

The Trafalgar School at Downton

Knowledge Organiser

Year 10: Terms 3 and 4

2022/2023



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Name.....House.....

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Using a Knowledge Organiser well

What is a Knowledge Organiser?

A Knowledge Organiser is a document that sets out the key information you need to understand, learn and memorise in each of the subjects you study this term.

Why do I have to carry my Knowledge Organiser around with me?

Your teachers will want you to use your Knowledge Organisers in lessons. They are yours forever and you may want to annotate or highlight on them when your teacher talks about things in them. They will certainly be used in lessons when you have a cover teacher and you can use them whenever you find yourself with some spare time.

How should I use my Knowledge Organiser?

You should use your Knowledge Organiser to learn this key information and commit it to memory. Your teachers will often quiz you on the information on the Knowledge Organiser in your lessons. The best way of using it is to use the look, cover, write, check method which you will have been introduced to in your Knowledge Organiser launch assemblies.

What do I do with my Knowledge Organiser at the end of the term?

You don't have to carry your Knowledge Organiser around with you anymore but you should keep it somewhere safe where you can easily get it out and use it. Remember that the information on the Knowledge Organiser includes things you will need to remember for your GCSE exams, so your teachers will continue to quiz you on it.

Why is a Knowledge Organiser important?

New GCSE specifications mean that students have to memorise more facts, equations, quotations and information than ever before and there are things you will learn right from the start of year 7 that you will need to know in year 11 when you sit your GCSE exams – the Knowledge Organiser helps you to identify the things that you need to try and commit to your long term memory and return to over and over again during your time at secondary school. There are also things that we think it is important you learn about and remember that might not be in a GCSE exam but represent useful knowledge for life.





WHAT WE EXPECT FROM YOU

BE ON **TIME** ●

BE **EQUIPPED** ●

PEN, PENCIL, RULER, KNOWLEDGE ORGANISER & EXERCISE BOOK (AS A MINIMUM)

LISTEN TO STAFF AND **ALWAYS**
COOPERATE ●

DO NOT INTERRUPT **LEARNING** TIME ●

COMPLETE **ALL WORK** SET
BEST WORK, FIRST TIME ●

SHOW **RESPECT** ●

WEAR UNIFORM **PROPERLY** AND
WITH **PRIDE** ●

MOBILE DEVICES/SMART
WATCHES TO BE IN **YONDR** CASE ●

Being Trafalgar

At the end of your time at the school your knowledge organisers will provide you with lots of help and support when you prepare for your GCSE exams.

To help yourself you should:

- Keep your Knowledge Organisers as tidy as possible
- Highlight parts of them as you go through learning lessons or add in post-it notes etc. to help you learn key knowledge
- Keep your used Knowledge Organisers safe at home. If you have used them since Year 7 you will end up at the end of Year 11 with 14 Knowledge Organisers. Line them up on your shelf at home and keep coming back to them for your revision, homework and learning
- Show them to your parents and talk through with them the facts and knowledge you have learned about in lessons – help them to learn new things too!
- Take your Knowledge Organiser for the term you are in to school every day and use it in every lesson you can!

Learning the knowledge in the organiser

Your Knowledge Organiser is a vital document. It contains all the key things from your lessons that you will need to work on committing to your long-term memory.

The best method to use when you are working on memorising things from your Knowledge Organiser is to self-quiz, using the Trafalgar Revision Method, below:

Really read and understand	Read the information 3 or more times and ask for help in understanding
Reduce the knowledge	Rewrite the information, making revision cards or mind maps
Remember	Reread and test that you can remember
Repeat	Repeat the process above until you can recall the information quickly and accurately. Only at this point have you acquired the knowledge!

How do I remember? Activating your memory

Students often say “I can’t remember” and the reason for this is that the information they are trying to remember and learn is not yet in their **long term memory**.

Your long term memory gets activated by repetition over a number of days. And so repeat the following process to embed knowledge in your long term memory.

Look	Read the information 3 or more times 
Cover	Now cover what you have just read up
Write	Now try and write down the information you have just read 
Check	Did you write down the information correctly? If you made mistakes, correct them with a different colour pen and repeat daily until you “just know it”.





- alliteration:
- anecdote:
- antithesis:
- chiasmus:
- emotive language:
- experts:
- extended metaphor:
- foreshadowing:
- imperative verbs:
- metaphor:
- modal verb:
- pathetic fallacy:
- sensory description:
- simile:
- statistics:
- superlative:
- onomatopoeia:
- personification:
- repetition:



You'll never put a better bit of butter on your knife



Talking to his children about the dangers of running in the house, a dad might include an anecdote about falling in his home as a boy and breaking his arm.



That's one small step for man, but a giant leap for mankind.

'Let us never negotiate out of fear, but let us never fear to negotiate.'

Think about the poor, defenceless animals that suffer due to our rubbish!



'Group chat can often be a source of upset,' warned psychologist Dr Linda Pappadopolis.

The Road Not Taken, by Robert Frost, is one of the most famous examples of extended metaphor; in the poem, he compares life's journey to a forest path.

The witches in Macbeth are used to foreshadow that Macbeth is not innocent: 'Fair is foul and foul is fair' a line he echoes in his first appearance when he says 'so foul and fair a day I have not seen'.



Chill out! Do as I say! Don't eat the daisies! Please be quiet! Be quiet!



'The sun in the west was a drop of burning gold that slid near and nearer the sill of the world.'

You must be home by midnight. You could be tired if you're any later. E.g. mustn't, can, might, shouldn't, may, will etc.

In *Macbeth*, the night the King is murdered 'has been unruly ... in th' air, strange screams of death ... Some say the Earth was feverous and did shake.'



Wind swirled around the beach house, whistling loudly. He felt the snowflakes melting on his skin, their liquid trickling down his neck, cold, wet, seeping into his clothes.

Without warning, Lionel gave one of his tight little sneezes: it sounded like a bullet fired through a silencer.

You only have a 20% chance of surviving a 60mph crash if you don't wear a seatbelt!

This is the worst day of my life but at least we're in the finest café in London.

The dog knocked over the vase with a crash!



Dancing on the water, the sun shone endlessly.

'As my grandfather went, arm over arm, his heart making sour little shudders against his ribs, he kept listening for a sound, the sound of the tiger, the sound of anything but his own feet and lungs.'



'I' versus 'me'

Use 'I' when the people named are the subjects of the sentence:

Boris Johnson and I shook hands.

Use 'me' when the people named are the objects of a verb:

The press took pictures of Boris and me shaking hands.

Check: Will it still make sense if you remove the name/s?

~~Boris Johnson and I~~ shook hands. ✓
~~Boris Johnson and me~~ shook hands. ✗

The press took pictures of ~~Boris and I~~ shaking hands. ✗
The press took pictures of ~~Boris and me~~ shaking hands. ✓

People can't lick their elbows. **their** (shows ownership)
"Their" is like "our."

She is there already. **there** (a place)
"There" is like "here."

They're all crazy! **they're** (short for "they are")
"They're" = "they are"



Use fronted adverbials:

Rather slowly, (manner)
During the night, (time/temporal)
Every minute or two, (frequency)
At the end of the corridor, (spatial)

Just beyond the stairwell on his left,
he opened the door.

Use a two and then three word sentence:

It hurt. I was dying!

Snow fell. Flakes floated precariously.

Use anaphora:

Now is the time for action. Now is the time to take up arms. Now is the time to fight for your country.

Use epiphora (epistrophe)

I can't believe I was robbed. Everything is gone. My television and electronics are gone. The money I left on my nightstand is gone.

Use a range of sentence structures:

The spotted green frog jumped into the pond.
(simple)

The spotted green frog jumped into the pond and he splashed water on me.
(compound – coordinating conjunction: for, and, nor, but, or, yet, so)

The spotted green frog jumped into the pond when the hawk flew overhead.
(complex – subordinating conjunction: if, although, as, before, because, when, after, since, until, so that, while etc.)

When the hawk flew overhead, the spotted green frog jumped into the pond.
(subordinate/dependent clause start)

The frog, which had been lurking underwater, jumped on the lily pad.
(embedded clause)

Use a past participle - 'ed' start:
Glazed with barbecue sauce, the rack of ribs lay nestled next to a pile of sweet coleslaw.

Use a present participle - 'ing' start:
Whistling to himself, he walked down the road.

Use a tricolon (tripartite list):

'I stand here today humbled by the task before us, grateful for the trust you have bestowed, mindful of the sacrifices borne by our ancestors.'

Snap! Crackle! Pop! (Rice Krispies slogan)

Use a conditional sentence:

When people smoke cigarettes, their health suffers.

If I had cleaned the house, I could have gone to the cinema.

Use paired adjectives to describe a noun:

Take a look at this **bright red** spider.

Luckily, it isn't a **wild, dangerous** one.

Use anadiplosis (yoked sentence):

Building the new motorway would be **disastrous, disastrous** because many houses would need to be destroyed.

'Fear leads to anger. Anger leads to hate. Hate leads to suffering.'
Yoda, *Star Wars*.

Use different sentence types:

The wind is blowing. (declarative)

Put your pen down. (imperative)

Who do you trust most in the world? (interrogative)

Pollution is killing us! (exclamation)

Use discourse markers to begin paragraphs and start/link some sentences:

First of all, To begin with, Firstly,

Therefore, Consequently, Hence, As a result,

Furthermore, In addition, Additionally, Moreover,

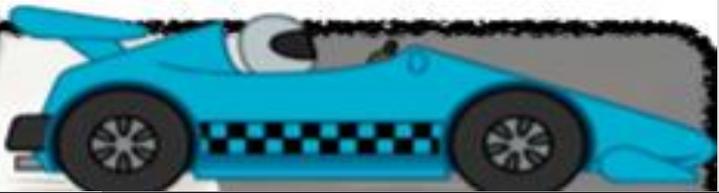
Meanwhile, Later that day, Seconds later, Subsequently, That afternoon,

On the whole, Interestingly, Basically, In short, Broadly speaking,

Alternatively, Conversely, Similarly, On the other hand, Despite this, Likewise, However,

To conclude, Finally, In conclusion, Eventually, In the end,

PUNCTUATION PIT STOP



Full Stop

Full stops are used to:

1) mark the end of a sentence. 😊

Carefully, he kicked the ball into the goal.

2) show when a word has been abbreviated.

Saint Peter's Road is on the High Street.

→ St. Peter's Road is on the High Street.

COMMAS

Commas are used to separate: 🗨️

1) items in a list. 🗨️

Bert, Ernie and Elmo are my three pet rats.

2) **dependent clauses and phrases.**

While I was in the bath, the cat scratched at the door. That meant, because I was on my own in the house, I had to get out to let him in. Thankfully, I had a towel handy!

Quotation Marks

Quotation marks show exact words that are spoken or written by someone. 😊

'Don't be late!' shouted Mrs Smith. 🗨️

'I will be,' Molly said, and added, 'so don't expect me before 11.'

Question Mark

Question marks are used at the end of direct questions instead of a full stop. 🗨️

What is your favourite food? 🗨️

How do you feel today? 🗨️

An indirect question ends with a full stop rather than a question mark: 🗨️

I'd like to know what you've been doing all this time. I wonder what happened.

Exclamation Mark

Exclamation marks express strong emotions: forcefulness, commands, anger, excitement, surprise etc.

Don't buy that car! Stop telling me what to do! I'm free! You're late! She actually won!

They're also used for most interjections: 🗨️

'Hi! What's new?' 'Ouch! That hurt.'

'Oh! When are you going?' 🗨️

Semi-colon

Semi-colons are used to separate two sentences that are closely related: 🗨️

It was winter; the snow was falling heavily.

They can also be used to separate items in a list made of longer phrases. I have been to Newcastle, Carlisle, and York in the North; Bristol, Exeter, and Portsmouth in the South; and Cromer, Norwich, and Lincoln in the East.

Colon

Colons are used to: 🗨️

1) begin a list. 🗨️

I have three pet rats: Bert, Ernie and Elmo.

2) indicate that what follows it is an explanation or elaboration of what precedes it.

Unfortunately, the weather forecast was wrong: it rained all day!

Apostrophe

An apostrophe is used to show: 🗨️

1) omission - where a letter or letters has been missed out.

does not → doesn't I am → I'm

2) possession - when some thing/one owns something. Thankfully, they played Susan's game. Interestingly, David's house has no garden, but Susan's house does.

Dash —

Dashes are used for parenthesis: a word or phrase inserted as an explanation or afterthought into a passage which is grammatically complete without it. E.g.

Last year, they roasted the winning brisket — the size of a pillow — in a mighty clay oven. Paul felt hungry — more hungry than he'd ever been.

Brackets

Brackets are used in pairs for parenthesis: a word or phrase inserted as an explanation or afterthought into a passage which is grammatically complete without it. E.g.

Andrew Jacklin (last year's losing finalist) is expected to win this heat.

Tigers are carnivores (meat eaters)!

Ellipsis

Ellipsis is used to: 🗨️

1) show a pause or hesitation in someone's speech or thought.

I don't know ... I'm not sure.

2) build tension or show that something is unfinished.

Looking up, Paul couldn't believe what he saw ...

PUNCTUATION PIT STOP



Writing the text for a leaflet

Stay Safe and Sound Online

clear/apt/original title

subtitles

Manage your online reputation

Anything that you upload, email or message could stay online forever. Therefore, before you post anything online, consider whether or not you would want your parents, teacher or a future employer seeing it. If the answer is no, don't post it! Your privacy is key here.

effectively/fluently sequenced paragraphs

Privacy Matters

Make sure you set high privacy settings on social networks. Regularly you should change passwords and never share or put online any of your personal details like a phone number, address or your school details. Make sure your safety and privacy settings are activated on your mobile devices too, so you aren't sharing private information. Be aware that using public WiFi might not filter inappropriate content, so look for friendly WiFi symbols when you're out and about.

Writing Forms

bullet points

Remember:

- make sure you know how to block abusive comments and report worrying content;
- don't arrange to meet people in real life that you've only talked to online;

Text for a Speech 'Address to Nation on the Challenger' by Ronald Regan (28th January, 1986)

Ladies and Gentlemen, I'd planned to speak to you tonight to report on the state of the Union, but the events of earlier today have led me to change those plans. Today is a day for mourning and remembering. Nancy and I are pained to the core by the tragedy of the shuttle Challenger. We know we share this pain with all of the people of our country. This is truly a national loss.

a clear address to an audience

For the families of the seven, we cannot bear, as you do, the full impact of this tragedy. But we feel the loss, and we're thinking about you so very much. Your loved ones were daring and brave, and they had that special grace, that special spirit that says, 'Give me a challenge and I'll meet it with joy.' They had a hunger to explore the universe and discover its truths. They wished to serve, and they did. They served all of us.

rhetorical indicators that an audience is being addressed throughout

The crew of the space shuttle Challenger honoured us by the manner in which they lived their lives. We will never forget them, nor the last time we saw them, this morning, as they prepared for the journey and waved goodbye and 'slipped the surly bonds of earth' to 'touch the face of God.'

a clear sign off e.g. 'Thank you for listening'

Thank you.

Article

Andy Murray's Appliance of Science

clear/apt/original title

By Jim White

by-line

If the Caledonian superman wins Wimbledon this year, it will be thanks to pieces of sushi a day, a magic potion and a battalion of experts.

strapline

If you want to know what it is about Andy Murray that makes him stand out from the rest of us – apart from that fizzing backhand return and the huge-mouthed celebratory yodel – it is summed up in one word: science!

Sample Check

sub-headings

Today, before he even steps out on to the Centre Court for his Wimbledon semi-final, the 27-year-old, 2009 Wimbledon champion has already been subject to several of these. He does a urine test every time he pops to the lavatory. The osmolarity check is conducted by one of his staff, its purpose to gauge the percentage of water and minerals in his urine, to show whether his body is correctly hydrated. The fact is, if Murray wins today, it will only be thanks to the bloke who inspects his wee.

introductory (overview) paragraph

fluently sequenced paragraphs

Daily Diet

At 7.30 this morning, while many of the other players arriving at Wimbledon's press restaurant will have begun their day assaulting the glittering Himalaya of fried starch, Murray will have eaten yogurt, fruit and a bagel smeared in peanut butter ...

Writing in the Essay Form

clear title

Zoos Should be Banned

effective introduction

In America, approximately 175 million people visit a zoo each year. That's half of America's population. Clearly this suggests that zoos remain popular places for people to visit for entertainment and to learn about wild animals. However, although some people are of the opinion that zoos can provide a source of educational entertainment and a sanctuary for endangered animals, I believe that the cruelty that wild animals suffer outweighs this benefit, and that they should be shut down!

effectively/fluently linked paragraphs to sequence a range of ideas

On the surface, zoos are a huge tourist attraction because they allow families to spend a day out in the sun, looking at animals, and eating overpriced junk food. But what most people don't know is that zoos are far more sinister than selling small bottles of water for £5.00. Statistics show that in all zoos, fifteen percent of animals die every year due to living in captivity. Obviously then, zoos must be an unsuitable environment for wild animals and should, therefore, be abolished. How can zoos justify their existence by claiming animals in captivity provide people with the experience of observing wildlife they wouldn't otherwise experience, when it costs at a cost to their life?

a range of ideas (no room to reproduce the other two paragraphs here)

In conclusion, a zoos only purpose is to make as much money as possible by showing thousands of people per day to gawk at animals and spend far too much money on souvenirs and junk food. Zoos do not protect or help to repopulate animals, nor do they educate people on the specifics of these animals, and therefore should be abolished.

convincing conclusion

Writing a formal letter

221B Bakers Street
London
NW1 6XE

reader's
address

Writing
Forms

writer's
address

35 Hibiscus Crescent
Andover
Hants
SP10 3WE

date

20th February, 2020

Dear Sir or Madam

Formal Salutation: Sir/Madam/Mr Roderick/Mrs Roderick

I am writing because you chair a committee in charge of the compulsory wearing of school uniforms. I am a student at Brinsley High School, a friendly and successful school where uniforms are not worn.

Of course, ... that students won't spend all morning choosing what to wear or beg parents for clothes that will impress. There is another side to this case: uniforms breed uniformity. We are a culturally diverse nation and we all dress the same, this encourages us to be the same. At Brinsley High, we are encouraged to express our individuality, yet this seems to be in contradiction of the message enforced uniform sends to us.

fluently sequenced paragraphs

fluently sequenced paragraphs

Furthermore, ...

Yours faithfully
Boris Johnson

formal sign off: Yours faithfully (Sir/Madam = Faithfully) (Mr/Mrs = Sincerely)

Dystopian Narrative: *The Machine Stops* by E.M. Forster

Above her, beneath her, and around her, the Machine hummed eternally; she did not notice the noise, for she had been born with it in her ears. The earth, carrying her, hummed as it sped through silence, turning her now to the invisible sun, now to the invisible stars. She awoke and made the room light.

"Kuno!"

"I will not talk to you," he answered, "until you visit me."

"Have you been on the surface of the earth since we spoke last?"

His image faded.

Again she consulted the book. She became very nervous and lay back in her chair palpitating. She directed the chair to the wall, and pressed an unfamiliar button. The wall swung apart slowly. Through the opening she saw a tunnel that curved slightly, so that its goal was not visible. Should she go to see her son, this would be the beginning of the journey.

Of course she knew all about the communication-system. There was nothing mysterious in it. She would summon a car and it would fly with her down the tunnel until it reached the lift that communicated with the air-ship station: the system had been in use for many, many years, long before the universal establishment of the Machine. Those funny old days, when men went for change of air instead of changing the air in their rooms! And yet — she was frightened of the tunnel: she had not seen it since her last child was born.

Journey Description

Sitting in my seat – aisle, two rows from the front – I look out. Illuminating a town engulfed in darkness, lights flash past me: shop lights, street lights, car lights, and as the clouds part just enough for the moon to penetrate through the smog, moonlight!

Inside it's silent. No one speaks. The bus windows shut, lulled by the rocking motion, side-to-side, back-and-forth, up-and-down, my eyes feel heavy. Outside, I'm mesmerised by the noise I can only see, only imagine: mouths asking, replying, laughing, traffic screeching, angry drivers honking, shop doors opening and closing.

Once more the bus door opens and, as if I've lifted my head out from underwater, I can hear the street bustle, smell the takeaways, taste the diesel fumes.

Description of Place

spatial discourse markers

adjectives

Green limbs tangled above the decaying shells of long-abandoned vehicles, forming a canopy that barely permitted the harsh rays of the sun to burn through. The stealthy fingers of squat oak trees reached out tenaciously towards them. The vehicles themselves were coated in a thick layer of rust and a patina of blue copper – and were battered and bruised through years of exposure to the elements.

Metaphor, simile, personification

Like a queue of taxi cabs, the vehicles waited patiently in the forgotten depths of the forest. Specks of light from the midday sun, which had successfully fought their way through the overhead canopy, lit up their broken bodies. Their trunks gaped open woefully and their shattered eye sockets stared blindly forward.

sensory description

sensory description

The aroma of rust and decay occupied the clearing: it was choking, corrosive. No fresh breeze could infiltrate the thick shrubbery to provide relief. The cars lay there, suffocating on their own putrid stench. It was overpowering. Meanwhile, the squawks of blackbirds echoed like sirens around the clearing. The chilling sound was relentless. It echoed through the car's hollow bodies, feeding its way through the cracks in windows and doors, striking the upholstery of the rotting seat as it passed.

spatial discourse markers

sensory description

Spread over the floor of the clearing, a thick blanket of autumn leaves hid the earth beneath. They had turned a shade of burnt red and had bleached edges that resembled torn parchment. They were brittle and cracked from the heat in the clearing. Amongst them, all manner of insects scuttled- manoeuvring themselves between moments of shade, before the unforgiving rays of sun could scorch their exposed bodies.

adjectives

Climax (problem at its worst)

- Use exciting/dynamic verbs;
 - Quicken pace;
- Show characters feelings through action;
- Attempts to solve problem fail/intensify problem.
- Vary sentence length: short for action, longer for description.

Fail to Plan
Plan to Fail!

Rising Action (build up/conflict)

- Build on character, setting and plot;
- Introduce a problem/conflict/dilemma;
- Build tension/excitement using interesting adjectives, metaphors, similes etc.

Falling Action (fix problem)

- Character/s solving conflict/dilemma/ problem.

Exposition (introduction)

- Use a story hook to grab attention e.g. atmosphere, sudden event etc.;
- Use descriptive vocabulary to set the scene and describe the main character;

Resolution/Dénouement (ending)

- Link back to the start.
- What has the character learned?
- Is there an exciting twist?
- Is there a cliff-hanger ending?

**Freytag's Pyramid/
the Story Mountain is the best
for planning narratives
(stories).**

Conclusion:
To conclude,
repeat RQ,
Yes.

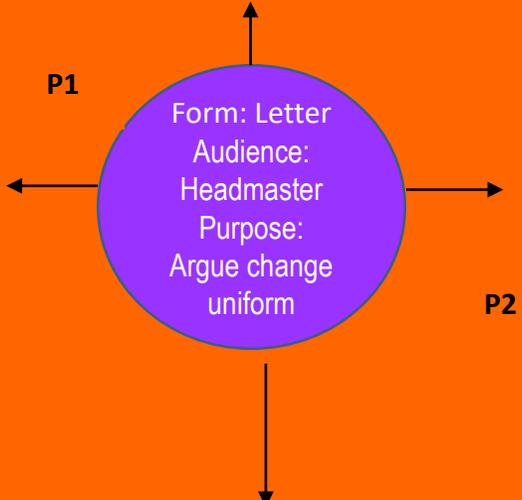
Yours
Sincerely

Intro: My address right hand side, +
date, school address left,
Dear Mr Curtis

Should we consider discontinuing
wearing a school uniform, you've
asked? Quite simply, yes! Within this
letter, you will find several arguments
setting out precisely why we should
make this change.

Counter: all look same
so no
prejudice/bullying over
clothes,
Argument: no
individualism, learning
who we are
Reasons to: RQ
+triple
Isn't part of our
learning at school
about learning how to
dress appropriately,
learning who we are,
learning how to judge
people on what is
inside, not what wear?

Counter: old-
fashioned tradition,
so easier to continue
Argument: other
traditions - burnt
witches, slept on
straw, walked
barefoot – now
discontinued so ...
Reasons to:
anecdote, use
experts



Counter: cost cheaper as not designer or from shops
making huge profit
Argument: cost of blazers, trousers and skirts from
school uni shop expensive as no competition, own
clothes mix 'n' match so fewer outfits needed, wear
weekends so more use,
Reasons to: emotive language: force poorer families to
go without, statistics

Mind maps/spider diagrams, allow you to jot down content ideas in no particular order and then decide on the best order to write them up in – so they're ideal for non-fiction writing. Each leg = a paragraph

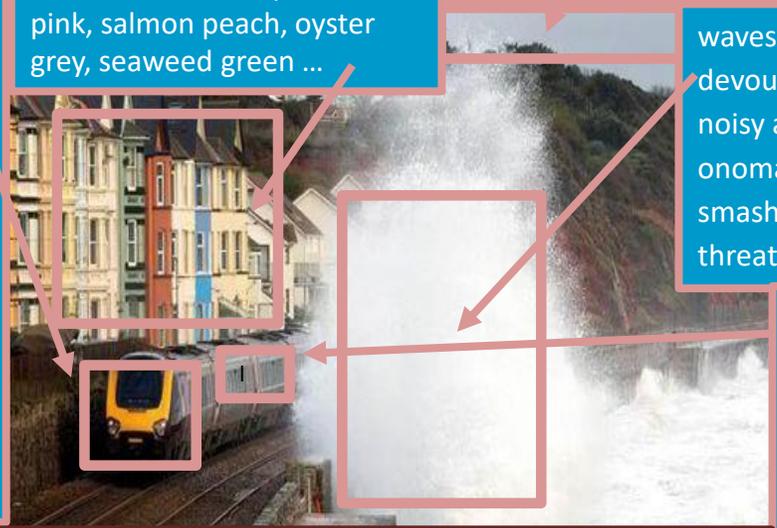
Personify train - a victim moving along railway line, past houses, towards destination - metaphor: caterpillar train sways and pitches precariously along the track to its daily destination. Snatching bites, the sea salt nips at its metal skin as it passes, gnawing at it, killing it. Rattles. Will it survive?

houses, like soldiers standing to attention - defending their inhabitants. Diff pastel colours of a seaside town: prawn pink, salmon peach, oyster grey, seaweed green ...

canopy of sky above threatening Adjectives for mood: grey sky, stuffed clouds full of cold, sharp rain, Verb: beating down, attacking!

waves engulfing and devouring the sea side town - noisy and disruptive, onomatopoeia: Crash! whip, smash personify so violent/threatening movement.

zoom in - one carriage window. Windows hit by spray that's 'like a tame cat turned savage'. Passenger pitched side-to-side: bubbling sickness, rising bile from stomach!

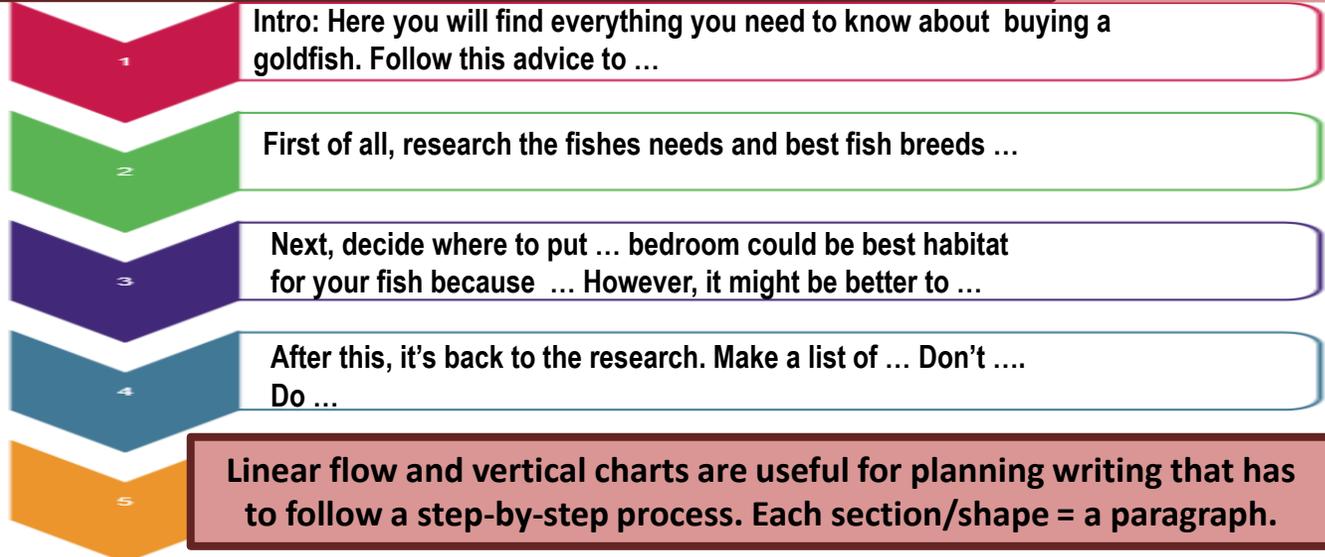


The Grid Plan is good for making sure you include lots of different methods, or to compare two/more things side-by-side. Each row/column = a paragraph.

Paragraph content/ topic	Language method/vocab	Sent structures	Punc
1: waves engulfing and devouring the sea side town - noisy and disruptive, movement	onomatopoeia crash, whip, smash personify so violent/threatening	'ing' start verbs (pres part)	! ;
2: train victim moving across railway line past houses towards destination	personify - victim, alliteration, metaphor: A caterpillar, the train sways and pitches precariously along the track to its daily destination. Snatching bites, the sea salt nips at its metal skin as it passes, eating away at it, killing it. Rattles. Will it survive?	Chain/ tricolon Question	? --
3: zoom in on one carriage window, motion sick	Windows hit by spray that 'like a tamed ca' has 'turned savage' today. Passenger pitched side-to-side; bubbling sickness rising bile from stomach!	Anadiplosis (yoked)	' ' ; !
4: houses	Like soldiers standing to attention they are defending their inhabitants. Diff pastel colours of a seaside town: prawn pink, salmon peach, oyster grey, seaweed green, cracking paintwork	Fronted spatial adverbials	() :
5: canopy of sky above threatening	Adjectives for mood: grey sky, stuffed clouds full of cold, sharp rain, Verb: beating down, attacking,	Two then three word sentences	... ;

**Fail to Plan
Plan to Fail!**

Plan describing pictures by boxing/framing parts of the image to help you to focus description on specific areas, zooming in on minute detail, and out again to another area. Each boxed area = a paragraph.



Writing Purposes

Key Language/Structural methods

Chocolate Model!



Most often

Mis spelled
words

accidentally	leisure
accommodate	maintenance
allude/allusion	mischievous
believe	necessary
business	occurrence
caesura	pastime
calendar	privilege
disappoint	recommend
experience	referred
foreign	restaurant
generally	rhythm
hierarchy	separate
ignorance	tyranny
illusion	vacuum
independent	vicious

Inform: tell the reader what they want/need to know.

- Use interesting facts details;
- use brackets to explain technical terms.

Interestingly, chocolate is actually made from the seeds of a cacao tree. After fermentation, the beans are dried, cleaned, and roasted. The shell is then removed to produce cacao nibs (**unadulterated chocolate in rough form**).

Explain: tell the reader how and why.

- Use connectives: 'as a result', 'because', 'so that', when;
- use sequence discourse markers: Eventually, Another, Furthermore.

Often, when in need of comfort or reassurance, or in stressful situations, people crave chocolate. Primarily, this is **because** dopamine is released into your brain **when** you eat chocolate, and **as a result** it can lower levels of anxiety ...

Describe: help the reader to picture it and imagine the experience.

- Use similes, metaphors, personification, interesting adjectives/verbs, sensory description.

Enticingly, the dome of dark chocolate, flecked sporadically with lime slivers, remained encased in its **fluted carapace**. **Around** the outside of it **cleaved** the **diminutive remains** of its **neighbour**: a **praline** long ago eaten! **Velvety smooth**, this **solitary bead of ganache glistened, revelling** in its **escape, yet mourning its rejection**.

Narrate: tell the reader a tale that will have them hanging on your every word.

- Use the mountain/pyramid structure;
- use some description;
- use a few lines of direct speech.



Suddenly, she was aware she had arrived at her destination! On the door in front of her, a **scarlet square of shiny plastic printed** with the words 'Chocolate Laboratory' stood out on its **splintering wood**. **Why she was standing on this doorstep, though, and what, or who, had led her here in the first place?**

Persuade: try to get the reader to do as you ask/agree with you.

- Use APE FOR REST: anecdote, personal pronouns, emotive language, fact, opinion, rhetorical questions, repetition, experts, statistics, triples.

One of the world's greatest comfort foods, Chocolate, is the **unrivalled 'go-to'** when **life takes a bad turn**, an **easy gift to thrill** just about **everyone**, and a **tasty treat** that will **uplift even the most melancholy of moods**.

Argue: present two sides, but ensure your side appears strongest so reader agrees with you.

- Use sequence discourse markers;
- use 'Some believe ..', 'However, most people would agree that';
- use APE FOR REST (above).

First of all, some believe that as **chocolate** is high in calories, it is bad for you. **However, scientific experts have proven** that chocolate, as it contains high levels of antioxidants, could **lower cholesterol levels, improve mood and prevent memory decline!**

Advise: help warn and guide reader, but reassure with carefully considered advice.

- Use imperative verbs (stop, do, don't, wait etc.), and modal verbs (if, could, might, should).
- use second person (you, your).

Most importantly, if you are feeling bored and craving chocolate, **don't** give in to your yearning. Instead, **you could go** for a walk, **run** errands, **call** a friend or **read** a book. **If you** can take your mind off food for a short time, the craving **may** pass.

KEY THINGS TO CONSIDER ABOUT THE SOURCE YOU ARE GIVEN...

Genre: What type of story is it? Is it horror? Romance? A mystery? What conventions does the story include that make it fit into that genre? Why has the writer chosen this genre?

Reader: How is a reader supposed to respond to this text? Are they meant to be scared? Happy? Confused? How does the writer achieve this?

Atmosphere: What type of mood or tone does the writer create in their story? How do they achieve it?

Names: Which characters are named? What are they called? Which characters are **not** named? Why not this be? Why might these names be important?

Dialogue: Do characters speak to each other? Why? Why do they talk about? What does this tell us about character, theme or plot?

Description of character: How are the characters described? What does this information reveal to us about them?

Archetypes: What **types** of characters do we have in this story? Villains? Heroes? Antiheroes? Comedic characters?

Description of setting: How is the setting described? Why is this important? Is setting more important than character?

KNOW YOUR BASICS! Noun/verb/adverb/adjective/ simile/metaphor/question/ alliteration/ onomatopoeia/5 senses/listing/personification/ repetition

PACE AND TONE – HOW SENTENCES HAVE AN IMPACT ON THE READER...

Sometimes students can feel a little confused when asked to consider ‘sentence forms’ in Q2, but there is an easier way to look at them. Every writer wants to establish a **pace** and a **tone** to their writing. Pace is how fast or slow a text is meant to be read, and tone is the kind of sound or mood you want to give to a piece of writing.

If you use lots of short sentences together it can build tension, but it can also speed up a text as a reader becomes more desperate to find out what happens as tension builds. Alternatively short sentences can make a reader stop and reflect on specific ideas.

Longer, more complex sentence forms can be used to aid description or to help a reader build up an understanding of character.

So when you read the exam text, think about what kind of tone and pace is created and how the writer uses sentences to achieve that effect on the reader.

LANGUAGE FEATURES

SIMILE

Similes help readers to picture a particular object, person or place by **comparing something they don’t know to something they do**. They can also be used for **exaggeration**.

METAPHOR

Metaphors help readers to picture a particular object or place by **transforming them into something they understand better**. They can also be used for **exaggeration**.

PERSONIFICATION

Where an inanimate object/thing is given human characteristics

ALLITERATION

Alliteration creates a memorable sound in the readers’ head that means they notice that particular line more or they can remember it quite well. **This means it can be used to emphasise a particular point, idea or feeling.**

NOUNS AND VERBS

Nouns are people, places or objects. Verbs are actions or ‘doing words’. **Both can be used carefully to evoke or give off certain emotions or feelings.**

ADJECTIVES AND ADVERBS

Adjectives are words that **describe nouns**. Adverbs are words that describe **verbs**. These are both used to add to **descriptions** and help **build specific images or feelings in the readers’ heads**.

STRETCH YOURSELF! Embed quotations/ Look at the bigger picture – not just individual quotes/ Consider genre and form/narrative voice/use terms: implies/ illustrates

THE DESCRIPTIVE 'RULES'
No names for people
At least 3 zoom-ins
No person described for more than a paragraph
Minimum 3 senses
1-3 sentences of direct speech (if cannot be avoided)
Maximum 1 exclamation mark
3 rd person
No thoughts
Present or past tense (not both)
Move the camera – like a film. Tell your reader through the viewpoint what you want them to focus on.

Symbolism	A literary device that contains several layers of meaning, often concealed at first sight, and is representative of several other ideas. Writers often use symbolism to convey a message to readers in a more subtle or personal way.
	In narrative, it is a repeated sign which can help create mood or theme. Colours are often used in this way as is light & dark – <i>think of the colours used in film to represent good or bad characters</i>
Motif	A rhetorical device through which writers identify differences between two subjects, places, persons, things, or ideas. Simply, it is a type of opposition between two objects, highlighted to emphasize their differences. All the best writing is based around the use of contrast so you should always look for it.
Contrast (technique)	Includes simile, metaphor & personification - sometimes called 'figurative language'. Essentially this is where a writer uses language visually – to create an image by suggesting a connection between ideas that the reader can then 'see'.
Imagery	

BE AMBITIOUS WITH YOUR VOCABULARY!

DO SECTION B FIRST!

IF TIME AT THE END OF THE EXAM, ALWAYS CHECK YOUR SECTION B RESPONSE FIRST

6 RULES FOR WRITING STORIES
 Start every sentence with a new word
 Include the word 'choreography'
 Have a long sentence – 30 words plus
 Include a list
 Have a sentence with 4 verbs
 End a paragraph with a short sentence
 Use **CONTRAST** in every sentence

THE EXAM
45 minutes - 1 task - 40 marks (1 from a choice of 2 - usually 1 descriptive <u>or</u> 1 narrative...but could be 2x narrative or 2x descriptive)
Step one: read & highlight key words in question (including PURPOSE, AUDIENCE, LANGUAGE & FORM)
Step two: Study the stimulus (picture) then choose one of the two questions
Step three: Plan 6 -8 things you can include, then put them in order (Steps 1 to 3 = 10 mins)
Step four: Write it' (Step 4 = 30 mins) <input type="checkbox"/> Should be lots of crossing out to show 'crafting' <input type="checkbox"/> Should be 2 sides approx

THE BASICS
Capital letters
Full stops
Question marks
Commas
Apostrophes
Consistent tense
Paragraphs
Connectives
Semi-colons
Colons
Dashes
Parenthesis (...)
Topic sentences
Vary sentence starts/lengths
Vary paragraph lengths

SENTENCE STARTS
Verb – <i>Running quickly, she</i> (make sure you finish sentence)
Adverb – <i>Darkly, the night sky....</i>
Adjective – <i>Red light filled the ...</i>
Preposition – <i>Down there, all.../Next to...</i>
Discourse Markers – <i>However, his life...</i>
ISPACED...VARIETY!

PAPER 1 LANGUAGE - READING TEXTS - 60 mins (25% GCSE) - One literary fiction text.

REMEMBER YOU SHOULD HAVE ALREADY DONE SECTION B!

QUESTION TO EVALUATE

Statement written. How far do you **AGREE?**

- Bullet points guide your answer
- AO4 – Evaluate

To answer: Read and highlight key words in the question

Two stages: recognising **how** the writer tries to achieve effects and deciding **how effectively** this has been done.

- The best answers *mostly* agree with the statement
- “I agree with ... except when ...”
- “Although I agree that... it is also possible that ...”
- Methods** means **CONTRAST** – how does the writer use this? (it will always be there)
- + Narrative voice – Who is talking? Why this person/viewpoint?
- Use this phrase to frame your answer: *The writer uses the...*
- Then add: *the word/phrase/personification/metaphor/simile/alliteration...*
- Then add a **quotation**
- Then add: *This method shows that/suggests/implies ...*
- End by evaluating: *although/however/but ...*
- Then: **repeat** until you run out of time (literally repeat the above frame)

MAKE SURE YOU HAVE SOME HIGHLIGHTERS! USE A DIFFERENT COLOUR TO HIGHLIGHT THE INFORMATION

QUESTION ABOUT STRUCTURE

How has the writer **STRUCTURED** the text to...?

- You need to consider the **WHOLE** text.
- Bullet points guide your answer
- AO2 – Structure

To answer:

- Read and highlight key words in the question**
- Leave 3 lines at the top of your answer for a summary statement** – do it at the end though because by then you will have worked out what it is

The 5Cs of Structure + HOW & WHY

- Construction** – how has the writer ‘built’ the text? Is it simply *chronological* or more *complex* – flashbacks, single/multiple narratives, repetition, patterns, motifs...
- Contrast** = again, no.1 structural technique...it will always be there so learn what to **look** for! Light/dark; small/big; 1 person/crowds of people; day/night; etc
- Camera + Cinematic** – where are we positioned? What do we see?
- Circular** = if they can find a circular narrative, the examiners will use it so look for this – it means we start & end in a similar place but something has changed – what?
- Changes in focus = changes in perspective = changes in paragraphs!** Look at each paragraph – **how** has it changed? **why** has it changed? [TiPToP]
- Summary statement = the examiners want this for the higher marks = one sentence overview of how the structure changes across the text – you’ve left 3 lines for this!
- Check you’ve commented on each change of focus/perspective/paragraph
- Consider **coherence**, (connections and links across paragraphs, links within paragraphs, topic sentences.)

Top Tips:

Comment in the writer’s techniques like a film makers using phrases like: focusing, zooming, narrowing, widening, introducing, developing, changing focus, concluding, foreshadowing, contrasting. E.G. ‘We start to see things through the father’s eyes as if we are searching with him’ or ‘We go from a wide viewpoint to a close-up focus if we are getting inside the father’s mind’

FOR EACH QUESTION IN SECTION A

STRUCTURAL FEATURES

Narrative perspective/voice

Flash-forward/Flash-back

Dialogue

Topic sentence

Discourse markers

Ellipsis

Foreshadowing

Focus/Narrowing

Contrast/juxtaposition

Circular narrative

Exposition

Rising action

Dramatic climax

Denouement

Zoom in/out

Focus shift

DO NOT ANALYSE LANGUAGE IN Q3!

LANGUAGE FEATURES TO TALK ABOUT
Pronouns
Direct speech
Terms of address
Noun phrase
Subordinate/ main cause
Narrative voice
Simple/compound /complex sentences
Accent /Dialect
Utterances
Ellipsis
1 st /3 rd person
Hyperbole
Imperatives
Exclamations

PAPER 1 LANGUAGE – READING TEXTS - 60 mins (25% GCSE) - One literary fiction text.
REMEMBER YOU SHOULD HAVE ALREADY DONE SECTION B!

<p>QUESTION ON LANGUAGE How does the writer use LANGUAGE to.....? <input type="checkbox"/> Bullet points guide your answer <input type="checkbox"/> AO2 – Language</p> <p>To answer: <input type="checkbox"/> Read and highlight key words in the question <input type="checkbox"/> ‘Analysis of Language’ means you must write about SYMBOLISM <input type="checkbox"/> Pick your quotations first then consider devices/methods that are used by the writer. <input type="checkbox"/> Consider what impact they have.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> CONTRAST is the number 1/most important language technique – it is always in all good writing/extracts – so always look for this & comment on it <input type="checkbox"/> There are 10 key terms to learn for a language question: <input type="checkbox"/> Imagery = Simile, metaphor, personification, alliteration, Adjective, adverb, verb, <input type="checkbox"/> Motif – repeated images or patterns – often colours or ideas – freedom/flight/light <input type="checkbox"/> And the phrase ‘perhaps...’ (allows you to speculate & offer alternative ideas) <input type="checkbox"/> And also the phrases: ‘the effect of this is...’ & ‘the effect of the motif is...’ (don’t be afraid of sounding repetitive, the marks are for comments on ‘effect’ ...not for style!) <input type="checkbox"/> +There will generally be at least one complex sentence used as a list - always find this and refer to it – you don’t need to comment on sentence forms in any other way. <p>Top tips: <i>Pick out individual words afterwards and discuss their effect (not meaning). When you pick out a word/device underline it – so the examiner knows you know which word is the ‘verb’ etc. Track through the extract from start to finish.</i></p>
<p>QUESTION ONE <input type="checkbox"/> straightforward marks <input type="checkbox"/> LIST _ things in lines <input type="checkbox"/> Must be in selected lines <input type="checkbox"/> AO1 - Locate</p>	<p>To answer: <input type="checkbox"/> Read and highlight key words in the question <input type="checkbox"/> Simply select the correct lines from the passage <input type="checkbox"/> Write four short points for the marks</p> <p>Top tips: <i>This is not a trick question. It is easy. Be brief but accurate. Re-read the correct lines from the text.</i></p>

REMEMBER SOAPAIMS?

YOU MAY HAVE BEEN TAUGHT TO USE SOAPAIMS IN YOUR RESPONSE TO SECTION B...THESE ARE THE TECHNIQUES (METHODS) THAT YOU CAN LOOK FOR AND COMMENT UPON IN QUESTIONS 4 & 2

SOAPAIMS.....SIMILE, ONOMATOPOEIA, ALLITERATION, PERSONIFICATION, ADJECTIVES, IMAGERY, METAPHOR, SENSES

THE EXAM
2 Tasks – no choice
Step one: read & highlight key words in question one
Step two: read the first poem at least twice & highlight devices
Step three: Write a mini-intro (what the poem is about) then as many analytical paragraphs as possible (use PEETWE/TWE/MEE/MICE). – name devices /pick out words (but do not simply technique spot – instead talk about impact)
Step four: read the second poem at least twice & highlight devices
Step five Write a mini-intro (what the main difference between the two poems is) then as many ‘PEE/PEA/Compares’ as you can - name devices or pick out words . Plus – use connectives : also/additionally/both/whereas/ however/ meanwhile

DO NOT FORGET TO LOOK AT THE TITLE – SOMETIMES THIS CAN BE VERY IMPORTANT BUT IS OFTEN OVERLOOKED!

DO NOT FORGET YOUR HIGHLIGHTERS FOR THIS QUESTION!

UNSEEN POETRY	
<i>Example question and how to get top marks (20% of final English Literature GCSE)</i>	
Both unseen poems will be printed on the question paper.	
<p>Q1 - In ‘To a Daughter Leaving Home’, how does the poet present the speaker’s feelings about her daughter?</p> <p>Q2 - In both ‘Poem for My Sister’ and ‘To a Daughter Leaving Home’ the speakers describe feelings about watching someone they love grow up. What are the similarities and/or differences between the ways the poets present those feelings?</p>	
AO1 (Question one only)	<input type="checkbox"/> Critical, exploratory conceptualised response to task and text <input type="checkbox"/> Judicious use of precise references to support interpretation(s)
AO2 (Question one and two)	<input type="checkbox"/> Analysis of writer’s methods with subject terminology used judiciously <input type="checkbox"/> Exploration of effects of writer’s methods on reader

POETRY DEVICES – STRUCTURE (DEVICES IN BOLD = PASS. OTHER DEVICES WILL SET YOU ON THE PATH FOR A STRONGER PASS)	
Chronological	In order of time
Caesura	A big break in the middle of a line
Enjambment	A sentence runs over more than one line
Iambic pentameter	5 sets of weak/strong beats in a line
Juxtaposition	Two opposites
Layout	Position of lines/words on the page
Anaphora	Repeated first few words at start of lines
Oxymoron	Two opposite words next to each other
Rhyme scheme	The organisation of the rhyme
Rhyming couplet	Two lines that rhyme next to each other
Rhythm	The beat
Stanza/Verse	A paragraph in a poem
Volta	The turning point of a poem
Repetition	Something repeated

**POETRY DEVICES – LANGUAGE
(DEVICES IN BOLD – FOR A PASS)**

Abstract	An idea rather than a real thing
Alliteration	Repeated first letter or sound
Antagonist	Evil main character
Assonance	Repeated vowel sound – soft sounds
Authentic	Seems genuine/truthful
Cliché	Over-used phrase
Consonance	Repeated consonant sound
Concrete	A solid/real example
Colloquial language	Local/casual language
Emotive	Makes you feel emotional
Euphemism	Alternative words to make something nasty sound more pleasant
Extended metaphor	A series of metaphors all relating to each other
Half rhyme	Nearly rhymes – indicates that something is not quite right
Hyperbole	Exaggeration
Imagery	Something used to describe something else
Internal rhyme	Rhyme that is on the same line
Irony	Sarcasm
Metaphor	Something is described as being something else
Mood	Atmosphere
Onomatopoeia	A verb sounds like what it does
Personification	A non-human thing is given human qualities

**DO NOT MIX
THESE WORDS UP:**
 Poet/speaker/
 narrator/persona/ writer/
 character

**POETRY DEVICES – LANGUAGE (continued)
(DEVICES IN BOLD – FOR A PASS)**

Plosive	Alliteration using letters p/t/k/b/d/g. Harsh sounds.
Protagonist	Good main character
Question	Asks something – usually rhetorical question
Rhyme	Words that sound the same
Semantic field	Words that are about the same thing
Sibilance	A repeated s sound (hissing sound)
Simile	Something is described as being like/as something else to describe it
Symbol/ symbolism	Something that represents something else
Tone/Voice	Emotion
POETRY DEVICES – FORM	
Auto-biographical	About the poet
Ballad	Story poems– often 4 lines stanzas
Blank verse	Verse with no rhyme – usually 10 syllables
Dramatic monologue	A character speaks to the reader
Epic	Tragic/heroic story poems
Free verse	No regular rhyme/rhythm
Lyrical	Emotional and beautiful
Narrative	A story
Ode	Lyrical poem often addressed to one person
Phonetic spelling	Written like it sounds
Sonnet	14 lines, ababcdcdefefgg, Often love poem

Year 10 Maths

Simplify

Simplify the given expression.



Simplify fully

Simplify the given expression. Answer must be given in its simplest form.



Factorise

Insert brackets by taking out common factors.



Factorise fully

Insert brackets by taking out **all** the common factors.



Expand

Remove brackets.



Expand and simplify

Remove brackets and then collect like terms.



Command Words in Maths questions

These words are the clue to what the examiner expects you to do. Remember to always show your workings. You can get marks for it, even if you get the final answer wrong.

TECHNICAL VOCABULARY

Factor	A number which divides exactly into another.
Multiple	A multiple is a number made by multiplying two other numbers.
Prime	A prime number has exactly two factors.
Integer	The positive and negative whole numbers.
Estimate	Usually a calculation where the numbers have been rounded before the operation is performed.
Index (indices plural)	An index is a power or exponent.
Square root	Is the number that was multiplied by itself to get the square number.
Square number	Is a number that has been multiplied by itself.
Cube number	Is a number that is multiplied by itself then again by the original number.
Cube root	Is the number that was multiplied by itself and itself again to get the cube number
Numerator	The number on the top of the fraction. Shows how many part there are.
Denominator	The number on the bottom of the fraction. Shows how many equal parts the item is divided into.
Common denominator	When two or more fractions have the same denominator.
Equivalent	Having the same value
Inverse	The opposite mathematical operation.
Reciprocal	The number produced by dividing 1 by a given number
Odd	An integer that cannot be divided exactly by two.
Even	An integer that can be divided exactly by two.

Calculate

A calculator and some working will be needed.



Find

Some working will be needed to get to the final answer.



Work out

Some working will be needed in order to get the answer.



Explain

Write a sentence or a mathematical statement to show how you got to your answer or reached your conclusion.



Describe

Write a sentence that gives the features of the situation.



Complete

Fill in missing values.

x	y
-1	-3
0	1
2	3
5	5

Give a reason

Must be clear and accurate reasons. If the reasons are geometrical then make sure you:

- provide a reason for each stage of working (if required)
- use correct geometric terminology.

Express

Re-write in another form, some working may be needed.



Justify

Show all working and/or give a written explanation.



Solve

Find the solution of an equation or inequality.



Solve algebraically

Find the solution of an equation or inequality; algebraic manipulation **must** be shown.



Prove

More formal than 'show', all steps must be present. In the case of a geometrical proof, reasons must be given.



Prove algebraically

Use algebra in the proof.



Draw

Produce an accurate drawing (unless a sketch is being drawn).



Draw a sketch of... Sketch

Produce a drawing that does not have to be drawn to scale or a graph that is drawn without working out each coordinate.



Change

Usually convert from one unit to another; either using known metric unit conversions or the use of a conversion graph.



Show

All working needed to get to a given answer or complete a diagram to show given information.



Websites to help you with understanding and revision

SparxMaths.com

CorbettMaths.com

Trafalgar Maths Site

Mathsgenie.co.uk

Maths Bot



Probability uses numbers to calculate or predict the chance of something happening in the future.

Vocabulary: Probability, Probability Scale, Relative frequency, Theoretical Probability, Dependent Events, Independent Events, Sample Space, Venn diagrams,

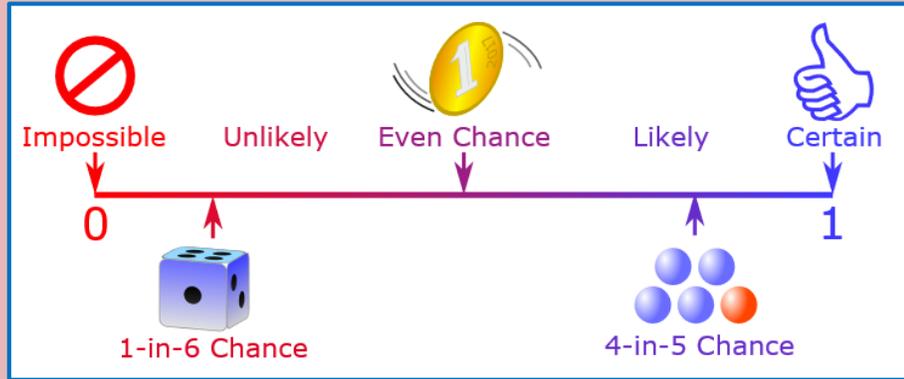
Sparx: GCSE U803

Skills you will need: Addition, Subtraction, Multiplication of Fractions

A **Probability Scale** is used to describe all probabilities, or how likely they are to happen

If an event is **Certain** its probability is 1
Boxing Day will follow Christmas Day in December

If an event is **Impossible** its probability is 0
You will grow to be 5m tall



An event has a probability **Evens** if the two outcomes are equally likely
Flipping a coin and getting heads. The probability of getting a head is ½ or 50%

Sparx: GCSE U408, U510

Likely describes the probability of an event which is more than evens chance but not certain.
You roll a die and get a number greater than 2

Unlikely describes the probability of an event which is less than evens chance but not impossible.
I choose a letter from the word RAIN and pick the A

Relative Frequency (Experimental Probability)
This is the estimated probability based on the results of an experiment.
I surveyed 50 birds landing on my bird table. 18 of them were bullfinches.
The experimental probability of the next bird landing on my bird table being a bullfinch is 18/50 or 36%
The more trials that are performed, the more reliable the results will be.

Sparx: GCSE U580

Addition and Subtraction:

- Find the LCM of the denominators
- Convert them to their equivalent fractions where the denominators are the same
- Once the fractions have the same denominator you can add or subtract the numerators. The denominator stay the same.
- Simplify if you can

Multiplication:

- Cancel any of the numerators with any of the denominators by finding common factors.
- Multiply the numerators together and the denominators together.

$$\frac{2}{9} + \frac{1}{5}$$

LCM of 9 & 5 is 45

$$\frac{10}{45} + \frac{9}{45} = \frac{19}{45}$$

$$\frac{2}{9} - \frac{1}{5} = \frac{1}{45}$$

Check why

$$\begin{array}{r} 1 \\ \cancel{2} \times \frac{\cancel{6}}{\cancel{8}} \\ 3 \qquad \qquad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \qquad 2 \\ \cancel{2} \times \frac{\cancel{6}}{\cancel{8}} = \frac{2}{4} = \frac{1}{2} \\ \cancel{2} \qquad \cancel{8} \qquad 4 \qquad 2 \\ \hline 1 \qquad 4 \end{array}$$

The probability of an event happening is always greater than or equal to 0 (Impossible) but less than or equal to 1 (Certain)

0 ≤ probability ≤ 1

Sparx: GCSE U736,U793, U475

Year 10 Maths Term 3/4 Probability 2

A **Sample** is a selection of items from a population.
 Your sample could be a selection of 20 pupils from your year group.

The larger the **sample size** or the more times you repeated a trial the closer your probability will be to the true probability.

A **Sample Space** is way of recording the outcomes of two events

Sparx: GCSE U104

This **sample space** records all the possible outcomes of a game of rock, paper scissors

	ROCK	PAPER	SCISSORS
ROCK	RR	RP	RS
PAPER	PR	PP	PS

Theoretical Probability is a number between 0 and 1 representing the probability of something happening.

Number of favourable outcomes
 Total number of outcomes

Sparx: GCSE U408

To find the **Expected outcomes** multiply the probability by the number of trials.
 The probability of a team winning is 0.3. How many games can they expect to win in a season of 24 games?

$0.3 \times 24 = 8$ 8 games

Sparx: GCSE U166

More Vocabulary:
 Sample, Sample size, Probability notation, Expected outcomes, Mutually Exclusive Events, Exhaustive Events, Tree Diagrams

Probability Notation
 P(X) refers to the probability of X occurring
 P(Red, two) refers to a red two picked from a pack of cards

Events are **Mutually Exclusive** if they cannot happen at the same time
 Getting Heads or Tails on a coin
 Turning Left or Right

Sparx: M755

Events are **Exhaustive** if they cover the entire range of possible outcomes
 When you flip a coin the outcomes Heads and Tails are exhaustive because they cover all the possible outcomes
 The probabilities of an exhaustive set of outcomes total 1.

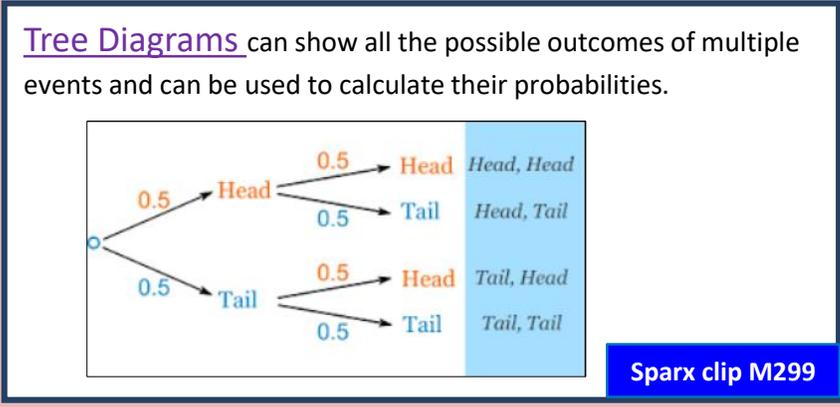
Therefore if: **The P(Success) = 0.9** then **The P(Failure) = 1 - 0.9 = 0.1**

An **Independent Event** is when the probability of one event does not depend on the outcome of another event.
 If I flip a coin the probability of getting a Head is 0.5.
 The probability will not change for any subsequent flipping of the coin.

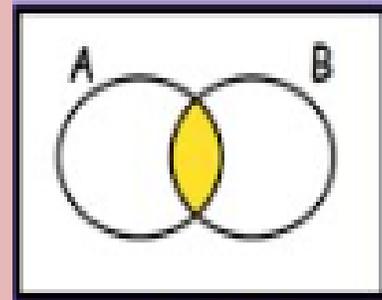
Sparx: GCSE U558

Dependent Events. This is when the probability of one event depends on the outcome of another.
 If I wake up late the probability of being late for school increases.

Sparx: GCSE U727



Sparx clip M299

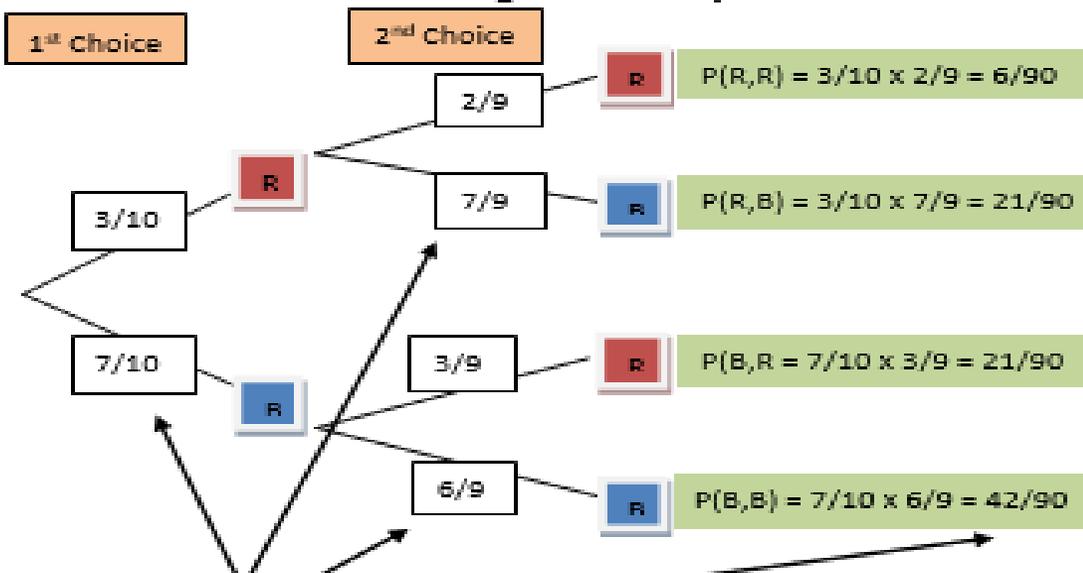


Sparx clips M829 & M419

Venn Diagrams can be used to show the relationship between multiple groups of things and how they overlap.
 These diagrams can be used to calculate probabilities

Combining Probabilities: If you want to find the the probability of more than one thing happening you will need to multiply the probabilities.

Tree Diagrams There are 3 Red Balls and 7 Blue Balls in a bag. Balls are taken from the bag and not replaced.



Branches total 1

$P(\text{Choosing at least one red}) = 6/90 + 21/90 + 21/90 = 48/90$

Corbett Maths Video 252

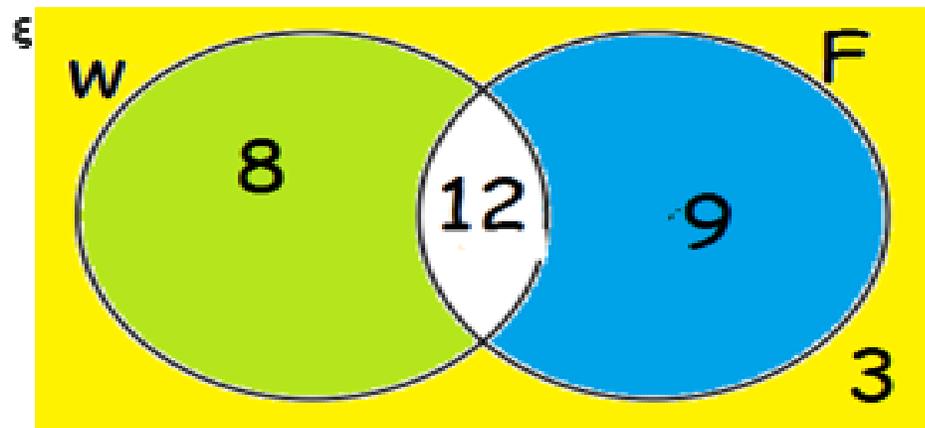
Sparx: GCSE U558, U727, U806

Venn Diagrams

Corbett Maths Video 380

Sparx: GCSE U476, U748, U699

ξ : 32 pupils in a class
 W: pupils who walk to school
 F : pupils who like football



$P(W \cap F) = 12/32$ $P(W \cap F') = 8/32$
 $P(W' \cap F') = 3/32$ $P(W \cup F)' = 3/32$

Two way Tables - Holidays

Sparx: GCSE U981

	Spain	France	Other	Total
June	5	19	3	29
July	12	17	3	32
August	17	15	7	39
Total	34	51	15	100

What is the probability that a person selected at random

Went to France on holiday?	51/100
Did not visit either Spain or France?	15/100
Went on holiday in July?	32/100
Went to Spain in June?	5/100

Sequences

A sequence is a series of numbers (or pictures) that follows a pattern or rule.

Each number or item in a sequence is called a **term**.

Term-to-Term rule – the “rule” that gets you from one number in a sequence to the next.

Position-to-Term – the “rule” that enables you to calculate the **value** of a term **at any given position** or place in the sequence. It is sometimes called the **general rule** or, most commonly, the **n^{th} term rule**.

“**n**” is the **position of a term** in the sequence it must **ALWAYS** be an **integer**

Types of sequence:

Sparx Maths: GCSE U213,U206, U680, U958

There are different types of sequence each of which is identified by how their pattern continues:

- **Linear (or arithmetic) sequences**
- **Quadratic sequences**
- **Geometric sequences**

Common special sequences include:

- **Fibonacci** – type sequences
- Sequence of **Squares** (quadratic)
- Sequence of **triangular numbers** (quadratic)

Examples:

Linear 2, 4, 6, 8, 10, 12, 14

Quadratic 1, 4, 9, 16, 25, 36

Geometric 2, 6, 18, 54, 162

Fibonacci 1, 1, 2, 3, 5, 8, 13, 21, 34, 55

LINER /ARITHMETIC SEQUENCE

Key property: linear sequences increase or decrease by the same amount each term.

So to get from one term to the next you will **add or subtract the same amount**.

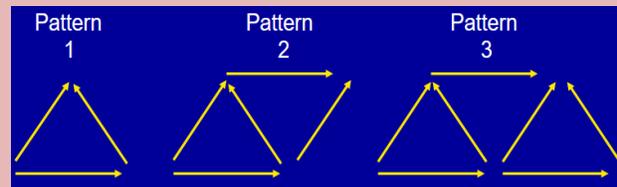
All the multiplication times-tables are linear sequences.

To find nth term rule of a linear sequence:

- 1) Find the **common difference** (“**d**”) – the same amount added or subtracted each time.
- 2) This is the base times-table – so the nth term rule will include “**dn**”
- 3) Adjust to the sequence you want: what do you need to add or subtract from **1d** to get the starting number?
eg **3, 5, 7, 9** => adjustment $1 \times 2 = 2$ so must $+1 \Rightarrow 2n + 1$ and **7, 5, 3, 1** => adjustment $1 \times (-2) = -2$ so must $+9 \Rightarrow -2n + 9$ (or $9 - 2n$)

UNDERSTANDING PICTURE PATTERNS

Reduce a picture pattern to numbers
– use a table of values to help you e.g.



Pattern Number (n=...	1	2	3	4
Total arrows (Sequence=...	3	5	7	?!)
nth term rule => $2n + 1$				

USING THE Nth term RULE

What is the difference between the 6th and 8th term of the sequence $5n - 2$?

Remember: for linear sequences (**d**) (difference) is always the same:– here **d=5** as sequence is based on the 5x table.
There are two “jumps” from 6th to 8th term so difference between their values will be **$2 \times 5 = 10$**

**A sequence has a rule: $5n - 2$
Is the term 72 in the sequence?**

Remember: for **any** sequence “**n**” represents a term’s position and **MUST be an integer**.
Form and solve an equation ie.:
Here **n is not an integer so 72 is not a term**

$$\begin{aligned} 5n - 2 &= 72 & (+2) \\ 5n &= 74 & (\div 5) \\ n &= 14.8 \end{aligned}$$

QUADRATIC SEQUENCES

Key property: quadratic sequences increase or decrease by a different amount each term – but the difference between the differences is always the same....so to get from one term to the next you will **add or subtract the previous difference plus a same extra amount** each time.

The “base” quadratic sequence is the sequence of square numbers: 1, 4, 9, 16.....

Sparx Maths: GCSE U206, U530

To find nth term rule of a linear sequence:

- 1) Find 1st and then 2nd differences between the terms
- if the 2nd difference is the same
the sequence is quadratic and rule will include n^2
- 3) Half the 2nd difference to get coefficient (number) of n^2
- 4) Subtract each term of the new n^2 sequence from the original
- 5) Find the nth term rule of the adjustment
- 6) Combine both elements for final rule

Example: **Foundation**

Find the nth term rule of the sequence: 2, 5, 10, 17, 26.....

Original	2	5	10	17	26
1 st difference	+3	+5	+7	+9	
2 nd difference		+2	+2	+2	
2 nd difference is same so sequence is quadratic (n^2) Half of second difference is 1: rule must include $1n^2$					
n^2	1	4	9	16	25
Adjustment (Original – new)	+1	+1	+1	+1	+1

The nth term of the original sequence must be $n^2 + 1$

Example: **Foundation / Higher Crossover**

Find the nth term rule of the sequence: 0, 6, 16, 30, 48....

Original	0	6	16	30	48
1 st difference	+6	+10	+14	+18	
2 nd difference		+4	+4	+4	
2 nd difference is same so sequence is quadratic (n^2) Half of second difference is 1: rule must include $2n^2$					
$2n^2$	2	8	18	32	50
Adjustment (Original – new)	-2	-2	-2	-2	-2

The nth term of the original sequence must be $2n^2 - 2$

Example: **Higher**

Find the nth term rule of the sequence: 0, 6, 16, 30, 48....

Original	3	9	17	27	39
1 st difference	+6	+8	+10	+12	
2 nd difference		+2	+2	+2	
2 nd difference is same so sequence is quadratic (n^2) Half of second difference is 1: rule must include $1n^2$					
$1n^2$	1	4	9	16	25
Adjustment (Original – new)	+2	+5	+8	+11	+14

Find the nth term rule for this adjustment as for any linear sequence: $3n - 1$

The nth term of the original sequence must be $n^2 + 3n - 1$

GEOMETRIC SEQUENCES

Key property: geometric sequences increase or decrease by the scale factor each term

So to get from one term to the next you will **multiply (or divide) by the same amount**.

This value is called the **common ratio** and found by dividing one term by the term before

$ar^{(n-1)}$ is the general rule of **all** geometric sequences

Where **a** is value of the first term of the sequence

r is the common ratio between each term

and **n** is (as ever) the position of a term

As such geometric sequence growth is **exponential**

To find nth term rule of a geometric sequence:

- 1) Identify the first term
- 2) Find common ratio between terms - **divide the value of a term by term before**.
- 3) Substitute into the general form $ar^{(n-1)}$ - **simplify as needed**

Understanding the nth term rule:

Example: Starting at 1 create a sequence where each term is 3 times more than the last:

Position (n = ...)	1	2	3	4	5
Starting term (a =	1				
Common ratio (r =		x3	x3	x3	x3
Sequence:	1	3	9	27	81

So to calculate the 5th term, you would have to start with 1 then multiply by 3 4 times in total i.e. $1 \times 3^4 \dots$ and whatever term you want to calculate you need to apply the "r" 1 less times than its position i.e. $1 \times 3^{(n-1)}$

FIBONACCI-style SEQUENCES

Key property: add the previous 2 terms to get the next term.

The classic Fibonacci sequence is 1, 1, 2, 3, 5, 8, 13, 21 i.e. 1, 1, (1+1=2), (2+1=3), (3+2=5), etc

Fibonacci-style sequences are based on this term-to-term rule but may start at different points:

e.g. starting at 4,5 \Rightarrow 4, 5, 9, 14, 23, 37

So for any starting point a and b \Rightarrow a, b, (a+b), (a+2b), (2a+3b), (3a+5b), etc...

Year 10 Maths Term 3 & 4 – Ratio, Proportion and Proportionality

What do I need to be able to do?

- Use fractions and percentages to describe a proportion of an amount
- Calculate percentage increases and decreases using multiplication
- Solve problems involving percentage change including repeated proportional change
- Find the original value of a quantity after a percentage increase or decrease
- Set up solve and interpret growth and decay problems including compound interest
- Divide a quantity in a given ratio and reduce a ratio to its simplest form
- Calculate unit ratios and recognise scale factors and maps scales as a unit ratio
- Understand direct proportion in “real life” scenarios such as recipes, best buys, maps scales and compound measures and use proportionality to solve problems
- Use scale factor to convert between lengths on maps and scale diagrams and distances they represent
- Use, calculate convert between standard units of measure and compound units
- Solve direct and indirect proportion problems
- Describe direct and indirect proportion relationships using equations
- Recognise graphs showing direct and indirect proportion

Key terms:

Proportion: a proportion of an amount can be expressed as a **fraction**, **decimal** or **percentage**. A proportion compares the parts into which an object is divided with total parts ie the whole

Previous learning: Year 9 KO Term 1&2 Fractions decimals and percentages

Ratio:

a ratio shows the relationship between the **parts** into which an object has been divided.

A ratio compares **part to part** (note: ratios are written with a colon (part : part) which is said as the “to”)

Since the ratio only gives information about the relationship between the parts, the total number of equal parts can be calculated by adding these parts together.

Proportionality – pairs of values are **in proportion** if the **multiplicative relationship** between them is the same.

Multiplicative relationships are only the same if **all elements have been multiplied by the same factor**. (Scale factors are most correctly given as a **multiplier** but as multiplying and dividing are inverse operations, dividing by the same number will also mean values are in proportion)

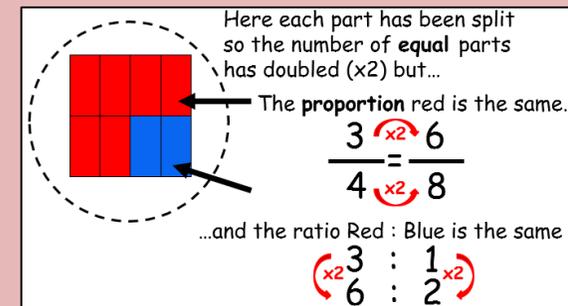
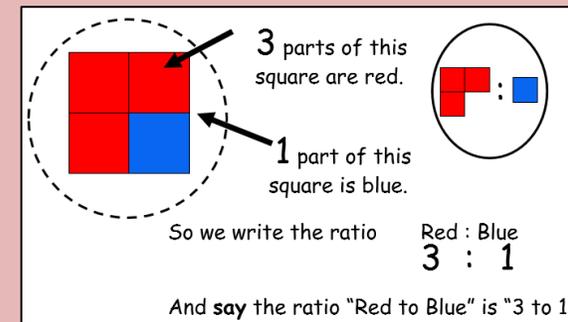
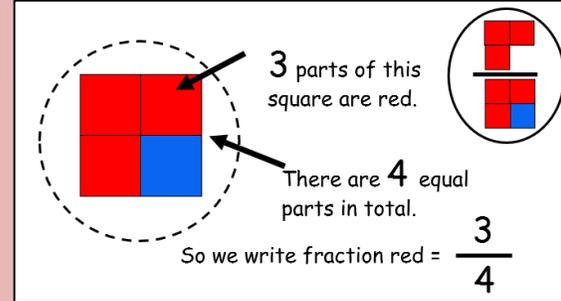
Equivalent fractions and ratios can be calculated like this.

Direct Proportion

Two sets of values are in direct proportion when they **increase (or decrease) by the same ratio (multiplier)**. Direct proportion relationships are commonly used in every day life – for instance calculating the cost of buying multiple single items; scaling up a recipe, calculating distances from maps scales; and using compound measures

Indirect or Inverse Proportion

Two sets of values are in indirect proportion if as **one increases, the other decreases** by the opposite proportion so if 2 people build a wall in 5 days, it will take 4 people 2½ days (double workers half the time) but 1 person 10 days (half workers double time)



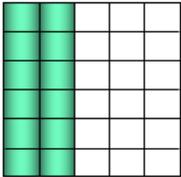
Express a quantity as a proportion of another

Sparx GCSE U278

Key fact: fractions show part "out of" a whole – so start by rewriting any quantity comparison as a fraction...

Sparx GCSE U163

Example 1: What proportion of this diagram is shaded?



Answer
 $\frac{12}{30} = 40\%$

Give your answer as a percentage

Step 1: Consider proportion: 12 parts out of 30 total

Step 2: Write as a fraction: $\frac{12}{30}$ and simplify $\frac{12^{(-3)}}{30^{(-3)}} = \frac{4}{10}$

Step 3: Calculate as a percentage

either rewrite "out of 100" $\Rightarrow \frac{4}{10} \times 100 = 40$

or find proportion of 100% $\Rightarrow \frac{4}{10} \times 100\%$

Remember: Units of measure **must be the same** when writing one quantity as a proportion of another

Example 2: What proportion of 12metres is 150cm?

Step 1: write as values **with the same units**

so use values either in metres: 12m and 1.5m

or in centimetres: 1200cm and 150cm

Step 2: Write as a fraction and simplify (to correct form)

either $\frac{1.5}{12} \times 100$ or $\frac{150}{1200} \Rightarrow \frac{15}{120} = \frac{1}{8}$

Check: You have the values correctly written in the fraction: (numerator) compared to or as a proportion of (denominator)

Example 3: Chris earns £320 per week. Rudy earns £400

What proportion of Rudy's wages does Chris earn?

"of Rudy's" means Rudy is denominator: $\frac{320}{400} = \frac{80}{100} = 80\%$

What proportion of Chris's wages does Rudy earn?

"of Chris's" means Chris is denominator: $\frac{400}{320} = \frac{5}{4} = 125\%$

(When comparing quantities percentages can be more than 100% - it just shows that a quantity is bigger than the original)

Finding the change in proportion – finding profit or loss

Key fact: this is in effect the same as expressing a value as a proportion of another. Most care needs to be taken over what value is to be written as a proportion of what.

$\frac{\text{Change in value}}{\text{Original value}} \times 100\%$ or simply $\frac{\text{NEW}}{\text{OLD}} \times 100\%$

Example 1: Sam buys a picture for £1300 and sells it the following year for £1650.

What is his percentage profit (to 2 sig fig)?

Change in value $1650 - 1300 = \text{£}350$;

ORIGINAL value £1300

Percentage change = $\frac{350}{1300} \times 100\% = 27\% \text{ (2sf)}$

Example 2: Sam buys a car for £15750 and sells it five years later £10000. What is the percentage change in value of the car?

Change in value $15750 - 10000 = \text{£}5750$;

ORIGINAL value £15750

Percentage change = $\frac{5750}{15750} \times 100\% = 38\% \text{ (2sf)}$

See Previous learning: Year 9 KO Term 1&2
Fractions decimals & percentages

Finding a proportion of an amount

Remember: "finding a proportion of" = multiply by proportion

Example 1: Find $\frac{3}{4}$ of £320

Method 1 - find $\frac{1}{4}$ of amount then scale up ($\times 3$)

$\frac{1}{4} \Rightarrow \div 4 \Rightarrow 320 \div 4 = \text{£}80$

$\frac{3}{4} \Rightarrow 3 \times \frac{1}{4} \Rightarrow 80 \times 3 = \text{£}240$

Method 2 - (cancel and) multiply fraction

$\frac{3}{4} \times \frac{320}{1} = \text{£}240$

Method 3 - Calculator: find and use the fraction button and multiply

Example 2: Find 60% of £320

Method 1 - **Non-calculator**

combine values for "easy" percentages

$10\% = \frac{1}{10} \Rightarrow \div 10 \Rightarrow 10\% \equiv \text{£}32$

$50\% = \frac{1}{2} \Rightarrow \div 2 \Rightarrow 50\% \equiv \text{£}160$

$60\% = 50\% + 10\% \Rightarrow 60\% \equiv \text{£}192$

Method 2 - **Calculator**

Convert to a decimal and multiply

$60\% = 0.6 \Rightarrow 0.6 \times \text{£}320 = \text{£}192$

Increase or decrease an amount by a proportion

Sparx GCSE
U773, U671

Non-calculator method - find the required proportion then add or subtract from original

Calculator method (%) - convert to a **decimal multiplier** and multiply by the original amount

- **to increase:** decimal multiplier will be >1 ($100\% + \% \text{increase} / 100$)

- **to decrease:** decimal multiplier will be <1 ($100\% - \% \text{decrease} / 100$)

Example 1: Increase £450 by 20%

Answer will be $100 + 20\% = 120\%$ of original

Decimal multiplier $\Rightarrow 120/100 = 1.2$

Calculation: $\text{£}450 \times 1.2 = \text{£}540$

Example 2: Decrease £450 by 20%

Answer will be $100 - 20\% = 80\%$ of original

Decimal multiplier $\Rightarrow 80/100 = 0.8$

Calculation: $\text{£}450 \times 0.8 = \text{£}360$

Repeated proportional change

Key fact: This means you need to find a proportion of a proportion of a proportion (of an amount) etc. As “of” means multiply, you will need to multiply all proportions (and the amount) together:

Example 1: There are 800 pupils in the school.
 $\frac{5}{8}$ of pupils are girls. $\frac{1}{2}$ of girls study Spanish.

i) How many girls study Spanish?

Need to find: $\frac{1}{2}$ of $\frac{5}{8}$ of 800 pupils

Calculation: $\frac{1}{2} \times \frac{5}{8} \times 800 = 250$ girls study Spanish

ii) What proportion of pupils are girls who study Spanish?

Either: express as a fraction of an amount: $\frac{250}{800} = \frac{5}{16}$

Or find $\frac{1}{2}$ of $\frac{5}{8} \Rightarrow \frac{1}{2} \times \frac{5}{8} = \frac{5}{16}$

Sparx GCSE
U773, U671

For repeated percentage change use decimal multipliers:

Example 2: Sam earns £1500 per month
 Sam spends 85% of this paying bills. His rent bill makes up 70% of all money paid on bills.

i) How much does he pay in rent each month?

Need to find: 70% of 85% of £1500

For percentages - use decimal multiplier

Calculation: $0.7 \times 0.85 \times 1500 = \text{£}892.50$

ii) What proportion of his income goes on rent?

Calculation: $0.7 \times 0.85 = 0.595 = 59.5\%$

Remember: fraction decimal & percentages can be equivalent – so chose “easiest” format:

Example 3: Sam pays £175 in utility bills each month. 80% of this is his gas and electricity of which $\frac{1}{4}$ is for the gas.

i) How much is his **electricity** bill each month?

Need to find: $\frac{3}{4}$ of 80% of £175

Either as fraction: $\frac{3}{4} \times \frac{4}{5} \times \text{£}175 = \text{£}105$

Or % (as multiplier): $0.75 \times 0.8 \times \text{£}175$

ii) What proportion of his bills is for electricity?

Calculation: $0.75 \times 0.8 = 0.6 = 60\%$

Simple Interest and Compound interest

Simple Interest is paid JUST on the original value. The amount received will be the SAME each year.

Example 1: A bank offers simple interest at 3% per annum [means 3% each year]
 Charley invests £500 for 5 years.

i) How much interest does she get in total?

Need to find: 5 x value for 1yr (3% of £500)

Calculation: $5 \times 0.03 \times 500 = \text{£}75$

ii) How much is in her bank account?

Need to find: Add interest to original amount

Calculation: $75 + 500 = \text{£}575$

Sparx GCSE U553

Compound interest is paid on the original amount AND any interest already received. The amount will increase each year. This is the form of interest most commonly given by banks.

Non Calculator Method

Example 2: A bank offers compound interest at 5% per annum. Charley invests £500.

i) Calculate the value of the investment after 2 years?

Year 1 Need to find: 5% of £500 and add onto £500

Calculation: $\text{Original} + 5\% = \text{£}500 + \text{£}25 = \text{£}525$

Year 2 Need to find: 5% of £525 and add onto £525

Calculation: $5\% \text{ of } \text{£}525 = \text{£}26.25$

Total investment = £525 + £26.25 = £551.25

ii) How much more does she get from compound interest than if simple interest of 5% had been given?

Need to find: 2 x (value of interest for 1 year)

Calculation: $2 \times \text{£}25 = \text{£}50$ interest accrued in 2

years so Charley has £1.25 more with compound interest than with simple interest only.

[Exponential Growth and Decay]

Compound interest is normally a calculator paper topic.

Formula for compound interest:

£Original x decimal multiplier^(time)

Example 3: A bank offers compound interest at 3% per annum. Charley invests £500 for 5 years.

i) How much is Charley's investment after 5 years?

Investment will be worth 103% after 1 year

Need to find: repeated percentage increase of 103%

Calculation: $1.03 \times 1.03 \times 1.03 \times 1.03 \times 1.03 \times 500$

or: $1.03^5 \times 500 = \text{£}579.64$ (2dp)

ii) How much interest did she get?

Need to find: Subtract original from total investment

Calculation: $579.64 - 500 = \text{£}79.64$

Note: Compound interest and depreciation (growth and decay) is a form of geometric sequence (General rule : $ar^{(n-1)}$)

Depreciation occurs when a value decreases by given proportion each year – so is calculated like compound interest but percentage decimal multiplier will be less than 1

Example 4: Sam buys a car for £15000.

The car depreciates by 15% each year.

What is the value of the car after 3 years?

Car will be worth $100\% - 15\% = 85\%$ after 1 year

Need to find: repeated percentage decrease of 85%

Calculation: $0.85 \times 0.85 \times 0.85 \times 15\,000$

or: $0.85^3 \times 15000 = \text{£}9211.88$ (2dp)

Reverse proportions :

Sparx GCSE U286

Finding the original amount after a proportional change

Key fact: this is the inverse process of finding a proportional increase or decrease.

Original \rightarrow multiply by proportional change \rightarrow New value

Original \leftarrow DIVIDE by proportional change \leftarrow New value

Eg "Increase £100 by 10%" problem: $\text{£100} \rightarrow \times 110\% \rightarrow \text{£110}$

"Find original amount" problem: $\text{£110} \leftarrow \div 110\% \leftarrow \text{£100}$

DO NOT just find the same proportion of the new value :-

Increase £100 by 10%: $\text{£100} \rightarrow \times 110\% \rightarrow \text{£110}$

but decreasing £110 by 10% $\text{£110} \rightarrow \times 90\% \rightarrow \text{£99}$

... does not get back to the same value. Remember proportion is relative to the "total" ... and this is different in both cases!

Fractions:

See Year 9 KO
Term 1&2

Divide fractions
= multiply by
reciprocal: KFC"

Example 1: In May, a shop decreased the price of a certain brand of t-shirt by $\frac{1}{4}$ to £15. What was the price of the t-shirts before the decrease?

A decrease by $\frac{1}{4}$ means £16 is $\frac{3}{4}$ of the original

Process to decrease: Original $\rightarrow \times \frac{3}{4} \rightarrow \text{£15}$

So reverse to find Original $\leftarrow \div \frac{3}{4} \leftarrow \text{£15}$

Calculation: $\text{£15} \div \frac{3}{4} = \text{£15} \times \frac{4}{3} = \text{£20}$

Example 2: In May, a shop increased its sales income by 15% to £1840 per month. What was its monthly sales before the increase?

An increase of 15% means £1840 is 115% of original

Process to increase: Original $\rightarrow \times 1.15 \rightarrow \text{£1840}$

So reverse to find Original $\leftarrow \div 1.15 \leftarrow \text{£1840}$

Calculation: $\text{£1840} \div 1.15 = \text{£1600}$

Percentages:

(Calculator
Method)

Non-calculator: The amount after an increase or decrease in value is in direct proportion to the proportional change applied to the original... so use ratio techniques to scale up or down as required. So see using ratios to solve real life problems....

Ratio

Sparx GCSE U687,U610

A ratio can be used to compare two quantities: **part to part**.

Once the quantities have been linked, equivalent ratios can be found by scaling up both parts by a common multiple or simplified by dividing by common factors (much like equivalent and simplified fractions).

Example 1: Harry is 120cm tall; George is 140cm. Express Harry's height to George's as a ratio in its simplest form

Harry : George $\rightarrow \div 20 \left(\begin{array}{l} 120 : 140 \\ 6 : 7 \end{array} \right) \div 20$
Simplify ($\div 20$)

Example 2: This year the ratio between Tom and Henry's age will be 2 : 7. If Tom is 10, how old is Henry?

Tom : Henry $\rightarrow \times 5 \left(\begin{array}{l} 2 : 7 \\ 10 : 35 \end{array} \right) \times 5$
Scale up ($\times 5$)
If Tom is 10, then Henry is 35 years old.

- Make sure the ratio is written in the correct order for the question:

Harry : George
6 : 7

George : Harry
7 : 6

These are actually different ratios.

- Quantities must be in the same units when put into ratio form
- In ratio form, quantities do not contain any units... but units may need to be used when interpreting the ratio in context.

Ratios in Simplest form

Like fraction, simplify by dividing by the **highest common factor**. Simplest form ratios only include integer values.

Example: Simplify $50 : 75$
 $\div 25 \left(\begin{array}{l} 50 : 75 \\ 2 : 3 \end{array} \right) \div 25$

Unit Ratios

A unit ratio is one in the form **1 : n**. This is often called a **scale**. Note: as the first value must be 1, unit ratios can include decimals.

Example: Write $30 : 90$
as a unit ratio: $\div 30 \left(\begin{array}{l} 30 : 90 \\ 1 : 3 \end{array} \right) \div 30$

Scale diagrams and Maps are the most common form of unit ratios.

Sparx GCSE U257

Map scales give the scale factor between lengths linked on the map and in real life

Remember – map scales are:

- always written **Map : Real** distance
- always given in the **same units (cm)**

Convert the scale or answer to useable units

Example: On a map the distance two points is 4.5cm. What is the actual distance if the map's scale is **1 : 100000** ?

Scale means: $1 \text{ cm} = 100000 \text{ cm}$
 $= 1000 \text{ m}$
 $= 1 \text{ km}$

so $\times 4.5 \left(\begin{array}{l} 4.5 \text{ cm} = 4.5 \text{ km} \end{array} \right) \times 4.5$

Dividing in a given ratio

Sparx GCSE U577, U753

The TOTAL number of parts a quantity is divided into can be found by adding the elements of a ratio. This total will scaled up in the same way as the parts – and this can be used to see how a quantity may be divided in a given ratio:

...but be careful to check what information you have been given...

It may be about one of the ratio parts:

Or about the difference between the ratio parts rather than the total!:

Example : Jon and Pat share £350 in the ratio 2 : 5. How much will Jon receive?

$$\begin{array}{l} \text{Jon : Pat} \Rightarrow \text{Total} \\ 2 : 5 \Rightarrow 7 \text{ parts} \\ \text{£100 : £250} \Rightarrow \text{£350} \\ \text{Jon receives £100} \end{array} \quad \begin{array}{l} 350 \div 7 = 50 \\ 1 \text{ part} = \text{£50} \end{array}$$

Example : Yellow and blue paint is mixed in the ratio 3:4. Stan has 20 litres of blue paint and more than enough yellow. How much green paint can he make?

$$\begin{array}{l} \text{Yellow : Blue} \Rightarrow \text{Total Green} \\ 3 : 4 \Rightarrow 7 \\ (15\text{L}) : 20\text{L} \Rightarrow 35\text{L} \end{array}$$

Example : Jon and Karl share some money in the ratio 3 : 7. Karl receives £140 than Jon. How much money did they share?

$$\begin{array}{l} \text{Jon : Karl} \Rightarrow \text{Difference} \Rightarrow \text{Total} \\ 3 : 7 \Rightarrow 4 \text{ parts} \Rightarrow 10 \text{ parts} \\ 140 \div 4 = 35 \Rightarrow \text{£140} \Rightarrow \text{£350} \\ 1 \text{ part} = \text{£35} \quad \text{They share £350} \end{array}$$

What proportion of the money does Karl receive? Give your answer as a percentage

$$\begin{array}{l} \text{Ratio} \quad \text{Jon : Karl} \Rightarrow \text{Total} \\ 3 : 7 \Rightarrow 10 \text{ parts} \\ \text{Proportion} \quad \frac{3}{10} : \frac{7}{10} \\ \text{Karl receives } 70\% \end{array} \quad \begin{array}{l} \frac{7}{10} = 70\% \end{array}$$

Combining ratios and harder ratio problems

Two or more ratios may be combined if they share a common term. Find the lowest common multiple of that common term and scale each ratio up by that factor. Now combine the ratios around the common value

Example : A racecourse has 4 sections A, B, C and D. The distances of each section are in the following ratios

$$\begin{array}{l} \text{A : B : C} \quad \text{C : D} \\ 2 : 3 : 4 \quad 6 : 5 \end{array}$$

Sparx GCSE U753, U921, U676, U865

Calculate the ratio A : B : C : D

Common section C : common multiple of 4 and 6 = 12

$$\begin{array}{l} \text{A : B : C} \quad \text{C : D} \Rightarrow \text{A : B : C : D} \\ \text{x3} \left(\begin{array}{l} 2 : 3 : 4 \\ 6 : 9 : 12 \end{array} \right) \text{x3} \quad \text{x2} \left(\begin{array}{l} 6 : 5 \\ 12 : 10 \end{array} \right) \text{x2} \Rightarrow 6 : 9 : 12 : 10 \end{array}$$

Example: Given that $3x : 4 = 7 : 2$

Calculate the value of x

Link the terms and combine around a common value

$$4 \text{ and } 2 \text{ in the same position so } 3x : 4 = 7 : 2 \Rightarrow 3x : 4 = 14 : 4$$

As ratios are equal then

$$\begin{array}{l} 3x = 14 \\ x = \frac{14}{3} \end{array}$$

Example : What number needs to be added to 5 and 3 so that the ratio of the 1st number to the 2nd becomes 4 : 3

$$\text{Unknown number added to both} \Rightarrow \left(\begin{array}{l} 5 + n : 3 + n \\ 4 : 3 \end{array} \right)$$

The scale factor between needs

to be the same so create equivalent scale factors and solve as a linear equation:

$$\begin{array}{l} \text{Check: } 5 + 3 = 8 \Rightarrow \text{x2} \left(\begin{array}{l} 8 : 6 \\ 4 : 3 \end{array} \right) \text{x2} \\ 3 + 3 = 6 \end{array}$$

$$\begin{array}{l} \frac{5+n}{4} = \frac{3+n}{3} \\ 3(5+n) = 4(3+n) \\ 15 + 3n = 12 + 4n \\ 15 = 12 + n \\ n = 3 \end{array}$$

Writing a ratio as a proportion

As TOTAL number of parts can be found by adding the elements of a ratio, information given as a ratio can easily be converted to a proportion:

Remember fractions show **part** **whole**

And a fraction can then be converted to decimals or percentages as required

Ratio and Direct Proportion – Problem solving

Ratio which can be used to solve many different types of real life problem when two quantities that are in **direct Proportion** – as one increases the other will also increase in the same proportion:

Scaling up recipes

Sparx GCSE U721

Example 1: Nadia wants to make soup for 10.

How much of each ingredient will she need?

4 people → 10 people

Either: (÷2) 2 people + (x2) 8 people

Or $10 \div 4 = 2.5$ (multiply everything by 2.5)

People : Onion : Carrot : Oil : Tomatoes : Stock

$$\begin{array}{r} 4 : 160 : 80 : 1 : 500 : 840 \\ \times 2.5 \quad 2 : 80 : 40 : \frac{1}{2} : 250 : 420 \\ + 8 : 320 : 160 : 2 : 1000 : 1680 \\ \hline 10 \quad 400g \quad 320g \quad 2\frac{1}{2} \quad 1250g \quad 2100ml \end{array}$$

Soup Recipe: (Serves 4)

- 160g onions
- 80g carrots
- 1 tablespoon of oil
- 500g of tomatoes
- 840 ml vegetable stock

Finding Scale factor
 "New" = $\frac{10}{4} \rightarrow 2.5$
 "Old" = 4

Finding "best buys"

Example 2: Two shops have a special on for toilet rolls. Which is the best value for money?

Quik Shop

Bargain Mart

9 rolls for £5.22

8 rolls for £4.72

Calculate a common ratio for both either unit ratios or a common multiple - here 72 (9x8 rolls)

$$\begin{array}{r} \div 9 \quad (9 : £5.22) \div 9 \quad \div 8 \quad (8 : £4.72) \div 8 \\ 1 : £0.58 \end{array}$$

Quik shop is better value (58p per roll) as the price per roll is 1p cheaper than Bargain Mart.

Sparx KS3 M681

Careful you know what your ratio represents – the cost of 1 item or a quantity obtained for £1?

Sparx GCSE U257

Creating scale diagrams

Example 3: Ian is creating a scale diagram of his house. His living room is 3.8m wide. On the scale drawing the living room is 16mm wide. His living room is 4.4m long, how long is it on the drawing?

Link two known variables Width : Length

$$\begin{array}{r} \text{Real life} \quad (3.8 : 4.4) \\ \text{Scale drawing} \quad \times 5 \quad (16 : 22) \times 5 \end{array}$$

Scale factor
 "New" = $\frac{16}{3.8} \rightarrow 5$
 "Old" = 3.8

Understanding and calculating with compound measures

Sparx GCSE U151, U910, U527, U256

Compound measures involve two different units of measure linked in a proportional relationship e.g. Speed (miles per hour) or density (grams per cm²) The compound unit can be seen and treated as a ratio – for instance

Speed: "70 miles per hour" means 70 miles travelled in 1 hour so travelling at this average speed for 3.5 hours you go 245 miles

$$\times 3.5 \quad (70 : 1) \times 3.5 \\ 245 : 3.5$$

Example 1: Gail drives 20 minutes at 48 mph

How far does she travel?

Speed: 48 miles per 1 hour

20 minutes = $\frac{1}{3}$ of an hour

$$\div 3 \quad (48 \text{ miles} : 1 \text{ hour}) \div 3 \\ 16 \text{ miles} : 20 \text{ mins}$$

Best Practise :
 Work in the same units as needed for the compound measure

Example 2: Gail drives 40 minutes and travels 30 miles. What is her average speed?

Link information then scale

Up the time again to 1 hour:

$$\times 1.5 \quad (30 \text{ miles} : 40 \text{ mins}) \times 1.5 \\ 45 \text{ miles} : 1 \text{ hour}$$

Calculating percentages including reverse percentages

Sparx GCSE U286

Percentage of amounts are in proportion: 10% of an amount will be double 5% of the same amount and half 20%! If you are given information linking a percentage of an amount with a value, scale up or down as required.

Example 1: The cost of a train fare increased by 5% A ticket now costs £3.40 extra. How much was the ticket before the increase?

Linked information

Require 100%

The ticket was £68.00 before the increase

$$\times 20 \quad (5\% : £3.40) \times 20 \\ 100\% : £68.00$$

Example 3: In a sale the price of a coat was reduced by 40% The cost now costs £54. What was the price before the sale? Coat is currently at (100%–40%) 60% of its original price

Linked information

$$\div 6 \quad (60\% : £54.00) \div 6 \\ 10\% : £ 9.00 \\ \times 10 \quad (100\% : £90.00) \times 10$$

Example 2: The cost of a bus fare increased by 20% A ticket now costs £15.60 extra. How much was the ticket before the increase?

Ticket is currently 100% + 20% = 120% of original

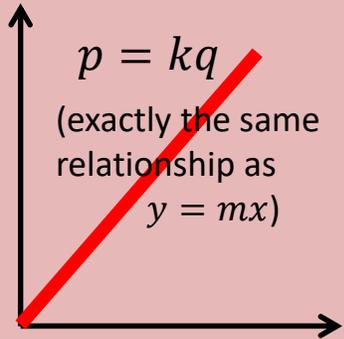
Linked information

Require 100%

The ticket was £13.00 before the increase

$$\div 6 \quad (120\% : £15.60) \div 6 \\ 20\% : £ 2.60 \\ \times 5 \quad (100\% : £13.00) \times 5$$

Solving direct proportion problems algebraically



Variables are in direct proportion if their graph is a straight line cutting through the origin.

Rather than using " $y = mx + c$ " to describe the relationship shown by the line a slightly different notation is used **but the principles are the same...**

The symbol \propto means "is in proportion to" and if variable p is in proportion to q ($p \propto q$) then you can describe the relationship as $p = kq$ where k is a scalar

Example 1:

p is in direct proportion to q .

When p is 15, q is 6

a) Find a formula for p in terms of q

b) Use your formula to find

i) p when $q = 10$

ii) q when $p = 23$

Process: state relationship \rightarrow use framework formula \rightarrow substitution of known values \rightarrow specific formula \rightarrow substitution for required values

If $p \propto q$
then $p = kq$
so $15 = k \times 6$ ($p=15$ and $q=6$)
 $k = \frac{15}{6} = \frac{5}{2}$
a) formula $\rightarrow p = \frac{5}{2}q$
b) i) If $q=10$ then $p = \frac{5}{2} \times 10 = 25$
ii) If $p=23$ then $23 = \frac{5}{2}q$
 $q = \frac{23 \times 2}{5} = 9.2$

Make sure that you check what the key relationship in the question is:

Example 2:

t is in direct proportion to the square of v .

When t is 5, v is 3

a) Find a formula for t in terms of v

b) Use your formula to find

i) t when $v = 1.8$

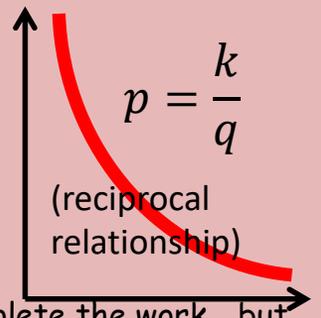
ii) v when $t = 1.25$

Note the process is the same in both examples... what is different is the complexity of the initial relationship

If $t \propto v^2$
then $t = kv^2$
so $5 = k \times 3^2$ ($t=5$ and $v=3$)
 $k = \frac{5}{9}$
a) formula $\rightarrow t = \frac{5}{9}v^2$
b) i) If $v=1.8$ then $t = \frac{5}{9} \times 1.8^2 = 9$
ii) If $t=1.25$ then $1.25 = \frac{5}{9}v^2$
 $v^2 = \frac{9 \times 1.25}{5} = \frac{9}{4}$
 $v = \sqrt{\frac{9}{4}} = \frac{3}{2} = 1.5$

Solving indirect proportion problems

Variables are inversely (or indirectly) proportional when the **PRODUCT** of the variables is constant



Example: Indirect proportion in "real life"

If it takes 8 workers 6 days to build a bridge how many days will it take 12 workers?

The more workers used the shorter the time taken to complete the work... but the total work days will remain the same.

Total work days = 8 workers \times 6 days = 48 work days

If 12 workers were employed: 48 work days \div 12 workers = 4 days

(The change is inversely proportional: the number of workers has been multiplied by 1.5... the number of days has been divided by 1.5)

Solving indirect proportion problems algebraically

Use the same process as for direct proportion – the only change is the initial relationship: the inversely proportional relationship is a reciprocal:

if p is inversely proportional to q then: $p \propto \frac{1}{q}$ and $p = \frac{k}{q}$

Example 3:

F is inversely proportional to d .

When F is 7, d is 8

a) Find a formula for F in terms of d

b) Use your formula to find

i) F when $d = 0.4$

ii) d when $F = 448$

Again take care to check the key relationship. If the question had said " F is inversely proportion to d^2 " then the set up would be: $F \propto \frac{1}{d^2}$

If $F \propto \frac{1}{d}$
then $F = \frac{k}{d} \rightarrow k = F \times d$
so $k = 7 \times 8$ ($F=7$ and $d=8$)
 $k = 56$
a) formula $\rightarrow F = \frac{56}{d}$
b) i) If $d = 0.4$ then $F = \frac{56}{0.4} = 140$
ii) If $F = 448$ then $448 = \frac{56}{d}$
 $d = \frac{56}{448} = \frac{1}{8}$

KS4 Biology: B7 Non-communicable diseases

Key term	Definition
Non-communicable diseases	Are not infectious and cannot be passed from one organism to another .
Carcinogen	Agents that cause cancer or significantly increase the risk of developing cancer.
Ionising radiation	Has enough energy to cause ionisation in the material it passes through, which in turn can make them biologically active and may result in mutation and cancer
Correlation	An apparent link or relationship between two factors .
Causal mechanism	Something that explains how one factor influences another.
Mutation	A change in the genetic material of an organism.
Benign tumour	Growths of abnormal cells that are contained in one area , usually within a membrane, and do not invade other tissues.
Malignant tumour	Invade neighbouring tissues and spread to different parts of the body in the blood where they form secondary tumours . They are also known as cancers .



Health is the state of being free from **illness** or **disease**. It refers to **physical** and **mental** wellbeing.

Disease and lifestyle **risk factors** such as diet, smoking, alcohol consumption and the use of illegal drugs, can all impact the health of a person.

Some conditions are linked with certain lifestyle choices and **causal mechanisms have been proven**:

- **Liver conditions** associated with poor **diet and prolonged excessive alcohol consumption**.
- **Lung cancer** is linked to **smoking**.
- Memory loss, poor physical health and hygiene are associated with the use of illegal or recreational drugs.
- **Obesity and diabetes** are associated with poor diet.

Impact of disease:

- On families: financial cost if a wage-earner cannot work.
- On Local communities: cost of supporting people wither through taxes or by taking care of affected families.
- On the Nation: expense of treating ill people, loss of money earned when large amount of people are ill.
- Globally: economy suffers especially if young people are ill.
- **Non-communicable diseases affect far more people that communicable diseases so have more impact on human and economic levels.**

To study these risk factors, **samples of the population** have been selected to study the correlations. To select the groups, scientists try to find:

- LARGE SAMPLE GROUPS – the more people the more reliable the data.
- Controls:
 - Age
 - Gender
 - Lifestyle (diet, exercise)

Cancer

The result of changes in cells that lead to **uncontrolled growth and division**.

Benign tumour

Usually grow slowly.

Usually grow within a membrane and can be easily removed.

Can cause damage to organs and be life-threatening e.g. brain tumours have no space to grow and can put pressure on the brain.

Does not spread around the body

Does not normally grow back.

Malignant tumour

Usually grow rapidly.

Cancerous

Cells can break away and cause secondary tumours to grow in other areas of the body.

Can spread around the body, via the bloodstream.

Causes: Some **genetic** risk factors e.g. early breast cancer, **mutations from carcinogens** e.g. tar in tobacco or asbestos, **ionising radiation** too much UV light from sunlight and X-rays.

Treatments: Radiotherapy which stops mitosis or Chemotherapy which causes cells to self-destruct.

Smoking

Cigarettes produce around 4000 different chemicals that are inhaled into the throat, trachea and lungs. **150 of these are linked to disease**.

Nicotine: addictive.

Carbon monoxide: reduces the ability of red blood cells to carry oxygen for respiration.

Smoking in pregnancy: reduces the oxygen available for the foetus can lead to:

- Premature birth
- Low birthweight
- Still birth, when the baby is born dead.

Cilia damage: cilia become anaesthetised by some of the cigarette chemicals so dirt and mucus not removed from trachea and bronchi leading to increased risk of infection.

Carcinogens: tar can cause cancer of throat, larynx, trachea and lungs.

Tar: thick sticky black chemical can increase risk of bronchitis and COPD (chronic obstructive pulmonary disease). Can lead to breathlessness and death.

Heart: smokers are more likely to have cardiovascular problems, narrowing of blood vessels also causes you to look older.

Diet, exercise, obesity

If you eat too much, the excess is stored as **fat**.

Being obese can lead to: **type 2 diabetes, high blood pressure and heart disease**.

Exercise increases heart fitness and lung capacity. You also get more muscle which does more respiration using more energy from food.

Type 2 diabetes cells stop responding to insulin so blood glucose levels rise too high.

Causes problems in:

- Circulation
- Kidney function
- Eyesight

Type 2 diabetes can often be controlled by low carbohydrate diet and exercise.

Alcohol

Alcohol is addictive.

After drinking, ethanol is absorbed into the blood and can pass easily into other tissues e.g. the brain.

In small amounts:

- Relaxed, cheerful, reduced inhibitions.

In larger amounts:

- Lack of self-control, lack of judgement.
- Possibly unconsciousness, coma, death.

Longer term addiction:

- Cirrhosis of the liver (scarring of the liver tissue).
- Cancer of the liver.
- Brain damage.

In pregnancy:

- Alcohol can pass through the placenta.
- Can cause miscarriage, stillbirth, premature birth, low birthweight, foetal alcohol syndrome (facial deformities and learning difficulties).

KS4 Biology: B8 Photosynthesis

Keyword	Definition
Active Transport	The movement of particles against a concentration gradient, requires energy.
Chlorophyll	A green pigment found in chloroplasts which absorbs light for photosynthesis.
Chloroplast	Organelle found in plant cells and algae, site where photosynthesis takes place.
Endothermic Reaction	A reaction where energy is transferred from the environment.
Eukaryote Cell	A complex cell such as a plant.
Guard Cell	A cell found on either side of the stoma which controls their size.
Limiting Factors	A factor which prevents a reaction from going any faster.
Nitrate Ions	Absorbed from the soil combined with glucose to make amino acids, building blocks for protein.
Osmosis	The movement of water molecules across a partially permeable membrane from a region of higher water concentration to a region of lower water concentration.

Carbon dioxide + water $\xrightarrow[\text{Chlorophyll}]{\text{Light}}$ glucose + oxygen



Leaves are specially adapted for photosynthesis.:

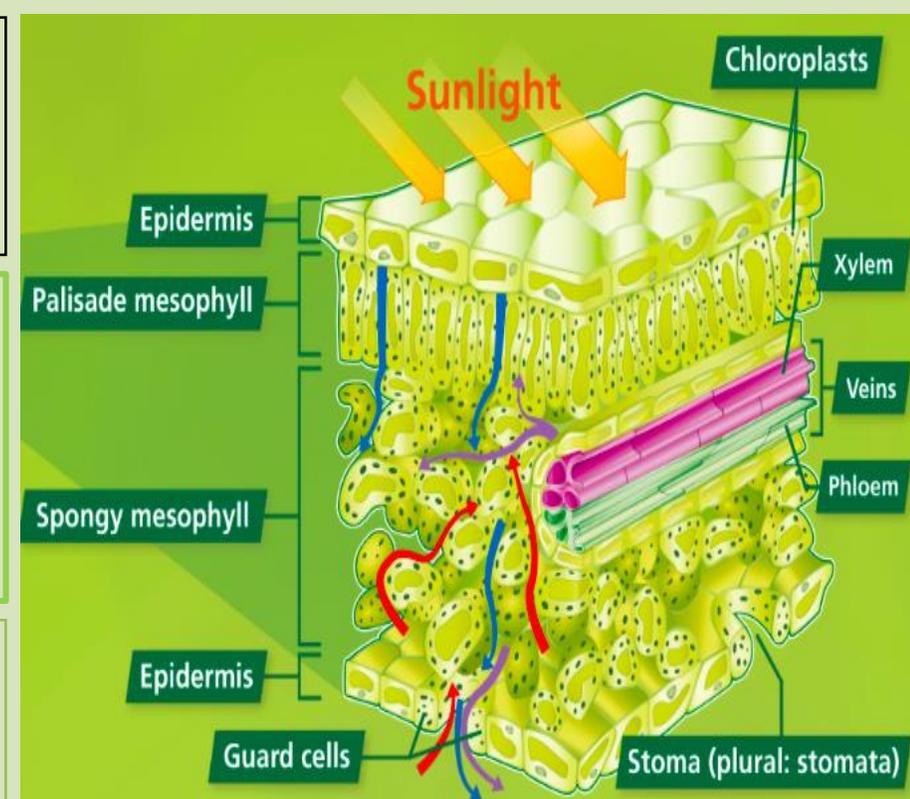
- Broad, giving them a large surface area
- Thin, short diffusion distances for the gases.
- Veins, plenty of water in the xylem, removes waste products.
- Air spaces, to allow carbon dioxide to get to the cells and oxygen to leave by diffusion.
- Guard cells, that open and close the stomata to regulate gas exchange.

Uses of Glucose

- Respiration: to transfer energy from glucose.
- Making cellulose: to make strong cell walls.
- Making amino acids: glucose is combined with nitrate ions to make amino acids which are the building blocks of proteins.
- Stored as oil or fat: glucose is converted into lipids and stored in seeds.
- Stored as starch: stored in roots, stems and leaves as an energy source when the rate of photosynthesis is slow. Storing glucose would cause the cell to absorb water and swell up. Starch is insoluble so does not cause this problem.

Photosynthesis

- Takes place in chloroplasts in green plant cells they contain pigments like chlorophyll that absorb light.
- Energy is transferred to the chloroplasts from the environment by light – it is an endothermic reaction.



Hint:

- More photosynthesis = more glucose. More glucose = bigger the plant / greater the yield of crop
- Less chlorophyll / reactants = less photosynthesis

Higher Only

Inverse Square Law: As the distance of the light from the plant increases, the light intensity decreases. This increase is inversely proportional to the square of the distance:

$$\text{Light intensity} \propto \frac{1}{\text{distance}^2}$$

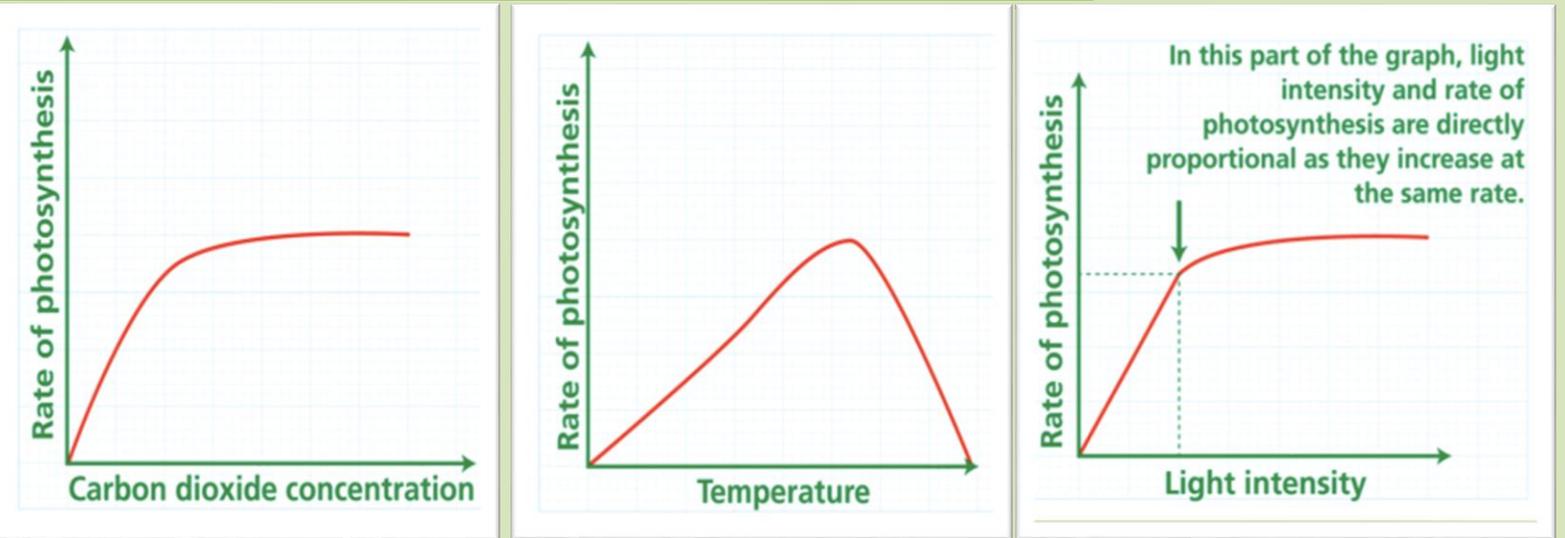
Keyword	Definition
Palisade Mesophyll Cell	Elongated cells, packed closely together with many chloroplasts.
Partially Permeable Membrane	A membrane with tiny holes which lets some molecules through.
Phloem	Type of plant tissue which transports dissolved sugars around the plant.
Photosynthesis	Process by which plants use energy to convert carbon dioxide and water into glucose and oxygen.
Protein	Large biological molecule made up of long chains of amino acids.
Root Hair Cell	Cell on the surface of a plant root which absorbs water and mineral ions. Specially adapted.
Starch	Insoluble carbohydrate used as a store of glucose in plants
Stoma	Tiny hole in the under surface of a leaf where gaseous exchange occurs.
Transpiration	Movement of water from a plant's roots through xylem and out of the leaves.
Xylem	Type of plant tissue which transports water and mineral ions around the plant.

Interpreting Limiting Factor Graphs

- Initially the rate of photosynthesis increases.
- When the scale on the x axis increases but the scale on the y axis plateaus (levels off) the x axis is no longer the limiting factor.

Limiting Factors

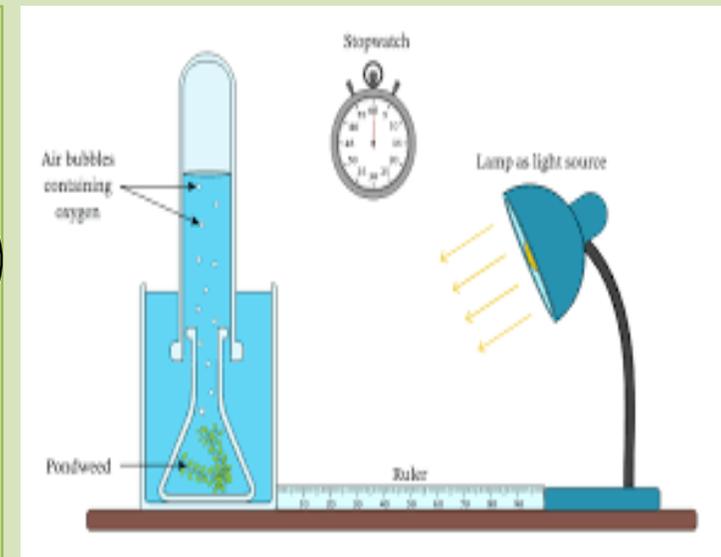
- These three factors can prevent the rate of photosynthesis happening faster:



Required Practical

- The effect of light intensity on the rate of photosynthesis.
- Count the number of oxygen bubbles produced by the plant, in a minute.
- Move the plant further away from the lamp.
- Types of plants mentioned in exams:
 - Elodea
 - Immobilised algae balls
- How to improve:
 - Record practical and slow down the bubbles.
 - Use gas syringe and collect volume of oxygen.
- Risk assessment:
 - Keep electrical equipment dry.
 - Lamp bulb will get hot.

Tip: don't worry about the type of plant



KS4 Biology: B9 Respiration

Aerobic Respiration

Glucose + Oxygen \longrightarrow Carbon dioxide + water + energy



Anaerobic Respiration

Humans: Glucose \longrightarrow lactic acid + energy

Plants: Glucose \longrightarrow ethanol + carbon dioxide + energy

Aerobic Respiration

- Chemical reaction that occurs inside cells in all living organisms.
- Process of transferring energy from the breakdown of glucose.
- Exothermic reaction.
- Aerobic respiration is with oxygen.
- Anaerobic respiration is without oxygen.
- Occurs in mitochondria.

Energy from Respiration

- Chemical reaction that occurs inside cells in all living organisms.
- Process of transferring energy from the breakdown of glucose.
- Exothermic reaction.
- Aerobic respiration is with oxygen.
- Occurs in the mitochondria.
- Anaerobic respiration is without oxygen.
- Occurs in cytoplasm.

Anaerobic Respiration

- Without oxygen.
- Useful in emergencies as transfers less energy as glucose is not fully oxidised.
- In humans produces lactic acid which is toxic.
- Creates muscle fatigue.

Oxygen Debt

- Is the amount of extra oxygen the body needs after exercise to react with the build up of lactic acid and remove it from the cells.
- The pulse and breathing rate stay high whilst there are high levels of lactic acid and carbon dioxide to deliver more oxygen to the cells.
- Lactic acid is also transported to the liver where it is converted back to glucose.

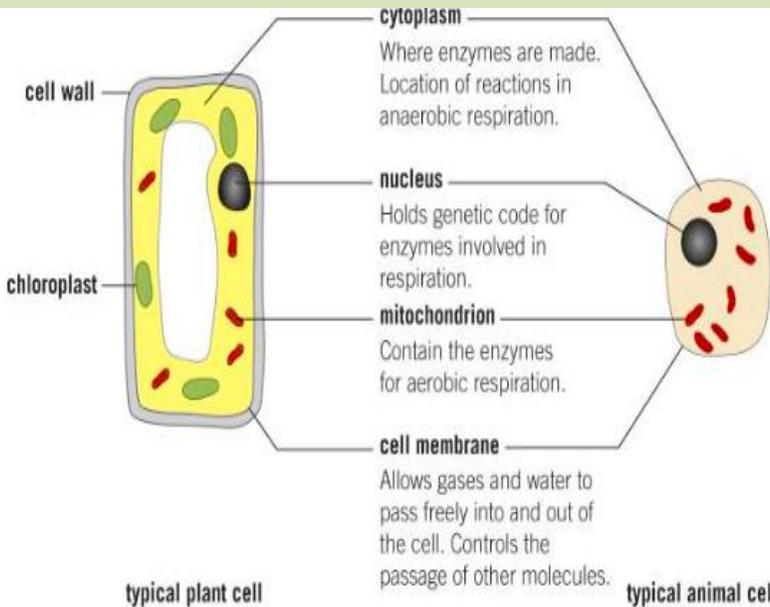
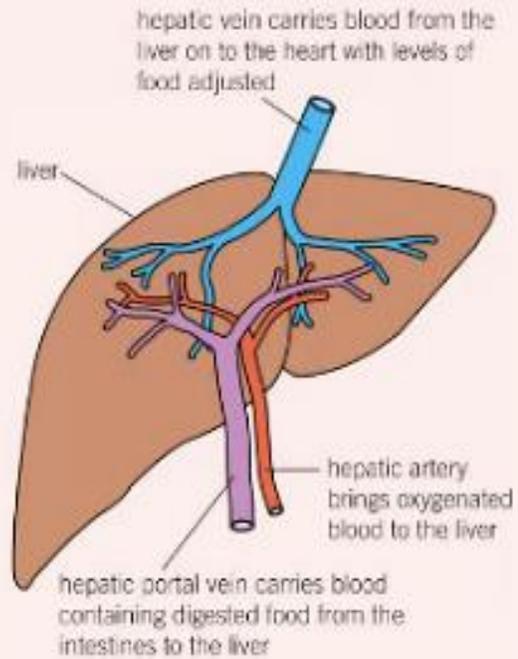


Figure 1 Aerobic respiration takes place in the mitochondria, but other parts of the cell play vital roles

Keyword	Definition
Aerobic Respiration	The reaction involved in breaking down glucose using oxygen to transfer energy.
Alveoli	Tiny air sac in the lungs where gas exchange occurs.
Anaerobic Respiration	The incomplete breakdown of glucose which produces lactic acid in humans and ethanol in plants and yeast.
Breathing	Moving air in and out of the lungs.
Enzymes	A protein that acts as a biological catalyst. Eg) Protease, lipase, amylase
Eukaryote Cell	Complex cell such as a plant or animal cell.
Exothermic Reaction	Reaction that transfers energy to the environment.
Fermentation	Process of anaerobic respiration in yeast cells.
Glycogen	A molecule that acts as a store of glucose in liver and muscle cells.
Haemoglobin	Red pigment found in red blood cells which carries oxygen.

Keyword	Definition
Lactic Acid	Product of anaerobic respiration that builds up in muscle cells.
Metabolism	All the chemical reactions that happen in a cell or the body.
Mitochondria	Organelle in a cell, site of most of the reactions for aerobic respiration.
Oxygen Debt	The amount of extra oxygen the body needs after exercise to react with the build up of lactic acid and remove it from cells.
Recovery Period	After anaerobic exercise when the heart rate and breathing rate stay higher than normal to repay the oxygen debt.
Red Blood Cell	Transports oxygen around the body and removes carbon dioxide as a waste product.
Respiration	The process of transferring energy from glucose, which goes on in every cell.

Liver



Exercise

- When we exercise we need to get more glucose and oxygen to our muscles for respiration.
- Do more work = need more energy.
- The energy that is transferred during respiration is used to enable muscles to contract.
- During exercise the human body responds to the increased demand for energy.
- Body responses to exercise include:
 - An increase in the heart rate, the breathing rate and the breath volume.
 - Glycogen stores in the muscles are converted to glucose for cellular respiration.
 - The flow of oxygenated blood to the muscles increases.
- These responses act to increase the rate of supply of glucose and oxygen to the muscles and the rate of removal of carbon dioxide the muscles.

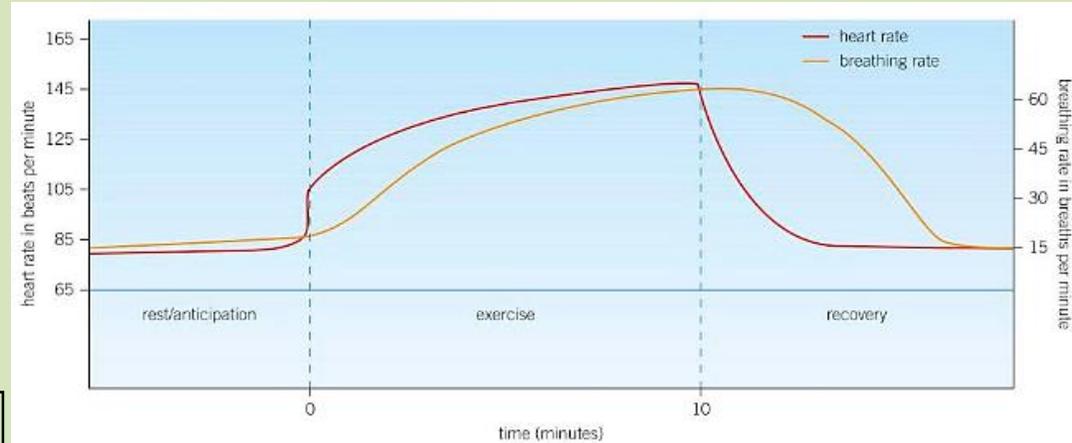


Figure 2 The changes measured in the heart and breathing rate before, during, and after a period of exercise

Metabolism

- Is the sum of all the reactions in the body.
- The energy transferred by respiration in cells is used by the organism for the continual enzyme-controlled processes of metabolism that synthesise new molecules.
- Metabolism includes the conversion of glucose to starch, glycogen and cellulose. Metabolism also includes the formation of lipid molecules, and the use of glucose and nitrate ions to form amino acids, which are used to synthesise proteins and breakdown excess proteins to form urea.

Higher Only

The role of the liver

- Detoxifying poisonous substances such as ethanol from alcoholic drinks
- Passing the breakdown products into the blood so they can be excreted in the urine
- Breaking down old, worn out blood cells and storing the iron until it is needed to make more blood cells
- Removing lactic acid, converting it back to glucose

KS4 Biology: B10

Homeostasis, The Nervous System, The Brain, The Eye

Keyword	Definition
Central Nervous System (CNS)	The brain and spinal cord, it is where reflexes and actions are coordinated.
Coordination Centre	An organ that processes information from receptors and organises a response from the effectors.
Effectors	Either a muscle or gland that responds to nervous impulses.
Enzymes	A protein that acts as a biological catalyst. Eg) Protease, lipase, amylase
Eukaryote Cell	Complex cell such as a plant or animal cell.
Glycogen	A molecule that acts as a store of glucose in liver and muscle cells.
Homeostasis	Regulation of a constant internal environment
Negative Feedback	A mechanism that restores a level back to optimum in a system.
Optimum Level	A level of something that enables the body to work at its best.
Peripheral Nervous System	The neurones that link the senses to the CNS

Homeostasis

- Is the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function, in response to internal and external changes.
- Important for maintaining optimal conditions for enzyme action and all cell functions.
- In the human body homeostasis includes control of blood glucose concentration, body temperature and water levels.
- The automatic control systems may involve nervous or chemical responses.
- All control systems include receptors coordination centres and effectors.

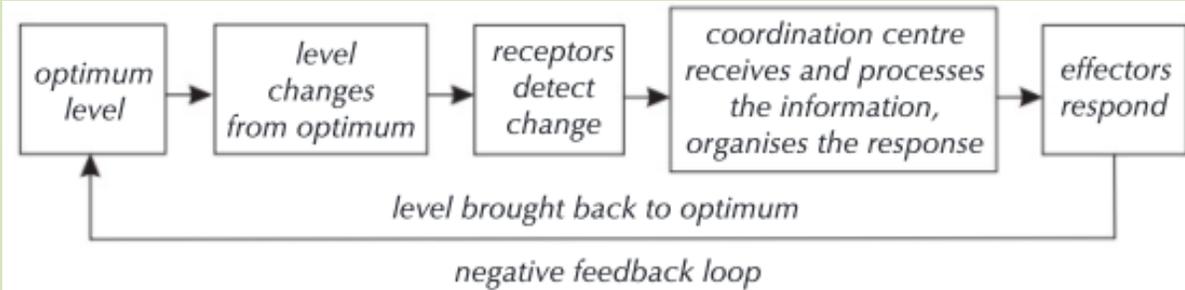


Figure 1: A negative feedback mechanism.

Tip: A negative feedback system responds when a level changes from its optimum point, in order to bring the level back to optimum. It's a continuous, looping process.

Example

Body temperature is usually kept within 0.5 °C above or below 37 °C.

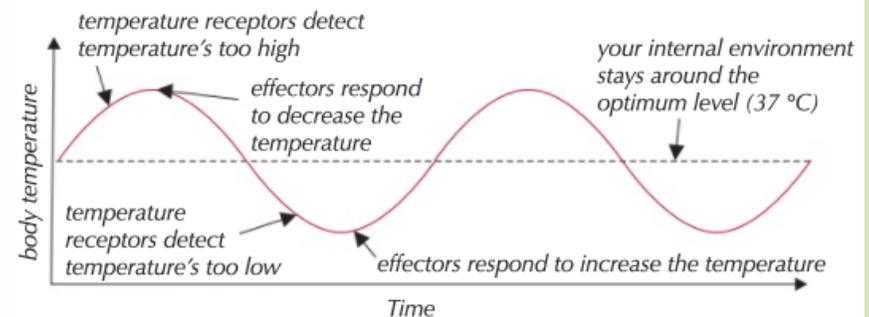
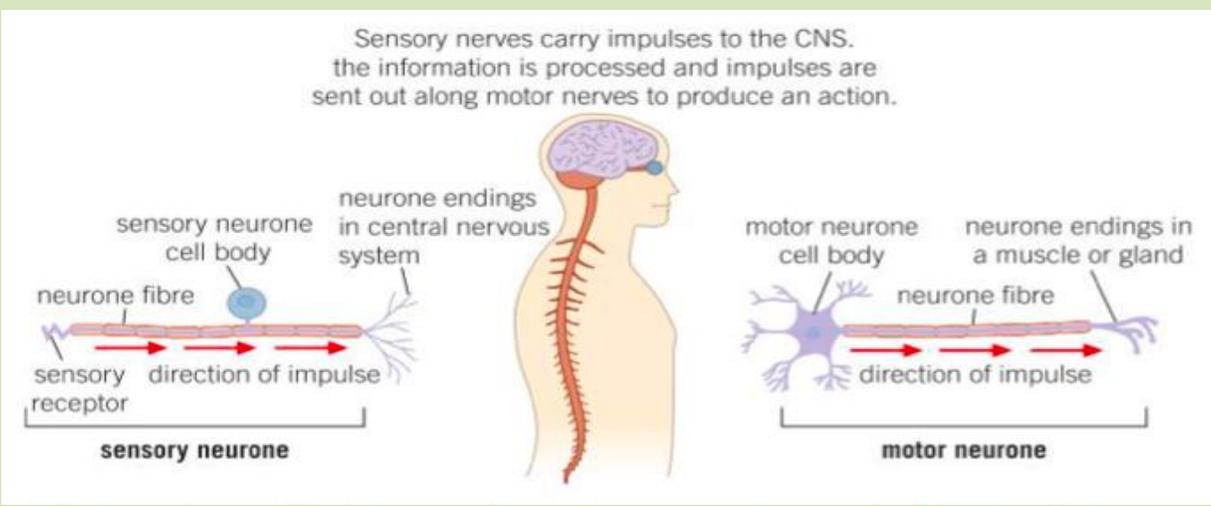


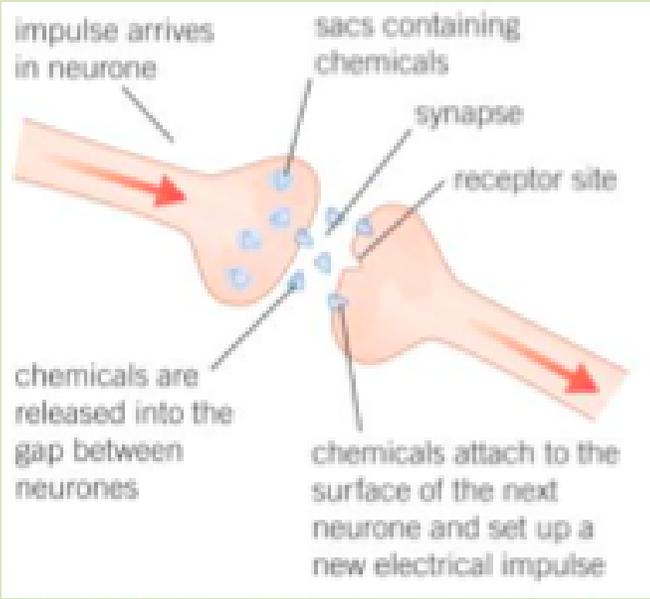
Figure 2: Control of body temperature via negative feedback.

Keyword	Definition
Motor Neurones	A nerve cell that carries electrical impulses from the CNS to effectors.
Sensory Neurones	A nerve cell that carries electrical impulses from the receptors in the sense organs to the CNS.
Stimulus	A change in the environment.

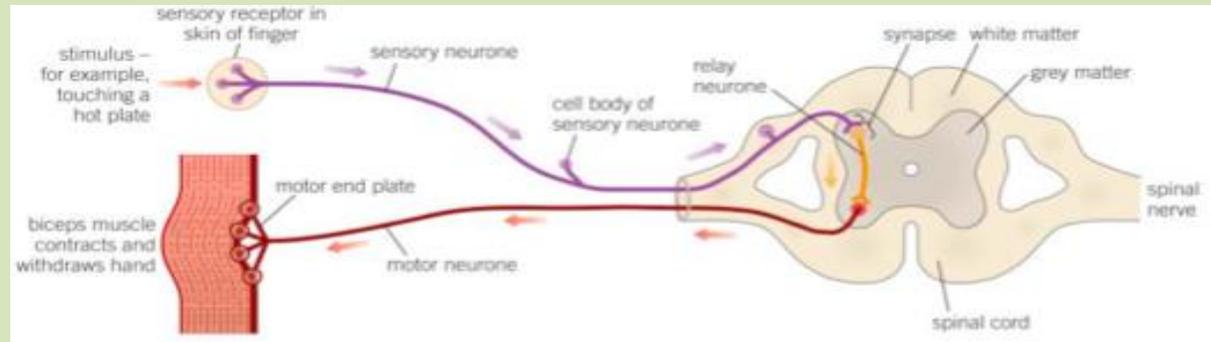


- Synapse**
- Neurones not joined, there are junctions called synapses.
 - Electrical impulses travel along the neurones and across the synapse to the next neurone.
 - A neurotransmitter is secreted across the synapse, electrical impulse travels down next neurone.

- The Nervous System**
- The nervous system uses electrical impulses to enable you to react quickly to your surroundings and coordinate your behaviour.
 - Cells called receptors detect stimuli.
 - Impulses from receptors pass along sensory neurones to the CNS. The brain coordinates the response, and impulses are sent along motor neurones from the brain to the effector organs.



- Reflexes**
- Reflex actions are automatic and rapid and do not involve the conscious parts of the brain.
 - Reflexes involve sensory, relay and motor neurones.
 - Reflex actions control everyday bodily functions, such as breathing and digestion and help avoid danger.



Keyword	Definition
Accommodation	The ability of focusing on near or distant objects by changing the shape of the lens in the eye.
Cerebral Cortex	Part of the brain concerned with consciousness, intelligence, memory and language.
Cerebellum	Part of the brain concerned mainly with coordinating muscular activity and balance.
Medulla	Part of the brain concerned with unconscious activities, such as controlling the heartbeat, the movements of the gut and breathing.
MRI Magnetic Resonance Imaging	A tube like machine that can be used to produce a very detailed picture of the brain's structures.

Separate Science Only

The Brain

- The brain is made up of billions of interconnected neurones that control complex behaviour.
- It has different regions with important functions.
- Scientists map regions of the brain to their functions by studying patients with brain damage, by electrically stimulating different areas of the brain and using MRI scanning techniques.

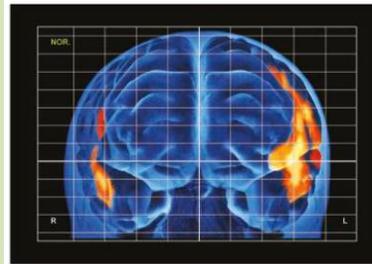


Figure 3 This special MRI scan shows the areas of your brain active as you read – so they are working right now

Parts of the Brain

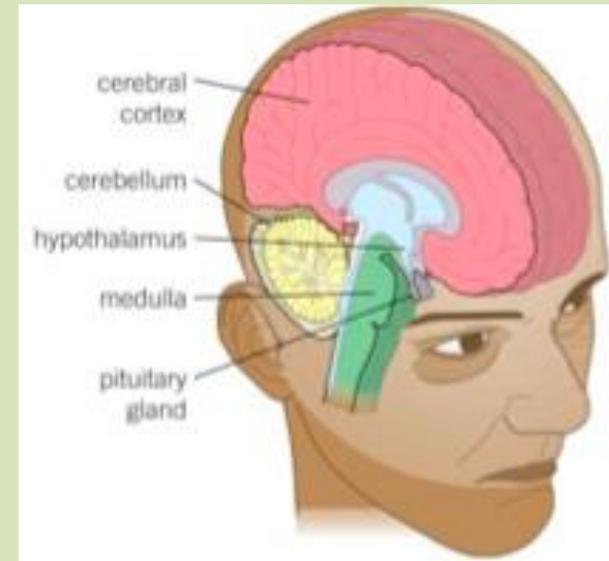
The cerebral cortex is concerned with consciousness, intelligence, memory and language

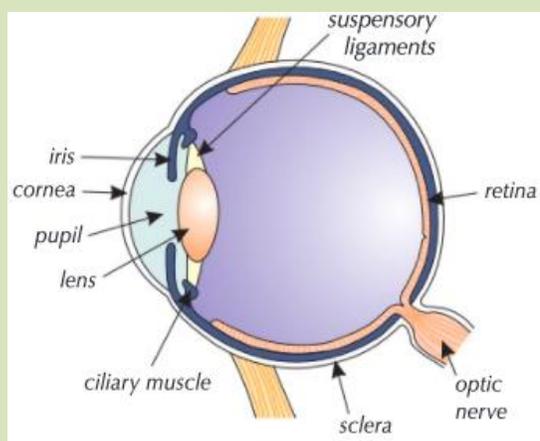
The cerebellum is concerned mainly with coordinating muscular activity and balance

The medulla is concerned with unconscious activities, such as controlling the heartbeat, movements of the gut and breathing

Investigating the Brain

- Electrically stimulating different parts of the brain
 - No sensory nerve endings in the brain, brain surgery is usually undertaken with conscious patients
- MRI Scans
 - Magnetic resonance imaging scan will show exactly which area of the brain is affected
- Problems with the brain
 - Difficult to investigate and treat
 - Drugs do not always reach the brain through the membranes which surround it





Sclera – the tough, supporting wall of the eye

Cornea – the transparent outer layer found at the front of the eye, it refracts (bends) light into the eye

Pupil – the hole in the centre of the eye, through which light enters

Iris – contains muscles that allow it to control the diameter of the pupil and therefore how much light enters the eye

Retina – the layer at the back of the eye that contains two types of light receptor cells. One type is sensitive to light intensity and the other to colour

Lens – focuses the light onto the retina

Ciliary muscles & suspensory ligaments – control the shape of the lens

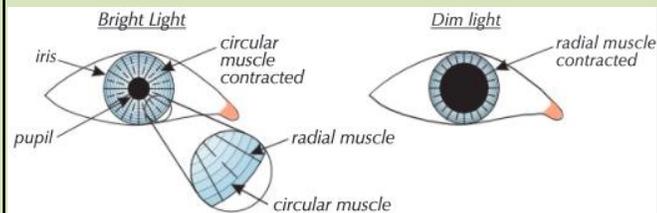
Optic nerve – carries impulses from the receptors on the retina to the brain

The Eye: A sense organ containing receptors in the retina that are sensitive to light intensity and colour.

Common defects of the eye

- To focus on close objects the ciliary muscles contract, the suspensory ligaments loosen and the lens becomes thicker so it can refract light rays strongly.
- To focus on distant objects the ciliary muscles relax, the suspensory ligaments are pulled tight and the lens is pulled thin so it only refracts the light rays slightly.
- Sight defects can be treated using spectacle lenses, hard and soft contact lenses, laser surgery and replacement lenses in the eye.

The Iris Reflex



Myopia

- Short-sightedness, unable to focus on distant objects.
- The lens is the wrong shape and refracts the light too much or the eyeball is too long.

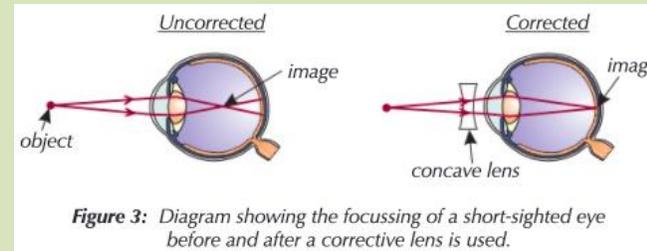


Figure 3: Diagram showing the focussing of a short-sighted eye before and after a corrective lens is used.

Hyperopia

- Long-sightedness, unable to focus on near objects.
- Lens is the wrong shape and doesn't refract the light enough, the objects are brought into focus behind the retina.

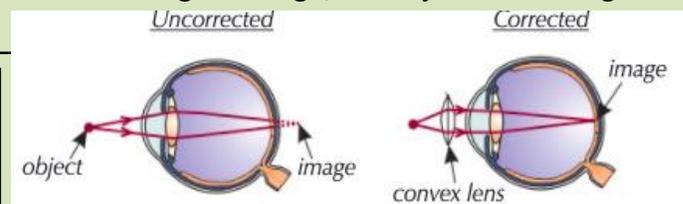


Figure 1: Diagram showing the focussing of a long-sighted eye before and after a corrective lens is used.

New Technology

- Contact lenses
- Laser eye surgery – used to treat myopia
- Replacement lenses – permanent

KS4 Chemistry – C5 Chemical Changes

Reactivity Series

A list of metals in order of how reactive they are:

Some metals are *very reactive* (at the top) and react easily in chemical reactions. E.g.

Sodium

Some metals are *unreactive* (at the bottom) and do not react easily or at all in reaction

e.g. gold

Further reading:

https://www.youtube.com/watch?v=KTmXEiiU_Go&safe=active

<https://www.bbc.co.uk/bitesize/topic/s/zcdj97h>

How to remember the Reactivity Series?

P lease	P otassium		Most reactive
S top	S odium		
C alling	C alcium		
M e	M agnesium		
A	A luminium		
C areless	(C arbon)		
Z ebra	Z inc		
I nstead	I ron		
T ry	T in		
L earning	L ead		
H ow	(H ydrogen)		
C opper	C opper		
S aves	S ilver		
G old	G old		
			Least reactive

Displacement Reactions

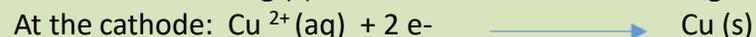
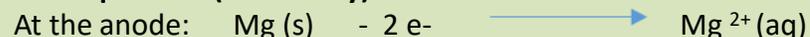
Displacement reactions involve a metal and a compound of a different metal; the more reactive metal *displaces* (pushes out) the less reactive metal from its compound:



Ionic Equations (H tier only)



Half Equations (H tier only)



Keyword	Definition
Acid	An acid has a pH value of less than 7
Alkali	Its solution has a pH value more than 7
Base	A soluble alkali that forms a salt when it reacts with an acid
Displacement reaction	When a more reactive metal replaces a less reactive metal in a compound
Electrolysis	The breakdown of a substance containing ions by electricity
Indicator	A substance that changes colour when added to acids or alkalis
Insoluble	Does not dissolve in water
Neutralisation	The reaction of an acid with a base producing salt and water
Ore	Rock which contains enough metal to make it economically worth extracting
Oxidation	The reaction when oxygen is added to a substance or electrons are lost
pH Scale	A number which shows how strongly acid or alkaline and solution is
Reduction	A reaction in which oxygen is removed or electrons are gained
Salts	A compound formed when some of the H in an acid is replaced by a metal
Soluble	Dissolves in water
Reactivity Series	A list of metals showing how reactive they are
Half Equation	An equation that describes the gain or loss of electrons
Ionic Equation	An equations that shows only those ions or atoms that change in a chemical reaction
Strong Acid	An acid that completely dissociated into ions in solution e.g. nitric acid
Weak Acid	An acid that is only partly ionized e.g. ethanoic acid

Reduction of metals by carbon and hydrogen

The oxides of metals below carbon in the series can be reduced by carbon

Metal oxide + carbon \longrightarrow metal + carbon dioxide

e.g. lead oxide + carbon \longrightarrow lead + carbon dioxide



Making Salts

There are various ways salts can be made. You need to know the products.

Acid + metal \longrightarrow salt + Hydrogen

Acid + Base \longrightarrow salt + Water

Acid + Alkali \longrightarrow salt + Water

Acid + metal carbonate \longrightarrow salt + water + Carbon dioxide

Making a copper salt – this is a required practical

Sulphuric acid + copper oxide \longrightarrow copper sulphate + water



Method:

Add EXCESS insoluble copper oxide to sulphuric acid and stir

Warm gently on a tripod – the solution will turn blue

Filter off excess copper oxide

Evaporate the water so that crystals of copper sulphate start to form

Stop heating when you have evaporated about half the water and allow the rest of the water to evaporate off naturally

Names of Salts

The acid used provides the negative ions present in all salts.

Hydrochloric acids make salts called *chlorides*

containing Cl^- ions

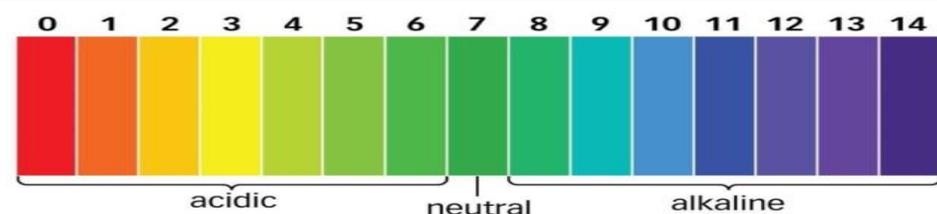
Sulphuric acid H_2SO_4 makes *sulphates* containing SO_4^{2-} ions

Nitric acid HNO_3 makes *nitrates* called NO_3^- ions

OILRIG is a useful way of remembering:

Oxidation Is Losing

Reduction Is Gaining (electrons)



pH Scale

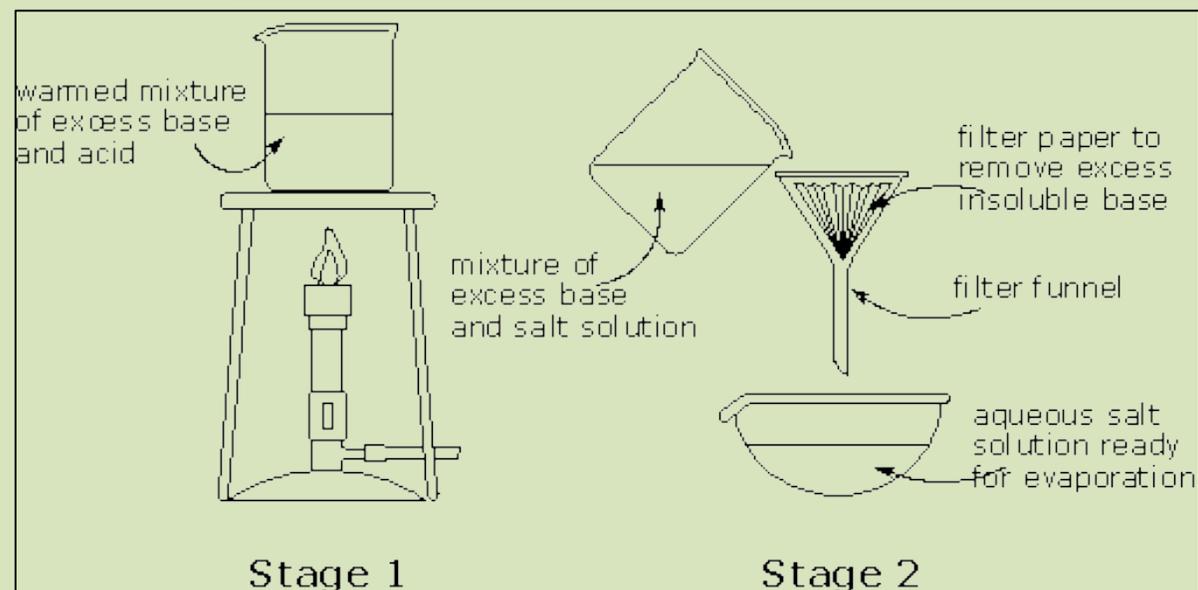
Universal Indicator changes colour depending on the pH of a solution.

Acids can be dilute (lots of water) or concentrated (less water)

Weak Acids e.g. citric acid are not harmful even when in concentrated solutions

Strong acids e.g. hydrochloric acid can be harmful even when diluted

Making a salt from a metal carbonate is also a required practical



Electrolysis

When an ionic compound is melted or dissolved in water, the ions are free to move about within the liquid or solution (electrolyte). Electrolytes can conduct electricity.

If an electric current is passed through this solution the ions will move to the electrodes.

Opposites attract.

Positive ions (cations) will go to the negative electrode (cathode)

Negative ions (anions) go to the positive electrode (anode).

For example in the electrolysis of lead bromide, Lead (Pb^{2+}) goes to the negative electrode and bromine (Br^-) goes to the positive electrode.

Links to Further Reading:

<https://www.youtube.com/watch?v=AhTRiL6xjBA&safe=active>

<https://www.bbc.co.uk/bitesize/guides/zpxn82p/revision/1>

Electrolysis of Copper Sulphate

Which elements form at which electrode depends on the **reactivity** of the elements involved. For example, in the electrolysis of aqueous copper sulphate is the electrolysis of copper sulphate, however there are also H^+ and OH^- ions from the water which is used as the solvent. This means there is more than one possible ion that can go to each electrode.

Positive ions: sodium (Cu^{2+}) and hydrogen (H^+)

Negative ions: sulphate (SO_4^{2-}) and hydroxide (OH^-)

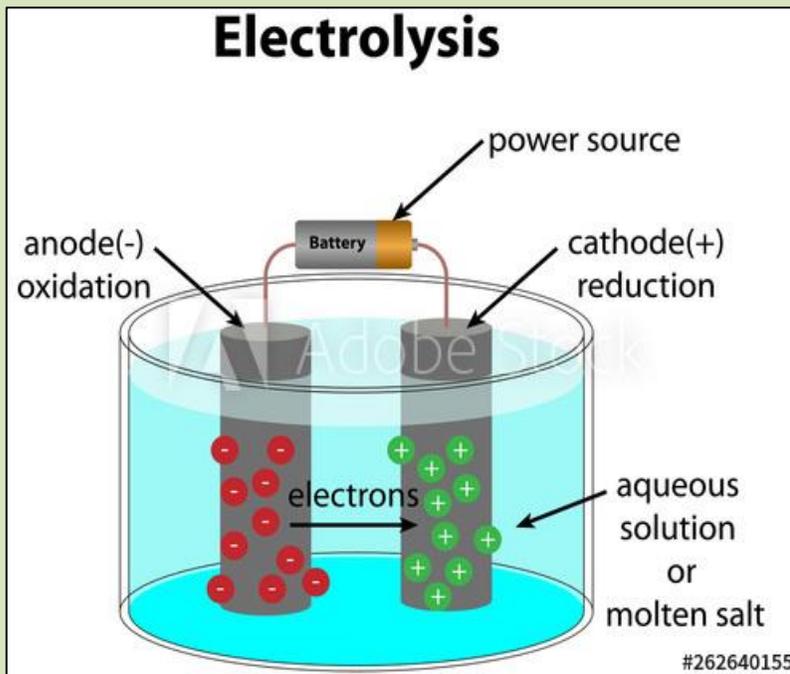
Copper is **less reactive** than hydrogen, so copper (Cu) is produced at the negative electrode.

The half equation is: $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$

The hydroxide ion is more reactive than the sulphate ion, therefore this **forms water (H_2O) and oxygen** at the positive electrode.

The half equation is: $4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-$

Key Term	Definition
Electrolysis	The breaking down of a substance using electricity
Electrolyte	The solution which is being broken down during electrolysis
Oxidation	The loss of electrons
Reduction	The gain of electrons
Anode	The positive electrode
Cathode	The negative electrode
Half Equation	An equation that shows the reaction at each electrode



Remember OILRIG – Oxidation is Losing, Reduction Is Gaining (electrons)

When a positive ion reaches the negative electrode, it gains electrons. This is a reduction reaction.

When the negative ion reaches the positive electrode, it loses electrons, this is an oxidation reaction.

We can represent these using half equations A half equation can represent the reaction at each electrode.

Half equations show how electrons are transferred and an electron is represented in an equation by an e^- symbol

Half equations show electrons (e^-) and how ions become atoms. For example $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$.

1. Write down the ion and atom: $\text{Cl}^- \rightarrow \text{Cl}_2$
2. Adjust the number of ions (if needed) and add electrons to balance the charges if required $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$

Remember that non-metal ions will typically form diatomic molecules.

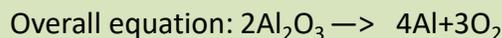
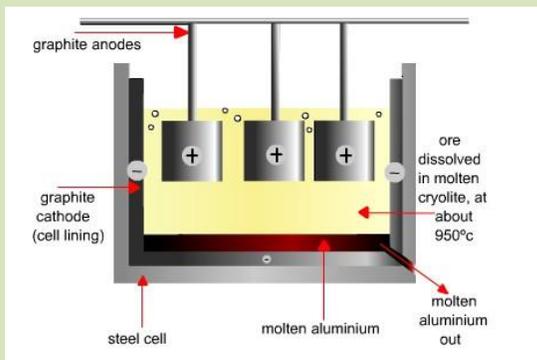
Extracting Aluminium from bauxite

Aluminium oxide is dissolved in molten cryolite .
 Cryolite reduces the melting point of aluminium oxide so the process requires less energy.
 Aluminium ions (Al^{3+}) are attracted to the negative electrode.
 Aluminium atoms are formed at the negative electrode (gain 1 electron)
 Oxide ions are attracted to the positive electrode
 Oxygen is formed at the positive electrode (each ion loses 2 electrons)
 Oxygen reacts with carbon to make carbon dioxide. This electrode needs to be replaced constantly.

At the negative electrode:



At the positive electrode



Electrolysis of Brine – required practical

Which elements form at which electrode depends on the **reactivity** of the elements involved.

The electrolysis of brine is the electrolysis of a solution of sodium chloride so there are also H^+ and OH^- ions from the water which is used as the solvent. This means there is more than one possible ion that can go to each electrode.

- **Positive ions:** sodium (Na^+) and hydrogen (H^+)
- **Negative ions:** chlorine (Cl^-) and hydroxide (OH^-)

When there is a mixture of ions, the products formed depend on the reactivity of the elements involved.

Hydrogen is less reactive than sodium, so hydrogen gas (H_2) is produced at the negative electrode.

Chlorine gas (Cl_2) is produced at the positive electrode.

Sodium hydroxide is produced from the ions that remain in solution.

Rules if there is more than one positive or negative ion present

If there are 2 positive ions present, the least reactive element gets discharged

If there are 2 negative ions present the halogen (if present) will be discharged first.

Types of ions

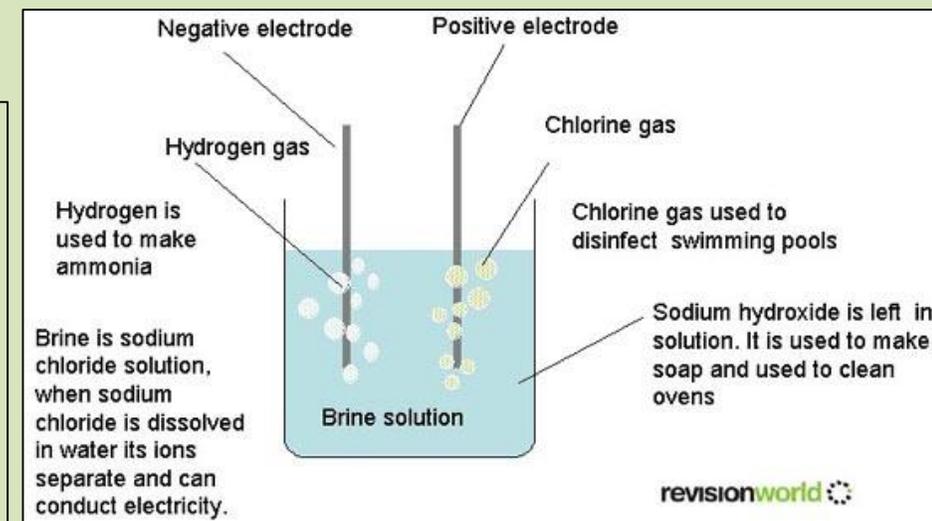
Metals and hydrogen form positive ions e.g. H^+ , Na^+ , Mg^{2+} , Al^{3+}
 Non-metals from negative ions e.g. O^{2-} , Cl^- , OH^-

The formula of the compound formed depends on the charges on the ions and the number of positive and negative ions needed to form a neutral compound.

Gas Tests

During electrolysis the products made are often gases. Below are the tests for three common gases you need to know

Gas	Test	Result
Hydrogen	Place a lit splint into the gas	If a squeaky pop is heard hydrogen is present
Oxygen	Place glowing splint into gas	If splint is relighted then oxygen is present
Chlorine	Damp litmus paper placed in gas	If paper bleaches chlorine is present
Carbon Dioxide	Bubble the gas through limewater	If the limewater goes cloudy carbon dioxide is present

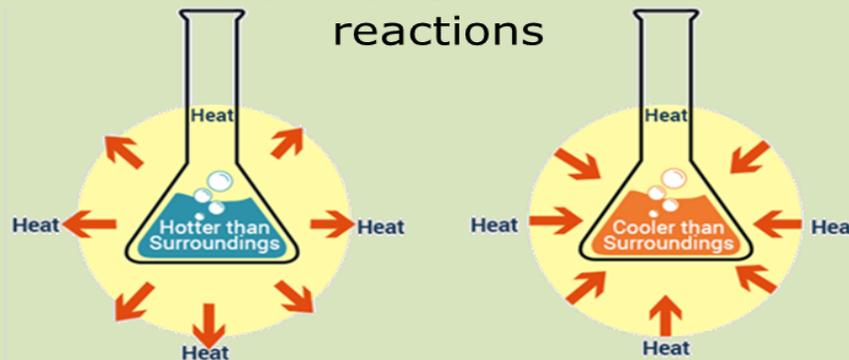


**KS4 Chemistry:
C7 Energy changes**

Examples

Keyword	Definition
Activation energy	The amount of energy required for reactants to react successfully
Bond energy	the amount of energy needed to break one mole of a particular bond.
Endothermic	A reaction that takes in more energy from the surroundings than it gives out
Exothermic	A reaction that gives out more energy to the surroundings than it takes in
ΔH	The change in energy between reactants and products
Electrical cell	Contains chemicals that react to produce electricity
Fuel cell	A device that produces voltage when supplied with fuel and oxygen
Reaction profile	Graph showing the energy in both reactants and products- including the difference between them

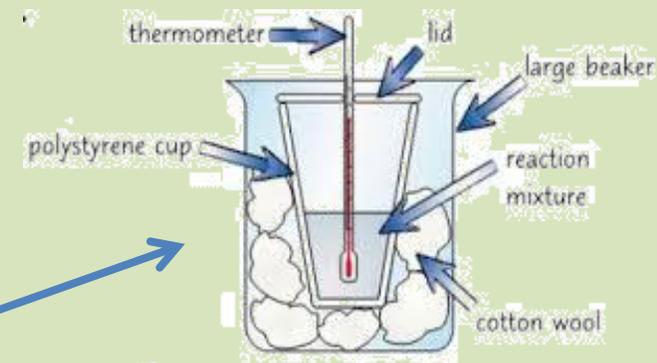
Exothermic vs Endothermic reactions



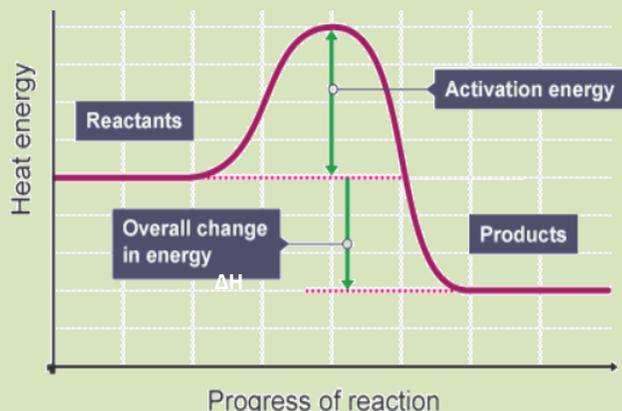
Energy can not be created or destroyed- only transferred from one form to another. Heat is an example of energy, in Exothermic reactions heat is transferred to the surroundings from the reaction and in Endothermic reactions heat is transferred from the surroundings to the reactions

Exothermic	Endothermic
Respiration	Photosynthesis
Neutralisation	Instant ice packs
Self heating cans	Thermal decomposition

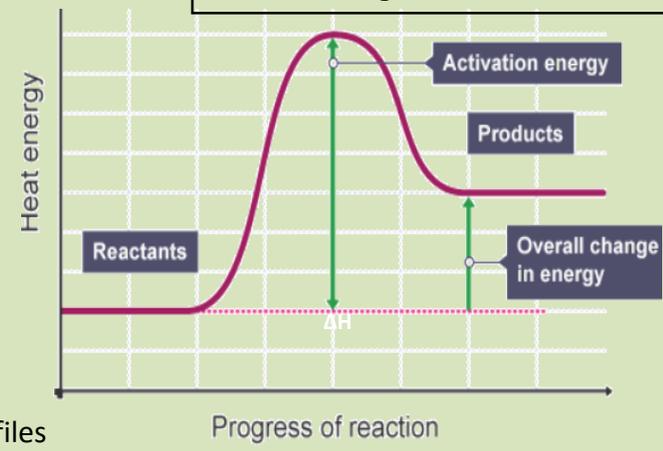
When investigating exothermic and endothermic reactions- be sure to insulate the container and add a lid to prevent energy transfer to or from the outside of the container (giving you more accurate results)



Exothermic
Reactants higher than products



Endothermic
Products higher than reactants



Bond breaking	Bonds need to be broken between the <u>reactants</u> before bonds can be made to form the products. Energy has to be taken in to break a bond, so <u>bond breaking is always endothermic.</u>
Bond making	To form bonds between the <u>product</u> molecules, energy is released, so <u>bond making is always exothermic.</u>

Reaction profiles

Bond energy calculations (Higher)

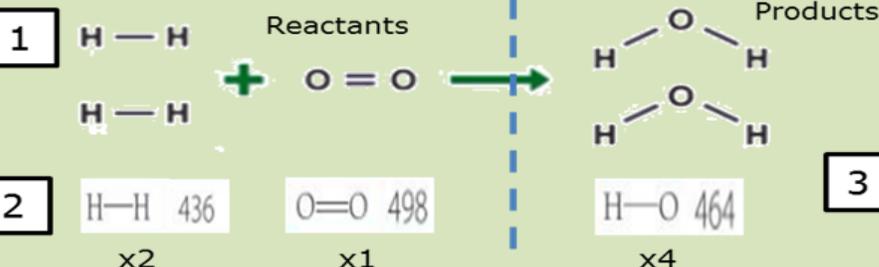
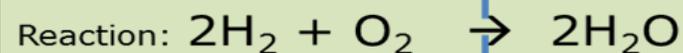
Bond energy calculations tell us the energy changes in a reaction. This ultimately determines if it is endothermic or exothermic.

We do this by working out the energy released from a bond and the energy required to break a bond

Bond	Bond energy in kJ/mol	Bond	Bond energy in kJ/mol
C—C	347	H—Cl	432
C—O	358	H—O	464
C—H	413	H—N	391
C—N	286	H—H	436
C—Cl	346	O=O	498
Cl—Cl	243	N≡N	945

1. Draw displayed formula for all molecules in the reaction.
2. Add up energy values for all bonds in reactants. (Bond breaking)
3. Add up energy values for all bonds in products. (Bond making)
4. Use the formula to calculate the energy change.

$$\text{Energy change} = \text{Energy of bond breaking (Reactants)} - \text{Energy of bond making (Products)}$$



$$872\text{kJ/mol} + 498\text{kJ/mol} = 1370\text{kJ/mol} \quad 1856\text{kJ/mol}$$

$$\text{Energy change} = \text{Energy of bond breaking (Reactants)} - \text{Energy of bond making (Products)}$$

4

$$1370\text{kJ/mol} - 1856\text{kJ/mol} = -486\text{kJ/mol}$$

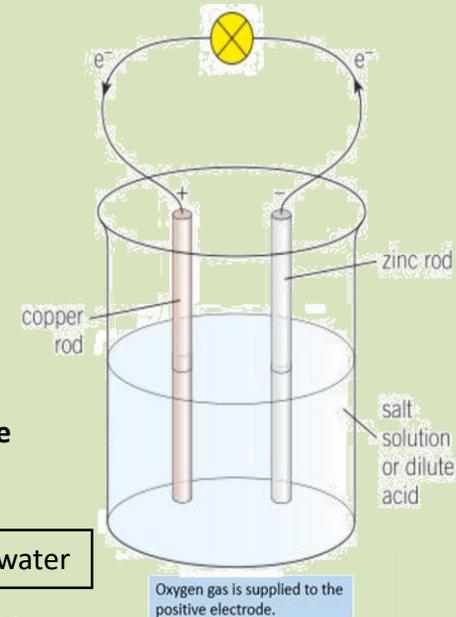
Chemical and fuel cells (Chem only)

A chemical cell can be made by connecting 2 metals of different reactivity in an electrolyte solution.

The more reactive metal will lose its electrons and form a positive ion.

The potential difference in charge between the two metals creates voltage.

The larger the gap in reactivity between the metals- the larger the voltage of the cell



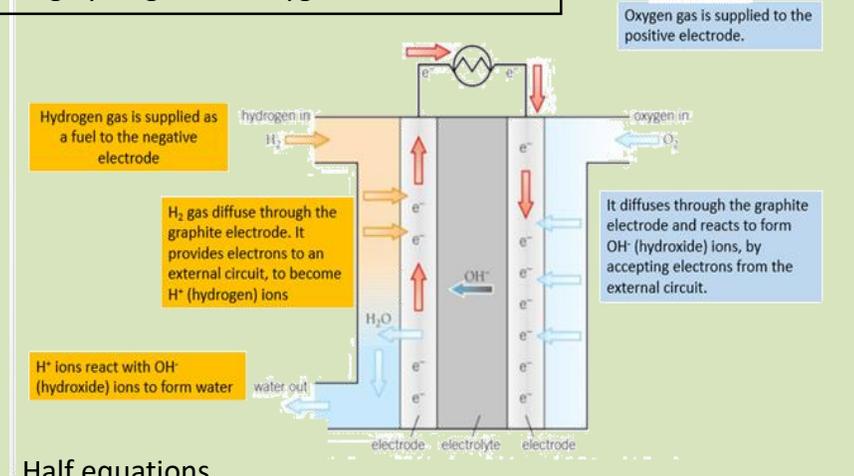
You can also make a cell by reacting hydrogen and oxygen to make water

Pros

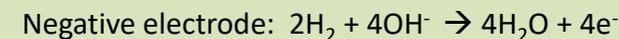
- Does not need to be electrically recharged
- No pollutants produced

Cons

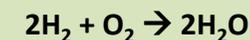
- Hydrogen is difficult to store
- Is highly flammable
- Is sometimes produced using finite resources



Half equations



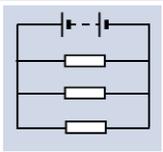
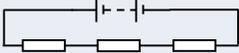
Full equation once spectator ions and water has been balanced out is

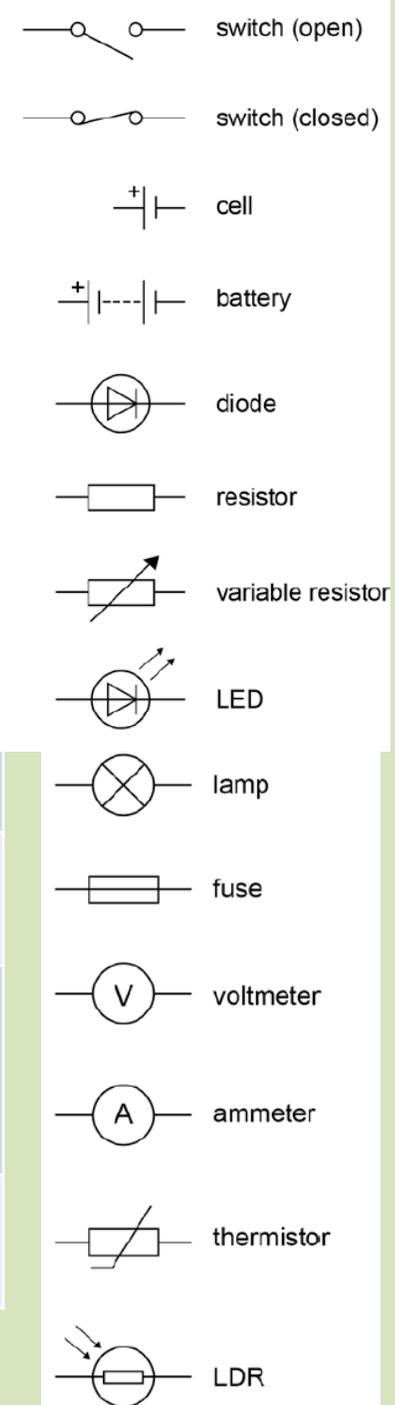


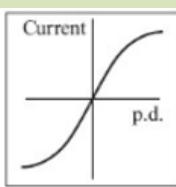
Further reading

- <https://www.bbc.co.uk/bitesize/guides/zsxn82p/revision/1>
- <https://www.youtube.com/watch?reload=9&v=L7829UGifpM>
- <https://www.bbc.co.uk/bitesize/guides/z2396vc/revision/1>

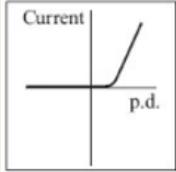
KS4 Physics: Electrical circuits

Key words	
Current	<p>The flow of charge. Negatively charged electrons flow in the wire.</p> <p>The current (I) through a component depends on both the resistance (R) of the component and the potential difference (V) across the component. The greater the resistance of the component the smaller the current for a given potential difference (pd) across the component.</p>
Charge	<p>Charge is a property of a body which experiences a force in an electric field. Charge is measured in coulombs (C).</p>
Potential difference (Voltage)	<p>A measure of the difference in electrical energy between two parts of a circuit. Measured in Volts. It tells us how many joules of energy is transferred by each coulomb of charge.</p> <p><i>You will only ever be asked about potential difference in exam questions however most equations refer to voltage. So for your GCSEs remember voltage is the <u>same</u> as potential difference</i></p>
Resistance	<p>The wires and the other components in a circuit reduces the flow of charge through them. This is called resistance. Resistance is measured in Ohms.</p>
Parallel circuits 	<p>In parallel circuits, electrical components are connected alongside one another, forming extra loops. When two components are connected in parallel, an individual charge will flow through one of the components only, not both.</p>
Series circuits 	<p>When components are connected in series a charge will flow through all the components in the circuit</p>

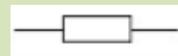
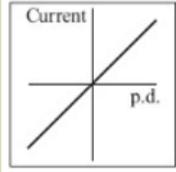




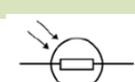
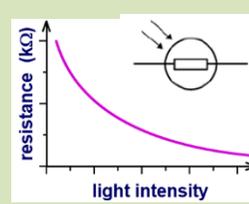
Filament bulb: As you pass a voltage across a filament lamp, the filament wire gets hotter. This causes the ions in the wire to vibrate faster making it harder for electrons to flow, increasing the resistance. As you increase the voltage the current increases but at a decreasing rate.



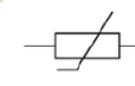
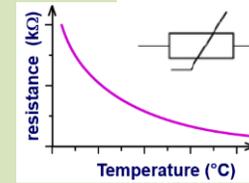
Diode: Diodes only allow current to flow in one direction. In the other direction they have an extremely high resistance



Resistor: For a resistor at a constant temperature current is directly proportional to voltage. The resistance remains constant.

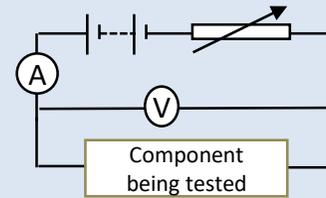


Light dependent resistor (LDR): As the light intensity increases the resistance of an LDR decreases. They are often used as light sensors.

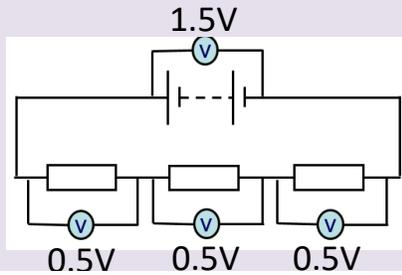
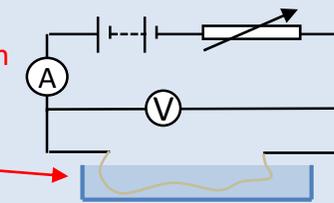


Thermistor: As the temperature of a thermistor increases the resistance decreases. They are often used in thermostats and temperature sensors.

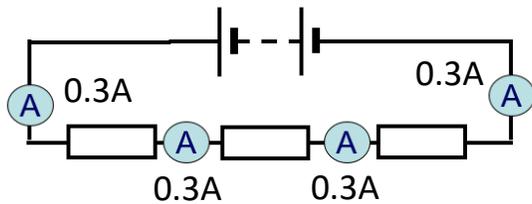
Required practical 4 – investigate the how potential difference affects current for a diode, filament lamp and resistor at constant temperature.



Through of water with wire submerged to maintain a constant temperature



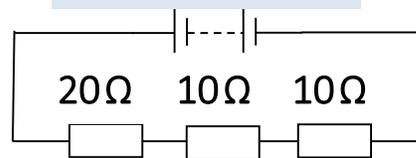
In Series
Potential difference is shared across each component depending on the resistance of each component



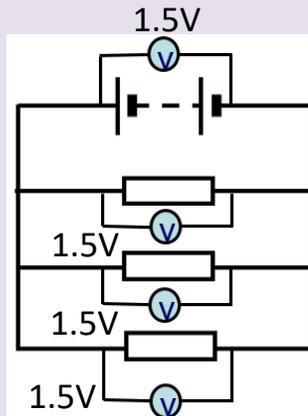
Current is the same every where in the circuit

When **resistors** are connected in **series** the total resistance of the circuit is the sum of their resistances.

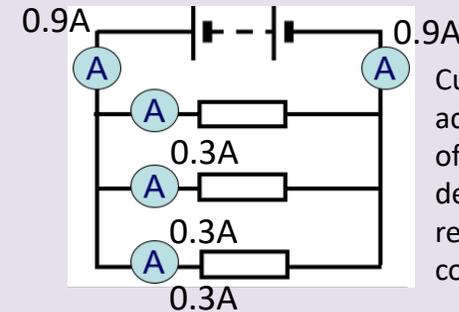
$$R_T = R_1 + R_2 + R_3$$



total resistance = 20 + 10 + 10 = 40 Ω



In Parallel
Potential difference the same across each branch of the circuit



Current is shared across each branch of the circuit depending on the resistance of each component

When **resistors** are connected in **parallel**, then the total resistance of the circuit decreases. Even though you have added another resistor, you have given more pathways for current to flow, thus reducing the overall resistance.

$$Q = I t$$

Charge = current x time

$\frac{Q}{I \times t}$

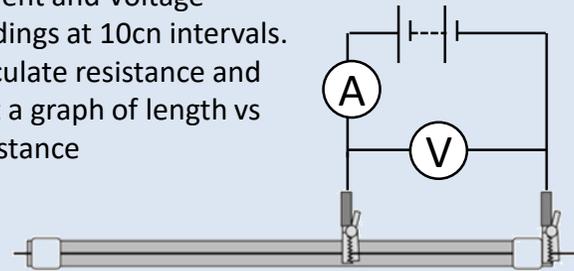
$I = \frac{Q}{t}$

This equation helps us understand current, current is the amount of charge passing a point in a given time (1 Amp = 1 coulomb per second)

Required practical 3
 How does length of a wire affect its resistance

IV – length of wire
 DV – current and voltage (to calculate resistance)
 CVs – cross sectional area of wire, temperature of wire, input voltage

Attach a piece of resistance wire to a meter rule. Take current and Voltage readings at 10cm intervals. Calculate resistance and plot a graph of length vs resistance



$$V = I R$$

Voltage = current x Resistance

Potential difference (V, Volts) (A, Amps) (Ω, Ohms)

$\frac{V}{I \times R}$

$$V = \frac{E}{Q}$$

Potential difference Voltage = Energy Charge

(V, Volts) (J, Joules) (C, Coulombs)

$\frac{E}{V \times Q}$

This equation helps us understand voltage, it tells us that voltage is the amount of energy per coulomb of charge

Symbols to remember:
V Voltage or Potential difference
I Current
P Power
R Resistance
t Time
E Energy

Power, Current, Voltage

$$P = I \times V$$

Power = current x Voltage

(W, Watts) (A, Amps) (V, Volts)

$\frac{P}{I \times V}$

Power, Current, Resistance

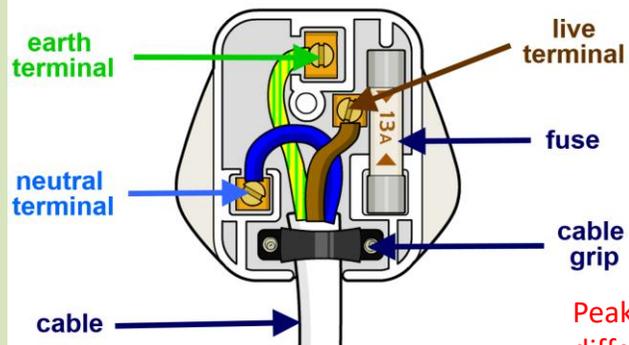
$$P = I^2 R$$

Power = current x Resistance

(W, Watts) (A, Amps) (Ω, Ohms)

$\frac{P}{I^2 \times R}$

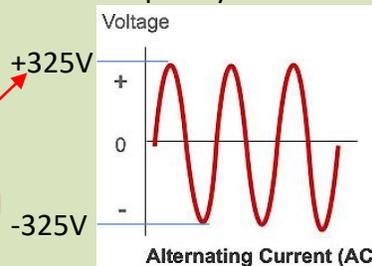
KS4 Physics: Electricity in the home



Mains electricity is an **Alternating Current (AC)**. The current switches repeatedly from + to -
The electrons flow back and forth in the wire. It does this 50 times a second.
We say it has a frequency of 50Hz.



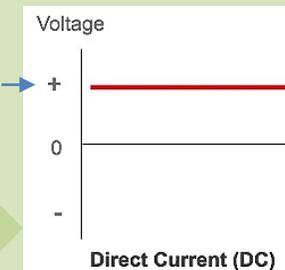
Cells and batteries supply **Direct current**. The electrons in the circuit only travel in **one direction** around the circuit.



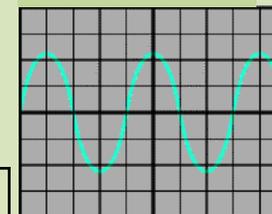
Peak Potential difference

$$\text{Frequency} = \frac{1}{\text{time taken for 1 cycle}}$$

Constant voltage



These are called oscilloscope traces



Each square on the y axis represents the potential difference (voltage) measured. Each square on the x axis represents a time

If each square on the x-axis represented 0.02s the period of the Alternating current would be 0.08s. The frequency would be 12.5Hz ($F = 1/T$)

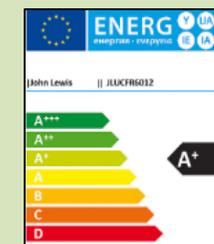
Live wire	brown	The live wire carries the alternating potential difference from the supply. The potential difference between the live wire and earth (0 V) is about 230 V (It alternates between +325V and -325 volts)
Neutral wire	blue	The neutral wire completes the circuit. The neutral wire is at, or close to, earth potential (0 V).
Earth wire	green and yellow stripes	The earth wire is a safety wire to stop the appliance becoming live. The earth wire is at 0 V. If a fault occurs connecting the live wire to the case of the appliance, the current will travel down the earth wire instead of a person! (avoiding an electric shock). If the case of your device has a plastic outer case then it would not need an earth wire as the case could not become live
Fuses		Fuses protect the appliance if the current gets to high. A fuse contains a piece of wire that melts if the current increases above a particular value. Fuses commonly come in 3A, 5A and 13A. If your appliance runs at 3.8A you would use a 5A fuse
Cable		Most electrical appliances are connected to the mains using three core cable. The insulation covering each wire is colour coded for easy identification.

$$\text{Efficiency} = \left(\frac{\text{Useful energy output}}{\text{Total energy input}} \right) \times 100$$

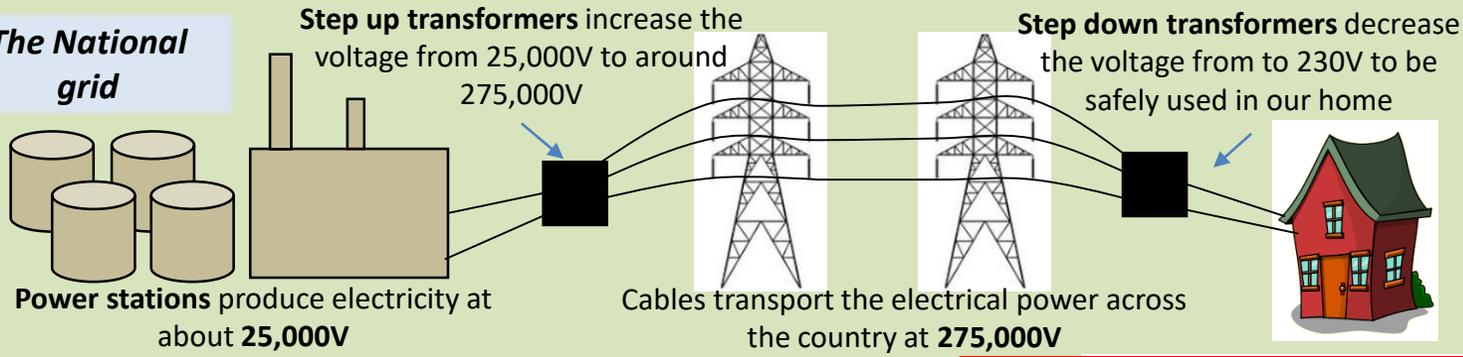
$$\text{Efficiency} = \left(\frac{\text{Useful power output}}{\text{Total power input}} \right) \times 100$$

The efficiency of electrical appliances is very important. An efficient appliance will transfer a high proportion of the electrical energy in a useful way.

Consumers can identify the efficiency of appliances using a rating system



The National grid



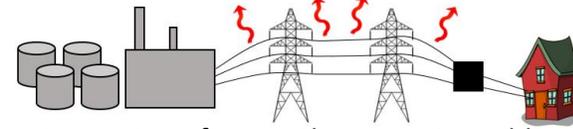
Step up transformers:
Increase voltage
Decrease current

Step down transformers:
Increase voltage
Decrease current

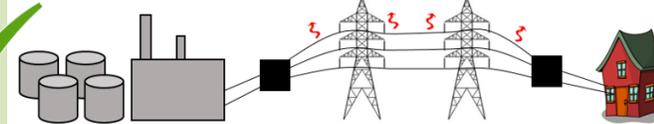
Reducing electrical energy losses

When electrical current passes through a wire it becomes hot. This means electrical power is being transferred to heat, resulting in less power being delivered to our homes.

The higher the current the greater the heating in the wires. Therefore electrical energy needs to be transferred through the cables at a low current. Step up transformers increase the voltage, which decreases the current, so electrical energy is transferred at very high voltages



With no step up transformer, the current would remain high and electrical power would be lost as it transfers to heat energy in the wires, and then to the surroundings



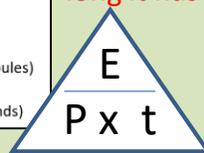
With a **step up transformer** (increasing the voltage) the current would reduce resulting in much less heating in the wires, resulting in more electrical power being supplied to the home.

Power, Energy, Time

$$P = \frac{E}{t}$$

Power = $\frac{\text{Energy (J, Joules)}}{\text{time (s, seconds)}}$

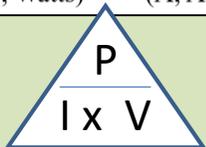
Power is the amount of energy used every second. You can work out how much energy you have used with an appliance if you know the power rating of the appliance and how long it has been on for.



Power, Current, Potential difference

$$P = I \times V$$

Power = current x Voltage Potential difference
(W, Watts) (A, Amps) (V, Volts)



You can also work out the power of an appliance if you know the potential difference and the current.

$P = IV$ and $V = IR$

Substitute V for IR

So...

$$P = I \times I \times R$$

$$P = I^2 R$$

How it works..

2000W of power could be transported at 100A and 20V
($P = I \times V$, $20 \times 100 = 2000W$)

However if you increased the voltage to 1000V using a step up transformer, the current would reduce to 2A reducing power losses due to heating

($P = I \times V$, so $2 \times 1000 = 2000W$)

In physics you can combine equations. This can be useful if it appears you don't have the right data in the question.

You may also face questions where you need to use one equation first, followed by a second equation

KS4 Physics: P7 Radioactivity

The history of the atom

Atomic structure

Subatomic particle	Mass	Charge
Neutron	1	0
Proton	1	+1
electron	Very small $\frac{1}{2000}^{\text{th}}$	-1

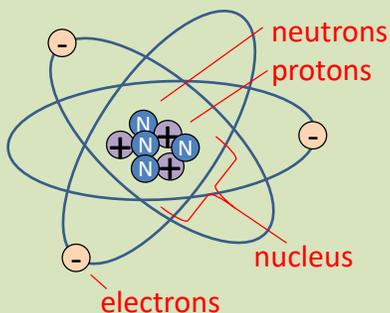
Relative atomic mass = number of protons and neutrons in the nucleus



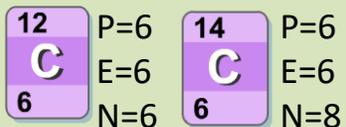
Atomic number = number of protons (number of electrons also)

P = 3
E = 3
N = 4 (7-3)

To work out the **number of neutrons** = **atomic mass – atomic number**



Isotope: an element containing the same number of protons but a different number of neutrons

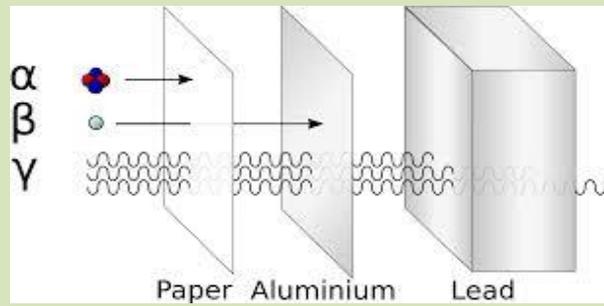


Some isotopes are more stable than others. Some isotopes are unstable and undergo radioactive decay.

Name	Date	Discovery	Diagram	Explanation
J J Thomson	1897	The electron – Plum pudding Model		Discovered the electron, proposed the plum pudding model that there were negatively charged electrons embedded in a sphere of positive charge
Rutherford Geiger and Marsden	1911	The Nucleus Nuclear model of the atom – gold leaf exp.		Positively charged alpha particles were fired at very thin gold foil, with Thomson's model they would have passed through but some were deflected and some reflected back. This could only be explained by a concentrated mass and charge at the centre of the atom. The charge must have been positive to deflect the alpha particles. Most of the atom must be empty space for the majority to pass straight through.
Niels Bohr	1922	Electron shells		He discovered that elements emitted light of only specific wavelengths leading to the idea that electrons exist in specific energy levels or shells. Electrons move closer to the nucleus when they emit EM radiation and further from the nucleus when they absorb EM radiation.
James Chadwick	1932	The neutron		Noticed that the mass of protons in an atom did not add up to the total mass of the atom, he later experimentally discovered the charge-less neutron.

Some isotopes **decay**, radioactive substances give out nuclear radiation in the form of **alpha particles (α)**, **beta particles (β)**, and **gamma rays (γ)**.

When this nuclear radiation interacts with other atoms or molecules, they may break them up into **ions**. This is known as **ionization**.



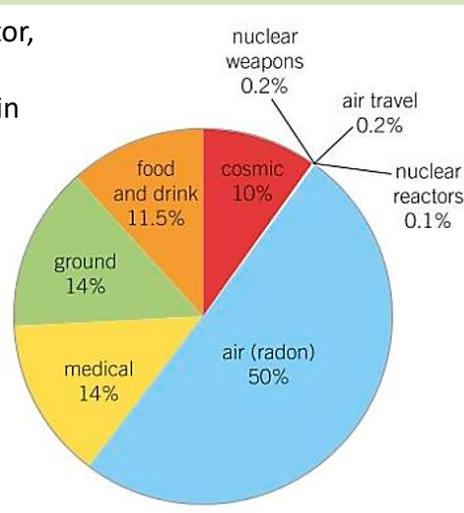
Radiation	Symbol	What is it?	Ionisation strength	Penetrating power	Range in air
Alpha α	${}^4_2\text{He}$ ${}^4_2\alpha$	A Helium nucleus	Strongly ionising	Stopped by paper	A few cm (~10cm)
Beta β	${}^{-1}_0\text{e}$ ${}^{-1}_0\beta$	An electron	Moderately ionising	Stopped by aluminium	Several metres
Gamma γ	${}^0_0\gamma$	An electro magnetic wave	Very weakly ionising	Stopped by thick lead	Many, many meters

Measuring radiation:

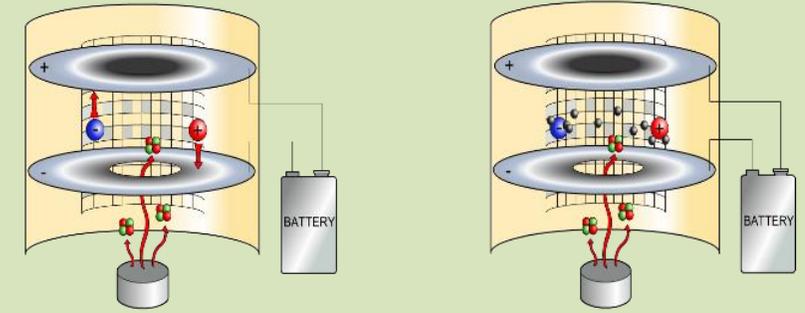
- **Count-rate** is the number of decays recorded each second by a detector, such as the Geiger-Muller tube.
- **Activity:** the number of decays per second from a sample (measured in Becquerel's Bq).
- Sieverts: this is a unit for dose (Sv) usually given in milli Sieverts, mSv

We are exposed to **background radiation** every day and it poses an extremely low risk. Most of this occurs naturally.

People who work with ionising radiation have to monitor their exposure time to ensure they do not go above the safe limits of exposure.

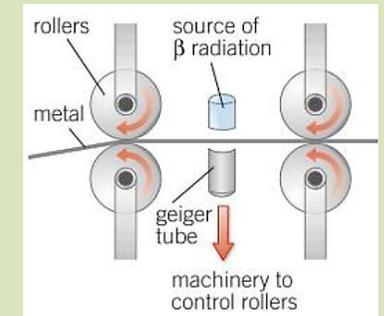


Uses of radioactive decay

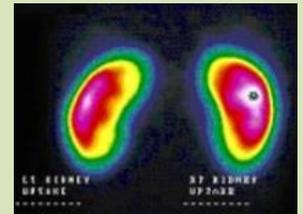


Alpha particles are used in smoke detectors. The alpha particles ionise air between two plates in a circuit. This allows a current to flow. If smoke is present, this interacts with the alpha particles resulting in a drop in the current and the alarm sounds.

Beta particles are used to detect the thickness of paper. If the detector detects too much beta radiation the paper has become too thin and the rollers are adjusted. If too little radiation passes through it means the paper is too thick.



Gamma Radiation has many uses. It can be used to sterilise medical equipment. It can be fired in narrow beams at cancerous cells as it can pass through the skin and body tissue.



It is used for radioactive tracers, for example to check for blockages in the kidneys. A solution containing a gamma source is ingested and gamma radiation will be emitted more strongly from an area that may be blocked as there will be a greater concentration of the gamma source. The source must have a long enough half-life to get readings but short enough not to cause harm to the body.

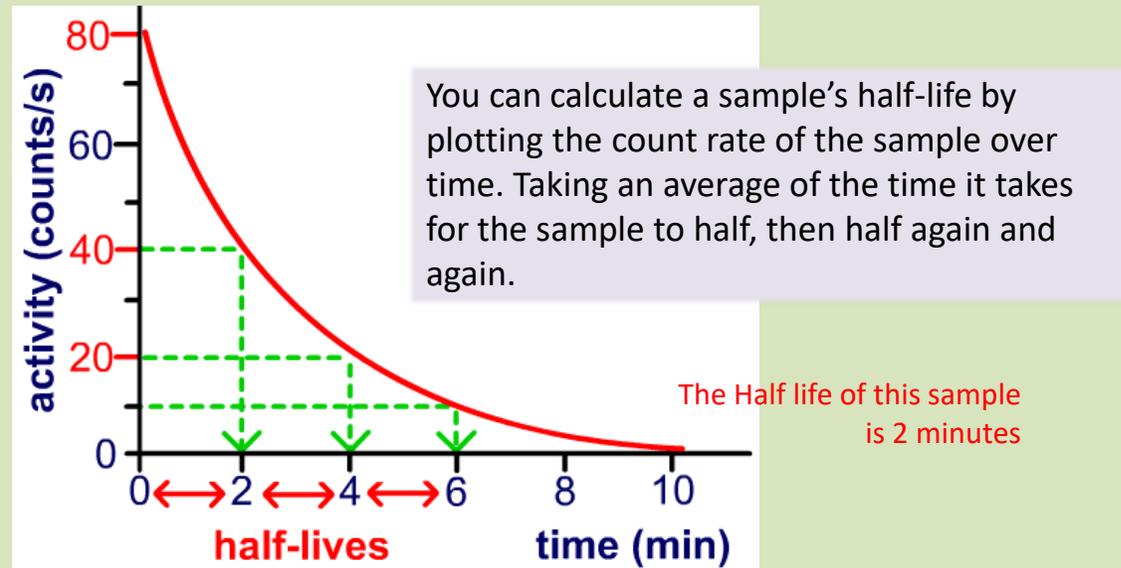
Half-life The half-life of a radioactive isotope is the average time that it takes for **half** the nuclei in a sample to decay.

There are three ways to consider half-life:

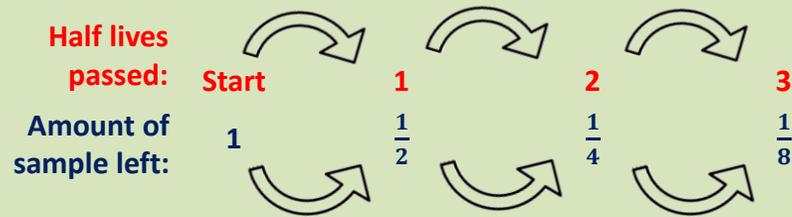
Half-life is the time it takes for half of nuclei in a sample to decay

Half-life is the time taken for the activity of the sample to halve

Half-life is the time taken for the count rate to halve



You may be asked to work out how much of a sample is remaining after a particular time. To do this work out how many **Half-lives** have passed. If 3 half-lives have passed you will have $\frac{1}{8}^{th}$ the original sample left.



Example. A sample of 12g of iodine has a half-life of 8 days. How much of the sample will remain after 24 days?

Answer: 24 days = 3 x half-lives. So the sample will have halved 3 times. There will be $\frac{1}{8}^{th}$ remaining so $\frac{1}{8}^{th}$ of 12g = 1.5g remaining

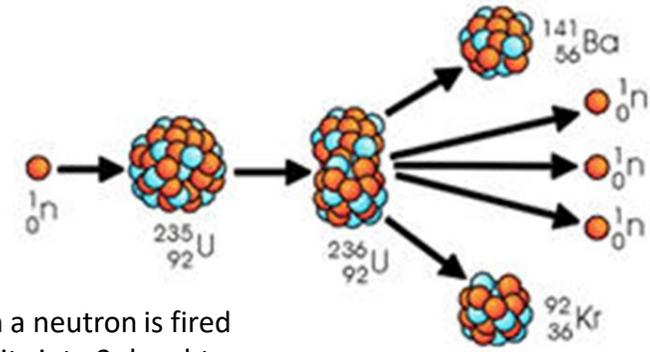
Physics Separates only

Fission and fusion

Fission : splitting atoms

Fusion : joining atoms

Nuclear fission occurs when a stable isotope is struck by a **neutron**. The isotope absorbs the neutron, becomes unstable and then **splits** apart, releasing large amounts of energy.



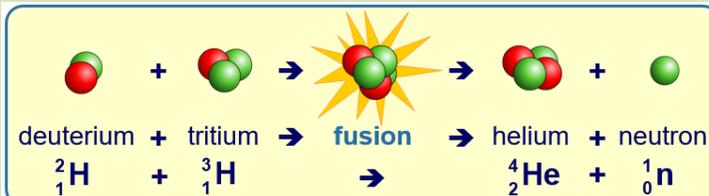
In a fission chain reaction a neutron is fired at a ${}^{235}U$ nucleus. This splits into 2 daughter nuclei and releases 3 more neutrons. These in turn collide with other ${}^{235}U$ nuclei and the process repeats. Lots of energy is released in the form of kinetic energy and gamma rays.

Nuclear Power stations control the chain reaction to harness the energy and heat water (creating steam to spin a turbine and generator)

Benefits: The fission of 1 kilogram of **uranium-235** releases more energy than burning 2 million kilograms of coal and there is no CO_2 output from Nuclear fission.

Drawbacks: Nuclear power stations produce nuclear waste that remains radioactive for 1000s of years. Accidents at nuclear power plants can result in harmful substances entering the environment.

Nuclear fusion occurs in under extremely high temperatures and pressures like that found in the sun and other stars. Small Nuclei are fused together to form larger atoms and energy is released.



The Torus fusion reactor can achieve this on earth but at the moment we put in more energy in than we get out so can not use it to generate electricity

Nuclear weapons involve uncontrolled fission chain reactions that trigger further fusion reactions releasing extraordinary amounts of energy.



Computational Thinking – Data Representation – Term 1

Converting Binary into Denary

People use the Denary (or Decimal) number system in their day-to-day lives. This system has 10 digits that we can use: **0, 1, 2, 3, 4, 5, 6, 7, 8 and 9**.

This is how we understand and count. For us to understand what PC's are trying to do we need to learn to convert Binary into Denary.

Converting Binary into Decimal

The value of each binary place value is calculated by multiplying the previous place value by two. The first eight binary place values are:

128	64	32	16
	8	4	2
	1		

In binary, each place value can only be represented by 1 or a 0.

To convert binary to denary, simply take each place value that has a 1, and add them together.

For example, the binary number 00001011 in binary place values is:

128	64	32	16
	8	4	2
	1		
0	0	0	0
	1	0	1
	1		



Scan this with your phone to take you to the Thinct.com page on [Data Representation](#)

128	64	32	16	8	4	2	1
0	0	0	0	1	0	1	1
				8 + 2 + 1 = 11			
128	64	32	16	8	4	2	1
0	0	0	1	0	1	0	1
			16 + 4 + 1 = 21				
128	64	32	16	8	4	2	1
0	1	1	0	0	1	0	0
		64 + 32 + 4 = 100					

Hexadecimal

Hexadecimal (or **hex**) is a base 16 system used to simplify how binary is represented. A **hex** digit can be any of the following 16 digits: **0 1 2 3 4 5 6 7 8 9 A B C D E F**.

Each **hex** digit reflects a 4-bit binary sequence.

This table shows each **hex** digit with the equivalent values in binary and denary:

	Denary	Binary	Hexadecimal
0		0000	0
1		0001	1
2		0010	2
3		0011	3
4		0100	4
5		0101	5
6		0110	6
7		0111	7
8		1000	8
9		1001	9
10		1010	A
11		1011	B
12		1100	C
13		1101	D
14		1110	E
15		1111	F

Example:

- **11010100** in binary would be **D4** in hex
- **FFFF3** in hex would be **11111111111111110011** in binary

Computational Thinking – Data Representation – Term 1

How do Computers represent characters?

When any key on a keyboard is pressed, it needs to be converted into a binary number so that it can be processed by the computer and the typed character can appear on the screen.

A code where each number represents a character can be used to convert text into binary. One code we can use for this is called **ASCII**. The **ASCII** code takes each character on the keyboard and assigns it a binary number. For example:

- The letter 'a' has the binary number 0110 0001 (this is the denary number 97)
- The letter 'b' has the binary number 0110 0010 (this is the denary number 98)
- The letter 'c' has the binary number 0110 0011 (this is the denary number 99)

Text characters start at denary number 0 in the **ASCII** code, but this covers special characters including punctuation, the return key and control characters as well as the number keys, capital letters and lower case letters.

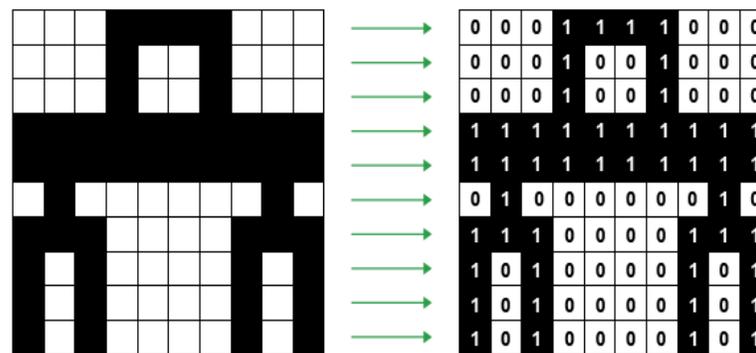
ASCII code can only store 128 characters, which is enough for most words in English but not enough for other languages. If you want to use accents in European languages or larger alphabets such as Cyrillic (the Russian alphabet) and Chinese Mandarin then more characters are needed. Therefore another code, called **Unicode**, was created. This meant that computers could be used by people using different languages.

How do Computers represent Images?

Images also need to be converted into binary in order for a computer to process them so that they can be seen on our screen. Digital images are made up of **pixels**. Each **pixel** in an image is made up of binary numbers.

If we say that 1 is black (or on) and 0 is white (or off), then a simple black and white picture can be created using binary.

To create the picture, a grid can be set out and the squares coloured (1 – black and 0 – white). But before the grid can be created, the size of the grid needs to be known. This data is called metadata and computers need metadata to know the size of an image. If the metadata for the image to be created is 10x10, this means the picture will be 10 **pixels** across and 10 **pixels** down.



How do Computers represent Sound?

Sound needs to be converted into binary for computers to be able to process it. To do this, sound is captured - usually by a microphone - and then converted into a digital signal.

An analogue to digital converter will sample a sound wave at regular time intervals. The samples can then be converted to binary. They will be recorded to the nearest whole number.

If the time samples are then plotted back onto the same graph, it can be seen that the sound wave now looks different. This is because sampling does not take into account what the sound wave is doing in between each time sample.

This means that the sound loses quality as data has been lost between the time samples. The way to increase the quality and store the sound at a quality closer to the original, is to have more time samples that are closer together. This way, more detail about the sound can be collected, so when it's converted to digital and back to analogue again it does not lose as much quality.

The frequency at which samples are taken is called the sample rate, and is measured in Hertz (Hz). 1 Hz is one sample per second. Most CD-quality audio is sampled at 44 100 or 48 000 KHz.



Scan this with your phone to take you to the Thinct.com page on [Data Representation](#)

Computational Thinking – Data Representation – Term 1

What is Compression

Processing power and storage space is very valuable on a computer. To get the best out of both, it can mean that we need to reduce the file size of text, image and audio data in order to transfer it more quickly and so that it takes up less storage space.

In addition, large files take a lot longer to download or upload which leads to web pages, songs and videos that take longer to load and play when using the internet. Compression addresses these issues.

Any kind of data can be compressed. There are two main types of compression: lossy and lossless.

Lossy

Lossy compression removes some of a file's original data in order to reduce the file size. This might mean reducing the numbers of colours in an image or reducing the number of samples in a sound file. This can result in a small loss of quality of an image or sound file.

A popular lossy compression method for images is the **JPEG**, which is why most images on the internet are JPEG images. A popular lossy compression method for sounds is **MP3**. **Once a file has been compressed using lossy compression, the discarded data cannot be retrieved again.**

Lossless

Lossless compression doesn't reduce the quality of the file at all. No data is lost, so lossless compression allows a file to be recreated exactly as it was when originally created. There are various algorithms for doing this, usually by looking for patterns in the data that are repeated. **Zip** files are an example of lossless compression.

The space savings of lossless compression are not as good as they are with lossy compression.



Scan this with your phone to take you to the Thinct.com page on [Data Representation](#)

Type	Lossy compression	Lossless compression
Formats	JPG, MP3, WMV, MPG	TIF, PDF, GIF, PNG, MOV, ZIP
Examples		
Advantages	Smallest file sizes, least transmission time, reduces Internet traffic and collisions	Original quality is preserved / no information or data is lost
Disadvantages	Detail is permanently lost	Less significant reduction in file size
Example uses	Music streaming, online images and video, image libraries on devices or in the cloud	Text documents, electronic books, high resolution print documents

Computational Thinking – Networking – Term 2

Introducing networks

A network is created when more than one device is connected together. A network can be a small collection of computers connected within a building (e.g. a school, business or home) or it can be a wide collection of computers connected around the world.

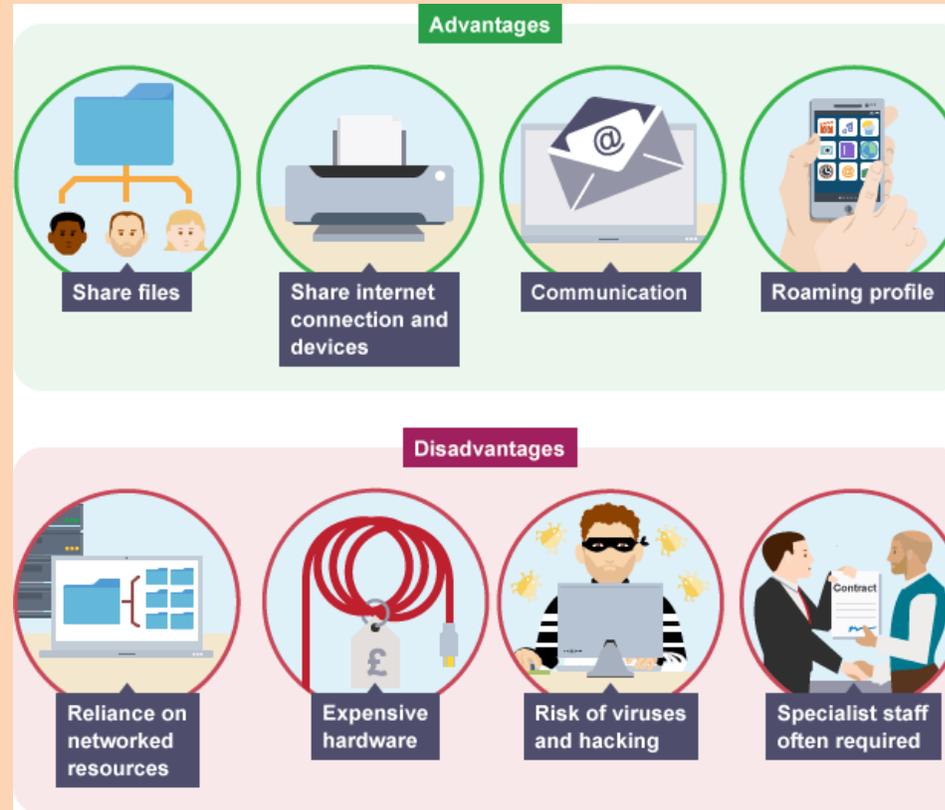
Data packets

The main purpose of networking is to share data between computers. A file has to be broken up into small chunks of data known as data packets in order to be transmitted over a network. The data is then re-built once it reaches the destination computer. Networking hardware is required to connect computers and manage how data packets are communicated. Protocols are used to control how data is transmitted across networks.

There are advantages and disadvantages to using networks.

Advantages

- **Communication** – it is easy (and often free) to communicate using email, text messages, voice calls and video calls.
- **Roaming** – if information is stored on a network, it means users are not fixed to one place. They can use computers anywhere in the world to access their information.
- **Sharing information** – it is easy to share files and information over a network. Music and video files, for instance, can be stored on one device and shared across many computers, so every computer does not need to fill the **hard drive** with files.
- **Sharing resources** – it is easy to share resources such as printers. Twenty computers in a room could share one printer over a network.
- **Sharing software** – it is possible to **stream** software using **web applications**. This avoids needing to download and store the whole software file.



Disadvantages

- **Dependence** – users relying on a network might be stuck without access to it.
- **Hacking** - criminal hackers attempt to break into networks in order to steal personal information and banking details. This wouldn't be possible on a stand-alone computer without physically getting into the room, but with a network it is easier to gain access.
- **Hardware** – **routers, network cards** and other network hardware is required to set up a network. At home, it is quite easy to set up a wireless network without much technical expertise. However, a complicated network in a school or an office would require professional expertise.
- **Viruses** - networks make it easier to share **viruses** and other malware. They can quickly spread and damage files on many computers via a network.

Types of networks

A network can be anything from two computers connected together, to millions of computers connected on the internet. There are many different types of networks such as **LAN**, **WAN**, and **PAN**.

- PAN:** Personal area network - e.g. Bluetooth phone to speaker.
- LAN:** Local area network - small geographical area.
- MAN:** Metropolitan network - e.g. London network.
- WAN:** Wide area network - large geographical area (Internet).

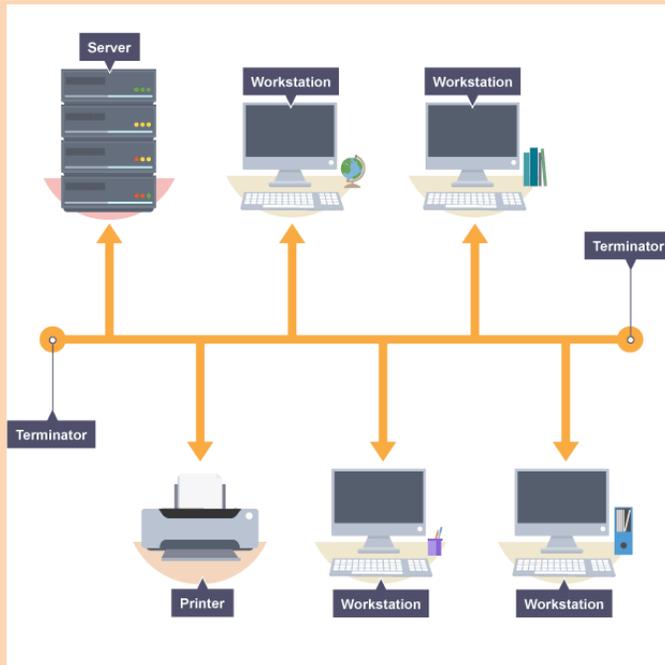
Computational Thinking – Networking – Term 2

Network Topologies – Network Design

There are different ways of setting up a **LAN**, each with different benefits in terms of network speed and cost. Three of the main **topologies** include bus, star and ring.

Bus Network

In a **bus network** all the **workstations, servers** and printers are joined to one cable - 'the bus'. At each end of the cable a **terminator** is fitted to stop signals reflecting back down the bus.



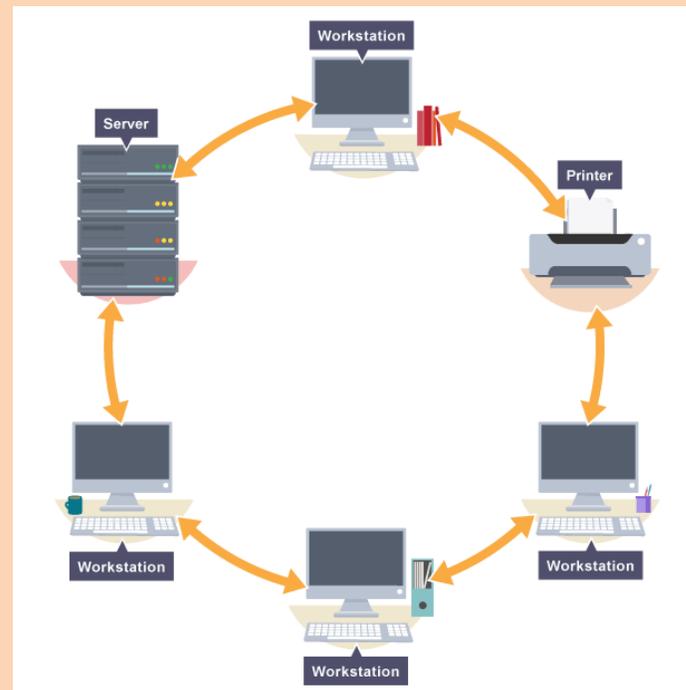
Network Equipment

Routers: A **router** can form a **LAN** by connecting devices within a building. It also makes it possible to connect different networks together. Homes and businesses use a router to connect to the internet. A router can often incorporate a modem within the hardware.

Switches: Connects different nodes on same network. It stores the MAC addresses of devices on the network and filters data packets to see which devices have asked for them.

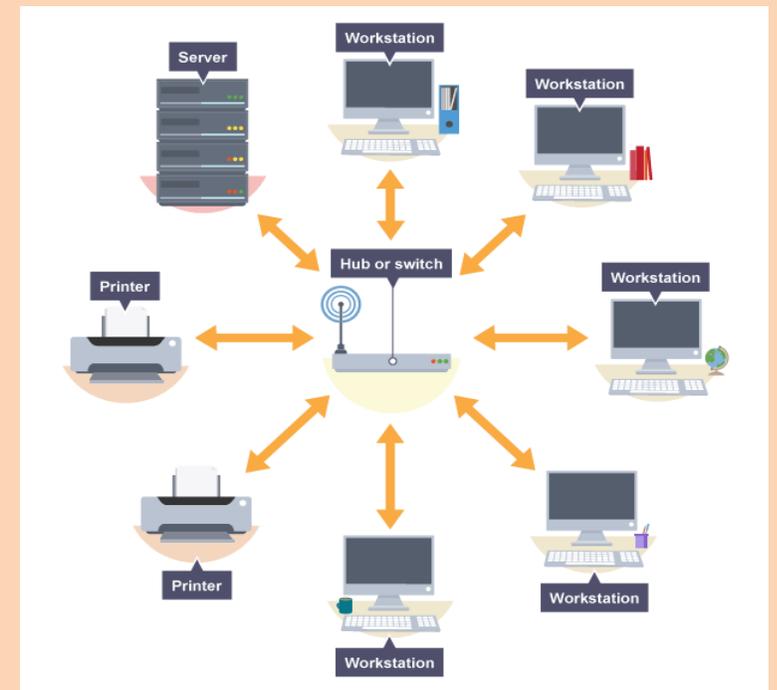
Ring network

In a ring network, each device (e.g. workstation, server, printer) is connected in a ring so each one is connected to two other devices. Each **data packet** on the network travels in one direction. Each device receives each packet in turn until the destination device receives it.



Star network

In a star network, each device on the network has its own cable that connects to a **switch** or **hub**. This is the most popular way of setting up a LAN. You may find a star network in a small network of five or six computers where speed is a priority.



Computational Thinking – Networking – Term 2

Protocol

The internet is similar to a road network in that it has rules (**protocols**) that you need to follow and only a certain number of vehicles (**data**) can get through at a time (**bandwidth**). If too many vehicles try to go down the same road you get congestion (reduced bandwidth).

When two devices send messages to each other it is called **handshaking** - the **client** requests access, the **server** grants it, and the **protocols** are agreed. Once the handshaking process is complete, the data transfer can begin.

Protocols establish how two computers send and receive a message. **Data packets** travel between source and destination from one **router** to the next. The process of exchanging data packets is known as **packet switching**.

Protocols manage key points about a message:

- Speed of transmission.
- Size of the message.
- Error checking.
- Deciding if the transmission is **synchronous** or **asynchronous**.

TCP/IP Protocol Layers

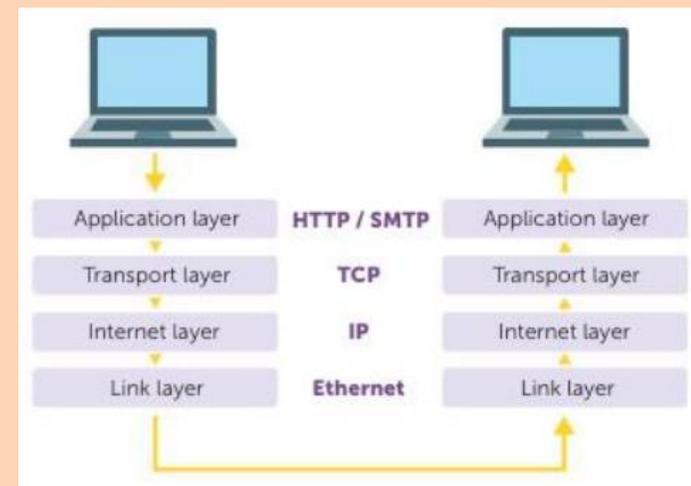
TCP/IP (also known as the internet protocol suite) is the set of protocols used over the internet. It organises how data packets are communicated and makes sure packets have the following information:

- **Source** - which computer the message came from.
- **Destination** - where the message should go.
- **Packet sequence** - the order the message data should be re-assembled.
- **Data** - the data of the message.
- **Error check** - the check to see that the message has been sent correctly.

Enables engineers to specialise in an area without needing to know about other layer. If protocols are changed in one layer they do not affect protocols in other layers

Different protocols are used for different purposes:

Protocol	Purpose	Key features
HTTP (Hypertext Transfer Protocol)	Used by a browser to access a webpage from a web server	Delivers web page data
HTTPS (Hypertext Transfer Protocol Secure)	As HTTP with encryption	Encrypts the data and uses a secure socket layer for greater protection
FTP (File Transfer Protocol)	Transmitting files between client and server computers	Used to upload and download files from a server
POP (Post Office Protocol)	Retrieving an email from an email server to your device	Deletes messages on the email server once they have been downloaded to a single device
IMAP (Internet Message Access Protocol)	Accessing email on a mail server via multiple devices	Maintains synchronisation of an email account across all devices
SMTP (Simple Mail Transfer Protocol)	Sending email messages between mail servers	Used for sending only



iMedia - Digital Graphics – Key Terms

Key Term	Explanation
Assets	These are the component parts that are used in the creation of the digital graphic. Examples would be photographs, images, graphics, text, logos.
Design and layout of graphics	This refers to the use of colour, composition, white space and styles in the digital graphic in the context of a given target audience . For example, choices of colour can be very different depending on the age group of the target audience . The colours should also contrast and complement each other. Composition refers to the layout of the different elements on the overall graphic, using suitable sizes and positions of different images and assets. White space is not necessarily a white colour – it is any blank space and can be used effectively to emphasise key parts of the graphic. The styles are associated with different genres of graphic products. Examples would include themed magazine covers, gaming covers, film posters, advertisements. These concepts of design and layout can be applied in the development of the visualisation diagram .
File formats	This refers to the type of image file and file extension that is being used or considered. Typical examples of file formats are .tif, .jpg, .png, .bmp, .gif and .pdf .
Image editing software	This is the type of software required for the unit. It is not the same as desktop publishing software, which does not have the required range of image editing tools and techniques.
Legislation	In the context of digital graphics , this refers to the differences between copyright protected, copyright free, royalty free and use of trademarks. For example, a final graphic may be considered as an orphan work but the copyright on component images and assets remains with the original author/owner. Google images should not be accepted as a copyright free source.

Key Term	Explanation
Properties	The properties of digital graphics refer primarily to the pixel dimensions and dpi resolution. Final work that is 595 x 842 pixels will be the correct aspect ratio for an A4 page but since this would only be at 72dpi it is not suitable for print purposes. Furthermore, a graphic that is saved using pixel dimensions of 2480 x 3508 (i.e. A4 at 300dpi) using jpeg low quality settings might reduce the file size but that does not mean it is suitable for web use. The fitness for purpose of the final graphics is fundamental to the unit. This means it must have an appropriate number of pixels – whether for print or web use
Resources	This refers to the hardware and software used to create the graphics. Examples would include both the computer equipment, image capture hardware and the image editing software application
Technical compatibility of assets	Component images that are to be used in a digital graphic should be technically compatible with each other. This primarily refers to the pixel dimensions and dpi resolution. For example, a 300 x 200 pixel image at 72 dpi would be unsuitable for use as the background image to a full size A4 print poster. If for print, this should be converted for typically 300dpi and the pixel dimensions taken into consideration for the print size of this component image rather than the overall finished product. Alternatively, high resolution photographs may not be suitable as a component part of a web graphic. The file formats would also be part of the technical compatibility consideration
Visualisation diagram	This is a preconceived sketch or diagram of what is to be created as the digital graphic. It can be hand drawn or produced using a software application. The intention is such that any other person or the client can get an idea of what the final product will look like. It can include annotations in addition to a draft layout of the content.

iMedia - Digital Graphics Term 3

What is a Client Brief

A client brief is what a company will be asked to do when designing a media product. These might come from as written brief, a discussion, a script or from a specification.

Target Audience

The Target audience of a product is who the product is aimed at. Note: This is not always the same as who it is being produced for!

You will need to consider the following when creating a product for your target audience:

- Age group
- Gender
- Location
- Ethnicity / culture
- Income

Image Editing

Image editing software is used to create and edit images. Often images can be edited or combined to create a new composition. They can also be created from scratch to create logos or illustrations.



Film Editing

Film editing software is used to create and edit video footage. It allows Video Editors to cut and manipulate video footage to create films, documentaries, tutorials and vlogs among many other things.



Digitising

Digitising is where a pre-production document is created by hand and then convert into a digital format, usually by a scanner. These are then saved as an appropriate file format and size.

Key Words

Hardware Software Web Browser
Digitising Peripheral Computer system
Plan Mind Map Storyboard
Pre-Production Visualisation

Hardware and Software

In order to create or digitise pre-production documents, different types of computer hardware are needed which are split into different categories. These are the computer systems, peripherals, imaging devices and other equipment

- Computer Peripherals – attachments to increase functionality of the system. e.g. keyboard, mouse, trackpad, graphics tablet, monitor, speakers, microphone etc.
- Imaging device – devices used to capture or create images e.g. digital cameras, camcorders, scanners
- Other equipment – these are pieces of equipment not connected to a computer system.

They are often materials that are used, such as pens, pencils, paper. They are still classed as Hardware because they are needed especially when pre-production documents can also be created by hand.

Primary Research

When planning a product for a client is it important that some research is undertaken in order to ensure your product is appropriate for both the client and it's intended target audience.

Primary research is where fresh or new data is collected for the first time. Examples of primary research methods are: questionnaires, surveys, interviews, focus groups or monitoring of particular behaviours or interactions. Others include photos, videos or recordings.

Secondary Research

Secondary research involves the gathering of pre-existing data that has already been produced.

Secondary research is where information or data is collected from reports or previous studies by agencies such as the government or business within a particular area of business or industry that has previously collected primary research, Others include biographies, articles or news broadcasts

Hardware and Software

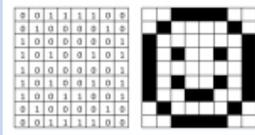
All components of a computer system can be categorised into Hardware and Software.

- Hardware – the parts of the computer system you can physically touch: e.g. Monitor, Printer, Camera, Microphone, Scanner
- Software – Programs that are installed and run on a computer to perform a specific task: e.g. Web browser, Desktop Publishing, Film Editing, Image Editing, Word Processing & Web Authoring.

iMedia - Digital Graphics Term 4

Bitmap

Bitmap graphics are made up of tiny little squares called pixels. Each pixel is stored as a data value which represents each colour. These data values are made up of 1's and 0's – a number system that computers use called binary.



Vector

A vector image uses geometrical formulas to represent image as a shape or object. They can be resized without losing quality and so are often used for company or product logos.



Images

Images are pictures that have been created or copied and stored in electronic form. There are two types: bitmap and vector graphics.

Key Words

Formats Bitmap Vector
Compression
Lossy Lossless Version Control

Version Control

The naming conventions of files should include the use of relevant words and phrases that describe the content of the digital graphic file. The renaming of a photograph from a digital camera would be a good starting point e.g. 'DSCN1056.jpg' being renamed to 'school_entrance.jpg'

File Compression

This is how files are made smaller so that they take up less storage space or can be easily transferred, transmitted or downloaded. There are two types:

- Lossy – Discards some of the original information to reduce file size. Quality is usually reduced. Useful for use on the web.
- Lossless – No information is discarded, file size is usually greater but so is the quality.

Examples of File Formats

Image	.jpg .psd .pdf	.png .bmp	.tiff
Video	.wmv .mov	.mp4 .fiv	.avi
Audio	.mp3 .ogg .m4a	.wav .aac	
Document	.doc .pub	.pdf .html	.ppt
Animation	.gif	.swf	

File Types and Formats

Depending on the pre-production document that you are creating, the content of it, and the software you are using, a digital file will be created when a project is saved or exported. It is important that the file type and format used is compatible with the document type otherwise it may be unreadable or inaccessible. Some file types are designed to only be used by specific software packages e.g. Photoshop .psd whereas others are designed to be widely compatible and accessible.

Examples of Image Formats

Format	Properties and Uses	Limitations
.jpg	Lossy compression to reduce file size.	Quality is reduced.
.png	Lossy compression and supports transparency.	Not widely supported.
.tiff	Lossless files used for high quality printing	Very large file size
.psd	Photoshop document that allows editing	Only supported by Adobe products.
.bmp	Bitmap file, usually uncompressed	Large file size
.pdf	Export format that turns documents into images	Cannot be directly edited.

iMedia - Digital Graphics Term 4

Legislation

Legislation are laws passed by government to control, restrict, protect and prevent various aspects of media production.

There are three main pieces of legislation that affect media production:

- Data Protection Act 1998
- Health and Safety Act 1990
- Copyright, Designs and Patents Act 1988

Health and Safety Act 1990

The Health and Safety Act is the main law that deals with the health and safety of employees.

The law ensures that employers look after the rights of their workers by keeping the conditions to an acceptable and legal standard.

Two areas covered by H&S are:

1. General Working Conditions
2. Employer Regulations

Data protection Act 1998

The Data Protection Act 1998 (DPA) is a law designed to protect personal and sensitive data that has been collected about people from being misused. There are 8 Principles:

1. Data is processed fairly and lawfully.
2. Data is used for specified legal purposes.
3. Data stored is adequate, relevant and not excessive.
4. Data is accurate and up to date.
5. Data is not kept longer than necessary.
6. Data is processed in accordance with data subjects' rights.
7. Data is kept safe from accidental damage and secure from unauthorised access.
8. Data is not transferred to another country outside the EU.

Copyright

Copy right is a law designed to help protect peoples work and ideas.

If you:

- **Take peoples work (download films /music)**
- **Use people's work (copy text/ images from the internet**
- **Steal people's ideas (create a new product using someone else's technology)**

Without permission and without acknowledging them, then you are breaking copyright law. Typical punishments range from 6 months to 10 years imprisonment and also £5000 fine.



Location Recce

Location Recce is a production term used in the UK, Europe, India, Australia, New Zealand, South Africa, and Malaysia which refers to a pre-filming visit to a location to determine its suitability for shooting (commonly carried out by the Director of Photography), including access to necessary facilities and assessment of any potential lighting or sound issues, and is closely related to location scouting. In the US, the term "site survey" or "tech scout" is commonly used with the same meaning.

Trademark

A Trademark is a type of intellectual property consisting of a recognizable sign, design, or expression which identifies products or services of a particular source from those of others, although trademarks used to identify services are usually called service marks. The trademark owner can be an individual, business organization, or any legal entity. A trademark may be located on a package, a label, a voucher, or on the product itself. For the sake of corporate identity, trademarks are often displayed on company buildings. It is legally recognized as a type of intellectual property.

Key Words

Legislation Data Protection Health & Safety
Copyright Location Recce Trademark
Intellectual Property Royalty Free

Intellectual Property

This is a piece of work, idea or an invention which may then be protected by copyright, patent or trademark. The concept of copyrighting an idea is increasingly becoming a bigger issue with the development of the internet and the ease of access to people's intellectual property.

Royalty Free

Normally, copyrighted material is protected and cannot be used without permission and payment of royalties. Royalties are usually a percentage of earnings or recurring payment made to a creator or intellectual property owner.

Royalty free is a term that is used to describe certain types of intellectual property that you're allowed to use without having to pay royalties. The intellectual property owner must specifically put this label on their content in order for anyone to use it in this way.

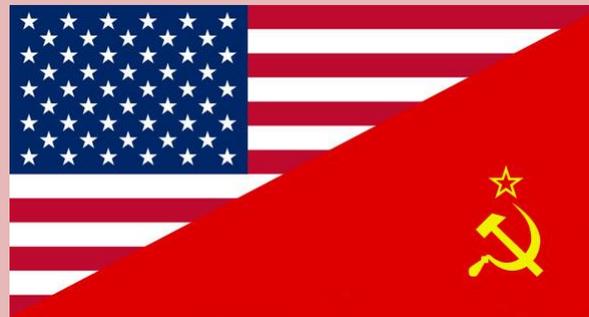
History Terms 3 & 4: The Cold War

Background Context

At the end of World War II, the world was split into two factions; The **Western Bloc** a group of countries under capitalist rule, comprised of the United States and its allies, some of whom would later become **NATO**, and the **Eastern Bloc** - led by the USSR (known as the Soviet Union) and communist countries, some of whom would later sign the **Warsaw Pact**. An imaginary **Iron Curtain** divided east and west.

These two factions would spend the next 40+ years engaged in a stand-off - both the United States and the USSR had developed nuclear weapons - and knew that attacking the other would lead to **M.A.D. (mutually assured destruction)**. There were incidents of **brinkmanship** and **proxy wars** fought in Korea and Vietnam, as the USA became increasingly concerned about a **domino** effect as neighbouring countries would fall to **communist** rule.

With the fall of the **Berlin Wall** in 1989, and the collapse of the USSR in 1991, the Cold War came to an end, as the world sought a more harmonious approach to co-existence.



USA, NATO & Its Allies
USSR & Its Allies
 Neutral/Non-aligned



Cold War Video Library

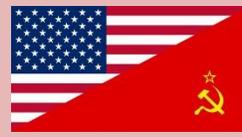
<https://tinyurl.com/ColdWarVids>

Key Vocabulary

Capitalism	An economic system based on private ownership
Communism	An economic system based on community ownership
Democracy	A political system where people vote for their representatives
Totalitarianism	A political system where one person holds complete power
Government	A group of people responsible for running a country
Rebellion	Fighting against someone who is in power
Guerilla Warfare	A method of fighting using ambushes, raids and surprise.
Nuclear Weapon	A weapon of mass destruction powered by a nuclear reaction.
Soviet Union	A communist country comprised of Eastern European republics.
Missile	A weapon that is projected (fired) at a target.
Blockade	Sealing off a place to prevent movement of goods or people.
Brinkmanship	Pushing a situation to the brink of disaster to achieve an advantage.
Domino Theory	A theory that if one country fell to communism, others would follow.
Iron Curtain	The imaginary line dividing free and communist countries in Europe.
Satellite Nations	Nations under the control of the Soviet Union.
Détente	Lessening of military and diplomatic tensions between countries.
M.A.D	Mutually Assured Destruction.
NATO	North Atlantic Treaty Organisation.
Warsaw Pact	A defence pact between the USSR and neighbouring countries
Allies	Countries that are committed to military cooperation and defence.

Potsdam Conference 1945	Iron Curtain divides East and West 1945	Truman Doctrine 1947	Berlin Blockade 1948	USSR tests nuclear bomb 1949	Korean War 1950-53	Vietnam War begins 1955	Space Race 1955-75	U-2 Plane Incident 1960	Berlin Wall erected 1961	Bay of Pigs botched invasion 1961	Cuban Missile Crisis - brink of WW3 1961	Strategic Arms Limitation Talks 1969	Soviets invade Afghanistan 1979	Fall of the Berlin Wall 1989	Fall of the USSR End of Cold War 1991
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Key Topic 1: Origins of the Cold War



Capitalism

Politics: Favours democracy – people choose their leaders from several different parties.

Economy: Businesses are privately owned, and there are opportunities to become very wealthy for some people. If you work hard and are good at your job, you will be promoted and earn more money – this gives people an incentive to work.

Beliefs: Freedom is good and is necessary for a successful society. Some people will be wealthier than others but mostly this should reflect their ability, ingenuity and hard work. It would be unfair for everyone to be equal if some work harder than others. Capitalism should be the system used by the rest of the world because it encourages prosperity and development.

Problems: Capitalism leads to inequality – some people become very rich, but others become very poor. Power is concentrated in the hands of a minority of rich and powerful individuals, whilst the poor are vulnerable to being exploited.

Communism



Politics: Only one party allowed, the Communist Party, which represents the people. There are no elections and you cannot change your government.

Businesses are all owned publicly – by the government. All profits and products are shared amongst the people. Nobody becomes hugely wealthy, but nobody is much poorer than anyone else.

Beliefs: Freedoms such as a free media and freedom to hold different political views is harmful to the unity and success of the country. Everyone should be equal, and it is the government's job to ensure that this happens, as capitalism will exploit the poor and the workers to benefit the elite. Communism should be the system used by the rest of the world, and the USSR should encourage revolutions in other countries to ensure this happens.

Problems: Communism leads to a lack of productivity – why work hard with no opportunity for financial reward? It also stifles creativity – people are less likely to have the freedom and incentive to develop ideas if they won't personally benefit from them. Lack of democracy leads to the suppression of other basic rights.

The Conferences

Grand Alliance | Wartime alliance between USA, Britain and USSR

Sphere of Influence | The region over which a country has influence/control

Demilitarisation | The removal of army and other military from a region

Soviet Expansion

Satellite states | Countries controlled by a larger, more powerful nation

Containment | The US plan to prevent the spread of Communism

Iron Curtain | The name given to the 'border' of Western/Eastern Europe

US Actions – The Truman Doctrine and Marshall Plan

Doctrine | A key message that you are committed to enforcing

Soviet Actions – The Berlin Blockade

Comecon | Organisation to increase Soviet economic control in Europe

Cominform | Organisation encouraging cooperation between communist countries

Blockade | Preventing access to a location or region

Bizonia | The merging of the German regions controlled by the US and Britain

Airlift | Bringing needed goods into a region by air

NATO | Military alliance of America and its allies

Warsaw Pact | Military alliance of the USSR and its allies

The Arms Race

Arms race | Competitive military spending between countries

ICBM | Missiles than can be fired huge distances – across continents

H-Bomb | Hydrogen bomb – a very powerful and destructive weapon

B-52 | The type of bomber aircraft used by the USA

Sputnik | A Soviet satellite, the first man made satellite in space

Hungarian Uprising

De-stalinisation | Khrushchev's policy of moving away from Stalin's methods

Secret Police | Organisations that enforce the law but are not accountable or public

Guerrilla | A type of fighting that relies on ambushes or unconventional warfare

Key Topic 1: Origins of the Cold War



The Three Conferences 1943-45

The Tehran Conference, November 1943

Representatives:

Franklin D. Roosevelt (USA)
Joseph Stalin (USSR)
Winston Churchill (UK)

Focus: Develop relationship between three powers in the Grand Alliance; strategy to win the war.

Level of cooperation: High, Roosevelt and Stalin agreed on most major issues.

Agreements:

Britain and US would open up a second front in WWII by invading France in 1944.
The Soviet Union would join the US in declaring war on Japan after Germany's defeat.
The United Nations would be set up after the war to resolve disputes and guarantee international security.
An area of Poland would become part of the USSR.

The Yalta Conference, February 1945

Representatives:

Franklin D. Roosevelt (USA)
Joseph Stalin (USSR)
Winston Churchill (UK)

Focus: What to do with Europe after Allied victory in WWII.

Level of cooperation: Medium, Stalin had started to push his luck on some issues and the other leaders put their foot down.

Agreements:

Both Germany and its capital Berlin would be divided into four zones administered by the US, USSR, Britain and France.
To give liberated countries formerly occupied by the Nazis full freedom to choose their own governments without pressure or interference.
That each of the three powers would join the new United Nations
That Eastern Europe was in the Soviet 'sphere of influence' and this would be respected by the US and Britain.

Disagreements:

How much in reparations Germany should pay (Stalin wanted more)
Where Germany's eastern border should be (Stalin wanted Germany to be as small as possible)
What kind of government Poland should have (Stalin wanted a 'friendly' Polish government to act as a buffer against Germany).

The Potsdam Conference, July 1945

Representatives:

Harry S. Truman (USA)
Joseph Stalin (USSR)
Winston Churchill then Clement Attlee (UK)

Focus: Resolving issues left incomplete at Yalta; dealing with changing situation after Germany's surrender.

Level of cooperation: Low, Stalin had ignored some previous agreements, and now that the war was over the US saw the USSR as more of a threat than an ally. Truman didn't get on with Stalin the way Roosevelt had.

Agreements:

Established borders of the zones of Germany and Berlin
Germany demilitarised
Democracy, freedom of speech and a free press would be established in Germany
Most of Germany's reparations would go to the USSR as they had suffered most.
The Nazi party was banned.

Disagreements:

Stalin wanted to disable Germany with huge reparations but Truman saw a strong Germany as a useful ally against the threat of the USSR
Truman wanted free elections across Eastern Europe but Stalin argued that as this was the Soviet sphere of influence this shouldn't happen.



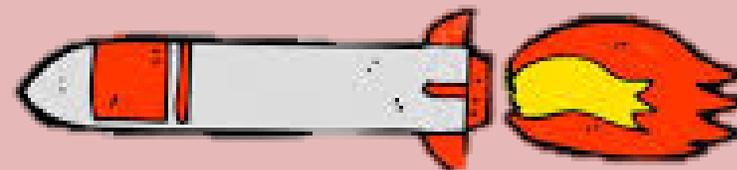
THE COLD WAR



Key Topic 1: Origins of the Cold War

Timeline of the arms race 1945-1962

1945	The USA tests its first atomic bomb. It is used twice, against Japan. Joseph Stalin demands the USSR develop its own nuclear capability, and triples the pay of scientists working on the project.
1949	The USSR carries out its first successful nuclear test. In the US, Truman massively increases defence spending and work commences on a new, more powerful 'hydrogen bomb' (H-bomb)
1953	The US and USSR both conduct their first successful H-Bomb tests. Both sides are now in possession of powerful nuclear weapons.
1954	The US explodes its largest ever H-Bomb – the equivalent of 15 million tons of TNT, and capable of wiping out Moscow, the Soviet capital. The USSR had similar capability to wipe out American cities.
1957	The Soviet Union launches the first satellite into space. The US fears that this could eventually lead to a military threat, and diverts resources to its own space program.
1962	The Cuban Missile Crisis – the US discovers Soviet nuclear missiles in Cuba, 90 miles off the coast of Florida. The USA has 63 inter-continental missiles, 21 nuclear submarines, 24 aircraft carriers and 96 missiles capable of being launched from submarines. The USSR had more than 50 inter-continental missiles, and no aircraft carriers, no sub-launched missiles and only 2 nuclear submarines. The USA had started to pull ahead in the arms race, but both sides possessed enough nuclear weapons to wipe the other side out many times over.



Roosevelt
1933-1945

1943 Tehran Conference
1944
1945 Yalta Conference / Potsdam Conference / A-Bomb



Truman
1945-1953

1946 1945-47 Soviet Expansion
1947 Truman Doctrine / Marshall Plan / Cominform
1948 Berlin Crisis / Airlift
1949 Comecon / NATO / USSR tests A-Bomb



Eisenhower
1953-1961

1950
1951
1952
1953 Successful H-Bomb tests / Khrushchev new leader
1954
1955 Warsaw Pact
1956 Hungarian Uprising
1957 Launch of Sputnik – first key moment of space race



Kennedy
1961-1963

1958
1959
1960 U-2 spy plane crisis
1961 Second Berlin Crisis
1962 Cuban Missile Crisis

Key Topic 2: Cold War Crises



Key Terms

Two crises in Berlin – not the same thing!

Berlin Crisis of 1948

The Berlin crisis of 1948 was caused by Stalin, who was resentful of the US and Britain having free access through East Germany to get to their sectors of Berlin. He thought they were spying on the Communist country and were spreading pro-capitalist messages. He closed off all the roads and railways, and attempted to force the US and Britain to give up their claim to West Berlin. Instead, the US organised airlifts of food and fuel to defeat the blockade and save the people of West Berlin. Stalin eventually had to back down. This crisis was significant in the wider Cold War because it showed that the USA was prepared to back up its words in the Truman Doctrine with actions. It was also significant because it led to the creation of NATO.

Berlin Crisis of 1961

The Berlin Crisis of 1961 was caused by Khrushchev, who was resentful of highly qualified professionals leaving East Berlin and East Germany. There was no border between the East and West zones, meaning that people frequently travelled to the West and then on to capitalist countries that they otherwise were not allowed to go to. Highly qualified people knew they could earn lots more money in the capitalist West, so the 'brain drain' was a big concern for Khrushchev. He attempted to force the US to prevent this migration, but the US refused, so Khrushchev authorised the East Germans to build a wall around the entirety of West Berlin. This meant no East Germans could enter or they would be shot. Migration stopped, but the city was cut in two. The wall stood for 28 years.

The Berlin Crisis, 1961

Defection Leaving one country to go to its enemy

Refugee A person fleeing crisis in their home country

Ultimatum A final choice with two serious options

The Construction of the Berlin Wall

Checkpoint A guarded border post on the Berlin Wall

The Cuban Revolution

Dictator A leader with total power over the country

Diplomat A representative from one country in another

Exile A person forced to leave a country to live in another

CIA The Central Intelligence Agency – US spy network

Bay of Pigs A bay in Cuba that was the focus of a failed invasion

The Cuban Missile Crisis

U-2 US spy plane which captured images of the missiles

Hawks and Doves

People who favoured aggressive or diplomatic US response

Brinkmanship

Going right to the edge to get what you want

Consequences of the Cuban Missile Crisis

Hotline

A telephone connection to allow instant communication

Treaty

An agreement between countries

Detente

The thaw in relations that led to progress between US/USSR

The Prague Spring

Reforms

Changes to the way the country is run

Censorship

Limiting the information that people have access to

The Soviet Invasion of Czechoslovakia

Resistance

Refusal to cooperate

Propaganda

Materials which are designed to push a particular message

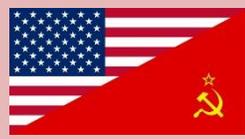
Brezhnev Doctrine

USSR plan to invade countries which threatened E. Europe

Vietnam War

A disastrous conflict the US was involved in in the 1960s/70s

Key Topic 2: Cold War Crises



Three Cold War Crises

The Berlin Crisis 1961

Key individuals:

- Eisenhower and Kennedy (USA)
- Khrushchev (USSR)

Causes:

- 'Brain drain' refugee crisis - hundreds of thousands of highly qualified workers leaving East Germany for the West

Key events:

- Berlin ultimatum 1958
- Vienna Summit 1961
- Construction of the Berlin Wall 1961

Outcomes:

- West Berlin isolated and migration ended
- Heightened tensions between USA and USSR

Cuban Missile Crisis 1962

Key individuals:

- Kennedy (USA)
- Khrushchev (USSR)
- Castro (Cuba)



Causes:

- USSR placed missiles on Cuba in response to US Jupiter missiles in Turkey.

Key events:

- Communist revolution led by Castro 1959
- Bay of Pigs invasion 1961
- Missiles discovered by USA
- Kennedy ordered removal + blockaded Cuba

Outcomes:

- Increased rivalry between USA and USSR
- Hotline installed for instant communication
- Various treaties between 1963 and 1968

Czechoslovakia 1968

Key individuals:

- Brezhnev (USSR)
- Dubcek (Czechoslovakia)
- Johnson (USA)

Causes:

- Czechs demanded greater freedoms and economic reform. Dubcek appointed leader

Key events:

- Dubcek announced Prague Spring reforms
- Opposition to Communism increase
- USSR invades and arrests Dubcek, reversing reforms

Outcomes:

- Brezhnev Doctrine
- Other communist countries condemned USSR
- US condemnation but no intervention



Eisenhower
1953-1961

1958 Berlin Ultimatum

1959 Khrushchev visits USA / Cuban revolution

1960 Planned Paris Summit / U-2 spy plane crisis

1961 Vienna Summit / Berlin Wall built / Bay of Pigs



Kennedy
1961-1963

1962 Cuban Missile Crisis

1963 Kennedy visits Berlin



Johnson
1963-1969

1964 Brezhnev replaces Khrushchev as Soviet leader

1968 Prague Spring / Soviet invasion / Brezhnev

Doctrine



Nixon
1969-1974

1969 Czech Anti-Soviet demonstrations continue

Key Topic 3: End of the Cold War



Ronald Reagan



Mikhail Gorbachev



Ronald Reagan was a former Hollywood actor who was elected US President in 1980. He took a tougher line with the USSR, and his SDI 'Star Wars' initiative led to massive military spending. His description of the USSR as the 'Evil Empire' in 1982 deteriorated relations, but his policies forced the USSR to accept that they couldn't keep up with US progress and that reform was necessary.

Mikhail Gorbachev came to power in 1985 with the USSR in crisis. He was their fourth leader in the last three years and their political and economic situation looked bleak. Gorbachev announced a series of reforms called 'New Thinking' including 'glasnost' and 'perestroika'. His willingness to reform the USSR and improve relations with the West made him incredibly popular in the USA. His reforms brought about the end of the Soviet Union.

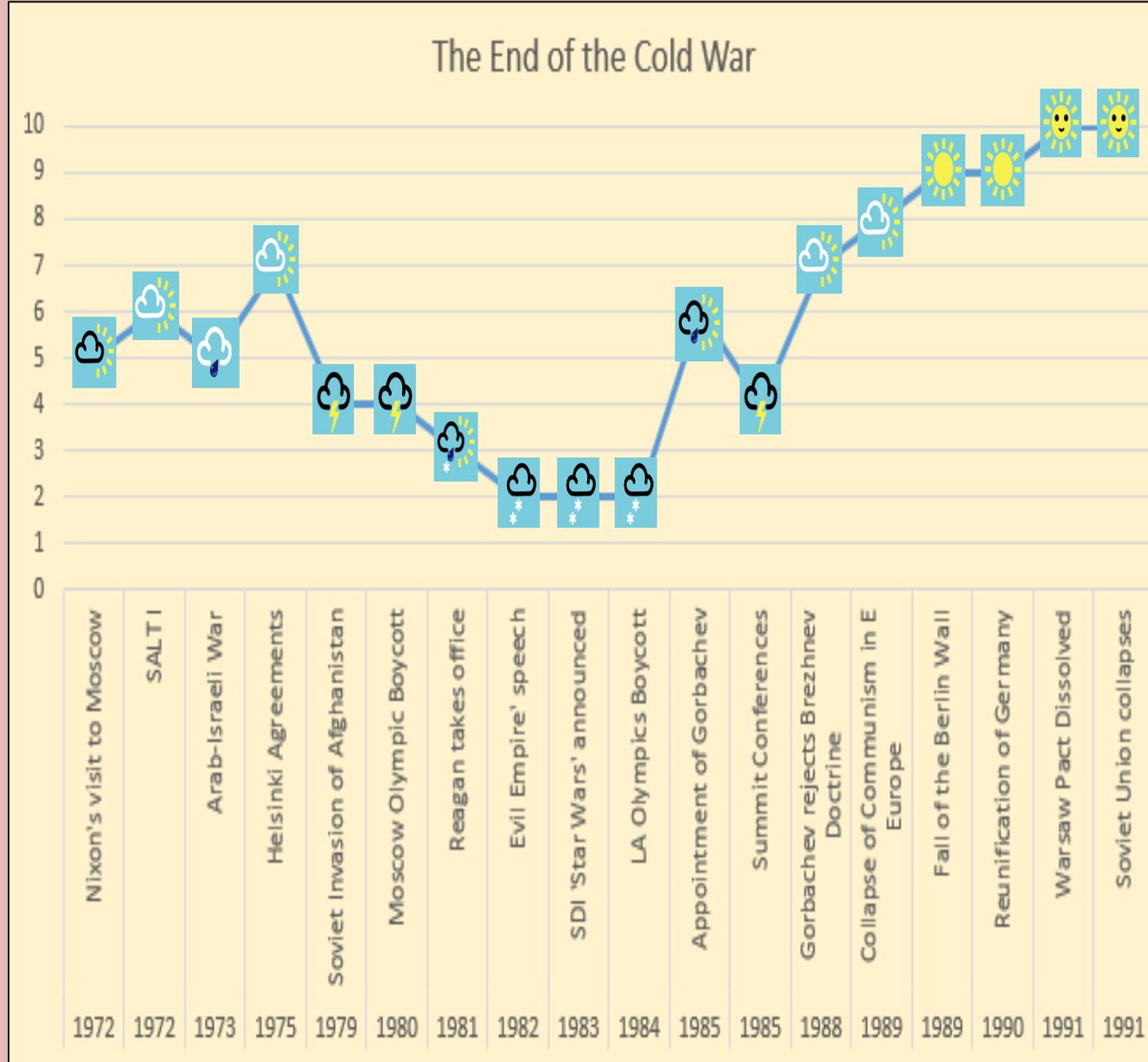
Key Terms

Reasons for Detente		Carter Doctrine	A US vow to go to war if their interests in Middle East threatened
Detente	An period of improved relations between US and USSR	Boycott	A refusal to use certain services or to attend an event
Linkage	Nixon's plan to 'link' benefits to positive Soviet actions	Reagan and the Second Cold War	
Bilateral	Agreements that involve cooperation between two parties	Second Cold War	Reagan's escalation of the Cold War after the failure of detente
Detente		NUTS	Targeting nuclear weapons at USSR warheads, not cities
SALT I	A plan to limit production of new nuclear weapons	START	Talks focused on reducing total nuclear weapons on both sides
ABM	Anti-Ballistic Missiles – reduced by the SALT Treaty	SDI	'Star Wars' – high tech laser guided missile protection system
MIRV	Weapons that contained several targetable warheads	Gorbachev's 'New Thinking'	
Disarmament	Reducing or completely destroying supplies of weapons	New Thinking	A series of reforms proposed by Gorbachev to modernise USSR
Apollo-Soyuz	A US-Soviet meeting in space to show their cooperation	Perestroika	'Restructuring' – economic changes to the USSR and communism
Helsinki Agreements	Agreements over issues like security and human rights	Glasnost	'Openness' – greater freedoms within the USSR and E Europe
Human Rights	Basic freedoms that are not respected in some countries	Dissidents	Political opponents to a regime that often experience persecution
Afghanistan and End of Detente		Uskoreniye	Acceleration – a Soviet plan to boost and modernise the economy
Mujahideen	An Afghan resistance force that was armed by the US	INF Treaty	First successful agreement to reduce nuclear weapons
Jihad	A Muslim 'holy war' that was declared against the USSR	Sinatra Doctrine	Nickname of plan for E European countries to do things 'their way'
Fundamentalism	An extreme and dangerous version of a religion	The Fall of the Berlin Wall and the End of the Cold War	
Embassy	A building that represents one country's people in another.	Reunification	Germany being reunited into a single country after being divided

Key Topic 3: End of the Cold War



The End of the Cold War



Nixon
1969-1974

1970

1971

1972 SALT I signed / Nixon visits Moscow

1973 USSR brokers peace deal to end Vietnam War

1974 Nixon visits Moscow for second time



Ford
1974-77

1975 Apollo-Soyuz link up / Helsinki agreements

1976

1977



Carter
1977-1981

1978 Communist revolution in Afghanistan

1979 SALT II discussions end / Soviets invade Afghanistan

1980 US boycott of Moscow Olympics

1981

1982 Death of Brezhnev / Andropov new leader

1983 SDI announced 'Star Wars'



Reagan
1981-1989

1984 Soviets boycott LA Olympics / Chernenko new leader

1985 Gorbachev new leader / Reagan + Gorbachev meet

1986 Reykjavik Summit collapses

1987 INF Treaty

1988

1988

1989 Iron Curtain ends / Berlin Wall pulled down



Bush Sr.
1989-1993

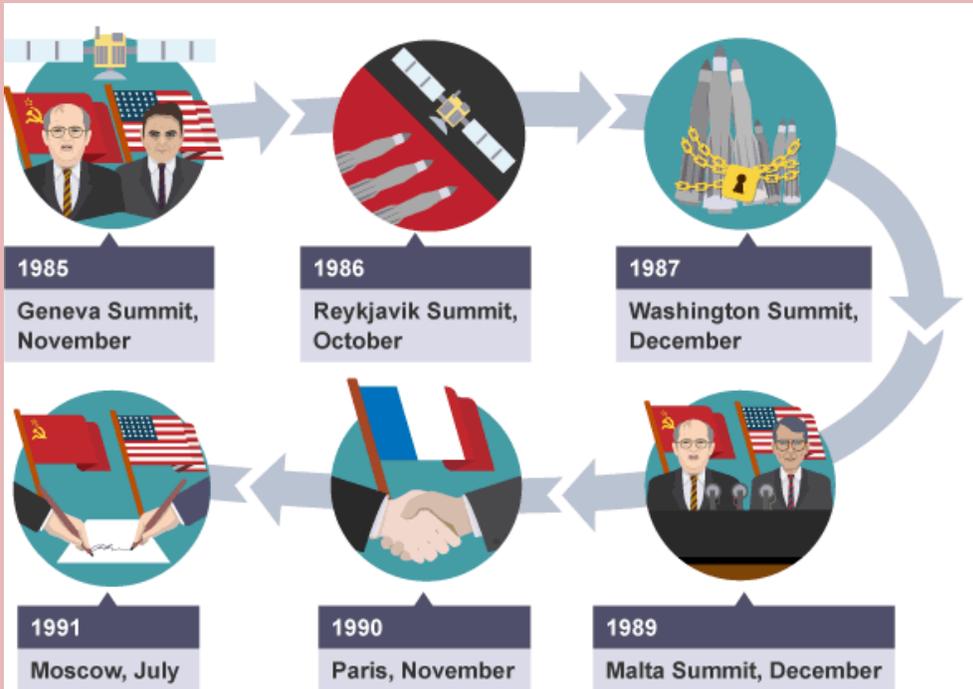
1990 Collapse of Soviet Union / Germany reunited

1991 START I / Gorbachev resigns / Warsaw Pact ends

Key Topic 3: End of the Cold War



Date	Summit, Meeting or Treaty	Key points
1972	Nixon visits Moscow	Nixon agreed to participate in European Security Conference which led to Helsinki Agreements.
1972	SALT 1	Restrictions on new nuclear weapons
1974	Nixon visits Moscow	Commitment to reduce tensions further
1975	Helsinki Agreements	Agreements on security, cooperation and human rights
1985	Geneva Summit	Commitment to abolish chemical weapons, Reagan refused to cancel SDI
1986	Reykjavik Summit	Talks collapse over continued refusal to cancel SDI
1987	INF Treaty	Large scale reduction of nuclear weapons



Cold War Video Library
<https://tinyurl.com/ColdWarVids>

East Germany

Oct-Nov 1989: Millions protest on the streets of major cities
 Nov 1989: Berlin Wall is opened
 Oct 1990: German reunification

Czechoslovakia

Nov 1989: Mass protests against Communism lead to resignation of government
 Dec 1989: Non-communist president appointed
 1990: Elections won by non-Communist alliance

Poland

1988: Mass strikes across country
 1989: *Solidarity* party wins elections and first non-Communist leader in E Europe is elected.

Romania

25 Dec 1989: Communist dictator Ceausescu executed
 1990: Democratic elections held, won by party dominated by ex-communists

Hungary

1988: Becomes multi-party state
 1989: Border opens with democratic Austria
 1990: anti-Communist alliance wins elections

Bulgaria

1990: Democratic elections held, won by renamed Communist Party



YALTA CONFERENCE 1945

BERLIN BLOCKADE 1948

WARSAW PACT 1955

BERLIN WALL 1961

TEHRAN CONFERENCE 1943

TELEGRAM LONG 1946
Novikov

NATO 1949

HUNGARIAN UPRISING 1956

GENEVA SUMMIT 1959

BAY OF PIGS 1961

CUBAN MISSILE CRISIS 1962

POTSDAM CONFERENCE 1945

TRUMAN DOCTRINE 1947

COMECON 1949

CAMP DAVID SUMMIT 1959

CUBA 1959 REVOLUTION

VIENNA SUMMIT 1961

GRAND ALLIANCE 1941

MARSHALL PLAN 1947

COMINFORM 1947

FRG 1949
GDR 1949

KENNEDY'S BERLIN SPEECH 1963

1940s > > > > > 1950s > > > > > 1960s

WASHINGTON-MOSCOW HOTLINE 1963

Superpower Relations & Cold War

LIMITED TEST BAN TREATY 1963

1990s < < < < < 1980s < < < < < 1970s

OUTER SPACE TREATY 1967

INF TREATY 1987

SDI "STAR WARS" 1983

REAGAN'S "EVIL EMPIRE" SPEECH 1983

CARTER DOCTRINE 1980

HELSEINKI AGREEMENTS 1975

1972 SALT 1 AGREEMENT

PRAGUE SPRING 1968
INVASION OF CZECHOSLOVAKIA

FALL OF THE BERLIN WALL 1989

REYKJAVIK SUMMIT 1986

LOS ANGELES OLYMPICS 1984

MOSCOW OLYMPICS 1980

1979 SOVIET INVASION OF AFGHANISTAN

NUCLEAR NON-PROLIFERATION TREATY 1968

BREZHNEV DOCTRINE 1968

WARSAW PACT DISSOLVED 1991

CHERNOBYL 1986

GENEVA SUMMIT 1985

SALT 2 ABANDONED 1979

RESIGNATION OF GORBACHEV & END OF USSR 1991

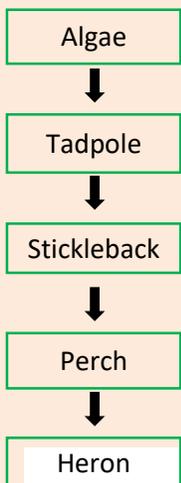
GORBACHEV BECOMES SOVIET LEADER 1985

What is an Ecosystem? An ecosystem is a natural system made up of plants, animals and their surrounding physical environment which includes various components such as soil, rainwater & sunlight. All of the components are closely inter-linked and if one changes there will be knock- on effects to the whole ecosystem.

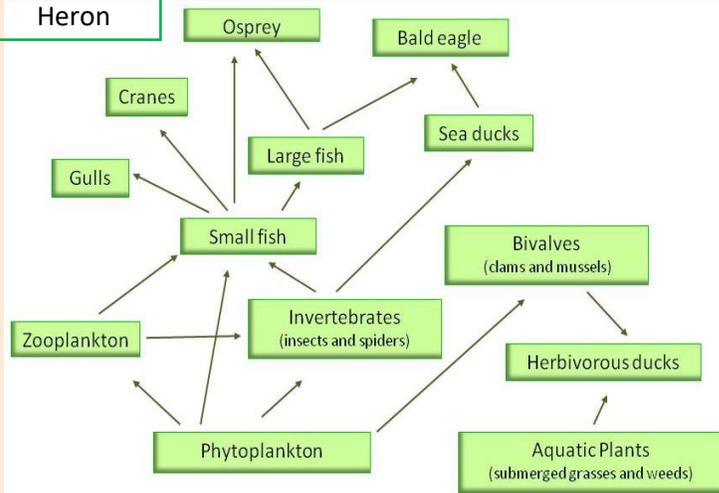
Food chains & Food webs

The links between **biotic** components in an ecosystem can be shown through two flow diagrams: a **food chain** and a **food web**.

Food chain:



Food web:



What is Nutrient cycling?

Nutrients are food that are used by plants and animals as they grow. Nutrients are derived from two main sources:

- **Rainwater**, washing chemicals out of the atmosphere
- **Weathering of rocks**, releasing chemicals onto the soil.

A typical **nutrients cycle** has 3 main nutrients stores & several flows responsible for transferring nutrients between the stores.

Decomposers help return nutrients to the soil as they break down dead **biotic** components of an ecosystem.

The impact of change on an Ecosystem.

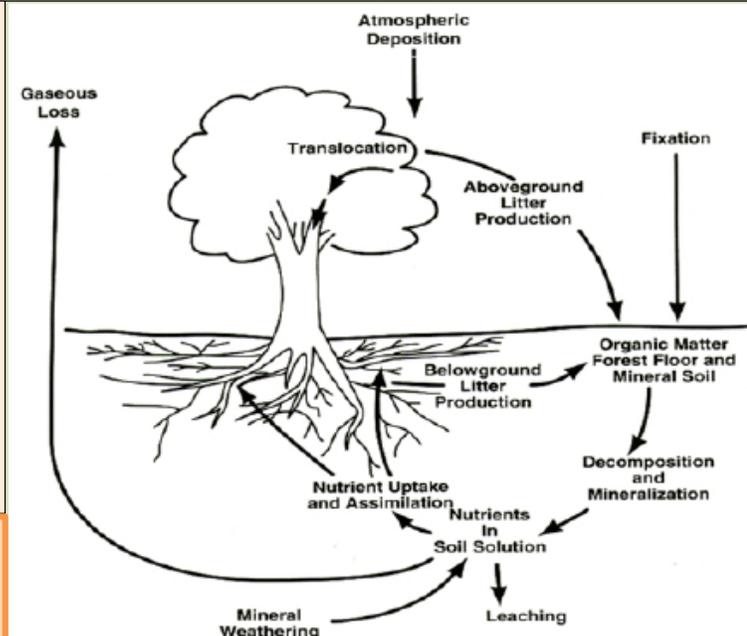
A **sustainable** and healthy ecosystem can take hundreds of years to develop. A sudden change can make everything become unbalanced which can have disastrous impacts. There are two main types of changes: natural changes & human – induced changes.

Natural Changes:

- Extreme weather events, such a flood or a drought
- Fire caused by a lightning strike
- Climate change and global warming
- Spread of invasive species or introduction of new species.

Human – induced Changes:

- Land use change, such as deforestation
- Alteration to water & soils
- Hunting or trapping animals or wildlife
- Introduction of new species



Key terms and definitions for this topic

Ecosystem- biological community of interacting organisms and their physical environment.

Food chain -a series of organisms each dependent on the next as a source of food.

Food web-a system of interlocking and interdependent food chain

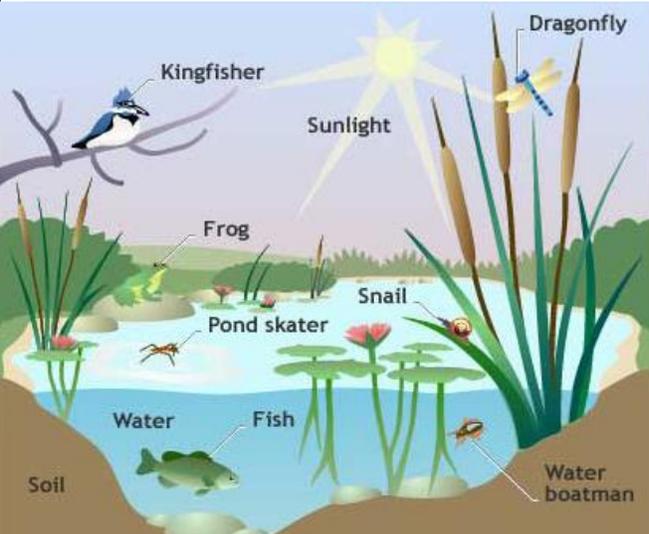
Nutrient cycling- repeated pathway of a particular nutrient or element from the environment through one or more organisms and back to the environment

Species- group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding.

Decomposers- an organism that decomposes organic material

Weathering- describes the breaking down or dissolving of rocks and minerals on the surface of the Earth.

A small scale ecosystem: a freshwater pond



In this picture, there are examples of **producers**, **consumers** & **decomposers**. If one of these species is removed or there is an increase in another species this will have an effect on the whole food chain and might cause an increase or decrease in another species.

Key terms and definitions for this topic

Biotic – living things such as plants & animals.

Abiotic – non-living things such as climate & soils.

Food chain – shows the direct links between different organisms that rely on each other as a food source.

Food web - shows the complex system of plants & animals that rely on each other as a source of food within an ecosystem.

Producer – convert energy from the environment into sugars. (Makes food)

Consumers – get energy from the sugars produced by the producers. (Eats a plant or another animal)

Decomposers – break down plant&animal matter, returning nutrients to the soil

Biomes – a global ecosystem often found at specific latitudes.

Nutrients – A nutrient is a substance used by an organism to survive, grow, and reproduce. The requirement for dietary nutrient intake applies to animals, plants, or fungi.

Global Ecosystems

Definition

Coniferous/Boreal forest

cold & dark winters with quite warm summers. Made up of coniferous trees and many more evergreen plants.

Deciduous/Temperate forest

mild & moist conditions with few extreme temperatures. Made up of deciduous trees meaning they lose leaves.

Desert

Hot during daytime & cooler at night. Plants & animals well adapted. Little rain leading to arid conditions.

Mediterranean(Chaparral)

hot & dry summer, wet & mild winters,vegetation includes citrus fruit, oak & olive trees.

Tundra

extremely cold all year round with brief summers where much of the land can become very boggy at surface level, but remain frozen deep down in the soil.

Temperate grassland

hot summers & cold winters with low rainfall perfect for grasses

Tropical rainforest

moist air rises to produce heavy rainfall & high temperatures. Ideal conditions for plant growth.

Tropical grassland

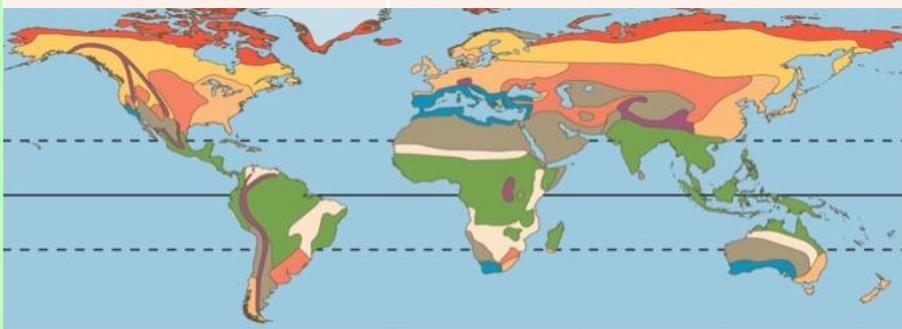
Tropical climate with wet & dry seasons. Fires are very common due to lightning strikes.

Polar Ice

Very cold all year around, with some ice melt but temperatures often below -40°C.

Mountain/Alpine

Comprise some of the most intriguing habitats of the world for the stark beauty of their landscapes and for the extremes of the physical environment. It's a hard place for plants and animals to live, with seasonal extremes of snow, rain and temperatures, as well as poor soils and rocky, often very steep slopes .These habitats lie above the upper limit of tree growth but in the summer often have a spectacular display of colourfully flowered plants. Globally, alpine ecosystems cover only about 3% of the world's land area.



The distribution of the different types of global ecosystems can be seen on this choropleth map.

What is it like in a tropical rainforest?

A tropical rainforest has some key characteristics that make it very different to other ecosystems or biomes and support a wide variety of different species. This means that they have a high **biodiversity**.

Climate

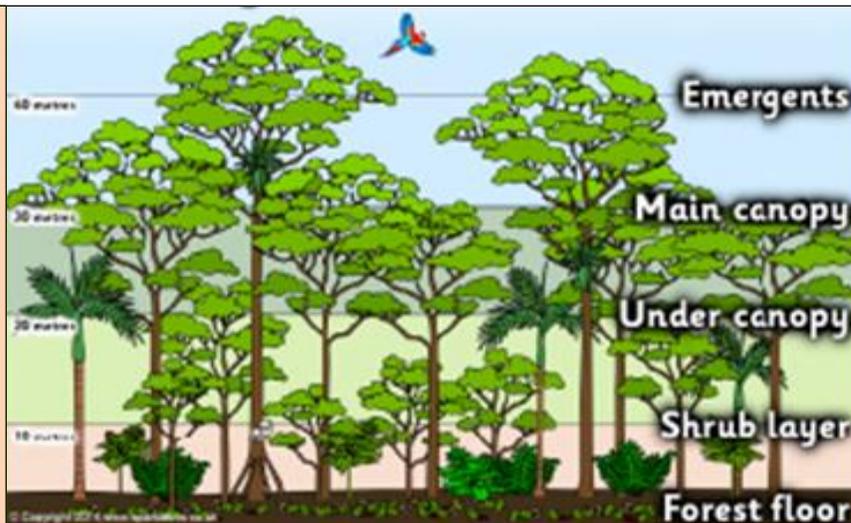
Tropical rainforests are very wet with over 2,000 mm of rainfall per year, and very warm with an average daily temperature of 28°C. The temperature never drops below 20°C and rarely exceeds 35°C. The atmosphere is hot and humid. The **climate** is consistent all year round. There are no seasons.

Soil

Most of the soil is not very fertile. A thin layer of fertile soil is found at the surface where the dead leaves decompose, but due to heavy rainfall the nutrients are quickly washed out of the soil. This is why trees have shallow roots. The soil is red in colour because it is rich in iron.

Structure of a tropical rainforest

A tropical rainforest has several distinct layers, as shown on the diagram. It is important to remember that the closer to the ground a tree or plant is, the less sunlight it will receive as the trees above will be shading it. For example, the shrub layer will be relatively dark and damp compared to the main canopy.



Plants

Lianas – Have adapted to the rainforest by being vines which are rooted in the ground but attach themselves to trees, so that as the tree grows, they too climb high into the tree canopy to receive light.

Buttress roots – Trees have adapted by growing very large roots which start above ground level and make the base of the tree wider and therefore more stable given the trees height.

Shallow roots – Plants have roots that generally grow outwards rather than downwards deep into the soil, to absorb nutrients from the thin fertile layer in the soil close to the surface.

Plants - in the shrub layer have large leaves that rotate with the sun in order to obtain enough energy in the low light conditions. These would be very easily snapped off if too much water collects on them, so they have drip tips to channel water away rapidly. These are three interlinked **adaptations!**

Layers of the Tropical Rainforest

Emergent- The top layer of trees which gets the most amount of sun.

Main canopy - 80% of sunlight is caught in here which leaves very little for below.

Under canopy - This is just below the main canopy and is home to squirrels, monkeys, bats etc. There is loads of food so life is plentiful.

Shrub layer- The shrub layer. It is dark and gloomy with very little vegetation between the trees. During heavy rainfalls this area can flood.

Forest floor – Made up of tree roots, soil and decaying matter.

Animals

Flying frog - has fully webbed hands and feet, and a flap of loose skin that stretches between its limbs, which allows it to glide from plant to plant.

Spider monkey - has long, strong limbs to help it to climb through the canopy.

Sloth - uses **camouflage** and moves very slowly to make it difficult for predators to spot.

Parrot – has a large, strong beak to help it crack nuts.

Facts

- 80% of sunlight gets caught in the main canopy.
- 80% of the flowers in the Australian rainforests are not found anywhere else in the world.
- Bats are essential for the pollination of many tropical foodstuffs such as bananas and mangoes.
- 1 out of 4 ingredients in our medicines are from rainforest plants.
- Tropical rainforests are located between the tropics.

Value of rainforests

- They are home to more species of plants and animals than any other ecosystem on the planet (over 50% of all species in the world!)

Tropical rainforests act as life support systems for the planet as they:

- **Regulate the composition of the atmosphere** - all tropical rainforests, such as the Amazon, regulate the composition of the atmosphere and help to offset the effect of climate change by taking in carbon dioxide through photosynthesis and releasing oxygen.
- **Maintain soil health** - in areas such as the Amazon, tropical rainforests have a thin yet rich, fertile top soil due to the rapid leaf fall and decomposition which rapidly recycles nutrients. These soils can be used to grow cassava and maize which is the staple diet of the local people.
- **Influence the hydrological cycle** - rainforests help to provide water for people. Trees act as a water store by intercepting rainfall. They release water into the atmosphere by evapotranspiration (evaporation and transpiration). This then falls again as precipitation and so gives the people living in areas such as the Amazon a constant supply of water. Tree roots also increase infiltration.

Goods and services

Food - rainforests can produce food such as nuts, which forms part of the diet of local people in the **Amazon**.

Cash crops - rainforests also produce cash crops, such as the development of wild coffee that resists disease and has a higher yield than the Arabica beans traditionally used by growers in the rest of Brazil.

Medicines - **rainforests** have also been used to search for medicines. For example, the rosy periwinkle from the rainforests of Madagascar can help treat childhood leukaemia. In total, more than 1 in 4 of all known medicinal ingredients are sourced from the rainforest!

Raw materials - rainforests can be logged to produce timber such as hardwoods for garden furniture exports. In Indonesia, oil palm plantations cover 7.8 million hectares and employ over 2 million people, making up 7% of Indonesia's **exports**, valued at \$12 billion. Palm oil is used in cosmetics, confectionary, detergents and many other **products**.

Causes of deforestation

- Clearing land for cattle ranching accounts for over 80% of **deforestation** globally.
- Clearing land for mining valuable minerals found beneath.
- Creation of **Hydroelectric power (HEP)** stations in the **Amazon Basin** has resulted in large areas of forest being flooded to create the reservoirs and dams. The flooding of the Balbina dam in Brazil resulted in the loss of 920 miles² of rainforest.
- The timber trade- global demand for tropical hardwoods which are hardwearing and durable, e.g. mahogany.
- Clearing land for transport links – mainly roads – to be developed between cities and countries, to increase trade between them.

Impacts of deforestation

- When **deforestation** occurs in the rainforest, millions of animals and plants lose their habitats.
- Indigenous people (300 tribes in Amazon alone) will lose homes. They are poorly equipped to adapt to modern city life.
- Loss of medicinal plants, some yet undiscovered.
- The soil soon loses **nutrients** due to surface run off, rendering the land useless for anything.

Strategies to manage deforestation include

- Setting up an **ecotourism** resort (Yachana Lodge) which supports local people with jobs, local children with training and education, and brings money in, in a sustainable manner.
- **Selective logging** can be utilised, rather than mass clearance techniques, so that only the trees required are removed, rather than large quantities of forest being flattened simply to make access to the desirable timber.
- At a National level, Governments could set up areas as **legally protected reserves**, while internationally, **HIC** governments could write off debts of **LICs** in return for the protection of areas of forest. Banning the international trade of tropical hardwoods reduces the incentive for cutting them down.

Key terms and definitions for this topic

Biodiversity - The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable.

Vegetation – collective name for the plants and trees in an ecosystem.

Adaption –Plants and animals changing to fit the needs of the environment.

Climate – long term weather patterns.

Deforestation – the act of cutting down large areas of trees.

HIC – High Income Country

LIC – Low Income Country

Key questions for this topic. Use the command word to help answer them appropriately when instructed to do so.

This could also be used as a revision activity, getting someone else to ask you the question and confirm the answer against your 'master' answer.

1. What is a producer? Consumer? Decomposer? **(compare)**

A producer is something that...

Whereas a consumer will...

While finally, a decomposer helps to return _____ to the soil.

2. What is a food chain? **(Definition)**

A food chain shows the direct links between c_____ and p_____ in a simple flow chart style.

3. How will removing all the rabbits, affect the food chain it is linked to? **(Explain)**

By removing rabbits, there will be more producers such as _____ as there will be less rabbits _____, but less secondary consumers like _____ because they won't have...

4. How could pollution impact upon the ecosystem you have studied? **(Explain)**

Agricultural fertilisers can lead to eutrophication: they increase the growth of algae in the _____, which will deplete levels of o_____ in the w_____ and this kills the fish, such as trout.

5. How are global ecosystems distributed? **(Describe)**

Global ecosystems tend to be distributed in L_____ (horizontal) belts around the w_____, for example, temperate forests such as that we see here in the UK is found at most latitudes where it is wa____ and w_____.

6. Why are tropical rainforests found close to the Equator? **(Explain)**

Tropical rainforests are found close to the E_____ because as warm m_____ air gets heated by the concentrated rays of the sun, it condenses leading to heavy _____. This is perfect conditions for rainforests.

7. Describe the Tundra ecosystem. **(Describe)**

*Tundra is characterised by low growing plants adapted to retain h____ and m_____ in the cold and dry conditions found in Northern Can_____, Eu_____ and the _____ Circle.
Animals such as _____ are adapted to survive the cold conditions found here.*

8. What are the physical characteristics of a tropical rainforest? **(Describe)**

A tropical rainforest is characterised by having ___ distinct layers. The E_____ are trees which have...

While the C_____ layer is where the majority of f_____ and f_____ are found, so it is home to a huge variety of _____. Below this, the layers received very little s_____ and so it tends to be very damp and quite d____k. A tropical rainforest also sees temperatures which are h___ and constant all _____, as well as a vast amount of r_____.

9. How are plants and animals adapted to live in the physical conditions of a rainforest? **(Explain)**

Plants living in the rainforest must cope with intense rainfall and a lack of light due to the dense canopy of trees above. In order to cope with rain, ...

Meanwhile, animals such as the _____, have adaptations such as _____, which help them to...

10. What are the causes of deforestation in a rainforest you have studied? **(Outline)**

In the _____ rainforest, there are several reasons for deforestation. Primarily, ...

11. How are people/plants/water/soils/animals and climate related in a Tropical Rainforest? **(Explain)**

In a tropical rainforest, as with many ecosystems, the biotic and abiotic elements are all d_____ upon each other, with any change having knock on impacts elsewhere: When people cut down trees, the nutrients in the soil get washed away because they are very sh_____ and there are no trees intercepting the h_____ rainfall. This leaves the soil useless and little will grow here, affecting animal habitats, food production and changes in the climatic patterns.

12. What are the impacts of deforestation in the Amazon rainforest? **(Discuss)**

The impacts of deforestation can be seen locally, such as...

Or, indeed, they can be seen at a global scale, for example...

13. How is Yachana Ecolodge contributing to Amazonian sustainability? **(Discuss)**

The Yachana Ecolodge, in the Amazon Rainforest, has been a huge success in promoting sustainable use of the rainforest. Firstly, it...

14. How are rates of deforestation changing globally and in the Amazon? **(Describe)**

In the Amazon, ...

Whereas internationally, ...

15. Why are tropical rainforests valuable to people and the environment? **(Explain)**

Rainforests are valuable to both people and the environment because...

16. What strategies do we use to manage rainforests sustainably? **(Suggest)**

At a local scale, it is possible to...

At a national scale, the Government could...

Globally, it is possible to...

Challenge: Can you discuss the Amazon Rainforest, bringing all of the elements together into one cohesive answer to illustrate why it is important, why it is at risk and what can be done about it?

Characteristics

Deserts have extreme **diurnal temperatures**. During the day the temperature may reach 50°C, while at night it may fall to below 0°C. Deserts have less than 250 mm of rainfall per year. The rain can be unreliable. Most deserts are found between 20° and 35° north and south of the equator. They are generally **sparsely populated** areas with little vegetation or **biodiversity** because the soil is dry and sandy with little water or nutrients and it is often windy. The Thar Desert is, however, the most densely populated desert anywhere in the world.

Adaptations

Due to the challenges of living in a hot desert, many animals and plants have adaptations to help them survive. Common themes include animals keeping cool by being active at night (being nocturnal), or digging underground burrows to shelter from the heat. Other animals have big ears, light-coloured coats, and adaptations that help conserve water. These are often **endemic** species – they only live in this one place.

- **Camel** – large feet help to spread their weight safely across the sand and their humps store fats so that they can go for long periods of time without food. Also has two sets of eyelashes to help keep sand out of its eyes!
- **Cactus** – spikes offer protection from animals who want a tasty snack; a waxy surface helps to minimise water loss; and long roots enable it to collect water from up to 10m away.
- **Joshua tree**- deep, thick roots up to 12m long to collect water and it retains its dead leaves, which hang against the trunk like an umbrella to shade it from the hot sun, reducing water loss.



Desertification

Causes

- **Soil erosion**- means that there is less plant growth as the topsoil is lost, often through windblown movement. This occurs more frequently where vegetation has been removed.
- **Salinization**- a process which occurs when the water in soils evaporates in high temperatures, drawing salts from the soil to the surface. These salts are toxic to many plants and make the land unusable. This has consequences such as low yields, poor profits and even starvation. **Irrigation of land** - when water is brought to land that is naturally dry - can cause salinization on desert margins.
- **Climate change** – means a change in seasonal rainfall, less rainfall, long droughts, higher rates of evaporation .
- **Population growth**- increased water consumption, over grazing and over cultivation, as well as **Urbanisation** – the growth of settlements.
- **Removal of wood** – logging to provide fuel wood means top soil is at risk of erosion.
- **Over-cultivation**- growing too much in one place reduces nutrients, fertility and weakens soil; overusing pesticides and planting crops in the same place each year damages the soil.
- **Over-grazing** – livestock eat plants quicker than they can grow, cattle trampling stops water from penetrating and infiltrating the soil, often as a result of reduced nomadic lifestyles (local people moving around less on the land than they used to).

Reduction

- **Water and soil management**- use drought resistant plants, roots of plants bind the soil together, building walls stops erosion.
- **Tree planting** – Great Green Wall (project in Saharan Africa, 800km wide) leaves provide shade for soil, acts as a wind break, there are jobs available planting trees meaning more money for locals.
- **Appropriate technology**- no machinery (not enough resources or money) ‘magic stones’ protect plants and provide shade, meaning less erosion of the soil.
- **Winds barriers** – provides shade and wind protection, stops soil eroding.

The Thar desert

- Crosses the border between India and Pakistan
- Average temperature is 27.3° C
- Temperatures often exceed 50° C
- In 1992, 3000km² was made into a national park
- The desert has a population density of over 80 people per km². (Other deserts have population densities below 10 per km²).
- There are many mobile sand dunes, and sandy hills.

Challenges

- **Water supply**- population growth and development in farming means demand is increased, low rainfall and high temperatures mean high rates of evaporation, water sources include: ponds, underground wells and intermittent rivers (only after rainfall).
- **Extreme temperatures**- high temperatures and low rainfall mean high rates of evaporation, means little water and nutrients in soil.
- **Inaccessibility**- limited road networks, high temperatures melted tarmac roads, winds blow sand over roads, transport usually consists of camels or overloaded buses.

Opportunities

- **Tourism**- camel tours/ safari, unique cultural hotels, selling local goods, dune buggies and dune surfing, cultural activities.
- **Energy**- solar panels, wind turbines, coal and oil extracted from under the soil.
- **Farming- Subsistence** - The desert area is not very fertile. Soils are quickly drained, and contain few nutrients. The farming is limited, typically a few animals on more grassy areas and fruit. Most is subsistence farming.
- **Farming- Commercial** - Commercial farming has been possible since the building of the Indira Gandhi Canal. This irrigates an area near Jodhpur. Wheat and cotton can be grown. The canal also supplies drinking water.
- **Mining**- Minerals such as **gypsum** and **feldspar** can be sold for use in building products. Limestone from Jaisalmar quarry is used in buildings. Minerals in the area (**rock phosphate**) are used to make fertiliser for crops.



Key terms and definitions for this topic

Diurnal temperature - the temperature throughout the day/night.

Feldspar – mineral used in glass and ceramics.

Gypsum – mineral used in plaster/ plasterboard.

Rock phosphate – used in fertiliser.

Irrigation - application of water to plants and crops.

Biodiversity – the variety of plants and species in a certain environment.

Endemic – a species native to a certain place.

Desertification – the destruction of land until nothing grows, due to loss of water and vegetation.

Salinization - the process of increasing salt levels in soil.

Commercial farming – growing crops to sell.

Subsistence farming – growing crops for your own needs.

Sparsely populated – low population density

Key questions for this topic. Use the command word to help answer them appropriately when instructed to do so.

This could also be used as a revision activity, getting someone else to ask you the question and confirm the answer against your 'master' answer.

1. What are the physical characteristics of a hot desert? **(Describe)**

A hot desert is a place which receives less than...

2. How are people/plants/water/soils/animals and climate related here? **(Explain)**

In a hot desert, there is a fragile relationship between the biotic and abiotic elements of the ecosystem. For example, ...

3. How are plants and animals adapted to living in hot deserts? **(Explain)**

Plants such as the _____ is adapted to the hot, dry conditions by...

In contrast, animals such as ...

4. What are the issues relating to biodiversity? **(Discuss)**

The lack of biodiversity in hot deserts means that...

5. What are the challenges of developing in the Thar Desert? **(Analyse)**

In the Thar Desert, located on the border between India and Pakistan, the climate is a key challenge for any human development, because...

6. What are the opportunities for mineral extraction, making energy, farming and tourism in the Thar Desert? **(To what extent)**

On one hand, gypsum used in plasterboard, kaolin which is used in paper, and rock phosphate, a fertilizer, are all found in the Thar Desert. This creates a variety of opportunities to make money as all of these products are used worldwide, though getting out of the desert can be difficult because of shifting sands. Equally Jaisalmer wind farm illustrates...

On the other hand, while there are some opportunities for farming...

Overall, I think the Thar desert creates _____ opportunities for development and income.

7. What are the causes of desertification? **(Discuss)**

One cause of desertification is climate change, which...

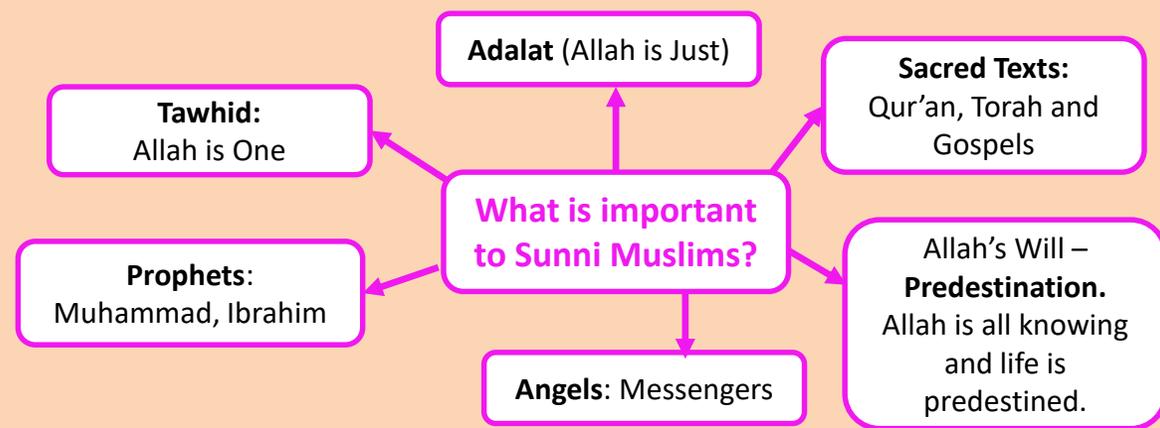
8. What strategies can be used to reduce the risk of desertification and how effective are they? **(Evaluate)**

Often the most effective strategies to reduce desertification are simplistic, local projects. A good example of this is...

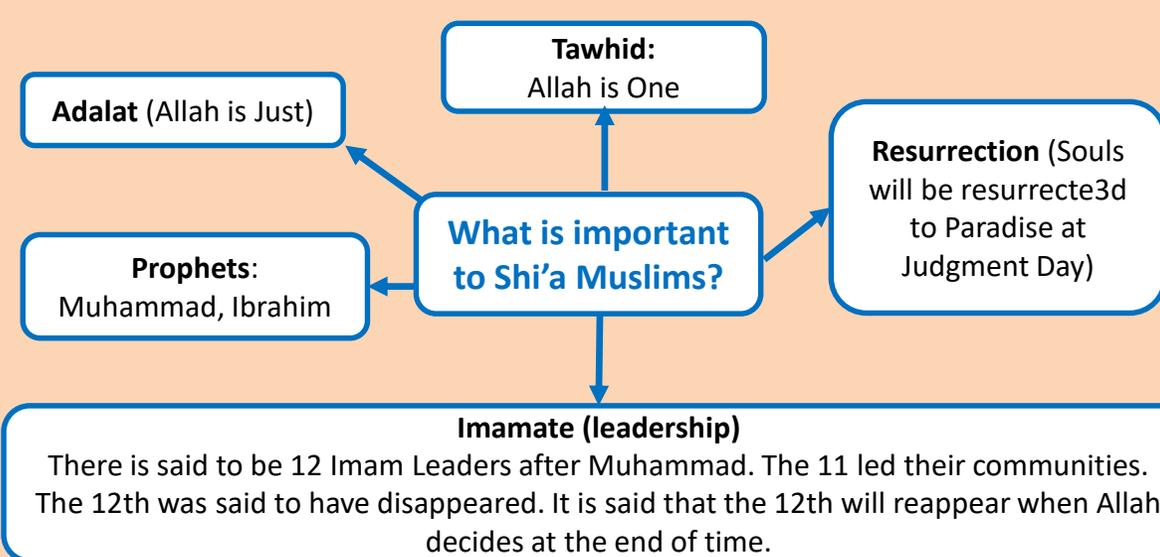
BVT: Islamic beliefs

Omnipotent	Muslims use the word Al-Qadeer to mean omnipotent for Allah.
Tawhid	Allah is One – he is ultimate, absolute and nobody comes close. Allah is everywhere. <i>“He is Allah, One”</i> Qur’an.
Merciful (all – loving)	Shows mercy is to show forgiveness. This shows Allah’s compassion. An example is that he sent Muhammad to guide Muslims to the right path. It shows Muslims are never alone without Allah.
Fair and Just	Muslims call justice - Adalat. The Day of Judgement shows justice. Fairness - the belief that Muslims should never live to the extreme
Immanent	Allah is active in the world – he can always be with you e.g. through the Qur’an and through teachings of Muhammad. <i>“He is with you wherever you may be”</i> Qur’an
Transcendent	He is beyond our world and understanding. He has no beginning or end and is beyond time. <i>“No vision can grasp him...He is above all comprehension”</i> Qur’an

Muslim Beliefs of the 6 Articles of Faith (Sunni)

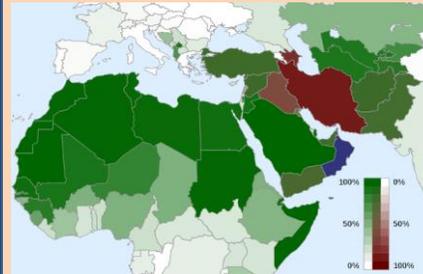


Muslim Beliefs of the 5 Roots of Usual Ad-Din (Shi’a)



Sunni and Shi’a Muslims.

- Like in other faiths, there are different groups of Muslims.
- This came about after the **death of Muhammad**. Some Muslims believed that Muhammad’s cousin Ali should have been the next leader of Islam; they formed a group called Shi’a Muslims.
- However, other Muslims believed that the next ruler should be elected, which fitted with Arab tradition where they lived. These Muslims formed a group called the Sunni Muslims. 90% of Muslims in the world are Sunni Muslims.
- Both Muslims have very similar beliefs and follow the teaching of Muhammad and are dedicated to Allah; however there are small differences to their beliefs and practices, just like within Christianity.



Green is the % of Sunni Muslims
Red is the % Of Shi’a Muslims

Prophets

Role of Prophets is to:

- Convey Allah's messages
- Show devotion to Allah
- To teach about Allah

Adam: The first prophet

Allah created the world for Adam and his decedents. He created Adam "I am going to create a human out of clay". He gave him a thirst for learning and to make choices himself. Allah created Hawwa (Eve) for Adam. They were tempted by **Iblis** (a creature to represent the Shaytan) to eat the fruit and were banished to earth by Allah.

Why is Adam important?

- Adam spread the word of Allah, he named his decedents to do the same
 - Adam took care of the planet (Stewardship)
- Adam teaches that sin will be judged and punished, but Allah will show mercy for those that repent.
- Adam built the Ka'aba (the first place of worship, visited at Hajj)



Ibrahim

Ibrahim challenged people worshipping idols, preaching that there was only one true God. "I have set my face towards the One" (Ibrahim). But people did not listen they threw him in a fire but Allah saved him from the fire.

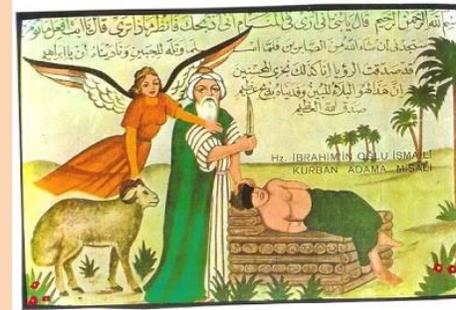
With his family and some followers he set off to God's Promised Land. This was his first test by Allah. Ibrahim faced 10 more tests. The last one he dreamt Allah wanted him to sacrifice his son, Ismail. "I have seen in a dream that I should sacrifice you" (Qur'an). They both agreed this is what Allah wanted and were prepared to go through with this. Allah stopped the sacrifice at the last minute and sacrificed a ram instead.

Allah also helped Ibrahim's wife and son Ismail who were searching for water in the desert by proving them with a well. This is called the Zam Zam well and visited on Pilgrimage.

Why is Ibrahim important?

- Shows devotion and faith to Allah by showing if you are willing to submit to Allah you will be rewarded and cared for
 - Zamzam well is used as sacred sites on Muslims pilgrimage in Makkah.

Zam Zam Well



Muhammad

The Night of Power:

In cave Hira Muhammad was visited by the Angel Jibril who told him to read a sacred text. Muhammad told him he could not, however after he was shaken by the angel he could then read – all was revealed to him. Muhammad had further revelations from Allah and over 23 years Muhammad wrote the Qur'an dictated to him by Allah (through Jibril). The Shahadah refer "And Muhammad is his Messenger" – showing Allah chose Muhammad to be prophet.

Muhammad preached about One God; Allah. However, not everyone wanted to hear this so Muhammad was forced to flee or go on a journey (Hijrah) to Madinah where he settled and converted to Islam. Muhammad later converted Makkah to Islam.

Why is Muhammad important?

- He wrote the Qur'an and established the 5 pillars
- The Hadith is a book written with Muhammad's sayings / teachings to live by for Muslims today
- He is a teacher and role model of Islam and Allah
- He lived humbly and shows equality to all Muslims

Angels

- Made from light
- Messengers of Allah – between Allah and man
- Record Muslims actions for Judgment day
 - Take care of paradise
- Help Prophets in difficult times



Mika'il:

- He is giver of rain and sustenance. (Spiritual and physical help for Muslims)
- He helped Muhammad in his battle to convert Makkah
- Mika'il purified Muhammad with water before he went to paradise with Allah.

Jibril:

- Visited Muhammad in Cave Hira – Night of Power
- Saved Ibrahim from the fire

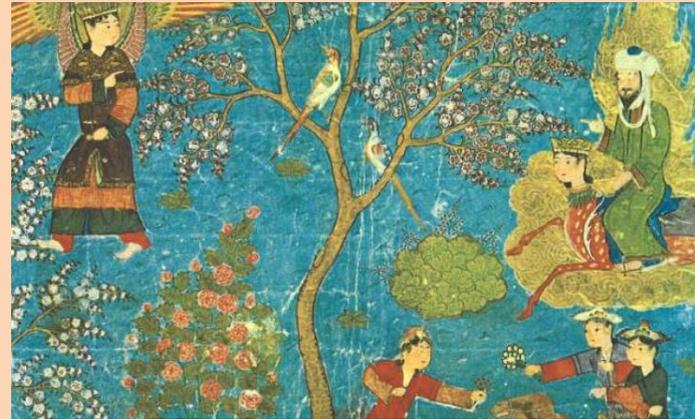
Azar'il:

- Known as the Angel of Death
- Azar'il asks 3 questions on death, if these are answered correctly, you can sleep until Judgment day, if not you are tormented.



Judgement, Heaven and Hell

Key Terms	Details
Akhirah	Means after life
Barzakh	Translates as barrier: This signifies Judgement day
Jannah	Heaven or paradise. Paradise has 8 gates (different aspects) and 7 levels (how good you lived). Each soul will go into a different gate at a different level
As-Sirat bridge	The bridge that must be crossed to get to paradise. Once over, angels welcome you to paradise.
Jahannam	Hell. This is a fire, pain, misery and torture. There are 7 levels to how bad it could be
Final Judgement	Angels will blow trumpets, the Qur'an will rise to paradise, 40 days after the trumpets – smoke will cover the land, fire will burn over the seas. A final trumpet will sound and the dead and the living will be judged and rise to Paradise



Important quotes:

“Enter among my servants! Enter my Paradise” Qur'an

“...your sins are against your soul... We will show you the truth of what you did”
Qur'an

Religious Texts

Holy Books associated with Muhammad: The Qur'an, the Hadith, the Sunnah

- The Qur'an was dictated by Angel Jibril (from Allah) to Muhammad over 21 years.
- The Qur'an was written over 23 years (2 years after his death too).
- It was dictated by Muhammad and scribed by followers and the next leader of Islam called the Caliph after Muhammad's death.
- It has authority to Muslims as it is the words of Allah and has never been translated or changed throughout history. *"Falsehood shall never come to it"* (Qur'an)
- The Hadith is a book of Muhammad's teachings and life. It was written after Muhammad's death by later Caliphs (some 3 generations after).

Memorising the Qur'an

At the time of the revelation of the Qur'an, books were not readily available and so it was common for people to learn it by heart.

Learning the Qur'an off by heart is called ***hafiz***.



The Holy Quran acts as the basis of Islamic belief. Some of the major themes are:

- Nature of God e.g. merciful (loving) and forgiving
 - Prophets
- Man – creation / free will
- Sin, judgement and afterlife



Shari'ah Law

- Shari'ah Law is Islamic Law, which some Islamic countries follow.
- Shari'ah Law are laws that originate from **teachings in the Qur'an** and the Sunnah (practises of Muhammad)
- These laws follow 5 areas: Behaviour, worship, beliefs, punishments, transactions (dealings with people)
- Many Muslims believe that **Shari'ah is superior to human law** as it comes directly from Allah (Allah has absolute authority)
- Muslims are taught to follow the laws of their country e.g. British Muslims follow British law. However some more **radical Muslims feel that Shari'ah Law has authority too**



Other Holy Books	Why they are important? Why are they not as accurate as the Qur'an?
Torah	Scrolls of the Torah are the oldest scripture. They contain teaching about God (Allah). They also contain the 5 books of the old testament which include teachings about Prophets Ibrahim (Abraham) and Moses as well as creation. They teach Muslims that Allah had messengers before Muhammad. These were written by Moses followers after his death . This is the oldest full surviving revelations from God . They have been translated .
Scrolls of Ibrahim	These were written revelations that Ibrahim received from Allah. It taught Muslims what Allah revealed to Ibrahim. They also contained parable like stories. The teachings of the scrolls have been passed down, but the scrolls themselves are now lost .
Gospels (New testament)	These tell Muslims the teachings and life of Prophet Isa (Jesus). Muslims believe that Jesus is a prophet of Allah to spread the word of God. These were written by his disciples after Jesus' death . They have also been translated .

Marriage

BVT - Relationships

Christianity	Islam
<ul style="list-style-type: none"> • Marriage is a bond between the couple and between them and God • Christians will also get married to have a family, this is called procreation • Marriage is a sacrament – an important part of being a Christian • “Man shall leave his mother and father and will join with his wife and become one flesh” (bible) • Bride and groom exchange rings – signify commitment and circle of everlasting love • Vows are exchanged to make promises e.g. love and cherish, till death do we part, in sickness and health • Hymns, bible readings , prayers signify the religious celebration within the community • Priest reads a homily – speech about importance of marriage 	<ul style="list-style-type: none"> • Many Muslims have arranged marriages where the parents and children agree to the marriage. The couple will be chaperoned in earlier meetings • Muslims will get married to join two families together. • Marriage is a gift from Allah and therefore an important part of being Muslim • Muslims will also get married to have a family, this is called procreation • The wedding ceremony can take place in a mosque or home • The ceremony / contract is called a Nikkah • The bride can sign the contract separate from the groom and meet up later • A dowry is paid by the groom to bride – it is a gift e.g. money, a house • The whole wedding can take up to 5 days

Type of relationship	Definition
Polygamy	A husband with more than one wife, in some Islamic countries; The husband must be able to provide and care for all wives
Cohabitation	2 partners living together, but not married
Civil marriage	This is a non-religious marriage. In 2014 this marriage became legal for homosexuals (before this they could only have a civil partnership)
Arranged marriage	Parents help Muslim children find a partner, both children and parents agree to the marriage
Forced marriage	Parents force their children into a marriage (unwanted), can often be underage children.



Role of parents

The **role for religious parents** is much the same as non religious parents, however there is the added **responsibility to teach their faith and bring them up within the religious community**

- Provide all that children need materially e.g. food, shelter, clothing
- Allow children to develop independence and confidence
- Provide protection for children
- Bring them up with good morals and behaviour e.g. teaching respect

“Fathers do not provoke your children to anger, but bring them up in the discipline and instruction of the Lord” Bible

- Teach them about their faith
- Some children maybe **attend teaching at a place of worship** e.g. Christian Sunday school, teaching at mosque
- They may have practises to follow as children e.g. Christian **baptism**



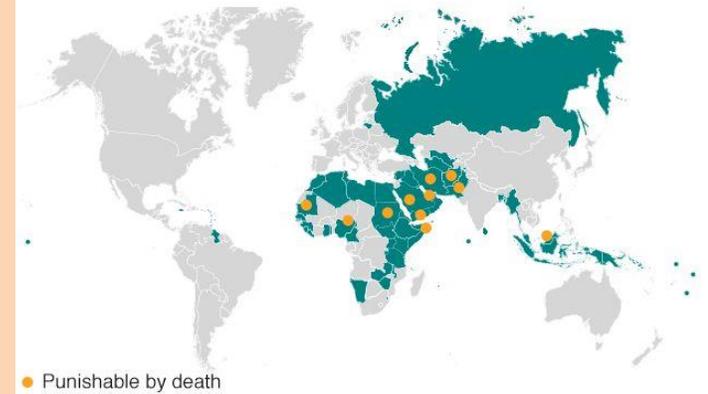
Sex and contraception

Catholics	Anglicans	Muslims
<ul style="list-style-type: none"> Sex is sacred and should only take place within marriage Believe in chastity – not having sex before marriage. Sex is a gift from God. Only natural contraception is allowed such as the Rhythm method. Contraception that interferes with conception e.g. condoms, is not allowed as the sperm is sacred as it gives life. 	<ul style="list-style-type: none"> Anglicans allow sex before marriage if the couple are in love in a committed relationship. Article contraception (pill / condoms) is allowed within committed relationships 	<ul style="list-style-type: none"> Sex is sacred and Muslims follow chastity, only having sex within marriage. Sex is an act of worship. Muhammad spoke that sex is special in marriage and a source of pleasure. Artificial contraception is allowed within marriage – but not to encourage adultery. Not allowed permanent contraception such as vasectomy.

Same sex relationships

Until **1967** Homosexuality was illegal in Britain. In 2001 it was legal for gay couples to have civil partnerships and for gay couples to adopt. It was not until **2014** that gay marriages were legalised. In many countries in Africa (Uganda) and the Middle East (Iran) **homosexuality is still illegal** and many of these have the death penalty for this.

Countries where there are laws against homosexuality



Reasons and impacts of gay relationships

Positive:
Love
Inclusion
Acceptance
Equality



Negative:
Exclusion – society / religion
Hate crimes
Isolation
Unfair
Traditional aptitudes

Christians

Many Christians point out in Genesis it says all people were created in the **image of God** (i.e. all equal)

Quakers accept same sex relationships as they believe the quality and depth of feeling between two people is the most important part of a relationship

“Neither Jew nor Greek, slave nor free, male nor female, for you are all one in Jesus Christ” Bible

However, in the Old Testament it says *“You shall not lie with a male as with a woman; it is an abomination (disgrace/outrage)”*. Many **Catholics** may agree with this.

Muslims

Homosexuality is a crime against Allah

The purpose of relationships is procreation and same sex marriages go against this

“If your lusts on men in preference to women.... we rain down on them a shower of stones” Qur’an

Homosexuality is punishable in some Islamic countries by execution (see map above)



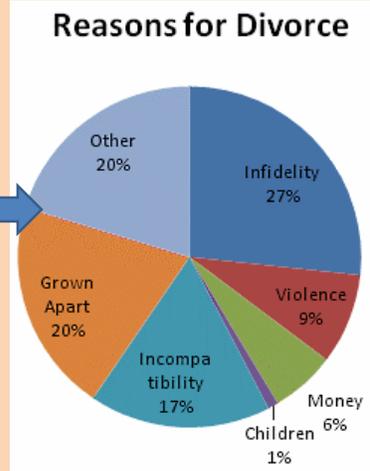
Adultery, Divorce and re-marriage

UK Laws regarding divorce

- Divorce laws have not changed since **1967** and there is a call for modernising them
- At present you can only divorce straight away if there has been **poor behaviour or adultery**
- Couples that both wish to divorce under different reasons have to have **5 years** separation first.
- There are calls for reform because life expectancy are rising, couples are e often together for many years.

"Thou shall not commit adultery" 10 Commandments

Why do marriages break down?



	Catholics	Muslims
Adultery	<ul style="list-style-type: none"> • Adultery is a sin and breaks wedding vows e.g. To love and cherish • In the 10 commandments it says <i>"Thou shall not commit adultery"</i> 	<ul style="list-style-type: none"> • The Qur'an says <i>"Do not commit adultery. It is shameful and an evil way to act"</i> • Adultery can be punishable by execution in some Islamic countries
	<ul style="list-style-type: none"> • Divorce is always wrong as marriage is a sacrament (sacred) • Divorce breaks wedding vows made to God so cannot be broken – Until death do us part: <i>"What therefore God has joined together, let not man separate."</i> Bible • Jesus said <i>"Whoever divorces... then marries another; it is as if he committed adultery"</i> • An annulment (making the marriage invalid) can be given in exceptional circumstances • There is no remarriage as divorce is not recognised by God 	<ul style="list-style-type: none"> • Divorce is available to Muslims however it is seen as a last resort. • Couples facing problems have mediation – someone to try and help resolve the problems. • The couple must wait 3 months through counselling before a divorced can be given. • If after counselling divorce is still wanted, then the man states "I divorce you 3 times", whereas a woman must seek approval at a Islamic council / Imam at their mosque • Half the dowry must be returned by the wife to husband
Divorce and re-marriage		

Divorce is becoming more common over the last 50 years. If divorce laws are relaxed, what would be the impacts?

Against relaxing divorce laws:

- For religious believers marriage is a **sacrament about God too**.
- Marriage will be taken into lightly – with no serious thought to "death do us part"
- It could have negative effects on children
- People will give up and not try to work through their difficulties

For relaxed divorce laws:

- Allowing people to move on to another relationship, where they are in love
- Love does not always last forever
- To end the relationship is often healthier if there are problems (even when children are involved)

Gender Equality

Christianity	Islam
<i>"Neither Jew nor Greek, slave nor free, male nor female, for you are all one in Jesus Christ"</i> Bible	Muhammad said <i>"I command you to be kind to women"</i>
Parable of the Good Samaritan	<i>"Men and women have equal rewards for their deeds"</i> Qur'an
In the Anglican church the first bishop was appointed in 2015	Benazir Bhutto was elected PM in Pakistan - a Muslim country
However, men and women can have different ROLES in Religion.	
However, In Catholic church women are not allowed to become priests	However all Islamic leaders (Imams) are men. Women are not allowed to pray at the front of the mosque
	A man can get a divorce by just declaring it 3 times, women must seek approval from a council at a mosque

Women in the Bible



Eve shows by giving into evil, she reminds the world that while God is good, Satan's temptations are not. Eve has also been shown to lead man (Adam) astray. This viewpoint was promoted by **St Augustine** in Catholicism.

Mary Magdalene is an often misunderstood Biblical figure, but she was certainly a **faithful follower of Jesus**. After being healed by Him, she travelled with Him and witnessed his crucifixion, burial, and resurrection.

Sarah Everard



1 in 10 women have faced sexual harassment at work

Inequality impacts....

- Aspirations
- Jealousy and tension
- Government laws to restrict or promote women
- Inclusion / exclusion
- Prejudice and attitudes
- Self worth and confidence
- Opportunities
- Violence or abuse



Gender has been in the news recently, expressing problems and inequality for women



Only **35%** of senior management roles were female in UK 2012

9.7% is the average full time pay gap between men and women. For every £1 earned by a man a woman earns **81p**

Misogyny is a form of sexism used to keep women at a lower social status than men. Examples of misogyny include sexual harassment and violence against women

GCSE SPANISH YEAR 10: FREE TIME and HEALTH

¿Cuáles son tus pasatiempos? / ¿Qué haces en tus ratos libres?

cuando hace buen tiempo / frío/calor (*when it's nice / cold / hot*)

durante mis ratos libres (*during my free time*)

sábado / domingo / durante la semana (*on Saturday / Sunday / during the week*)

a veces / normalmente / algunas veces (*sometimes / normally / occasionally*)

juego/ hago/ leo / ... (*I play / do / read...*)

me gusta / prefiero... no me gusta mucho (*I like / I prefer / I don't really like*)

mi deporte favorito (*my favourite sport*)

montar a caballo (*to do horseriding*)

hacer ciclismo (*to do cycling*)

nadar (*to swim*)

jugar al fútbol (*to play football*)

jugar al badminton (*to play badminton*)

ir al centro (*to go to town*)

leer (*to read*)

escuchar música (*to listen to music*)

R – range

O – opinions

T – tenses

A – adjectives

T – tie together

E – extend

¿Qué hiciste el fin de semana pasada?

sábado (mañana / tarde / noche) *Saturday (morning / afternoon / evening)*

hice / jugué (*I did / I played*)

leí (*I read*)

escuché (*I listened*)

visité (*I visited*)

ayudé en casa (*I helped at home*)

pasé al perro (*I walked the dog*)

visité... (*I visited [people]*)

ví (*I watched*)

fui (*I went*)

me quedé (*I stayed*)

¿Qué vas a hacer este fin de semana?

voy a / vamos a (*I'm going / we are going*)

intento/ quiero/ (*I intend / I want*)

ir (to go)

jugar (to play)

haré (*I will do*)

iré (*I will go*)

tendré (*I will have*)

Jugaré (*I will play*)

¿Qué te gusta comer y beber?

como/ bebo (*I eat / drink*)

me gusta / prefiero comer / beber (*I like to eat / drink*)

mi plato favorito (*my favourite meal*)

desayuno/ almuerzo (*for breakfast/lunch i eat*)

por la tarde etc (*in the evening*)

el pan (*bread*)

el queso (*cheese*)

la mantequilla (*jam*)

el carne (*meat*)

coles de Bruselas (*sprouts*)

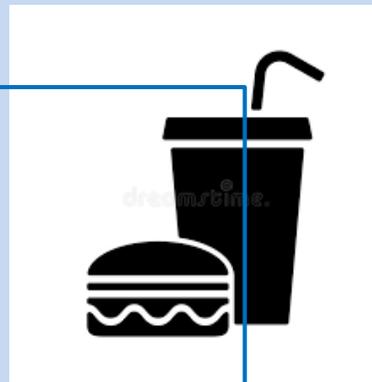
aqua (*water*)

berenjena (*aubergine*)

unca como ... (*I never eat*)

comemos en / el jardín /el comedor/ la cocina (*we eat in the garden / the dining room / the kitchen*)

Tener hambre/ sed (*to be [have] hungry / thirsty*)



delicioso (*delicious*)

asco (*revolting*)

repugnante (*disgusting*)

saboroso (*tasty*)

muy / demasiado / un poco (*very / too / a little*)

salado / azucarado / amargo / ácido /
crujiente (*salty / sweet / bitter / acidic /
crusty*)

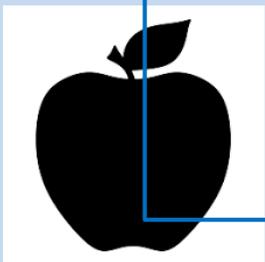
la semana pasada/ el fin de semana pasado/ sábado
(*last week / last weekend / on Saturday*)

fui a / visitamos(*I went to / we visited*)

un restaurante / McDonald's

fue el cumpleaños de X / mi cumpleaños (*it was X's
birthday / my birthday*)

la comida española/ inglés / china / india (*French food /
English / Chinese / Indian*)





Les opinions

Pienso que/ en mi opinión/
en lo que concierne/ en cuanto a mi/ a mi modo
de ver / según yo/mi amigo

*(I think that / in my opinion / with regards to /
when it comes to me / from my point of view /
according to me / my friend)*

Cuando era más joven... *(when I was younger)*
Cuando tenía... años *(when I was ... years old)*
Comía *(I used to eat)*
Bebía *(I used to drink)*
Hacía *(I used to do)*
Me gustaba *(I used to like)*

R – range
O – opinions
T – tenses
A – adjectives
T – tie together
E – extend

Qu'est-ce qu'on devrait faire pour rester en forme / bonne santé

Se debe *(you / one must)*

Se debería *(you / one should)*

Voy a *(I'm going to)*

Tiene que *(you must / one must)*

Es importante *(it's important to)*

siempre *(always)*

No *(not)*

Nunca *(never)*

evitar *(to avoid)*

fumar *(to smoke)*

beber *(to drink)*

drogarse *(to take drugs)*

Levantarse *(to get up)*

Acostarse *(to go to bed)*

Relajarse *(to relax)*

descansar *(to relax / unwind)*



KEY GRAMMAR

Present tense conjugation

THE **INFINITIVE** WILL END IN –AR (most common), –ER OR –IR

The infinitive starts with ‘to’ in English.
jugar= to play; comer = to eat; vivir = to live

-ar verbs

Juego = I play
juegas
juega
jugamos
jugáis
juegan

-re verbs

como= I eat
comes
come
comemos
coméis
comen

-ir verbs

vivo= I live
vives
vive
vivimos
vivís
viven



Preterite tense

The preterite tense is used for single events that happened in the past **at a definite time**. To form the preterite, you have to take the ending (ar, er or ir) off the infinitive and add the following endings:

-ar verbs

hablé
hablas
habló
hablamos
hablasteis
hablaron

-er and –ir verbs

comí
comiste
comió
comimos
comisteis
comieron



Imperfect tense

The imperfect tense is used for events that happened in the past (*used to/was*) **over a period of time**. To form the imperfect, you have to take the ending (**ar, er or ir**) off the infinitive and add the following endings:

ar verbs

hablaba
hablabas
hablaba
hablábamos
hablabais
hablaban

-er and –ir verbs

comía
comías
comía
comíamos
comíais
comían

Near future

ir + infinitive (just like in English...!)

Voy a hacer= I’m going to do

Vamos a comer= we’re going to eat

Vamos a jugar = we’re going to play

Simple future

This is when we want to say ‘I **will** do x, y, z’

Most of the time put these endings on to the **INFINITIVE**

(yo) hablar-é
tú) hablar-ás
(él/ella) hablar-á
(nosotros) hablar-emos
(vosotros) hablar-éis
(ellos/ellas) hablar-án

Note: tendré (I will have), haré (I will do)
saldré (I will go) , diré (I will say), volveré (I will return)

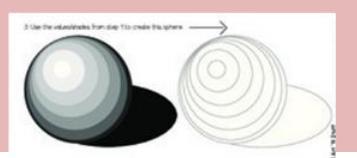
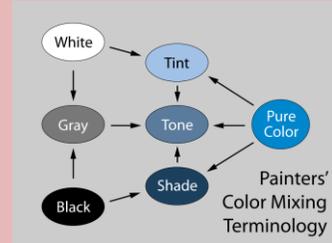
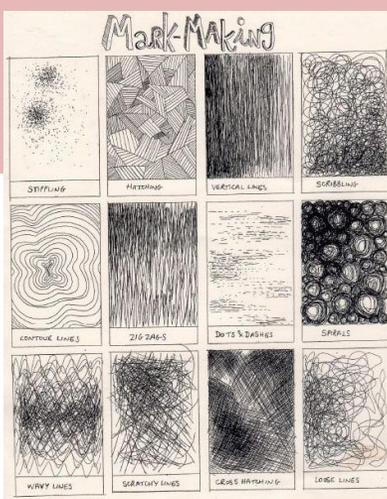
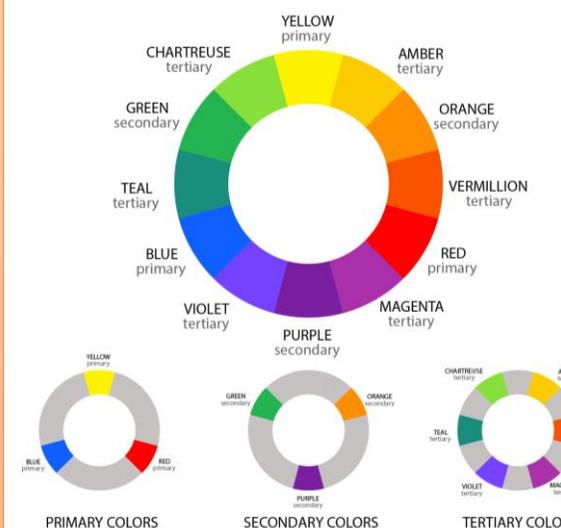
The Fundamentals of Art

ESSENTIAL EQUIPMENT:

- PENCIL PACK (2B, 4B, 6B ETC)
- ERASER
- SHARPENER
- SKETCHBOOK

OPTIONAL EQUIPMENT:

- DRAWING PENS
- WATERCOLOUR SET
- WATERCOLOUR PENCILS
- PAINTBRUSHES



Positive/Negative Shapes

Positive shapes – subject or dominant shapes on the picture plane
 Negative shapes – background areas



ATTITUDE

Be positive and try your best!

RESPECT

Respect others, work and the room

THINK

Understand and demonstrate.

IMAGINE

Be creative, use you imagination!

SPOTLESS

Tidy up after yourself.

TARGET

Follow directions.

COLOUR

BRIGHT
BOLD
VIBRANT
PRIMARY
SECONDARY
TERTIARY
RADIANT
VIVID
DULL
CONTRASTING
COMPLIMENTARY
HARMONIOUS
MONOCHROME
NATUARL
SATURATED
PASTEL
COOL
WARM

LINE

FLUENT
CONTINUOUS
CONTROLLED
LOOSE
POWERFUL
STRONG
ANGULAR
FLOWING
LIGHT
DELICATE
SIMPLE
THICK
THIN
BROKEN
OVERLAPPING
LAYERED
MARK MAKING

SHAPE/Form/SPACE

CLOSED
OPEN
DISTORTED
FLAT
ORGANIC
POSITIVE
NEGATIVE
FOREGROUND
BACKGROUND
COMPOSITION
ELONGATED
LARGE
SMALL
2D
3D
TWISTED
JAGGED

PATTERN AND TEXTURE

REPEATED
UNIFORM
GEOMETRIC
RANDOM
SYMMETRICAL
SOFT
IRREGULAR
UNEVEN
ROUGH
BROKEN
GRID
FLAT
WOVEN
ORGANIC
SMOOTH
ABSTRACTED

tone

BRIGHT
DARK
FADED
SMOOTH
HARSH
CONTRASTING
INTENSE
SOMBRE
STRONG
POWERFUL
LIGHT
MEDIUM
DARK
LAYERED
DEPTH
DEVELOPED
SOFT

A01 EXPLORE

DEVELOP
DEVELOP IDEAS
INVESTIGATE & RESEARCH
OTHER ARTISTS WORK
ANALYSE
ANNOTATE

A02 REVIEW

REFINE
EXPERIMENT
EXPLORE DIFFERENT IDEAS
AND MEDIA
A RANGE OF TECHNIQUES
& PROCESSSES
SELECT
IMPROVE

A03 EVIDENCE

RECORD
PRESENT IDEAS
PRIMARY OBSERVATION
DRAWING, PAINTING,
PRINTING, PHOTOGRAPHY,
WRITING, PHOTPGRAPY...
ANNOTATE
DIFFERENT MEDIA

A04 OUTCOME

PRESENT
FINAL IDEAS
DEVELOPED AS PLANNED
CLEARLY RESPONDS TO
ARTISTS EXPLORED
CONNECTION
CONCLUSION

ART ANALYSIS GUIDE

CONTENT/DESCRIPTION OF AN IMAGE

- What is it? (portrait/landscape/painting/mixed media etc)
- What is it about? What is happening? (describe the contents)
- Type of image? (black and white/colour/pencil etc)
- What is the theme of the image? Is there a greater meaning to the image?
- What message does the image communicate?
- Do you the year of the piece? What was happening in the world at the time? Does that have an influence on the piece?

PROCESS

- What type and direction of light was used/created? (harsh, soft, artificial lamp/natural lighting)
- How was this image 'built'?
- What kind of patterns and/or textures are in the image? How would you describe them?
- Describe the use of tone/texture/detail/scale/perspective/composition/colour within the image.

FORM/VISUAL ANALYSIS

- What do you look at first?
- How is your eye move around the frame?
- How is the image composed: lines, shapes, areas of tone?
- What was the artist's viewpoint? (worms eye view/birds eye view)
- Tone – is the image high or low contrast? How and why?
- Line – describe the lines in the image? How have they been positioned in relation to the rest of the composition? What effect does his have?

PERSONAL OPINION

- What was your first reaction?
- What is the mood of the image?
- What is the message of the image?
- What do you like or dislike and why? Use art specific language and justify your opinions.
- How does the image make you feel? Why do you think you feel like this?
- Does the colour, texture, form, detail, tone or theme of the image affect your mood? How and why?



NATURAL FORMS

TERM 3 & 4



Artists you could research:
 Billy Kidd
 Rocio Montoya
 Georgia O'Keeffe
 Karl Blossfeldt
 Ellsworth Kelly
 Ernst Haeckel
 Christian La Croix
 Helen Ahpornsiri
 Kate Malone
 Micheal Brennand-Wood
 Angie Lewin
 Henry Moore
 Polly Morgan

LINE

A **LINE** is the path left by a moving point, eg. A pencil or a brush dipped in paint. A **LINE** can take many forms, eg. Horizontal, diagonal or curved. A **LINE** can be used to show contours, movements, feelings and expressions.

-tone

tone means the lightness or darkness of something. This could be a shade or how dark or light a colour appears.

COLOUR

There are 3 primary **COLOURS**: **RED**, **YELLOW**, **BLUE**

By mixing any 2 **PRIMARY COLOURS** together you create **SECONDARY COLOURS**: **ORANGE**, **GREEN**, **PURPLE**

TEXTURE

TEXTURE is the surface quality of something, the way something feels or looks like it feels. There are two types of texture: **ACTUAL TEXTURE** and **VISUAL TEXTURE**. **ACTUAL TEXTURE**: really exists so you can feel it and touch it **VISUAL TEXTURE**: created using different marks that represent actual **TEXTURE**

PATTERN

PATTERN is a design that is created by repeating **LINES**, **SHAPES**, **TONES** or **COLOURS**.

Patterns can be manmade or natural.

SHAPE/Form

A **SHAPE** is an area enclosed by a **LINE**. It could be just an outline or it could be shaded in. **FORM** is a three dimensional shape such as a sphere, cube or a cone.

Sculpture and 3D design are about creating **FORMS**



Natural forms are organic objects found in nature. This includes;

- Shells, seaweed, fish, sea life
- Plants, flowers, seedpods, leaves, trees
- Skulls, bones, DNA
- People, portraits, figures
- Patterns found in nature
- Fruit, vegetables, roots
- Animals, insects, birds, wings, feathers



NATURAL FORMS

TERM 3 & 4



ELLY SMALLWOOD



SHIRIN NESHAT



JONATHAN YEO



NIKOS GYFTAKIS



DAVID THERON



KEHINDE WILEY



TAI-SHAN SCHEIRENBURG



GUSTAVE COUTBET



FRANCIS BACON



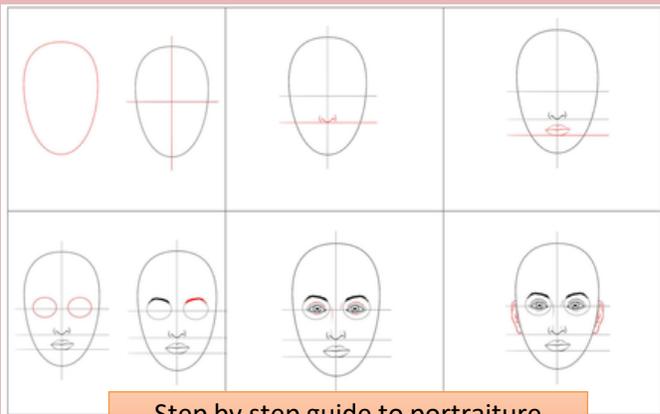
JOHN EVERETT MILLAIS



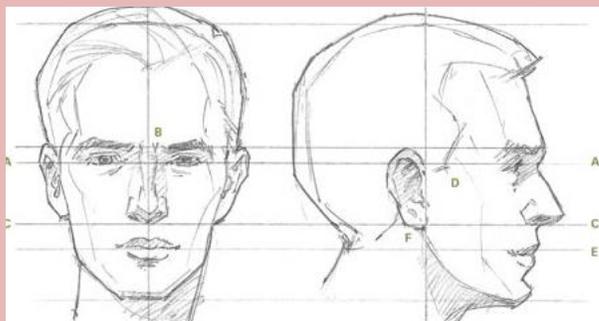
CESAR BIOJO



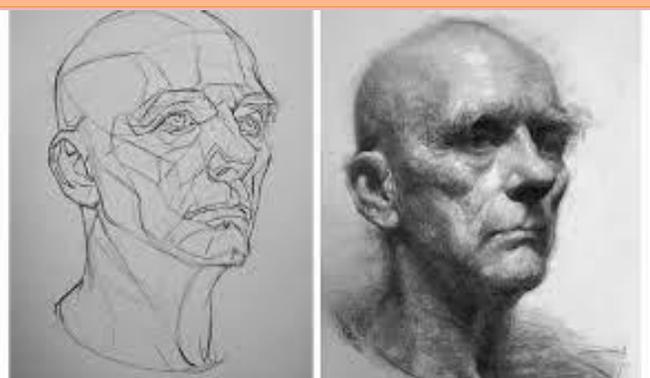
GUY DENNING



Step by step guide to portraiture



By adding tone to your outlines and contour lines, you can make your portraits more realistic.



Rocio Montoya

Montoya is a Spanish artist and photographer.

Montoya's work is mostly focused on conceptual photography, linking beauty and fashion using experimental photography and collage techniques.

There is an element of surrealism and abstraction within her work.

Montoya abstracts her subject matter through a mixture of digital and manual manipulations.

I think my work is quite symbolic, oblivious to reality. I'm always looking to find beauty in everything and everywhere and capture this search through aesthetic experiences..

- Rocio Montoya -



Approaches to text: Analysis, interpretation, rehearsal, performance & evaluation

Y10 terms 3 & 4

• Study Focus

- The focus of these two terms work is to give you an experience of a variety of play texts from a variety of cultural and historical sources. We will approach the texts from the points of view of theatre director, actor and scenic or stage designer. Wherever possible we will work on the texts in the way that was intended when they were written and that is, how they can be made to work on the stage for a contemporary audience. This will most obviously be in preparation for your component 2 examination, '**performing from text**'. This drama course is **holistic** so, the knowledge and understanding that you gain here will be crucial in your Component 3 written examination. It is vital that you remember this. The practical approaches that we take here to each individual text; the first reading, initial analysis, tailored rehearsal techniques, staging plan, design concept, *superobjective* and performance techniques, are the things that you will need to adopt and apply in your written examinations on staging the key set text (C1 section A) and reviewing how others have performed a piece of live theatre (C1 section B). You will encounter a range of theatre concepts such as atmosphere, mood and timing that it is vital that you understand both in, how to create these in practise in performance and how to identify and write about in your written examinations.
- Our study of Brecht's, 'The Exception & The Rule' will give you a good basic understanding of this major theatre practitioner's main political and theatrical ideas and theories in preparation for your component 1 examination.

• In short and in summary

- You will work practically on a number of scenes from a variety of plays so that you:
 - 1) **Broaden** your knowledge of theatre so that you have a body of texts to choose from for your C2 examination- Performing from Text
 - 2) **Develop** your performance, acting, directing and design skills so that you learn the acting and directing skills that you need to perform your C2 exam.
 - 3) **Deepen** your understanding of how meaning is created and communicated in theatre practice. Needed in all components.

Component 3 section B- Evaluating Live theatre 10% of final grade

Reviewing A Play

In your component 3 you will have about 35 minutes to answer a question on a piece of theatre that you have watched. You will have needed to prepare for this. You can be asked about any aspect of an actor, or director, or designer's work. You will have a choice of two questions and answer one only. The following guideline is to assist you in planning for this section of the examination.....At the beginning put:

The name of the Production:And Playwright:

The name of the Company:

The Venue:

Date watched

You will use two thinking skills:

Analysis & Evaluation

Analysis: Breaking the performance down into the 'things' (elements & Media) that it is made from. These are the same things you will have thought about (and I would have shouted about) when you were making your own play.

Evaluation: This is your judgement about the quality, intelligence, wisdom of the choices the company made in producing and performing their play response to the Brief. So, you are going to say if their ideas worked - how effective they were, how moving- **how thought provoking- how watchable** –etc. (use the evaluative vocabulary on this sheet).

What you need to write about

You should review the Elements of Production & Performance (see full list at the end) this includes the set, the props, the costume, the lighting (LFX) and the sound (SFX). Please review the company's interpretation of the play. Examine what it made you think and feel – what it meant to you; its themes and issues. You should also review the acting and directing too, of course.

*The Elements of Performance**

This sounds posh and really it is very simple. It just means all those things that are involved in **staging** a play for an audience. **The Elements of Performance** include; How the **actors** modified their **voices** and their **bodies** to show their **characters** and what they were thinking and feeling. So, you will talk about their; **tone, accent** and **pitch** and their **facial expression, gestures** and **posture**. You can also write about how quickly or slowly they moved and spoke. This is called their **tempo- rhythm** and can show if the character is nervous or confident or excited. **Pace** is how quickly a scene is played or how quickly an actor picks up their cue. **The Elements of Performance** include the use of **costume**, set and **props** as well as the Designer's use of lighting and **sound**. Lighting is used to highlight things and to create the scene's required **atmosphere** through colour and intensity. It also involves the ways that the director has **placed** the action on the stage – centre stage, upstage etc. and the moves that the actors make.

Rehearsal techniques to learn, remember & use in performance & in written work

• Four of Stanislavski's Psychological Techniques – of rehearsal

- **The Character's Given Circumstances-** doing your research work and creative work to find out & establish everything about your character- their background, age, class, status, ethnicity, personality, life experience that most affect them, where have they just come from – everything about their physical, financial, emotional, mental, relationship situation that makes them the way that they are... in this moment.
- **The Actor's Objective (the character's motivation).** What the character wants in this situation (these Given Circumstances) and what the actor needs to achieve in the scene.
- **Emotion memory-** the past feelings and emotions that you have actually felt in your life that are similar to the ones that the character is feeling in the scene (and that you may not have directly experienced) that you can lend to the situation you are playing.
- **The Creative If-** something that an actor can use that is both honest and can lift you from the plane (level)of Everyday Reality and onto the plane of the imagination.

• Five Brechtian Rehearsal and preparation Techniques

- **Gestus** – finding a gesture, physical action or voice that captures exactly what the character's role in society is- are they an exploiter or are they the exploited.
- **Speaking in 3rd Person** about your character- this will help you distance yourself from your role so that you can present your character at arms length as Brecht wanted so that you can remind the audience that you are playing a character in a play not a real person in real life

Also

- **Hot Seating-** Asking an actor –in – role questions about the character's past, present thoughts, feelings, attitude, relationships in fact anything that will help them discover more about their character and develop a deeper connection with their character.
- **Role on a Wall** – Making an outline drawing on a wall and filling it in with all the facts and details about the character so that you develop the role and learn about them
- **Status work** – various status exercises that help an actor find out their status in the scene so they know how to speak, act and behave in relation to the other characters in the scene.
- **Improvisation** – trying out different episodes from the characters past, present and future to discover more about them and help the actor to build the role and get into character.

Texts

You will work on scenes from some or all of the following texts

The Ash Girl- Timberlake Wertenbaker

The Life of the Insects Karel & Josef Capek

Spring Awakening – Frank Wedekind

The Exception & the Rule – Bertolt Brecht

Lemons Lemons Lemons - Sam Steiner

Assessment Objectives (AOs) GCSE drama

AO 1 - Create and develop ideas to **communicate meaning** for theatrical performance.

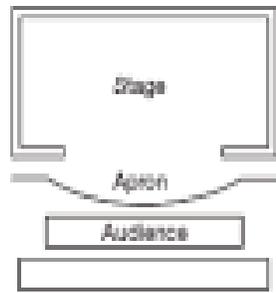
AO2 – Apply theatrical skills to **realise artistic intentions** in live performance.

AO 3 – Demonstrate **knowledge** and **understanding** of how drama and theatre is developed and performed.

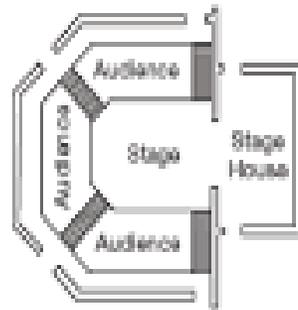
AO 4 – Analyse and evaluate your work and the work of others.

Four types of stage

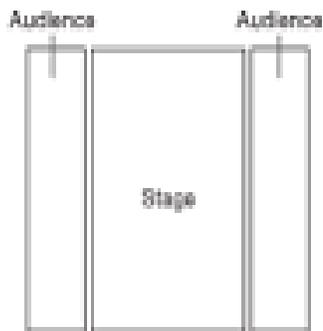
Proscenium arch



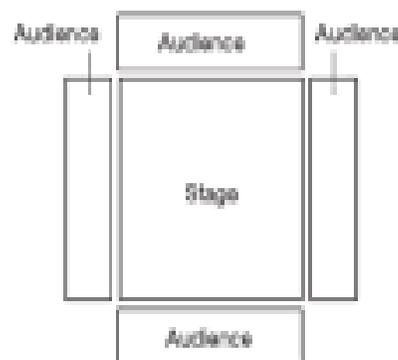
Thrust



Traverse



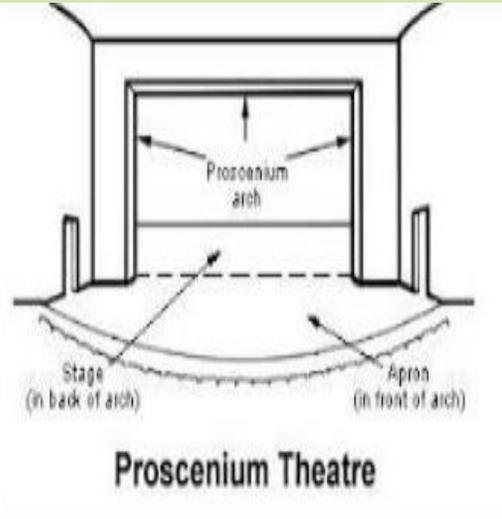
In the round



Ground Plans – Actor audience relationships

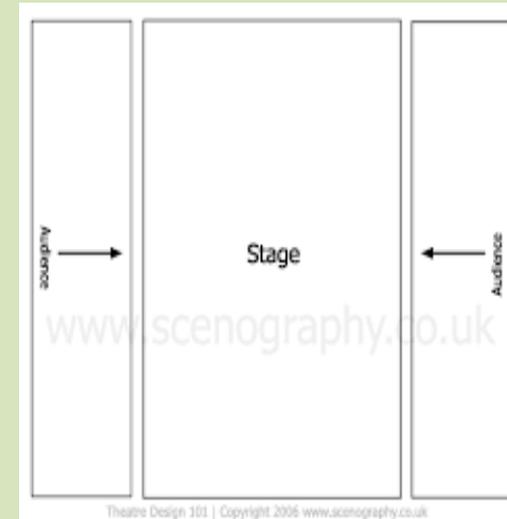
The Ground plan chosen for a production of a play sometimes depends on the way that the theatre is set up and built- the Globe theatre in London is a reproduction of one of Shakespeare's original theatres and has a thrust stage just as the original would have had. Each ground plan or actor/ audience relationship has its own challenges, restrictions and opportunities, They do have a hugely significant impact on the way that a production is rehearsed, designed, performed and received by an audience. The proscenium arch became popular after theatres reopened in 1660. Before they closed (1642) Thrust staging was the norm. A key thing for you to remember when being asked in a written examination which ground plan you would choose as either a theatre director or theatre designer to stage a given scene in your set play is, that each Ground plan informs what you can and cannot do in a performance and each has a very different impact on the audience. You need to decide which ground plan best suits the ideas that you have for the scene, the meaning that you want to communicate and the effect you want to have on the audience. You then need to remember the restrictions that your chosen ground plan brings. Your examination board are keen that you understand these.

Ways of arranging the actor / audience relationship in theatre - Ground Plans



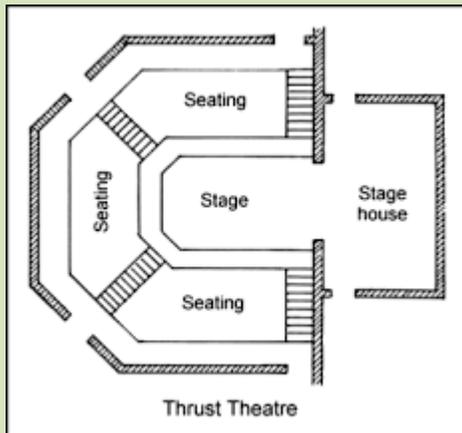
Proscenium Arch

The stage in our school hall is a good example. There are wings at the side where actors can hide from the audience. There is a pelmet at top which hides the lighting rig. The hiding of the actors out of character and the theatre machinery maintains an illusion that the play is real. The arch and wings act like a picture frame focussing the audience's attention



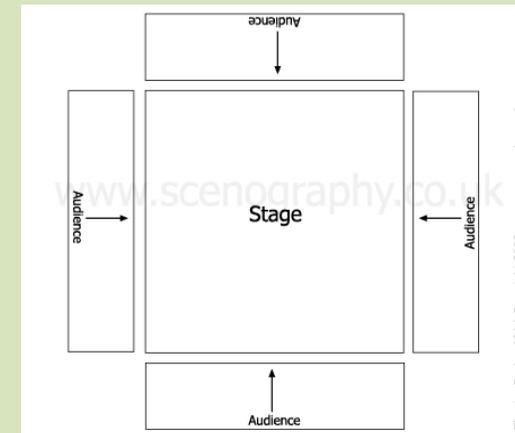
Traverse

Experienced directors and many actors enjoy the challenge of staging & performing a play with the audience on two sides. Audiences too can enjoy being able to see themselves across the stage. It gives me the sense that we are all in it together- the actors and audience all collaborating in the performance



Thrust staging

This was the popular actor/ audience relationship in Shakespeare's time. The stage extends- thrusts into the audience who watch from 3 sides. It allows actors to share asides and soliloquys with the audience. Scenery must be the bare minimum so that the audience's view from each side is not blocked



In the round

This is of course even more challenging to direct in and perform in. When it works it is very powerful and enjoyable for all. Minimal set is needed so all sections of the audience can see without obstruction.

YR 10 FILM STUDIES THE NEA

NEA = 30% of whole GCSE (Production = 20%, Evaluative Analysis = 10%)

PRODUCTION:

An extract from a screenplay for a genre film (800 – 1000 words) and a shooting script of a key section from the screenplay (about 1 min of screen time about 1 page of screenplay)

PLUS...

Evaluative Analysis of between 750 – 850 words. This analyses your production in relation to other professionally produced films/screenplays.

The NEA must be individual – no group submissions are allowed. There are strict controls in place regarding supervision, support and ensuring no plagiarism/copying takes place.

We have a choice of genres to work with!

OUR QUALIFICATION IS CALLED EDUQAS GCSE FILM STUDIES <https://www.eduqas.co.uk/qualifications/film-studies-gcse/>

IMPORTANT INFORMATION ABOUT NEA

The screenshot shows a digital interface for analyzing a screenplay. At the top, there's a toolbar with icons for search, zoom, and other functions. The main area displays a script excerpt with various elements highlighted and annotated with dashed lines pointing to a legend on the right.

FADE IN: Marks the start of the screenplay.

SCENE NUMBER: Generally numbered only in the shooting script.

TRANSITION: Used as transitional instructions for editing.

EXTENSION: Clarifies where a character is when they can't be seen.

PARENTHETICAL: Provides info on how the actor should say the line.

SHOT: Indicates the camera angle or movement in a scene.

SCENE HEADING: One line description of the location and time of day.

ACTION: The description of the actions in a scene.

CHARACTER: Identifies the character who is speaking.

DIALOGUE: The lines of speech your character says.

INTERCUT: Instructions when cutting to multiple locations.

SUBHEADER: Used when there are minor changes in a location.

Script Excerpt:

EXT. SUBURBAN HOME - NIGHT

WE OPEN on a modern suburban home. The front window illuminated by the lights inside. We see the silhouette of a man standing in the doorway. The camera moves in closer as we slowly see a BOY running around the house.

CUT TO:

2 INT. SUBURBAN HOME - KITCHEN - NIGHT

A GREEN BALL sits on a counter top. A young hand snatches it. It belongs to FILBERT (9), wiry, lost in his own imaginary world. Dressed as a knight. A toy sword in his other hand.

FILBERT (V.O.)

This is my castle. I am sworn to protect it. Anyone who stands in my way will bear the wrath of the almighty--

Just then, the babysitter walks by. BECKY (23), trendy, distracted. She is mid-phone call with Filbert's Mom, TRACY.

BECKY

(into phone)

Oh yeah, he's being good. He's just fighting orcs or trolls.

INTERCUT PHONE CONVERSATION

TRACY

Oh that's perfectly normal.

Filbert lifts his sword into the air, lets out a big battle cry, and sprints from the kitchen to --

HALLWAY

Filbert comes around the corner, distracted by his fantasy, bumps into the wall. His favorite ball slips from his hand. Everything slows down for Filbert.

FILBERT'S POV

IN SLOW MOTION - The ball tumbles down the stairs. WE HEAR each bounce echo as the ball travels down the steps.

SCREENPLAY/SEQUENCE - GENRE OPENINGS

KEY TERMINOLOGY (GENERAL)	DEFINITION
GENRE	THE TYPE OF FILM EG. ROMANCE, COMEDY, SCIENCE FICTION, THRILLER
STEREOTYPES	WIDELY HELD BUT FIXED AND OVER SIMPLIFIED IMAGE OR IDEA OF A PARTICULAR TYPE OF PERSON OR THING
CONVENTIONS	AN ACCEPTED WAY OF DOING SOMETHING...THE ASPECTS OF A MEDIA PRODUCT THAT MAKE IT IDENTIFIABLE IN TERMS OF GENRE
ARCHETYPAL	VERY TYPICAL OF A CERTAIN KIND OF PERSON OR THING
TODOROV'S PARADIGM	TODOROV'S NARRATIVE THEORY – PLEASE REFER TO TERMS 1 & 2 KNOWLEDGE ORGANISERS
SOLVERS	THE PEOPLE WHO AIM TO SOLVE THE CRIME AND SEE JUSTICE IS DONE
COMMITTERS	THE PEOPLE WHO MASTERMIND/CARRY OUT THE CRIME
VICTIMS	THE PEOPLE ON THE RECEIVING END OF THE CRIME
PROTAGONIST	LEADING CHARACTER OR ONE OF THE MAJOR CHARACTERS
ANTAGONIST	A CHARACTER WHO IS ACTIVELY HOSTILE TO SOMEONE OR SOMETHING – AN ENEMY
MISE-EN-SCENE	THE ARRANGEMENT OF SCENERY, PROPS, LIGHTING, COSTUMES ETC
CINEMATOGRAPHY	THE ART OF PHOTOGRAPHY AND CAMERAWORK IN FILM-MAKING



HORROR

FOR THIS PART OF THE COURSE, YOU WILL NEED TO BE ORGANISED, SELF-MOTIVATED AND INDEPENDENT. THIS PART OF THE COURSE IS VITAL AND NEEDS TO BE COMPLETED BY EVERYBODY. THERE IS NO PLAN B. THIS IS AN EXCELLENT WAY TO ENSURE THAT YOU ENTER THE EXAMINATION HALL IN YEAR 11 WITH EXCELLENT MARKS UNDER YOUR BELT.

TECHNICAL CODE	TERMINOLOGY	DEFINITION
EDITING 	STRAIGHT CUT	Smooth cut between one shot and the next
	FADE	Where a shot gradually turns black or white
	DISSOLVE	A technique that creates gradual fade from one image to another. Often used to connect images in some way.
LIGHTING 	WIPE	Where one shot replaces another by travelling from one side of the frame to another
	HIGH KEY	When bright colour is created through the use of lots of filler lights – few/no shadows
	LOW KEY	When fewer filler lights are used to help create pools of shadows
SOUND 	CHIAROSCURO	An Italian term usually used in art to refer to the high contrast light and dark in paintings. Used in cinema to describe the use of high and low key lighting in film noir films (lots of dark shadows, city scapes, shadowy characters)
	DIEGETIC	Sound that is part of the film's world e.g. birds singing, traffic passing
	NON-DIEGETIC	Sound that is not part of the film's world e.g. musical score or voice over narration
	PARALLEL	Music that matches the action on screen
	CONTRAPUNTAL	Sound that does not seem to 'fit' with the image on screen. It often works to add another layer of meaning or irony to what we see.
	INCIDENTAL MUSIC	Music used as a background to create /emphasise an atmosphere.
	PLEONASTIC	Emphasized sound to appeal to emotions or draw attention to significant action or prop eg. taking safety off a gun
DIALOGUE	A conversation between two or more people	



FILM STUDIES TERMS 3 & 4
TECHNICAL CODES

TERM	DEFINITION
LINEAR NARRATIVE	Is a story that takes place in a sequential manner. Generally, starts with the beginning, moves to the middle and concludes everything at the end (with all loose ends tied up nicely).
NON-LINEAR NARRATIVE	Where events are portrayed out of chronological order or the logical order presented in a story. The pattern of events jumps around. Also known as disjointed narrative or disrupted narrative. Flashbacks a common theme.
OPEN NARRATIVE	Has no sense of ending and they can go on forever (eg a soap opera such as Eastenders or Hollyoaks). Have lots of characters
CLOSED NARRATIVE	Where a story is when story is fully told and completed by the end of the film. Generally consists of clear beginning, middle and end.
MULTI STRAND NARRATIVE	Where a story is told from the points of view of several different characters.
DENOUEMENT	The final part of a play, film or narrative in which the strands of the plot are drawn together and everything is explained or resolved. Example would be at the end of every 'Death in Paradise' episode when all suspects are gathered together, the murderer is exposed and how they committed the crime is explained.
ENIGMA CODES	Not the WW2 film. This is simply the idea that a film text (does not have to be a film) portrays a mystery to draw the audience in and keeps them interested.
NARRATIVE FUNCTION	The importance of a particular type of character to the ways the story is told and understood (we can make predictions once we have identified their character type)



TODOROV'S NARRATIVE STAGES

- **Equilibrium:** everything in the film world is normal (not necessarily good, but it is normal).
- **Disruption:** something happens (usually caused by the film's main antagonist) to disrupt normal life.
- **Recognition of disruption:** the protagonist/s realise that something is wrong in their world or discover the disruption.
- **Attempt to solve:** the main protagonist goes on a journey to solve the disruption.
- **New equilibrium:** the disruption is solved and a new normality occurs (things can never be the same as they were before the disruption, but a new 'normal life' is created).

Propp's Character Theory

<http://foxhugh.com/literary-elements/character-theories-and-types/>

Vladimir Propp developed a character theory for studying media texts and productions, which indicates that there were 7 broad character types in the 100 tales he analysed, which could be applied to other media.

- 1) The (magical) helper (helps the hero in the quest)
- 2) The dispatcher (character who makes the lack known and sends the hero off)
- 3) The donor (prepares the hero or gives the hero some magical object)
- 4) The false hero (perceived as good character in beginning but emerges as evil)
- 5) The hero [AKA victim/seeker/paladin/winner, reacts to the donor, weds the princess]
- 6) The princess (person the hero marries, often sought for during the narrative)
- 7) The villain (struggles against the hero)



THE FAREWELL

The Farewell (Chinese: 别告诉她; pinyin: Bié Gàosù Tā; lit. 'Don't Tell Her') is a 2019 American comedy-drama film written and directed by Lulu Wang. It stars Awkwafina, Tzi Ma, Diana Lin, and Zhao Shuzhen. The film follows a Chinese-American family who, upon learning their grandmother has only a short while left to live, decide not to tell her and schedule a family gathering before she dies.

The film is based in part on director Wang's life experiences, which she first publicly discussed as part of her radio story What You Don't Know, which appeared as part of an episode of This American Life. The film was screened in the U.S. Dramatic Competition section at the 2019 Sundance Film Festival and was theatrically released in the United States on July 12, 2019, by A24. It received widespread acclaim from critics, with particular praise for Wang's screenplay and the performances of Awkwafina and Zhao Shuzhen. At the 77th Golden Globe Awards the film was nominated for two awards including Best Foreign Language Film, with Awkwafina winning for Best Actress – Musical or Comedy. The Farewell is a bilingual film in English and Mandarin Chinese.

The film was based on a Wang said that the film was based on her grandmother's illness, stating that "I always felt the divide in my relationship to my family versus my relationship to my classmates and to my colleagues and to the world that I inhabit. That's just the nature of being an immigrant and straddling two cultures."

The film was primarily shot in Changchun, China, over the course of 24 days in June 2018. Filming also took place in New York. In an interview with *Filmmaker*, cinematographer Anna Franquesa Solano stated that her main source of inspiration came from "spending time with Lulu's family at their home in Changchun, during pre-production."

Director Lulu Wang says that she kept the secret from her grandmother during and after film production. It was awkward to keep the secret when the grandmother visited the filming, a block from her home. Wang claims her grandmother eventually found out from discussing the movie with her little sister, who plays herself in the movie.

GLOBAL NON-ENGLISH FILM
COMPONENT 2 SECTION B:

KEY TERMINOLOGY	DEFINITION
GENDER STEREOTYPING	What is expected of a man or woman in a particular society or culture
PROTAGONIST	An essential character in a story. A protagonist works towards the central story goals
ANTAGONIST	An essential character in a story. An antagonist works against the central story goals
CULTURE	The ideas, customs and social behaviour of a particular people or society
HERITAGE	Aspects of culture that are passed down and preserved for the future
CUSTOMS	A traditional and widely accepted way of behaving or doing something that is specific to a particular society
IDEOLOGY	A set of beliefs characteristic of a social group or individual.
THEME	An idea that pervades a work of art or literature
SYMBOL/MOTIF	A thing that represents or stands for something else (especially a material object representing something abstract).

KEY TERMINOLOGY




Lulu Wang is a Chinese-born American filmmaker. She is best known for writing and directing the comedy-drama films Posthumous and The Farewell. For the latter, she received the Independent Spirit Award for Best Film and the film was named one of the top ten films of 2019 by the American Film Institute.

LEVI STRAUSS IDENTIFIED THAT SOCIETY IS BUILT UPON OPPOSITIONAL PERSPECTIVES. FILMS TEND TO USE THIS THEORY CALLED 'BINARY OPPOSITION'

EXAMPLES OF 'OPPOSITES' THAT CAN BE SEEN REGULARLY IN FILM TEXTS INCLUDE:

- GOOD V EVIL
- HERO V VILLAIN
- MAN V NATURE
- MAN V WOMAN
- CIVIL V SAVAGERY
- EAST V WEST
- RICH V POOR
- LOVE V HATE

YOU COULD PROBABLY NAME SOME EXAMPLES ALREADY!

HOW ARE THINGS PACKAGED FOR THE VIEWER?

ANALYSE THE
RELATIONSHIP BETWEEN
REPRESENTATION AND
GENRE

HOW MUCH OF THE
WORLD IS REPRESENTED
THROUGH THE MEDIA?

HOW DO AUDIENCES
READ REPRESENTATIONS
DIFFERENTLY

LOOK AT HOW FILMS
COMMUNICATE
MESSAGES

EXAMINE THE NEGATIVE
AND POSITIVE ASPECTS
OF STEREOTYPING



STUDYING
REPRESENTATION



THE FAREWELL -

The film had its premiere in the U.S. Dramatic Competition section at the 2019 Sundance Film Festival on January 25, 2019. In January 2019, A24 acquired worldwide distribution rights to the film for \$7 million, over Netflix, Amazon Studios, and Fox Searchlight.

It was released in the United States on July 12, 2019. A fully Mandarin-subtitled version of the film played in select theatres on September 8, 2019.



Info from Wikipedia



Year Ten Term Three Film Music

Topic 1 – The Film Industry

Main categories of films:

- Action
- Adventure
- Animation
- Biography
- Documentary
- Children's film
- Comedy
- Crime
- Disaster
- Fantasy
- Horror
- Musical
- Mystery
- Romance
- Sci-fi
- Spy
- Thriller
- War
- Western

There are 2 main categories of film music:

- **Diegetic** – The music is heard as part of the storyline, e.g. music heard on a speaker during the scene.
- **Non-Diegetic** – Back ground music that supports the on-screen action. It is only heard by the audience.

Topic 2 – Use of Musical Elements

Melody – This adds character and shape to musical ideas. It is common in film music to have a variety of different themes of equal importance. An important melodic theme will often be referred to as a **Leitmotif**.

Tempo – This will often reflect the action on the screen.

Metre - The time signature used – how many beats in each bar and what type of beats they are.

Rhythm – Different length durations of notes and rests to create a pattern. There many rhythmic devices used in film music – please refer to your film music PowerPoint resource.

Harmony – The way in which chords are used to create interest and complexity to the music.

- **Diatonic** – Chords that use notes from a specific key.
- **Chromatic** – Use of notes that are not in the key.
- **Dissonant** – Chords that use notes that do not 'fit' together well.

Intervals – The gaps between notes. Some intervals are very effective in film music in creating a certain mood, atmosphere and tension.

Fanfare – A short musical flourish or call to attention based on chords. It is often associated with an announcement or significant event.

Tonality – This refers to whether the music is Major, Minor or Atonal (no key/tone).

- **Atonal** – No sense of a tonic or 'home' key. Often use by composers to create an unsettling feeling.

Topic 3 – Musical Devices and Techniques

Leitmotif – A short musical theme or idea that is associated with a character, place, object or situation – often abbreviated to 'motif'.

Ostinato – A short repeating musical idea. In film music this could be a melody, rhythm or chord sequence. Often, other parts will be layered over the ostinato to emphasise a build up of the action or tension in the film.

Riff – Similar to the ostinato. The word riff indicates music from a popular or modern genre.

Layering - Building up the musical ideas to fill out the texture, to achieve a more powerful or interesting outcome.

Minimalism - A style of music characterised by the repetition of small cells of music, which evolve very gradually to create a hypnotic effect. Often used by film composers to establish the mood of a scene.

How music is used in film

- To create an atmosphere.
- To create a specific or geographic setting.
- To set the era, time or period, e.g. the use of classical music for a film set in the 18th century.
- To support the physical action and control the pace.
- To support the emotions of the characters and evoke certain emotions in the audience.
- To generate tension and build suspense.
- To support characters, situations and places through the use of a **leitmotif**.
- To predict events or inform the audience of impending events, e.g. when the *Jaws* theme is heard, but the shark has not yet been seen in the film. The audience are aware of the forthcoming danger, but the on-screen characters are not.
- To create a sense of space, breadth, depth i.e. the 'size' of something.

Star Trek
Soundtracks
are epic!



Melody – what is the lead line doing?

High or low. **Range**



Big or Small. **Range**



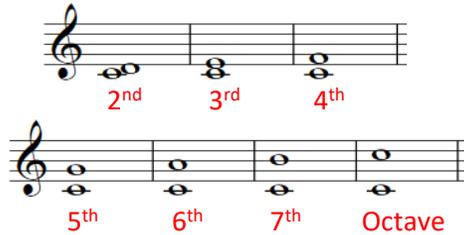
Direction = Ascending Descending



Chromatic The melody uses notes that aren't in the scale / key of the piece.



Interval The distance between two notes

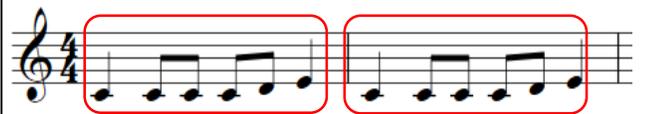


*Count the start note & end note

Sequence Doing the same shape idea but at a different pitch.



Repetition Doing the same thing again, without any changes.



Ostinato A short repeated idea.



Ornaments Trills



Mordents



MUSIC GCSE KEY VOCABULARY

Harmony - what are the chords and the tonality?

Key Signature

The sharps or flats at the start of a piece of music, showing what key the music is in.

Modulation

Musical word for key change. Most common changes: to **Dominant** or **relative Major/Minor**.

Identifying The Tonality...

- Tonal** - In a major or Minor Key
- Atonal** - There is no sense of key
- Modal** - Uses 'old-fashioned' scales called modes
- Pentatonic** - The music only uses 5 notes

Chords

- Triad** - A chord with three notes (See below)
- Power Chord** - Only playing the Root and Fifth of a triad (used in Rock music)
- Dissonance** - Clashing notes played together
- Chord Sequence** - The order the chords in a piece of music follow (containing cadences at the ends of phrases)

Cadences

The last two chords in a phrase. Only sounds 'complete' if ends on chord I.

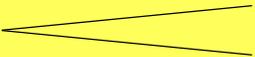
Sounds Complete

Perfect Cadence	V Dominant	I Tonic
Plagal Cadence	IV Subdominant	I Tonic

Sounds Incomplete

Imperfect Cadence	I Tonic	V Dominant
Interrupted Cadence	V Dominant	Minor Chord

Dynamics – how loud or quiet? How is it changing?

Marking	Italian Term	Meaning
pp	Pianissimo	Very Quiet
P	Piano	Quiet
mp	Mezzo Piano	Moderately Quiet
mf	Mezzo Forte	Moderately Loud
f	Forte	Loud
ff	Fortissimo	Very Loud
	Crescendo	Getting Louder
	Diminuendo	Getting Quieter
sfz	Sforzando	Sudden Accent

Baroque Period: Dynamics were rarely used (no crescendos and diminuendos). Use of **Terraced Dynamics**.

Classical Period: Some dynamics, to add contrast.

Romantic Period: Lots of crescendos & diminuendos and a large range of dynamics to add expression.

Describing What You Hear

Comment on any changes - don't sum up the whole example with one word (unless it doesn't change!)

The music starts... then... the music ends...

MUSIC GCSE KEY VOCABULARY

Structure – the way the music is built

Structure – The order that things happen in.

First... then... this is followed by... at the end.

Binary Form - Music in two parts

Section A and Section B.



Section B contrasts Section A in some way. Usually both sections are repeated.

Ternary Form - Music in three parts

Section A, Section B, Section A.



The 2nd Section A can be an exact repeat of the 1st Section A, or a slightly altered version.

You must know the individual structures of each set work.

Beethoven = Sonata Form (see the set work Knowledge Organiser)

Song Form

Intro Verse Chorus Middle 8 Bridge Outro

Instrumentation: The instruments you can hear and what they are doing

Rock and Pop instruments

Electric Guitar



Acoustic Guitar



Bass Guitar



Drum Kit



Synthesiser/Keyboard



Remember to revise the Gaelic and African instruments in Afro Celt

Instrumental Ensembles

- Solo - 1 performer
- Duet - 2 performers
- Trio - 3 performers
- Quartet - 4 performers

MUSIC GCSE KEY VOCABULARY

Instruments Of The Orchestra



Types Of Voices

- Soprano (Female)
- Treble (Boy)
- Alto (Female)
- Countertenor (Male Alto)
- Tenor (Male)
- Bass (Male)

**SATB Choir: Soprano, Alto, Tenor & Bass*

Other Vocal Terms

- A capella:** Singing without any accompanying instruments.
- Chorus:** Music written for a choir.
- Backing Vocals:** Sing harmonies / support the lead singer.

Tempo and Time: The speed and the timing of the music

Working Out The Tempo

Tap your toe to the pulse of the music and think, 'how fast am I tapping'.

**Don't tap your whole foot – it could be seen as distracting others and an exam violation!*

Rubato **Translates as 'to steal time'*

Not sticking strictly to the tempo - to add feeling (*Romantic Period – especially Beethoven!*)

Syncopation Playing off (or in-between) the beat / pulse

On The Beat

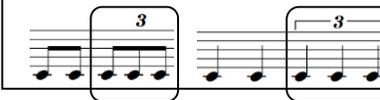
Playing on one of the beats that you would 'tap your toe' to

Off-beat

Playing in-between the beats you would 'tap your toe' to

Triplet

Three notes played evenly in the space of two notes:



Pause

If this symbol is written, stop the pulse of the music & pause on the note.



Marking	Meaning
Allegro / Vivace	Fast or Lively
Allegretto	Quite Fast (Not as fast as Allegro)
Moderato / Andante	Moderate / A Walking Pace
Adagio / Lento	Slowly
Accelerando	Gradually Speed Up
Ritardando / Rallentando rit. rall.	Gradually Slow Down
= 60 (60 bpm)	60 beats per minute
= 120 (120 bpm)	120 beats per minute

Anacrusis: An unstressed pickup or lead-in note(s) that comes before the first beat of the bar.



The Bach starts with an Anacrusis!

MUSIC GCSE KEY VOCABULARY

Time Signatures and Metre: How is the pulse organised?

Time Signatures

Written at the start of the music (and anywhere it changes) to show how many beats there are per bar, plus what type of beat

Simple Time Signatures **Each beat can be divided into two equal halves*



4 crotchet beats per bar



3 crotchet beats per bar



2 crotchet beats per bar

Compound Time Signatures **Each beat is dotted and can't be divided into two equal halves*



4 dotted crotchet beats per bar (12 quavers)



3 dotted crotchet beats per bar (9 quavers)



2 dotted crotchet beats per bar (6 quavers)

Listening Examples Go to Youtube to hear some examples of different metres:

2/4	Slaidburn March	<i>*A march is usually in 2/4 (Left, Right, Left, Right... = 1, 2, 1, 2...)</i>
3/4	Shostakovich's Waltz No.2	<i>*A waltz is a dance, usually in 3/4</i>
4/4	All That Jazz (from Chicago)	<i>*Chicago is a Musical</i>
5/4	Take Five (By Dave Brubeck)	<i>*Listen out for the jazz style</i>
7/4	The start of Money (By Pink Floyd)	<i>*Listen out for the opening bass riff</i>
6/8	We Are The Champions (By Queen)	<i>*Queen are a famous British Rock Band</i>
12/8	The Way You Make Me Feel (By Michael Jackson)	<i>*Count 1&a 2&a 3&a 4&a</i>

Style and Genre: Identifying the styles of music

Baroque Period 1600-1750	Classical Period 1750-1810	Romantic Period 1810-1910
Bach, Vivaldi, Handel	Mozart, Haydn, Beethoven	Chopin, Schubert, Wagner
Ornaments Terraced Dynamics Major & Minor Keys Harpichord Small Orchestra (Mostly Strings) Basso Continuo	Balanced, regular phrases Alberti Bass Wider range of dynamics Pianoforte introduced Wider range of mood Orchestra got bigger Elegant/Graceful style	Use of the leitmotif Music more expressive Huge range of dynamics Use of chromatic chords Unusual Key Changes Large Orchestra Use of Rubato

Film Music

***Genre** - Action, Adventure, Horror, Romance, War, Sci-fi, Western...

*Composers - John Williams, James Horner, Jerry Goldsmith

*Think, how do the **musical features represent what is happening on-**

screen? E.g. Car Chase: Fast tempo, loud dynamics, sudden changes in melody direction...War Film: Military instruments, fanfare, monophonic to represent isolation...Horror Scene: Dissonant chords and use of repeated pattern to build tension...

***Leitmotif** - A short musical idea linked to a specific character / thing

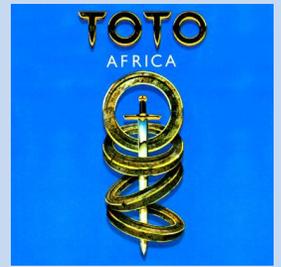
Fusion -Mixing more than one style of music together. For example... **Bhangra** - Came to UK in 1980s. Mixing traditional Indian music & pop.





Year Ten Term Four Popular Music

'Africa' by Toto



Background

Africa is a song recorded by the American rock band Toto in 1981 for their fourth studio album entitled Toto IV. It is a soft-rock love song with features of African music. The song was written by band members David Paich (born June 25th 1954) and Jeff Porcaro (born April 1st 1954 and died August 5th 1992). Africa was released as the third single from the album on September 30th 1982 through Columbia Records. In 2012, Africa was listed by music magazine NME in 32nd place on its list of '50 Most Explosive Choruses'.

The Introduction is in **B major** and uses **3 chords**:

A C# minor G# minor

The Verse is in **B major**:

B major D#m G# m B/F#
A/E C# m

The Chorus is in **A major**:

F# minor D
A E
And then a slightly tricky ending before heading straight back into the introduction
C# minor E F# minor E A

The Structure

Verse / Chorus Form:

Intro	Bars 1 – 4	4 bars
Verse 1	Bars 5 – 39	35 bars
Chorus 1	Bars 40 – 57	18 bars
Link 1	Bars 58 – 65	8 bars
Verse 2	Bars 14 – 39	26 bars
Chorus 2	Bars 40 – 57	18 bars
Link 2	Bars 58 – 65	8 bars
Instrumental	Bars 66 – 82	17 bars
Chorus 3	Bars 40 – 92	22 bars
Outro	Bars 93 – 96	4 bars

Instrumental

Performed on the synthesizer.

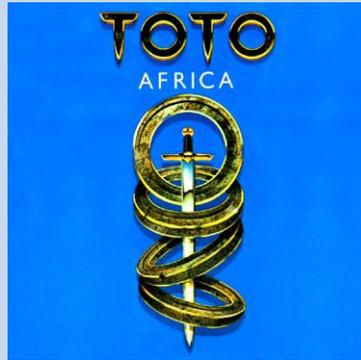
Completely homophonic in parallel harmony

First: A descending melody using a B major pentatonic scale with the notes falling into groups of three and ending with a triplet.

Then: An ascending and descending melody using the E major scale which contains more rhythmic variety than the first. Then returns to B major.

The Outro is a repeat of the introduction.

On the recording the music repeats continually and the texture is gradually reduced each time so that by the end the music is reduced to only the rhythm track heard at the beginning of the song accompanied by the bass line of Riff A.



Dynamics

Most of the song is mezzo-forte whilst the choruses are forte.

Rhythm and Metre

Ostinato rhythms, consisting almost totally of quavers
 Constant use of syncopation.
 The time signature is 2/2 (split common time) throughout
 Moderately fast.

Harmony

The majority of the song is in B major whilst the choruses are all in A major.
 Diatonic throughout

Timbre

Rock Band Line up:
 Drum kit with additional percussion
 Lead and bass guitars
 Synthesizers
 Male lead vocals and male backing vocals.
 African percussion used such as congas, marimbas, xylophones and cowbells.

Texture

Homophonic chords
 Melody and Accompaniment
 Parallel harmonies in the vocal part during the chorus

Melody

The melody is mostly conjunct (moving in step)
 Includes occasional use of the pentatonic scale.
 The pitch range of the vocal line is just less than two octaves on the printed score, but it is wider on the recording with the vocal improvisations towards the end of the song.
 Verse 2 is accompanied by a counter melody or descant, played on a flute-like instrument, which can be heard across the top of the texture. It changes pitch conjunctly, moving at the same speed as the harmonic rhythm.

Pop & Rock Music

- ***Pop** - Commercial music which appeals to lots of people
- ***Rock** - Generally 'more aggressive' but also includes rock-ballads.
- ***Instruments** - (See instruments sheet!)

Rock/Pop Song structure:

Intro	The beginning. Sets the mood & style. Usually just instruments.
Verse	Tells the story. Lyrics change each time but tune stays the same.
Chorus	The main message of the song. Same words and tune each time.
Bridge	A section that links two other sections.
Middle 8	A contrasting section of new ideas – usually 8 bars long.
Outro	Extra bit of music to finish off the song.



'Africa' by Toto

Melodic Analysis

Riff A – bars 1 & 2: A distinctive syncopated rhythm pattern mostly repeating chord IV and concluding with chords vi and ii:

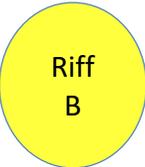
A musical score for Riff A in A major, 2/2 time. The melody is syncopated, starting on the second half of the first bar. The chords are A (IV), G#m (vi), and C#m (ii). The notation includes a treble clef, a key signature of two sharps (F# and C#), and a common time signature (C). The dynamics are marked 'mf'.



With the exception of the Chorus, Riff A makes an appearance in every other section of the song.

Riff B – bars 3 & 4: starts with an anacrusis and is an ostinato pattern of five notes – based on the E major pentatonic scale – over a sustained chord ii:

A musical score for Riff B in A major, 2/2 time. The melody is an ostinato pattern of five notes (E, F#, G, A, B) based on the E major pentatonic scale, starting with an anacrusis. The accompaniment is a sustained chord C#m (ii). The notation includes a treble clef, a key signature of two sharps (F# and C#), and a common time signature (C). The dynamics are marked 'mf'.



Chorus 3

A new electric guitar riff is heard on the recording in the last bar of each phrase:

A musical score for a new electric guitar riff in A major, 2/2 time. The riff consists of five notes (E, F#, G, A, B) based on the E major pentatonic scale, starting with an anacrusis. The notation includes a treble clef, a key signature of two sharps (F# and C#), and a common time signature (C).

African Influences

Riff A and B:

- Use of syncopation
- pentatonic scale
- Irregular ostinato groupings that cut across the 2/2 time signature.

The instrumental sonorities:

- Xylophones and marimbas – suggest the sounds of pitched percussion instruments which originate from the various countries of the African continent.
- Polyrhythms created

Start of the song:

- An additional eight bar introduction, performed only by unpitched percussion instruments. This is heard before the vocal score begins and contains African influence in its use of layered rhythm parts and ostinatos.

Vocals

- Homophonic texture in the vocal parts – movement in parallel harmony



Introduction (instrumental) X4

Verse 1:

B D#m G#m

I hear the drums echoing tonight

B/F# A/E C#m G#m (INTRO)

But she hears only whispers of some quiet conversation

B D#m G#m

She's coming in, 12:30 flight

B/F# A/E C#m G#m (INTRO)

The moonlit wings reflect the stars that guide me towards salvation

B D#m G#m

I stopped an old man along the way

B/F# A/E C#m G#m (INTRO)

Hoping to find some old forgotten words or ancient melodies

B D#m G#m (INTRO)

He turned to me as if to say, "Hurry boy, it's waiting there for you"

Chorus:

F#m D A E

It's gonna take a lot to drag me away from you

F#m D A E

There's nothing that a hundred men or more could ever do

F#m D A E

I bless the rains down in Africa

F#m D A (C#m E F#m E)

Gonna take some time to do the things we never had (ooh, ooh)

Introduction (instrumental) X2

Verse 2:

The wild dogs cry out in the night
As they grow restless, longing for some solitary company
I know that I must do what's right
As sure as Kilimanjaro rises like Olympus above the
Serengeti
I seek to cure what's deep inside, frightened of this thing
that I've become

Chorus 2 (same as chorus 1)

Introduction (instrumental) X2

Synthesizer solo

B / D#m / G#m / B / A / C#m / G#m /

B / D#m / G#m / / / (INTRO)

Hurry boy, she's waiting there for you

Chorus 3

It's gonna take a lot to drag me away from you
There's nothing that a hundred men or more could ever do
I bless the rains down in Africa x 5

Gonna take some time to do the things we never had (ooh)

Outro (same as introduction) x 8

Keywords

Lever: Is a bone and shown as a straight line



Fulcrum: Is a pivot or joint and shown as a triangle



Effort: Is a force provided by muscles and is shown by an arrow



Load: Is the weight of the body/ object being moved, it is shown as a square



AQA GCSE PE Paper 1

Chapter 2: Movement Analysis 2.1 Types of Levers

Mechanical Advantage

1 st Class Lever		<p>Advantage – High or Low</p> <p>Will vary depending on the distance of the load and the effort from the fulcrum</p>
2 nd Class Lever		<p>Advantage - High</p> <p>Able to lift heavier loads owing to its large effort arm</p>
3 rd Class Lever		<p>Advantage - Low</p> <p>Provides speed and wide range of movement owing to a long resistance arm</p>

Lever systems

1 st Class Lever		The fulcrum is surrounded by the effort and the load	<p>Heading a ball</p>
2 nd Class Lever		The load is surrounded by the fulcrum and the effort	<p>Calf raises</p>
3 rd Class Lever		The load is surrounded by the fulcrum and the effort	<p>Bicep curl</p>

Each lever system can be identified by the component in the middle:

One
F
(fulcrum)

Two
L
(load)

Three
E
(effort)



Effort = Biceps
Load = water
Fulcrum = hand/oars
1st class lever
(fulcrum in the middle)



Effort = Triceps
Load = Body weight
Fulcrum = Feet
2nd class lever
(load in the middle)



Effort = muscles
Load = bat/ball
Fulcrum = shoulders
3rd class lever
(effort in the middle)

2.3 Planes of movement and Axes of rotation

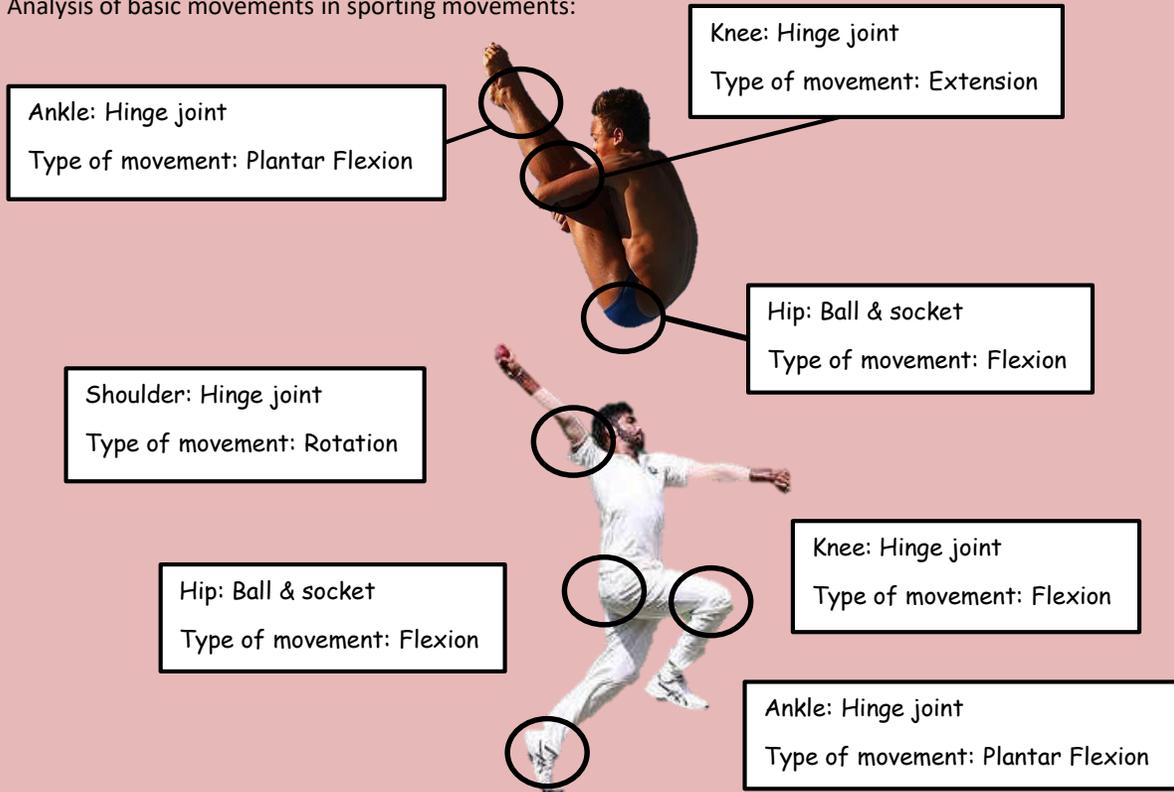
We move in planes around axes.

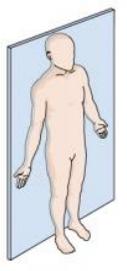
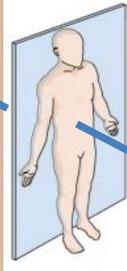
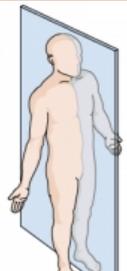
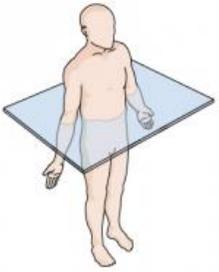
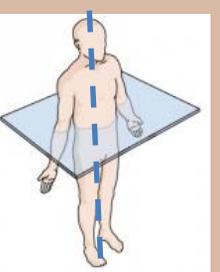
Plane: Is an imaginary line that movement direction occurs in

Axis: IS a line about which the body or boy part can turn.

2.2 Basic Movements

Analysis of basic movements in sporting movements:



Plane of movement	Axes of Rotation	Sporting example
 <p>Frontal Plane Separates the front and the back of the body</p>	 <p>Sagittal Axis Goes from the front to the back of the body</p>	 <p>Cartwheel The only movements are abduction and adduction</p>
 <p>Sagittal Plane Separates the left and the right side of the body</p>	 <p>Frontal Axis Goes from one side to the other side of the body</p>	 <p>Somersault The only movements are flexion and extension</p>
 <p>Transverse Plane Separates the top and the bottom of the body</p>	 <p>Longitudinal Axis Goes from the top of the body to the bottom of the body</p>	 <p>Full Twist The only movements are rotating and twisting</p>

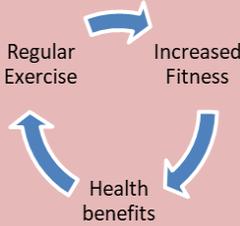
3.1 Health and Fitness

Health and fitness:
Fitness definition: 'The ability to meet the demands of the environment'
Health: 'A state of complete emotional, physical and social wellbeing and not merely the absence of disease or infirmity'

3.2 Components of Fitness

AQA GCSE PE Paper 1 Chapter 3: Physical Training

The relationship between health and fitness:



Exercise improves fitness, an increase in fitness will improve performance
 Exercise improves all aspects of health (physical, social, emotional)
 If you are not healthy enough to take part in regular exercise your fitness will deteriorate causing your performance to drop. Health benefits will not be gained

Cardiovascular fitness	Muscular Endurance	Flexibility	Reaction Time	Power	Speed	Agility	Balance	Coordination	Strength
'The ability of the heart and lungs to supply oxygen to the working muscles'	'The ability of a muscle group to undergo repeated contractions, avoiding fatigue'	'The range of movement possible at a joint'	'The time taken to respond to a stimulus'	'Is the ability to do strength performances quickly' Power = Strength x Speed	'The amount of time it takes to perform a particular action or cover a particular distance'	'Is the ability to change position of the body quickly while maintaining control of the movement'	'Is the ability to retain the body's centre of mass above the base of support' static or dynamic	'Is the ability to use two or more body parts together smoothly and efficiently'	'The ability to overcome a resistance. It requires a force to be applied to a muscle or muscle group'
Explanation	Explanation	Explanation	Explanation	Explanation	Explanation	Explanation	Explanation	Explanation	Explanation
They need good cardiovascular fitness to be able to maintain a high standard of performance throughout the race/match.	They need a prolonged additional oxygen delivery to the working muscles to repeat muscle contractions over a long period of time without tiring	Performers need good flexibility to be able to get into position without getting injured and to perform complex movements	Performers need to react to a stimulus. A stimulus can include: a ball, whistle, starters gun, or an opponent	Performers need power to improve performance. Speed and strength are needed in sports where you throw jump kick and sprint	Performers need speed to get from one position to another. This may be leg speed to run or arm speed when throwing or hitting	Performers need agility to change direction quickly. This can be used to evade opponents or move around the court or pitch quickly	Performers need balance so they don't fall over. E.g. in gymnastics when performing a balance (static) or travelling across the beam (dynamic)	Performers need coordination when they are using two body parts at the same time. It can be used when aiming, or striking/hitting a ball	Performers need Strength to support weight (static) lifting a weight (maximal) punch (dynamic) throw (explosive)
Sports	Sports	Sports	Sports	Sports	Sports	Sports	Sports	Sports	Sports
Games players Long distance runners/rowers	Cyclist (legs) Boxing (punching) Swimmer (arms/legs)	Gymnasts Goal keepers Divers	Sprinters Badminton players Rugby players	Shot put Football (kicking) High jump	Sprinting Badminton Javelin thrower	Rugby side-step Tennis Badminton	Gymnastics Skiing Hammer throw	Tennis Archery Football	Weight lifting Rugby Gymnastics
									
Fitness Test	Fitness Test	Fitness Test	Fitness Test	Fitness Test	Fitness Test	Fitness Test	Fitness Test	Fitness Test	Fitness Test
Multi stage fitness test	Sit-up bleep test	Sit and reach	Ruler drop test	Vertical jump	30m sprint	Illinois agility run	Stork balance test	Wall toss	Grip dynamometer 1 rep max test

3.4-3.14 Fitness Tests

Agility Fitness Test		Balance Fitness Test		Cardiovascular endurance test	
Fitness Test	Test Procedure	Fitness Test	Test Procedure	Fitness Test	Test Procedure
Illinois run	<ul style="list-style-type: none"> Set up the course as shown in the picture Lie face down on the floor, by the first cone On 'Go' run around the course as fast as you can Record result and compare to a rating chart 	Stork test	<ul style="list-style-type: none"> Place hands on your hips & foot on your knee Raise your heel from the ground so you are balancing on your toes Time starts when you lift your heel Record result and compare to a rating chart 	Multi stage fitness test	<ul style="list-style-type: none"> Measure out 20 metres Place cones to mark the distance Start the audio recording Run from one cone to the other until you cannot continue Record result and compare to a rating chart
Used by performers who change direction quickly such games players		Used by gymnasts and games players		Used by badminton and cricket players	
Coordination Fitness Test		Flexibility Fitness Test		Muscular endurance Fitness Test	
Fitness Test	Test Procedure	Fitness Test	Test Procedure	Fitness Test	Test Procedure
Wall toss test	<ul style="list-style-type: none"> Stand 2 meters away from a wall Throw a tennis ball underarm against the wall Throw with the right hand and catch with the left hand; then alternate hands Record result and compare to a rating chart 	Sit and reach test	<ul style="list-style-type: none"> Sit with your legs straight and the soles of your feet flat against the box With palms face down, one hand on top of the other, stretch and reach as far as possible Record result and compare to a rating chart 	Sit-up bleep test	<ul style="list-style-type: none"> Lie on a mat, knees bent, feet on the floor. your hands across your chest on shoulders Start the audio recording Sit up until you can no longer continue Record results and compare to a rating chart
Used by badminton and cricket players		Used by performers such as gymnasts and divers		Used by tennis and football players	
Power Fitness Test		Reaction Time Fitness Test		Speed Fitness Tests	
Fitness Test	Test Procedure	Fitness Test	Test Procedure	Fitness Test	Test Procedure
Vertical jump	<ul style="list-style-type: none"> Stand side onto the wall, feet flat on the floor Mark the highest point that the tips of your fingertips can reach Holding a piece of chalk, jump as high as you can Mark on the wall the top of your jump Measure the distance between the 1st and 2nd 	Ruler Drop	<ul style="list-style-type: none"> Stand with your hand open around the ruler, with the 0 cm mark between thumb and forefinger The assistant holds and drops the ruler Catch the ruler as quick as possible Record results and compare to a rating chart 	30m sprint	<ul style="list-style-type: none"> Measure and mark out 30 metres in a straight line Place one cone at the start and one at the end On 'Go' run as fast as you can Record result and compare to a rating chart
Used by sprinters, rugby players and long jumpers		Used by basketball, rugby and badminton players		Used by 100k sprinters and rugby players	
Maximal Strength Fitness Test		Strength Fitness Test		<p>Qualitative or quantitative data: When collecting pieces of data for fitness tests they are usually quantitative meaning. The measurements can be quantified as numbers such: Time (seconds) Distance (meters) Levels or numbers</p> <p>Data can be collected qualitative meaning the measurements are based on quality rather than quantity, such as a number out of 10 for a routine. They are opinions not facts.</p>	
Fitness Test	Test Procedure	Fitness Test	Test Procedure		
One rep Max	<ul style="list-style-type: none"> Warm up Lift the maximum weight you can in one attempt Record result and compare to a rating chart 	Hand grip dynamometer	<ul style="list-style-type: none"> Adjust the grip to your hand Keep your arm beside you at a right angle to your body Squeeze the handle as hard as you can Record result and compare to a rating chart 		
Used by performers such as power lifters, rugby players and boxers		Used by performers such as climbers (to lift body weight)			

3.3 Fitness Testing

Reasons for fitness testing:

Before a training programme:

- To identify strengths and areas for improvement
- Identify training requirements
- To show a starting level of fitness
- To motivate and provide goals

During and after a training programme:

- To monitor improvement
- To provide variety to a training programme
- Compare results against norms of the group
- To identify whether training has been successful

Limitation of fitness testing:

- Tests are often general and not sport specific
- The movement required in the test is not the same as in the actual activity
- Tests do not have competitive conditions required in sports
- Some tests do not use direct measuring and are an estimate or are submaximal
- Some tests need motivation, because they are exhausting to complete
- Some tests questionable reliability

Specificity: Training must match the requirements of the activity so that the right muscles and body systems are adapted.
Progression Overload: Gradually increasing the amount of working training so that fitness gains occur, but without the risk of injury.
Reversibility: Just as fitness improves with training it can decline if you stop training.
Tedium: This is the boredom that can occur when you train the same way every time. A variety of training methods are needed to keep motivated to carry on without giving up.

3.15 Principles of Training

Applying overload using the F.I.T.T principle:

Frequency: How often you train (should be gradually increased) Week 1 = train once per week - Week 2 = train twice per week
Intensity: How hard you train (should be gradually increased)
 Week 1 = 1 set of 5 repetitions of a 5 kg weight - Week 2 = 2 sets of 5 repetitions of a 5 kg weight
Time: How long you train (should be gradually increased) Week 1 = 20-minute session - Week 2 = 25-minute session
Type: Relates to specificity. training should closely match the activity. E.g. A marathon runner should use continuous training

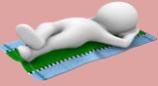
Training intensities:

Max Heart rate = 220 - age
Aerobic target zone: 60% - 80% of MHR
Anaerobic training zone: 80% - 90% of MHR
Strength/Power: high weight/low reps above 70% of 1 rep max (3 sets of 4/8 reps)
Muscular endurance: low weight/high res below 70% of 1 rep max (3 sets of 12-15 reps)

3.17 Types of Training

Continuous Training	Fartlek Training	Circuit Training	Interval Training	Plyometric Training	Weight Training	Static Stretching
Is sub-maximal aerobic exercise that has no breaks or rest. It lasts for a minimum of 20 minutes and can improve cardiovascular & muscular endurance	Form of continuous training that varies in pace and terrain. It is both aerobic & anaerobic and can improve cardiovascular & muscular endurance	Contains stations organised in a circuit, they can be skill or fitness based, aerobic or anaerobic Intensity is measure by circuits, time or repetitions. Can be adapted to improve all types of fitness	High intense exercise followed by periods of rest to recover Usually anaerobic can be used in a variety of locations Improves speed but can improve strength and cardiovascular	Maximal intensity involving jumping/bounding. It involves an eccentric contraction (muscle lengthens) immediately followed by a concentric (muscle shortens) Improves power (speed & strength)	Form of interval training which involves reps and sets. The weight provides the resistance. Can be done using free or fixed weights. It improves strength, power and muscular endurance	Stretch as far as you can. The stretch is held (isometric) for up to 30 seconds. It Can be done on your own, with apparatus or with a partner. Improves flexibility
Advantages	Advantages	Advantages	Advantages	Advantages	Advantages	Advantages
No equipment or facilities Has many health benefits (CHD) Can be done on your own	No equipment or facilities Change of pace can be more interesting Can be done on your own	Variety of stations generates interest Can be skill or fitness Can easily be adapted	Can be used to improve health and fitness (aerobic & anaerobic) No equipment needed	Develops power quickly No equipment	Can target specific areas of the body	Develops flexibility
Disadvantages	Disadvantages	Disadvantages	Disadvantages	Disadvantages	Disadvantages	Disadvantages
Boring No change of pace Can cause impact injuries	High intensity can be avoided A safe route may be hard to find	Equipment can be costly Can be time consuming to set up	Can be repetitive and boring Need to plan and keep track of sets	Can cause injury due to high intensity	Can cause injury with poor technique a spotter needed with free weights Can be expensive	Not as effective as other stretching methods and can take a long time to go through all muscle groups
Sporting Example	Sporting Example	Sporting Example	Sporting Example	Sporting Example	Sporting Example	Sporting Example
Marathon running Cycling Swimming	Fotball Rugby Netball	Can be adapted to suit all sports	Usually for speed It can be adapted to other sports	Basketball Long jump Hurdles	Weight lifting, tennis (muscular endurance)	Most sports and activities benefit from static stretching

3.18 Preventing Injury

Complete a warm up	A warm up should be completed to: increase the temperature in the muscles, tendons and ligaments. This increases the elasticity which will help prevent muscle pulls and strains	
Avoid overstretching	Stretching should be completed carefully without overstretching or bouncing as this can result in a muscle strain	
Avoid overtraining	If you train too hard adaptations will not take place e.g. lifting too heavy weight can cause an injury such as a strain	
Take adequate rest	Training programmes should include rest days. Make sure you have enough resting between sessions to allow for recovery	
Use taping or bracing	When necessary taping and bracing can be used to provide additional support to joints and muscles. E.g. an ankle support can reduce the chance of a twisted ankle (sprain)	
Remain hydrated	Maintain an appropriate level of hydration by drinking water. If you don't maintain your hydration levels you can become dehydrated, this can lead to dizziness and nausea	
Wear appropriate clothing and footwear	This may included non-slip footwear such as boots to prevent ankle injuries Gum shield in rugby to protect the teeth in boxing and rugby Shin pads to reduce impact on the shins in football and hockey.	
Use correct technique	When completing any activity, using correct technique will lead to better results. Help avoid injury by using the correct technique when lifting weight or throwing the javelin	

3.17 High Altitude Training

High Altitude training as a form of aerobic training:

- There are fewer air molecules at altitude. This means there is less oxygen available to take into our body. This means there is less oxygen available to get to the working muscles. The body's oxygen carrying capacity is reduced at high altitude.
- When an athlete first tries altitude training their performance will be worse. However, after several weeks of training at high altitude their body will adapt:
- Increasing red blood cells
- Increasing haemoglobin
- When they return to sea level, they will have an advantage because their oxygen carrying capacity will have increased



Benefits of high-altitude training:

- Increased red blood cell production
- Increased oxygen carrying capacity
- A greater amount of oxygen being transported to the working muscles once athletes return to sea level
- These benefits are particularly helpful to endurance athletes who rely on aerobic energy production for example marathon runners and triathletes



Limitations of high-altitude training:

- Adaptations take time
- Expensive to live away from home
- Timing of training for competition needs careful planning
- Altitude sickness (nausea caused by training at altitude)
- Limited to aerobic activities (no effect on anaerobic events)
- Can make it harder to train at high intensities need for anaerobic activities



3.19 Training Seasons

Pre-season (preparation phase):

This is the period up to competition.

Training includes:

- Develop techniques specific to the sport
- General fitness training such as continuous, fartlek or interval training sessions to increase aerobic fitness
- Weight training to build up strength and muscular endurance

Benefits:

- Fitness and skill lost during post season can be regained
- Skills and techniques can be improved. This means matches at the start of the season are more successful



Competitive-season (peak):

This is the playing season

Training includes:

Taking part in matches every week

Maintenance of fitness related to activity

Limited training, as it may cause fatigue which would decrease performance

Concentration on skills, set plays and tactics to improve performance

Benefits:

Fitness levels and quality of performance can be maintained throughout the season



Post-season (transition phase):

This is the period of rest, active recovery and light aerobic work after the competitive season

Training includes:

Rest to recover from the competitive season

Light aerobic exercise, to maintain a level of general fitness

Benefits:

Athletes are fully rested, ready for pre-season

Not too much fitness is lost



3.20 Warming up and Cooling down

Warm-up

A warm-up has three phases:

Phase 1 Pulse raiser

To raise the heart rate and speed up oxygen delivery to the working muscles. E.g. jogging a lap of the pitch

Phase 2 Stretching

Stretching the muscles and soft tissues you are about to use increases their elasticity and range of movement

Phase 3 Drills

These are more intense practices relating to the main session, such as dribbling if you are playing basketball

Benefits of a warm-up

To physical and mentally prepare for exercise

To increase oxygen delivery to the working muscles

Increase temperature of muscles, tendons, and ligament. Reducing the chance of injury

Increase the range of movement at a joint which will aid performance

Cool-down

A cool-down has two phases:

Phase 1 Light exercise

e.g. slow jogging at a much lower intensity you have been working

Phase 2 Stretching

Stretch the muscles you have used in the main activity

Why we cool down

The removal of lactic acid and CO₂

Prevents muscle soreness DOMS

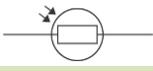
Bring heart and breathing rate slowly back to resting

Helps avoid dizziness due to blood pooling

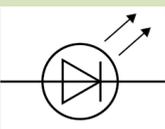
Improves flexibility

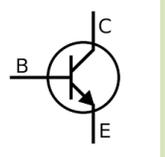
Design and Technology Timbers

Electronic systems can have singular or multiple input and output devices, and sometimes they have a controller between them. The system reads the input signals and controls the output signals according to the instructions in the program it has been given: INPUT DEVICE - CONTROL - OUTPUT DEVICE For example, when you use a computer you move a mouse or press buttons on a keyboard. These are input devices that give information to the computer. The computer controller reads the inputs, and its program tells it what to do. The output devices could be the screen, a printer, a laser cutter, or a very complicated robot in a huge factory. To design an electronic system, you need to know about the input devices and output devices you could use.

Sensors A sensor is affected by the conditions around it. Sensors are good input devices because they can give an input signal to an electronic system.	
<p>A thermistor is a temperature-dependent resistor. Its resistance changes with temperature.</p> <ul style="list-style-type: none"> • When it is hot, the resistance is low. • When it is cold, the resistance is higher. Some electronic thermometers use a thermistor. As the temperature changes, the system measures the resistance of the thermistor and turns it into a number to display on a screen. 	
<p>Light-dependent resistor When light falls on the sensing area of a light-dependent resistor (LDR) its resistance changes:</p> <ul style="list-style-type: none"> • In the light resistance is low, so electricity flows. • In the dark resistance is high, so not much electricity flows. 	

<p>Key terms</p> <p>Input device: something that can give an input signal to the system.</p> <p>Output device: something that responds to an instruction of change in control elements.</p> <p>Input signal: information given to the system by an input device.</p> <p>Output signal: an instruction the system gives to an output device.</p> <p>Program: a set of instructions the system controller has been given to make the electronic system do what it is supposed to do. If a transistor is used, there is no program, just a simple switching action due to the rise in voltage on the base of the transistor above 0.6 volts.</p> <p>Resistance: an electrical quantity that is a measure of how the device or wire reduces the electric current flow through it.</p>
--

Outputs In an electronic system, output devices are controlled by the system. They can be simple things like lights that are turned on and off or complex things like computer screens that output a lot of information.	
Buzzer A buzzer makes a sound. Buzzers can be useful in a sensing device to give people a warning that something needs their attention.	
Light-emitting diodes A light-emitting diode (LED) gives out light when electricity is passed through it. LEDs can be small coloured indicator lights or bright enough to light up a room in a house.	

Control devices and components. As well as sensors, there are some other components that can be used to give an input signal to an electronic circuit.	
A single-throw switch has a button that switches between on and off. It is a simple control device that the user can operate to turn a circuit on or off.	
<p>A resistor is a component that can be added to a circuit to change its resistance. This means it can Limit the flow of electricity through part of the circuit. Resistors can be used to:</p> <ul style="list-style-type: none"> • protect delicate components by stopping too much electricity flowing through them • help control the flow of electricity around a circuit. 	
A transistor acts like a tiny electronic switch. It has three connections. A small voltage at the base connection turns it on and lets a larger current flow into the collector and out of the emitter. Transistors are useful in sensing circuits to amplify (make bigger) the small current you get from some sensors. A transistor is a semi-conductor that acts Like an electronic switch depending upon the voltage across the base and emitter. You can get a single transistor to build into your own circuits. Transistors can be made extremely small by etching them onto silicon wafers known as silicon chips.	

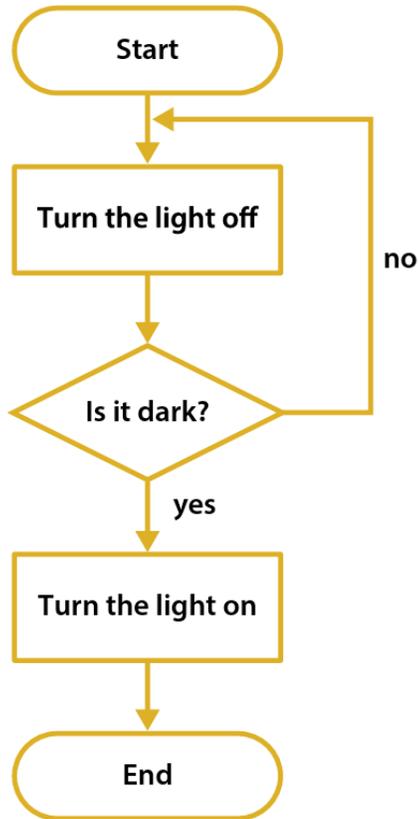
Programmable components are used in a variety of applications, for example alarm systems. In school they allow you to add intelligence to your projects. There are many types of PIC (Programmable Interface Controllers) micro-controllers available, for example the GENIE range. These are programmed and tested by software that makes use of flowcharts.

- A flowchart is a good way to plan a computer program.
- A flowchart uses instructions and yes/no questions to create a program.
- Analogue inputs give a range of values to the controller.
- Time delays and counts are useful in a program.
- Feedback loops allow a program to monitor a sensor.

comes on in the dark.
gets light.

A rectangular box is an instruction, so it tells the program to do something.

A diamond-shaped box is a question, so the program can decide something.



Inputs and decisions: switching outputs on or off.

An electronic system uses the questions in its program to make decisions. These decisions tell its output devices what to do. When the control program detects an input, it moves to the next part of the program, and follows the instructions to make an output happen. It is important for a designer to know exactly what they want a product to do, and then break it down into a set of simple steps that can be put into a flowchart.

How to process and respond to analogue inputs

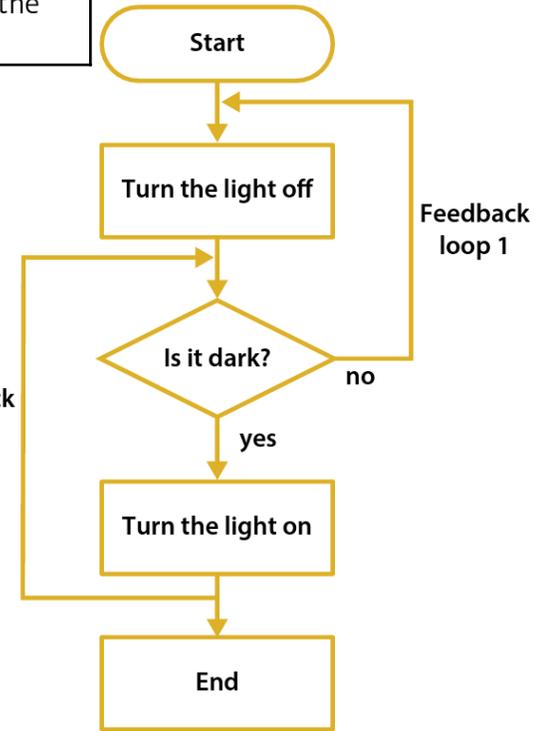
Some sensors give out an analogue signal. This means they can give a range of values. LDRs and thermistors are analogue devices. Their resistance goes up and down as Levels or temperatures change. This means a system can be programmed to respond to different Levels. The outside light has a variable resistor that lets you change the light level at which the Light turns on.

How to use simple routines to control outputs

There are some simple routines that can be added to a program to change what happens:

- **Time delay.** A program instruction that says 'wait 10' means the program will wait 10 seconds then go on to the next instruction. You could use this to make a light flash on and off as quickly or slowly as you want.
- **Count.** A program can be told to count how many times it gets an input, and perhaps give an output every ten pushes of a button.
- **Feedback loop.** This sends the program back to an earlier point to do the same thing repeatedly. This is how a system monitors a sensor - it goes around in a loop asking the same question until the answer changes. The flowchart below shows a second feedback loop added to the circuit. Now the light comes on in the dark and goes off when it gets light.

Feedback loop 2

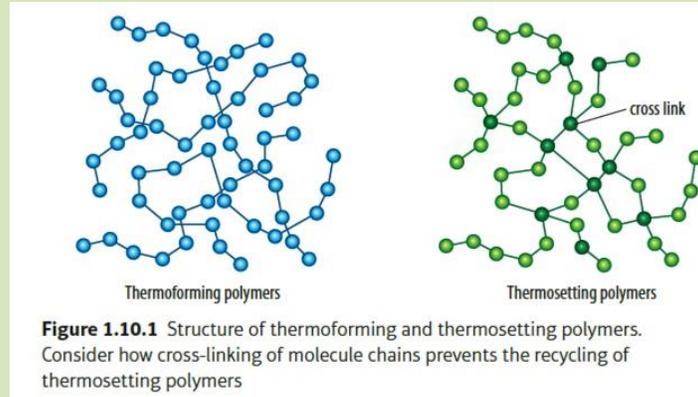


Feedback loop 1

Figure 1.7.1 A flowchart for a simple outside light that comes on in the dark. The light is off to start with, comes on when it gets dark and just stays on forever

Name	Who are they?	Known For	Why they are influential
	Company, established in Italy in 1921	Designer and mass producer of functional but visually appealing homeware and kitchen products	Uses famous designers, such as Philippe Starck, to create iconic kitchen products such as the iconic spider like Juicy Salif lemon squeezer and retro kettles, setting a standard for other homeware companies
<p>Apple</p> 	Company, established in the USA in 1976	Producer of consumer electronics and software using cutting-edge technologies, e.g. iPad, iWatch, iPod, iPhone, iTunes	<ul style="list-style-type: none"> • Ground-breaking design: products looked completely different to anything before • Breaking with tradition and legacy, Apple's iPod made digital music mainstream • A loyal customer base
<p>Heatherwick Studio</p> 	Design studio, established in the UK in 1994	Around 200 designers, architects and makers have worked on projects from perfume bottles to Routemaster buses and Singapore University buildings	Stretches the boundaries of materials, craftsmanship and artistic thinking, showing that products and buildings can be unusual, experimental and interesting
 <p>Joe Casely-Hayford</p>	Fashion designer, born 1956	Noted for his original but wearable designs that push barriers of conformity, made by master craftspeople using traditional English tailoring methods	Sets standards for British tailoring that combines style with character and is popular with celebrities
<p>Pixar</p> 	Animation studio, established in the USA in 1979	Among the first to develop computer-animated feature films	Uses new techniques and technologies to make popular and successful films, including <i>Toy Story</i> and <i>Finding Nemo</i>
<p>Raymond Loewy</p> 	Industrial designer (1893–1986)	<p>'The father of modern design'</p> <ul style="list-style-type: none"> • Emphasised the importance of combining simplicity with functionality, working with more than 200 companies on designs ranging from refrigerators to planes, trains and spacecraft 	<ul style="list-style-type: none"> • Introduced the idea that if two products have the same price, function and quality, the products with better aesthetics will be more popular • His designs are recognisable today, including the Coca-Cola bottle, Le Creuset Coquelle dish and logos for Shell and BP
<p>Tesla</p> 	Automotive and energy storage company, established in the USA in 2008	Produces electric cars that don't compromise on power or quality, have zero emissions, are affordable and can be charged at home	Leads electric car design and technology, including the <i>Tesla</i> Model X SUV (2016)
<p>Zaha Hadid</p> 	Architect (1950–2016)	<ul style="list-style-type: none"> • Integrated geometric forms with expressive, sweeping fluid forms • Promoted architecture as a visual art form, with buildings intended to give aesthetic pleasure 	<ul style="list-style-type: none"> • Overcame racial and gender barriers to establish an architecture practice that has designed more than 1000 iconic buildings worldwide

Polymers have a wide range of uses in everyday life. A synthetic polymer is usually made from oil based petrochemicals, but coal and gas can also be used. The crude oil is refined and mixed with other chemicals and can be used to produce many types of polymer. A wide range of polymers is available, with engineers continuing to develop the range to meet the requirements of designers and manufacturers. There are two main categories of polymer that you need to know about, thermoforming polymers and thermosetting polymers.



Thermoforming polymers

- Thermoforming polymers are commonly used to make everyday products. They can offer a wide range of properties that make them suitable for an extensive array of uses. One of the biggest advantages of thermoforming polymers is that they can be recycled, which offers huge benefits to the manufacturer in reducing waste, as well as being attractive to the consumer because it helps to conserve non-renewable resources and prevents more waste going to landfill.

Thermosetting polymers

- Thermosetting polymers set hard once heated and cooled. Unlike thermoforming plastic, a thermosetting plastic shape, once formed, cannot be altered through reheating. These plastics cannot be recycled and are often used in applications where they will be subjected to heat, chemicals or solvents. The molecule chains in thermosetting polymers set differently once heated and cooled, with cross-linking of the chains preventing further forming and recycling.

Thermoforming polymer	Thermosetting polymer	Properties
Acrylic	Polyester resin	Insulator of heat
High Impact polystyrene	Urea formaldehyde	Insulator of electricity
Biopol		Toughness

Paper consists of fine cellulose fibres, usually from wood but also hemp, flax, cotton or bamboo, pressed together with water and then dried. To achieve the required texture and surface finish, chemicals are added to the pulp – brightening bleaches, for example. It may also be coated with an agent that fills the minuscule pits between the fibres, for a smooth, flat surface with better opacity, lustre and colour-absorption.



In Europe, paper and board is measured in grams per square metre (gsm), which means the number of grams a 1 m × 1 m sheet weighs. Paper usually weighs 80–220 gsm. Thicker paper suggests higher quality – copier sheets are often 80 gsm, whereas writing paper is typically 120 gsm

Papers weighing more than 220gsm are generally classified as **boards**. Their thickness is measured in microns which is 1/1000 of a millimetre. A two-ply (layer) board is 200 microns thick.

Paper – is a thin, flat material made from natural fibres, weighing less than 220gsm

Board – thick paper or layers of paper more than 220gsm

Paper	Board	Properties
Copier paper 80gsm	Folding boxboard	Flexibility
Cartridge paper 120-150gsm	Corrugated board	Printability
Tracing paper 60-90gsm	Solid white board	Biodegradability

Modern materials do not occur naturally, but are existing materials that have been altered to improve their properties

Smart materials are existing or modern materials with physical properties that can be varied by an external input such as temperature, light, moisture, force or electrical current. They sense and respond to conditions in their environment and some can return to their original state when the conditions change.

Composite Material

Concrete

Plywood

Carbon/Glass fibre

Reinforced polymers

Robotic materials

A **composite** consists of reinforcing material(s) and a bonding agent called a matrix. The new material has enhanced properties than the original material(s). Most **composites** have excellent strength to weight ratios, they are stronger than other materials of the same weight or mass.

Technical textiles are developed for their functions rather than appearance. They can be strong, lightweight, waterproof, tough, breathable, biodegradable and versatile and are increasingly economical.

Technical textiles

Agrotextiles

Construction textiles

Geotextiles

Domestic textiles

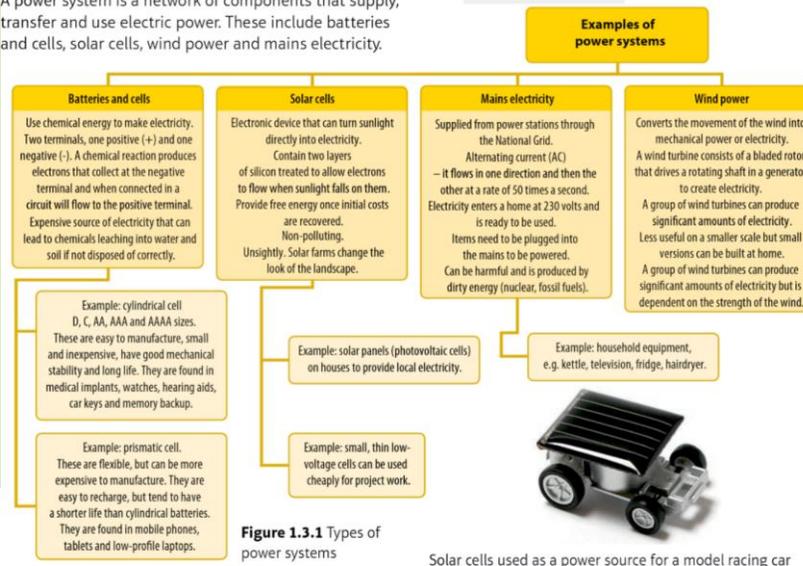
Environmentally friendly textiles

Protective textiles

Sports textiles

Power systems

A power system is a network of components that supply, transfer and use electric power. These include batteries and cells, solar cells, wind power and mains electricity.



Sources, generation and storage of energy

Non-renewable energy sources are fossil fuels that were formed from the remains of animals and plants that lived millions of years ago. They cannot be replenished quickly and will eventually run out. Renewable energy sources use natural energy to make electricity. Renewable energy sources produce 20% of the UK's electricity (and rising) and are important for reducing carbon emissions.

Renewable

Biomass

Biodiesel

Tidal

Wind

Solar

Hydroelectric

Smart and Modern Materials

Shape memory alloys (SMAs)

Nanomaterials

Photochromic glass

Reactive Glass

Piezoelectric materials

Temperature responsive polymers, e.g. poly N-isopropylacrylamide (PNIPAM)

Conductive inks

Choosing appropriate energy sources for products and power systems. Here are some examples of factors that designers may need to consider.

- Portability of the power source:** remote working requires access to devices (computers, phones, medical aids) with a power source that does not need to be plugged into mains electricity. Such devices can be portable and compact as they do not need power converters.
- Environmental impact:** no entirely clean energy source exists. The impact may be active, like fossil fuel emissions or the destruction of habitats through extraction. Passive impacts include the sound of generators or the appearance of wind farms. Other environmental factors include the impact of transportation or waste disposal.
- Power output:** a generator's output may vary according to conditions at the power plant, fuel costs or the electric power grid operator. Many renewables do not produce electricity predictably or consistently; for example the output of solar panels relies on the strength of the sunshine, which depend on the time of day and cloud cover. Renewables are therefore often backed up by other forms of electricity generation. A designer must select an electricity supply capable of reliably delivering the required power.
- Circuit/system connections:** when considering alternative power sources, a designer will need to consider how the circuit or system will be connected to it, for example the use of available plugs, connectors and terminals.
- Cost:** the choice of the energy supply, for example batteries or a mains electricity power pack, will impact the running costs of alternative power supplies must be considered carefully by a designer

Non renewable

Coal

Oil

Gas

TEXTILES – All flexible fabrics created from **FIBRES**. These are fine hair like structures that can be **WOVEN, KNITTED** or **FELTED** into a variety of **FABRICS**. These **FIBRES** can be either **NATURAL** – from plants or animals – or **SYNTHETIC** – man-made from chemicals.

Natural Fibres - plant sources include **COTTON, HEMP, FLAX, JUTE, BAMBOO, COCONUT**. Animal sources include wool and silk.

	Properties/characteristics	Advantages/Disadvantages	What is it used for?
Animal eg. WOOL	From an animal fleece. Each fibre has a kink or crimp that allows it to trap air. This makes it warm and insulating. Made from porotein molecules.	Warm, absorbant, breathable, durable, repels rain, creases drop out. Dries slowly. Susceptible to moth attack. Can feel itchy. Can shrink when wet.	Coats, jumpers, blankets, rugs and carpets.
Plant eg. COTTON	Bolls are harvested from the cotton plant and the waste is removed. The cotton fibres are plant cellulose which is naturally strong and absorbent.	Cool and absorbent, soft, resists abrasion. Can resist washing and ironing at high temperatures. Static and cling resistant.	Towels, various fabrics such as T-shirt fabric, denim and calico. Socks and underwear.



Synthetic Fibres – man-made/artificial fibres are usually made from coal, oil or other petro-based chemicals. Examples include **POLYESTER, ACRYLIC, POLYAMIDE (nylon), ELASTANE(Lycra) and KEVLAR**.

Polyester	Simple chemical chains (monomers) are joined to make polymers which are then spun into yarn. Can be used or their own or spun with other fibres such as cotton.	Strong when wet or dry. Easy care, dries quickly and does not need ironing. Stain resistant. Can be recycled or made from recycled plastics. Does not breath, poor absorbancy.	Fleece jackets, raincoats, Work clothes and uniforms.
Acrylic	Formed by polymerisation where the molecules form a chain.	Warm, dries quickly, good drape, durable, easy care. Poor absorbancy, feels stiff, can irritate skin.	Imitation wool knitwear, upholstery fabrics, fleece jackets, blankets.



Woven Textiles – weaving turns fibres into **LENGTHS** of fabric on a loom where vertical **WARP** threads are held under tension and horizontal **WEFT** threads loop back and forth to create a non-fraying edge.

Plain weave eg. Calico	A simple cotton cloth with very little stretch It may be soft or coarse, bleached or unbleached..	Strong, hardwearing, wears well, same both sides, Good for printing on and embellishing. Can vary in quality.	Shirts, bags, bedding ,textile crafts.
Twill weave - denim	The weft yarn crosses over two or more threadson alternate rows creating a diagonal effect. The warp is blue but the weft is white.	Hardwearing, strong, more interesting when wears or fades. Can be thick and heavy to use without softening treatments.	Jeans, jackets, utiily clothing, blankets, soft furnishings.



Non – Woven Textiles – short fibres are layered at angles to form a web, joined by **FELTING** or **BONDED** with a heat and/or glue.

Felted wool fabric	Scaly fibres of wool become matted when wet and rubbed together.	Resists chemicals and fire, does not unravel or fray. Excellent sound insulator, sustainable. Expensive, no drape, deforms when wet.	Hats, pool table surfaces, slippers, wall hangings, art material.
Bonded fibres/web	Can be produced quickly and cheaply in a range of weights from short fibres.	Stable, retains shape and can be bonded to lightweight fabrics to add strength. Not strong, cannot be repeatedly washed.	Wetwipes, disposable overalls, bondaweb.



Knitted Textiles – Knitted textiles are constructed from interlocking loops of yarn. These can be **WARP** knitted or **WEFT** knitted. To make a stretchy malleable fabric.

AQA Design and Technology Textiles 8552 – NEA Controlled Assessment

This project work is the coursework for your GCSE. It covers 50% of your GCSE marks and gives you the opportunity to show your ability to design and make a high quality product in answer to a specific design brief. The controlled assessment is split into three parts, AO1 (research) is 20% of the grade, AO2 (designing, modelling and making) is 60% and AO3 (evaluating) is worth 20%.

Your project will involve **a lot** of work. 30-35 hours in total in class time, plus you will need to put in time after school and at home on your folder work. It is therefore important that you choose to make a product you are interested in. It is expected that you plan and organize your time wisely during lesson time and for homework.

The assessment criteria for the NEA are split into six sections as follows.

	Section	Criteria	Maximum marks
AO1 (Phase 1) Identify, investigate & outline design possibilities	A	Identifying & investigating design possibilities	10
	B	Producing a design brief & specification	10
A02 (Phase 2) Design & make prototypes that are fit for purpose	C	Generating design ideas	20
	D	Developing design ideas	20
	E	Realising design ideas	20
A03 (Phase 3) Analyse & evaluate	F	Analysing & evaluating	20
Total			100

Each section of your coursework folder is worth a different amount of marks.

As you can see, the sections in AO2 covering the Development of your design and the practical (Making) are worth almost $\frac{2}{3}$ of the overall folder grade.

REMEMBER: you should only have 20 pages in your folder so **WHAT you include** in your folder is important.

You can use the coursework guide to help you present your work. The following symbols

HOW TO USE THE GUIDANCE TEMPLATES:

What do the symbols mean on each slide?

Red text must be read then deleted.



Each page will have guidance for you to follow. They will include **details of what to include** in your work. They will always be written in red and **MUST** be deleted.



This icon indicates that you must **add an image, graph or photograph** to help illustrate your work. You **MUST** add appropriate labels to whatever you use.



This icon is used to highlight sections of the project that require **feedback** from your client.



This icon is used to indicate which pages require a **summary / conclusion** needs to be added.



This icon is used to indicate which sections you have sought **inspiration** from other designers on.

AO2: Generating Design Ideas

1. Initial Ideas

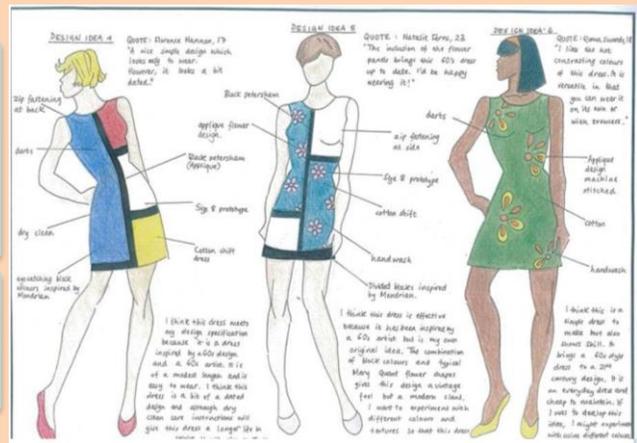
- Re-read your **DESIGN BRIEF**
- Look at your **RESEARCH**
- Re-read your **SPECIFICATION/DESIGN CRITERIA**.

You must be very clear about what it is you are designing and **WHO IT IS FOR!**

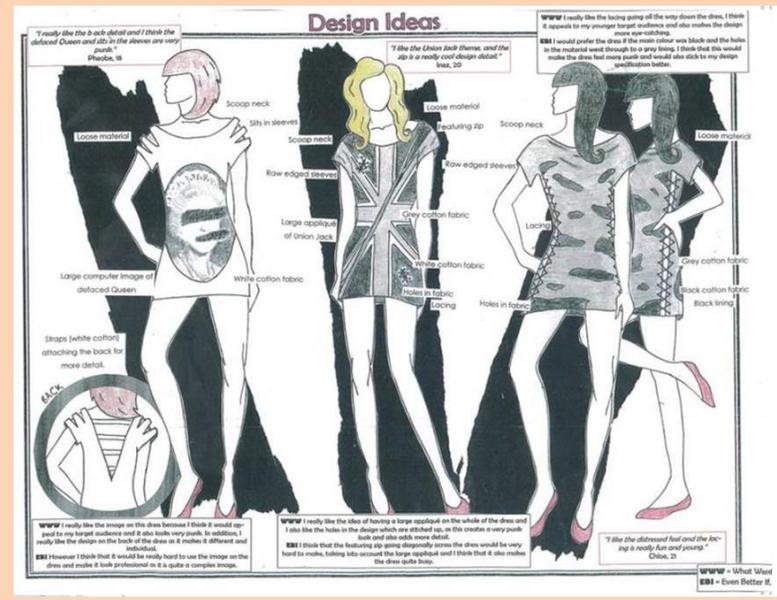
Use an **HB** or **2B** pencil to **SKETCH** your ideas. Relax and sketch **FREELY**. Be **BOLD** and **CONFIDENT**. Let the **MODERATOR** see what you are thinking – **LABEL** your ideas, use **KEYWORDS**

The **PURPOSE** of the task is to design something **NEW, ORIGINAL** and **EXCITING!** It must be a product with a **DIFFERENCE** and something your 'Target Audience' will want to buy.

Pick out **SHAPES, PATTERNS** and **ELEMENTS** that appeal to you. **COMBINE** ideas.



If you find this difficult, it is usually because **AO1** - the research element of your coursework **ISN'T GOOD ENOUGH**. Is there any more research you could do that would help?



You will need to get feedback from your client about your first ideas so that you can develop one further into a final product.

GENERATING DESIGN IDEAS concept one

You are expected to produce a range of imaginative, creative and innovative ideas some of which take inspiration from existing designs. A good design sheet will have a mixture of rough sketches, notes/annotations, better-refined sketches, evaluative comments and colour on it.



You will need three/four concept sheets.

Use the **Coursework guidance** to help you and always refer to the **coursework mark scheme** to make sure you are on track.

Evaluation

- Evaluate your idea making judgments about:
- How well will it work. Good points and bad points?
 - Are its aesthetics appealing to your clients?
 - How difficult will it be to make?
 - Will it be expensive, a reasonable cost, or cheap?

GENERATING DESIGN IDEAS concept two

You are expected to produce a range of imaginative, creative and innovative ideas some of which take inspiration from existing designs. A good design sheet will have a mixture of rough sketches, notes/annotations, better-refined sketches, evaluative comments and colour on it.



Evaluation

- Evaluate your idea making judgments about:
- How well will it work. Good points and bad points?
 - Are its aesthetics appealing to your clients?
 - How difficult will it be to make?
 - Will it be expensive, a reasonable cost, or cheap?

AO2: Developing Design Ideas

2. Review Of Initial Ideas

1. You need to determine which of your designs follow your design brief and specification and should be taken forward for development.

- I. Compare each idea against the **SPECIFICATION** the table shown.
- II. Give each idea a tick or a cross to show whether or not it meets each criteria.
- III. Total up ticks for each idea.
- IV. This will indicate which ideas are the strongest ones.

Review of initial ideas

	Design 1	Design 2	Design 3	Design 4	Design 5	Design 6
Aesthetics						
Customer						
Cost						
Environment						
Size						
Safety						
Function						
Materials & Manufacture						
Total						

2. Client's Opinions Of Your Ideas

Ask your client what they think of your design ideas. Which one is the strongest? Why did they like it? Why did they reject the others? Does this correspond with your comparison against the SPECIFICATION?

3. Evaluation of Initial Ideas

Say which design was your CLIENT's favourite, which meets specification the best and which one you prefer and why.

Explain why you are going to take this design forward and how you can develop it in 3 ways to improve design for your FINAL DESIGN taking on board any of your client's suggestions.

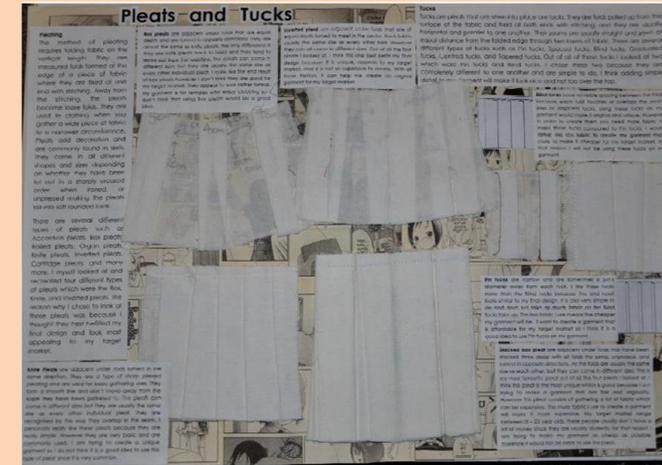
3. Development And Refinement Of Design Ideas

You will now need to continually test, evaluate and refine your ideas. Look at the 2-3 most suitable ideas from your Initial Ideas and refine them so they suit the brief and specification even better.



Develop these design ideas. Evidence everything you do, this should a mix of...

- Prototype modelling
- Client testing and feedback
- Materials testing
- Aesthetics
- Further Research



DEVELOPMENT

Selection ✕

Explain which concept you are going to develop into your final solution. Justify your selection.

You must refine and improve your chosen design idea, using an iterative design (the next improved version) approach.

Produce a range of 2D, 3D isometric and exploded sketches that show developments in the functionality, constructional detail and aesthetics of your design. You will also need to suggest materials, that could be used.

Add lots of notes to your work saying what improvements you have made, and how it more closely meets your specification or user needs.



INSERT PICTURE HERE THAT YOU WILL TAKE INSPIRATION FROM E.G. HINGE ASSEMBLY.

Use the **Coursework guidance** to help you and always refer to the **coursework mark scheme** to make sure you are on track.

PHYSICAL MODEL

This next iteration (the next improved version) of your design will be done through modelling.

- Model some aspects of your project to try and find out something you don't know or are not sure of.
- Model one of the techniques you intend to use.
- Make a part that you are not sure will work.
- Make a part that you are not sure how to do.
- Make a small scale version of your whole product to help you visualise it.



PICTURES OF MODEL

Model Construction

Describe the materials and joining methods used to make your model.



PICTURES OF MODEL

Model Evaluation

Explain what you have learnt from making this model. How will this change your design as you move forward?

AO2: Developing Design Ideas

4. Modelling Ideas

Produce a fully detailed model of your final prototype. The functionality, constructional detail and aesthetic appearance of your design should be finalised.



Use good technical knowledge and effectively use modelling to make quality refinements of your design ideas so that they fully meet the requirements of the design specification.

VIRTUAL MODEL

This iteration (the next improved version) of your design will be done through modelling – testing.

Produce a fully detailed model of your final prototype. The functionality, constructional detail and aesthetic appearance of your design should be finalised. Your model will be used to create a materials and equipment list, overall project cost and manufacturing specification. It is a massively important part of the project.



SCREENSHOT OF YOUR FINAL PROTOTYPE (FULL VIEW)



SCREENSHOT OF YOUR FINAL PROTOTYPE (EXPLODED VIEW)



SCREENSHOT OF YOUR FINAL PROTOTYPE (CROSS SECTION VIEW)

Feedback

Add some feedback from either your client or users at this stage. As well as positive comments it should include at least one thing that they think could be improved.

Use the **Coursework guidance** to help you and always refer to the **coursework mark scheme** to make sure you are on track.

5. MATERIALS AND EQUIPMENT LIST

MATERIALS AND EQUIPMENT LIST

Produce a list of materials, components, and other times you will use to make your product. Create a costings chart to show total cost of product.



INCLUDE AN IMAGE OF YOUR PATTERN ENVELOPE – FRONT AND BACK.



INCLUDE A LAYPLAN (LAYOUT) OF YOUR PATTERN PIECES.

Justification

Explain the purpose of the pattern, layplan and material list.

Summary

Comment on whether you feel the price is reasonable. What did your client specify? Have you been successful?

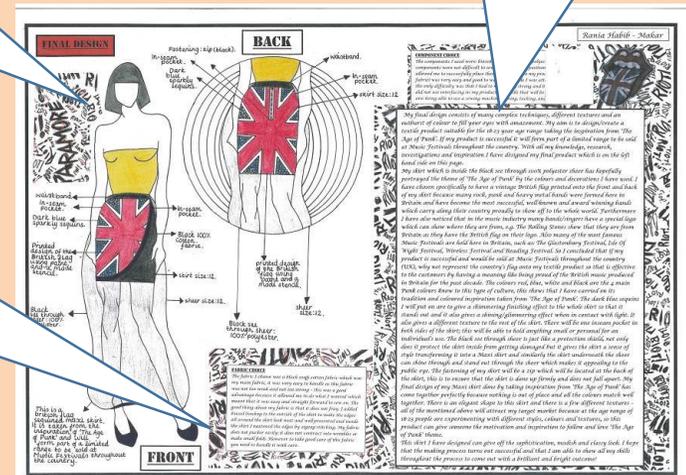
6. Final Design Idea

Present your final design idea. From your final design ideas:

Choose the idea you want to make into a prototype and produce a presentation drawing or CAD image.

Make sure you get feedback from your client or end users regarding their thoughts on the chosen design.

Make sure you have given consideration given to the materials, techniques and processes required to produce the chosen design.



Produce a list of materials, components, and other times you will use to make your product. Create a costings chart to show total cost of product.

Your modelling will be used to create a materials and equipment list, overall project cost and manufacturing specification. It is a massively important part of the project.

AO2: Realising Design Ideas 7. Production of a prototype

You now need to start making the prototype of your final design.

Annotate all of your work.
Explain what you did and importantly why you did. Say what went well, what went wrong and why

As you make your prototype take photographs to evidence the processes and techniques you use.

Part name - add
Process used - add



PICTURE OF MANUFACTURE

Description of process

Quality checks applied

Describe the quality checks you did to check you had completed the task accurately / that it worked / looked good, etc. Name any checking equipment used, and focus on any tolerances applied.

Health & Safety

Describe how you completed the work here naming the tools used.

Describe how you applied health and safety procedures to ensure the processes did not cause injury to you or others.

Include information on....
Safety
Quality control
Material choices
How you fixed problems

	Process	Photo	Equipment	Time	Health & Safety	Problems	How I made sure I produced a 'Quality' Product
1	I cut out pattern pieces I needed to make my dress		Felt tipped pen, paper scissors, pattern pieces	45 minutes			I selected the correct size for my TARGET AUDIENCE , I drew around the line I was cutting on in felt tip so that I made no mistake and cut out slowly and carefully.
2	I pinned down pattern pieces and cut them out in fabric (COTTON and VISCOSE) and interfacing.			1 hour & 15 minutes	I tied my hair back and worked in a clear area. I put equipment away after I had used it.		I pinned down making sure there were no creases which could alter the shape and size. I made sure that the GRAINLINE was parallel with the SELVEDGE of the fabric. I cut out all of the pattern pieces slowly and remembered to cut out NOTCHES on the patterns.
3			Needle, thread, fabric scissors, appropriate pattern pieces attached to its fabric	15 minutes	I tied my hair back and worked in a clear area. I put away NEEDLES and other equipment after I had used it.		I made sure that I had transferred all markings and that the loops were small and the ends were long on the TAILOR TACKING .
4	Using CARBON PAPER and a TRACING WHEEL , I marked on the DART pattern markings.		Carbon paper, tracing wheel, pattern pieces with its fabric attached	5 minutes	I tied my hair back and worked in a clear area. I put away needles and other equipment after I had used it. I used the TRACING WHEEL carefully as it is sharp.		

8. Finished Prototype

Summarise what you think of your work and how the final prototype meets the end user needs.

To get top marks ensure you produce a fully functioning prototype that fully meets the end user and meets the requirements of the specification.

Annotate each photograph to include which tools were used and what features have been produced.

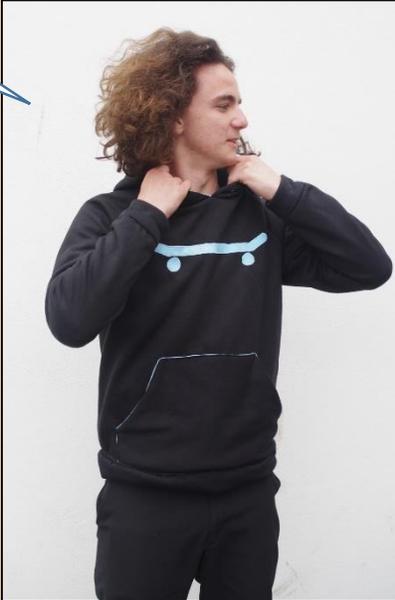
Make sure your prototype is accurately made and finished to a high quality.



Set-up and take at least one high quality presentation photograph.



Use the **Coursework guidance** to help you and always refer to the **coursework mark scheme** to make sure you are on track.



Now you have made the prototype you need to test and evaluate it. You must evaluate the PRODUCT and the PROCESS (how you made it) and NOT the project (how hard you worked).



Testing the product:

I took my product to a local nursery as that I could get feedback from my target audience (children aged 0-2 yrs) and their parents.
The children really engaged with the product and liked matching up the shapes. One child wanted to climb inside and use it like a blanket!
I found out that it also appealed to children aged 3 and 4 yrs old. This would mean that siblings, who are a few years apart, could play with it so encouraging family time.

Test your product! Use it for its intended purpose where possible and ask potential end users for feedback.

Explain the results.

Product testing

Comparing against a commercial product

I have chosen a commercial product from Mothercare as I think my product would be sold here if it were made for mass production.

Commercial product



This product costs £29.99, is rectangular and is quilted with printed pictures. It measures 1.45m x 95cm. This is a simple construction and a printed design that makes it suitable for mass production.

My Final Product



My product cost £19.71, is square and padded with appliqué shapes. My product measures 100cm x 100cm, is reversible and has appliqué patterns on. This would take more time and would be difficult for mass production.

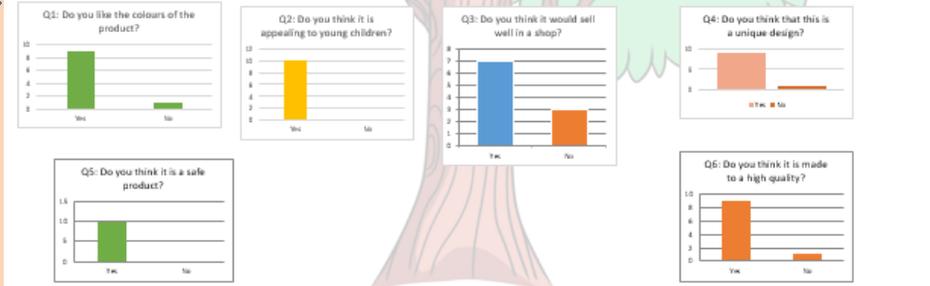
Both products are suitable for young children. The commercial one suitable for children from birth as it has no loose parts that could be a choking hazard. I have used Velcro and stitched securely making sure no parts come undone but the appliqué shapes would suggest being appropriate for a child a few months old. Both are a good size and are comfortable because they are padded. My product is more interactive and allows a child to explore more sensory and fine motor skills to help them to develop.

Specification criteria	Did I meet the criteria Y/N	Test /Observation	What I found	Modifications
Must appeal to 0-4 year olds.	Y	I gave it to children in this age range to see if they liked.	All the children liked it and play with it as I think it was a hit and appealing for the correct age range.	I would add more interactive parts to the both sides so that it would be even more appealing and suitable. I could have parts that make a noise or showed their reflection.
Must have bright colours.	Y	My product looked bright and I asked parents and found out what they thought.	People said that they thought it was bright and colourful and liked the colour combinations.	I might add more contrasting colours.
Must cost around £10-£20.	Y	I asked people how much they would pay, and bought my fabric so that it was inside this budget.	My product cost £19.71 so was just inside my budget.	I would make it so it is reversible so that it is simpler to make.
Must be made from an easily washable material.	Y	I only used materials that I knew could be machine washed from my testing.	Washing did not change their appearance and did not leave any small things behind. It would probably have to be hand washed.	I would make it from more durable material to use with a more vigorous machine wash.
Must be big enough for a 0-4 year old to lie on.	Y	I gave it to some young children use and lie on to see if it was the correct size.	It was the right size for 1-2 children to use at the same time but I would need it to be bigger for older children to use together.	I would make it bigger so that more children could play on it and would be softer.
No small parts that could be a choking hazard.	Y	I asked people if they thought there could be any potential hazards on my product.	There was not any very small parts so on the whole it is safe. The materials did not fray or have any loose fibres.	For very young children I would make the parts attached so that it would be safer and they could not choke.
Must teach children basic knowledge.	Y	I used a questionnaire and asked people if they thought it was educational.	Parents liked the shapes on my product which had to be matched up so taught 'matching' skills and hand-eye co-ordination.	If I were to do it again then I would add more educational parts to it, such as numbers for counting so to be more appealing.
Must be made from a soft comfortable material.	Y	I gave it to some young children to see if they liked it, and also asked parents what they thought.	I used polar fleece and cotton materials which are very soft and comfortable for young children.	If I would do it again then I would add different textured materials, some softer than others.

Compare your product your Design Criteria/ Specification

Questionnaire evaluation

I asked 10 parents of my target audience, a set of questions about my product to see what they thought of it and that it is finished.
Firstly, I asked whether they liked the colours of the product and 90% of people said "Yes", they did like the colours. However, 10% said "No" because they wanted more contrasting colours like black and white.
I asked if they thought it was appealing to young children and everyone said "Yes" because it had bright colours and was interactive so that the children could play with and it was comfortable for newborns to lie on.
In addition to this, I asked if they thought it would sell well as a gift in a shop and 70% said "It would" but 30% said that "It might not" because it is not very interactive parts that could be choking hazards. My concerns about the Velcro shapes were not the same as the parents and they thought they would be okay for young children.
My fourth question was "Do you think that this is a unique design?" 9/10 people said it was unique because it was reversible and they had not seen anything inspired by nature. One person said it was not but could not give me any real reason why not. It could have been that it just did not appeal to them.
In addition to these questions, I lastly asked whether they considered it a safe product and everyone said "Yes" it was safe because there were no loose threads or small parts that could be choking hazards. My concerns about the Velcro shapes were not the same as the parents and they thought they would be okay for young children.
Lastly, I asked if they think it is made to a high quality and 9/10 people said it was, however 1/10 people said that "...Even though it is well made, it might be a bit difficult to turn the product inside and poke the corners out." I would need to completely sew both bits of fabric together if I was to do it again so it would be easier to turn inside out.



Collect feedback from your clients. What did they think?

Use the Coursework guidance to help you and always refer to the coursework mark scheme to make sure you are on track.

TESTING

Carry out several tests (at least 3) on your product and explain in detail how well it worked. Make sure you add positives and any negatives issues that are evident.

Test 1

Test 2

Test 3

MARKET TESTING

Get some comments from your client and or your target population about how well they think it works, how good it looks, ease of use, safety, cost and whether they would buy it or not. Use their "Quotes" then write a conclusion.

Types of establishment

Commercial – Residential (A place that you can stay at overnight)	Commercial – Non – Residential (A place you cannot stay overnight)	Non-commercial (non-profit) (Providing a service rather than trying to make money)
Hotels Guest houses Bed and breakfasts Farmhouses Motels Holiday parks Some public houses	Restaurants Fast food outlets Public houses Bars Delicatessens Take away outlets School meals Burger vans	Hospitals Prisons Meals on wheels Residential care homes Armed services

Chefs

Head Chef: The boss. The head chef is responsible for menu planning, food production, costing and purchasing, staff work rotas and training, hygiene of the kitchen and staff, stock control

Sous Chef - The Sous chef (sous=under in french) is directly in charge of food production, the minute by minute supervision of the kitchen staff, and food production

Pantry chef - aka garde manger - A pantry chef is responsible for the preparation of cold dishes, such as salads and pâtés

Pastry chef - aka le pâtissier - The King or Queen of the pastry section; baked goods, pastries and desserts are this chefs forte.

Sauté chef - aka saucier or sauce chef - They're responsible for sautéing foods, but their most vital role lies within the creation of the sauces and gravies that will accompany other dishes.

Soup Chef - aka le potager - Responsible for making soups and preparation of accompaniments for the dishes

Vegetable Chef - aka le legumier - The vegetable chef prepares all vegetables for dishes, in smaller restaurants the vegetable chef would also make soups.

Fish chef - aka le poissonnier - An expert in the preparation of fish dishes, and often responsible for fish butchering as well as creating the appropriate sauces.

Key questions to check your learning for Learning Objective 1:

1. Recap what makes a business successful e.g. social media, prices of food, customer service and the atmosphere of the restaurant
2. What are the different salaries for jobs in the H&C industry?
3. What are the different types of service available?
4. What is the difference between commercial and non commercial?

Styles of service

TABLE SERVICE	COUNTER SERVICE	PERSONAL SERVICE
<p>Plate: Pre-plated meals from the kitchen. Can be a basic plated meal or a decorated nouveau cuisine style</p> <p>Family: Dishes are put on the table where spoons are provided and the customers serve themselves. Suited to ethnic restaurants such as Indian, Chinese and Spanish tapas</p> <p>Silver: Food is served by the staff using spoon and fork</p> <p>Gueridon: Food is served from a side table or a trolley using a spoon and fork. Sometimes dishes are assembled or cooked in front of the customer</p>	<p>Cafeteria: A single long display counter but can sometimes be multiple counters</p> <p>Buffet: Set up in a room usually along one long table. It can be self service or staff can serve customers. Carvery service is where joints of meat are carved in front of customers and plated</p> <p>Fast Food: Takeaway with eat-in areas where customers collect food from one small counter</p>	<p>Tray or Trolley: An assembled meal provided or a choice of food and drink from a trolley</p> <p>Vending: Sold from a machine</p> <p>Home Delivery: Delivered to house individually or on a round</p>

Suppliers to the hospitality and catering industry:

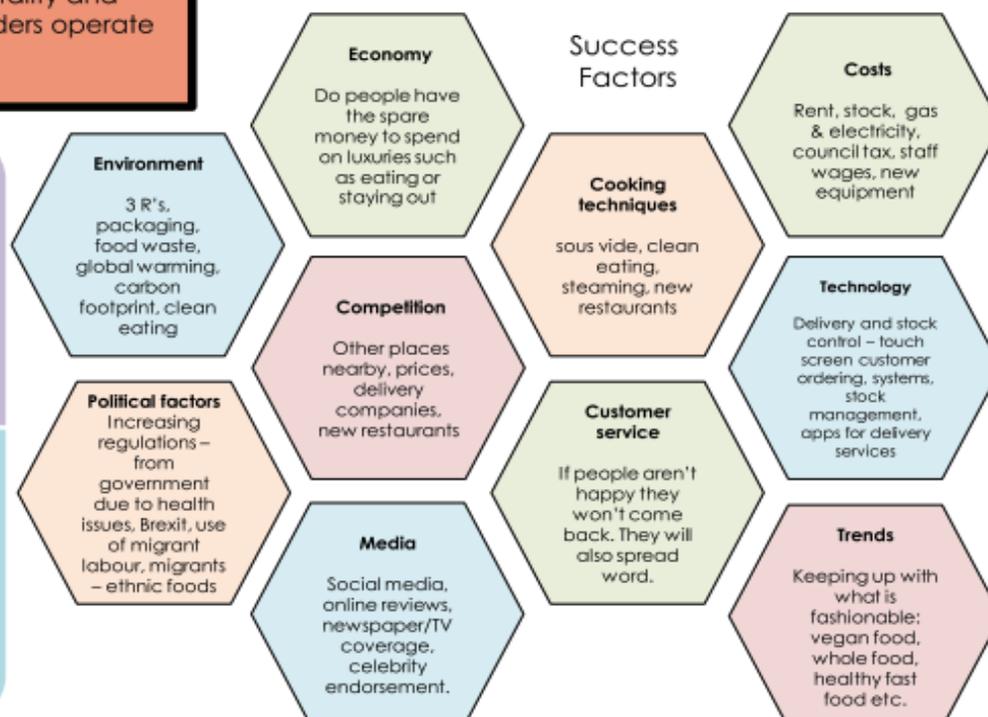
- Specialist markets – e.g. butchers, fish markets. Some deliver
- Local suppliers – local deliveries are better for the environment but might not have a wide selection of stock
- Equipment suppliers – provide equipment and appliances to the catering industry
- Large wholesalers – large quantities of stock, can buy premade and proportioned food but can be expensive
- Independent suppliers

Hotel job roles
Hotel manager
Barmen/maids
Supervisor
Waiter/waitress
Housekeeper
Chambermaid
Receptionist
Porter
Concierge

Minimum Wage

21-24 £7.70 p/h
18-20 £6.15 p/h
16-17 £4.35 p/h
Under 19 £3.90 p/h

LO1 The environment in which hospitality and catering providers operate

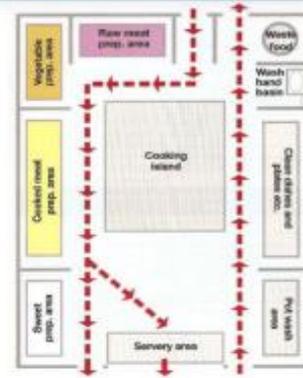


Kitchen

Documentation					
Temperature charts: fridge, freezer, display, point of sale. Taken at least twice per day.	Time sheets: logging staff working hours	Accident report forms: used to report any accidents and near misses	Food safety information: blast chill records, food related incidents and cleaning rotas	Equipment fault reports: What was the issue and how was it dealt with.	Stock usage reports: order books, stock control sheets, invoice, delivery notes
Bookings/reservations: Electronic booking system, electronic reservations system, diary with bookings and reservations Feedback forms	Personnel records: Hours worked, personal details, Wages, Taxation, National insurance, Training, Accidents, Staff rotas and timetables	Financial records: Incomings and outgoings for Income tax, VAT, Wages, Insurance, Profit & loss, Staff costs, Heating, lighting	Health and safety: Fire certificate, Staff training records, Accident book, Food hygiene checks, Cleaning checks, First aid records	Purchasing: Food and drink orders Packaging orders, equipment Tables, chairs etc, Consumables and disposables, Cutlery and crockery, Staff uniforms	Stock control: Monitor stock levels for re ordering, Decide frequency of stock check, First in First out for items with a shelf life

Front of House

Documents should be:
Legible (readable)
At correct interval (daily, hourly),
Completed accurately,
Signed and dated.
Remember
Some information is confidential or sensitive i.e. staff personal information. There is a legal requirement under the data protection act to store this type of information securely



Kitchen Workflow
Workflow in the kitchen should follow a logical process by using different areas so that the clean stages in food production never come into contact with the "dirty" stages

1. Delivery
2. Storage
3. Food preparation
4. Cooking
5. Holding
6. Food service area
7. Wash up
8. Waste disposal

Customer needs

Local Residents	Business Customers	Leisure Customers
<ul style="list-style-type: none"> • Value for money • Good standard of customer service so they return • Catering for local needs (culture, religion) • Consistent dishes served • Loyalty schemes • Recognised by staff- feel welcome • Menu specials • Theme nights • OAP discount day • Child friendly • Entertainment • Mailing list or email for special offers 	<ul style="list-style-type: none"> • Dedicated corporate (business) contact at establishment • Discounted rates • Meeting rooms • Water, juice on tables • Presentation equipment, projector, tv, • Office facilities- printer, phone, fax, internet, stationery • Tea and coffee for breaks • Lunch or other meals- buffet or restaurant • Accommodation if attendees are from a long distance • Quick service for lunch meetings 	<ul style="list-style-type: none"> • Value for money • Good facilities • Families want child menus, play area, child friendly • Tourists want local food, easy to communicate • Older people may want more formal service • Good customer service • Varied choice of menu • Dietary needs eg allergies, intolerances, vegetarian catered for without having to ask for special foods • Facilities for physically impaired customers

LO2 Understand how hospitality and catering provisions operate



Sous Vide



Blender



Oven



Hot plate



Bain Marie



Fryers



Blast Chiller



Percolator

Customer Rights

1. The right to be protected (against hazardous goods)
2. The right to be informed (about quality, quantity, allergies etc)
3. The right to have their complaints be heard
4. The right to seek redressal (compensation.)
5. the right to receive satisfactory goods that match their product description



POS Till Point



Grill



DRESS CODE:
White shirt
Formal trousers
Formal shoes
Apron
Tie



DRESS CODE:
Chef's jacket
Chef's pants
Hat
Neckerchief
Apron
Hand towel
Slip-resistant shoes

Key questions to check your learning for Learning Objective 2:

1. What documentations are used in an establishment by law?
2. What is the workflow of a kitchen?
3. What are the different types of customers you may come across in an establishment and what do they require?
4. What are customer rights?
5. What is a correct dress code to have when working in a kitchen?

HASAWA – Health and safety at work act

- Employers must:
- To protect the health, safety and welfare of staff
 - Carry out risk assessments
 - To provide and maintain safe equipment and safe systems of work
 - Safe use, handling, storage and transport of articles and substances
 - Provide a safe workplace with a safe entrance and exit
 - Provide information, instruction, training and supervision on how to work safely
 - Provide a written safety policy
 - Make sure there are toilets, places to wash and drinking water for workers
 - Make sure that there is first aid provision
 - Provide PPE for jobs if needed
 - Have insurance to cover injury or illness at work
 - Ventilation lighting and emergency exits
 - Provide a health and safety law poster entitled "Health and Safety law: What you should know" displayed in a prominent position and containing details of the enforcing authority.

COSHH – control of substances hazardous to health regulations

SUBSTANCES COVERED BY COSHH:

- Chemicals including cleaning chemicals
- Micro-organisms
- Dusts
- Medicines, pesticides, gases
- HSE list (Health and safety executive)

Employees must:

- Use control measures and facilities provided by the employer
- Ensure equipment is returned and stored properly
- Report defects in control measures
- Wear and store personal protective equipment (PPE)
- Removing PPE that could cause contamination before eating or drinking
- Proper use of washing, showering facilities when required
- Maintaining a high level of personal hygiene
- Complying with any information, instruction or training that is provided

RIDDOR – Reporting injuries, disease and dangerous occurrences regulations

RIDDOR is the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013. The law requires employers and other people in control of work premises (known as the 'responsible person') to report to the Health and Safety Executive (HSE) and keep records of the following:

- Death
- Injuries resulting in over 7 days off work (7 day injuries)
- fractures (except fingers, thumbs and toes);
- amputation of limbs or digits
- loss or a reduction of sight;
- crush injuries
- serious burns (over 10%)
- unconsciousness caused by a head injury or asphyxia;
- any other injury needing admittance to hospital for more than 24 hours.
- Hypothermia

Manual handling operations regulations

- Require you to avoid any manual handling operations at work which involve a risk to health – so far as reasonably practicable.
- If it is not reasonably practicable to avoid any manual handling operations, you must carry out a manual handling risk assessment to identify how the risk is caused, so each factor can be addressed and measures taken to control the risk.
- Provision of information, instruction and training to staff are legal requirements

What is manual handling:

Any transporting or supporting of a load by hand or bodily force
Lifting, putting down, pushing, pulling, carrying or moving

PPER – Personal protective equipment at work regulations

PPE is equipment that will protect the user against health or safety risks at work. Includes clothing and other items worn by staff to protect themselves from work hazards

It can include items such as Gloves, goggles, hard hats, hearing protectors, warm clothing (in cold conditions), safety shoes or boots, respirators etc

Hearing protection and respiratory protective are not covered by these Regulations there are specific regulations that apply to them. these items need to be compatible with any other PPE provided.

PPE could include:

- non-slip shoes where there is a slipping risk;
- 100% cotton garments (for example, chefs' whites) where there is a risk that the material may aggravate burns in the event of a fire
- where caustic cleaning substances are used, long-sleeved vinyl gloves, goggles, a visor and possibly respiratory equipment.

LO3 Meeting health and safety requirements

Security hazards

Workers can be at risk from security hazards in the same way they are from safety hazards. Security risks include

- Disagreements between customers
- Customers being intoxicated (alcohol)
- Customers who have used drugs
- Verbal abuse
- Physical assaults

Prevention

- Brightly lit areas
- CCTV
- Easy escape routes
- Area for handling larger sums of money
- Appoint more senior staff to deal with problems and complaints
- Train staff to difuse angry customers
- Contact local police if necessary
- Make sure lone workers are aware of risks
- Keeping doors and windows secure and locked

RISK ASSESSMENTS:

When you carry out a risk assessment you need to think about how likely it is to happen and what the consequence might be if it did. E.g. A spillage is very likely to happen in a restaurant kitchen.

	Probability	Severity
1	Not very likely to happen	1 If it did happen the harm would be minimal and could be dealt with by an untrained person (e.g. might just need a plaster)
2	1 in 4 (25%) chance	2 Might need to visit a professional for advice or treatment (e.g. might need stitches)
3	2 in 4 (50%) chance	3 Would take a few weeks to heal, but not a serious injury.
4	3 in 4 (75%) chance	4 Could cause serious injury or damage, but would eventually be resolved (e.g. broken leg)
5	Very likely to happen	5 The result could be permanent disability, destruction of a building or in extreme cases, death.

Key questions to check your learning for Learning Objective 3:

Can you recap all of the different health and safety requirements for each of these:

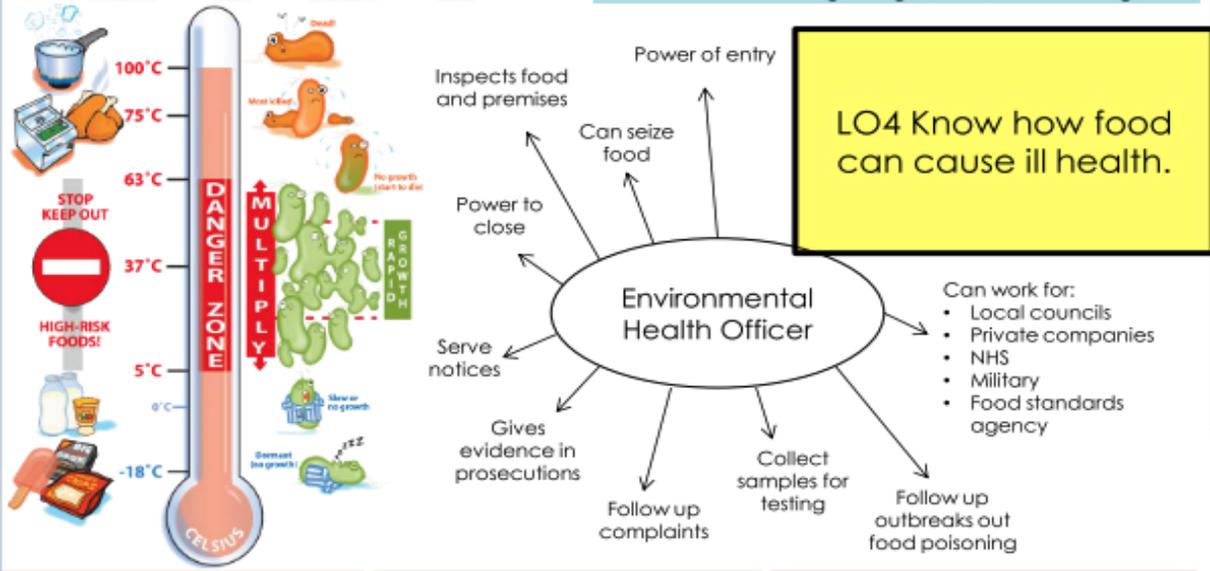
- HASAWA
- COSHH
- RIDDOR
- Manual handling operations
- PPER
- What is a risk assessment?
- What are security hazards?

Allergies
 A food allergy is a rapid and potentially serious response to a food by your immune system. It can trigger classic allergy symptoms such as a rash, wheezing and itching. Anaphylaxis is most commonly caused by food allergies, but can also be caused by other things, such as insect bites and drug allergies.
 Wait staff should have a good knowledge of which allergens are present. When using pre prepared ingredients, kitchen staff should check the labels carefully to identify any allergens



Intolerances
 Food intolerances are more common than food allergies. The symptoms of food intolerance tend to come on more slowly, often many hours after eating the problem food.

- Lactose intolerance**
- Avoid milk and milk products
 - Experience nausea, bloating, pain in the abdomen and diarrhoea
 - Eat lactose-reduced products or alternatives such as goats cheese, soya milk, feta cheese, rice milk
- Celiac disease/gluten intolerance**
- Causes diarrhoea, anaemia, weight loss
 - Gluten is found in many cereals plants primarily wheat, rye, barley and some oats
 - Avoid pasta, bread, cereals flour based foods
- Yeast intolerance**
- Yeast is present in a variety of foods, commonly bread, baked products and alcoholic beverages. Very ripe fruits contain natural yeasts
 - Symptoms include flatulence, bad breath, fatigue, irritability, cravings for sugary foods, stomach cramps, bad skin and indigestion.
 - Fermented foods e.g. vinegar, wine, salad dressing



Food Safety Act
 Food businesses:
 - Must ensure that the food served or sold is of the nature, substance or quality which consumers would expect
 - Ensure that the food is labelled, advertised and presented in a way that is not false or misleading, e.g. photos on menus that do not look like the dishes served to customers

Food Safety (General Food Hygiene Regulations)
 - Food premises
 - Personal hygiene of staff
 - Hygienic practices
 Food businesses must:
 - make sure food is supplied or sold in a hygienic way;
 - identify food safety hazards;
 - know which steps in your activities are critical for food safety;
 - ensure safety controls are in place, maintained and reviewed.

Food Labelling Regulations
 This information is required on packaging by law:
 • the name of the food
 • weight or volume
 • ingredient list & allergen information
 • genetically modified ingredients
 • date mark and storage conditions
 • preparation instructions
 • name and address of manufacturer, packer or seller & place of origin
 • lot (or batch) mark
 • nutrition information

	Found in	Symptoms	Onset	Duration
Campylobacter	Poultry, raw meat, unpasteurised milk products, water	Headache, abdominal pain, bloody diarrhoea	2-5 days after infection	Up to 10 days
Salmonella	Raw meat, unwashed vegetables, eggs undercooked chicken	Fever, diarrhoea, vomiting, abdominal pain, blood in poo	12-72 hours	4-7 days can be up to 3 weeks
E-Coli	beef, chicken, lamb, unpasteurised milk cheese, spinach, salads, raw veg	Abdominal cramps, bloody diarrhoea, nausea	Up to 24 hours	Up to 24 hours
Clostridium perfringens	Undercooked meats, large volumes of food, casseroles, gravies	Stomach cramps, fever, diarrhoea (not usually vomiting)	6-24 hours	4-7 days can be up to 3 weeks
Listeria	Raw foods, fridge temperatures, unpasteurised milk, cheese, smoked salmon, pate, raw sprouts	Headache, stiff muscles, confusion, fever, convulsions	3-70 days (21 typical)	3 weeks
Bacillus cereus	Rice, leftover food, foods at room temperature, sauces and soups	1) Watery diarrhoea, cramps, 2) vomiting and nausea	1) 30 min-6 hrs 2) 6-15 hours	24 hours
Staphylococcus aureus	Foods made by hand and no additional cooking Salads, ham, tuna chicken, cream pastries, sandwiches, dairy products, meat, eggs	Projectile vomiting, diarrhoea, abdominal cramps, fever	1-6 hours	24-48 hours

Food related causes of ill health
 Microbes - Some microorganisms cause food borne illness which is not classified as food poisoning because of other symptoms they cause. The two main ones are: Norovirus From leafy greens such as lettuce, fresh fruits and foods that are not washed before eating and Toxoplasmosis From infected meat (also cat poo but you wouldn't eat that)

Chemicals - Some chemicals can end up in our food and potentially make us ill. These chemicals could come from: hormones, pesticides, fertilizer, packaging additives, cleaning fluids

Metals - When ingested metals can be extremely harmful to the body. Some metals can be found in food because they occur naturally, they enter the food chain or residues of metals can be found in food.

Poisonous plants - Some plants can be poisonous when eaten, these could be contaminants such as weeds or naturally occurring foods such as rhubarb leaves, raw potatoes and uncooked kidney beans.

Key questions to check your learning for Learning Objective 4:

- Name at least 4 different types of food poisoning bacteria, give the symptoms and where they are found
- What does it mean to have an intolerance and what foods can this be for?
- What is the Food safety act?
- What are the food related causes of ill health?
- What is an allergen? Name some
- What is the danger zone?

Commodities – Dairy Products

Secondary processing

Milk is used to make a number of products during secondary processing.

These are known as dairy products

- butter
- cheese
- cream
- yoghurt



In the UK milk is supplied by dairy cows but is also available from sheep and goats. A dairy herd is usually milked twice a day.

Milk is the ideal substance for **bacteria** to grow in.

To **prevent food poisoning and extend the shelf life** of the milk, heat treatments are used. The **heat treatment** is carried out as soon as possible after the milk is collected.

Cream is the concentrated fat, which has been skimmed from the top of milk.

Types of cream:

Single cream

Double cream

Whipping cream

Clotted cream

Ultra heat treated (UHT) cream

cream

Flavoured cream – like

Chantilly cream

Cheese and yoghurt

Cheese and yoghurt are made from milk. Making milk into cheese and yoghurt is secondary processing. Bacteria are needed to make both cheese and yoghurt. These bacteria are called the starter culture, and are added to warm heat-treated milk. During cheese and yoghurt making, the starter culture causes the sugar in milk, called lactose, to turn into lactic acid. The acid gives more flavour to the cheese and yoghurt, and makes them last for longer.

Type of milk	Temperature, time and processing needed	Storage
Pasteurised	Heating milk to 72 degrees for 15 seconds. Most bacteria are destroyed.	In the fridge, use within 5 days
Sterilised	Heating milk to 110-130 degrees for 10 to 30 minutes. All bacteria are destroyed	At room temperature for about 6 months, once opened use within 5 days
Ultra- heat treatment (UHT)	Heating milk to 135 degrees for 1 second All bacteria are destroyed	At room temperature for about 6 months, once opened use within 5 days

Nutritional value

Protein – HBV

Fat –depending on the type

Vitamin A and D – why does the amount of this depend on the amount of fat?

Calcium – for bones and teeth

Carbohydrate – Lactose



Commodities – Eggs

Types

There are many different types of eggs available in the UK:

- Hens
- Ducks
- Quails
- Geese.

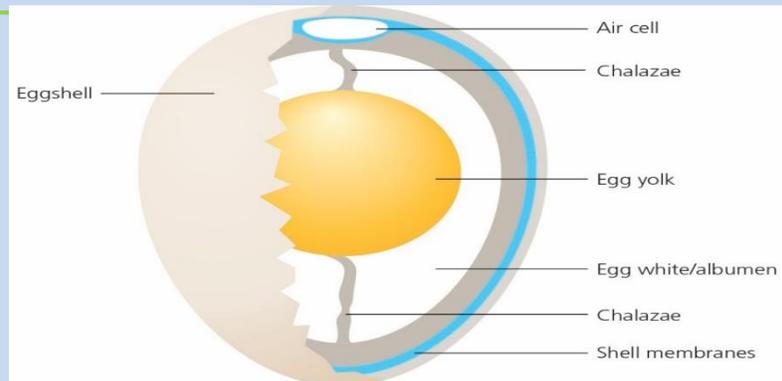
The most popular eggs we consume and use in food preparation and cooking are hens eggs.

Egg Production

Enriched cage production: Hens are kept in small, stacked cages in sheds to promote egg laying.

Free range eggs: This type of farming allows hens to walk around outside, scratch the soil and peck for food, sit up on perches and lay eggs in nests.

Barn eggs: Hens are allowed to roam freely inside, uncaged, and have perches to roost on.

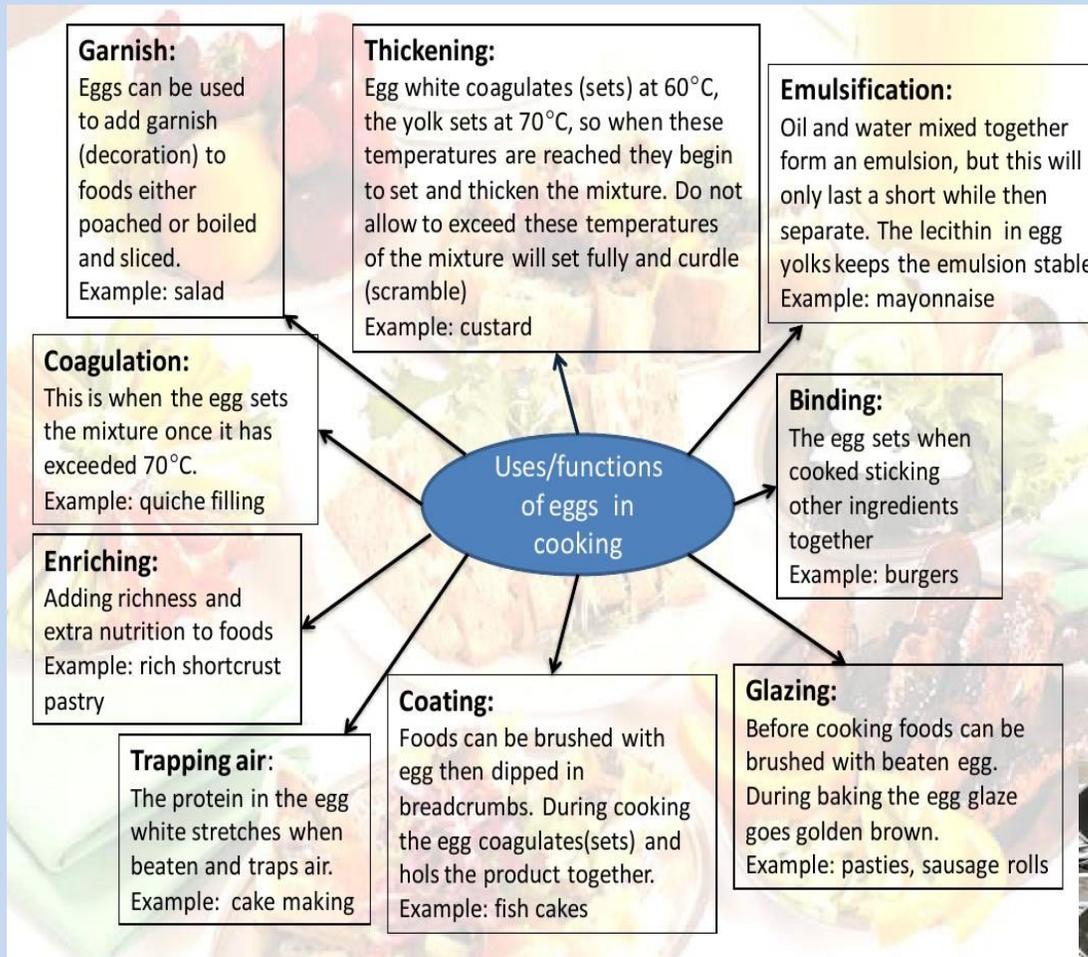
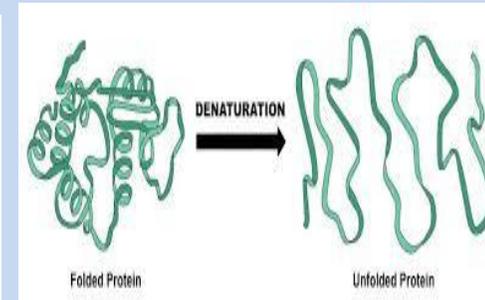


Nutritional Value

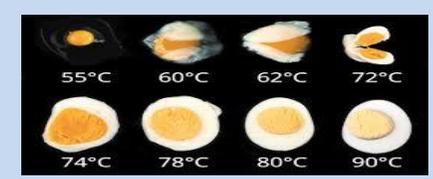
Protein – in both the white and yolk.
 HBV
 Vitamins A, D and E in the yolk; B in the white
 Iron – in the yolk
 Fat – in the yolk
 Water – in both the white and yolk.

Denaturation of Protein

Many of the functions of eggs are related to the principle of denaturation – this is the unfolding of amino acid chains causing a change in the structure of proteins. This is why eggs change form liquid to solid when heated or are able to trap air when whisked



Coagulation



Aeration



Commodities – Protein

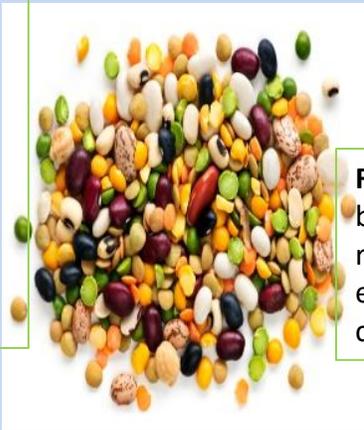
(Alternatives - soya, tofu, beans, nuts and seeds)

Soya

Soya beans are used to develop a textured vegetable protein to replace meat. Even though it is plant based it is HBV protein Low fat

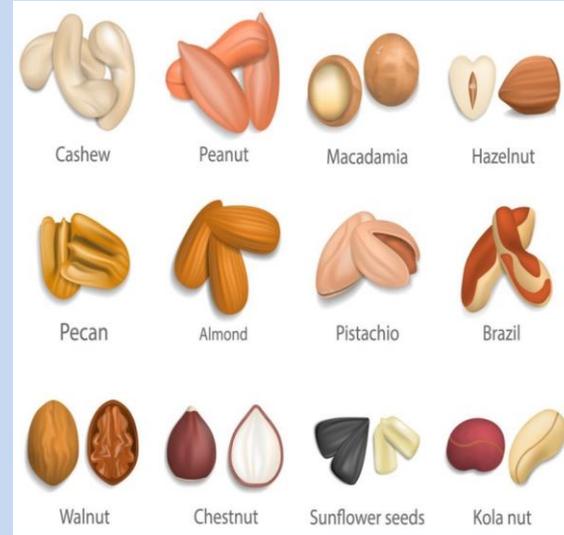


Tofu is a bean curd made from soya milk which has been curdled so it is solid. HBV protein and low in fat. Used in curries, stir fries and desserts



Reasons for use – versatile, health benefits, cost benefits (cheaper than meat), environmental reasons (reduces carbon footprint), moral and ethical issues around reducing meat consumption

Nuts are dry edible kernels within a shell. Nuts contain protein and fat, but the fat is unsaturated so it is good for us. Can cause allergic reactions so care needs to be taken



Seeds

We can eat the seeds of a wide variety of plants, they are a good source of vitamins and minerals. Examples include pumpkin, chai and sesame. They contain

Protein

B and E vitamins

Essential minerals such as iron and zinc



Legumes

A legume is a plant from the Fabaceae family, or the fruit or seed of such a plant.

When dried the seed is also called a pulse

Lentils, beans and chickpeas are examples

High in LBV protein

Good source of Vitamin D

Contains fibre



Beans are seeds from edible plants, they contain protein and are healthy because they are low in fat and high in fibre. Examples include broad beans, kidney beans and haricot beans. Beans contain some carbohydrates, LBV protein. B vitamins, Iron and Dietary Fibre

Commodities – Fats and Oils

Provides energy, insulates organs, source of fat soluble vitamins (A and D)

Saturated fats – animal fats – butter and lard

Saturated fats can increase cholesterol
Solid as they are saturated with Hydrogen molecules
Too much can lead to health problems

Unsaturated fats – plant fats/oils

Polyunsaturated/ monounsaturated , sunflower spread and olive oil

These can help to reduce cholesterol in the blood
Liquid as there are gaps in the molecular structure where hydrogen molecules are missing

Cooking with fats and oils

Adds flavour
Adds moisture
Adds fats
Reduces vitamin A and D
Browning



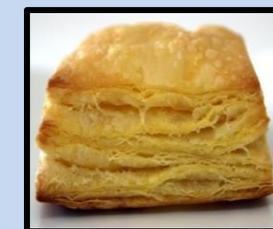
Cooking with oils

Dressings and Marinades
Used in some baking – moist results
Frying – lubricates
Roasting – keeps moist and lubricates



Cooking with fats – properties

Adds moisture
Plasticity – melts over a range of temperatures
Traps air – cake making
Shortening – pastry
Lamination – trapping air in flaky pastry
Enriching – mashed/jacket potato
Lubricating – frying and spreading on bread/toast



Healthy Fats

Fish Oil

Olive Oil



Cold-presser-pressed plant oils

Such as grapeseed, walnut, sesame



Avocados



Nuts & Seeds



Olives



Coconut



Essential Fatty Acids

Omega 3

Fatty acids are found in oily fish and seeds help our brain function and may reduce the risk of heart disease

Omega 6

Fatty acids are found in foods such as chicken, nuts and vegetable oils, they help to reduce blood cholesterol and reduce inflammation

EAT

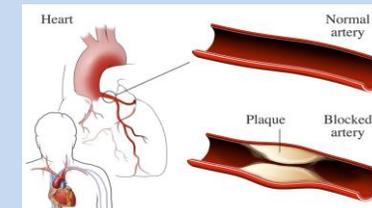


AVOID



Too much fat in the diet

Coronary heart disease
Stokes
High Blood pressure
Obesity
Joint problems
Psychological issues



Commodities – Sugar

Sugar Beet – grown in the UK



Non UK sugar is produced from sugar canes grown all round the world especially in hotter, wet climates such as India, Brazil, Thailand, China, USA, Mexico, Russia Pakistan and Australia



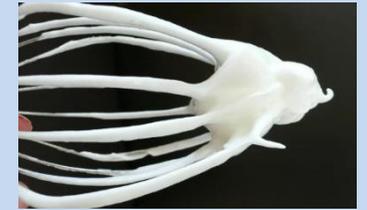
Fairtrade

Sugar plantations run by small-scale farmers produce high quality sugar canes under Fairtrade agreements



Sugar in Cooking

- Browns – caramelisation
- Aeration – with fat traps air
- Flavour – adds sweetness
- Delays staling – cakes
- Stabilises mixtures – egg whites
- Texture - Softens gluten in cakes



Types of sugar

All sugar ingredients are chemically named **sucrose** made from sugar cane or sugar beet

Sucrose is

- ✓ icing sugar
- ✓ caster sugar
- ✓ granulated sugar
- ✓ soft brown sugar
- ✓ demerara sugar
- ✓ molasses
- ✓ treacle and syrup



Too much sugar

Too much sugar can lead to tooth decay, weight gain, obesity, type 2 diabetes



Too little

Lack of sugar, not eating enough or problems with diabetic control can result in hypoglycaemia or very low blood sugar. It causes dizziness and fainting

Sugar Tax

Manufacturers get taxed if they make drinks containing too much sugar, it's called **The Sugar Tax**
The sugar tax pays for extra sport facilities in schools.

