Year 10 Cycle 3

Knowledge Organisers

Contents

LO: How do I use a knowledge organiser so that I don't forget what I've learnt?

SUBHEADINGS

1. Look at the subheading.
2. Write down everything you know about that topic without looking at the KO.
3. Check what you've missed; add this to your notes in a different colour.
4. Do something else (e.g. revise something else).
5. Return to this and repeat from the beginning.

'Remains' – Knowledge Organiser

What happens in the poem? The speaker and two other soldiers are sent to tackle some looters who are robbing a bank. They open fire on a looter who is running away. The looter is seriously wounded He is carried away in the back of a lorry. The soldier has to walk past the blood stain left on the ground week after week. He returns home and is haunted by the memory of what he has done, reliving it again and again. He drinks and takes drugs in an attempt to forget what happened. However, he is unable to forget the looter and what he did. The memory remains stuck in his mind.

What is the context of the poem?

- Simon Armitage wrote 'Remains' (and other poems) for a Channel 4 programme called 'The Not Dead'.
- He has never been to war himself and has never been a soldier.
- To write the poems, he interviewed a number of soldiers who have survived war (in Iraq, Afghanistan, the Falklands etc.) i.e. the 'not dead'.
- The poems show the suffering soldiers experience long after wars have finished.
- 'Remains' is heavily based on the experience of Guardsman Tromans who fought in the Iraq war.
- Tromans shot a looter in Iraq and suffers from PTSD.

What is the significance of the title? The poem is about PTSD – in other words, how the traumatic experience of war REMAINS with the soldier. It could also refer to the human REMAINS – the image of the looter – that the soldier obsesses over so much as part of his PTSD.

What is a central idea in this poem? As is implied by the title, the poem explores the trauma experienced by soldiers and the terrible impact of PTSD on survivors long after the battle has ended.

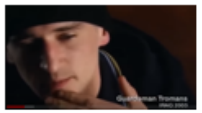
What other ideas are explored in the poem?

- War can cause suffering beyond the battlefield.
- War is damaging.
- Guilt is powerful and can overwhelm us.
- War can result in us dehumanising the enemy.
- War can cause us to act in ways we later regret.
- Memory can have a powerful effect on us.

Key Vocabulary	Definition	Example
Traumatic	Causing severe and lasting emotional shock or pain.	Being involved in war is deeply disturbing and a highly _____ experience.
PTSD (post-traumatic stress disorder)	This is an anxiety **disorder** caused by very stressful, frightening or distressing events. Someone with this often relives the **traumatic** event through nightmares and flashbacks, and may experience feelings of isolation, irritability and guilt.	The soldier in 'Remains' is suffering from _____.
Guilt	A feeling of worry or unhappiness that you have because you have done something wrong.	The soldier struggles to come to terms with the _____ he feels over shooting the looter.
Haunt	To revisit again and again.	The memory of the shooting _____ the soldier.
Dehumanisation	To treat people as less than human.	It can be argued that the soldiers in 'Remains' _____ the looter by treating him with so little respect.
Dramatic monologue	A poem made up of a single *character* speaking (i.e. the poet is very clearly writing as someone else).	'Remains' is a _____ because Armitage is writing as someone else and there is only one speaker in the poem.

Writer's Craft:	Example
Why is the poem written as a dramatic monologue?	To explore a traumatised soldier's thoughts and feelings; because the poem was produced following an interview with a soldier.
Why does Armitage use colloquial language?	To create a convincing voice – an ordinary person/soldier; to contribute to the almost matter-of-fact tone in the first half of the poem.
What does the first/second half focus on? What is the turning point?	First half: the shooting; second half: the emotional impact on the soldier. Turning point = 'End of story, except not really.'
Why is the shooting described with graphic imagery?	To convey the brutality; to show what has traumatised the soldier; because it's so vivid in the soldier's mind.
Why is the blood on the street described as a 'blood shadow'?	Shadow = dark imagery – connotations of death and misery; the shooting has cast a shadow over his life; a shadow follows you around
What does the imagery 'dug in behind enemy lines' suggest?	To the looter, the soldier is the enemy; the soldier's mind is enemy territory. The looter is in the soldier's mind, so this is 'behind enemy lines'. 'Dug in' means well defended and prepared for attack – this suggests that the memory of the looter is difficult to remove; 'dug in' is a military term, suggesting that the war/conflict is still going on for the soldier.
What impression does the final stanza leave us with and what is meant by 'bloody hands'?	It leaves us with the impression that the pain will be ongoing – there seems little hope of an end as the looter is still 'here and now'. 'Bloody' can suggest frustration (swearing), but 'to have blood on your hands' also means to be responsible for an act of violence against someone i.e. to be guilty of something.



VOCABULARY

1. Cover the vocabulary and definition columns. Try to work out what the missing word is in the example. Check. Move to the next word. Repeat until you can do this with all the words you've studied so far.
2. Try the same as above, but this time by looking at just the definition column.
3. Try the same as above, but this time just look at the vocabulary and try to explain what the definition is.

BIG IDEAS

1. Look at the list of big ideas.
2. For each idea, make notes.

MINDMAP

1. Create a mindmap of what you know about the topic *from memory*.
2. Check your mindmap against the KO.
3. Add 5 things that you've missed using a different colour pen.
4. Do something else (e.g. revise something else).
5. Repeat.

PICTURES

1. Look at just the pictures.
2. Explain how each of these pictures is relevant to the topic.

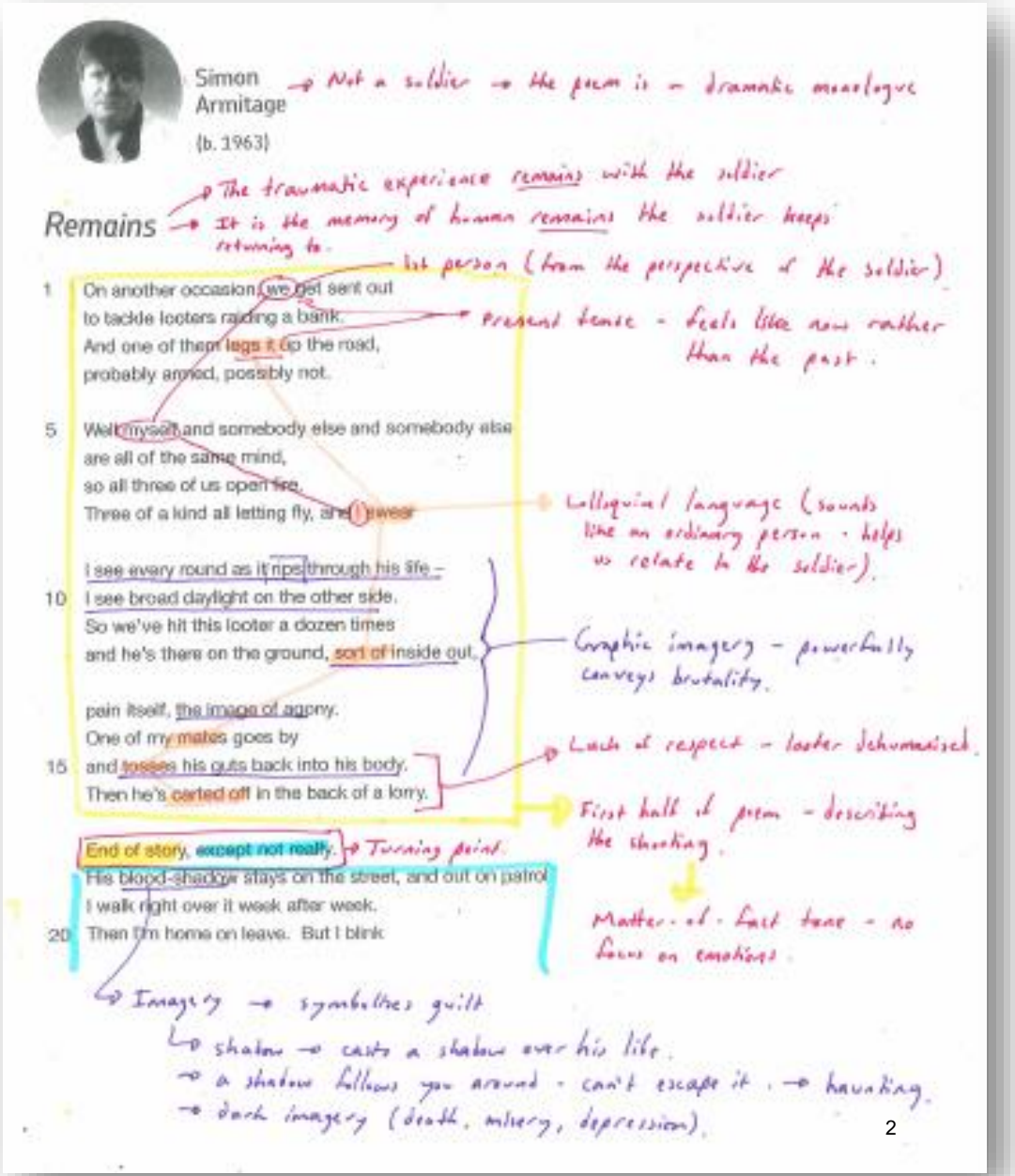
OTHER QUESTIONS

1. Cover the explanation.
2. Answer the questions.
3. Check your answers; add anything you missed; correct anything you got wrong.
4. Do something else (e.g. revise something else).
5. Return to this and repeat from the beginning.

LO: How do I revise (poetry) so that I don't forget what I've learnt?

You also have access to an annotated copy of the poem. This can help us to revise too:

1. Take a blank copy of the poem.
2. Annotate it with everything you can remember about the poem.
3. When you've finished, check it against the annotated version.
4. Add anything you missed using a different colour pen.
5. Do something else.
6. Repeat with another blank copy of the poem.



Simon Armitage (b. 1963)

→ Not a soldier → the poem is = dramatic monologue

Remains

→ The traumatic experience remains with the soldier
→ It is the memory of human remains the soldier keeps returning to.

1 On another occasion we get sent out
to tackle looters raiding a bank.
And one of them legs it up the road,
probably armed, possibly not.

5 Well myself and somebody else and somebody else
are all of the same mind,
so all three of us open fire.
Three of a kind all letting fly, and I swear

I see every round as it rips through his life –
10 I see broad daylight on the other side.
So we've hit this looter a dozen times
and he's there on the ground, sort of inside out,

pain itself, the image of agony.
One of my mates goes by
15 and tosses his guts back into his body.
Then he's carted off in the back of a lorry.

End of story, except not really. → Turning point.
His blood-shadow stays on the street, and out on patrol
I walk right over it week after week.
20 Then I'm home on leave. But I blink

1st person (from the perspective of the soldier)

Present tense - feels like now rather than the past.

Colloquial language (sounds like an ordinary person - helps us relate to the soldier).

Graphic imagery - powerfully conveys brutality.

Lack of respect - looter dehumanised.

First half of poem - describing the shooting.

Matter-of-fact tone - no focus on emotions.

→ Imagery → symbolises guilt
↳ shadow → casts a shadow over his life.
→ a shadow follows you around - can't escape it. → haunting.
→ dark imagery (death, misery, depression).

Y10C3 Catering Knowledge Organiser

Basic Costs	
Labour costs	Salaries and wages paid to staff
Material costs	Ingredients, cleaning materials, uniform
Overheads	Rent, bills, Wi-Fi, insurance etc

Environmental needs	
Seasonality	Buying foods when they are in season
Sustainability	Using less energy, avoid waste, recycle and reuse
Reducing energy and water use	Solar panels, turn off lights, ask guest to reuse towels
Reusing food	Leftover food can be turned into something else
Reusing sundries	Using metal straws, use washable clothes
Recycling	Jars and containers, packaging, recycling bins

Gross profit =
selling price – costs

Gross profit % =
GP ÷selling price (x100)

Net profit =
Gross profit - overheads

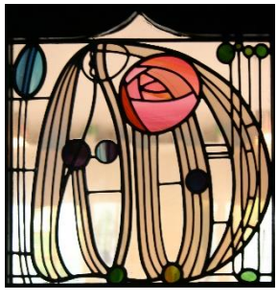
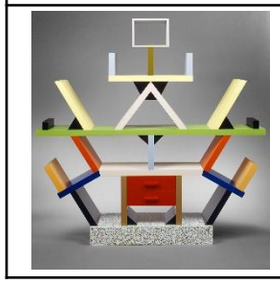
Toad in the Hole
Ingredients cost = £1.50
Selling price = £7.95
GP = £7.95 - £1.50 = £6.45
GP% = £6.45 ÷ £7.95 (x100) = 81.1%

New technology
Cashless payment, paying by smartphone, booking online, key card access, web booking

Impact of different types of media		
	Positive impact	**Negative impact**
Printed media	Visually appealing. God to target local areas	Can't reach a global audience. Easily ignored
Broadcast	Mixture of sound and sight. TV reaches a large audience.	Very expensive. Radio adverts require the attention of the listener
Internet	Social media can share post. Reviews can be left	Negative reviews can be damaging. Some social media posts can be damaging
Competitive	Might give you a competitive advantage if you can see what they are doing.	Lots of competitors can impact the price of goods.

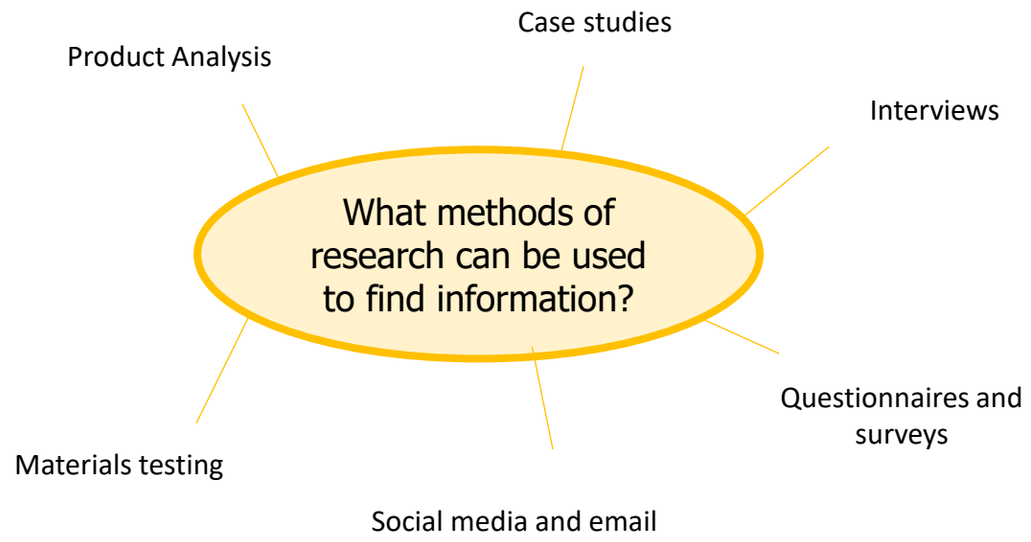
Y10 Cycle 3 DT Knowledge Organiser: Work of others and Customer Research

Work or Others

Image/ Example	Designer	Design Movement	Key info
	William Morris	Arts and Crafts	• British designer in 1880s • Simple natural crafts • Useful and beautiful products (wallpapers, cushions, etc)
	Charles Rennie Mackintosh	Art Nouveau	• Scottish designer in 1860s – 1920s • Known for light and shadow • Created stained glass and furniture • Inspired by nature and geometric lines
	Ettore Stottas	Memphis	• Italian designer in the 1950s/60s • Enjoyed making everyday objects wacky and bold • Used lots of bold colours and black lines

Image/ Example	Brand	Key info
	Alessi	• Italian Design Company • Homeware and kitchen utensils • "Post-modern" style • Phillipe Starke is a major designer
	Apple	• USA-based tech company • Famous for **iconic designs** of iPod and iPhone • Steve Jobs and Johnathon Ive are major designers • Known for innovative and modern design
	Dyson	• British engineering company • Famous for vacuum cleaners and innovative technology • James Dyson is a major designer

Research



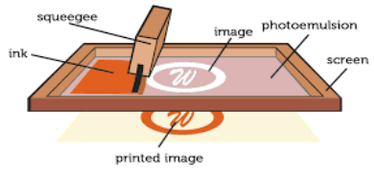
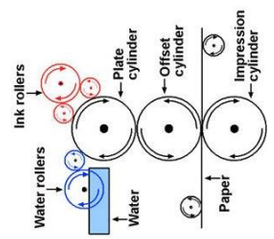
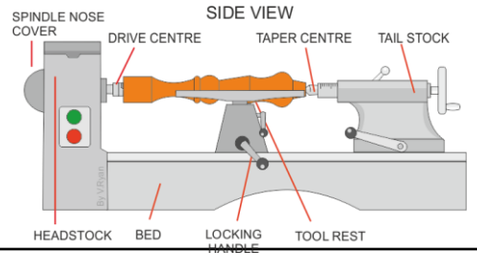
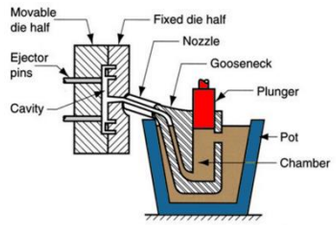
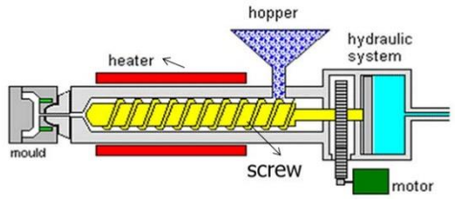
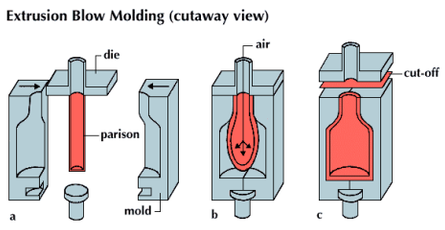
Research can be divided into 2 categories; **Primary Research** and **Secondary Research**.
Primary is research you complete yourself.
Secondary is research from resources others can gathered e.g. books, magazines and internet

Primary research is generally more reliable as it is done by the person using it and can double-check the data

Another key piece of research, is **Anthropometrics and Ergonomics.** This helps develop the sizes of products, etc to make sure it fits the User

Anthropometrics	The study of measurements of the human body. E.g. Knowing the grip width of a palm, if designing a new travel coffee cup
Ergonomics	The application of anthropometrics to ensure products are safe and comfortable to use. This can also include; size, material, appearance, brightness, sound and texture. E.g. making sure the travel cup is the correct size, and an insulating smooth material to make it comfortable to hold for long periods

Y10 Cycle 3 DT Knowledge Organiser: Production Processes

Name of Process	Diagram	Material	Products Made	Key info
Screen-printing		Papers and Textiles	Posters, signs and t-shirts	Screen printing places paint on top of a screen. The screen has a stencil embedded in it, so when the paint is passed across it the desired shape is printed underneath. Good process in one-off and batch production as often done by hand
Offset Lithography		Papers and card (thin, flexible plastics)	Posters, newspapers, plastics bags	Rollers containing the colours and water go onto the plate cylinder. The water stops the colours sticking to certain places, creating the shape. The shape is transferred between rollers and onto the material. Can be used at batch and mass production
Lathe Turning		Wood and metal	Chair legs, baseball bats)(cylindrical items)	Material is placed between the tail stock and the headstock and spun at high speed. The material is then cut using specialist tools (either by hand or my automated machinery) to the desired shape. Can be used in one-off and batch production
Die Casting		Metal	Car parts, engine components, etc	Molten metal is poured into a chamber and a plunger forces the metal through the nozzle into the mould. Unlike sand casting, the mould is reusable. Good process for both one-of and batch production
Injection Moulding		Plastics	Chairs, toys, etc	Plastic granules are poured into the hopper and onto the screw. The screw moves the material towards the heater where it turns into a liquid. The liquid is then forced into the mould, cooled and released. Great process for mass production as it makes 100s+ of products at once, to a identical standard.
Blow Moulding		Plastics	Plastic bottles	A Plastic parison is heated and put into the mould. The parison is then filled with air (like blowing up a balloon) and is forced to fit the mould shape. It is then cooled and then released. This is a great process for mass producing bottles.

CAD Computer Aided Design

Examples; 2D Design, Autodesk Inventor, Fusion 360, Photoshop, etc

Advantages	Disadvantages
• Easy to change designs • Designs are easily saved and sent • Can be worked on by multiple people simultaneously • Can be used for virtual testing • Can produce high-quality designs	• Complex and time-consuming to learn • Expensive to buy • PCs can crash or be hacked – causing work to be lost • Takes up PC memory

CAM Computer Aided Manufacture

Examples; 3D Printing, Laser Cutting, CNC Router, Automated Machines and Robotics, etc

Advantages	Disadvantages
• Faster and more accurate than traditional tools • Repetitive accuracy/ consistent outcomes • Machines can run 24/7	• Expensive to buy the equipment, etc • Training takes cost and time • Need specialists to maintain and repair the machines • Dependence on CAM can cause unemployment

Flexible Manufacturing Systems

This is where **automated machines** are adaptable and can produce different products if needed.

If a manufacture is making a product with machines that are just dedicated to specific tasks they have to be reprogrammed and re-tooled before changing to a new task. This is time consuming and expensive.

Examples include; CNC Machines, 3D Printers, Laser Cutters, Robotic arms, etc

Lean Manufacturing

This is where waste and energy is kept to a minimum.
This helps manufacturers save money and resources in production, as well as helping minimise the **environmental impact** of producing products.

Just-in-Time (JIT) Manufacture

This is where manufacturers only order materials, parts, etc when needed. The customer's order triggers the production process and the resources needed for that order are the only ones bought.

This can be used in any **scale of production** but is particularly useful for one-off production.

Advantages	Disadvantages
• Saves on warehouse and storage costs • Money is not tied-up in stock • Little/minimal waste • Customer often pays in advance so money is secure before production	• All production stops if a part/ material is missing • Needs to have a fast, reliable and good quality supply chain to work properly • Can be time-consuming

Y10 Cycle 3 DT Knowledge Organiser: Scales of Production

Name/ Type	How many it makes	Key Info	Examples of Products
One-off Production	1	• Also known as Bespoke or Prototype manufacture • Custom-made products • Specialist workers/ skills • Specialist machines and materials • High Quality but expensive	• Towers / Bridges • One-off Houses • Custom made clothes
Batch	10s-1000s	• Uses a mix of workers and machinery • Uses jigs, moulds and templates to help make identical products • Stations of workers e.g. cutting station, painting station, etc • Can have some variation e.g. colour, finish, flavour	• Baked foods • Limited edition car • Socks • Chairs
Mass	10,000s - 100,000s	• Big assembly lines (and sub-assembly lines) • Heavily automated • Standard and identical products • Little worker input	• Cars • Bottles • Microchips • Plain shirts
Continuous	100,00s +	• 24/7 production • Heavily automated • Standard and identical products • Little worker input	• Energy • Water • Paper • Plastic

One-off Production	
Advantages	**Disadvantages**
• Custom made • High Quality Materials • High Quality Craftsmanship	• Time consuming • Specialist training for workers • Expensive to buy

Batch Production	
Advantages	**Disadvantages**
• Lower cost than one-off • Jigs, moulds and templates help products look identical • Can have some variety	• High storage costs • Jugs, moulds and templates have to be checked • Workers can become bored on their station

Mass Production	
Advantages	**Disadvantages**
• Large amounts made at once • All products are identical and to same standard • Using automation reduced human error	• Initial starting costs are high • If production line stops, the product can't be made • Workers become bored monitoring machines and repetitive tasks

Continuous Production	
Advantages	**Disadvantages**
• Large amounts made at once • All products are identical and to same standard • Using automation reduced human error	• Initial starting costs are high • If production line stops, the product can't be made • Workers become bored monitoring machines and repetitive tasks

Y10 French LC3 SB1: Qu'est-ce que tu voudrais faire dans le futur ? What do you want to do in the future?

Time marker	Conditional	job	connective	conditional tense phrase (reason)
Un jour (one day) A l'avenir (In the future) Dans le futur (in the future) Après avoir fini mes études (When I have finished my studies)	je voudrais être j'aimerais être (I would like to be)	acteur/actrice (actor/tress) agent de police (police officer) agriculteur/agricultrice (farmer) architecte (architect) créateur/créatrice de mode (fashion designer) dentiste directeur/directrice (director) électricien/électricienne (electrician) infirmier/infirmière (nurse) ingénieur (engineer) journaliste (journalist) médecin (doctor) professeur (teacher) programmeur/programmeuse (programmer) employé de bureau (office worker) maçon (builder) mécanicien/mécanicienne (mechanic) fonctinnaire (civil servant) informaticien/informaticienne (computer scientist) 	parce que puisque (because) car je pense que (because I think that)	je préférerais travailler en plein air (I would prefer to work in the fresh air) je préférerais travailler en équipe (I would prefer to work in a team) je préférerais travailler seule(e) (I would prefer to work alone) je préférerais un métier créatif (I would prefer a creative job) je voudrais travailler avec les enfants (I would like to work with children) je voudrais aider les autres (I would like to help others) je voudrais sauver la vie de gens (I would like to save the lives of people) je voudrais travailler dans une grande entreprise (I would like to work in a big company) je voudrais travailler à l'étranger (I would like to work abroad) je suis passionnée par la loi et la justice (I am passionate about the law and justice je suis passionnée par l'art et le théâtre (I am passionate about art and theatre

Y10 French LC3 SB2 : Qu'est-ce que vas faire dans la vie ? What are you going to do in life?

Time phrase	verb	infinitive phrase	connective	subjunctive phrase
Avant d'aller à l'université (Before going to university) Avant d'avoir un métier (before having a job) Après avoir terminé mes examens (When I have finished my exams) Après avoir quitté le collège (After having left school) Plus tard (later) Un jour (One day)	je veux (I want) j'espère (I hope) j'ai envie de/d' (I want to) j'ai l'intention de/d' (I intend to) mon rêve serait de/d' (my dream would be)	prendre une année sabbatique (to take a sabbatical) aller à l'université (to go to university) entrer en apprentissage (to do an apprenticeship) faire du bénévolat (To do volunteering) faire le tour du monde (to travel the world) me reposer et ne rien faire (to rest and do nothing) voyager avec mes amis (travel with my friends) me marier/me pacser (get married/be in a civil partnership) avoir des enfants (have children) m'installer avec mon copain/ma copine (move in with my boy/girlfriend)	mais (but) cependant (however) néanmoins (nevertheless) pourtant (however)	il faut que je sois réaliste. (I must be realistic) il faut que j'aille directement à la fac. (I must go straight to university) il faut je fasse mes études d'abord. (I must do my studies first) il faut que je fasse ma licence. (I must do my degree) il faut que je gagne de l'argent. (I must earn some money) mes parents veulent que je travaille immédiatement. (my parents want to me to get a job immediately) mes parents veulent que je finisse mes études. (my parents want me to finish my studies) mes parents veulent que je fasse ma licence. (my parents want me to get my degree)

Y10 French LC3 SB3 : Tu as un petit boulot ? Do you have a part time job ?

verb phrase 1	verb phrase 2	noun/person	frequency	verb	noun
J'ai un petit job (I have a part time job) 	je travaille dans (I work in)	une boulangerie (bakery) un café un magasin (shop) un supermarché une librairie (a magazine/ bookshop)	un jour par semaine (one day a week) le weekend (at the weekend) après le collège (after school) tous les jours (every day) quelquefois (sometimes) de temps en temps (from time to time)	je sers les clients (I serve the customers) je remplis les rayons (I fill the shelves) j'organise des livraisons (I organise deliveries) je livre les journaux (I deliver newspapers)	
Pour gagner mon argent de poche (To earn my pocket money) Pour gagner de l'argent (To earn money)	j'aide à la maison (I help at home) je passe l'aspirateur (I do the hoovering) je lave la voiture (I wash the car) je fais la vaisselle (I do the washing up) je tonds la pelouse (I mow the lawn) je fais du babysitting (I do babysitting) je promène le chien (I walk the dog)	pour mes parents (for my parents) pour mes voisins (for my neighbours) pour mes grand parents (for my grandparents)		je gagne (I earn) je reçois (I receive) ils me donnent (they give me)	trente livres par mois (Thirty pounds per month) dix livres par semaine (ten pounds per week) cinq livres par heure (five pounds per hour)

Y10 French LC3 SB 4 : Tu as fait un stage ? Have you done work experience?

Time marker	past tense phrase	noun	past tense phrase	past tense	intensifier	adjective
L'année derniere (last year) La semaine derniere (last week) En juillet (in July) En avril (in April)	j'ai fait un stage dans (I did work experience in)  	un bureau (an office) un garage (a garage) un hôtel (a hotel) un magasin (a shop) un salon de coiffure (a hairdressers) une banque (a bank)	j'ai tapé des documents (I typed documents) j'ai envoyé des emails (I sent emails) j'ai fait des photocopies (I did photocopies) j'ai aidé les mécaniciens (I helped the mechanics) j'ai appris changer des pneus (I learned to change tyres) j'ai servi des clients (I served clients) j'ai repondu au téléphone (I answered the phone) j'ai pris des réservations (I took reservations) j'ai rangé les vêtements (I tidied the clothing) j'ai fait le thé/café (I made the tea/coffee)	c' était (it was)	assez (quite) très (very) vraiment (really) un peu (a bit)	fascinant (fascinating) monotone (monotonous) génial (great) nul (rubbish) utile (useful) éducatif (educational) fatigant (tiring) difficile (difficult) facile (easy)
				c'était une bonne expérience (it was a good experience) c'était une mauvaise expérience (it was a bad experience)		
				j'ai beaucoup appris (I learned lots) je n'ai rien appris (I learned nothing)		

Y10 French LC3 SB 5 – ordering & booking – Je peux vous aider? Can I help you?

Greeting/question	conditional	noun	question	noun	please	price
Bonjour, je peux vous aider ? (Hello, can I help you?)	Je voudrais (I would like)	le plat du jour (dish of the day) la soupe (the soup) l'agneau (the lamb) le bœuf (the beef) le poulet (the chicken) le poisson (the fish) les legumes (the vegetables) le riz (the rice) les pâtes (the pasta) le roti de_____ (the roast__) la salade (the salad)	et comme boisson? (and as drink?) et comme dessert? (and as dessert?)	un coca (a coca cola) de l'eau (water) du thé (tea) du café (coffee) la mousse (the mousse) la tarte (the tart) les fruits (the fruit) la glace (the ice cream) le gateau (the cake)	s'il vous plaît.	ça fait ___ euros, merci et au revoir. that's __ euros, thanks and goodbye.
	Je voudrais une chambre (I would like a room)	avec un grand lit (with a double bed) avec un lit simple (with a single bed) pour une personne (for one person) pour deux personnes (for two people) avec une vue sur la mer (with a sea view) avec une douche (with a shower) avec une salle de bains (with a bathroom)	Pour combien de nuits? (For how many nights ?)	pour __ nuits s'il vous plaît. (for __ nights please.)		

opinion	past tense postive	connective	past tense negative
A mon avis (in my opinion	c'était propre/pas cher (It was clean/cheap) c'était delicieux/confortable (It was delicious/comfortable) le service était impeccable (the service was impeccable)	mais (but) cependant (however)	c'était sale/cher (it was dirty/expensive) c'était dégoutant/pas confortable (it was disguesting/not comfortable) le service était affreux (the service was awful)

GCSE Geography Knowledge Organiser

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Lesson content
(If you cannot access the QR code, ask your teacher to share the folder with your school email)

Year	10	Cycle	3	Topic	The Challenge of Natural Hazards

Subject vocabulary

Natural hazard	An unexpected or uncontrollable natural event that threatens people's lives and livelihood.
Hazard risk	The chance or probability of being affected by a natural event. People who choose to live close to a river may be at risk from flooding. Those who live close to the sea may be at risk from tropical cyclones or tsunami.
Plate margin	Where two sections of the Earth's crust meet.
Conservative margins	Tectonic plate margin where two tectonic plates slide past each other.
Constructive margin	Tectonic plate margin where rising magma adds new material to plates that are diverging or moving apart.
Destructive margin	Tectonic plate margin where two plates are converging or coming together and oceanic plate is subducted. It can be associated with violent earthquakes and explosive volcanoes.
Collision margin	occur when two plates of the same densities move together (fold mountains)
Subduction	The sideways and downward movement of the edge of a plate of the earth's crust into the mantle beneath another plate.
Convection currents	Warm mantle currents drive and carry plates of lithosphere along a like a conveyor belt.
Primary effects	Things that happen immediately as a result of a volcano; pyroclastic flow, tephra, lava flows, volcanic gases.
Secondary effects	Things that happen in the hours, days and weeks after the initial volcano; Landslide, tsunami, lahars & flooding.
Short term or immediate response	A response in the days and weeks immediately after a disaster has happened. Short-term responses mainly involve search and rescue and helping the injured.
Long term response	Responses that go on for months and years after a disaster. It involves rebuilding destroyed houses, schools, hospitals, etc. It also involves kick-starting the local economy.
Fault	The point where two tectonic plates meet.
Focus	The exact location, under the earth, where the plate moves and energy is released
Epicentre	The point on the surface directly above the focus
Seismic waves	The energy released by an earthquake. P waves- Primary waves (strong and first waves felt. Can move through liquid and solid rock) S waves- Secondary waves (weaker and slower)
Richter scale	Measures the magnitude (strength) of vibrations in the earth. The scale is **logarithmic-** an earthquake with a magnitude of 5 is 10 time more powerful than on of 4.
Mercalli scale	Measures the intensity of damage caused by an earthquake. In the form of **words or photos**.
Monitoring	Using scientific equipment to detect warning signs of events such as a volcanic eruption.
Prediction	Using historical evidence & monitoring to predict when and where a hazard may happen.
Protection	Designing buildings that will withstand tectonic hazards.
Planning	Identifying and avoiding places most at risk.
Low pressure	Is created by rising warm air. This leads to the formation of clouds and storms.
High pressure	Is created by sinking cool air. This leads to settled and dry weather (but not always cold weather!).
Tropical storm	A rapidly revolving storm that is characterised by low pressure. They are associated with thunderstorms, very strong winds and heavy to torrential rainfall. Depending of the location of the storm they will be named locally as hurricanes, typhoons or cyclones.
Extreme weather	A weather event is significantly different from the average or usual weather pattern. This may take place over one day or a period of time.
Climate change	The large-scale, long-term shift in the planet's weather patterns or average temperatures. Earth has had tropical climates and ice ages many times in its 4.5 billion years.
Global warming	A gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide, CFCs, and other pollutants.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something.
Adaptation	Responding to changes and adjusting accordingly in order to survive.

Natural hazards

Natural events have always occurred on our dynamic Earth. Without people, natural events would be just that, events – there would be no natural 'hazards'. If the landslide had occurred in a remote area where it did not pose any threat to people it would not be considered a hazard.

A natural hazard is a natural process which could cause death, injury or disruption to humans, property and possessions.

What factors affect risk?

Urbanisation	The more people living in an area, the more people who are exposed to risk if a hazard were to occur.
Poverty	In poorer parts of the world poverty may force people to live in areas at risk.
Climate change	In a warmer world, tropical storms may become stronger and more frequent. Flooding and drought may affect countries more.
Farming	When a river floods it deposits fertile silt on its floodplain, which is excellent for farming. But when people choose to live there they are putting themselves at risk.

Layers of the Earth

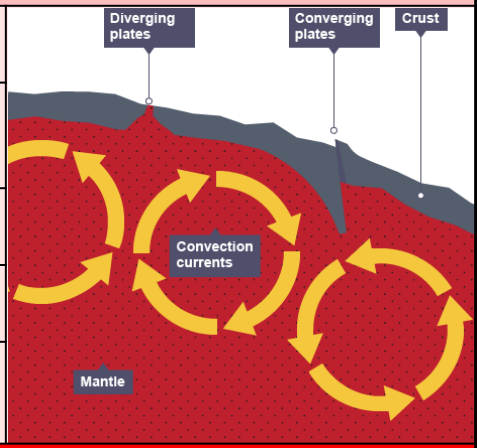
The Crust	Varies in thickness (5-10km) beneath the ocean. Made up of several large plates.
The Mantle	Widest layer (2900km thick). The heat and pressure means the rock is in a liquid state that is in a state of convection.
The Inner and outer Core	Hottest section (5000 degrees). Mostly made of iron and nickel and is 4x denser than the crust. Inner section is solid whereas outer layer is liquid.

Oceanic crust	Continental crust
5-10km thick (Dense)	25-100 km thick (Less dense)
Sinks when it meets continental crust	Doesn't sink
Max 180 million years old	Up to 3-4 billion years old
Forms constantly at constructive margins	New crust isn't formed
Destroyed at destructive margins	Cannot be destroyed

Convection Currents

The crust is divided into tectonic plates which are moving due to convection currents in the mantle.

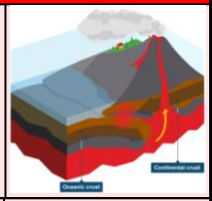
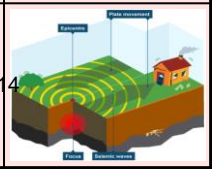
1	Radioactive decay of some of the elements in the core and mantle generate a lot of heat.
2	When lower parts of the mantle molten rock (Magma) heat up they become **less dense** and **slowly rise**.
3	As they move towards the top they cool down, become **more dense** and **slowly sink**.
4	These **circular movements** of semi-molten rock are **convection currents**
5	Convection currents create **drag** on the base of the tectonic plates and this causes them to move.



Mechanisms of plate movements

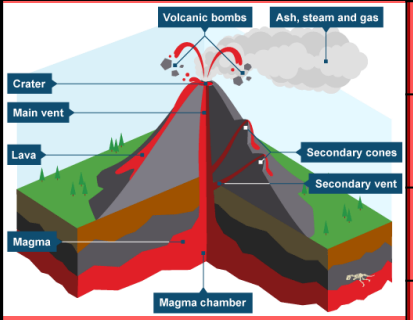
Ridge push	(buoyant upwelling mantle at mid-ocean ridges) — newly-formed plates at oceanic ridges are warm, and so have a higher elevation at the oceanic ridge than the colder, more dense plate material further away; gravity causes the higher plate at the ridge to push away the lithosphere that lies further from the ridge.
Slab pull	Older, colder plates sink at subduction zones, because as they cool, they become more dense than the underlying mantle. The cooler sinking plate pulls the rest of the warmer plate along behind it.

Plate margins

Destructive	When the denser plate subducts beneath the other, friction causes it to melt and become molten magma. The magma forces its ways up to the surface to form a volcano. When two plates of the same density move towards each other, the earth moves upward to create fold mountains, this is what we call a **collision margin**.	
Constructive	Here two plates are moving apart causing new magma to reach the surface through the gap. Volcanoes formed along this crack cause a submarine mountain range such as those in the Mid Atlantic Ridge.	
Conservative	Plates slide past each other in opposite directions, or in the same direction but at different speeds. This is responsible for earthquakes such as ones happening along the San Andreas Fault, USA.	

Global distribution of plate boundaries

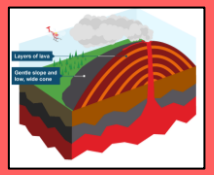
Structure, type and hazards of volcanoes



A volcano is an opening or vent in the earth's surface through which molten material erupts and solidifies as lava.

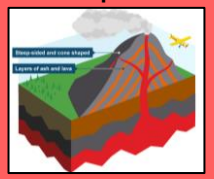
Ash cloud	Small pieces of pulverised rock and glass which are thrown into the atmosphere.
Gas	Sulphur dioxide, water vapour and carbon dioxide come out of the volcano.
Lahar	A volcanic mudflow which usually runs down a valley side on the volcano.
Pyroclastic flow	A fast moving current of super-heated gas and ash (1000°C). They travel at 450mph.
Volcanic bomb	A thick (viscous) lava fragment that is ejected from the volcano.

Shield



These volcanoes are created at constructive margins. This is where two plates are moving apart from each other and magma moves to the surface through the gap. The emerging lava is more fluid and therefore the shape of the volcano is low and wide. This is why it is called a 'shield' volcano. The eruptions from these volcanoes are generally more gentle and can last for several months.

Composite



These are formed at destructive margins where one plate slides underneath the other; A slab of ocean floor slides down and is melted due to friction. This is called the subduction zone. This melted magma warms up slowly and mixes with water and carbon dioxide released from the rock. The hot magma is more sticky rises in violent eruptions to form steep sided volcanoes. The eruption is explosive and rock molten and solid flies from the volcano.

Hot spot volcanoes

In places where the plate is particularly thin, magma may be able to escape to the surface. As the plate continues to move the volcano dies out and a new volcano is formed on another area of the plate. Hot spots can create chains of shield volcanoes. They therefore have gentle oozing lava. An example is Mauna Loa Hawaii.

Earthquakes

An earthquake is caused by a release of pressure. When tectonic plates move past each other, they can become stuck. Over time, pressure will build up. As it this pressure is released, the sudden movement of energy causes earthquakes!

Earthquakes can occur on ALL plate boundaries.

Fault	The point where two tectonic plates meet.
Focus	The exact location, under the earth, where the plate moves and energy is released
Epicentre	The point on the surface directly above the focus
Seismic waves	The energy released by an earthquake. P waves- Primary waves (strong and first waves felt. Can move through liquid and solid rock) S waves- Secondary waves (weaker and slower. It can only move through solid rock)

1	Two plates begin to try and move.
2	The plates try to slide past each other. As they try and move parts get locked.
3	Enormous tension builds up. This causes the stuck rock to give way; this point is called the focus. Suddenly one plate is now able to lurch forward.
4	The built-up tension is now released and so is waves of energy. The waves of energy called seismic waves travel in all directions. rocks slowly settle in their new positions, aftershocks occur.

Effects and responses to volcanic eruptions

Primary effects	Things that happen immediately as a result of a volcano; pyroclastic flow, tephra, lava flows, volcanic gases.
Secondary effects	Things that happen in the hours, days and weeks after the initial volcano; Landslide, tsunami, lahars & flooding.
Short term or immediate response	A response in the days and weeks immediately after a disaster has happened. Short-term responses mainly involve search and rescue and helping the injured.
Long term response	Responses that go on for months and years after a disaster. It involves rebuilding destroyed houses, schools, hospitals, etc. It also involves kick-starting the local economy.

Earthquakes

Earthquakes are measured using machines called seismometers

Richter scale	Measures the magnitude (strength) of vibrations in the earth. The scale is **logarithmic-** an earthquake with a magnitude of 5 is 10 time more powerful than on of 4.
Mercalli scale	Measures the intensity of damage caused by an earthquake. Observations can be in the form of **words or photos**.

The effect of an earthquake is the damage which happens as a result of the earthquake. The effects of an earthquake can vary depending on…

The size of the earthquake on the Richter scale - the higher it is on the scale, the more destruction it can cause.

The depth of the focus - if it's shallow, it can be more destructive.

Level of development - whether it occurs in a rich or a poor country. Richer countries will be more likely to be able to predict, protect and prepare themselves from the effects of an earthquake.

Distance from epicentre - the effects are more severe at its centre.

Population density - the more people living in an area, the more likely that more deaths and casualties may arise.

The time of day - whether people are in their homes, work or travelling.

Primary effects	Secondary effects
Buildings collapsing Roads and bridges destroyed Ground shaking and the earth splitting People dying and being injured Railway lines being buckled	Fires: usually from ruptured gas lines. Landslides can often be triggered by earthquakes, causing huge amounts of material to be moved very quickly. Tidal waves: A tidal waves caused by an earthquake is called a tsunami. Diseases can spread very quickly in the unsanitary conditions often left behind by massive earthquakes. Water becomes contaminated very quickly Liquefaction is when soil and groundwater mixes. The ground becomes very soft, similar to quicksand. It can cause the foundations and supports of buildings, bridges, pipelines, and roads to sink into the ground, collapse or dissolve.

Why do people choose to live in areas of risk?

- Communities have built up around the volcano because of the tourism potential. The soils near volcanoes are very fertile.
- Valuable minerals are found near to volcanoes; employment working in the mines. People may think that the actual chance of something happening is very low. People may not be able to afford to live elsewhere.
- People think that there are adequate warnings and evacuation methods in place so they won't be harmed.

Comparing earthquake events: an example of a HIC (Italy) & LIC (Nepal)

Earthquakes occur whether the country is a high–income country, newly emerging or a low–income country. Tectonic events do not discriminate by wealth. However, the effects of an earthquake differ due to the ability to predict, protect against and prepare for the hazard. Equally, a country's ability to manage the effects can be affected by its level of wealth and resources.

Earthquake in L'Aquila Italy (2009)	Earthquake in Gorkha, Nepal (2015)
On 6 April 2009, an earthquake measuring 6.3 on the Richter scale struck L'Aquila in the Abruzzo region of Italy. The earthquake's epicentre was seven kilometres northwest of L'Aquila. L'Aquila experienced a range of impacts which affected the wealth of the area and of the community, the lives of members of the community and the landscape.	On 28 April 2015, a 7.8 magnitude earthquake struck the Gorkha district in Nepal. The earthquake's epicentre was in Barpak, 80 kilometres northwest of the capital, Kathmandu.

	Italy	Nepal
Income level	High income	Low income
GDP	US$2.144 trillion (2014)	US$19.64 billion (2014)
GNI per capita	US$34,280 (2014)	US$730 (2014)
Magnitude	6.3 magnitude	7.8 magnitude
Time of day	3.32 am (local time)	12.50 am (local time)
Deaths	308	8,841 (19 on Mount Everest)
Homeless	67,500	1 million
Hospitals damaged	San Salvatore Hospital	26 hospitals
Sites damaged	Basilica of St Bernardino, National Museum, Porta Napoli and L'Aquila University	World Heritage sites, e.g. Dharahara Tower, the Patan and Bhaktapur Durbar Square.
Cost of damage	US$1.1 billion	US$5.15 billion
Amount of aid	US$552.9 million from EU	US$274 million from EU

Managing Volcanic Eruptions

Prediction: Warning signs: lava, temperature rise, gas being released	**Monitoring**: seismometers, thermal imaging, gas samples

Preparation: exclusion zone around the volcano, being ready and able to evacuate residents, having an emergency supply of basic provisions, such as food, and Trained emergency services and a good communication system.

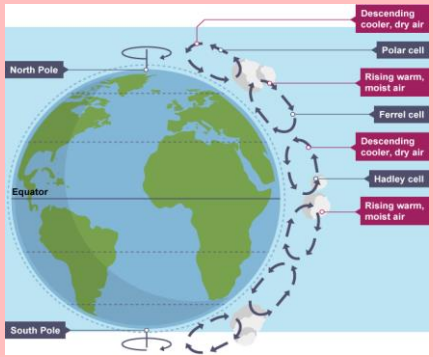
Managing Earthquakes

Prediction: Satellite surveying (tracks changes in the earth's surface). Laser reflector (surveys movement across fault lines)Seismometer. Water levels fluctuate before an earthquake).Seismic records to predict when the next event will occur.	**Protection**: You can't stop earthquakes, so methods aim to reduce potential damage: Earthquake-resistant buildings Raising public awareness

Global atmospheric circulation model

Atmospheric circulation is the large-scale movement of air by which heat is distributed on the surface of the Earth.

Hadley cell	Largest cell which extends from the **Equator** to between **30° to 40° north & south**.
Ferrel cell	Middle cell where air flows **poleward** between **60° & 70°** latitude.
Polar cell	**Smallest & weakness** cell that occurs from the poles to the Ferrel cell.



Tropical storms

A tropical storm is a rapidly revolving storm that is characterised by **low pressure**. They are associated with thunderstorms, very strong winds and heavy to torrential rainfall. Depending on the location of the storm they will be named locally as hurricanes, typhoons or cyclones. They tend to occur 5- 35 degrees in latitude from the equator. This is where ocean temperatures are 27°c, >60m ocean depth, converging trade winds create low wind shear, and the Coriolis force is strong

1	Air is heated above the surface of warm tropical oceans. The warm air rises rapidly under the low-pressure conditions.
2	The rising air draws up more air and large volumes of moisture from the ocean, causing strong winds.
3	The Coriolis effect causes the air to spin upwards around a calm central eye of the storm.
4	As the air rises, it cools and condenses to form large, towering cumulonimbus clouds, which generate torrential rainfall. The heat given off when the air cools powers the tropical storm.
5	Cold air sinks in the eye, therefore there is no cloud, so it is drier and much calmer.
6	The tropical storm travels across the ocean in the prevailing wind.
7	When the tropical storm meets land it is no longer fuelled by the source of moisture and heat from the ocean so it loses power and weakens.

Changing pattern of Tropical Storms: Scientist believe that global warming is having an impact on the frequency and strength of tropical storms. This may be due to an increase in ocean temperatures.

Management of tropical storms

Protection
Preparing for a tropical storm may involve construction projects that will improve protection. Hurricane straps for houses, planting mangroves along the coast to absorb energy

Aid
Aid involves assisting after the storm, commonly in LIDs.

Development
The scale of the impacts depends on the whether the country has the resources cope with the storm.

Planning
Involves getting people and the emergency services ready to deal with the impacts.

Prediction
Constant monitoring can help to give advanced warning of a tropical storm; satellites and drones can measure

Education
Teaching people about what to do in a tropical storm.

Example: Typhoon Haiyan 2013

Causes
Started as a tropical depression on **2rd November 2013** and gained strength. Became a Category 5 **"super typhoon"** and made landfall on the Pacific islands of the Philippines.

Effects
- Almost **6,500 deaths**.
- **130,000 homes destroyed.**
- Water and sewage systems destroyed had caused **diseases**.
- **Emotional grief** for dead.

Management
- The UN raised **£190m in aid**.
- USA & UK **sent helicopter carrier ships** deliver aid remote areas.
- **Education** on typhoon preparedness.

Secondary Effects of Tropical Storms

- People are **left homeless**, which can cause distress, poverty and ill health due to lack of shelter.
- **Shortage of clean water** and **lack of proper sanitation** makes it easier for diseases to spread.
- **Businesses are damaged** or destroyed causing employment.
- Shortage of food as **crops are damaged**.

Primary Effects of Tropical Storms

- The intense winds of tropical storms can destroy whole **communities, buildings** and **communication networks**.
- As well as their own destructive energy, the winds can generate abnormally high waves called **storm surges**.
- Sometimes the most destructive elements of a storm are these subsequent **high seas and flooding** they cause to coastal areas.

UK weather hazards

Extreme weather- A weather event is significantly different from the average or usual weather pattern. This may take place over one day or a period of time.

Weather is driven towards the UK by **south-westerly prevailing wind**s. Fuelled by the warm and moist conditions of the Atlantic Ocean, strong winds and heavy rain batter the exposed western areas.

The UK can suffer from a variety of weather hazards including: Thunderstorms, prolonged rainfall (mass movement), drought, extreme heat, heavy snow, extreme cold, strong winds, ice, fog, hail and flooding.

What happens to the weather when the air masses meet?

Depressions (low pressure system) form when a cold air mass meets a warm air mass.

The junction between these two different air masses is called a front. A front is associated with a change in the weather.

A **warm front** means that warm air is coming.
At a warm front, warm air is rising over cold air.
This usually produces clouds and rain.

A **cold front** means that a cold air is coming.
At a cold front, cold air pushes under the warm air.
This produces strong winds and heavy rain.

Anticyclones (high pressure systems)

Anticyclones are areas of high atmospheric pressure.
They are a weather system that brings dry, bright and settled weather.
They usually last for several days.

Anticyclones form in areas where the air is descending. As more air descends, the pressure increases, so an area of 'high' pressure develops. As the air descends it warms and picks up moisture through evaporation. Condensation is unlikely in these conditions so clouds rarely form and the weather remains fine and dry. There is also very little wind.

Is extreme weather on the rise in the UK?

There have been many extreme weather events in the UK throughout history. However, scientists have noticed that these events seem to be occurring more frequently than in the past.

Temperatures have been more extreme in recent years, it's raining more, and we are experiencing more flooding in the UK

Example: Extreme weather in the UK: The Beast from the East

Causes

On 25th February 2018 The Beast from the East arrived in the UK It was caused by a change to the northern polar jet stream, which twisted its direction unexpectedly, drawing in cold air to the UK from the east.

A sudden stratospheric warming reverses the jet stream, and means that the UK's weather starts coming from the east- meaning the freezing mass of Siberia.

Effects

- **10 deaths**.
- **Cost the economy £1 billion per day**
- Lows of -12°c and 61 mph
- **Power cuts and +450 schools closed**
- **50cm snow on high ground**
- **200k+ without water. 8000+ vehicle collisions**

Management

- **Four water companies write action plans** to improve response (OFWAT)
- Millions paid in **compensation** by water companies
- **NHS** winter plans for future response

What is Climate Change?

Climate change is a large-scale, long-term shift in the planet's weather patterns or average temperatures. Earth has had tropical climates and ice ages many times in its 4.5 billion years.

Quaternary period: The current geological period dating from 2.6million years ago to the present day. We live in the Holocene epoch of the Quaternary period, which covers the last 12,000 years since the end of the last ice age.

Evidence for climate change

Global temperature	Average global temperatures have increased by more than **0.6°C since 1950**.
Ice sheets & glaciers	Many of the world's glaciers and ice sheets are melting. E.g. the Arctic sea ice has declined by **10% in 30 years**.
Sea Level Change	Average global **sea level has risen by 10-20cms** in the past 100 years. This is due to the additional water from ice and thermal expansion.

What about the era before we had all this fancy technology?

For the era before there were reliable data records, we need to take clues from proxy data (natural recorders), such as tree rings, fossil pollen, ice cores and ocean sediments to estimate what the climate was like.

However, these records are not as reliable, because these only indicate climate change rather than providing direct evidence of accurate temperatures.

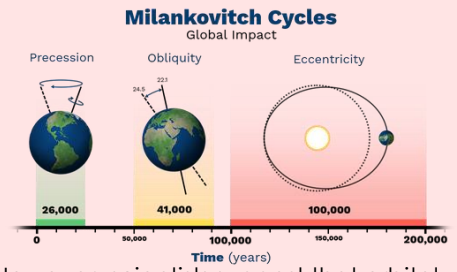
Proxy data as evidence for climate change

Tree rings	One light ring plus one dark ring equals one year of the tree's life. Because trees are sensitive to local climate conditions, such as rain and temperature, they give scientists some information about that area's local climate in the past.
Ice cores	Antarctic ice cores are crucial in understanding long-term climate change. Antarctica is a wilderness with no permanent residents, so the layers of snow remain unaltered. They act like time capsules, holding information about climate change as different layers of snow build up over thousands of years. The ice cores can be drilled so that the information about what the climate was like when the snow fell can be analysed. The deeper the snow that is drilled, the older the snow. Records go back to about 800,000 years ago. Oxygen isotopes in the ice cores are commonly used to estimate what the temperatures would have been. The isotopes are atoms with different numbers of neutrons.
Ocean sediments	As with ice, the deeper the sediment, the older the sediment. The billions of tonnes of sediment deposited at the bottom of the sea also act as a timeline for providing evidence of climate change. Organisms and remains of plankton in the sediment reveal information such as past surface water temperatures, and levels of oxygen and nutrients.

Human causes of climate change

Greenhouse effect	This is a natural process that warms the Earth's surface. Radiation from the Sun enters the Earth's atmosphere and is trapped inside by greenhouse gases. This radiation then warms the Earth. Without this 'blanketing' effect, the Earth would be too cold to sustain life. It is thought that without the greenhouse effect, the Earth would be approximately 33 °C colder and therefore life would not exist as we know it today.
Enhanced greenhouse effect	Recently there has been an increase in humans burning fossil fuels for energy. These fuels (gas, coal and oil) emit greenhouse gases. This is making the Earth's atmosphere thicker, therefore trapping more solar radiation and causing less to be reflected. As a result, the Earth is becoming warmer. Burning fossil fuels, agriculture and deforestation are major causes.

Physical causes of climate change

Orbital Changes	Some argue that climate change is linked to how the Earth orbits the Sun, and the way it wobbles and tilts as it does it. Together, these three orbital changes vary the distribution of the Sun's energy on the Earth. This can mean a significant impact on climate change.	 However, scientists suggest that orbital changes would not cause an ice age for at least 30,000 years.
Sunspots	Dark spots on the Sun are called Sunspots. They increase the amount of energy Earth receives from the Sun. The data shows that overall solar output, from the Sun has barely changed in the last 50 years; in fact, it has decreased slightly. Therefore, solar output cannot be responsible for the cause of the climate change seen from the 1970s.	
Volcanic eruptions	Volcanoes release large amounts of dust containing gases. These can block sunlight and results in cooler temperatures. These effects are temporary.	

Responses to climate change

Mitigation	The action of reducing the severity, seriousness, or painfulness of something.
Adaptation	Responding to changes and adjusting accordingly in order to survive.

Mitigation

Carbon Capture This involves new technology designed to reduce climate change.	**Planting Trees** Planting trees increase the amount of carbon is absorbed from atmosphere.
International Agreements Countries aim to cut emissions by signing international deals and by setting targets.	**Renewable Energy** Replacing fossil fuels based energy with clean/natural sources of energy.

Adaptation

Changes to agricultural systems: Peru's potato park has experimented with planting at higher altitudes at cooler temperatures	**Managing water supply:** By 2030, all London homes should have been offered free water-efficient devices, including aerators. Thames water has also opened a desalinisation plant

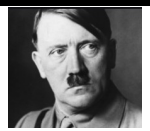
Reducing risk from rising sea levels: Flood barriers can be built, e.g. the Thames Barrier. In Bangladesh, people build their homes on top of embankments or build raised flood shelters instead.

History: Tower of London Knowledge Organiser

Norman 1066-1250	**Who and when?** Built for William I. Designed by Bishop Gundulf of Rochester. Building started on White Tower in 1080s – finished by 1100 - after William's death in 1087. **Why?** Symbol of Norman Power, built with stone brought from Caen in Normandy – wants to intimidate Saxons and prevent rebellion. Prevent invasion (Vikings). **Why there?** London becomes William's capital – changed from Winchester – shows Norman control. Protects river – able to defend against Viking invaders who could attack by sailing up the Thames. Used the site of the Roman wall - makes defences quicker. Natural defences – river, marsh land to east. **Uses:** Fortress – very strong, walls of White Tower = 90ft high 15ft thick – door is on the 1st floor with wooden staircase which can be destroyed if under attack (protects against battering rams). Construction of the Tower shows how important it was to the Normans (fear of rebellion or invasion), the engineering skill and wealth of England's new Norman rulers. **Key Buildings left?** White Tower is only remaining Norman feature.
Medieval 1250-1500 **KEY TURNING POINT**	**Changes to the site:** Henry III built the inner curtain wall. Nine towers including Lanthorn, Salt and Wakefield Towers. Started the building of the Medieval Palace – Wakefield Tower. Edward I (son of Henry III), built outer curtain wall – made the castle a Concentric Castle (walls within walls). Built rest of Medieval Palace – St Thomas' Tower. Built main entrances – Watergate (known as Traitors' Gate after Tudors) , in St Thomas' Tower; Lion, Middle and Byward Towers (main entrance). Dug the moat. Spent £21,000 on renovations (equivalent to govt spending £6.5 billion today as proportion of money available!) Shows the importance of the TofL to the King. **Key people:** Henry III and Edward I (Henry III's son), see above for the changes they made. Yeoman Warders – probably created by Henry VII 1485. Guards for the Tower. **Uses:** Palace and Fortress – dangerous, uncertain times. Medieval Palace is created in Wakefield Tower and St Thomas' Tower, Lanthorn Tower also used initially. More comfortable apartments for Royals. St Thomas' Tower housed Edward's bedchamber, had hand painted walls plaster walls. Royalty wanted comfort but needed the protection of living in a castle – shows how dangerous the times were.
Early Modern 1500-1750	**Key People:** Anne Boleyn & Katherine Howard – Two of Henry VIII's wives executed at the Tower. Lady Jane Grey, queen for 9 days, protestant put on the throne after Edward VI's death in attempt to stop Mary I becoming queen and making England Catholic- executed at the tower 1553. Guy Fawkes – member of the Gunpowder Plot, 1605 – Catholic attempt to blow up protestant King James I. Fawkes was tortured and wrote confession in Tower. **Key Uses:** Prison/place of execution (see above). Salt Tower and Beauchamp Tower have graffiti in them from prisoners. E.g. Henry Walpole – Catholic Priest, carved his name into the wall of Salt Tower. No longer used much as royal palace – safer times, monarchs move to palaces e.g. Henry VIII, Hampton Court palace – more comfortable. The type of people being imprisoned reflect the religious problems that England had in the Tudor and Stuart periods – arguments between Catholics and Protestants. Beginnings of Tourism – could bring cat or dog to feed to the lions and get in free. Only wealthy would go. **Changes to the site:** Mostly decorative **not** defensive e.g. the cupolas (decorative roofs) on top of the towers of the White Tower built by Hen VII. Queens House – Tudor building, half timbered (where Guy Fawkes was interrogated). Important because one of only a few to survive the Great Fire of London 1666.

Industrial 1750-1900 **KEY TURNING POINT**	**Changes to the site:** Salvin (see Key People) – Medievalisation, entirely rebuilt Lanthorn Tower, refaced the curtain wall, rebuilt the bridge joining St Thomas' and Wakefield Towers (medieval palace). Duke of Wellington (see Key People) – Built Waterloo Barracks. Could house 1000 soldiers built on the site of the Grand Storehouse which was destroyed by fire in 1843. Drained the moat – obsolete (no longer useful for the purpose it was built for – modern weapons) also stop spread of disease as it was filthy. Removed the animals to London Zoo. **Key People:** Anthony Salvin – Architect (gothic revivalist) who restored parts of the Tower. Believed in medievalisation (restoring the Tower so it looked like it did originally). Encouraged tourism at the site Duke of Wellington – Constable of the Tower 1826-1852. Wanted the tower to be a military site. Disliked tourism. Famous military leader who defeated Napoleon at Battle of Waterloo 1815. Was twice Prime Minister whilst constable of the Tower. **Uses:** Military site – Wellington updated the tower for modern warfare – Waterloo Barracks & drained moat. British Empire at its height – Britain needed a strong army Tourist site: Industrial revolution means transport – people can visit & more free time. 500,000 visitors per year by 1900. Britain's pride in its Empire increases interest in Britain's glorious past.
1900-Present	**Changes to site**: WWI: Temporary rifle range added in outer ward. Ticket offices built just outside the Tower. Shop and Cafes built e.g. White Tower Shop (basement of White Tower sells gifts and souvenirs; Ravens Shop – sells toys and dress up for children. **Key People:** Carl Lody – One of 11 German spies imprisoned and executed at the Tower of London during WWI, Josef Jakobs – German Spy during WWII – last person executed at the Tower, 1941. Cray Twins – East End gangsters, imprisoned at the Tower for a few days for failing to turn up for national service, 1952. **Uses:** Tourist site: 2.9 million visitors in 2019 - most visited paid site in London. Visited by people form across the country and world. Yeoman Warders now act as tour guides. Education: reduced rates for school visits to encourage education; re-enactment shows (e.g. dramatisation of death of Anne Boleyn), free learning resources produced for schools. Conservation: run by an independent charity (Historic Royal Palaces) – charges entry fees. Money is used to protect and conserve the building. Not all of the site is open to visitors e.g. Byward Tower has medieval wall painting – too fragile to allow public in. Art/Public events: Poppies in the Moat to commemorate the start of WWI and Flamming Torches in the moat to commemorate the end of WWI – both created by artist Tom Piper
Comparison with other sites	**TofL is typical (same as other sites):** Most Norman castles now tourist sites – Beaumaris, Dover, Exeter, Totnes. All are preserved in some way and open to the public for entertainment/education. Others have been used as a place for art installations (TofL – poppies in the moat to commemorate outbreak of WWI similar to Shrouds of the Somme in the gardens of Exeter Castle - commemoration of the dead at the battle of the Somme or Dragons in the Moat at Beaumaris Castle. Original purpose is typical – built for defence and status – to intimidate the Saxons, as symbols of Norman rule and power. It is not unique in its continued use – Dover Castle has also has been in constant use throughout its history, including having a major role in WWII, like TofL. **TofL is not typical (different from other sites):** Most of Norman castles were motte and baileys e.g. Totnes, Exeter etc. Vast majority are ruins and quickly fell out of use e.g. Rochester Castle. Beaumaris was never even finished. It is a UNESCO world heritage site – only 35 in UK. White Tower is identified by UNESCO as a Norman keep 'par excellence' (best example). More significant than other sites at all points in its history. Situated in London – at centre of government. It is a Royal Palace – home to kings and Queens, not just owned by them. Medieval palace made TofL the first example of a fortress palace. This was copied all over Britain and Europe. Far more visitors – approx. 3 million per year, Dover Castle has 350,000, Beaumaris only has 41,000.

Knowledge Organiser 1—Nazi Germany—Democracy to Dictatorship 1933-34

Key People		Role
Adolf Hitler		Leader of Nazis since 1921, wrote Mein Kampf, imprisoned in 1923 for failed uprising.
Joseph Goebbels		Head of propaganda, used media such as film/radio to spread ideas. Showed Hitler as God.
Ernst Rohm		Leader of the SA (brownshirts), Hitler's private army, used to attack communists and intimidated voters.
Heinrich Himmler		Leader of the SS (blackshirts), elite soldiers & fanatical Nazis, helped control Germany including running con-

Nazi Beliefs	Explanation
Scrap Treaty of Versailles	Blamed Germany for WW1. Made Germany pay huge amounts in reparations—Links to the Stab in the Back myth.
Brot und Arbeit	Bread and Work. Destroy communism—middle classes were frightened of communism.
Conquer Lebensraum	Living Space—Germany needs to be bigger to feed its people by expanding into Eastern Europe.
Aryanism	Northern Europeans were the Master Race/ ubermenschen but others such as Jews, Slavs were subhuman/untermenschen
Nationalism	Germany is the best and should be run by Germans

Key Word	Definition
Reichstag	German Parliament
Enabling Act	Passed March 1933. Meant Hitler could pass laws without the approval of the Reichstag.

Steps to Power

Date	Event	Details	Impact
30th Jan 1933	Hitler becomes Chancellor	Nazis win the November elections. Hitler becomes Chancellor = PM	Still limited power due to Democracy, Hindenburg, political parties and the army who hate him.
27th Feb 1933	Reichstag Fire	Parliament burns down. Communist van der Lubbe blamed. Blamed on Communist plot—**Reichstag Fire Decree** passed. Restricts civil liberties, speech. 4000 communists arrested and meetings banned	Removed significant political opposition by removing communists. Restricts freedoms of ordinary citizens.
March 1933	Enabling Act	Parliament votes 444 votes to 94 to allow Hitler to pass laws **without the Reichstag**,	Germany is now a **dictatorship.**
March-July 1933	Gleichschaltung	Bringing Germany into line. **1—Civil Service Act** (remove civil servants from jobs such as teachers, judges). **2—Encouraging Anti-Semitism** (Boycott Jewish businesses & sack Jewish doctors). **3—Book Burning** (25000 non-approved books destroyed) **4—Terror** (Dachau concentration camp opened, 100000 arrested).	Gradual reduction in freedoms and restrictions on certain groups in society increasing the control of central government and removing opportunities for opposition.
May 1933	Removing Opposition	Trade Unions Banned. Nazis create own group **German Labour Front**. Other **political parties banned** and no new political parties permitted.	No workers representation. All opposition is now banned and outlawed.
June 1934	Night of the Long Knives	Hitler wanted support of Army who are fearful of SA's 3 million members. Ernst Rohm killed and thousands arrested by the SS. 85 killed in total	Hitler gains support of army. Reduces power of SA. SS grow in power. Fear within Germany grows.
August 1934	Hindenburg dies	Technically could have removed Hitler as Chancellor but unlikely. Hitler combines role of Chancellor & President to Fuhrer.	Not the most important step to power as Hindenburg was not that restrictive.

Knowledge Organiser 2—Nazi Germany—Control and Opposition 1933-39

Key People		Role
Joseph Goebbels		Head of propaganda, used media such as film/radio to spread ideas. Official title was Head of the Ministry of Public Enlightenment.
Heinrich Himmler		Leader of the SS (blackshirts), elite soldiers & fanatical Nazis, helped control Germany including running concentration camps.
Martin Niemoller		Protestant Pastor set up Confessional Church in direct opposition to Nazis Reich Church.

Nazi control through fear

Method	Explanation
SS	Elite force of Nazis. Had 52,000 members and all pure Germans and Aryan. Rose to power during Night of the Long Knives & by 1936 were in charge of police. Loyal to Hitler & ran concentration camps.
SD	Intelligence gatherers to identify actual or potential enemies of the Nazis. A series of spies who sent information to the Gestapo.
Gestapo	Secret Police. Spied on the public & investigated any threats. 15,000 members. Opened post, listened to conversations. Used Block Wardens and Informers to get civilians to spy on their neighbours. Tortured people to get confessions.
Judges & Courts	Judges swore oath of loyalty to Hitler. Changed laws so 46 crimes now punishable by death instead of 3. No jury in courts, predetermined sentences. 40,000 sentenced to death.
Concentration Camps	Purpose to imprison and re-educate the Nazis' political enemies. First camp opened in Dachau in March 1933. 70 camps opened and run by SA but disorganised so taken over by SS in June 1933. Harsh punishments introduced including flogging and withholding food. By 1939 21,000 held in concentration

Nazi control through propaganda

Method	Explanation
Newspapers	By 1939 two thirds of all newspapers controlled by Nazis. E.g. Der Sturmer. **Editor's Law** controlled content of what was written.
Radio	Best method of mass communication as no TV's. All stations part of the **Reich Radio Company** where all output was controlled by Nazis. Played Nazi speeches, folk music and classical music that Hitler liked, no jazz or Jewish music. By 1939 70% of German population had cheap radios, **The People's Receiver**
Rallies	Hundreds of Thousands of people in one place listening to speeches, marches and mock battles. **Nuremburg Rally** was the largest with 250,000 attending in 1934.This was filmed and showed repeatedly across Germany.
Berlin Olympics	Held in **1936** and used to showcase to the world the Nazi state. Nazis only put forward Aryan athletes and did win most medals but African American Jesse Owens also won 4 medals.
Film	All films controlled by **Reich Film Chamber**. 66% of films paid for by state, very little foreign film. Messages were subtle and focused on romance and strength rather than open propaganda.

Attempts to Oppose the Nazis

Group	Method of Opposition	Outcomes
Social Democrats	Made anti-Nazi posters and leaflets	1200 arrested in Ruhr alone. Relatively unsuccessful.
Communists	Met in secret and produced newsletters, posters and leaflets. Red Flag published monthly and printed 10,000 copies. **George Esler** tried to kill Hitler 1939	Unsuccessful assassination attempt. Executed after 5 years in Dachau. Other communists hunted by Gestapo.
Church	Neimoller—refused to join Reich Church. Founded non-Nazi Confessional Church—3xsize of Reich Church	800pastors arrested including Niemöller and sent to concentration camps.
Youth Groups	Edelweiss Pirates—fought Hitler Youth, sang songs, refused to join Hitler Youth.	Some Pirates arrested and hung publicly to put others off.
	Swing Kids—listened to jazz and swing music, dressed differently.	Swing kids sent to concentration camps by Gestapo.

Knowledge Organiser 3—Nazi Germany—Changing Lives 1933-39

Working Life

Employment	1933—6 million unemployed. Reduced to 35,000 unemployed.
Small Craftsmen	**Law to Protect Retail Trade** introduced 1933. Aim to protect small craftsmen but number of artisans actually fell.
Peasants	Farm workers promised protection but rural population fell from **21% to 18%**
Factory Workers	46% of workers employed in factories. Higher wages but prices up also so not always better off.
Trade Unions	Abolished in 1933 so DAF set up in place. **29 million members** by 1939. Included **Strength through Joy** provided cheap holidays, theatre tickets, 50% discount on hotels. **Beauty of Labour**—group aimed to improve workplace with new toilets, showers etc. Included savings scheme to purchase a VW car. Paid 5 marks per week—no one got a car.

Women

The ideal Nazi woman	Does not smoke; appear natural; unprovocative dress; cook; physically robust; be a member of the **National Women's League,** had 2 million members—gave advice on cooking, cleaning and childcare
Encouraging Motherhood	Loans to Aryan couples for women who gave up their jobs. Amount owed would reduce for every child they had. **250,000** loans in **1934**
	Divorces were made easier so more children could be had with new partners
	Only 10% of women permitted to attend university
	Honour crosses given for number of children born—**Gold cross = 8 children**
Impact	Marriages increased by **50% by 1939**
	Birth rate initially rose but then fell—**3.6 to 3.2 children per couple**
	Extra number of jobs meant women in work increased by **0.3 million** and in industry in particular by **0.6 million.**
	Number of women in uni fell but plan **backfired** when educated women needed during war

Control of Young People

Education	Control Teachers	Must be Nazi party supporters. Jewish teachers sacked. 13% headteachers in Berlin sacked. **Nazi Teachers League** formed—97% teachers joined. Children spied on teachers for Gestapo.
	Control Schools	Specialist **Military Schools** set up by SS teaching war education. **Adolf Hitler Schools** set up for students to become future leaders—selection on physical and racial attributes—only 6000 attend
	Control Curriculum	Old textbooks destroyed—new curriculum. **History**—based on war and nationalism, blamed WW1 on Jews. **Geography**—based on Lebensraum for German people. **Biology**—based on race & identifying suitable Aryan partners. **PE**—increased & vital for war-ready people.
Youth Organisations	Hitler Youth	Controlled leisure time. Compulsory after **193**6. No other youth groups available. Focused on map reading, parades, marching, shooting, brainwashing & PE
	League of German Maidens	Controlled leisure time. Compulsory after **193**6. No other youth groups available. Focused on nursing, cooking, cleaning, singing, dancing.

Persecution of the Jews

Myths Taught	Jews were rich, taking money from Germans, cowards and communists.
Social Exclusion	Shops refused to be served in shops, restaurants etc.
Physical Persecution	Jews beaten up or intimidated
Publications	Newspapers like **Der Sturmer** published anti-Jewish cartoons & articles
Kristallnacht	**November 1938**—Nazis supported attacks on Jewish property by SA/SS. **267** synagogues destroyed; **7500** businesses destroyed; **30,000** Jews arrested.
Nuremburg Laws	Passed September **1935**—Jews no longer citizens of Germany; marriage between Jew and non-Jew illegal. **November 1938**—Jews not allowed to run most businesses. **Sept 1939—**Jews cannot leave home after 8pm
Emigration encouraged	282,000 Jews leave Germany by 1939. After 1939 it's too late

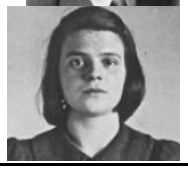
Knowledge Organiser 4—Nazi Germany—Germany in War—Impact on the People 1939-45

Key People

Albert Speer

Minister for Armaments and War Production from 1942. Responsible for reorganisation of factories and the economy to ensure production of essential products for war.

Sophie Scholl



Leader of **White Rose Group** who opposed Nazis during war. Arrested and tortured by Gestapo. Executed.

Impact on lives 1939-42

Impact

Immediate

Stockpiled food.

Blackouts enforced.

Children sent to the country.

Sandbags distributed to all homes.

War Economy

Huge amounts of weapons , ammunition, tanks etc. required.**55% workers** employed in war factories.

Military spending **doubled**, 1939-41

December 1939 Hitler announced Germany in war economy

Factories not efficiently producing goods. **1942 Albert Speer** put in charge—gave factories independence from gov. Central Planning Board set up—factories make one product only, women employed as workers, used concentration camp inmates as labour. Resulted in **10x more tanks** and **4x more aircraft** between 1940-44.

Impact on civilians

Shortages of coal & wood & electricity made cold winters worse

Rationing of food introduced—quantities of food based on age, work and race.

Women—now had male role and mother role to do. Restrictions on higher education lifted. If under age 25 had to do **6 months** farming.

Bombing—RAF begin bombing 1940—**air raids 3x per week**. Evacuation encouraged but only **40,000 out of 260,000 children** went from Berlin

Overall: limited impact at this stage. Would get *much* worse after 1942—Total War

Wartime Opposition

Group	What Happened	Successful?
Assassination Attempts	War going wrong from 1942. **4 attempts** e.g. July Bomb Plot **1944**. Von Stauffenberg & General Beck panned **Operation Valkyrie** to kill Hitler in bunker with bomb and overtake gov.	Failed. Hitler protected by leg of table. 7000 arrested, 5000 executed
Public Criticism	**Cardinal Galen** (Catholic) delivers 3 sermons, 1941. Criticises Gestapo and killing disabled children. **Lion of Munster**. Sent out leaflets also criticising.	Survived—too well known to kill. Could have become a martyr
	Dietrich Bonhoffer—Protestant pastor (minister) joined underground resistance. Organised escape of Jews to Switzerland.	Arrested but preached in prison—killed in concentration camp
Youth Opposition	**White Rose Group** led by **Hans and Sophie Scholl**—printed & distributed leaflets at Munich University. **9000** leaflets sent.	Arrested, tortured and faced People's Court. **Executed** by guillotine
Passive Resistance	Graffiti on walls after 1942 suggesting Germany was losing the war. **Non-violent opposition**—not saying 'heil Hitler,' listening to BBC, hiding Jews.	Difficult to find but when did, severe punishment

Total War 1939-45

War turned against Germany 1943—defeat at **Stalingrad** and **Northern Africa.** Goebbels and Hitler decided Total War needed

Impact on German People	Women in work—**3 million** called to work but only **1 million** turned up. Non-war activity ended—magazines closed, sports clubs closed, more propaganda. **Increase air raids**—more civilian deaths **Hamburg** (1943) **40000** dead, **Berlin**: **500,000** homeless, 100,000 injured.
Desperation	From 1944 war got even worse. Hitler salute made compulsory. **500,000** workers made soldiers. **Volkssturm—**all males aged 16-60 had to fight regardless of health or fitness—no uniform & old rifles
Chaos **1945**	War almost lost. Rationing not working—food shortages. Women prostituting for food. No surrender. 90,000 women raped. **30th April** Hitler commits suicide. Surrender **9th May 1945**

Knowledge Organiser 5—Nazi Germany—Germany in War—Occupation 1939-45

Experiences of Occupation

Poland

Occupied in **1939.** Aim to **totally remove Polish culture**. 100,000's expelled and replaced by pure Germans. **Hans Frank** in charge of occupation of Poland—brutal ruler. Schools and Universities **closed. 30,000** educated Poles executed.

1.5 million deported. Sexual relations with Germans banned. Jews put in ghettos. **3million (85%)** of Polish Jews dead by 1945

Many non-Jews also killed—**1.9 million Slavic Poles** killed.

HOWEVER Poland saw largest rebellions against Nazis e.g. **2 month Warsaw uprising**

Poland targeted so much due to Nazi racial beliefs. Saw all Polish people as

Netherlands

Occupied in **1940**. Same ethnic background as Germans. Better treatment—than in the East e.g. government workers could **keep their jobs**. Dutch generally **complied** with Nazis e.g. completing forms to prove not Jewish.

After **1941** things got worse. **425 Jews** deported, communists went on strike—shot by Germans.

1943—Jews must wear Star of David badge, **107,000** deported. 75% of Jews from the Netherlands were murdered. Jews in the West were treated basically the same as those in the East (Poland)

1943—**300,000** Dutch sent to work in **German** factories.

Resistance—**300,000** went into hiding to avoid being sent to Germany. **20,000** resistance members arrested—**10%** of those shot.

The Holocaust

Definition: The systematic attempt to kill all of Europe's Jews. In total approx. **6 million** Jews were killed.

1st Solution **1938-39**		Force Jews to leave. Austria—**110000** out of **192000** Jews left. Beaten, humiliated by scrubbing pavements or cleaning toilets. SS **looted** all valuable possessions. Called **Vienna Model**
2nd Solution **1939-41**		Concentration in **ghettos.** Too many Jews in Poland to leave so put in walled areas of cities. Largest was **Warsaw—445000** people in **2%** of cities land. Disease like typhus spread rapidly. **140000** died in Warsaw alone.
Final Solution **1941-45**	Phase 1: **Einsatzgruppen** (Killing Squads)	Mobile killing units sent in to round up and kill suspected Jews as Nazis expanded into Eastern Europe. Captured Jews expected to dig own grave. **Four Mobile Units** (A, B, C, D) with approx. 1000 men. **1 million** Jews killed this way.
	Phase 2: **Death Camps**	Began with exhaust fumes in locked lorries in town of Lodz but slow. New death camps created at **Auschwitz & Treblinka**. Run by SS. Gas chambers constructed for **mass killing**. **Heydrich and Eichmann** ran camps. Gas was **Zyklon B. 12000** killed per day at Auschwitz alone.

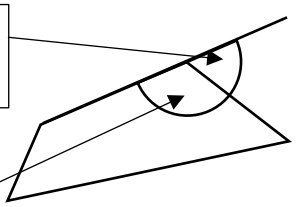
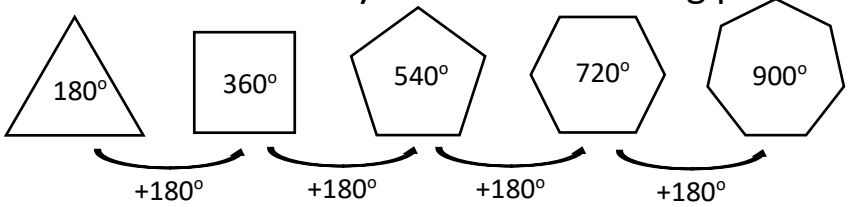
Collaboration, Accommodation and Resistance

France	Mixed. South (**Vichy France)** collaborated—handed over Jews and escaped prisoners. **Northern France** largely accommodated. Some resistance like listening to BBC or destroying German railways. **70000** Jews handed over to Nazis. **Andre Trocme** hid Jews help them escape deportation; **Coco Chanel** had relationship with Nazi military intelligence officer.
Poland	Largely **resisted** Nazis. Army fought hard before being defeated. People rescued **over 450000 Jews** and got them to safety. **Warsaw Ghetto Uprising** lasted 2 months—fought against the Nazis despite being totally outnumbered.
Latvia	**Collaborated** with Nazis. **Latvian Security Police** set up to look for Communists and Jews. **50%** of Jews in Latvia murdered (**26,000**) All done voluntarily—not forced by the Nazis.

Key Words

Accommodation	Those countries controlled by the Nazis who did as they were told but did not actively help the Nazis.
Collaboration	Those countries who worked with the Nazis and helped them rule.
Resistance	Those countries who tried to fight back against the Nazis.

Y10C3 Maths Foundation Key knowledge

Item	Description
Gradient	*The amount a straight line goes up or down for every unit it moves to the right.*
Gradient	$gradient = \frac{change\ in\ y}{change\ in\ x}$
Y intercept	The place where a line crosses the y axis.
The general equation of a straight line	$y = mx + c$ m is the gradient c is the y intercept
Interior and Exterior angles	The **exterior angle** formed outside a polygon by extending a side. The **interior angle** of a polygon 
The interior angle sum of a polygon	The interior angle sum for a polygon depends on the number of sides. They form the following pattern: 
The exterior angle sum of a polygon	Exterior angles always add up to 360°
Transformation	There are 4 transformations at GCSE. They are **Rotation**, **Reflection**, **Transformation**, & **Enlargement**
Describe fully	Command words that are asking for all information about a transformation **including the name**.

Rotation	Reflection	Transformation	Enlargement
• Angle • Direction • Centre of rotation	• Mirror line	• Vector $\begin{pmatrix} x \\ y \end{pmatrix}$	• Centre of enlargement • Scale factor

Y10C3 Maths Higher Key knowledge

Item	Description
Median and quartiles	The **median** is the **middle** value of an ordered list **Quartiles** split the list into **quarters**. 4, 5, 7, 11, 15, 20, 25, 26, 27 Lower quartile 6 — Median 15 — Upper quartile 25.5
Interquartile range	$\boldsymbol{Interquartile\ range = Upper\ quartile - Lower\ quartile}$
Cumulative frequency	The running total of frequencies
Tangent to a curve at a point	The **straight line** that "just touches" the curve at that point.
Speed and velocity	Speed is the distance travelled in a given amount of time. Velocity describes a **speed and** a **direction** of travel.
Velocity	Velocity is the **gradient** of a distance-time graph.
Acceleration	Acceleration is the **gradient** of a velocity-time graph.
Distance travelled	Distance travelled is the **area** under a velocity time graph.
Histogram	A histogram is similar to a bar chart. The number of items in each bar is represented by the **area of the bar**, not the height (as with a bar chart).
Frequency density	The height of a bar in a histogram. Given by $\boldsymbol{Frequency\ density = Frequency \div Classwidth}$
Composite function	A composite function is a function made of more than one function. For example, $fg(x)$ represents a function made of the f and g functions. $x \rightarrow g(x) \rightarrow f(x) \rightarrow fg(x)$
Inverse function	An inverse function is a function that "reverses" another function. For example, $f^{-1}(x)$ reverses $f(x)$

RPE: Worldviews in Britain knowledge organiser

Purpose of life

Buddhists: the meaning of life is to become **enlightened**; life is full of **suffering** (**sukkha**) caused by **desire** and **craving**

Christians : the purpose of life is to love God and your neighbour

Hindus: By breaking free from reincarnation, Hindus believe they achieve union of the soul (atman) with the supreme spirit or God, Brahman

Jews: God made a covenant (agreement) with the Jewish People;
their duty is to fear God and keep his commandments

Muslims: life is a test which determines if whether people go to paradise or hell

Sikhs: life is an opportunity to meditate on the wonder of God and the aim of life is to promote peace, equality and positive action.

Atheism

Atheism is a lack of belief in a God or gods. A person who does not believe in any kind of god or gods is called an *atheist*.

Multiculturalism

Multiculturalism: A community made up of different cultures, ethnic groups and religions.

Prejudice – a negative idea about someone based on a stereotype

Discrimination – treating somebody different because of a prejudice

Religious festivals

A religious festival is **a time of special importance marked by followers of that religion**.

Christmas -**Birth of Jesus**
Easter -**Death and resurrection of Jesus**

Eid ul-Adha -**Festival of Sacrifice**
Eid ul-Fitr -**Festival of Breaking the Fast**
Ashura- -**Festival of Remembrance**

"Mutual respect for and tolerance of those with different faiths and beliefs and for those without faith"

Humanism

Humanism is not a religion. Humanism is all about not having a religion.

Humanist makes their ethical decisions based on reason, empathy, and a concern for human beings and other sentient animals.

Its believes that, human beings can act to give their own lives meaning by seeking happiness in this life and helping others to do the same.

State religion: the official religion of a country

Multifaith- the many worldviews within a community

Homeostasis - Nerves

Homeostasis means to maintain a **stable internal environment**, including water and ion levels, temperature and glucose levels. These are regulated by automatic control systems in our body.

Negative Feedback

This is the mechanism that keeps your internal body conditions constant. If the levels of something get too high or too low your body brings it back to normal.

Level too high

↓

Detected by a **receptor**

↓

Coordination centre receives, process the information and organises a response

↓

Response produced by the effector. This counteracts the change, returning the **level back to normal**.

Level too low

↓

Detected by a receptor

↓

Coordination centre receives, process the information and organises a response

↓

Response produced by the effector. This counteracts the change, returning the **level back to normal**.

Sometimes the body overcompensates (ie. level starts too high but the response makes the level too low). This is not a problem because negative feedback starts again.

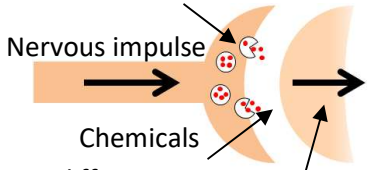
Nervous System

This allows your body to detect and react to its surroundings.

- **Central nervous system (CNS)**. This is the brain and spinal cord. It co-ordinates the response
- **Sensory neurones** carry electrical impulses from receptors (cells that detect stimuli, eg. light receptors detect light) to the CNS.
- **Motor neurones** carry electrical impulses from the CNS to effectors
- **Effectors** are muscles and glands. They respond to electrical impulses.

Synapses

This is the connection between two neurones. Electrical signal causes chemicals to be released into the synapse.



The Reflex Arc

The reflex arc helps to protect your body. The neurones go through the **spinal cord** or **unconscious** part of the brain. This means the response is very quick. The pathway the electrical impulse takes is:

eg. a bright light or hot object.

Stimulus → Receptor → Sensory neurone → Relay neurone → Motor neurone → Effector → Response

A muscle contracts (eg. to pull your hand away from a hot object), or a gland releases a hormone.

eg. a light receptors in the eye, touch receptors in the skin.

This is in the spine or unconscious part of the brain.

Can be a muscle or a gland.

Homeostasis - Hormones

Hormones (Endocrine System)

Hormones are **chemicals** that are released into the blood by glands. They act on a target organ and can have long lasting effects.

Pituitary gland: releases many hormones that act on other glands, causing them to release hormones in turn.

Thyroid: produces thyroxin which regulates metabolism, heart rate and temperature.

Adrenal gland: produces adrenaline (fight or flight hormone).

Pancreas: produces insulin which regulates blood glucose levels.

Ovaries: produce oestrogen which helps regulate the menstrual cycle.

Testes: produce testosterone which control puberty and sperm production.

Nerves vs Hormones

Nerves	Hormones
Electrical impulses	Chemical messages
Carried by neurones	Carried in the blood
Fast acting	Slower action
Act for a short time	Act for a long time
Act on a precise area	Act on a more general area

Controlling Blood Glucose levels

Blood glucose levels are controlled by negative feedback. The pancreas is the organ responsible for controlling glucose levels by secreting the hormones insulin and glucagon.

Too much glucose

↓

Pancreas releases **insulin**

↓

Liver converts glucose into **glycogen** (which can be stored in the liver or muscles)

↓

Blood glucose returns to normal

Too little glucose

↓

Pancreas releases **glucagon**

↓

Liver converts **glycogen** into **glucose**

↓

Blood glucose returns to normal

Diabetes

This is a condition where your body is unable to control blood glucose levels properly.

Type 1: The pancreas produces too little insulin meaning blood glucose levels can rise too high. Insulin injections are needed and the person may have to avoid sugary foods. Insulin injections are an effective treatment for type 1 diabetes.

Type 2: The person becomes resistant to their own insulin. Obesity increases your chance of developing type 2 diabetes. A person can help control type 2 diabetes by exercising and controlling the amount of carbohydrates they eat.

Biology: Respiration

Keywords

Aerobic respiration	Breaking down glucose with oxygen to release energy and producing carbon dioxide and water.
Anaerobic respiration	Releasing energy from the breakdown of glucose without oxygen, producing lactic acid (in animals) and ethanol and carbon dioxide (in plants and microorganisms).
Breathing	The inflation and deflation of the lungs.
Fermentation	Yeast anaerobically respiring to produce ethanol and carbon dioxide.
Lactic acid	The mild poison made during anaerobic respiration.
Glycogen	A carbohydrate store in animals.
Oxygen debt	The extra oxygen that must be taken into the body after exercise has stopped to complete the aerobic respiration of lactic acid.

Aerobic Respiration

glucose + oxygen → carbon dioxide + water

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

Respiration is the chemical process of turning glucose and oxygen into carbon dioxide and water. It releases energy and is controlled by enzymes. Respiration is an exothermic process.

Anaerobic Respiration

glucose → lactic acid

$$C_6H_{12}O_6 \rightarrow C_3H_6O_3$$

Anaerobic respiration releases energy in the absence of oxygen. It is much less efficient than aerobic respiration. It produces a poisonous waste product called lactic acid, which can be removed by reacting it with oxygen.

Lactic acid + oxygen → carbon dioxide + water

Effect of Exercise

Heart rate: increases and the arteries to your muscles dilate. This has the effect of increasing oxygen and glucose supply and increasing carbon dioxide removal.

Breathing rate and volume: increases and you breathe more deeply. You breathe more often and also bring more air into your lungs in each breath. This increases the rate of oxygen uptake and carbon dioxide removal.

Temperature: increases. Respiration is an exothermic reaction and some energy is lost as heat.

Glycogen stores: decrease. Glycogen is converted back into glucose to supply the cells with the fuel they need for increasing cellular respiration.

Metabolism and the Liver

Metabolism is the sum of all the chemical reactions that take place in a cell or in the body.

The liver has many different roles:

1. Detoxifies substances such as the ethanol from alcoholic drinks.
2. Breaks down products into the blood so they can be excreted in urine via the kidneys.
3. Breaks down old, worn out blood cells and stores iron until it is needed.

Metabolism and the Liver

The liver also deals with the lactic acid produced in anaerobic respiration. The blood transports the lactic acid to the liver. Here, it is converted back into glucose, which is then broken down in aerobic respiration to form carbon dioxide and water. If the glucose isn't needed, it can be stored as glycogen in the liver.

Respiration

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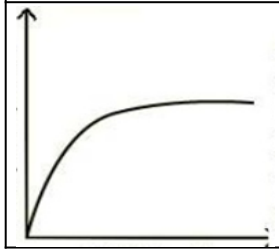
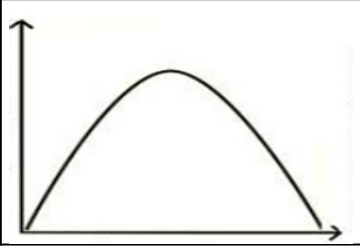
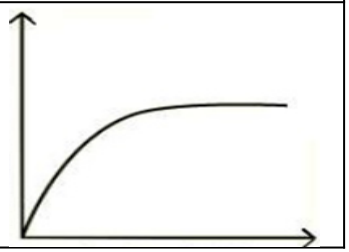
Biology: Photosynthesis

Keywords	
Limiting Factors	Thing that reduce the rate of reaction
Photosynthesis	The process by which plants make food using carbon dioxide, water and light
Chloroplasts	The organelles where photosynthesis takes place
Chlorophyll	The green pigment contained in the chloroplasts

Light intensity	Temperature	Carbon dioxide levels
Lots of light = lots of photosynthesis. Not much light = not a lot of photosynthesis	Affects chemical reactions. The rate of photosynthesis will increase up to 40°C. After this, enzymes needed for photosynthesis are denatured.	CO_2 is the raw material for photosynthesis. There is only 0.04% CO_2 in the atmosphere. More CO_2 = photosynthesis increases
		

Photosynthesis

Plants and algae have evolved to harness the energy of sunlight and use it to make the sugar glucose in a process called **photosynthesis.** Chloroplasts are the organelles responsible for photosynthesis, they contain the green pigment chlorophyll.

Carbon dioxide + Water → Oxygen + Glucose

$$6CO_2 + 6H_2O \rightarrow 6O_2 + C_6H_{12}O_6$$

Algae

Algae are small photosynthesizing plants you find in water. They are adapted to photosynthesis in aquatic conditions. They absorb the CO_2 they need from the water around them

Leaf Adaptations

Large surface area: to absorb as much sunlight

Thin: short distance for diffusion

Chlorophyll: green pigment in chloroplasts necessary for photosynthesis

Stomata: allows the diffusion of gases into and out of the leaf.

Xylem: (plant veins) supply plenty of water to the leaf.

Using Glucose

Glucose: a small, simple, soluble sugar made during photosynthesis and used for respiration.

Starch: an insoluble polymer (chain) of glucose. Glucose must be converted to starch for storage.

Cellulose: a complex carbohydrate made from glucose to strengthen cell walls.

Amino acids: the building block of proteins, made by combining glucose with nitrate ions from the soil.

Fats & oils: made from glucose, used to strengthen cell walls and as an energy store.

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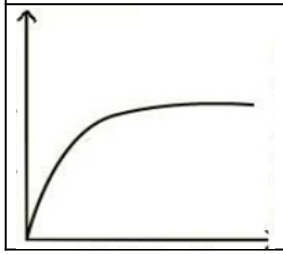		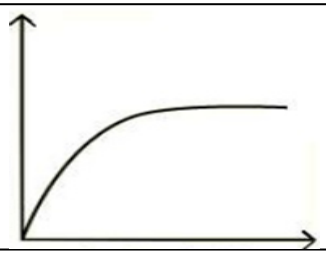

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AQA GCSE Chemistry (Combined Science) Unit 7: Organic Chemistry Knowledge Organiser

Crude Oil

Hydrocarbons are compounds that are made up of the elements **hydrogen** and **carbon** only.

Crude oil is a **non-renewable resource**, **a fossil fuel**. Crude oil is made up of a mixture of compounds, most of which are long- and short-chain hydrocarbons.

Most of the compounds in crude oil are hydrocarbons called **alkanes**. The alkanes form a **homologous series**. This is a family of hydrocarbons that all share the **same general formula** and have **chemical properties** that are **similar**.

Alkanes are held together by **single bonds**.

The general formula for an alkane is C_nH_{2n+2}.

They differ from the neighbouring alkane with the addition of a CH_2.

Alkanes are **saturated hydrocarbons**. This means that all their bonds are taken up and they cannot bond to any more atoms.

Alkanes have **similar chemical properties** but have **different physical properties** due to differences in chain length. The longer the chain, the higher the boiling point of the hydrocarbon.

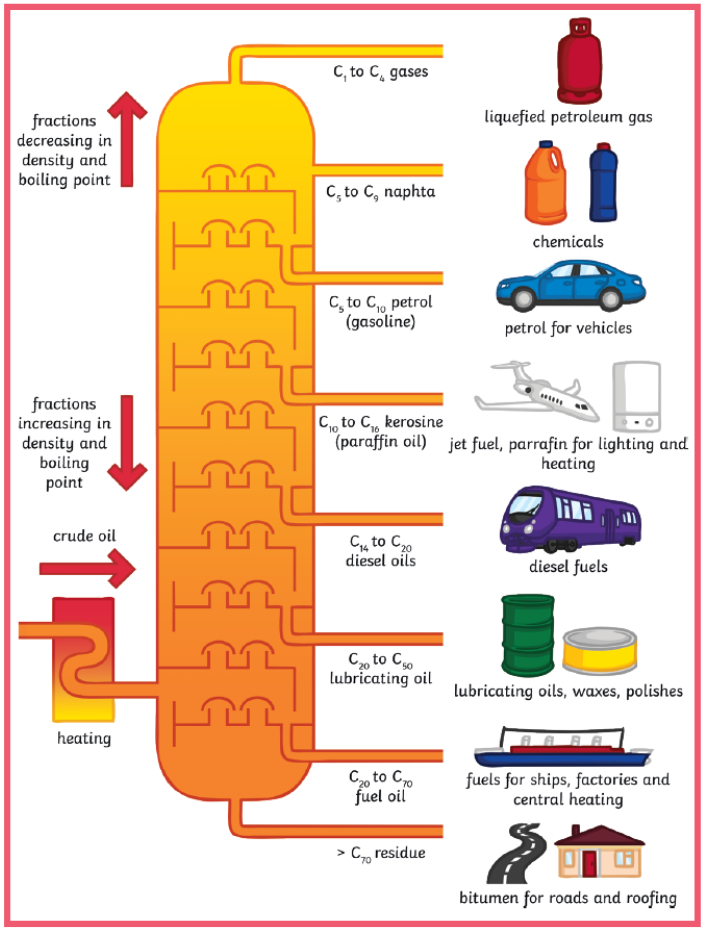
The first four alkanes are: methane, ethane, propane and butane.

A mnemonic to help you remember the order of the alkanes: **m**ice **e**at **p**aper **b**ags.

Fractional Distillation

Fractional distillation is used to **separate** a mixture of long-chain hydrocarbons in crude oil into smaller, more useful fractions.

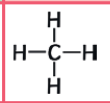
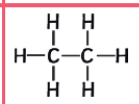
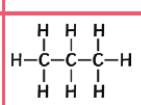
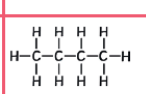
Hydrocarbons have different boiling points depending on their chain length. **Each fraction contains hydrocarbons of a similar chain length**. These fractions will boil at different temperatures due to the difference in sizes of the molecules. The different parts of crude oil are called fractions because they are a small part of the original mixture.



Crude oil is heated and enters at all column called a **fractioning column**. The column is **hot at the bottom** and decreases in temperature toward the top. As the crude oil is heated, it begins to evaporate and its vapours begin to rise up through the column. These vapours condense at the different fractions.

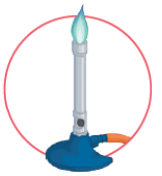
Short-chain hydrocarbons are found at the **top** of the column. This is because shorter chain molecules are held together by **weak intermolecular forces** resulting in low boiling points. These shorter chain hydrocarbons leave the column as gas.

Long-chain hydrocarbons are found at the bottom of the column and are held together by **strong intermolecular forces**, resulting in high boiling points.

Name of Alkane	Structural Formula	Molecular Formula
methane		CH_4
ethane		C_2H_6
propane		C_3H_8
butane		C_4H_{10}

Combustion

Complete combustion occurs when there is **enough oxygen** for a fuel to burn. A hydrocarbon will react with oxygen to produce carbon dioxide and water.



Incomplete combustion occurs when there **isn't enough oxygen** for a fuel to burn. The products in this reaction are water and poisonous **carbon monoxide**.

AQA GCSE Chemistry (Combined Science) Unit 7: Organic Chemistry Knowledge Organiser

Cracking

Cracking is an example of a **thermal decomposition reaction. Long-chain** hydrocarbons can be **broken** down into **shorter**, more useful hydrocarbon chains.

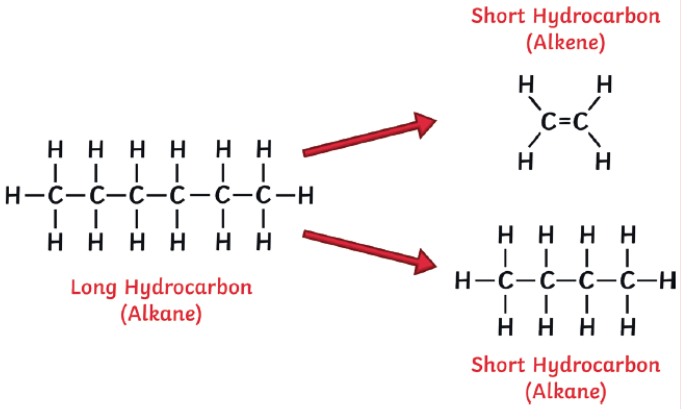
Cracking can be carried out with a catalyst in **catalytic cracking** or with steam in **steam cracking**.

Catalytic cracking involves heating a hydrocarbon to a high temperature (550°C) and passing over a hot catalyst.

Cracking of a long-chain hydrocarbon **produces** a **short-chain alkane** and an **alkene**.

Alkenes are another type of hydrocarbon that is double bonded. The general formula for an alkene is C_nH_{2n}.

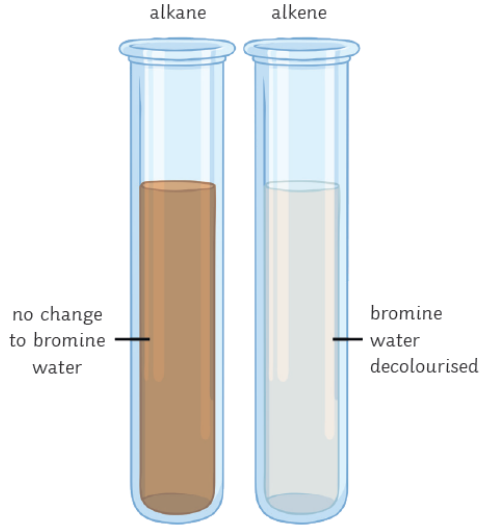
Alkenes are **unsaturated hydrocarbons**. In a chemical reaction, the double bond of the alkenes can break. This allows other atoms to bond to it.



Test for Alkanes

Bromine, when added to an **alkane**, will **remain brown/orange**. Alkanes are saturated hydrocarbons, they have no double bonds which could be broken to accept the bromine molecule and so remain orange.

Bromine, when added to an **alkene**, will **change from brown/orange to colourless**. This is because alkenes are unsaturated hydrocarbons. The double bond breaks and the bromine molecule is accepted.



Making Polymers

The fractional distillation of crude oil and cracking produces an array of hydrocarbons that are key to our everyday lives.

Alkenes are used to produce plastics such as poly(ethene) which is used to make plastic bags, drinks bottles and dustbins. Poly(propene), another polymer, forms very strong, tough plastic.

Short-Chain Molecules	Increasing Chain Length →	Long-Chain Molecules
	As chain length increases, the **boiling point** of the hydrocarbon chains also increases. →	
thin 	**Viscosity** describes how easily a substance can flow e.g. treacle is very viscous; it is thick. →	thick 
	**Flammability** is a measure of how easily a substance burns. →	

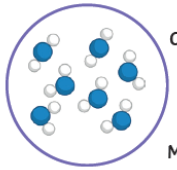
AQA GCSE Chemistry (Combined Science) Unit 8: Chemical Analysis

Pure Substances

Pure substances, in chemistry, only contain **one type of element** or **one type of compound**. For example, pure water will just contain water (a compound).

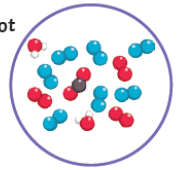
In our everyday language, we use the word 'pure' differently to how it is used in chemistry. Pure can mean a **substance** that has had **nothing else added to it** and is in its natural state. An example of this is pure orange juice. This means that the bottle will just contain orange juice and no other substances.

Elements are made up of **one type of atom**. For example, oxygen is made up of oxygen atoms. Carbon is made up of carbon atoms.



Compounds are **two or more elements** that are **chemically joined** together. For example, NaCl which is sodium chloride.

Mixtures are **two or more elements or compounds** that are **not chemically joined** together. An example of this is a standard cup of coffee. Coffee contains water, milk, coffee and possibly sugar. The components of the cup of coffee are not bonded together.



Pure Substances have a **sharp melting point** compared to **impure** substances which **melt over a range** of temperatures.

Formulations

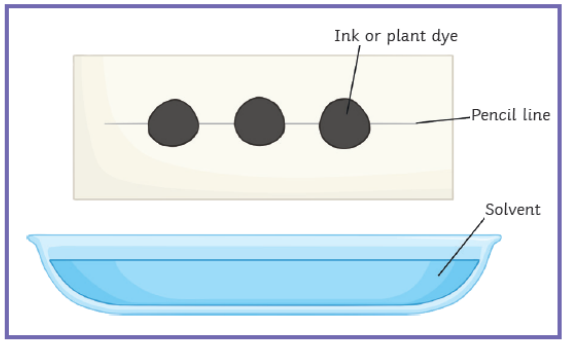
Formulations are **mixtures of compounds or substances** that **do not react together**. They do **produce a useful product** with desirable characteristics or properties to suit a particular function.

There are examples of formulations all around us such as medicines, cleaning products, deodorants, hair colouring, cosmetics and sun cream.

Chromatography

Paper chromatography is a separation technique that is used to **separate** mixtures of **soluble substances**. How soluble a substance is determines how far it will travel across the paper.

In chromatography, there are **two phases**: the mobile and **stationary** phase.

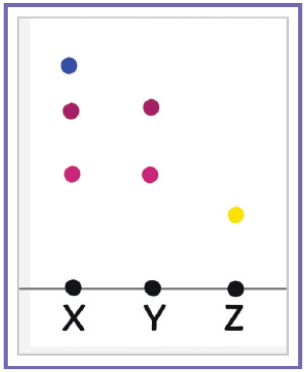


The **mobile phase moves** through the stationary phase. The **solvent** is the **mobile phase**. It moves through the paper carrying the different substances with it.

The **stationary phase** in paper chromatography is the **absorbent paper**.

Separation of the dissolved substances produces what is called a **chromatogram**. In paper chromatography, this can be used to **distinguish** between those substances that are **pure** and those that are **impure**.
Pure substances have **one spot** on a chromatogram as they are made from a single substance. **Impure substances** produce **two or more spots** as they contain multiple substances.

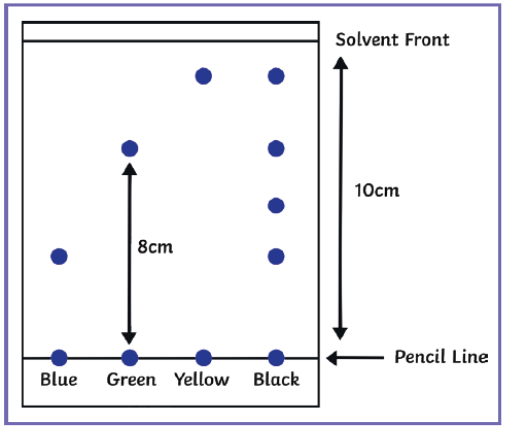
By calculating the **R_f values** for each of the spots, it is possible to identify the unknown substances. Similarly, if an unknown substance produces the **same number** and **colour of spots**, it is possible to match it to a known substance.



R Value

$$R_f = \frac{\text{distance travelled by substance}}{\text{distance travelled by solvent}}$$

Different compounds have different R_f values in different solvents. The R_f values of known compounds can be used to help identify unknown compounds.



Required Practical – Paper Chromatography

Investigate how paper chromatography can be used to separate and distinguish between coloured substances.

Step 1 – Using a ruler, measure 1cm from the bottom of the chromatography paper and mark with a small dot using a pencil. Rule a line across the bottom of the chromatography paper with a pencil, going through the dot you have just made.

Step 2 – Using a pipette, drop small spots of each of the inks onto the pencil line. Leave a sufficient gap between each ink spot so that they do not merge.

Step 3 – Pour a suitable solvent into the bottom of a container such as a beaker. The solvent should just touch the chromatography paper. The solvent line must not go over the ink spots as this will cause the inks to run into each other.

Step 4 – Place the chromatography paper into the container and allow the solvent to move up through the paper.

Step 5 – Just before the solvent line reaches the top of the paper, remove the chromatogram from the container and allow to dry.

Step 6 – Once the chromatogram has dried, measure the distance travelled by the solvent.

Step 7 – Measure the distance travelled by each ink spot.

Step 8 – Calculate the R_f value. Compare the R_f values for each of the spots of ink.

$$R_f = \frac{\text{distance travelled by substance}}{\text{distance travelled by solvent}}$$

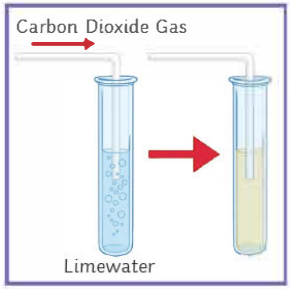
Identification of the Common Gases

The Test for Hydrogen

Place a burning splint at the opening of a test tube. If hydrogen gas is present, it will burn rapidly with a **squeaky-pop sound**.

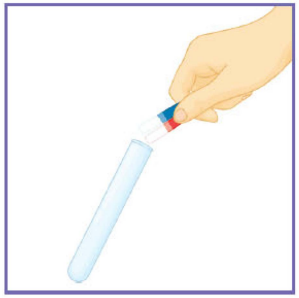
The Test for Oxygen

Place a glowing splint inside a test tube. The **splint will relight** in the presence of oxygen.



The Test for Carbon Dioxide

Calcium hydroxide (lime water) is used to test for the presence of carbon dioxide. When carbon dioxide is bubbled through or shaken with limewater, the limewater turns **cloudy**.



The Test for Chlorine

Damp litmus paper is used to test for chlorine gas. The litmus paper becomes **bleached and turns white**.

AQA GCSE Physics (Combined Science) Unit 5: Forces

Scalar and Vector Quantities

A **scalar** quantity has **magnitude** only. Examples include temperature or mass.

A **vector** quantity has both **magnitude** and **direction**. Examples include velocity.

Speed is the scalar magnitude of **velocity**.

A vector quantity can be shown using an **arrow**. The size of the arrow is relative to the magnitude of the quantity and the direction shows the associated direction.

Contact and Non-Contact Forces

Forces either **push** or **pull** on an object. This is as a result of its interaction with another object.

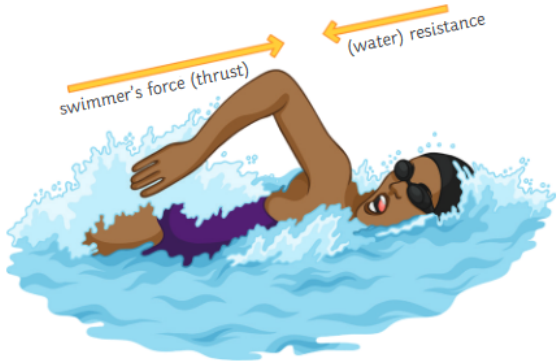
Forces are categorised into two groups:

Contact forces – the objects are touching e.g. friction, air resistance, tension and contact force.

Non-contact forces – the objects are not touching e.g. gravitational, electrostatic and magnetic forces.

Forces are calculated by the equation: **force (N) = mass (kg) × acceleration (m/s^2)**

Forces are another example of a **vector quantity** and so they can also be represented by an **arrow**.



Gravity

Gravity is the natural phenomenon by which any object with mass or energy is drawn together.

- The **mass** of an object is a scalar measure of how much matter the object is made up of. Mass is measured in **kilograms (kg)**.
- The **weight** of an object is a vector measure of how gravity is acting on the mass. Weight is measured in **newtons (N)**.

weight (N) = mass (kg) × gravitational field strength (N/kg)

(The gravitational field strength will be given for any calculations. On earth, it is approximately 9.8N/kg).

An object's **centre of mass** is the point at which the weight of the object is considered to be acting. It does not necessarily occur at the centre of the object.

The **mass** of an object and its **weight** are **directly proportional.** As the mass is increased, so is the weight. Weight is measured using a **spring-balance** (or **newton metre**) and is measured in **newtons** (N).

Resultant Forces

A **resultant force** is a single force which replaces several other forces. It has the same effect acting on the object as the combination of the other forces it has replaced.

The forces acting on this object are represented in a **free body** diagram. The arrows are relative to the magnitude and direction of the force.

The car is being pushed to the left by a force of 30N. It is also being pushed to the right by a force of 50N.

The **resultant force is 50N – 30N = 20N**

The 20N resultant force is pushing to the right, **so the car will move right.**

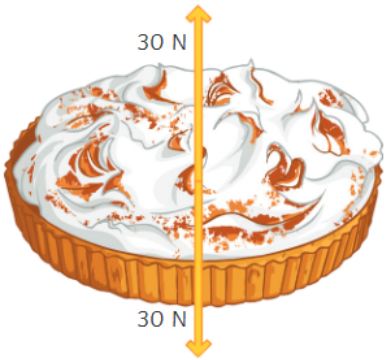
When a resultant force is not zero, an object will **change speed (accelerate or decelerate)** or **change direction (or both)**.

When an object is stationary, there are still forces acting upon it.

In this case, **the resultant force is 30N – 30N = 0N**.

The forces are in **equilibrium** and are **balanced**.

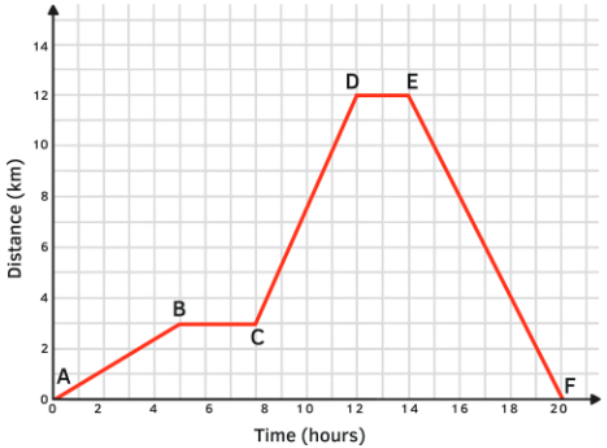
When forces are balanced, an object will either **remain stationary** or if it is moving, it will continue to move at a **constant speed**.



AQA GCSE Physics (Combined Science) Unit 5: Forces

Distance-Time and Velocity-Time Graphs

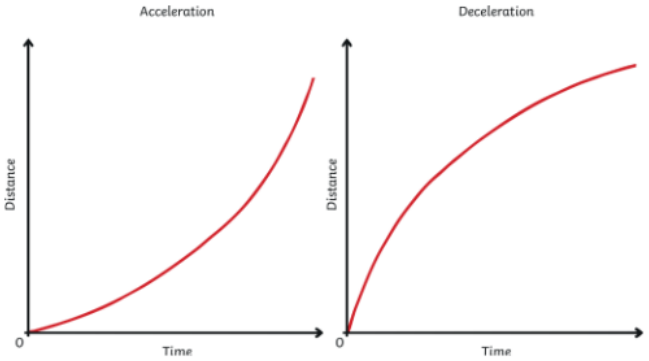
When an object travels in a **straight line**, we can show the distance which has been covered in a **distance-time graph**.



You should be able to understand what the features of the two types of graph can tell you about the motion of an object.

Graph Feature	Distance-Time Graph	Velocity-Time Graph
x-axis	time	time
y-axis	distance	velocity
gradient	speed	acceleration (or deceleration)
plateau	stationary (stopped)	constant speed
uphill straight line	steady speed moving away from start point	acceleration
downhill straight line	steady speed returning to the start point	deceleration
uphill curve	acceleration	increasing acceleration
downhill curve	deceleration	increasing deceleration
area below graph		distance travelled

Changing Speed on a D-T graph



When the graph is a **straight line**, it is representing a **constant speed**. A **curve** represents a changing speed, either **acceleration** or **deceleration**. The speed at any given point can be calculated by drawing a **tangent** from the curve and finding the **gradient** of the tangent.

Terminal Velocity

When an object begins moving, the force **accelerating** the object is much greater than the force resisting the movement. A resistant force might be **air resistance** or **friction**, for example.

As the **velocity** of the object increases, the force **resisting** the movement also increases. This causes the acceleration of the object to be reduced gradually until the forces become **equal** and are **balanced**. This doesn't cause the object to stop moving. As the object is already in motion, balanced forces mean it will continue to move at a **steady speed**. This steady speed is the maximum that the object can achieve and is called the **terminal velocity**.

The terminal velocity of an object depends on its shape and weight. The shape of the object determines the amount of resistant force which can act on it. For example, an object with a large surface area will have a greater amount of resistance acting on it.

Consider a skydiver and his parachute. When the skydiver first jumps from the aeroplane, he has a small area where the air resistance can act. He will fall until he reaches a terminal velocity of approximately 120mph.

After the skydiver releases his parachute, the shape and area has been changed and so the amount of air resistance acting is increased. This causes him to decelerate and his terminal velocity is reduced to about 15mph. This makes it a much safer speed to land on the ground.

AQA GCSE Physics (Combined Science) Unit 5: Forces

Acceleration

Acceleration can be calculated using the equation:

$$\text{acceleration (m/s}^2\text{)} = \frac{\text{change in velocity (m/s)}}{\text{time taken (s)}}$$

Worked example:

A dog is sitting, waiting for a stick to be thrown. After the stick is thrown, the dog is running at a speed of 4m/s. It has taken the dog 16s to reach this velocity. Calculate the acceleration of the dog.

$a = \Delta v \div t$

$a = (4-0) \div 16$

$A = 0.25 m/s^2$

Changes in velocity due to acceleration can be calculated using the equation below. This equation of motion can be applied to any moving object which is travelling in a **straight line** with a **uniform acceleration**.

Final velocity^2 (m/s) – initial velocity^2 (m/s) = 2 × acceleration (m/s^2) × displacement (m)

or

$v^2 - u^2 = 2as$

Worked example:

A bus has an initial velocity of 2m/s and accelerates at 1.5m/s^2 over a distance of 50m. Calculate the final velocity of the bus.

Step 1: rearrange the equation: $v^2 - u^2 = 2as$

$v^2 = 2as + u^2$

Step 2: insert known values and solve

$v^2 = (2 \times 1.5 \times 50) + 2^2$

$v^2 = (150) + 4$

$v^2 = 154$

$v = \sqrt{154}$

$v = 12.41 m/s$

Braking Distance

The **braking distance** is the distance travelled by a vehicle once the **brakes are applied** and until it reaches a full stop.

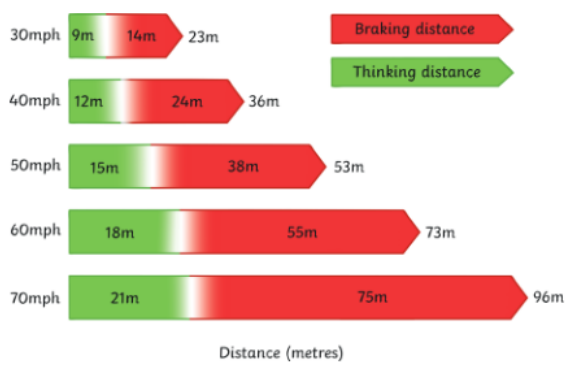
Braking distance is affected by:

- **adverse weather conditions** (wet or icy)
- **poor vehicle condition** (brakes or tyres)

When **force** is applied to the brakes, **work is done** by the **friction** between the car wheels and the brakes.

The work done reduces the **kinetic energy** and it is transferred as **heat** energy, increasing the **temperature** of the brakes.

increased speed = increased force required to stop the vehicle
increased braking force = increased deceleration



Large decelerations can cause a huge increase in **temperature** and may lead to the **brakes overheating** and the driver **losing control** over the vehicle

Newton's Laws of Motion: Newton's First Law

If the resultant force acting on an object is zero...

- **a stationary object will remain stationary.**
- **a moving object will continue at a steady speed and in the same direction.**

100N resistance (friction and air)

100N thrust

Inertia – the tendency of an object to continue in a state of rest or uniform motion (same speed and direction).

Newton's Laws of Motion: Newton's Second Law

The acceleration of an object is proportional to the resultant force acting on it and inversely proportional to the mass of the object

resultant force (N) = mass (kg) × acceleration (m/s^2)

Inertial mass – how difficult it is to change an objects velocity. It is defined as the ratio of force over acceleration.

Newton's Laws of Motion: Newton's Third Law

When two objects interact, the forces acting on one another are always equal and opposite.

For example, a book laid on a table is being acted upon by at least two forces: the downward pull of gravity and the upward reaction force from the table surface. The forces are equal and opposite so the book does not move. We describe the forces as being **balanced**.

Year 10 Spanish Learning Cycle 3 Sentence Builder 1:

¿Qué vas a ser en el futuro? – What are you going to be in the future

<table>
<tr>
<td rowspan="4">Voy a ser =
I am going to be

Seré =
I will be

Me gustaría ser =
I would like to be

Voy a trabajar como =
I am going to work as

Trabajaré como =
I will work as

Me gustaría trabajar como =
I would like to work as</td>
<td rowspan="4">abogad@ = lawyer
albañil = bricklayer
am@ de casa = househusband/wife
azafat@ = flight attendant
bomber@ = firefighter
camarer@ = waiter/ress
cociner@ = chef
contable = accountant
diseñador(a) = designer
electrista = electrician
enfermer@ = nurse
escritor(a) = writer
fontaner@ = plumber
fotógraf@ = photographer
funcionari@ = civil servant
guía turística = tour guide
ingenier@ = engineer
jardiner@ = gardener
mecánic@ = mechanic
médic@ = doctor
peluquer@ = hairdresser
periodista = journalist
policía = police officer
profesor = teacher
socorrista = lifeguard
soldad@ = soldier
veterinari@ = vet</td>
<td rowspan="3">porque=
because</td>
<td>soy = I am</td>
<td>ambicios@ = ambitious
comprensiv@ = understanding
creativ@ = creative
extrovertid@ = extroverted
fuerte = strong
organizad@ = organised
paciente = patient
práctic@ = practical
responsable = responsable
seri@ = serious
trabajador(a) = hard working
valiente = brave</td>
</tr>
<tr>
<td>se me da(n) bien
= I'm gifted at

tengo talento en
= I have talent in</td>
<td>las ciencias = the sciences
las matemáticas = maths
los idiomas/las lenguas = langauges
las artes = the artes
la educación física = PE</td>
</tr>
<tr>
<td>es un trabajo =
it is a … job</td>
<td>artístico = artistic
manual =manual
exigente = demanding
variado = varied
bien pagado = well paid
con responsabilidad = with responsibility
con buenas perspectivas =
with good prospects
con un buen sueldo = with a good salary
en el aire libre = in the open air
en una oficina = in an office</td>
</tr>
<tr>
<td>si = if</td>
<td colspan="2">apruebo mis examenes = I pass my exams
trabajo mucho = I work a lot</td>
</tr>
</table>

Year 10 Spanish Learning Cycle 3 Sentence Builder 2:

¿Qué hiciste para tus prácticas laborales? – What did you do for your work experience?

<table>
<tr>
<td rowspan="3">**Hice mis** prácticas laborales **en** = **I did my** work experience **in**

Pasé cinco días trabajando en = **I spent** five days working **in**</td>
<td rowspan="2">**un** polideportivo = **a** sports centre
una agencia de viajes = **a** travel agency
una granja = **a** farm
una escuela = **a** school
una oficina = **an** office
una tienda (benéfica/solidaria) = **a** (charity) shop
una fábrica de juguetes = **a** toy factory
un restaurante = **a** restaurant
un taller = **a** workshop
la empresa **de mi** madre = **the** business **of my** mother</td>
<td rowspan="4">**todos los días = every day**

cada día = each day</td>
<td rowspan="4">archivaba documentos = I filled documents

ayudaba a (infintive) = I helped to

empezaba/teminaba **a las…** = I started/finished **at…**

hacía una variedad **de** tareas = **I did a** variety **of** tasks

llevaba ropa elegante = I wore smart clothing

cogía **el** tren/el autobús = I caught **the** train/bus</td>
<td rowspan="4">**mi** jefe **era = my** boss **was**

el trabajo **era = the** work **was**

mis compañeros **eran = my** colleagues **were**

los clientes **eran = the** customers **were**

los niños **eran = the** children **were**</td>
<td rowspan="4">alegre(s) = cheerful

(des)agradable = (un) pleasant

(mal)educad@(s) =(im)polite

dur@(s) = hard</td>
</tr>
<tr>
<td>El primer día = on the first day

El último día = on the last day</td>
<td>llegué = I arrived
fui a = I went to
conocí a = I met</td>
</tr>
<tr>
<td>aprendí = I learnt</td>
<td>**muchas** nuevas habilidades = lots of new abilities

como trabajar en equipo = **how** to work **in** a team

a usar… = **to** use…</td>
</tr>
<tr>
<td colspan="2">no aprendí **nada** = I didn’t learn **nothing**</td>
</tr>
</table>

Year 10 Spanish Learning Cycle 3 Sentence Builder 3:

¿Por qué quieres este empleo? – Why do you want this job?

<table>
<tr><td colspan="2">tengo = I have</td><td colspan="3">experiencia previa = previous experience
buen sentido de humor = a good sense of humour
buenas capacidades de comunicación = good communication skills
buenas capacidades de resolución de problemas = good problem solving skills
buenas habilidades lingüísticas = good linguistic abilities</td></tr>
<tr><td colspan="2">he estudiado = I have studied
he hecho un curso en = I have done a course in
he aprendido = I have learnt</td><td colspan="3">escritura creativa = creative writing
periodismo = journalism
jardinería = gardening
Microsoft Office
primeros auxilios = first aid
programación = programming
diseño = design
lengua de señas = sign language</td></tr>
<tr><td>he trabajado en = I have worked in

he tenido experiencia en = I have had experience in</td><td>un polideportivo = a sports centre
una agencia de viajes = a travel agency
una granja = a farm
una escuela = a school
una oficina = an office
una tienda (benéfica/solidaria) = a (charity) shop
una fábrica de juguetes = a toy factory
un restaurante = a restaurant
un taller = a workshop
la empresa de mi madre = the business of my mother</td><td>donde = where</td><td colspan="2">cuidaba a los clientes = I cared for customers
contestaba llamada telefónicas = I amswered calls
preparaba comida = I prepared food
lavaba los platos = I washed dishes
servía comida y bebida = I served food and drink
repartía los periódicos = I delivered newspapers
sacaba fotocopias = I photocopied
colaboraba con colegas = I collaborated with colleagues
hacía una variedad de tareas = I did a variety of tasks
manejaba dinero = I handled money</td></tr>
<tr><td colspan="2">he visitado = I have visited
he ido = I have gone</td><td colspan="3">…</td></tr>
</table>

Remember I have is often abbreviated to I've in English

Year 10 Spanish Learning Cycle 3 Sentence Builder 4: Shopping

¿Qué es el problema con esta camisa? – What is the problema with this shirt?

Part 1

Quisiera = I would like **¿Tiene = Do you have…?** **¿Puedo** probar **= Can I** try**…?**	**este/ese** abrigo = **this/that** coat **este/ese** chándal = **this/that** tracksuit **este/ese** jersey = **this/that** jersey **este/ese** sombrero = **this/that** hat **este/ese** traje = **this/that** suit **este/ese** vestido = **this/that** dress **esta/esa** camisa = **this/that** shirt **esta/esa** camiseta = **this/that** t-shirt **esta/esa** chaqueta = **this/that** jacket **esta/esa** falda = **this/that** skirt **esta/esa** gorra = **this/that** cap **estos/esos** pantalones = **these/those** trousers **estos/esos** calcetines = **these/those** socks **estos/esos** vaqueros = **these/those** jeans **estas/esas** gafas = **these/those** sunglasses **estas/esas** medias = **these/those** tights	**pero = but**	**en una** talla/un tamaño más grande/pequeño = **in a** bigger/smaller size **en otro** color = **in another** colour

Part 2

Quiero devolver **este porque = I want** to return **this because**	**está/están = it is/ they are**	rot@ = broken
	es/son (demasiado) = it is/ they are (too)	**grande = big** pequeñ@ = small estrech@ = tight largo = long horrible = horrible fe@ = ugly incómod@ = uncomfy
	tiene/tienen = it has/ they have	**una** mancha = **a** stain **un** agujero = **a** hole
	falta/faltan = it's/they're missing	**un** botón = **a** button

Year 10 Spanish Learning Cycle 3 Sentence Builder 5:

¿Qué son tus planes para el futuro? – What are your plans for the future?

Si = if	apruebo **mis** exámenes = I pass **my** exams trabajo **bien** = I work **well** gano **mucho** dinero = I earn **lots of** money	**voy a** tener éxito = **I'm going to** be successful **voy a** ir a la universidad = **I'm going to** go to university **voy a** celebrar con mis amigos = **I'm going to** celebrate with my friends **voy a** ir de vacaciones = **I'm going to** go on holiday **voy a** viajar = **I'm going to** travel **voy a** tomarme un año sabático = **I'm going to** take a gap year
	fuera posible = **it was** posible ganara la lotería = I won the lottery **pudiera = I could** **tuviera** dinero = **I had** money **tuviera** tiempo = **I had** time **tuviera la** oportunidad = **I had the** opportunity **tuviera** la suerte = **I had** luck	compraría **un** coche rápido = I would buy **a** fast car compraría **la** casa **de mis** sueños = I would buy **the** house **of my** dreams **daría mucho a … = I would give a lot to** **iría a una** isla privada = **I would go to** a private island viajaría alrededor del mundo = I would travel around the world pasaría **más** tiempo haciendo el vago=I'd spend **more** time lazing around estudiaría **todo** = I would study **everything** **(no) sería más** feliz = **I would(n't) be** happier
	hubiera podido (+ infinitive) = I could have	**lo habría hecho = I would have done it**