



Knowledge Organiser

Year 9

Term 2

Name _____

Tutor Group _____

This document is part of your compulsory equipment and must be taken to every lesson (with the exception of practical PE).

Table of contents

1.	Knowledge Organisers (what/how)	page 3
2.	The King Solomon Standard	page 4
3.	The PEEL paragraph	page 5
4.	Art	page 6 - 7
5.	Design and Technology	page 8
6.	English	page 9 - 10
7.	Food	page 11
8.	Geography	page 12 - 13
9.	History	page 14 - 15
10.	Jewish Studies	page 16 - 17
11.	Maths	page 18 - 23
12.	Performing Arts: Drama	page 24 - 25
13.	Performing Arts: Music	page 26 - 27
14.	Physical Education	page 28 - 31
15.	Science	page 32 - 38
16.	Spanish	page 39 - 41

What is a Knowledge Organiser?

Your knowledge organiser summarises all the key facts and knowledge that you will need to have learned on a particular subject onto one side of A4. This information might include,

- key vocabulary
- key places and people
- useful diagrams
- key dates for a subject like history
- key themes
- important quotes
- stem sentences for a subject like Maths



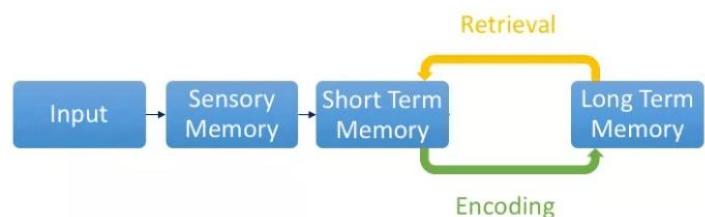
How can you use your Knowledge Organiser most effectively?



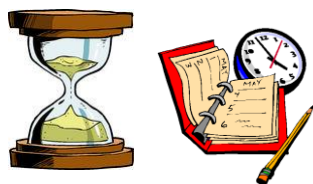
1. Use it as a **checklist** to make sure you have notes and resources in your books or folders on each area. If you have a gap, talk to your teacher.



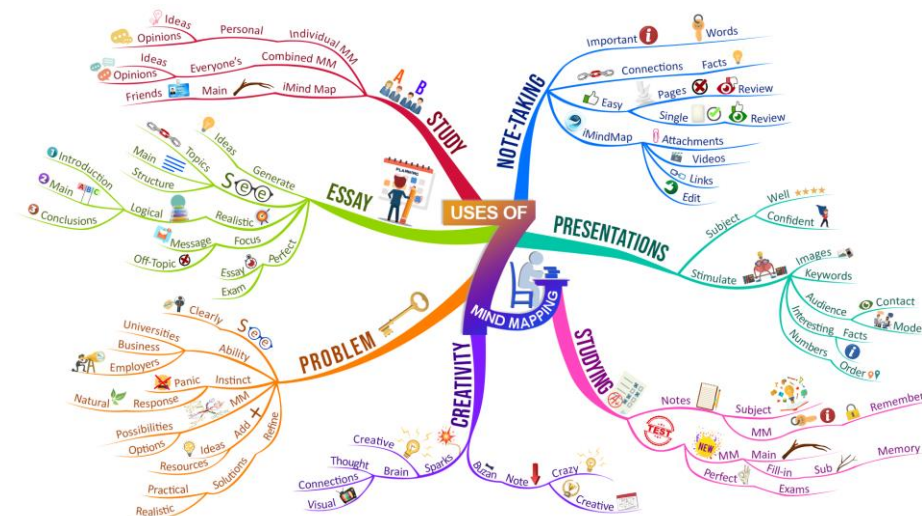
4. Use your knowledge organiser **to get ahead on a topic**. Reading about what you are going to study and looking up any new or difficult words means that you are better prepared for your learning in the next lesson.



2. Use it to help get the information and knowledge into your **long-term memory**. Just reading over the pages does not help. You will need to put your knowledge organiser away and see how much you can remember. You could get a family member or carer to help test you on what you have remembered.



5. It is best to use your knowledge organiser for **short periods of time but regularly**. Choose a small part of a topic and practice writing it out with your organiser closed every day for 10 minutes.



3. Knowledge organisers have already broken the knowledge down into chunks for you so they can be used to create **flashcards, revision posters or mind maps**.

THE KING SOLOMON STANDARD

Come to class fully prepared with correct equipment (Black / Blue Pen, pencil, glue stick, scissors, ruler, calculator, protractor and compass, exercise / text books).
Form Tutors will check your equipment on a regular basis.

Presentation

- Students write in black or blue ink only unless allowed by teachers to use another colour.
- Students ensure that all work has a Title and Hebrew and English dates, which are all underlined.
- Students take care of their exercise books and folders. There is no graffiti in, or on, books. All books must be covered and labelled clearly.
- Worksheets and Pit Stops slips must be stuck in or stapled.
- Pages must not be torn out of books.
- Work will be returned if it represents a significant lack of effort and students will be expected to resubmit the work.
- **PEEL** paragraphs must be labelled clearly and easy to spot.

Literacy marking symbols

Your teachers will be using the symbols below to mark your work.

S	Spelling mistake.
P	Punctuation mistake – either punctuation has been omitted, or has been used incorrectly.
??	Does not make sense/is not clear.
//	Start a new paragraph.
^	A word or sentence is missing.
C	Capital letter is needed.
DW	Choose a different word.

- *Correct all your class work and homework errors using a different coloured pen.*
- **C3B4ME** (See three before me; i.e. first try independently, check your class notes/resources or ask one of your peers before you ask your teacher 😊).

How to complete my Pit Stop slips

What went well....

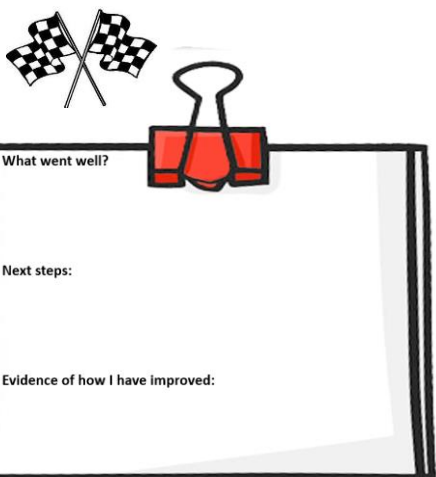
Completed by your teacher or by you after receiving some guidance from your teacher.

Next steps....

Completed by your teacher or by you after receiving some guidance from your teacher.

Evidence of how I have improved:

Completed by student stating clearly where the work can be found. This is not a promise of what you will do but a clear indication of where to find the work of what you have done already in order to improve and following the advice from next steps.



THE PEEL PARAGRAPH

PEEL

Point: Your argument in one line.

I think that It is clear that..... In my opinion The point is that....

Evidence: Reasons or evidence that back your argument up.

This is because This is evidenced by For instance We can see that...

Explanation: Explain how your reasons or evidence prove your point.

Therefore, this proves that..... because This shows that This demonstrates.....

Link: Mini conclusion answering the question.

In conclusion Overall To conclude Finally..... To summarise...

How can I improve my writing?

Point

- I have included a point in my paragraph.
- The reader will be able to understand my entire argument just by reading the point.

Evidence

- My paragraph has at least two pieces of evidence.
- My evidence is in full sentences, carefully chosen and clearly helps prove my argument.
- My evidence is specific and detailed (includes quotes/facts/names/events/key words).

Explanation

- I explain how my evidence proves that my argument is right.
- My explanation is at least two or three sentences long.
- I have added some balance to my argument and shown how there may be other reasons or arguments to the question.
- I have explained why my answer is the right one rather than any of the other reasons, ideas or arguments.

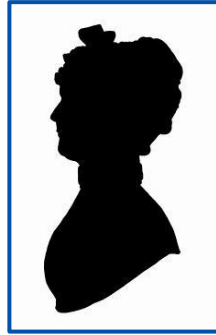
Link

- I have included a link sentence in my paragraph.
- My link sums up my argument.
- My link uses the information I have used in my paragraph.

KEY MOVEMENTS - Prehistoric Art, Victorian Art, Art Nouveau, Modernism, Postmodernism



Prehistoric Cave Art



Victorian Silhouettes



Matisse Cut-Outs



Hazard Sign



iTunes Adverts

Researching the Simplified Figure



Art Nouveau / Advertising



Expressive Distortion



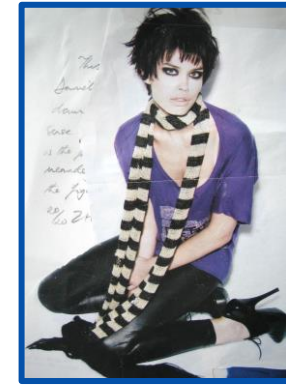
Matisse

Exploring



Silhouettes

Realising



Personal Response



Key Words

Pose, Posture, Two-Dimensional, Silhouette, Solid Shape, Outline, Profile, Single Hue/Tone, Identifiable, Foreground, Background.

KEY MOVEMENTS - Japanese Print-Making, Modernism, Postmodernism



Japanese Print-Making



Picasso



Warhol



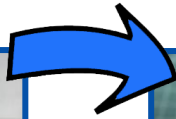
Katz



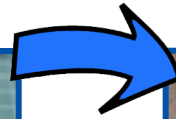
Hume



Finding/Preparing/Transferring



Cutting



Printing



Layering of Colours

Key Words

Process, Trace, Transfer, Bench-Hook, Brayer/Roller, Cutting Tool, U/V Gouge, Key-Block, Lino, Linocut, Noise, Overprinting, Platemark, Reduction, Registration, Relief Print, Trap.

Design and Technology

Subject: Design & Technology

Year: 9

Term: 2 Topic: Structures

Key Assessments

Pit stop test and

Constructed structure.

Core Texts / Websites

Design and Technology KS3 photocopy resources.

BBC Bitesize.

Technologystudent.com

The things you need to learn in this knowledge organiser are:

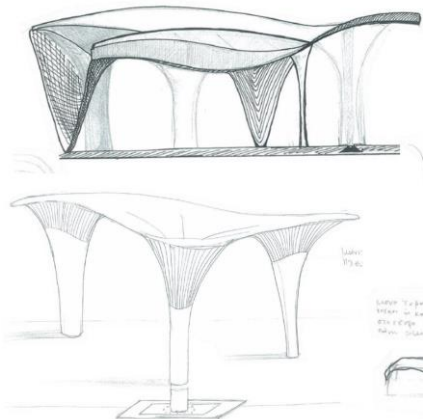
Describe the different types of structural forms.

Understand the types of **forces**.

Know the types of bridges and the forces which act on them.

Understand how **triangulation** works.

Know how to construct a **geodesic dome**



Unit Structures & Forces

Key Words:

Compression, Tension, Bending, Torsion, Pushing, Pulling, Beam, Arch, Truss, Suspension, Cantilever, shear, Pavilion.

Key Skills: Drawing, designing, assembling, testing, following instructions, working in a team.

Knowledge summary:

Pavilion is a decorative building used as a shelter in an open space.

Compression occurs when a pushing force is applied to either end of a material.

Tension occurs when a pulling force is applied to either end of a material.

Bending is both tension and compression forces; tension on 1 side with compression on the other.

Torsion forces occur when a material is twisted.

Beam bridges, also known as stringer bridges, are the simplest structural forms for bridge spans supported by an abutment or pier at each end. The basic principle of **arch** bridge is its curved design.

Truss bridge, with its load-bearing structures composed of a series of wooden or metal triangles, known as trusses.

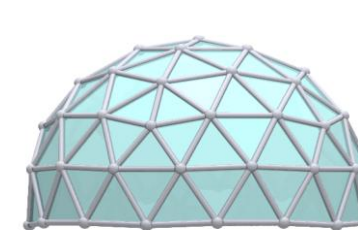
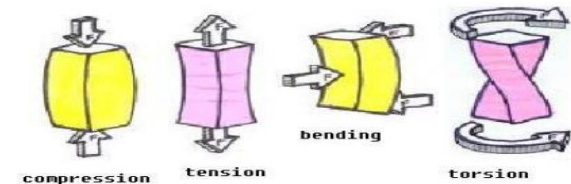
A **suspension** bridge is a type of bridge in which the deck (the load-bearing portion) is hung below suspension cables on vertical suspenders.

A **cantilever** bridge is a bridge built using cantilevers, structures that project horizontally into space, supported on only one end.

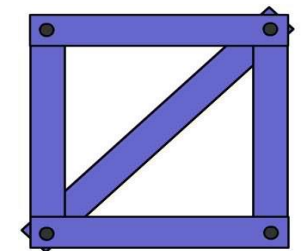
A **frame structure** is a structure made up of separate parts and each part is known as a 'member'. Members in a structure are connected by 'nodes'.

A **geodesic dome** is a [shell structure](#) (lattice-shell) based on a [geodesic polyhedron](#). The **triangulation** of the dome are structurally rigid and distribute the structural [stress](#) throughout the structure, making geodesic domes able to withstand very heavy loads for their size .

Visual Reminders



Geodesic Dome



Triangulation

Links to previous units you have studied:

- The Island (Year 7)
- Food Writing (Year 8)

Links to other units you are going to study:

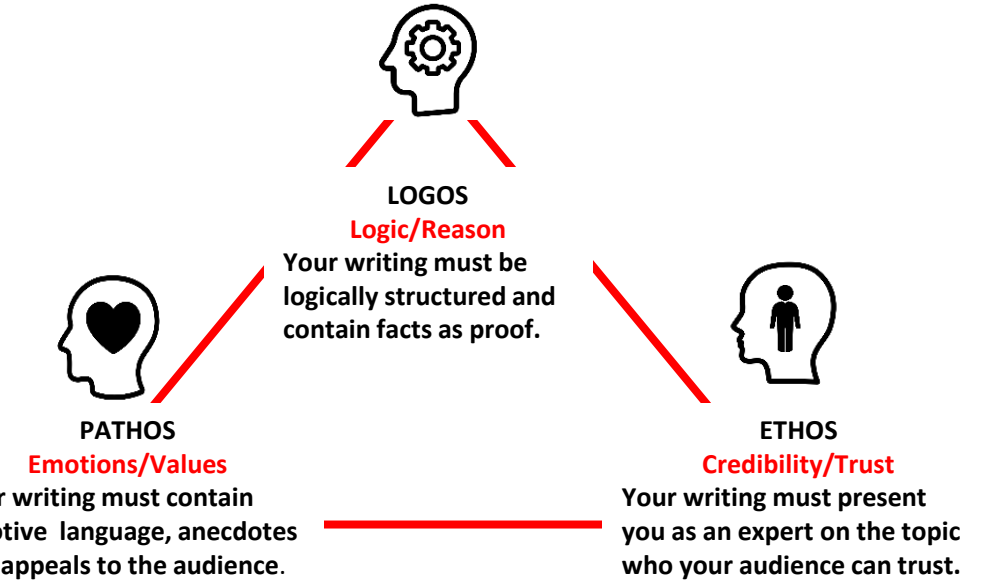
- Language Paper 2 (Year 10)
- An Inspector Calls (Year 10)

EPIIIC: A paragraph planning resource for non-fiction writing

1. Establish your audience, their views and where they might be
2. Picture this: – appeal to the reader's emotions or pathos
3. Imagine... – paint a picture of the ideal situation
4. Information – appeal to the reader's reason or logos
5. I – create credibility using personal experience: ethos
6. Counter argument & conclusion

Glossary

Discrimination	the unjust or prejudicial treatment of different categories of people
Inequality	lack of fairness or justice
Social Injustice	the extent to which there are differences between groups in society. Examples of this are below.
Gender	A system of government where one person has absolute power and all citizens are subservient.
Class	A person with supreme authority over a group of people, usually a country.
Sexuality	Using language as a means to persuade or control a group of people.
Ableism	Language with the purpose to persuade. (Logos, pathos and ethos)
Race	An order. For example, 'put your hands up'.
Age	When a text begins and ends in the same place or with the same idea



Rhetorical Methods (DAFOREST)

- D** – Direct address, addressing the reader directly using pronouns such as “we” or “you”
- A** - Alliteration, a group of words which begin with the same letter or sound
- F** - Facts, something which can be proven true
- O** - Opinion, a belief which cannot be proven true – someone’s ideas
- R** - Rhetorical question/ Repetition, a question which does not require a response/ repeating something that has already been written
- E** - Emotive Language, words which provoke an emotional response from the audience.
- S** - Statistic, numerical facts and data used to support a point.
- T** - Three (power of three) , list of three things in a sentence.



Context	
World War 2	Be a warning or indication of (a future event).
Social Democracy	Orwell derided any form of totalitarianism, whether Fascist or Communist. He wished for people to work for their own wealth but with a strong emphasis on helping those in poverty.
Imperialism	A story, poem, or picture that can be interpreted to reveal a hidden meaning, typically a moral or political one.
The Russian Revolution	When a text begins and ends in the same place or with the same idea

Character List	
Old Major	A pig. He creates the ideas behind Animalism and inspires the other animals to rebel.
Napoleon	A pig. He cares more about his own power than he does about the ideals of the revolution. This leads him to build a totalitarian government based on terror and lies.
Snowball	A pig. Snowball is an intelligent pig, but he is less shrewd in the ways of power than Napoleon. He values the ideals of the revolution but is unable to retain power.
Squealer	A pig. Squealer is a terrific speaker who prioritizes his personal comfort above all else. He represents the propaganda that proliferates tyrannical regimes.
Boxer	A horse. Boxer is honourable but not intelligent. He believes deeply in the revolution and has the strength to overthrow the dictatorship, but not the wit to realise that it is a dictatorship.

Glossary	
Anthropomorphism	A type of personification - Giving animals human characteristics.
Capitalism	The political ideology of profit. Each individual tries to gain as much as possible and give as little as possible.
Communism	The political ideology of equality. Wealth, power, and rights are shared equally between all citizens.
Totalitarianism	A system of government where one person has absolute power and all citizens are subservient.
Dictator	A person with supreme authority over a group of people, usually a country.
Propaganda	Using language as a means to persuade or control a group of people.
Rhetoric	Language with the purpose to persuade. (Logos, pathos and ethos)
Imperative	An order. For example, 'put your hands up'.
Cyclical Structure	When a text begins and ends in the same place or with the same idea
Symbolism	An object which represents an abstract idea.
Allegory	A story that can be interpreted to reveal a hidden meaning, typically a moral or political one.

Links to previous units you have studied:	Links to other units you are going to study:
<ul style="list-style-type: none"> Protest Writing (Year 9) Noughts and Crosses (Year 8) 	<ul style="list-style-type: none"> An Inspector Calls (Year 10)

Chapter	Key Quotation
One	"Weak or strong, clever or simple, we are all brothers. No animal must ever kill any other animal. All animals are equal.
Two	"Never mind the milk, comrades!" cried Napoleon, placing himself in front of the buckets. "That will be attended to. The harvest is more important.
Three	Milk and apples (and this has been proved by Science, comrades) contain substances absolutely necessary to the well-being of a pig. We pigs are brain-workers.
Four	"Who will believe that I did not do this on purpose?" "No sentimentality, comrade!" "War is war. The only good human being is a dead one.
Five	"One of them all but closed his jaws on Snowball's tail, but Snowball whisked it free just in time. Then he put on an extra spurt and, with a few inches to spare, slipped through a hole in the hedge and was seen no more."
Six	"Comrades," he said quietly, "do you know who is responsible for this? Do you know the enemy who has come in the night and overthrown our windmill? SNOWBALL!"
Seven	"One Sunday morning Squealer announced that the hens, who had just come in to lay again, must surrender their eggs. Napoleon had accepted... a contract for four hundred eggs a week."
Eight	"He called the animals together and told them that he had a terrible piece of news to impart. Comrade Napoleon was dying!"
Nine	"Boxer!" cried Clover in a terrible voice. "Boxer! Get out! Get out quickly! They're taking you to your death!"
Ten	"Somehow it seemed as though the farm had grown richer without making the animals themselves any richer..." "All animals are equal, but some animals are more equal than others."



Food & Nutrition

Culinary skills

Vegetable cuts – classic French Cuts



batons – 5-6.5cm long x 1 cm square



dice – 1cm square



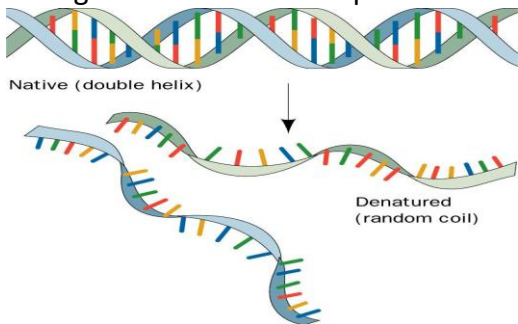
julienne/match stick – 5-6.5cm long x 3 mm square



fine julienne – 5-6.5cm long x 1.5mm square

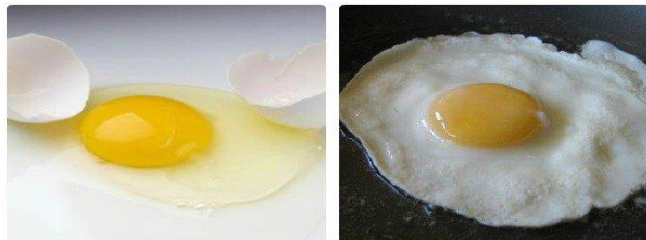
Science - Food Processes

DENATURATION: occurs when the bonds holding the helix shape are broken and the strands of the helix separate and unravel. It is a permanent change in the structure of proteins.



Denaturation, this process occurs when denatured proteins separate from other nutrients and solidify or semi solidify. An example shown below is an egg when cooked it will turn from a liquid to a solid.

Coagulation



Types of Pastry

Main ingredients flour, water and fat (butter or oil). Different types of pastry



Shortcrust pastry



Puff pastry



Flaky pastry

Shortcrust Pastry

Easiest pastry to make, the dough will bounce back almost entirely with little to no finger like a shortbread cookie dough.

Puff Pastry

Often used for pie crusts, wrapping for meats, vol-au-vents and mille feuille. This pastry uses air and fat that's trapped between the layers of dough. This gives rise to its delicate and crisp texture and appearance. .

Flaky Pastry

Flaky pastry, used for sweet and savoury pies, quiche, sausage rolls and turnovers,

Choux Pastry



Cooking for health

Take into account healthy eating recommendations to ensure that dishes/meals are part of a varied, balanced diet.

- Planning - does the meal meet the nutritional needs and preferences of those it is being cooked for? Base your meals on starchy food.
- Choosing - choose low fat/sugar/salt versions, where possible.
- Preparing - limit the amount of fat added (try a spray oil) and replace salt with other flavourings, such as herbs and spices.
- Cooking - use cooking practices which reduce the amount of fat needed and minimise vitamin losses from fruit and vegetables.
- Serving - serve the meal in proportions which reflect current healthy eating advice. Do not forget to include a drink.



Key words

Choux
Flaky
Shortcrust
Suet
Shorten
Dextrinisation
Bind
Sealing
Glazing
Baking Blind
Shrinking

Geography Enquiry question 3: 'Brazil is an emerging country' - is this an accurate statement?

Physical geography of Brazil

Continent: South America
States: 27
Surrounding ocean: Atlantic
Land area size: 8.5 million km²
Coastline length: 8000km
Capital city: Brasilia
Neighbouring countries: Uruguay, Argentina, Paraguay, Bolivia, Peru, Colombia, Venezuela, Guyana and Suriname
Lines of latitude: Equator and Tropic of Capricorn
Largest river: Amazon River
Climate of Brazil: There are 5 climate zones these include, equatorial, tropical, semi-arid, highland tropical and subtropical.

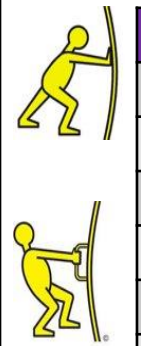


Amazon Rainforest

Ecosystem	A community of plants and animals which depend on each other to survive
Deforestation	The action of clearing a wide area of trees
Habitat	A natural home or environment of an animal or plant.
Endangered	A species which is seriously at risk of extinction
Biome	A large naturally occurring community of plants and animals occupying a major habitat
Biodiversity	The variety of plant and animal life in the world or in a particular habitat.
Fauna	The animal life present in a particular region.
Flora	The plant life present in a particular region
Ecosystem goods	Products that are taken from the rainforest e.g. food, medicines and raw materials.
Ecosystem services	These are the benefits obtained from the processes which occur within the rainforest.
Indigenous people	An ethnic group who are descended from and identify with the original inhabitants of a given region.

Human geography of Brazil

Migration: The movement of people from one place to another.
Urbanisation: is the increase in the proportion of people living in towns and cities.
Pull factors: Are the reasons why a person moves to a particular area.
Push factors: Are the reasons why a person moves away from a particular area.



Push Factors	Pull factors
Poor education opportunities	Increased job opportunities
High crime rates	Better education facilities
Drought prone areas	More fertile land
Crop failure	Less Risk from natural hazards
High levels of poverty	Better climate
Poor healthcare services	Overall better quality of life

Consequences of urbanisation: Inequality

Income inequality - refers to the extent to which income is distributed in an uneven manner among a population.
 Around 16 million Brazilians live below the **'poverty line'**. This is \$1 a day, the equivalent of 65p.

These Brazilians often live in the **'favelas'**. Favelas are overcrowded settlements of homes made from scrap materials such as wood and metal sheeting. They often do not have amenities such as sanitation, water or electricity.



Brazil development indicators:

GDP: \$1.45 Trillion
Literacy rate: 94%
Life expectancy: 75 years
HDI: 0.76
Infant mortality rate: 11.4



BRICS:

Brazil, Russia, India, China, and South Africa, the five largest emerging economies in the world.

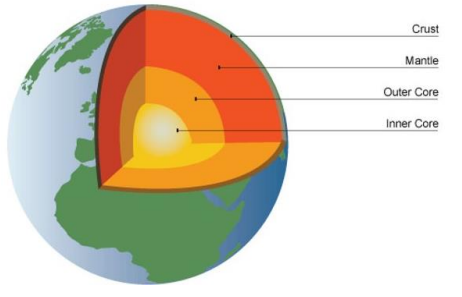
Objectives of the BRICS:

- To promote and achieve economic development.
- To achieve regional development.
- To remove trade barriers.
- Optimum use of resources.
- Building harmony and relationships among nations.
- To become a dominant supplier of manufactured goods, services and raw material by 2050.

Geography Enquiry question 2: Why are some earthquakes and volcanoes more deadly than others?

Structure of the Earth

- The **inner core** is extremely hot and is a very dense solid.
 The **outer core** is 2,000 km thick and is a liquid.
 - The **mantle** is semi-molten and about 3,000 km thick.
 - The **crust** is the rocky outer layer; it is thin compared to the other sections, approximately 5 to 70 km thick.



Convection currents

- The mantle is made up of semi molten rock.
- Convection currents are circular currents in the mantle.
- Convection currents cause the overlying tectonic plates to move.

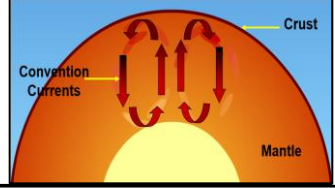
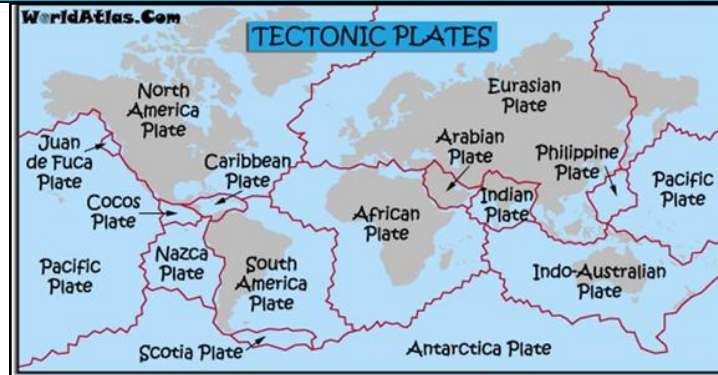


Plate Tectonics

Tectonic Plates: The crust is split into several pieces (like a cracked eggshell). These pieces of rock are called tectonic plates. They float on the mantle.
Oceanic Crust: Crust found under the oceans (thin, young, denser)
Continental Crust: Crust found under land (thick, old, less dense)
Continental Drift: Theory that said the earth's continents are very slowly moving and that once all the continents were joined together to form a super-continent called Pangea.
Earthquake: A sudden movement of tectonic plates due to a release of energy of pressure. It is followed by a series of aftershocks.
Plate margin/boundary: where two or more plates meet.



As tectonic plates suddenly move, they send out **SEISMIC WAVES**

- The point of movement is called the **FOCUS**. The point directly above the focus is called the **EPICENTRE**

Types of plate boundaries

Divergent/constructive plate boundary

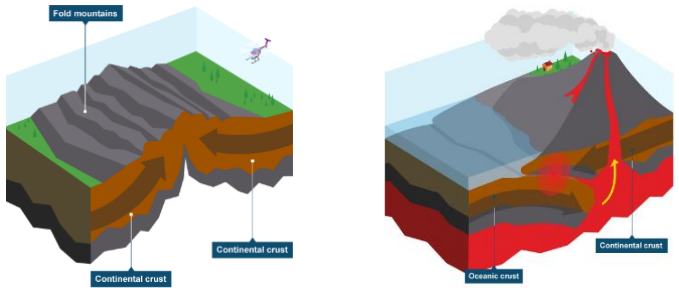
A divergent plate boundary occurs when **plates move apart**. Volcanoes are formed as magma rises up to fill the gap, and eventually new crust is formed. Earthquakes occur here also.
E.g. North American and Eurasian plates forming the mid-Atlantic Ridge.



Convergent/destructive plate boundary

Destructive plate margins occur when tectonic plates **move towards each other** and collide. The effect this has depends on what kinds of plates are colliding:

- If **two continental plates collide**, they are both the same density and so cannot sink into the mantle. As a result, compression forces the plates to collide and form fold mountains. **E.g.** The Indian & Eurasian plates formed the Himalayas.
- If an **oceanic and a continental plate move towards each other**, the denser oceanic plate is subducted and sinks under the continental plate and into the Earth's mantle, where it is recycled. Earthquakes, fold mountains and volcanoes occur. **E.g.** The Nazca & South American Plates.

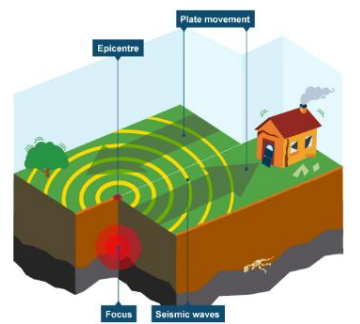


Conservative plate boundary

A conservative plate margin occurs where **plates slide past each other** in opposite directions, or in the same direction but at different speeds.

Friction is eventually overcome and the plates slip past in a sudden movement, producing an earthquake.

E.g. The North American and Pacific plates forming the San Andreas Fault in California.



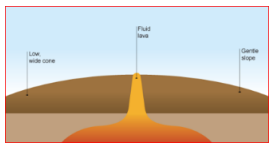
Haiti Earthquake 2010:

Plate Margin: conservative plate boundary - Caribbean and North American plates
Magnitude: 7.0
Epicentre: 25km west of Port-au-Prince, at a depth of 13km.

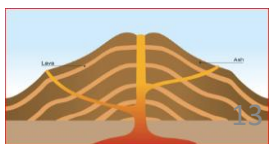
PRIMARY EFFECTS	SECONDARY EFFECTS
<ul style="list-style-type: none"> • 220,000 dead • 300,000 injured • 200,000 homes damaged and 100,000 destroyed • 8 hospitals destroyed in Port-au-Prince • 5000 schools destroyed or damaged • Transportation routes destroyed • Service lines and infrastructure destroyed 	<ul style="list-style-type: none"> • Diseases from dead bodies. • 1.3 million Haitians in temporary camps • Increase in unemployment • Loss of profit from trade, they couldn't export goods • High crime rates • Aid supplies could not reach victims. • 2 million Haitians with no food, electricity, water • Cost: \$11.5 billion

Volcanoes

A **shield volcano** has gently sloping sides and runny lava that covers a wide area. They are more frequent but cause less damage.



A **composite volcano** is steep sided and cone-shaped, it is made up of layers of ash and lava. The lava is sticky (viscous) so it does not flow far. They are less frequent but cause more damage.



History: The Industrial Revolution

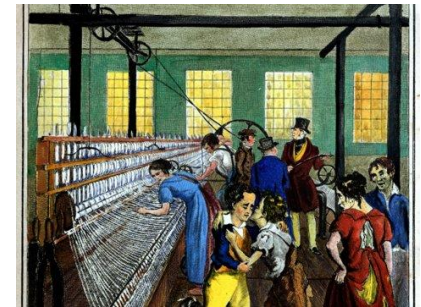
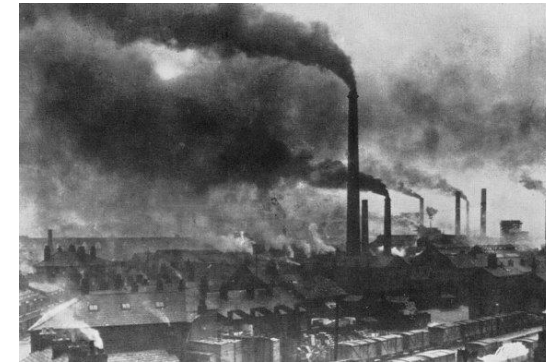
Were Social changes of the Industrial Revolution more important than economic changes?

Year	Events
1714	Jethro Tull invented the seed drill, this would make farming a lot quicker and require less people to pay to work on the land.
1750	Population of England is 11 million. Only 5% of the population could vote.
1757	Sankey Cut a canal in Liverpool is built to help boost trade
1811	Luddites – people were angry that machines took their jobs were active in Nottinghamshire
1825	First Railway the Stockton and Darlington introduced
1829	George Stephenson built the rocket
1847	Children could not work for longer than 10 hours in a factory
1850	Cotton cloth becomes Britain's largest industry thanks to steam powered machinery
1899	Education made compulsory and free for all children until the age of 12

The Industrial Revolution was a time of major **change** throughout England and Europe.

Before 1715, most people lived and worked in the **countryside** on the **farm land** growing **crops** and animals for food. However, over time everything changed. Once people worked out that you could burn **coal** to produce **steam**, more and more **factories** appeared across Britain. Factories were places where **companies** could produce **goods** in large amounts very quickly. The **machines** that could do this replaced a lot of people which meant that they lost their **jobs**. As people lost their jobs, **families** became desperate and even had to send their **children** to work.

However, with all of the new inventions people's lives began to change dramatically. With the help of people such as **Louis Pasteur**, people discovered that **germs** were making them sick and so new **medicines** were introduced that meant people could live longer. The development of **railways** meant people could **travel** further and faster.



Key words:	
Industrial	Anything to do with trade, buying and selling or manufacturing.
Revolution	Significant change or development
Agriculture	The science and practice of farming. Including animals and crops.
Rotation	Moving around in a circle
Locks	A section dug in a canal to allow boats to travel if the ground was a different level.
Toll	Amount of money you had to pay to pass through a canal or lock.
Compulsory	Everyone has to do something
Politics	Activities that involve ruling over an area. Including voting and making decisions about laws
Labour	Physical work
Apprentice	someone who learns their job while working for someone.
Slops	Waste water from a kitchen or toilet
Ventilation	Making sure the room has air
Crop rotation	The growing of different crops in succession on a piece of land to avoid exhausting the soil and to control weeds, pests, and diseases.
Selective breeding	the process by which humans use animal breeding to selectively develop particular traits by choosing which animals will have offspring together.
Enclosing fields	When landowners put up fences around their land so that the peasants could not use it for their own.

What sources should I know about/use?

English Heritage video summary of the Industrial Revolution (secondary) - https://www.youtube.com/watch?v=vizSn5_uZNg

British Library Overview of the Industrial Revolution (secondary) - <https://www.bl.uk/georgian-britain/articles/the-industrial-revolution>

History: Conflict in the Early 20th Century

Overarching Enquiry Question 1: To what extent did Adolf Hitler take power legally?

Overarching Enquiry Question 2: How *could* the Holocaust have happened?

Losing the First World War left Germany in a very difficult position. After the signing of the **Armistice**, the problems Germany faced were worsened by the harsh restrictions imposed upon them in the **Treaty of Versailles** from Allied France, Britain and USA. A new and **democratic** Republic had been formed, the **Weimar Republic**, but it faced many **challenges** politically, economically and socially from the very start. Whilst **Stresemann** went some way to repair Germany economically and on the foreign stage, the **Great Depression** plunged Germany into turmoil again, and it was from this unsteady background that **Adolf Hitler** and the **Nazi Party** were able to rise. Hitler became **Chancellor** in 1933, promising to fix many of the issues within Germany, but from the start he had paved a way to become **dictator**, through methods that were both **legal** and **illegal**. The Nazis' programme of **anti-Jewish persecution** began as soon as Hitler came to power in 1933. The process of persecution escalated in the late 1930s, before developing into a campaign of **mass murder** during the course of the **Second World War**. Millions of Jews were deported from **ghettos** or holding camps to be killed. Most were sent to a small number of purpose-built killing centres called **death camps**, but as the war developed, thousands more were sent to **concentration camps** to be worked to death in service of Germany's deteriorating war effort. This Nazis were central to this process, but they did not act alone and relied on the support and **complicity** of hundreds of thousands of people across Europe.

Timeline of events	
11 th November 1918	Signing of the Armistice
Jan 1919	Spartacists (KPD) rebel
February 1919	Weimar Republic formed
28 th June 1919	Treaty of Versailles
March 1920	The Kapp Putsch
January 1923	Invasion of the Ruhr
March 1923	Hitler's Munich Putsch
November 1923	Hyperinflation
November 1923	Rentmark
April 1924	The Dawes Plan
December 1925	Locarno Pact
September 1926	The League of Nations
August 1928	Kellogg-Briand Pact
August 1929	Young Plan
24 th October 1929	Black Thursday
January 1933	Hitler is Chancellor
February 1933	The Reichstag Fire
March 1933	The Enabling Act
March 1933	Dachau opened
June 1934	Night of the Long Knives
August 1934	Hindenburg's death
9 November 1938	Kristallnacht
April 1940	Auschwitz established
May-June 1940	Dunkirk
July 1940	Battle of Britain
December 1941	Pearl Harbour
July 1942	Battle of Stalingrad
June 1944	D-Day
September 1945	End of WW2

Key words:	
Chancellor	The head of government in Germany, works similarly to a Prime Minister in Britain.
Fredrich Ebert	The chancellor of Germany from in 1919, and then its President until 1925.
Republic	A form of government in which "power is held by the people and their elected".
Bill of Rights	Guaranteed every German citizen freedom of speech and religion, and equality.
Proportional representation	When seats in the Reichstag (Parliament) were allocated exactly reflecting the number of votes from the people.
Article 48	In an emergency the president did not need the agreement of the Reichstag to issue decrees.
Armistice	The formal agreement between Germany and the Allies to end the First World War.
Treaty of Versailles	A treaty that decided the terms of the WW1 peace, that placed many restrictions upon Germany.
Reparations	The compensation for war damage paid by those who lost, in this case, money.
Gustav Stresemann	Chancellor of Germany in 1923 and foreign minister 1924–29.
NSDAP	National Socialist German Workers Party (Nazi Party).
Adolf Hitler	An Austrian-born German politician who was dictator of Germany from 1933-45.
SA	The Nazi Party's private army, also known as the Brownshirts or Stormtroopers.
The Great Depression	A severe worldwide economic depression beginning in US with Black Thursday.
The Reichstag Fire	An arson attack on the Reichstag building, home of the German Parliament.
The Enabling Act	A law that gave the Chancellor powers to make and enforce laws without the Reichstag.
Night of the Long Knives	The assassination of leading members of the SA, including Ernsts Rohm.
Dictatorship	People have no say in how their country is run. One person/party with limited or no freedoms.
Anti-Semitism	Hostility towards the Jews as a racial, ethnic and religious group.
The Holocaust	A term used to describe the 8 million Jewish people who were systematically killed by the Nazis.
Genocide	Deliberate killing of a large number of people from a particular nation or ethnic group.
Gestapo	The German secret police.
Ghettos	Enclosed districts that isolated Jews with terrible living conditions.
Kristallnacht (Night of the Broken Glass)	On this night, almost 200 synagogues were destroyed, over 8,000 Jewish shops were sacked and looted, and tens of thousands of Jews were removed to concentration camps.
Concentration camp	A camp in which people are detained or confined, usually under harsh conditions.
Death camp	A concentration camp in which large numbers of prisoners are systematically killed.





Judaism



Comparative faith/society





Topic	Judaism	Comparative Faith/society
Divorce 	Judaism does allow divorce, however it should be a last resort after counselling or attempts to save the marriage. “G-d hates divorce” (Torah) “anyone who divorces his wife, even the altar weeps” (Talmud) A Beit Din must grant the divorce by giving a ‘get’. The man must give this and the woman keeps the actual ‘get’ document. Reform Judaism has adapted this and a man or woman can give the get.	Roman Catholics are against divorce and state it is always wrong. “Whoever divorces ... then remarries another; it is as if he committed adultery” Other Christians consider it the lesser of two evils or even a necessary evil, but a divorced couple are not usually able to remarry in a church. Divorce is legal in the UK.
Remarriage 	Judaism allows remarriage once a woman has received a ‘Get’. A person should be given every opportunity to find a partner and be happy. A couple should wait for 90 days before remarrying to ensure the woman is not pregnant.	Catholics do not allow remarriage because a person has broken promises they have made in front of God once they should not be given the opportunity to do this again. An annulment (as if the marriage never took place). may take place after a few months if the relationship was not consummated (sex). Church of England does allow couples to remarry so they can be happy but does not allow for a religious ceremony due to the holiness of the vows they originally made.

Key word	Definition
Adultery	Having sex with someone who is not your husband or wife, outside of marriage
Artificial contraception	Methods of preventing pregnancy e.g., condoms, the pill, the coil
Cohabitation	Living and starting a family with someone who you are not married to
Divorce	The legal ending of a marriage
Family planning	Using a woman’s natural cycle of fertility to try and avoid pregnancy
Gender discrimination	Acting against people based on their gender
Gender prejudice	Holding biased opinions about people based on their gender
Heterosexual	Sexual attraction to the opposite gender
Homosexual	Sexual attraction to the same gender
Marriage	A legal and religious ceremony joining two people together in love
Procreation	Bringing babies into the world
Remarriage	Marrying someone else after divorce

Key word	Definition
Beit Din	Jewish Court of Law
Get	Jewish document of divorce
Torah	Jewish holy book
Talmud	Jewish oral law
annulment	Legal process making a marriage no longer valid
minyan	10 men over 13 needed for a full service in synagogue
Nuclear family	Family made up of 2 parents and children

MATHS Chapter 5 - Constructions

Topics

- ❑ Understand and apply scale in maps and diagrams.
- ❑ Make accurate constructions using drawing equipment
- ❑ Use a compass, protractor and ruler appropriately.
- ❑ Understand and apply congruence.

Key Skills



- **Prior Knowledge:** 455 - 461
- **Scale Diagrams:** 864 - 870
- **Accurate Diagrams:** 659, 683
- **Advanced Constructions:** 660 - 669

You can login to [Hegarty Maths](https://www.hegartymaths.com) with your full name and birthday and use the search bar to find the skills listed above by their numbers.

Key Vocabulary

- **Locus** – Set of points with a common property
- **Equidistant** – The same distance
- **Perpendicular** – Lines that meet at 90 degrees
- **Arc** – Part of a curve
- **Bisector** – A line that divides something into two equal parts
- **Congruent** – The exact same size and shape – sometimes with a different orientation.

Key Equipment

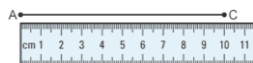
- **Protractor**



- **Compass and Pencil**

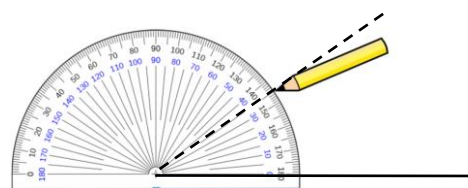


- **Ruler**



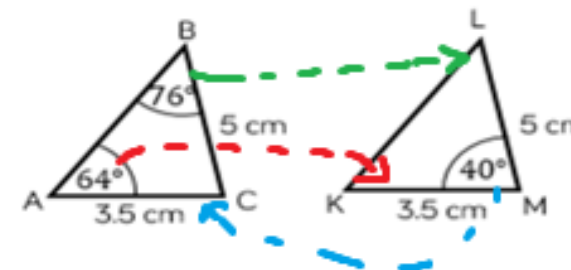
Things to Remember

How to Measure and Draw Angles



This is a 35° angle. Make sure the centre of the protractor lines up with the corner of the angle between the two lines (called 'arms') of the angle. It helps to draw the bottom line first. Mark the 35 degree angle on the outside of the protractor – then remove the protractor and draw the line from the centre to the mark to complete the angle.

Congruent Figures

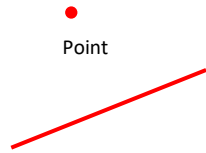


Congruent figures are the exact same, but can be rotated or moved about. All the matching angles in each shape are the same. All the matching sides are the same as well.

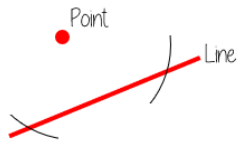
MATHS Chapter 5 - Constructions

Model Answers and Examples

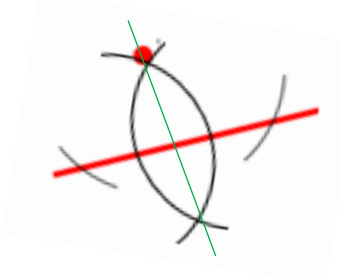
Perpendicular Bisector of A Line



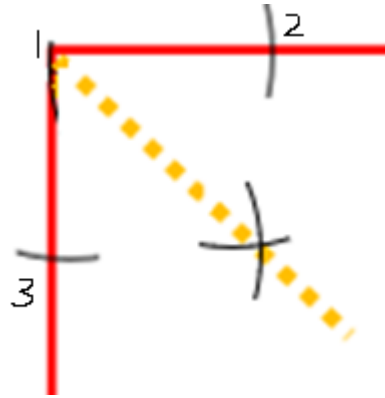
Put the compass on the point and draw an arc that crosses the line twice.



Put the compass on each created arc and draw two more arcs in the middle. Connect these two points (green line) to finalise the perpendicular bisector.



Perpendicular Bisector of An Angle



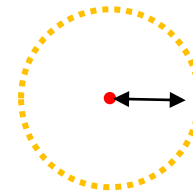
Put the compass the corner (called the vertex – point 1) of the angle and draw two arcs that hit the side arms of the angle. These are points 2 and 3 on the diagram.

Put the compass on point 2 and draw an arc in the middle of the angle.

Put the compass on point 3 and do the same.

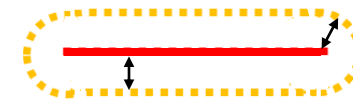
Where the two arcs cross, join to the vertex to cut the angle in half (yellow line).

Locus From a Point



Use the compass to draw a circle around the point at the given distance. Measure the distance between the compass arms to match.


Locus From A Line



Use a ruler to construct a line that is the given distance from the middle.

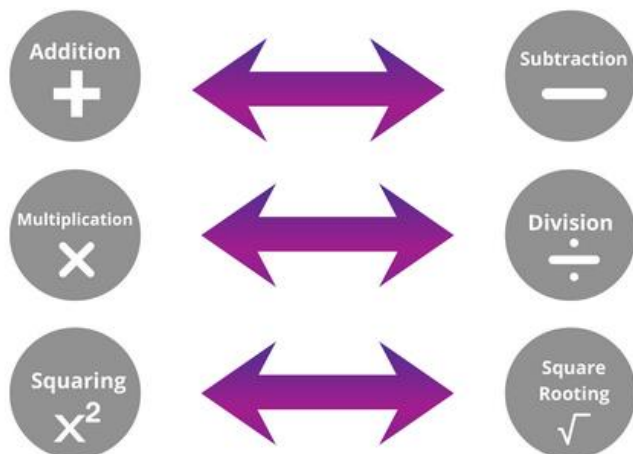
Use a compass to round the ends off – remember to measure the correct distance.

MATHS Chapter 6 – Sequences, Equations, Inequalities and Proportion

Topics	Key Skills	Key Vocabulary
<ul style="list-style-type: none"> ❑ Find and use the <i>n</i>th term of an arithmetic sequence. ❑ Recognise and continue geometric and quadratic sequences. ❑ Represent inequalities on a number line. ❑ Solve inequalities. ❑ Solve equations. ❑ Write and solve equations relating to direct or inverse proportion 	<div style="text-align: center;">  </div> <ul style="list-style-type: none"> • Prior Knowledge: 176 • Nth Term: 919 - 922 • Inequalities: 266 - 271 • Equations: 177 - 195 <p>You can login to Hegarty Maths with your full name and birthday and use the search bar to find the skills listed above by their numbers.</p>	<ul style="list-style-type: none"> • Variable – A quantity that may change within the problem – represented by a letter. • Rearrange – Change the order of the equation. • Inverse Operation – The operation (plus, divide etc) that undoes another action • Substitute – Replace a variable with a number. • Solve – Find the value of the variable that satisfies an equation.

Key Rules

Inverse Operations



Things to Remember

- When doing this type of algebra, you can always check your working by using substitution! This is a key step that many neglect. It can help you by identifying small errors in calculation or if you mess up with negative numbers.
- When solving inequalities – if you divide or multiply by a negative number you must reverse the inequality sign.
- When solving equations and inequalities – before doing an inverse operations – try to think about what is happening to the unknown. If you can work out how to ‘build up’ the equation you can work out how to break it down with inverse operations.

Symbol	Words	Example
$>$	greater than	$x+4 > 1$
$<$	less than	$3x < 9$
\geq	greater than or equal to	$2x \geq -1$
\leq	less than or equal to	$5x+3 \leq 7$

Finding the n th term

Use the DINO Method:

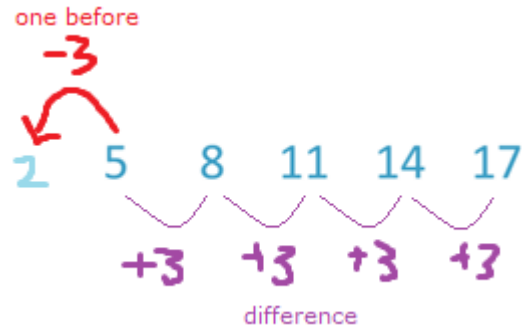
- D**i – Difference
- N** – Write n
- O** – One before



Here is a sequence:

n = 1	n = 2	n = 3	n = 4	n = 5
5	8	11	14	17
Term 1	Term 2	Term 3	Term 4	Term 5

Find the difference between each term and the 'one before'



Write n next to the difference and add the one before:

$$3n + 2$$

Solving Equations

The balance method focuses on using inverse operations on both sides of the equation.

It can be difficult to know what operation to 'undo' first. One hint - leave the coefficient of the unknown variable until last.

$$3(2x + 4) = 30$$

Expand the brackets

$$6x + 12 = 30$$

$$\begin{array}{r} -12 \qquad \qquad -12 \\ 6x + 12 = 30 \\ \hline 6x = 18 \end{array}$$

$$\begin{array}{r} 6x = 18 \\ +6 \quad -6 \\ \hline x = 3 \end{array}$$

$$\underline{x = 3}$$

Solving Inequalities

Follow similar methods for solving equations.

$$\begin{array}{r} 2 - 3x > 17 \\ +3x \quad +3x \\ \hline 2 > 17 + 3x \\ -17 \quad -17 \\ \hline -15 > 3x \\ \div 3 \quad \div 3 \\ \hline \underline{-5 > x} \end{array}$$

If there are unknowns on both sides - gather them to one side.

$$\begin{array}{r} 5(x + 4) < 3(x + 2) \\ 5x + 20 < 3x + 6 \\ 2x + 20 < 6 \\ 2x < -14 \\ \underline{x < -7} \end{array}$$

MATHS Chapter 7 – Circles, Pythagoras and Prisms

Topics

- Calculate circumference and area of circles.
- Understand and apply Pythagoras' Theorem.
- Calculate surface area and volume of 3D prisms.
- Manipulate and convert units of volume.
- Calculate upper and lower bounds of measurements.
- Calculate percentage error.

Key Skills – Hegarty Maths



- **Prior Knowledge:** 477-483
- **Circles:** 534 - 543
- **Area and Volume:** 567 - 591
- **Pythagoras:** 497 - 507

You can login to [Hegarty Maths](https://www.hegartymaths.com) with your full name and birthday and use the search bar to find the skills listed above by their numbers.

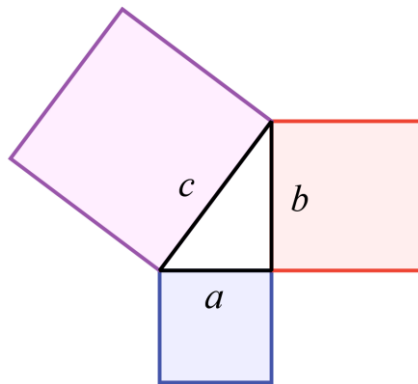
Key Vocabulary

- **Circumference** – The distance around the outside of a circle (perimeter).
- **Diameter** – The distance from one side of a circle to the other, through the middle.
- **Radius** – Half the diameter
- **Surface Area**– The space on the surfaces/outside of a 3D shape or object.
- **Volume** – The space inside a 3D shape,
- **Measurement Error** – Mistakes that come from inaccurate measurement.

Formulae & Rules

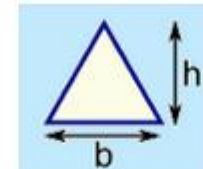
Pythagoras' Theorem

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

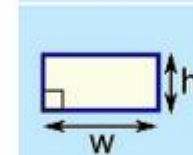


Things to Remember

- The volume of any 3D Prism can be calculated by multiplying the area of its 'base' by its height. Surface area is calculated by adding up the 2D areas of all a prisms sides. Both calculations require the formulae's for area.
- The area formulas for some common shapes can be found here.



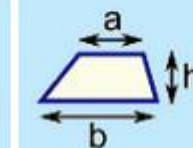
Triangle
 Area = $\frac{1}{2} \times b \times h$
 b = base
 h = vertical height



Rectangle
 Area = $w \times h$
 w = width
 h = height



Circle
 Area = $\pi \times r^2$
 Circumference = $2 \times \pi \times r$
 r = radius



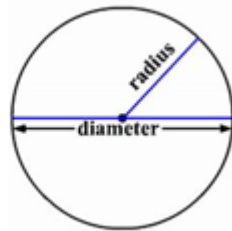
Trapezoid (US)
Trapezium (UK)
 Area = $\frac{1}{2}(a+b) \times h$
 h = vertical height

MATHS Chapter 7 – Circles, Pythagoras and Prisms

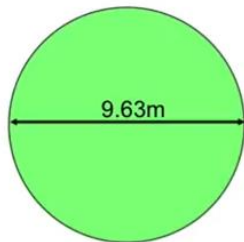
Model Answers and Examples

Calculating With Circles

- Write the formula.
- Fill in the known values and perform calculations.
- Use the right units in your answer



Circumference Example



$$C = \pi d$$

$$C = \pi(9.63)$$

$$C = 30.253\dots$$

$$C = 30.25m$$

Area Example



$$A = \pi r^2$$

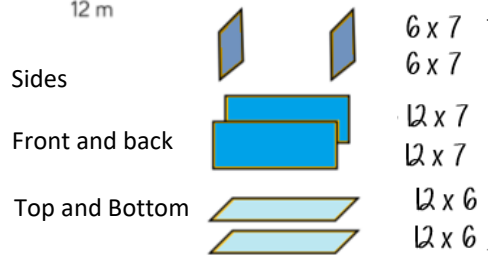
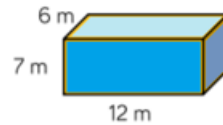
$$A = \pi(11)^2$$

$$= 380.13\dots$$

$$= 380 \text{ cm}^2$$

Surface Area

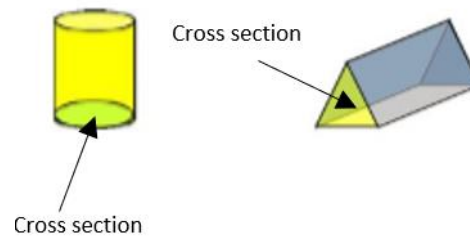
Sketching nets first helps you visualise all the sides that will form the overall surface area



Add all these up to find the surface area. (396cm²)

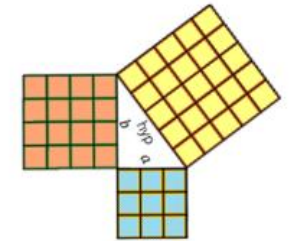
Volume

Prisms and cylinders
= Area cross section x
Height

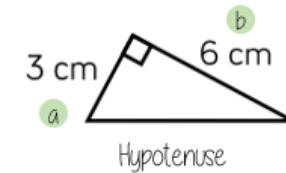


Pythagoras' Theorem

If a triangle is right-angled, the sum of the squares of the shorter sides will equal the square of the hypotenuse.



$$a^2 + b^2 = \text{hypotenuse}^2$$



$$3^2 + 6^2 = \text{hypotenuse}^2$$

$$9 + 36 = \text{hypotenuse}^2$$

$$45 = \text{hypotenuse}^2$$

$$\sqrt{45} = \text{hypotenuse}$$

$$6.71 \text{ cm} = \text{hypotenuse}$$

Designing DNA

DNA was written in 2007 and is set in the early 21st Century. It's about a group of teenagers, who could be described as a 'gang' who have accidentally killed one of their classmates. When they realise their mistake, they try to cover up the crime but inadvertently implicate an innocent man. They have plenty of opportunities to be honest about what they've done, but the group instead continues to weave a darker and more complex web of lies.

Useful Revision

Set Design -

<https://www.youtube.com/watch?v=eE5Fi5e0yz0&t=32s>

Costume Design -

<https://www.youtube.com/watch?v=48mrV0VZsWc>

Lighting Design -

<https://www.youtube.com/watch?v=wqMYsJHU5rU&t=56s>

Sound Design -

https://www.youtube.com/watch?v=UO3N_PRIgX0&t=175s

How to make a shoe box theatre:

<https://www.youtube.com/watch?v=gRwI-cnXQw>



Key Command Words:

Describe: Tell me what you see or do

Explain: Tell me why you did it or why they did it

Evaluate: Tell me how it could be improved or what was good about it.

Within a play, playwrights often use a traditional plotline (How the story is structured from beginning to end). DNA follows an episodic structure.

Principles of Set Design

COLOUR



When you create a design, you must look at the colour wheel. Colours can be used to both highlight/illuminate and hide/mask. Some colours are complementary to each other – for example, blue and orange which represent the blue sky and the colour of your skin. These are often used together in TV commercials.

TIP! Think about the colour of costumes. Do not put puppeteers in black, this will not make them disappear. Put them in a colour that contrasts their puppet!

MULTIPLE/PATTERN



Set Designers often use the 'overload techniques' using lots of multiple shapes and patterns on stage. When there are too many repeated items (e.g. hanging lightbulbs, hanging umbrellas), the brain stops trying to count them, and instead leaves the observer feeling overwhelmed and in awe.

DID YOU KNOW? This technique has been used in several productions including *Matilda* and *Frankenstein*.

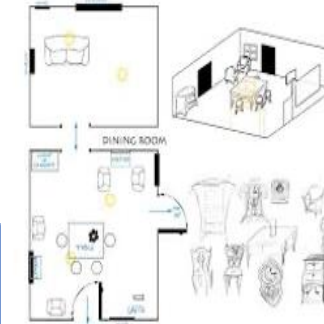


SCALE + BALANCE



Consider the size and scale of your set design and the objects you use. Depending on the genre and style of your piece, scale can communicate different meanings to your audience.

DID YOU KNOW? Big objects are associated with fun. They remind us of our childhood, wanting to climb everything around, a sense of adventure. Small objects are cute. They often make the audience feel care towards the object. Scale can show power between characters in a scene/narrative.



DILAPIDATION/ CLEANLINESS



Each set belongs to its own time period, which sometimes relies on items looking dilapidated. For example, the school desks in *Willy Russell's Blood Brothers* need to look worn and graffiti'd to show the poor educational conditions at the time. However, some sets like *The Curious Incident of the Dog in the Night-time*, need to feel extremely clean and somewhat clinical. This set design represents Christopher's autistic psychological processes.

ANGLES



When creating a set design, experiment with the angles of objects. Can you alter the angle so the audience can see more? Or could you add more abstract angles to the production, to suit its style and genre.

EXAMPLE! If your set includes a door frame, why not angle the door frame to add a surreal effect?

LOCATION(S)



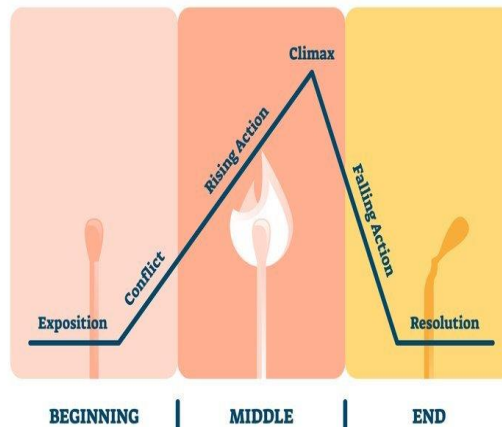
One play can often include several locations which can provide challenges for set designers. If you need to show several locations, think about using the following ideas in your designs:

- Lighting.
- Levels.
- Segregate the stage – have several small sets.

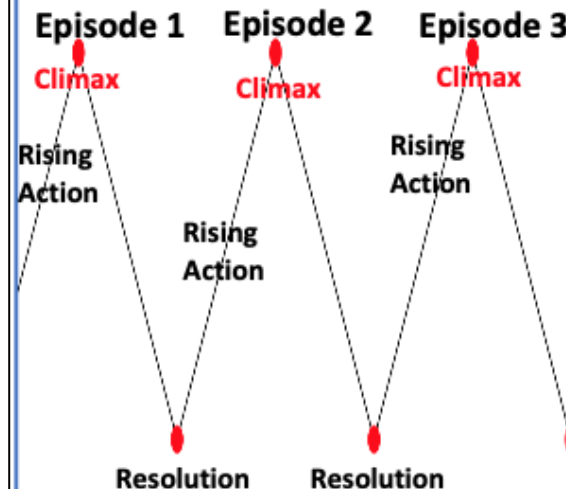
DNA Set Design Examples...



PLOT DIAGRAM



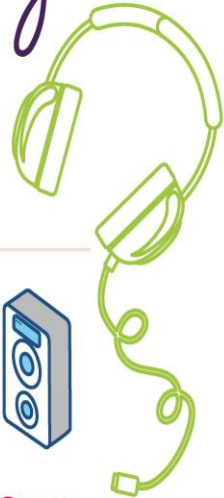
EPISODIC STRUCTURE



Key Elements of Sound Design



Source & Direction

Where is the sound coming from? If it's coming from a speaker, where is the speaker in the performance space? For example, behind the audience or underneath the stage? Are they wall mounted?




Volume

Is the sound being played at a quiet, medium or loud volume?

Types of sound

Are the sounds recorded or live (Foley)? Diegetic or non-diegetic?

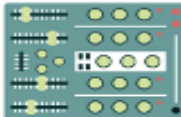


Cues

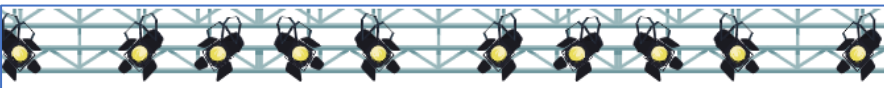
What is the 'trigger' for the sound to be played or performed (e.g. a line of dialogue or visual 'cue')?

Editing

How has the sound been manipulated or edited? (e.g. echo/ fades/ loops)



Elements of Lighting Design



Direction

The angle of light as it hits the performer or object.



Intensity

How bright or dimly lit the stage is.



Colour

The use of colour to convey a particular mood or atmosphere



Movement

A transition from one lighting state to another.

Quality

Whether the beam of a lantern is hard or soft.



Key Elements of Costume Design



What are the key elements or considerations for a costume designer?

Colour Palette

The colour of a costume can tell you so much about a character. Colour can be used to emotionally manipulate the audience.



Shape & Silhouette

Consideration of the shape of the costume on the performer's body and the silhouette it creates on stage. Silhouettes can indicate specific time periods.

Character/ Personality/ Style

Just as we have our own personal style, so does every character. What are the details in the costume which communicate their unique personality?



Texture & Fabric

Every fabric has a different texture. This refers to how the fabric feels and moves on the actor. For example, is it rough, smooth or soft?



Battles of The Bands

Rock music is a form of popular music that evolved from rock and roll and pop music during the mid and late 1960s. Harsher and often self-consciously more serious than its predecessors, it was initially characterized by musical experimentation or anti-establishment lyrics.

The structure of a pop/rock song may include:

- INTRO: Short opening section, usually instrumental.
- VERSE: Same music but different lyrics each time.
- CHORUS: Repeated with the same lyrics each time (refrain).
- MIDDLE EIGHT: A link section, often eight bars, with different musical ideas.
- BRIDGE: A link/transition between two sections.
- OUTRO: An ending to finish the song (coda).
- You may also hear a pre-chorus, instrumental interlude or instrumental solo.
- Strophic songs, 32 bar songs (AABA) and 12 bar blues are also found in popular music.

A typical rock ballad in verse chorus form would follow the pattern:

- Intro
- Verse 1
- Chorus
- Verse 2
- Chorus
- Middle Eight
- Chorus
- Outro

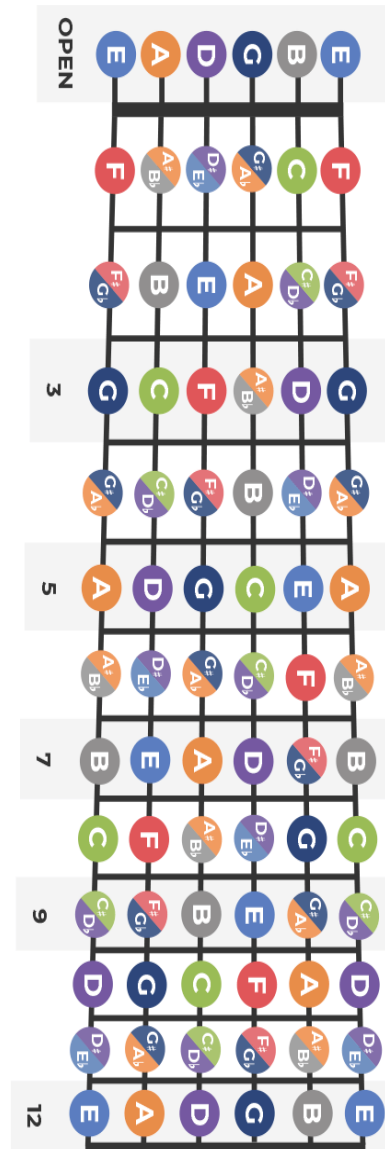
Instruments

- Electric Guitar:** Also known as the lead guitar. It plays the melody/ solos/riffs.
 - Rhythm guitar:** Plays the chords/ accompaniment.
 - Bass Guitar:** Plays the bass line.
 - Drum Kit:** Provides the beat.
 - Lead Singer:** The main vocalist.
 - Backing Vocals:** Singers who provide harmony.
- Pop/rock groups may also include acoustic (not electric) instruments e.g. trumpet, trombone, saxophone and/or electronic keyboards/synthesizers.

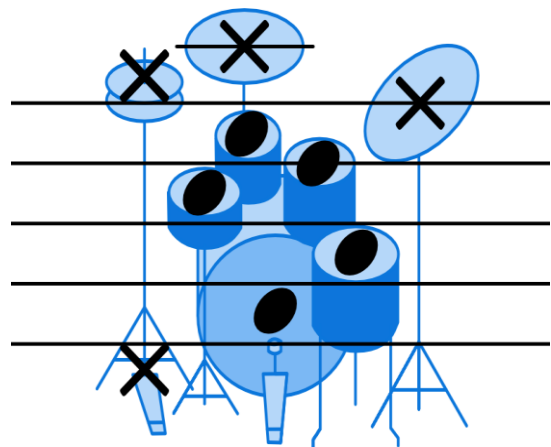
Guitar chords



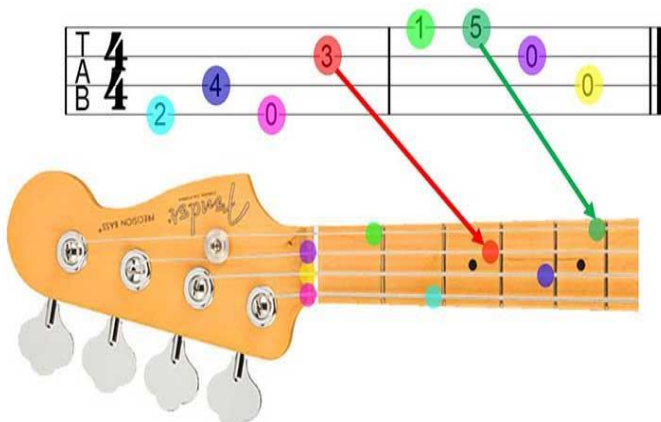
Notes on the guitar



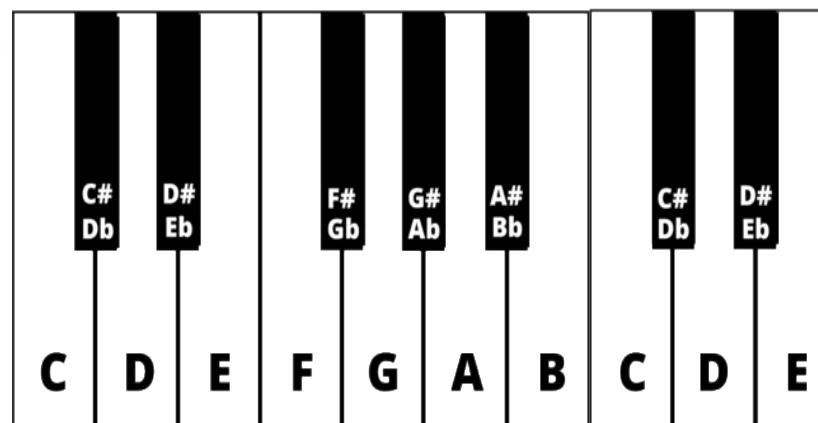
Drum Notation










Bass Tab

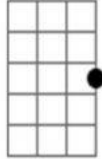
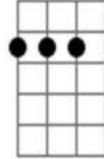
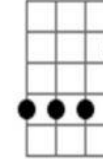
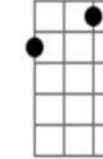
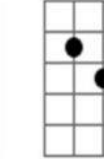
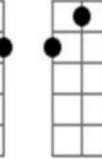
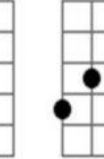
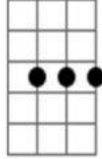
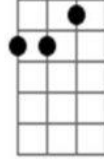
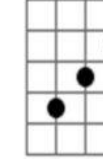

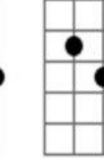
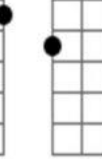
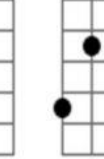
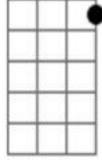
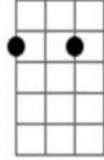
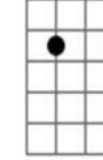
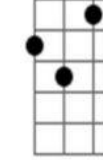
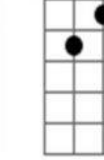
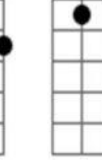
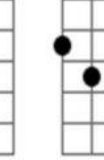
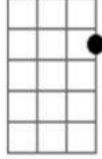
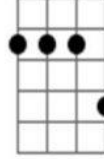
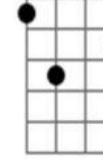
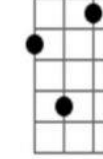
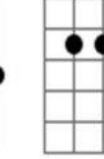
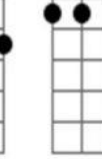
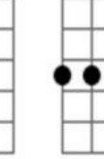
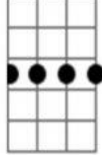
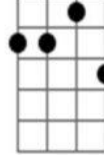
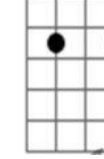
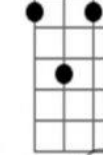
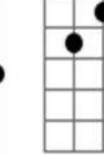
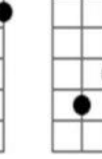
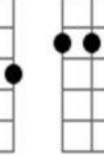


Piano notes



Term	Definition	Example
Electric guitar	A guitar with a built-in pickup or pickups which convert string vibrations into electrical signals for amplification.	
Bass Guitar	A bass guitar is a plucked string instrument built in the style of an electric guitar but producing lower frequencies.	
Drum kit	A percussion instrument which sound is heard by being struck with sticks, typically cylindrical, barrel-shaped, or bowl-shaped, with a taut membrane over one or both ends.	
Keyboards	Keyboard instrument, any musical instrument on which different notes can be sounded by pressing a series of keys, push buttons, or parallel levers.	
Vocals	A singer, typically one who regularly performs with a jazz or pop group.	
Mixing desk	A console where sound signals are mixed during recording or broadcasting.	
Practice	Practice is the deliberate, creative process of improving musical ability and of mastering music for performance.	

Ukulele Chords

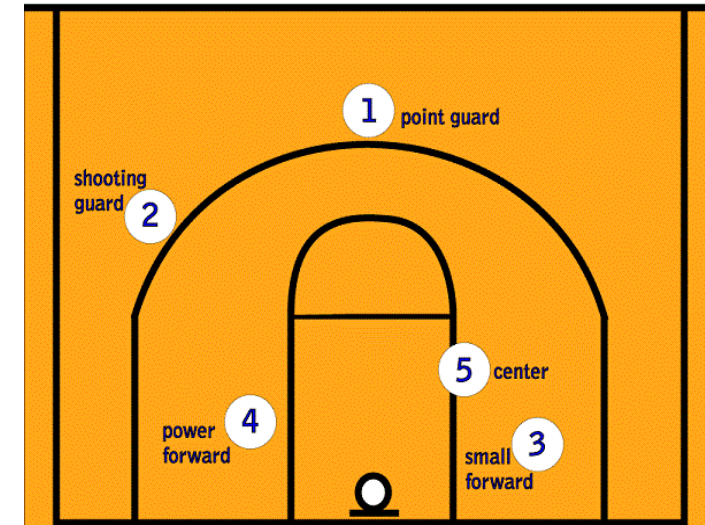
C	D	E	F	G	A	B
						
Cm	Dm	Em	Fm	Gm	Am	Bm
						
C7	D7	E7	F7	G7	A7	B7
						
Cmaj7	Dmaj7	Emaj7	Fmaj7	Gmaj7	Amaj7	Bmaj7
						
Cm7	Dm7	Em7	Fm7	Gm7	Am7	Bm7
						

PE - Year 9 Basketball

Key Vocabulary

Dribbling	Head up, spread fingers and fingertips, waist height.
Chest pass	W grip, step, chest to chest, follow through, short distance.
Bounce pass	W grip, step, chest to chest, follow through, bounce before player, short distance.
Pivoting, footwork and jump stop	Landing on alternative feet- first foot to land is the static pivoting foot. Landing on simultaneous feet- either foot can become static pivoting foot/can be used at the end of a dribble or when receiving a pass. On the move- release ball before third step.
Set shot	Knees bent, dominant foot slightly in front of other, strong hand at bottom, supporting hand on side, and elbow at 90 degrees.
Lay up	Strong hand at bottom, supporting hand on side, keep it high, right hand dribble, step right, jump left aim for top right hand corner of box, left hand dribble, step left, jump right, aim for top left corner of box.
Defending	Man to man- knees bent, back straight, head up, arms out, watch opponent's belly-button.
Attacking	Dribble into space, screen defenders, dribble out wide and quick inward passes, drive towards ball to receive pass losing defender, overload zone defence.
Triple threat position	Knees bent, hands positioned on ball so ready to shoot, head up, can dribble, pass or shoot from here.

Key Images



Challenge Questions

Watch a video of a NBL game, identify key players and their positions and write what they did well and what they could improve on. Also identify the difference between man to man marking, zone marking and on the move marking and write down the difference between them and when in a game they would be used.



Dig Deep & Discover

Find local clubs (P10)

<https://www.redbridge.gov.uk/media/7611/sports-club-directory.pdf>



<https://www.basketballengland.co.uk/>

PE - Fitness

Key Vocabulary

Training Methods:-

Interval -Athletes training with periods of work followed by periods of rest

Continuous -Training for a specific period of time with no rest

Fartlek -A combination of slow and fast running over a variety of distances and terrains

Cross -A mixture of training

Circuit -A number of exercises, set out at 'stations' to avoid exercising the same muscle group consecutively

Weight -Using progressive resistance, either in the form of actual weight lifted or in terms of the number of times the weight is lifted

Flexibility – Either Ballistic; Static or PNF.

Plyometric – Involves jumping and immediately Jumping again.

Speed Training – Could include Hollow Sprints ; Acceleration and Interval Training

Key Images



Challenge Questions

Can you link the images above to the correct training method?

Devise a Training Programme for a Specific Sport

Dig Deep & Discover

<https://www.health.com/fitness>

<https://www.rslonline.co.uk/>



PE - Table Tennis

Key Vocabulary

Slice (Forehand and Backhand) - A shot played in which the ball is cut underneath to alter the direction when it lands on the table.

Backhand push (Develop) - The ball is played on the backhand side, with a flat bat face to push the ball over the net, and move the opponent consistently out of position and accurately play the shot into the target area.

Forehand push (Develop) - The ball is played on the forehand side, with a flat bat face to push the ball over the net, and move the opponent consistently out of position and accurately play the shot into the target area.

Serve - The first shot to begin a rally. The serve is alternated between the two players, after two serves the service goes to the opposite player regardless of the winning shot. Play a variety of shots to move the opponent out of position and accurately play the shot into the target area.

Forehand topspin - A shot played on the forehand side, contact cuts on an angle to the ball to make it move differently, and move the opponent consistently out of position and accurately play the shot into the target area.

Key Images



Challenge Questions

How would you play the slice shot on the forehand/backhand side?

How is this different to the topspin technique?

How can adding spin or slice influence your opponent during a rally?

Dig Deep & Discover

Find local clubs (P26)

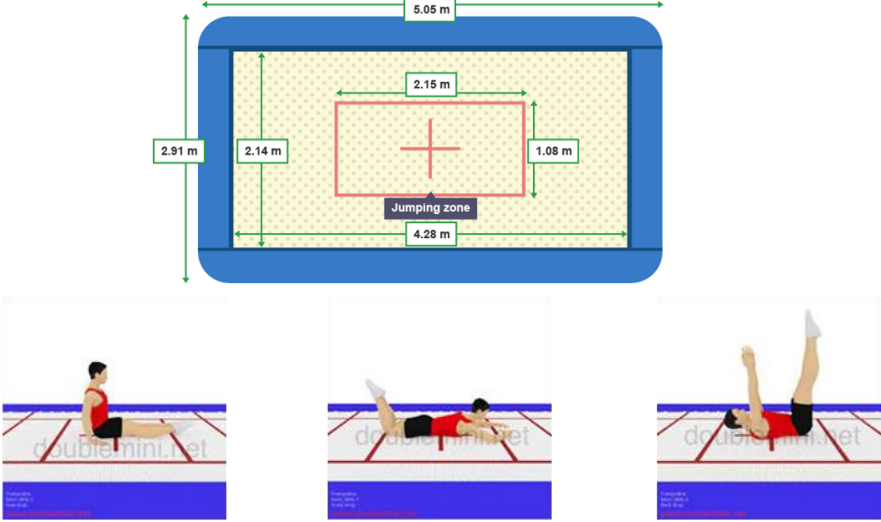

<https://www.redbridge.gov.uk/media/7611/sports-club-directory.pdf>

<https://www.ittf.com>

<https://www.tabletennisengland.co.uk>



PE - Trampolining

Key Vocabulary	Key Images
<p><u>Basic Shapes</u></p> <p>Straight – A vertical jump with arms held straight, together and above the head on take-off.</p> <p>Pike – From a straight jump start, the legs are lifted up and in front, keeping them together and straight. This is done whilst reaching for the toes.</p> <p>Tuck - From a straight jump start, the knees are tucked up to the chest and the hands must grasp the legs between the knees and ankle.</p> <p>Straddle - Similar to the pike jump except that the legs are spread sideways approximately 90° apart and the arms reach forward towards the toes.</p>	<p>Key Images</p> 
Challenge Questions	Dig Deep & Discover
<p><u>Spotting</u> is where performers around the trampoline prevent the active performer from falling off. What other ways can you remain safe during a lesson on the trampolines?</p> <p>Can you produce your own 10 bounce routine using the moves you have learnt?</p>	<p>Find local clubs (P28) https://www.redbridge.gov.uk/media/7611/sports-club-directory.pdf</p> <p>https://youtu.be/M_h9dmJ3NmM</p> 

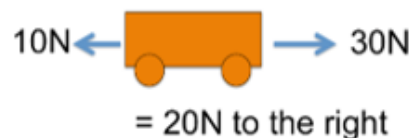
Physics P2: Forces and motion

Lesson sequence

1. Resultant forces
2. Newton's first law
3. Mass and weight
4. Newton's second law
5. Core practical – investigating acceleration
6. Newton's third law
7. Momentum (HT)
8. Stopping distances
9. Car safety

1. Resultant forces

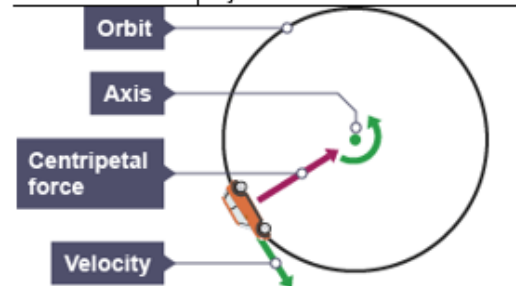
Scalar quantity	A quantity with magnitude (but no direction).
Vector quantity	A quantity with magnitude and direction.
Force arrows	Arrows can be used to represent forces: - Direction = direction of force - Length = size of force
Resultant force	The force left over when forces acting in opposite directions are cancelled out.
Calculating resultant force	Subtract the total force in one direction from the total force in the other direction.



Balanced forces	When the resultant force is zero (because forces acting in opposite directions are the same size).
Unbalanced forces	When the resultant force is non-zero (because there is more force in one direction than another).

2. Newton's first law

Newton's first law of motion	An object will move at the same speed and direction unless it experiences a resultant force.
The effect of resultant forces	Resultant forces cause acceleration: speeding up, slowing down or changing direction
Effect of forces on motion	Forces make you start moving, stop moving or change direction, they are not needed to keep you moving!
Circular motion	Moving in a circle is a type of acceleration because you are changing velocity (your direction changes even if your speed does not).
Centripetal force	A force acting towards the centre of a circle that enables objects to move in a circle.



Sources of centripetal force	Gravity – keeps the Earth orbiting the sun Tension – lets a bucket swing in circles on a rope Friction – keeps cars turn round a roundabout
-------------------------------------	---

3. Mass and weight

Mass	The quantity of matter in an object is made of. Units = kilograms, kg.
Weight	A force caused by gravity pulling downward on an object. Units = newtons, N.

Force meter	An instrument for measuring forces. They usually involve a spring that stretched more the more the force.
--------------------	---



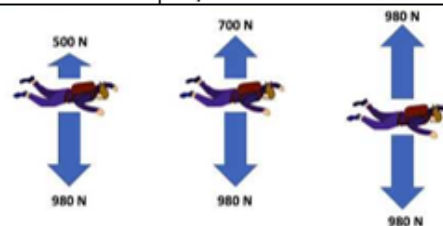
Gravitational field strength	The strength of gravity, which is different on different planets. Units = newtons per g=kilogram, N/kg.
-------------------------------------	---

Gravitational field strength on Earth	9.8 N/kg Sometimes rounded to 10 N/kg
--	--

Calculating weight	Weight = mass x gravitational field strength $W = m \times g$ Weight = N Mass = kg Gravitational field strength = N/kg
---------------------------	---

Air resistance	A force created by the air pushing against you as you move. Faster movement → greater air resistance.
-----------------------	---

Motion whilst falling	Accelerate until the air resistance is equal to the weight; now there is no resultant force so speed stays constant.
------------------------------	--



4. Newton's second law

Newton's second law of motion	Force = mass x acceleration
Acceleration is greater when...	- The force is greater - The mass is smaller

Calculating forces	Force = mass x acceleration $F = m \times a$ Force = N Mass = kg Acceleration = m/s^2
---------------------------	---

Calculating acceleration	Acceleration = mass / force $a = F / m$
---------------------------------	--

Inertial mass	The mass calculated by measuring the acceleration produced by force, using the equation ' $m = F / a$ '
----------------------	---

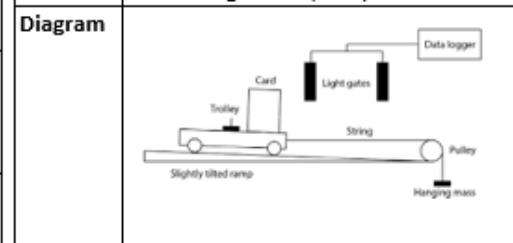
The point of inertial mass	Inertial mass is the same as mass measured with a mass balance, but it gives us a way to measure mass where there is no gravity, such as in space.
-----------------------------------	--

5. Core practical – investigating acceleration

Link to video of practical	https://www.youtube.com/watch?v=LZqFrXWgd2o
-----------------------------------	---

Aim	To investigate how changing force changes acceleration.
------------	---

Setup	A trolley on a ramp with 90 g masses. 10 g mass hanger attached to trolley via a string over a pulley.
--------------	--



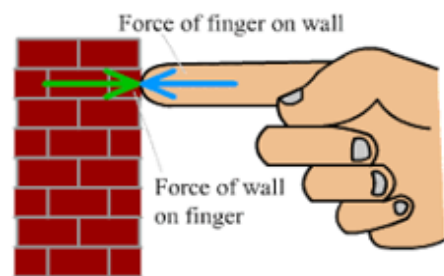
Data collection	Release the trolley, use light gates to measure the acceleration.
------------------------	---

Variations	Move 10 g of mass from the trolley to the mass hanger each time.
-------------------	--

Independent variable	The force: each 10 g mass = 0.1 N force
-----------------------------	---

Results	More mass → more force → greater acceleration.
----------------	--

6. Newton's third law	
Newton's third law	For every action force there is an equal but opposite reaction force.
Action force	The force you push or pull with.
Reaction force	A force of the same size but opposite direction to an action force.
Action-reaction forces	If, A applies an action force to B, B applies a reaction force of same size and opposite direction to A.

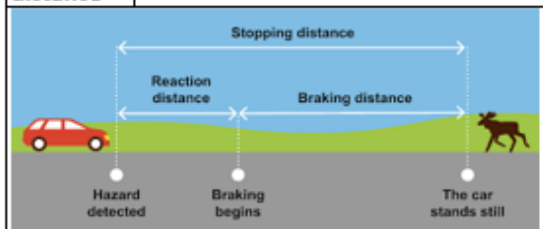


Action-reaction vs balanced forces	Similarities: same sizes, opposite directions Differences: balanced forces act on same object, action-reaction act on different objects
Action-reaction forces - collisions	<u>E.g.</u> kicking a ball: the foot pushes the ball, the ball pushes back on the foot.

7. Momentum (HT)	
Momentum	The tendency of an object to keep moving.
Calculating momentum	Momentum = mass x velocity $p = m \times v$ Momentum = kg m/s Mass = kg velocity = N/kg

Momentum and force calculations	Force = change in momentum / time $F = (mv - mu)/t$ Force = N Mass = kg Velocity = m/s Time = s
Conservation of momentum	Total momentum before and after a collision is the same.

8. Stopping distances	
Stopping distance	The distance travelled from when a hazard is seen to when you fully stop.
Thinking distance	The distance travelled from when a hazard is seen to when you brake.
Braking distance	The distance travelled from when you brake to when you fully stop.
Calculating stopping distance	Stopping distance = thinking distance + braking distance



Thinking distance and reaction time	Slower reactions = greater thinking distance
Thinking distance increased by...	Higher speed, tiredness, illness, drugs, distractions, old age
Braking distance increased by	Higher speed, poor brakes, poor tyres, wet/icy/gravelly road, downhill, heavier load

9. Crash hazards	
Crash danger	Crashes involve large decelerations, creating large forces which can injure you.
Car safety features	Increase the time a collision takes, reducing deceleration and forces.
Three car safety features	Crumple zones, (stretchy) seat belts, air bags
Collision forces	Greater momentum <u>change</u> → greater force
Calculating collision forces	Force = change in momentum / time $F = (mv - mu)/t$ Force = N Mass = kg Velocity = m/s Time = s

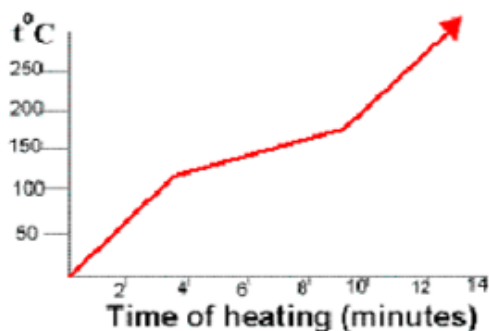
Chemistry C2: States of matter and separating substances

Lesson sequence

1. Mixtures
2. Filtration and crystallisation
3. Paper chromatography
4. Distillation
5. Core practical – investigating inks (CP7)
6. Drinking water

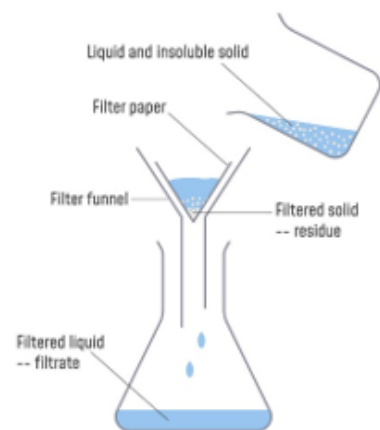
1. Mixtures

Element	A substance made from only one type of atom.
Compound	A substance made from two of more different elements bonded together.
Mixture	A substance made of two of more substances (elements or compounds) mixed but not bonded together.
Melting point of mixtures	Mixtures do not melt at a fixed temperature but melt gradually over a range of temperatures.
Heating curves of mixtures	The flat sections of the heating curves of a pure substance are sloped for a mixture.



2. Filtration and crystallisation

Dissolve	When a substance mixes with a liquid by breaking down into individual particles (atoms or molecules).
Soluble	When a substance can be dissolved by a liquid.
Insoluble	When a substance can't be dissolved by a liquid.
Filtration	A method of separating a mixture of a liquid and an insoluble solid by passing it through a filter paper.
Residue	The solid that gets left behind in the filter paper.
Filtrate	The liquid that passes through the filter paper.
How filtration works	The filter paper contains many tiny holes. The water molecules are small enough to pass through the holes, the solid particles are too big and get trapped.



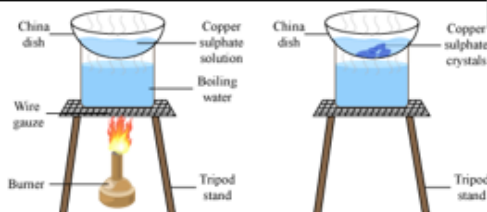
Solution	A mixture of a solute dissolved in a solvent.
Solvent	A liquid that has dissolved a substance, for example water.
Solute	A solid that has been dissolved, for example salt.

Crystallisation

A method of collecting the dissolved solid from a solution by heating it so that the solvent evaporates away.

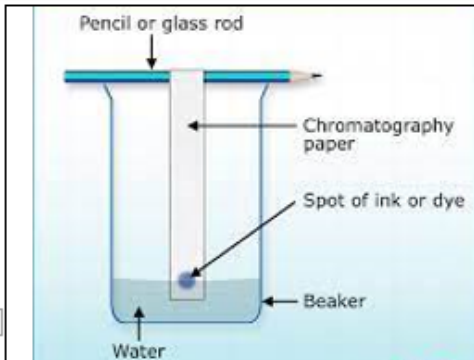
Risks of crystallisation

As the solvent boils away, the hot solution can spit, so you should wear safety goggles to protect your eyes.

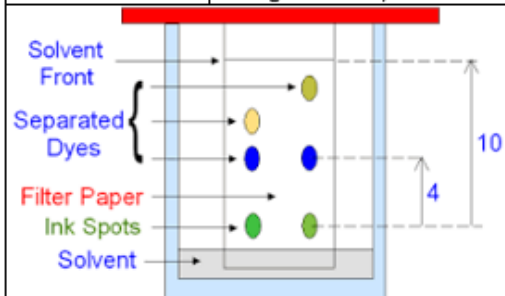


3. Paper chromatography

Paper chromatography	A method of separating out mixtures of liquids to show what is in them, by letting them travel up a piece of chromatography paper.
Chromatography method	<ol style="list-style-type: none"> 1. Draw pencil line on paper 2. Place sample spot <u>on line</u> 3. Place paper in solvent, with solvent below pencil line. 4. Allow solvent to soak up the paper 5. Stop when solvent near top, and mark how far it gets.

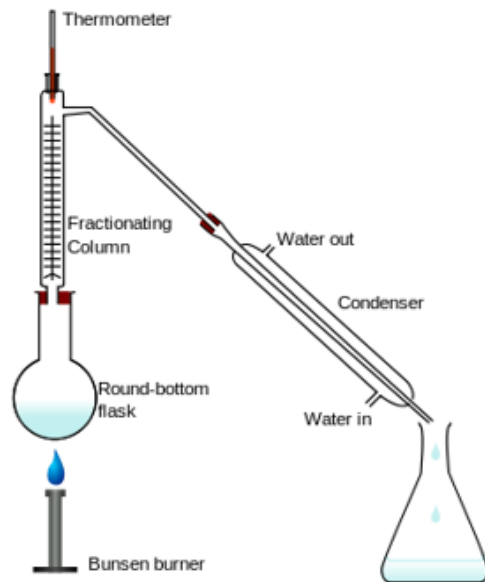


Stationary phase	The substance the solvent moves through – usually paper (Note: technically it is a thin layer of water from air that is bound to the paper molecules)
Mobile phase	The solvent.
R_f (retardation factor)	$R_f = \text{spot distance} / \text{solvent distance}$ In diagram $R_f = 4/10 = 0.4$

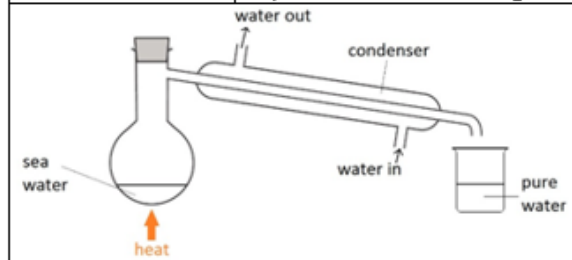


Uses of R_f	R _f enables you to identify a substance because for a given solvent and stationary phases, it is unique to each substance.
Uses of chromatography	<ul style="list-style-type: none"> - To tell between pure and impure substances - To identify substances by comparison with known ones - To identify substances by calculating R_f.

4. Distillation	
Distillation	A method used to collect pure liquid from a solution, such as getting pure water from seawater.
Condenser	A glass tube surrounded by a glass jacket containing cold tap water. Used to condense gases back to liquids.
How distillation works	The solution is heated until it is hot enough for the solvent to boil. The solvent is then passed through a cool condenser where it turns back to liquid. The solute does not get hot enough to evaporate and stays where it is.



Anti-bumping granules	Jagged grains of glass that are added during distillation to prevent violent boiling.
------------------------------	---

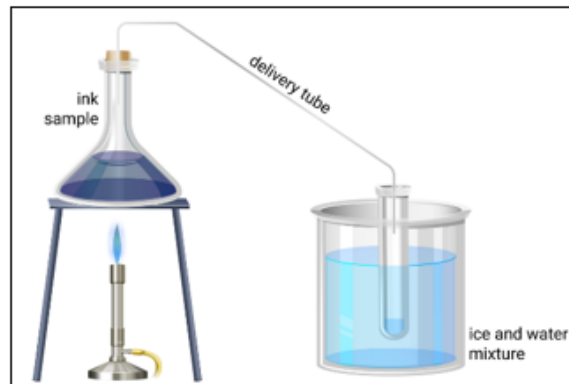


Fractional distillation	A type of distillation used to separate mixtures of two or more liquids.
--------------------------------	--

How fractional distillation works	The liquid with the lowest boiling point boils first and can be collected, then the next boils and so on.
--	---

Fractionating column	A tall glass column used during fractional distillation that gives a better separation of the liquids by producing a temperature gradient.
-----------------------------	--

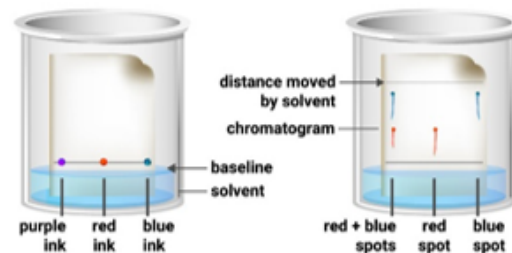
5. Core practical – investigating inks	
Link to video of practical	https://www.youtube.com/watch?v=HOS-Z5aqDwA
Aim	To separate inks using distillation and chromatography.
Distillation set up	Place some ink in a conical flask with a side arm and delivery tube attached, place the flask on a tripod above a Bunsen burner. Place a boiling tube in a beaker of ice and place the delivery tube into the boiling tube.
Run the distillation	Light the Bunsen burner and allow the ink to boil, stop once a few drops of liquid have collected.
Distillation results	Pure water collects in the test tube because it <u>boils</u> and the cold ice condenses the vapours back to liquid. The ink gets darker because there is less water to dilute it.



Chromatography setup	<ol style="list-style-type: none"> 1. Draw pencil line on paper 2. Place ink spot <u>on line</u> 3. Place paper in solvent, with solvent below pencil line. 4. Allow solvent to soak up the paper 5. Stop when solvent near top, and mark how far it gets.
-----------------------------	---

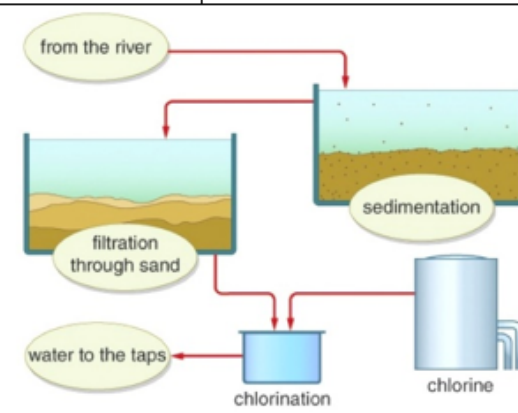
Chromatography - calculate Rf	Measure how far each of your spots has moved from the line and how far the solvent has moved. $R_f = \text{spot distance} / \text{sample distance}$.
--------------------------------------	---

Chromatography results	The ink separates into multiple different spots. The one that moves furthest is most soluble in the water.
-------------------------------	--



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

6. Drinking water	
Potable water	Water that is safe to drink.
Desalination	Producing pure water from seawater.
Purifying seawater	The seawater is distilled: heating the water to produce water vapour and condensing it back to liquid. Uses lots of energy.
Uses of pure water	Pure water <u>has to be used</u> when chemists analyse substances to find out what they contain. Tap water contains many dissolved substances that could interfere with this.
Water treatment in the UK	Water is passed through a sedimentation tank, to allow sediment to settle out, it is passed through a filtration tower to remove floating particles, chlorine is added to kill bacteria.



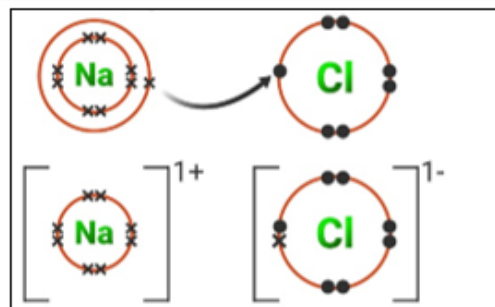
Chemistry C5-7: Bonding

Lesson sequence

1. Ionic bonding
2. Ionic compounds
3. Properties of ionic compounds
4. Covalent bonding
5. Covalent structures
6. Allotropes of carbon
7. Metallic bonding
8. Classifying materials

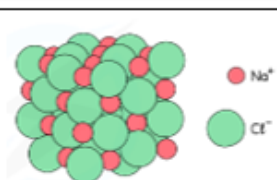
1. Ionic bonding

Bond	An attraction between two atoms that holds them together.
Ion	An atom that has gained a charge by <u>gaining</u> or <u>losing</u> electrons.
Charge	Whether an ion is positive or negative.
Cation	Positive ion formed by losing electrons. Formed by metal atoms.
Anion	Negative ion formed by gaining electrons. Formed by non-metal atoms.
Size of charge	The number of electrons transferred affects the size of charge: losing two electrons makes a 2+ charge, gaining three electrons makes a 3- charge.
How many electrons are gained or lost?	Metals: <u>however</u> many electrons are in the outer shell Non-metals: <u>however</u> many electrons are needed to fill the outer shell.
Electrostatic force	A force of attraction between a positive and negative particle.
Ionic bond	When two oppositely charged ions are held together by an electrostatic force.
Forming ionic bonds	Electrons are transferred from a metal atom to a non-metal atom to form a positive metal cation and a negative metal anion. The oppositely charged ions are attracted to each other.



2. Ionic compounds

Chemical formula	Shows the number of atoms of each element present in one 'unit' of a compound.
Writing formulae	- Each chemical symbol starts with a capital letter. - The number of each atom present is shown with a subscript number after the symbol. E.g. Na ₂ SO ₄ .
Determining ionic formulae	- Ensure the total number of positive and negative charges balance. - Change the number of each ion present by changing the subscript numbers.
Compound ions	An ion made from two or more atoms that share a charge.
Common compound ions	Hydroxide: OH ⁻ Nitrate: NO ₃ ⁻ Sulfate: SO ₄ ²⁻ Sulfite: SO ₃ ²⁻ Carbonate: CO ₃ ²⁻ Ammonium: NH ₄ ⁺
Including compound ions in formulae	If you need more than one, put brackets around it. E.g. Mg(OH) ₂
Ionic lattice	The structure of ionic compounds: a repeating 3D pattern of alternating positive and negative ions.



Crystal A piece of material with a regular shape and straight edges formed by the regular pattern of ions in an ionic lattice.

3. Properties of ionic compounds

Melting point of ionic compounds	High because melting needs a lot of energy to break strong ionic bonds.
Solubility of ionic compounds	Many ionic compounds dissolve in water.
Electrical conductivity of ionic compounds	Solid: Do not conduct because ions can't move. Liquid (molten or solution): Do conduct because ions can move.
How ionic compounds conduct electricity	When they are in a liquid form, the positive cations move to the negative electrode (cathode) and the negative anions move to the positive electrode (anode).

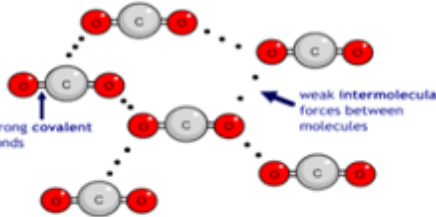
4. Covalent bonding

Covalent bond	An electrostatic attraction between two atoms and a shared pair of electrons.
Double bond	A covalent bond involving two shared pairs of electrons.
Dot and cross diagram	A bonding diagram showing the electrons in the outer shell of each atom, with electrons drawn as dots or crosses.

Hydrogen, H₂	
Hydrogen chloride, HCl	
Oxygen, O₂	 Two pairs in the overlap = a double covalent bond
Water, H₂O	
Carbon dioxide, CO₂	
Methane, CH₄	
Valency	The number of covalent bonds an atom can form.

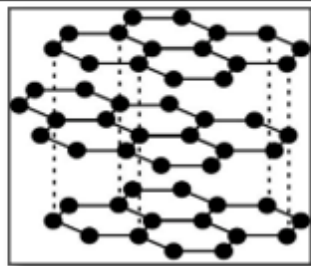
5. Covalent structures

Molecule	A particle made from two or more atoms bonded together.
Simple molecular structure	A structure made of small molecules in which a few atoms <u>join together</u> to form a small particle.
Structure of molecular substances	Atoms in a molecule are held together by strong covalent bonds. Neighbouring molecules are held close by weak intermolecular forces.

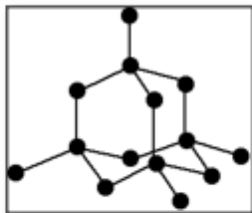
Intermolecular force	A weak electrostatic force that holds two neighbouring molecules together.
Melting point of simple molecular compounds	Low because melting only needs a little energy to break weak intermolecular forces.
	
Electrical conductivity of simple molecular compounds	Do not conduct because there are no electrons that are free to move.
Examples of simple molecular substances	Hydrogen gas, oxygen gas, water, carbon dioxide, methane.
Giant molecular structure	A structure made of a repeating pattern of atoms covalently bonded together.
Melting point of giant molecular compounds	High because melting requires breaking strong covalent bonds.
Electrical conductivity of simple molecular compounds	Do not conduct (except graphite) because there are no electrons free to move.
Examples of giant molecular substances	Silicon dioxide (silica), diamond, graphite.
Polymer	A large molecule made of a small unit repeated many times.
Monomer	A small molecule that can be joined together many times to form a polymer.

6. Allotropes of carbon	
Allotrope	A different structural form of an element made of the same atoms just bonded together differently.

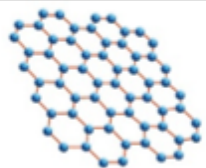
Carbon's allotropes	Graphite, diamond, graphene, fullerenes
Graphite	Giant covalent structure: stacked sheets of carbon in a honeycomb pattern with delocalised electrons between them. Properties: sheets slide apart easily, excellent conductor Uses: lubricants



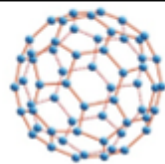
Diamond	Giant covalent structure: Repeating pattern of 4 atoms bonded to 4 others. Properties: Extremely hard. Uses: Cutting tools and drills
----------------	--



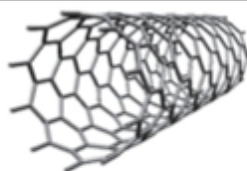
Graphene	Giant covalent structure: A single layer of atoms in a honeycomb pattern. Properties: Very strong, excellent conductor. Uses: None yet, but potentially many.
-----------------	--



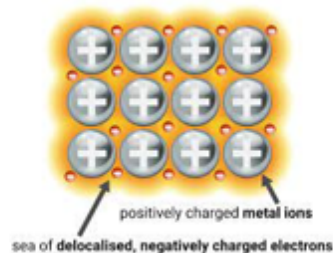
Buckminster fullerene	Simple molecular structure: Ball-shaped molecules of C_{60} . Properties: Low melting point Uses: None
------------------------------	---



Carbon nanotubes	Giant covalent structure: Cylinders made of carbons bonded in a honeycomb pattern. Properties: Very strong, excellent conductors Uses: Strong and flexible materials, electronics.
-------------------------	---



7. Metallic bonding	
Structure of metals	A lattice of positive metal ions surrounded by a cloud of delocalised electrons.



Delocalised electrons	Electrons that are not bound to a single atom but move freely around many.
Metallic bonding	The electrostatic attraction between the lattice of positive metal ions and the cloud of delocalised electrons.
Electrical conductivity of metals	Metals are good conductors because the electrons are free to move.

Comparing the conductivity of metals	Metals with more electrons in the outer shell – such as Al – are better conductors than those with fewer – such as Li – because there are more delocalised electrons that are able to move.
Malleable	When a substance dents when it is hit instead of shattering.
Malleability of metals	Metals are malleable because the atoms are arranged in regular sheets and these sheets can easily slide over each other when hit.
Melting point of metals	High because melting them requires breaking the strong force of attraction between the lattice of metal ions and the cloud of delocalised electrons.

8. Bonding models	
Classifying materials	The properties of a material can be used to determine the type of bonding in it.
Properties of ionic compounds	High melting point, often soluble in water, solid does not conduct electricity, liquid/solution does.
Properties of simple molecular compounds	Low melting point, does not conduct electricity, sometimes soluble in water.
Properties of giant molecular compounds	High melting point, does not conduct electricity (except graphite), insoluble in water.
Properties of metallic compounds	High melting point, does conduct electricity, insoluble in water.
Bonding models	The ideas and drawings that we use to explain the bonding of atoms.
Problems with bonding models	- Dot and cross diagrams make electrons seem different, they are not - Atoms appear stationary but are actually vibrating - Atoms don't appear to be touching when they actually are.

Biology B6: Plants

Lesson sequence

1. Photosynthesis
2. Leaves
3. Factors affecting photosynthesis
4. Core practical – effect of light intensity on photosynthesis
5. Roots
6. Transpiration and translocation

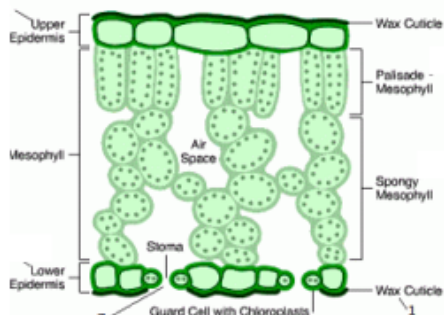
1. Photosynthesis

Photosynthesis	How plants produce glucose using the energy from light.
Photosynthesis equation	Carbon dioxide + water → glucose + oxygen
Chloroplast	Part of a plant cell where photosynthesis happens.
Chlorophyll	A green pigment that enables photosynthesis by trapping the energy in light.
Forming starch	As soon as they are made, glucose molecules are joined together into long chains to form starch.
At night	Starch is converted into a sugar called sucrose which is easy to move around the plant.
Uses of sucrose	Sucrose is converted into: - Glucose for respiration - Starch for storage - Other molecules for growth
Biomass	The total mass of materials in an organism (except water). Photosynthesis is the main source of biomass.

2. Leaves

Job of leaves	To conduct as much photosynthesis as possible as quickly as possible.
Leaf adaptations	To do more photosynthesis, leaves have: a large surface area, a waxy cuticle, palisade cells, a spongy layer, stomata.
Large surface area	Allows the leaf to absorb more light.

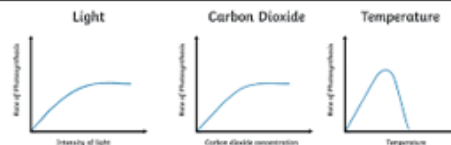
Waxy cuticle	A waxy coating that stops water evaporating from the leaf.
Palisade cells	Tall cells in a leaf with many chloroplasts for lots of photosynthesis.
Spongy layer	A layer of cells with lots of gaps that allows gases to move around inside the leaf.
Stomata (singular = stoma)	Holes in the bottom of the leaf that allow carbon dioxide in and oxygen and water vapour out.
Stomata structure	Each stoma is surrounded by two cells called guard cells that can swell to open it or shrink to close it.
How stomata work	During the day, the stomata open to allow gas exchange. At night the stomata close. Stomata also close during dry spells to stop water loss.



3. Factors affecting photosynthesis

Limiting factor	A factor that holds back the rate of photosynthesis when in short supply.
The limiting factors	Carbon dioxide concentration, light intensity, temperature.
Limiting factor graphs	The line slopes up when the factor is limiting, the line levels out when the factor is not limiting.
Carbon dioxide and light intensity	To start with, increasing them will increase the rate of photosynthesis because they are limiting. Eventually increasing them further has no effect as they are no longer limiting.

Temperature and photosynthesis	Increasing temperature towards the optimum increases the rate as particles move faster and collide more. Increasing past the optimum decreases rate as enzymes denature.
Inverse square law (HT)	$I_{new} = \frac{I_{orig} \times d_{orig}^2}{d_{new}^2}$



4. Core practical – effect of light intensity on photosynthesis (CP4)

CP4 – Key question	How does light intensity affect the rate of photosynthesis?
CP4 - Set up equipment	Place some pondweed in a beaker of water with a glass funnel over it and place it 10 cm away from a lamp and wait three minutes for it to settle.
CP4 - Recording results	Count the number of bubbles produced in a minute.
CP4 - Vary the light intensity	Repeat the experiment lowering the light intensity by moving the lamp 10 cm further away each time until it is 50 cm away.
CP4 - Results	As the light intensity decreases, the number of bubbles per minute decreases because the rate of photosynthesis decreases.

5. Roots

Role of roots	To absorb water and nutrients from the soil.
Root hair cells	Role: To quickly absorb water and minerals from soil Adaptations: A long hair which increases their surface area, thin cell walls to ease water absorption.
Movement of water	Water enters roots by diffusion and osmosis and travels to the xylem in the centre.

Diffusion in roots	Water diffuses along the cell walls around the outside of each cell until it reaches the xylem.
Osmosis in roots	Water travels from cell to cell across cell membranes by osmosis until it reaches the xylem.
Minerals in the soil	Plants absorb minerals from soil such as nitrates, phosphates and potassium.
Absorbing minerals	Plants absorb minerals by active transport because their concentration is low.

6. Transpiration and translocation

Transpiration	The movement of water into a plant's roots, up its stem and evaporating out of the leaves.
Xylem	Hollow tubes that carry water from the roots, up the stem to the leaves.
Xylem cells	Role: To carry water from the roots to the leaves. Adaptations: Hollow to let water pass, no walls between neighbours to allow water through, rings of lignin to make them strong.
actors increasing transpiration	Air movement (wind), dryer air (low humidity), higher temperatures
Translocation	The movement of sucrose (sugar) around a plant through the phloem.
Phloem	Tissue that transports sucrose around plants, made of sieve tubes and companion cells.
Sieve tubes	Cells in phloem with a large channel running through them to carry sucrose solution.
Companion cells	Cells in phloem that sit next to the sieve tubes and pump sucrose into the sieve tubes.

- **CORE PRACTICAL** – Light Intensity & Photosynthesis
(<https://www.youtube.com/watch?v=rWfPzWvw-gc>) or (<https://www.youtube.com/watch?v=f9MD2Qng0-U>)

Opinion verbs

Interesar works like **gustar** and **encantar**.

(Singular noun) **Me interesa el inglés.** English **interests me.**

(Plural noun) **¿Te interesan las ciencias?** Do sciences interest **you?**

Odiar and **preferir** don't need *me, te*, etc.

Odio la educación física. Prefiero la música. I hate PE. I prefer music.

Remember to use **el/la/los/las** with opinions about nouns and to make adjective endings agree with the noun.

Adjectives

Ending	Singular		plural	
	Masculine	Femenine	Masculine	Femenine
-o	blanco	blanca	blancos	blancas
-e	verde	verde	verdes	verdes
consonant	azul	azul	azules	azules

1. Remember: When describing your clothes, the adjective comes after the noun.

2. Remember: When describing your clothes, the **adjective** must agree with the **noun** in gender and number.

N.B. **naranja, rosa** y **violeta** do not change for gender.

Ejemplo: **el jersey naranja**

Exclamations!

Speak more expressively by using exclamations.

¡Qué va!	No way!
¡Qué horror!	How awful!
¡Qué bien!	How great!

¿Qué opinas (del dibujo, de la geografía, de los idiomas, de las empresariales)?

(No) Me gusta (No) Me interesa Me encanta	el dibujo, el inglés La geografía, la tecnología, la biología, la música. la religion, la historia	porque ya que dado que puesto que	es	práctico/a, creativo/a, aburrido/a, útil, fácil, difícil, importante, interesante
(No) Me gustan (No) Me interesan Me encantan	los idiomas, las empresariales, las ciencias		son	prácticos/as, creativos/as, aburridos/as, útiles, fáciles, difíciles, importantes, interesantes

To say you do things on certain days use **los** + the day of the week.

Los *Viernes tengo matemáticas.*

To say "in the morning/afternoon" use **por**:

Por *la mañana tenemos dibujo.*

Por *la tarde hay tres clases.*

Antes + imperfect tense, **ahora** + present tense

Antes no había donde jugar

Before there wasn't anywhere to play.

Ahora hay un patio cubierto.

Now there is a covered playground.

Verbs with an infinitive

To describe rules, use structures followed by the **infinitive**:

Está prohibido	<i>It is forbidden to</i>
No se permite	<i>You are not allowed to</i>
No se debe	<i>You/one must not</i>
Hay que	<i>It is necessary to</i>
Tenemos que	<i>We have to</i>
No se permite ser agresivo o grosero	

NEAR FUTURE

Voy	a	visitar
Vas		comer
Va		salir
Vamos		
Vais		
Van		

Use the near future to say what you are going to do. Use the present tense of **ir** + **a** + **infinitive**

Time expressions

Time expressions can help you decide if people are talking about the past, present or future:

Past: el año pasado, el trimestre pasado

Present: ahora, este trimestre

Future: el próximo trimestre, el año que viene

The preterite tense is used to refer to past achievements and successes:

Gané... *I won...*

Participé... *I participated*

Toqué... *I played*

Dí... *I gave*

SPANISH

¿Te interesa(n)...? *Are you interested in...?*

el arte dramático	<i>drama</i>
el dibujo	<i>art / drawing</i>
el español	<i>Spanish</i>
el inglés	<i>English</i>
la biología	<i>biology</i>
la educación física	<i>PE</i>
la física	<i>physics</i>
la geografía	<i>geography</i>
la historia	<i>history</i>
la informática	<i>ICT</i>
la lengua	<i>language</i>
la química	<i>chemistry</i>
la religión	<i>RE</i>
la tecnología	<i>technology</i>
los idiomas	<i>languages</i>
las empresariales	<i>business studies</i>
las matemáticas	<i>maths</i>
las ciencias	<i>science</i>
la asignatura	<i>subject</i>
Mi día preferido es (el viernes).	<i>My favourite day is (Friday).</i>
mi horario	<i>my timetable</i>
Tengo inglés los martes.	<i>I have English on Tuesdays.</i>
¿A qué hora tienes...?	<i>What time do you have...?</i>
a la una / a las dos	<i>at one o'clock / at two o'clock</i>
la educación infantil / primaria	<i>pre-school / primary education</i>
la educación secundaria	<i>secondary education</i>
el instituto	<i>secondary school</i>

¿Qué tal los estudios? *How are your studies?*

La física es más / menos ... que...	<i>Physics is more / less ... than...</i>
Es mejor / peor que...	<i>It's better / worse than...</i>
tan ... como	<i>as ... as</i>
fácil / difícil	<i>easy / difficult</i>
divertido/a / aburrido/a	<i>fun / boring</i>
útil / relevante / práctico/a	<i>useful / relevant / practical</i>
creativo/a / relajante	<i>creative / relaxing</i>
exacto/a / lógico/a / exigente	<i>precise / logical / demanding</i>
Mi profesor(a) (de ciencias) es...	<i>My (science) teacher is...</i>
paciente / impaciente	<i>patient / impatient</i>
tolerante / severo/a	<i>tolerant / harsh</i>
listo/a / tonto/a	<i>clever / stupid</i>
trabajador(a) / perezoso/a	<i>hard-working / lazy</i>
simpático/a / estricto/a	<i>nice / strict</i>
Mi profe...	<i>My teacher...</i>
enseña / explica bien	<i>teaches / explains well</i>
tiene buen sentido del humor	<i>has a good sense of humour</i>
tiene expectativas altas	<i>has high expectations</i>
nunca se enfada	<i>never gets angry</i>
me hace pensar	<i>makes me think</i>
nos pone muchos deberes	<i>gives us lots of homework</i>
el curso académico	<i>academic year</i>
las pruebas / las evaluaciones	<i>tests / assessments</i>
suspender / aprobar	<i>to fail / to pass</i>

¿Cómo es tu insti? *What is your school like?*

En mi instituto hay... / Mi instituto tiene...	<i>In my school there is... / My school has...</i>
un salón de actos	<i>a hall</i>
un comedor	<i>a canteen</i>
un campo de fútbol	<i>a football pitch</i>
un patio	<i>a playground</i>
un gimnasio	<i>a gym</i>
una piscina	<i>a pool</i>
una biblioteca	<i>a library</i>
una pista de tenis / atletismo	<i>a tennis court / an athletics track</i>
unos laboratorios	<i>some laboratories</i>
muchas aulas	<i>lots of classrooms</i>
Lo bueno / malo es que...	<i>The good / bad thing is that...</i>
Lo mejor / peor es que...	<i>The best / worst thing is that...</i>
Lo que más me gusta es / son ...	<i>What I like most is / are...</i>
Lo que menos me gusta es / son ...	<i>What I like least is / are...</i>
no...ningún / ninguna	<i>not a single...</i>
ni...ni...	<i>(n)either...(n)or</i>
nada	<i>nothing / anything</i>
nadie	<i>no-one / anyone</i>
tampoco	<i>not either</i>
Mi insti es...	<i>My school is...</i>
mixto / femenino / masculino	<i>mixed / all girls / all boys</i>
público / privado	<i>state / private</i>
pequeño / grande	<i>small / large</i>
moderno / antiguo	<i>modern / old</i>
En mi escuela primaria había...	<i>In my primary school there was/were...</i>
Mi escuela primaria tenía...	<i>My primary school had...</i>
más / menos...	<i>more / fewer, less</i>
exámenes / deberes / alumnos	<i>exams / homework / pupils</i>
muebles / espacios verdes	<i>furniture / green spaces</i>
tiempo libre	<i>free time</i>
oportunidades / instalaciones	<i>opportunities / facilities</i>
pizarras interactivas / clases	<i>interactive whiteboards / lessons</i>
aulas de informática	<i>ICT rooms</i>
donde jugar	<i>somewhere to play</i>
poco espacio	<i>little space</i>
antes / ahora	<i>before / now</i>
El edificio / El colegio / El día escolar	<i>The building / The school / The school day</i>
es / era...	<i>is / was...</i>
(in)adecuado/a / corto/a / largo/a	<i>(in)adequate / short / long</i>
Las clases son / eran...	<i>The lessons are / were</i>

Está prohibido... *It is forbidden...*

No se permite...	<i>You are not allowed...</i>
No se debe...	<i>You / one must not...</i>
comer chicle	<i>to chew chewing gum</i>
usar el móvil en clase	<i>to use your phone in lessons</i>
dañar las instalaciones	<i>to damage the facilities</i>
ser agresivo o grosero	<i>to be aggressive or rude</i>
correr en los pasillos	<i>to run in the corridors</i>
llevar piercings	<i>to have piercings</i>
Hay que...	<i>It is necessary...</i>
ser puntual	<i>to be on time</i>
respetar el turno de palabra	<i>to wait for your turn to speak</i>
mantener limpio el patio	<i>to keep the playground clean</i>
La norma más importante es...	<i>The most important rule is...</i>
respetar a los demás	<i>to respect others</i>
Las normas son...	<i>The rules are...</i>
necesarias / demasiado severas	<i>necessary / too strict</i>
para fomentar la buena disciplina	<i>for promoting good discipline</i>
para limitar la libertad de expresión	<i>for limiting freedom of expression</i>
para fastidiar a los alumnos	<i>for annoying the pupils</i>
sacar buenas / malas notas	<i>to get good / bad grades</i>
Estoy de acuerdo.	<i>I agree</i>
Un problema de mi insti es...	<i>One problem in my school is...</i>
el estrés de los exámenes	<i>exam stress</i>
el acoso escolar	<i>bullying</i>
las presión del grupo	<i>peer pressure</i>
Hay (unos) alumnos que...	<i>There are (some) pupils who...</i>
se burlan de otros	<i>make fun of others</i>
sufren intimidación	<i>are victims of intimidation</i>
tienen miedo de...	<i>are afraid of...</i>
son una mala influencia	<i>are a bad influence</i>



Las normas del insti	School rules
Tengo que llevar ...	I have to wear ...
Tenemos que llevar	We have to wear ...
...	
(No) Llevo ...	I (don't) wear ...
(No) Llevamos ...	We (don't) wear ...
Es obligatorio llevar	It's compulsory to wear
un jersey (de punto)	a (knitted) sweater
un vestido	a dress
una camisa	a shirt
una camiseta	a T-shirt
una chaqueta (a rayas)	a (striped) jacket
una chaqueta de punto	a cardigan
una corbata	a tie
una falda (a cuadros)	a (checked) skirt
unos pantalones	trousers
unos calcetines	socks
unos zapatos	shoes
unos vaqueros	jeans
unas medias	tights
amarillo/a	yellow
blanco/a	white
negro/a	black
rojo/a	red
morado/a / violeta	purple
naranja	orange
rosa	pink
azul	blue
verde	green
gris	grey
marrón	brown
oscuro / claro	dark / light
a rayas / a cuadros	striped / checked
bonito / feo	pretty / ugly
cómodo / incómodo	comfortable / uncomfortable
anticuado / elegante / formal	old-fashioned / smart / formal
El uniforme...	Uniform...
mejora la disciplina	improves discipline
limita la individualidad	limits individuality
da una imagen positiva del insti	gives a positive image of the school
ahorra tiempo por la mañana	saves time in the morning

Está prohibido...	It is forbidden...
No se permite...	You are not allowed...
No se debe...	You / one must not...
comer chicle	to chew chewing gum
usar el móvil en clase	to use your phone in lessons
dañar las instalaciones	to damage the facilities
ser agresivo o grosero	to be aggressive or rude
correr en los pasillos	to run in the corridors
llevar piercings	to have piercings
Hay que...	It is necessary...
ser puntual	to be on time
respetar el turno de palabra	to wait for your turn to speak
mantener limpio el patio	to keep the playground clean
La norma más importante es...	The most important rule is...
respetar a los demás	to respect others
Las normas son...	The rules are...
necesarias / demasiado severas	necessary / too strict
para fomentar la buena disciplina	for promoting good discipline
para limitar la libertad de expresión	for limiting freedom of expression
para fastidiar a los alumnos	for annoying the pupils
sacar buenas / malas notas	to get good / bad grades
Estoy de acuerdo.	I agree
Un problema de mi insti es...	One problem in my school is...
el estrés de los exámenes	exam stress
el acoso escolar	bullying
las presiones del grupo	peer pressure
Hay (unos) alumnos que...	There are (some) pupils who...
se burlan de otros	make fun of others
sufren intimidación	are victims of intimidation
tienen miedo de...	are afraid of...
son una mala influencia	are a bad influence

¿Qué vas a hacer?	What are you going to do?
Voy / Vas / Vamos a...	I'm going / You're going / We're going to...
llegar / salir / estar	arrive / go out / be
ir en coche / andando	go by car / walk
llevar ropa de calle	wear casual clothes / non-uniform
ir / comer juntos	go / eat together
hacer una visita guiada	do a guided tour
ver los edificios	see the buildings

¿Cómo es tu día escolar?	What is your school day like?
normalmente	usually
Salgo de casa a las...	I leave home at...
Voy...	I go...
a pie / andando	on foot / walking
en bici / en autobús / en coche	by bike / by bus / by car
en metro / en taxi / en tren	by underground / by taxi / by train
Las clases empiezan / terminan a las	Lessons start / finish at ...
Tenemos ... clases al día.	We have ... lessons per day.
Cada clase dura ... minutos	Each lessons lasts ... minutes.
El recreo / La hora de comer...es a la(s)...	Break / Lunch is at...

SPANISH 	
pasar todo el día en...	spend the whole day in...
asistir a clases	attend lessons
practicar el español	practise Spanish
ir de excursión	go on a trip
Va a...	It's going to...
ser fácil / guay	be easy / cool

Las actividades extraescolares	Extra-curricular activities
Toco la trompeta...	I play / I've been playing the trumpet...
Canto en el coro...	I sing / I've been singing in the choir...
Voy al club de...	I go / I've been going to the ... club
Soy miembro del club de...	I am / I've been a member of the ...
ajedrez / judo / teatro / periodismo	chess / judo / drama / reporters
lectores / Ecoescuela / fotografía	reading / eco-schools / photography
desde hace ... años / meses	for ... years / months
Para mí...	For me...
Pienso que / Creo que...	I think that...
las actividades extraescolares son...	extra-curricular activities are
muy divertidas	a lot of fun
algo diferente / un éxito	something different / an achievement
te ayudan a...	they help you to...
olvidar las presiones del colegio	forget the pressures of school
desarrollar tus talentos	develop your talents
hacer nuevos amigos	make new friends
te dan...	they give you...
una sensación de logro	a sense of achievement
más confianza	more confidence
la oportunidad de expresarte	the opportunity to express yourself
El año / trimestre / verano pasado...	Last year / term / summer...
participé en un evento especial	I took part in a special event
un concierto / un concurso / un torneo	a concert / a competition / a tournament
gané un trofeo	I won a trophy
toqué un solo	I played a solo
como...	as...
ganamos una competición nacional	we won a national competition
dimos un concierto	we gave a concert
¡Fue un éxito!	It was a success!
Este trimestre / El próximo trimestre...	This term / Next term
voy a	I'm going to...
aprender a ...	learn to ...
continuar con...	continue with...
dejarlo	stop doing it
apuntarme al club de...	sign up for the ... club
vamos a...	we are going to...
montar una obra de teatro	put on a play
conseguir...	achieve...