
Diffusion: **No** energy required	**Movement of particles in a solution or gas from a higher to a lower concentration**	• O_2 and CO_2 in gas exchange • Urea from cells into the blood plasma.
Osmosis: **No** energy required	**Movement of water from a dilute solution to a more concentrated solution, through a partially permeable membrane**	• Plants absorb water from the soil by osmosis through their root hair cells.
Active transport: **ENERGY** required	**Movement of particles from lower concentration (a dilute solution) to a higher concentration(a more concentrated solution)**	• Movement of mineral ions into roots of plants • The movement of glucose from lower concentrations in the gut into the blood.

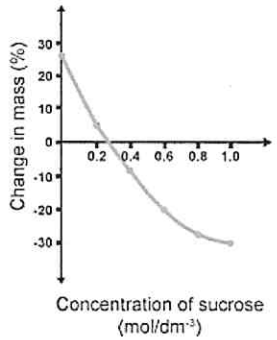
FACTORS INCREASING THE RATE OF DIFFUSION

- Greater concentration gradient
- Higher temperature
- Larger surface area of the membrane (surface area to volume ratio)

10. OSMOSIS REQUIRED PRACTICAL

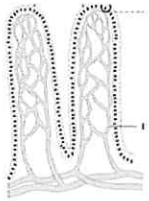
1. Set up 5 boiling tubes, with 5 different concentrations of sugar solutions.
2. Cut 5 pieces of potato, the same size using the cork borer & cut off the ends.
3. Blot with paper towel to remove excess moisture.
4. Record the mass of each potato tube, using a top pan balance, then place each potato into a different test tube.
5. After 30 minutes take out the potato tubes and blot with paper towel to remove excess moisture.
6. take and record the new mass and length of each potato.
7. Record the change in mass and the change in length in your tables (if it has gone down it will have a negative value).
8. Calculate change in mass: **change in mass = final mass – original mass**
9. Repeat 3 times for each concentration and calculate a mean
10. Calculate % change in mass: **% change = change in mass ÷ original mass**
11. Plot a graph with concentration of solution on the x-axis and % change in mass on the y-axis.
12. Draw a line of best fit – it will be a curve
13. Where the graph crosses the x-axis, this is the concentration inside the potato because there is no change in mass.

Independent variable = concentration of sugar solution
Dependent variable = mass of potato
Control variables = size of potato, type of potato, time, temperature, same volume of solution

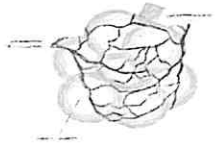


11. ADAPTATIONS OF EXCHANGE SURFACES FOR DIFFUSION

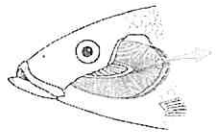
Small Intestines
- *Villi – increase surface area*
- *Good blood supply – to maintain concentration gradient*
- *Thin membranes – short diffusion distance.*



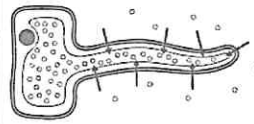
Lungs
- *Alveoli– increase surface area*
- *Good blood supply – to maintain concentration gradient*
- *Thin membranes – short diffusion distance.*



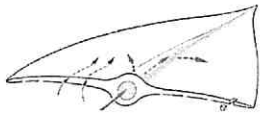
Fish gills
- *Gill filaments and lamella – increase surface area*
- *Good blood supply – to maintain concentration gradient*
- *Thin membranes – short diffusion distance.*



Roots
- *Root hair cells- increase surface area*
- *Long and thin - cover more area of soil*



Leaves
- *Large surface area*
- *Thin leaves, for short diffusion path*
- *Stomata on the lower surface to let O_2 and CO_2 in and out.*



C1 Knowledge Organiser

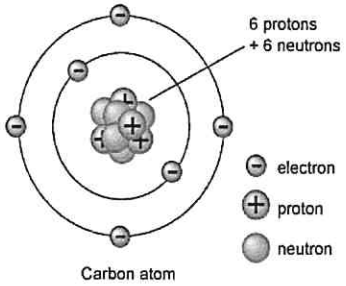
Atoms, Elements, Compounds & Isotopes.

1. DEFINITIONS

- An **element** is made up of one type of atom.
- A **compound** are two different elements chemically joined together.
- A **mixture** are two elements or compounds not chemically joined together.
- **Isotopes** are atoms which have the same number of protons but a different number of neutrons.
- **Ions** are atoms with a positive or negative charge
- Mixtures can be separated by processes such as:
- **Filtration** – separating an insoluble solid from a liquid, e.g. sand and water.
- **Simple distillation** – separating two liquids depending on their boiling point e.g. Ethanol (boiling point at 78°C) and water (boiling point at 100°C)
- **Chromatography** – Separating small amount of soluble substances by running a solvent along a material such as absorbent paper

2. STRUCTURE OF ATOM

Name of particle	Relative Mass	Relative charge
Proton	1	+1
Neutron	1	0
Electron	Very small	-1



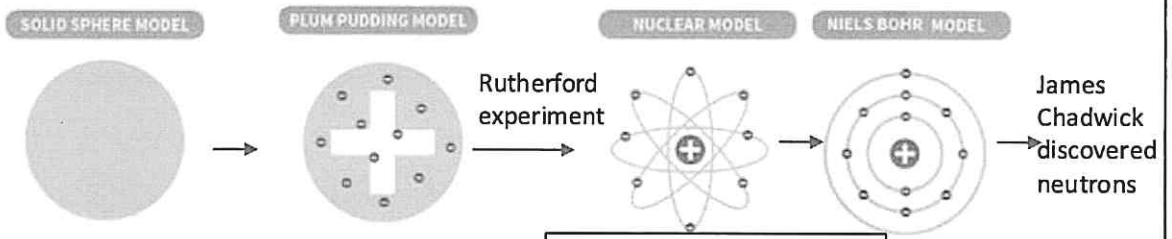
- Atoms have the same number of protons and electrons.
- Atoms have no overall charge.
- The **atomic number = the number of protons**
- For an atom, number of protons = number of electrons
- **Mass number = number of protons + number of neutrons**

so number of neutrons = mass number – atomic number

$^{23}_{11}Na$ (Mass number 23, Atomic number 11)

Eg Sodium atom has 11 protons, 11 electrons and 12 neutrons

3. DEVELOPMENT OF THE ATOM



Initially the atom was believed to be a **solid tiny sphere** that could not be divided.

The plum pudding model is a **ball** of **positive** charge with negative **electrons embedded** randomly

Nuclear model:
Positive charge in the nucleus
Negative electrons orbiting the nucleus
Atom is mainly empty space
Mass of atom concentrated in the nucleus.

Niels Bohr discovered:
Electrons orbit the nucleus at **specific distances**

Rutherford experiment:

Alpha particles were fired at gold foil and the results of the experiment and what it proved was:

- Most alpha particles travelled straight through showing the atom was mainly empty space
- Some alpha particles were deflected showing the mass was concentrated in the centre
- Some alpha particles were deflected showing the centre of the atom (nucleus) was positive. This led to the discovery of a nucleus and protons

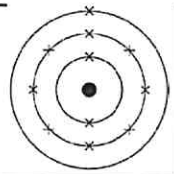
4. CALCULATING RELATIVE ATOMIC MASS

The relative atomic mass of an element is an average value that takes account of the abundance of the isotopes of the element. To calculate this, use the formula below:

$$\frac{(Mass\ of\ isotope\ 1\ x\ its\ abundance) + (Mass\ of\ isotope\ 2\ x\ its\ abundance)}{Total\ abundance}$$

5. ELECTRONIC STRUCTURE

- The **first** shell can hold **2 electrons**
- The **second and third** shells can hold up to **8 electrons.**
- The electronic structure of sodium is shown on the right.



6. THE PERIODIC TABLE

- The elements in the modern periodic table are arranged in order of **atomic number.**
- Elements with similar properties are in vertical columns known as **groups**.
- Elements in the same group in the periodic table have the same number of electrons in their outer shell eg group 4 atoms have 4 electrons in their outer shell
- Metals are found on the left of the periodic table, non-metals are found in the top right.
- **Metal** atoms **lose** electrons to get a full outer shell and form **positive ions**
- **Non-metal** atoms **gain** electrons to get a full outer shell and form **negative ions**

7. DEVELOPMENT OF THE PERIODIC TABLE

- The early periodic table was arranged by **atomic weight.**
- Mendeleev **left gaps** for elements that he thought had **not been discovered** and in some places changed the order to match up elements which reacted similarly E.g. Te and I
- Elements with properties predicted by Mendeleev were discovered and filled the gaps.

Groups are the vertical columns down

Periods → are the rows across

Key: relative atomic mass, **atomic symbol**, name, atomic (proton) number

1	2											3	4	5	6	7	0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	[285] Cn copernicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[294] Ts tennessine 117	[294] Og oganesson 118

8. GROUP 0

- The elements in group 0 of the periodic table are called the **noble gases.**
- They are inert (unreactive) because their atoms have a full outer shell of electrons (are stable).
- The boiling points of the noble gases **increase** as you go down the group.

9. GROUP 1

Elements in group are known as the **alkali metals**

In group 1, the **reactivity of the elements increase going down the group** because:

The outer electron gets **further away** from the nucleus

The **attraction** between the outer electron and the nucleus **gets weaker.**

Therefore, the outer electron is more easily **lost.**

If an atom **loses** an electron it forms a **positive ion.**

Metals in group 1 react with water to form the metal hydroxide and hydrogen.

You'd observe the metal floating and moving on the water and fizzing. Potassium sets on fire and produces a lilac flame

Metals in group 1 react with oxygen to form the metal oxide.

Metals in group 1 react with chlorine to form the metal chloride.

7 Li lithium 3
23 Na sodium 11
39 K potassium 19
85 Rb rubidium 37
133 Cs caesium 55
[223] Fr francium 87

10. GROUP 7

The elements in group 7 of the periodic table are known as the **halogens**

They all have **7 electrons in their outer shell.**

Group 7 elements are non-metals and consist of molecules made of **pairs of atoms** (diatomic) eg Cl_2, Br_2

As you go down Group 7, **the melting point and boiling point increase.**

In group 7, the reactivity of the elements **decrease down the group** as:

The outer shell gets **further away** from the nucleus

The **attraction** between the outer electrons and the nucleus **gets weaker**

Therefore, the ability for the atom to **gain** another electron is reduced (remember all atoms want a full outer shell – therefore, a group 7 element needs to **gain** an electron.

If an atom **gains** an electron it forms a **negative ion**

A more reactive halogen can displace a less reactive halogen from an aqueous solution of its salt. This is a **displacement reaction**

e.g. Sodium Bromide + Chlorine → Sodium Chloride + Bromine

19 F fluorine 9
35.5 Cl chlorine 17
80 Br bromine 35
127 I iodine 53
[210] At astatine 85
[294] Ts tennessine 117

P1 Energy

Box 1: Energy stores

Energy Store	Example
Kinetic	Energy stored in moving objects
Gravitational	Energy stored in objects at a height
Chemical	Energy stored in fuels, foods and batteries
Electrostatic	Energy stored between charged particles
Magnetic	Energy stored in magnetic fields
Elastic	Energy stored in stretched and squashed objects
Nuclear	Energy stored in the nucleus of an atom
Thermal	Energy stored due to an objects temperature

Box 2: Energy Transfers

Energy Transfer	Example
Mechanically	Energy transferred due to a force
Heating...	Energy transferred due to temperature differences
Radiation	Energy transferred as a wave
Electrically	Charges moving due to a potential difference

Box 3: Units to learn

Energy – Joules (J)
Work Done – Joules (J)
Power – Watts (W)
Distance – Metres (m)
Time – Seconds (s)
Mass – Kilograms (kg)
Spring Constant – N/m
Specific Heat Capacity – J/kg°C
Gravitational Field Strength – N/kg

Box 5: Calculation prefixes

Prefix	How to convert	Standard form
Kilo (k)	x1,000	$x\ 10^{3}$
Mega (M)	x1,000,000	$x\ 10^{6}$
Giga (G)	x1,000,000,000	$x10^{9}$
Centi (c)	/100	$x10^{-2}$
Milli (m)	/1000	$x10^{-3}$
Micro (μ)	/1,000,000	$x10^{-6}$
Nano (n)	/1,000,000,000	$x10^{-9}$

Box 4: Definitions to learn

System – A group of objects
Closed system – The amount of energy in the system is constant
Wasted Energy – Energy that is dissipated (spread out) and stored in less useful ways
Specific Heat Capacity – The amount of energy required to raise the temperature of one kilogram of the substance by one degree Celsius.
Power – Rate of energy Transfer (1W = 1 Joule per second)
Conservation of Energy - Energy cannot be created or destroyed – only transferred usefully, stored or dissipated.
Non-renewable energy resource - These will run out. It is a finite reserve. It cannot be replenished.
Renewable energy resource - Replenish as they are being used

Box 6: How to reduce energy loss

Lubrication – Reduces friction, so less energy dissipated due to heating.
Insulation – Low thermal conductivity – lower rate of energy transfer.
Efficient – Wastes a lower proportion of the energy provided.

Box 7: Describing energy changes

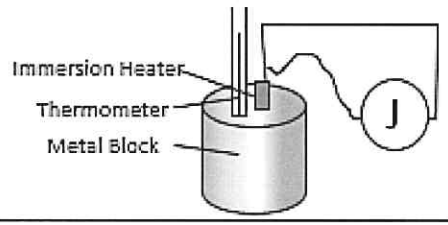
Describing a mass being lifted by a battery powered motor

Before being turned on, a battery has chemical energy. When turned on, the chemical store is decreased by electrical working to turn the motor. This causes the mass to raise by mechanical work and increase its gravitational store.

Box 9: Specific Heat Capacity

Core Practical – Specific Heat Capacity

- Measure mass of sample using a top pan balance
- Plug in an immersion heater and joulemeter
- Measure the temperature before switching on
- Switch immersion heater on for 5 minutes
- Measure the temperature after 5 minutes
- Measure the energy from the joulemeter
- Use the equation: Specific heat capacity = energy/(mass* temperature change) to calculate the
- **Insulate** to reduce energy loss = more accurate result.



Box 8: Energy resources

Energy resource	What is it?	Positive	Negative
Fossil Fuels (coal, oil and gas)	Burnt to release thermal energy used to turn water into steam to turn turbines	Easy to transport, relatively cheap	Extraction can cause problems: fracking can lead to tremors. Carbon Dioxide released → Greenhouse gas → Leads to Global Warming
Nuclear	Uranium fuel undergoes Nuclear Fission	No CO_2 produced. Lots of energy produced from small amounts of fuel.	Non-renewable. Radioactive waste remains dangerous for a long time. Possibility of disaster (Eg Chernobyl)
Biofuel	Fuel from living organisms	As plants grow, they absorb CO_2: 'carbon neutral'.	Land used for fuel crops instead of farming (in developing countries). Habitats destroyed to use land for fuel crops.
Tides	"Tidal Barrage" traps water from tides to use to generate electricity.	Predictable due to consistency of tides. No greenhouse gases produced.	Expensive to set up. A barrage (dam) is built across a river estuary, flooding habitats and causing problems for ships and boats.
Waves	Up and down motion turns turbines	No waste products.	Can be unreliable depends on wave output as large waves can stop the pistons working.
Hydroelectric	Falling water spins a turbine	No waste products. Very reliable.	Habitats, farmland and houses can be flooded when dam is built.
Wind	Movement causes turbine to spin which turns a generator	No waste products.	Unreliable – wind varies. Visual and noise pollution. Dangerous to migrating birds.
Solar	Directly heats objects in solar panels or sunlight captured in photovoltaic cells	No waste products.	Unreliable due to light intensity (Eg: Night time or cloudy days). Making and installing solar panels expensive.
Geothermal	Hot rocks under the ground heats water to produce steam to turn turbine	No greenhouse gases produced.	Limited to a small number of countries. Geothermal power stations can cause earthquake tremors.