



Knowledge Organiser

Year 9

Term 1

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.	Drama	page 9 - 10
7.	English	page 11 - 14
8.	Food	page 15 - 18
9.	Geography	page 19 - 20
10.	History	page 21 - 22
11.	Jewish Studies	page 23
12.	Maths	page 24 – 31
13.	Music	page 32
14.	Performing Arts	page 33 - 34
15.	Physical Education	page 35 - 38
16.	Science	page 39 - 45
17.	Spanish	page 46 - 48

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



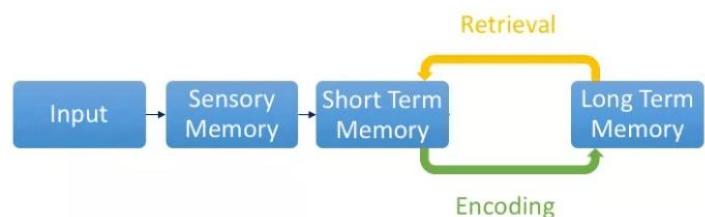
How can you use your Knowledge Organiser most effectively?



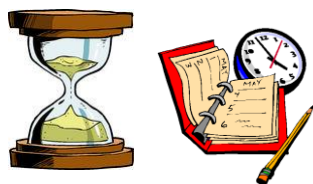
1. Use it as a **checklist** to make sure you have notes and resources in your books or folders on each area. If you have a gap, talk to your teacher.



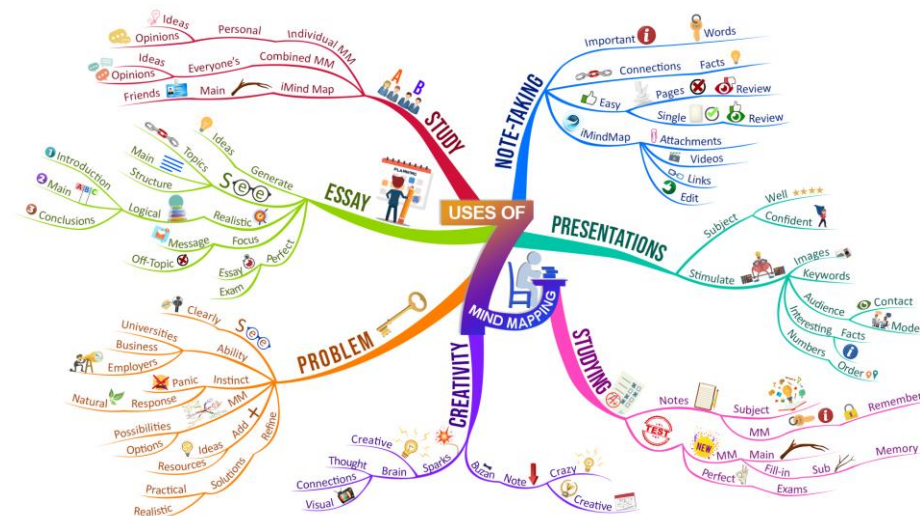
4. Use your knowledge organiser **to get ahead on a topic**. Reading about what you are going to study and looking up any new or difficult words means that you are better prepared for your learning in the next lesson.



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**.

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....

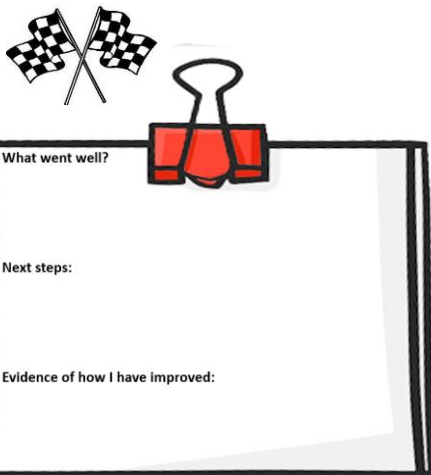
Completed by your teacher or by you after receiving some guidance from your teacher.

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

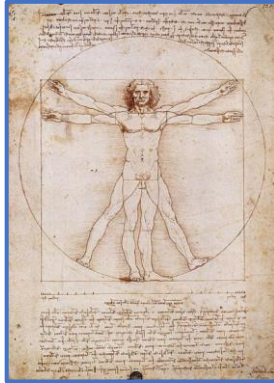
- My paragraph has at least two pieces of evidence.
- My evidence is in full sentences, carefully chosen and clearly helps prove my argument.
- My evidence is specific and detailed (includes quotes/facts/names/events/key words).

Explanation

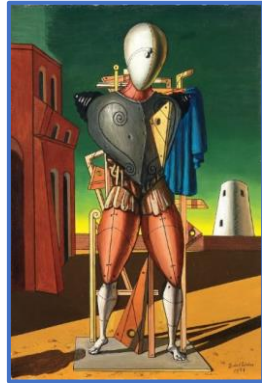
- I explain how my evidence proves that my argument is right.
- My explanation is at least two or three sentences long.
- I have added some balance to my argument and shown how there may be other reasons or arguments to the question.
- I have explained why my answer is the right one rather than any of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



Leonardo



De Chirico



Schlemmer



Giacometti

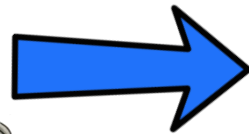


Rodin



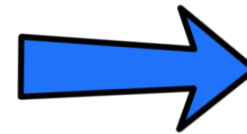
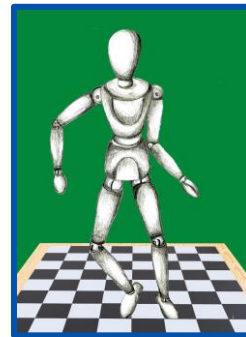
1. Studies of Mannequins

- "Man is the measure of all things."
- Understanding basic proportions of the human body and how it articulates.
- Drawing the mannequin using different media.



2. Placing the Figure on a Base

- Investigating perspective.



3. Placing the Figure in an Architectural Environment

- Combining a drawing with a photograph.
- Becoming aware of how to include depth. Foreground, Background.

Key Words

Mannequin Drawings: Proportion, Articulation, Pose, Manipulation, Contrapposto.

Mannequin on a Base and in an Environment: Pattern, Receding, Perspective, Depth, Piazza, Architecture, Classical, Columns.

AUTUMN 2

KEY MOVEMENTS - Primitivism and Fauvism



Primitive Cave Paintings



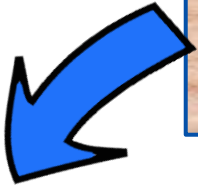
Matisse



Neel

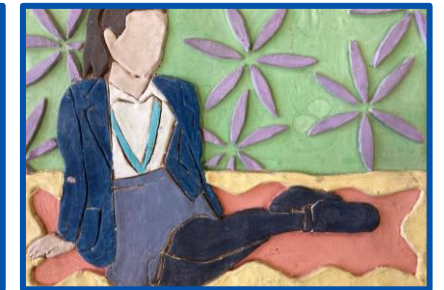
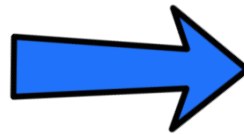


Keita



4. The Expressive Body

- Simplification of the human body into expressive shapes.
- Freedom to experiment and distort parts of the body.



5. Pathways of Development from photographic source

- Drawing, Collage, Painting, Clay Relief.

Key Words

Simplification, Rhythm, Flow, Movement, Composition, Dynamism, Scale, Three-Quarter View, Pattern, Background, Ground, Celebration, Harmony, Juxtaposition.

Design & Technology

Ergonomics and Anthropometrics

Ergonomics — Designing a product according to human needs and how the user will interact with the product. The best designs are 'inclusive', allowing all users of different shapes, sizes and abilities to use the product.

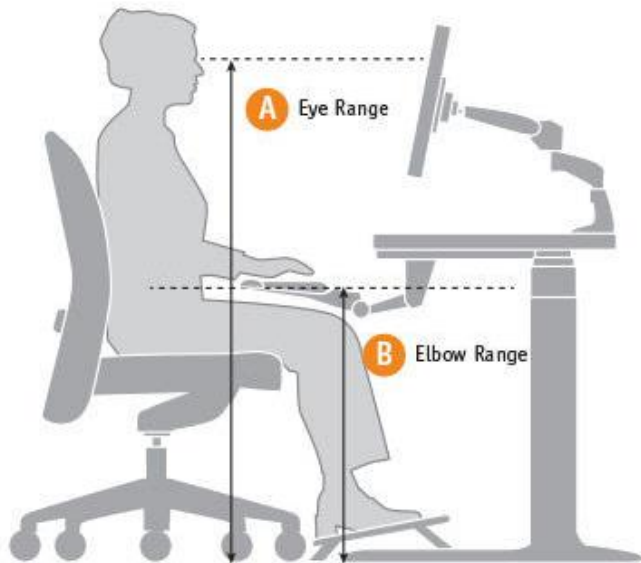
Examples

- An adjustable chair for different heights and widths.
- A rubber grip to allow users with arthritis to grip with less effort.
- Safety/environment labels where users can see them.

Anthropometrics — The measurement of humans to understand the physical variation between different people. Anthropometric data is used by designers to ensure their product will 'fit' their range of intended users. The data can be found in a range of books or software (e.g. People Sizes).

Examples

- Average hand grip sizes for designing tennis balls.
- The difference between the 5th and 95th percentile when considering the width of a chair.



Key Terms	
Key Term	Definition
Alloy	Two or more metals mixed together.
Anthropometrics	The measurements (height, width, weight, circumference, rotation, angles) of the human body
Coniferous trees	Trees which are wider at the bottom, and narrow at the top, needle like leaves which stay through winter (example – pine, christmas trees)
Deciduous trees	Trees which have broad leaves which are lost during winter (example – oak)
Ergonomics	How a human interacts with an object physically, mentally and visually
Exclusive design	A product which has been designed specifically for one person or a small group of people (example – wedding dress)
Ferrous metal	A metal which contains iron
Hardwood	Timber which comes from deciduous trees
Inclusive design	A product which has been designed for a large number of people (example – water bottle)
Manufactured board	A timber which uses recycled wood particles, or glues planks or blocks together.
Non-ferrous metals	Metals which do not contain iron.
Softwood	Timber from coniferous trees
Synthetic fibres	Fibres from oil and coal
Thermoforming polymers	Plastics which can be reshaped when heated
Thermosetting polymers	Plastics which can not be reshaped when heated

Properties Of Materials	
Key Term	Description
Brittleness	Inability to withstand sudden stress of shocks
Density	Compactness of a material, defined as mass per unit volume
Ductility	Ability to be deformed by bending, twisting or stretching
Durability	Ability to withstand deterioration over time
Elasticity	Ability to return to original shape once deforming force is removed
Electrical conductivity	Ability to conduct electricity
Hardness	Ability to resist deformation, indentation or penetration
Malleability	Ability to be permanently deformed in all directions without fracture
Plasticity	Ability to permanently deform without breaking when subjected to a force
Stability	Ability to resist changes in shape over time
Stiffness	Ability to resist bending
Thermal conductivity	Ability to conduct heat
Toughness	Ability to withstand sudden stress or shock
Electronic components	
Name	Uses
Light dependant resistor (LDR)	When light falls on the sensing area of a LDR, its resistance changes
Light emitting diode (LED)	Lights up when current flows through
Printed circuit board (PCB)	Board which you solder components on, with pre-printed connections
Resistor	Controls the flow of current in a circuit
Transistors	It allows a small amount of current to switch a much larger amount of current either on or off.
Variable resistor	Has a knob that can be turned to change its resistance.

Physical Theatre






Physical theatre explores the idea that you don't have to use words to express ideas. It uses techniques such as movement, mime, gesture and dance and can be used to explore complex **social and cultural issues**. Some Theatre companies that work within this style include DV8 and Frantic Assembly.

Social Issues: A broad range of concerns that impact a group of people who share aims and routines, a sense of unity and a common identity.

Cultural Issues: A Broad range of concerns that impact race, ethnicity, religion, sexual orientation, gender, and disability.

Physical Theatre Examples



Physical Theatre techniques	Definition	Visuals
Mime	This usually means stylised movement but can be comparatively realistic.	See picture 1
Gesture	A gesture is a movement with a meaning.	
Status	Who has the power. This may be shown through use of levels, by distance, by strength of contact, or a combination of all of these.	See picture 2
Proximity	How close or far you are from your co-performers and what this represents.	
Stance	This is associated with strength as the body could radiate assertion and authority or weakness by stance, incorporating posture.	
Harshness & Tenderness	How your movements are performed. Harsh = Robotic and swift. Tender = Softy and flowy.	See picture 3
Mask work	A covering for your face which allows you to focus less on your facial expression and more on other ways to move.	
Motif	This is repeated use of a movement pattern which has meaning and reminds us of the central theme of the work.	
Movement	How you are using your body.	See picture 4

- Role** 
- Character** 
- Relationship** 
- Tension** 
- Focus** 
- Situation** 
- Time** 
- Place** 
- Language** 
- Movement** 
- Mood** 
- Atmosphere** 
- Symbols** 

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.

How to Evaluate

P -> Point: Tell me which performance skill (physical or vocal skill) you used.

E -> Evidence: Tell me how you have used the performance skill.

E -> Explain: Tell me why you used the performance skill.

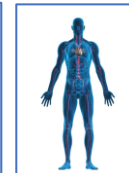
L -> Link: Link to how it helped you create one of the dramatic elements.

Don't forget your dramatic elements!

You need these for every performance otherwise you won't be able to create the dramatic action.

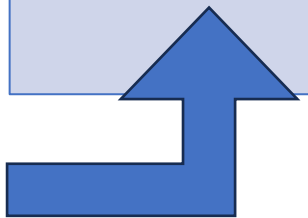


Vocal Skills:
How you modify your voice when performing.



Physical Skills:
How you modify your body when performing.

Vocal Skills	Definition	Physical Skills	Definition
P - Pitch	How high or low your voice sounds.	P - Posture	The way you hold yourself.
I - Intonation	How clearly you speak.	E - Eye Contact	Where you are looking.
P - Pace	The speed in which you speak.	T - Tension	How tight or relaxed your body is.
E - Emphasis	The importance you put on certain words.	F - Facial Expression	How you are modifying your face.
D - Dynamics	The volume that you are speaking at.	L - Levels	The heights used within the performance.
B - Breath Control	How many breaths you take in a sentence.	A - Action	Movements that have specific meanings.
A - Accent	The way you pronounce words.	G - Gait	The way you are walking.
P - Pause	How many breaks you take.	S - Space	The area that you are using.





George

George is one of the two protagonists. He can be short-tempered with Lennie but he is a loyal and caring friend



Lennie

A kind and simple character, who possesses enormous physical strength but has a learning disability.



Candy

The oldest person on the ranch. He only has one hand after an accident and worries that one day he will be cast aside.



Crooks

The stable-buck. He's named Crooks because of his crooked back. He's lonely because of racism as the only black person.

English: 'Of Mice and Men'

Key Term:

Migrant Itinerant Worker.

A worker who travels from place to place to earn a living and has no stable base.



'The American Dream'
A belief that anyone can succeed.

Themes
Dreams – Each character in the text has their own dreams that they live and work for:. None of the characters make their dream, showing the impossibility of the American Dream
Loneliness – All of the characters, in some sense, experience loneliness, except for Lennie and George who have each other.
Inequality – Of Mice and Men was set in a time in which the laws favoured white people, and men held far more rights than women..
Animals and Nature – Steinbeck makes frequent references to animals and nature. At the start and end of the novella, he vividly describes the scene of nature. He also compares characters to animals.



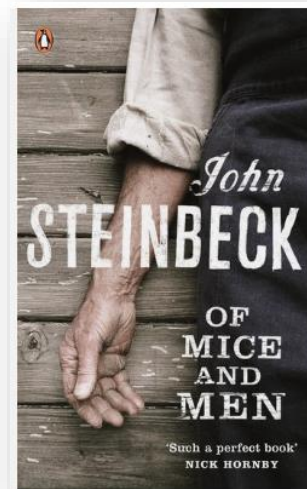
Curley

The boss' son. Curley treats others on the ranch poorly as he feels he is above them. He is often aggressive.



Curley

The boss' son. Curley treats others on the ranch poorly as he feels he is above them. He is often aggressive.



Links to Other Units:

Tragedy

(Year 7, Richard III & Year 10 Macbeth)

Friendship

(Year 8, Noughts and Crosses & Year 10 Jekyll and Hyde)

Inequality

(Year 8, Noughts and Crosses & Year 10 Jekyll and Hyde, Year 10 An Inspector Calls.



Curley's Wife

Initially introduced to the reader as a 'tramp', she is the only female on the ranch and we never learn her name.

English: 'Of Mice and Men' Continued

Key Term:

The 'isms'

A belief held by people that usually causes oppression (to be treated unfairly). EG: Racism, ageism, sexism, ableism.

Key Technique Glossary

Foreshadowing	Be a warning or indication of (a future event).
Naturalism	Naturalism as a style meaning the honest, idealising depiction of the subject
Allegory	A story, poem, or picture that can be interpreted to reveal a hidden meaning, typically a moral or political one.
Cyclical Structure	When a text begins and ends in the same place or with the same idea
Zoomorphism	Assigning a person with animalistic characteristics.
Inequality	The unfair situation in society when some people have more opportunities, money, etc. than other people
Loneliness	Sadness because one has no friends or company.
Americanism	A word, expression, or other feature that is characteristic of American English

Context

<p>Gender Inequality – Women had filled in for men when they had participated in the First World War. However, after the Great Depression, when many jobs were lost, women's jobs were often the first to go.' With so few job prospects, many women consigned themselves to a life as a housewife.</p>	<p>The American Dream – The American Dream is a national ethos of the United States, which declares that freedoms, prosperity, success, and social mobility, can all be achieved through hard work. It implies that society has few barriers preventing anyone from achieving their dreams.</p>
<p>Racism – Life was tough for black people living in America in the 1930s. White and black people were segregated at the time, and black people were considered 2nd class citizens. The lynching of black people was common, sometimes for the most petty or unproven of crimes. A set of rules named 'The Jim Crow Laws' were in place to keep those from different cultural backgrounds oppressed.</p>	<p>The Wall Street Crash and The Great Depression – In October 1929 millions of dollars were wiped out in an event that became known as the Wall Street Crash. This triggered the Great Depression across the country throughout most of the 1930s. In this time one third of the population at the time became unemployed.</p>

Section	Key Quotation
One	"With us it ain't like that. We got a future. We got somebody to talk to that gives a damn about us."
Two	She smiled archly and twitched her body. "Nobody can't blame a person for lookin'," she said."
Three	"Curley's fist was swinging when Lennie reached for it. The next minute Curley was flopping like a fish on a line."
Four	"...You go on get outta my room. I ain't wanted in the bunk house, and you ain't wanted in my room." "Why ain't you wanted?" Lennie asked. "'Cause I'm black..."
Five	"And when they were gone, Candy squatted down in the hay and watched the face of Curley's wife. "Poor bastard," he said softly."
Six	"Lennie said, "I thought you was mad at me, George." "No," said George. "No, Lennie, I ain't mad. I never been mad, and I ain' now. That's a thing I want ya to know."

English: 'War Poetry Writing' (Analysis Skills)

Key Terms:

Language

Devices used to help the reader imagine what is being described.

Structure

Features that organise the whole poem.

Form

The type of poem. EG: Monologue, narrative, sonnet etc.

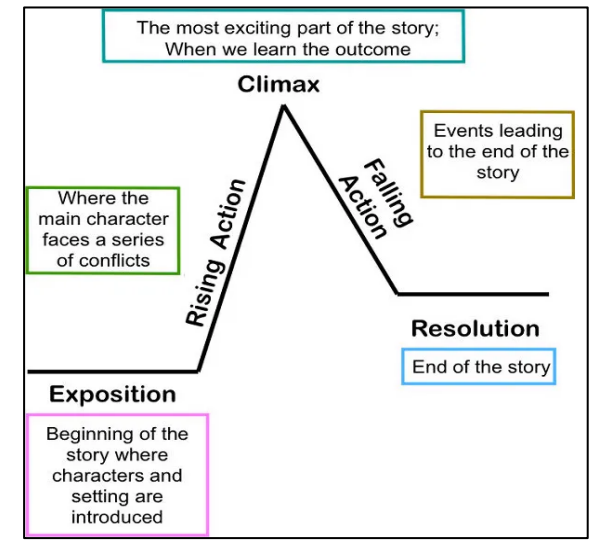
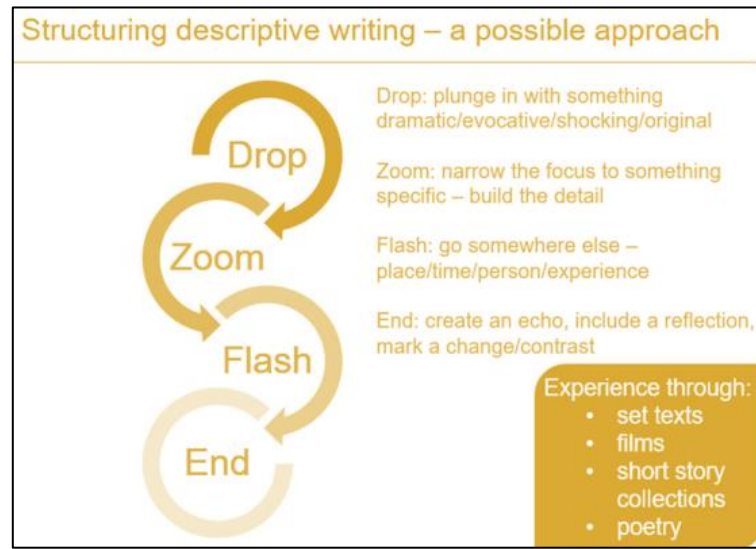
Device	Definition
Alliteration	Consecutive words that start with the same letter
Assonance	Repeating vowel sounds in a series of words
Sibilance	Consecutive words that start with S
Onomatopoeia	Words that are sounds e.g. bang, hiss, boom
Imagery	Visually descriptive words/language
Metaphor	Comparison with 'is' e.g. the sun is a ball
Simile	Comparison with 'like' or 'as' e.g. the sun is like a ball
Hyperbole	Exaggeration
Mood/tone	The feeling created by text
Symbolism	Words used to symbolically represent something
Personification	When an object is described with human characteristics
Foreshadowing	When the writer drops clues and hints to what might happen
Pathetic Fallacy	When the weather reflects the mood
Repetition	Repeating something that has already been written
Oxymoron	Two opposing words together e.g. bittersweet
Juxtaposition	Two opposing ideas
Allegory	a story, poem, or picture that can be interpreted to reveal a hidden meaning, typically a moral or political one.

Rhyming Couplets	Two consecutive rhyming lines
Rhyme Scheme	The rhyming pattern in a poem (abcb)
Enjambment	When a line carries on the next without punctuation
Anaphora	Repetition of words, phrases or lines throughout a poem
Free Verse	To write without structure or rules
Stanza Length	The length of a poems "paragraphs"
Caesura	When there is punctuation, that denotes pauses, in the lines
Rhythm	The "flow" of the poem
Meter	The rhythmic structure of the poem
Quatrain	A stanza of four lines

Type	Definition
Ballad	Popular narrative song normally written with abcb and in quatrains
Haiku	A Japanese poem of seventeen syllables, in three lines of five, seven, and five
Narrative	When a poem has a story like structure. It has a beginning, middle, end
Lyrical	Expresses personal emotions or feelings
Sonnet	A poem of fourteen lines using any of a number of formal rhyme schemes, in English typically having ten syllables per line.

English: 'War Poetry Writing' (Writing Skills)

Device	Definition
Alliteration	Consecutive words that start with the same letter
Assonance	Repeating vowel sounds in a series of words
Sibilance	Consecutive words that start with S
Onomatopoeia	Words that are sounds e.g. bang, hiss, boom
Imagery	Visually descriptive words/language
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Describe

Poem	Content
Exposure	Focuses on the horrors of the trenches; the weather, the boredom and the complete lack of control.
Bayonet Charge	Describes the few desperate moments of a soldier's charge across a battlefield.
COTL	Swathes of men are sent to their death in their quest to fight for their country.
Remains	A Speaker describes shooting a looter dead in Iraq and how it has affected him.
Kamikaze	A Kamikaze pilot's mission, his decision to return & how he's shunned when he returns home.
War Photographer	A war photographer develops photos at home in England who begins to remember the horrors of war.
Poppies	A mother who is left behind to cope with her son's death.

Links to Other Units:

Identity and awareness of self
(Year 7 Identity Poetry, Year 8 Noughts and Crosses, Year 10 An Inspector Calls)

Writing Skills
(Year 7 The Island, Year 8 Gothic Writing, Year 8 Food Writing, Years 10 & 11 English Language Papers 1 & 2)

Poetry
(Year 7 Identity Poetry, Year 10 Power and Conflict Poetry)

Descriptive Methods (DESCRIBES)

D - Detail – zoom in on something in detail

E - Evoke the senses (see, hear, touch, taste, smell)

S - Sentence variety used for effect

C - Colour (think shades)

R - Range of punctuation used accurately

I - Imagery (similes, metaphors, personification)

B - Brilliant vocabulary

E - Emotion – atmosphere or feelings

S - Spelling is accurate

Year 9 Food & Nutrition: Commodities - Cereals & Rice



Secondary processing

Flour into bread

Four basic ingredients to make bread are:

1. flour;
2. yeast (make the bread rise);
3. salt (adds taste & aids proving);
4. warm water.

Fat can sometimes be added to make the loaf lighter and extend the shelf life.



Bread in the UK

All white bread commercially sold in the UK is made with white flour fortified with calcium, iron and B vitamins. It is a legal requirement to fortify flour in the UK.



Key terms

Fortify: Adding nutrients to food.

Gluten: Part of the grain that provides the elastic texture of dough.

Harvesting: Gathering crops when ready or ripe.

Milling: Process to separate different parts of the grain.

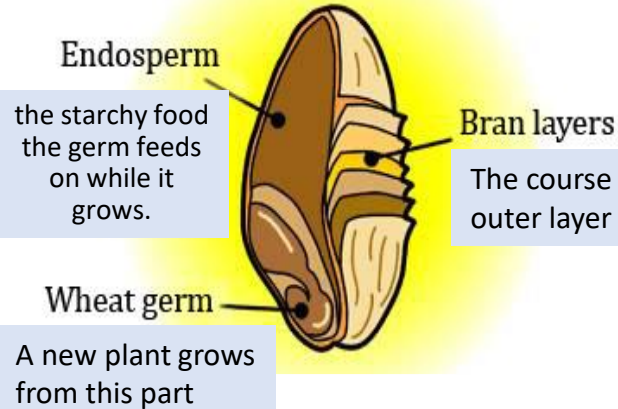
Threshing: Method to remove the outer husk layer from rice grains.

- Food is sourced, processed and sold in different ways.
- Food production and processing ensures that food is edible and safe.

What are cereals?

- Wheat, barley and oats are all types of cereals grown in the UK.
- Grains grow at the top of the plant, closely packed together called 'ears'.
- Each ear of wheat is made up of 45-50 grains, it is these starchy grains we eat.

Three parts to wheat grains:



Primary processing

Milling

- Milling is the process that turns wheat and oats into flour.
- The harvested grain is delivered to the mill where it is cleaned and conditioned.
- The grain is then passed through rollers and sieves to open and separate the different parts of the grain. Grains like oats are rolled and cut to produce flakes and oatmeal.

Types of flour

- **White** – usually contains **75%** of the grain and most of the bran and wheatgerm are removed.
- **Brown** – usually contains about **85%** of the original grain and some of the bran and wheatgerm are removed.
- **Wholemeal** – made from the whole wheat grain.
- **Malted wheatgrain** – brown or wholemeal flour with malted grains added after milling.
- **Wheatgerm** – white or brown flour with at least **10%** made up of wheatgerm added during milling.
- **Strong** – contains a higher gluten content to make a range of different breads, pizzas and crumpets.
- **Plain** – contains a lower gluten content and used to make biscuits, pastry, sauces, pancakes, batters and Yorkshire puddings.
- **Self-raising** – baking powder is added as part of the milling process and mainly used to make cakes and scones.



Around the world other flours are used which are not made from wheat. Some of the less common types include flour made from **coconut, potato, peas and chickpeas**. Other grains such as **rye, oats and spelt** are also used.

What is rice?

Rice is a short living plant that requires a substantial amount of water when growing. When farming rice, the fields are flooded and drained before harvest. The rice, once harvested, is known as a paddy grain. The paddy grains are sent to a mill to be threshed and turned into grains of rice for cooking.

Rice varieties can be divided into 3 groups:

- **long grain** – all purpose and can be used as an accompaniment eg. basmati;
- **medium grain** – used in risottos & puddings as it is creamy when cooked eg. Arborio
- **short grain** – used to make sushi and puddings as it tends to be stickier when cooked eg. bomba



Growing wheat, barley and oats

- Wheat is grown worldwide. Varieties grown depend on the climate and geography.
- In the UK it is planted in early autumn and harvested the following summer.
- About half the crop of wheat is made into food for human consumption, and some used for animal feed (for chickens, cattle & pigs).
- Other crops grown in the UK include barley and oats.

Year 9 Food & Nutrition: Cooking Processes

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

Function of key Ingredients in baked products

Eggs

- Holds air when beaten
- Coagulate (sets when heated)
- Add colour to mixtures
- Thicken sauces, custards
- Glaze bread, scones and pastry
- Bind ingredients together
- Provide protein, fat, iron and Vits A, B & E

Flour

- Many different types
- Provide fibre (especially if wholemeal)
- Makes mixtures rise (self-raising)
- Forms the bulk of bread, pastry & cake mixes
- Provides colour and texture (wholemeal)
- Gluten in flour produces a stretch dough
- Provides carbohydrate, vitamin B, calcium & iron

Types of Pastry

Main ingredients flour, water & fat (butter or oil). Ratio of ingredients depends on type of pastry



Shortcrust pastry



Puff pastry



Flaky pastry



Choux Pastry

Shortcrust Pastry

Most versatile and easiest pastry to make. Used for savoury or sweet dishes. Pies, jam tarts, bakewell tart, pasties, quiche.

Puff & Flaky Pastry

This pastry uses air and fat that's trapped between the layers of dough to give a flimsy, light and crisp finish. This is achieved by rolling and folding the pastry. Used for sweet and savory pies, quiche, sausage rolls, cream horns, mille feuille, turnovers.

Choux Pastry

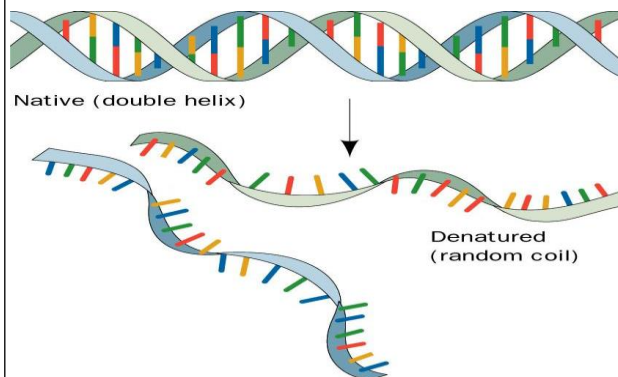
Light specialty pastry with a high water content, which is turned into steam during baking and this forces the pastry shell outwards and gives it volume. Eclairs, cream buns

Keywords:

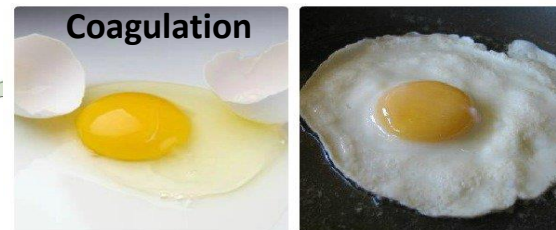
Choux, Flaky, Shortcrust, Suet, Shorten, Dextrinisation, Bind, Sealing, Glazing, Baking, Blind, Shrinking

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.



Food skill	Food skill	Food skill	Food skill	Food skill	
Bake		Fry and sauté		Portion / divide	
Beat		Glaze and coat		Prove	
Blitz, puree and blend		Grate		Roast	
Casserole		Grill		Roll-out	
Chill		Juice		Rub-in	
Core		Knead		Sift	
Cream		Layer		Snip	
Crush		Mash		Spread	
Cut out		Measure		Stir-try	
Cut, chop, slice, dice and trim		Melt, simmer and boil		Weigh	
Decorate and garnish		Microwave		Whisk	
Drain		Mix, stir and combine		Zest	
Fold		Peel			
Form and shape		Pipe			

Food skills enable a variety of increasingly complex dishes to be prepared and made.

These can include:

- beating, combining, creaming, mixing, stirring and whisking;
- blitzing, pureeing and blending.
- kneading, folding, forming and shaping;
- knife skills;
- rubbing-in and rolling-out;
- use of the cooker -boiling/simmering/poaching, frying, grilling, roasting and baking

Year 9 Food & Nutrition – Food Contamination, Spoilage & Food Poisoning

Food spoilage:



Caused by the growth of.

- bacteria – single celled micro-organisms which are present naturally in the environment;
- yeasts – single celled fungi;
- moulds – fungi which grow as filaments in food.

Food contamination: can lead to food poisoning. There are three ways food can be contaminated: **bacterial, chemical** and **physical**.

- **Bacteria** can be transferred onto food through **cross-contamination** via equipment, people or pests, or can be naturally present in the food, such as salmonella; Some bacteria can produce toxins which can cause food poisoning
- **chemicals**, eg. cleaning chemicals.
- **physical** contaminants, eg. hair, plasters, egg shells, packaging.

Food Poisoning

Most bacteria are harmless but a small number can cause illness and are known as pathogenic bacteria. Food which is contaminated with pathogenic bacteria can look, taste and smell normal. The process of food becoming unfit to eat through oxidation, contamination or growth of micro-organisms is known as food spoilage

Symptoms of food poisoning

Food poisoning can be mild or severe. The most common symptoms are:

- feeling sick;
- being sick;
- diarrhoea;
- abdominal pain.

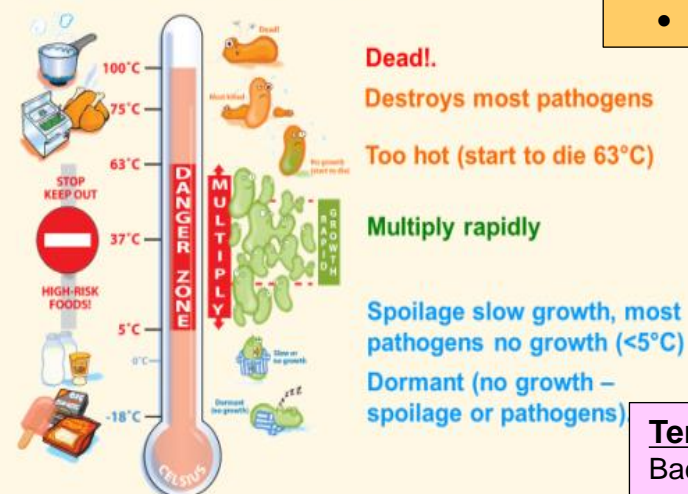
Bacterial growth and multiplication

All bacteria, including those that are harmful, have four requirements to survive and grow:

- food;
- moisture;
- warmth;
- time.

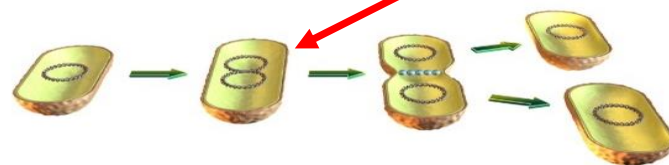


Influence of temperature



Time

Given the right conditions, one bacterium can divide into two every 10-20 minutes through a process called **binary fission**.



Food

Bacteria need a source of food to grow and multiply, these food are usually high in moisture, fat and protein, and may be ready to eat. Food where bacteria rapidly multiply in is called a **high-risk food**. For example:

- meat, meat products and poultry;
- milk and dairy products;
- eggs – uncooked and lightly cooked;
- shellfish and seafood;
- prepared salads and vegetables;
- cooked rice and pasta.



Moisture

Where there is no moisture bacteria cannot grow. However, bacteria and moulds can both produce spores which can survive until water is added to the food.



Temperature

Bacteria need warm conditions to grow and multiply.

- The ideal temperature for bacterial growth is 30°C – 37°C.
- Some bacteria can still grow at 10°C and 60°C.
- Most bacteria are destroyed at temperatures above 63 °C.
- Bacterial growth danger zone is 5°C - 63°C.

At very cold temperatures, bacteria become dormant – they do not die, but they cannot grow or multiply.



Key terms

Bacteria: Small living organisms that can reproduce to form colonies. Some bacteria can be harmful (pathogenic) and others are necessary for food production eg. make cheese & yogurt.

Binary fission: The process that bacteria uses to divide and multiply.

Cross-contamination: The transfer of bacteria from one source to another. Usually raw food to ready-to-eat food but can also be the transfer of bacteria from unclean hands, equipment, cloths or pests. Can also relate to allergens.

Food spoilage: Action of enzymes or microorganisms which make the food unacceptable to consume.

Food poisoning: Illness resulting from eating food which contains food poisoning micro-organisms or toxins produced by micro-organisms.

Toxin: A poison produced by some bacteria which can cause food poisoning.

Desirable food changes

Desirable changes that can be caused by micro-organisms include:

- bacteria in yogurt and cheese production;
- mould in some cheeses, eg. Stilton;
- yeast in bread production.

Year 9 Food & Nutrition: Food Choice

Food choice

Food choices for a balanced diet depend on many factors, such as:

- advertising and other point of sale information;
- cost and economic considerations;
- cultural or religious practices;
- environmental and ethical considerations;
- food availability;
- food preferences;
- food provenance;
- health concerns;
- individual energy and nutrient needs;
- portion size;
- social considerations















Cultural or religious practices

People around the world choose to eat or avoid certain food due to their cultural or religious practices.

Religion	Pork	Beef	Lamb	Chicken	Fish
Islam	x	Halal only	Halal only	Halal only	✓
Hinduism	x	x	✓	✓	✓
Judaism	x	Kosher only	Kosher only	Kosher only	✓
Sikhism	x	x	✓	✓	✓
Buddism (strict)	x	x	x	x	x
Seventh-day Adventist Church	x	x	x	✓	✓
Rastafari movement	x	x	x	x	x

Allergen labelling

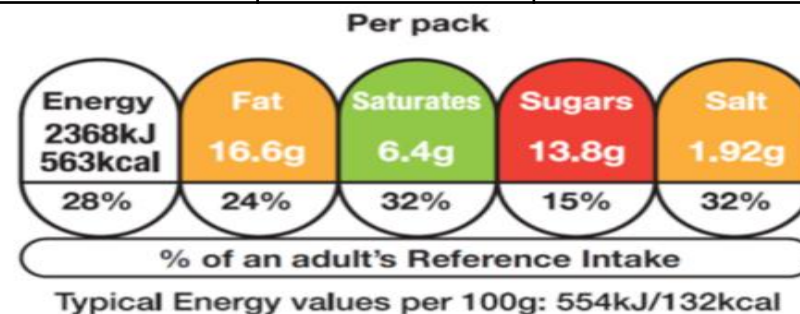
An **allergen** is a substance or food that may cause an **allergic reaction**. Some food allergies are mild, but others can be very serious. There are 14 ingredients (allergens) that are the main reason for adverse reactions to food.

Foods containing gluten, present in wheat, barley and rye 	Crustaceans 	Eggs 	Fish 	Lupin 
Peanuts 	Soybeans 	Milk 	Nuts 	Molluscs 
Celery 	Mustard 	Sesame seeds 	Sulphur dioxide 	

Traffic Light Labelling

Energy, saturated fat, salt and sugar are labelled on a food product in either green, amber or red and shows whether a food is high, medium or low for fat (saturates), sugars or salt. The colour coding can be used to compare two products.

Green	Amber	Red
Low amounts of fat, saturated fat, salt and sugar	Medium amounts of fat, saturated fat, salt and sugar	High amounts of fat, saturated fat, salt or sugar



Key terms

Advertising: Advertising is a form of communication for marketing and used to encourage, persuade, or manipulate an audience to continue or take some new action.

Ethical: Relating to personal beliefs about what is morally right and wrong.

Food certification and assurance schemes: Defined standards of food safety, quality or animal welfare.

Food provenance: Knowing where food was grown, caught or reared and how it was produced.

Marketing: Promoting and selling products or services, including market research and advertising.

Religion: A particular system of faith and worship.

Seasonal food: Food grown at a particular time of year.

List of Ingredients

Price

Nutrition information

Serving instructions

Country of origin & provenance

Additives/allergens

Storage/preparation instructions

Weight/volume

Name of food

Recycling symbol/information

Name & address of manufacturer

Date mark

Geography Enquiry question 1: Why are some countries more developed than others?

Development

Development is all about how wealth and the quality of life of people living on our planet varies from place to place.

Levels of Development

Developed country- these are richer countries that have lots of industry and service jobs such as the UK and Japan.

Developing country- These are poorer countries that have mainly primary jobs such as farming and mining. Countries include Bangladesh and Mali.

Emerging country - These countries are those that have developed fastest over the latter part of the 20th Century such as China or India.

Trade – the buying and selling of goods.

Import – bringing (goods or services) in a country from abroad for sale.

Export – sending (goods or services) to another country for sale.



Why is global trade unfair for developing countries?

The products they export are mostly primary goods, therefore have a lower value which results in less revenue. This keeps them in a **poverty cycle**.

Why has trade increased nowadays?

- More Trans-national corporations (TNC'S)
- Cheaper production methods
- Technological advancements
- Increase in transport
- Greater affluence (wealth)
- More trade blocs



Measuring development - Development Indicators

Geographers use different **DEVELOPMENT INDICATORS** to measure the development of different countries.

Economic Development Indicators	Human Development Indicators
<ul style="list-style-type: none"> • Gross National Income (GNI) • Gross Domestic Product (GDP) • Unemployment • Economic structure • Economic growth 	<ul style="list-style-type: none"> • Human Development Index (HDI) • Birth Rate • Death Rate • Infant Mortality Rate (IMR) • People per doctor • Literacy Rate • Life expectancy



Development gap

The development gap has grown due to various factors:

Historical/Political	Physical	Social
<ul style="list-style-type: none"> • European colonisation in the 19th century. • Corruption & political instability. • Trade barriers • War and civil unrest 	<ul style="list-style-type: none"> • Climate • Natural Resources • Location e.g., landlocked • Natural Hazards 	<ul style="list-style-type: none"> • Access to services • Low skilled workers • Diseases e.g., Malaria • Discrimination/Inequality • Lack of education

How to reduce the development gap?

Fair trade - the producer receives a guaranteed and fair price for their product.

Aid - A form of help given from one country to another; or one person to another, or from a charity (often called Non-Government Organisations) to a country or region.

There are different types of aid that can be used to help a country:

- Emergency or short-term aid
- Conditional or tied aid
- Charitable aid
- Long-term or development aid
- Multilateral aid



GDP:

The value of goods and services would be much higher for a developed country. This is because people earn higher incomes, and more products are being purchased throughout the country. The value would be lower for a developing country. This is because people earn lower incomes, and more people live in poverty, so they are less able to afford products and services.

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.

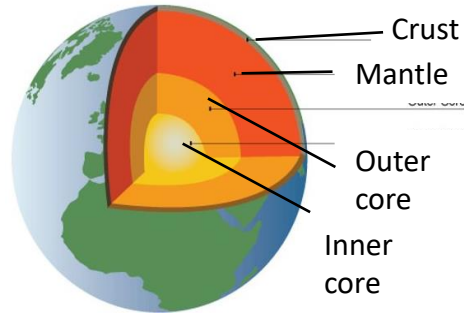


Plate Tectonics

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.

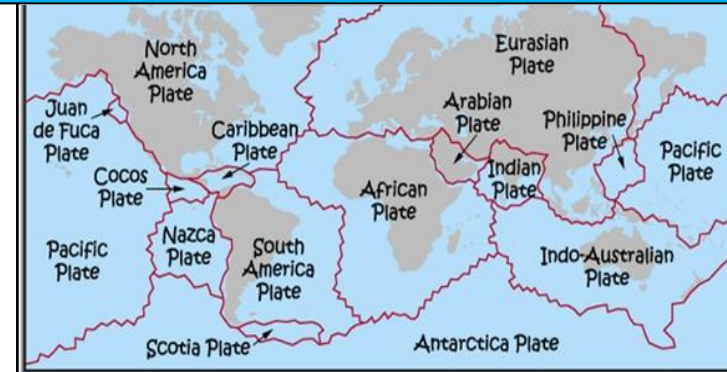
Oceanic Crust: Crust found under the oceans (thin, young, denser)

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.

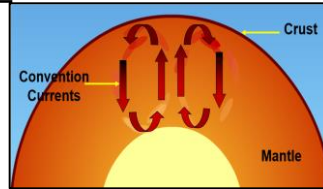


As tectonic plates suddenly move, they send out **SEISMIC WAVES**

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

Convection currents

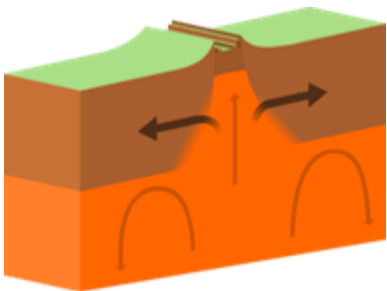
- The mantle is made up of semi molten rock.
- Convection currents are circular currents in the mantle.
- Convection currents cause the overlying tectonic plates to move.



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.

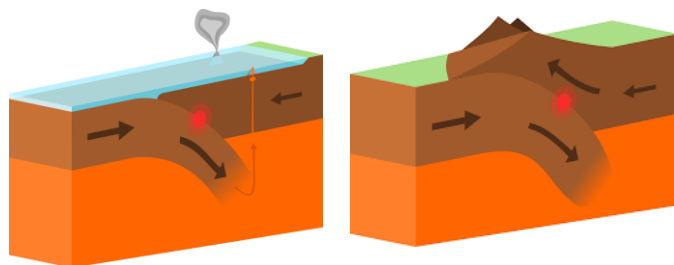


Convergent/destructive plate boundary

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.

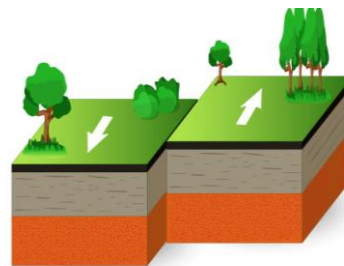


Conservative plate boundary

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

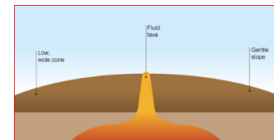
Magnitude: 7.0

Epicentre: 25km west of Port-au-Prince, at a depth of 13km.

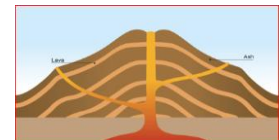
PRIMARY EFFECTS	SECONDARY EFFECTS
<ul style="list-style-type: none"> • 220,000 dead • 300,000 injured • 200,000 homes damaged and 100,000 destroyed • 8 hospitals destroyed in Port-au-Prince • 5000 schools destroyed or damaged • Transportation routes destroyed • Service lines and infrastructure destroyed 	<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.



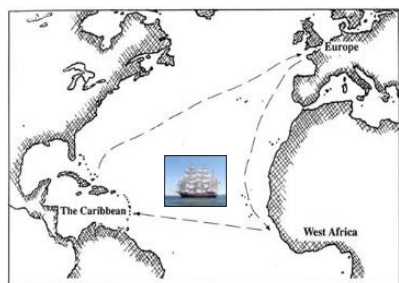
A **composite volcano** is steep sided and cone-shaped, it is made up of layers of ash and lava. The lava is sticky (viscous) so it does not flow far. They are less frequent but cause more damage.



History: The Transatlantic Slave Trade

Overarching enquiry question: How did the Transatlantic Slave Trade impact Africa, the Americas and Britain?

From **1440**, white Europeans started to arrive in **Africa** and force Africans into slavery. However, before Europeans arrived in **West African Kingdoms**, there was prosperous cities, education and culture. The **Triangle of Trade** moved goods between Europe, Africa and the Americas; as part of this slaves were taken from Africa to the Americas in a journey known as the **Middle Passage**. Once in the Americas, Slaves often lived and worked on large **plantations** once in the Americas, farming crops like sugar, tobacco and cotton. Many slaves wanted **freedom** and some would **rebel** against their masters, but were treated harshly if they were caught. Not only did the slave trade affect the economic development of America and Britain, it also accelerated Britain's **Industrial Revolution**. However, many started to disagree with slavery and campaigned for its end in 1807; they used methods like pamphlets, books, boycotts, and meetings. Some of the those who helped to campaign for the end of slavery in Britain were: **Olaudah Equiano**, **Thomas Clarkson** and **William Wilberforce**. Thomas Clarkson was able to gather information from people who used to be slaves or those who worked in the transatlantic trade. Finally, in **1833**, the British government **abolished** slavery across the British Empire. Yet the impact of can be felt in **the American Civil War** and later fight for equality during the **Civil Rights** movement.



The Triangle of Trade



Nat Turner's Slave Revolt as shown by those who agreed with slavery

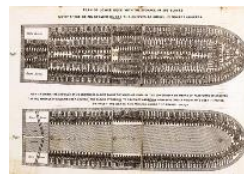
Olaudah Equiano a former slave and abolitionist



Timeline of events	
1226	Mali Empire across the coast of West Africa is established
1440	White Europeans arrive in Africa and take Africans as slaves
1670	Mali Empire falls
1730	Little George (slave trade ship) Mutiny by slaves
1831	Nat Turner's Slave Revolt in Virginia, USA
1807	Slave Trade was abolished by the British government
1833	Slavery made illegal across the British Empire
1861-5	American Civil War

What sources should I know about/use?

A Plan of a Slave Ship – This shows how slaves were expected to travel across the Middle Passage.



A reward poster – This shows us how slaves would run away and how they were considered 'goods'.



Key words:

Slavery	Being legally owned by someone else and forced to work or obey them.
Freedom	The power or right to act, speak or think as one wants.
Rights	The legal entitlement to have or do something e.g. It is your right to free speech.
Primary Source	A source that was made at the time.
Inference	Going beyond what the source says, to what it suggests.
Legacy	Something handed down from the past.
Merchants	People who buy and sell goods.
Inhabitants	People who live in a town/city.
Abundant	Enough for everyone.
Continuity	Things stay the same.
Triangle of Trade	System of trade where goods were exported between Europe, Africa and the Americas.
The Middle Passage	The journey between Africa and the Americas, slaves were transported in horrible conditions by boat.
Plantation	A large farm.
NOP	Nature – What is the source? Origin – When, where and who did it come from? Purpose – why was it created?
Rebel	Act against the people in charge.
Captivity	Being held against your wishes.
Abolition	To end or get rid of something.
Boycott	When a person refuses to buy something in protest.
Civil Rights	Guarantee of equal social opportunities and equal protection under law.

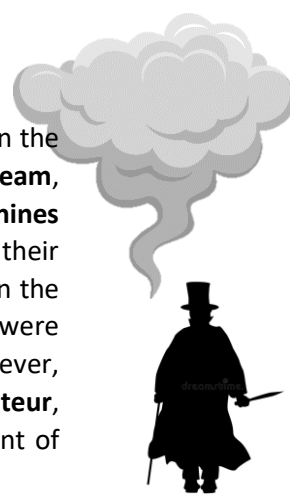
Year	Events
1714	Jethro Tull invented the seed drill
1750	Population of England is 11 million. Only 5% of the population could vote
1757	Sankey Cut a canal in Liverpool is built to help boost trade
1811	Luddites – people were angry that machines took their jobs
1825	First Railway the Stockton and Darlington introduced
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
1888	Jack the Ripper murders 5 prostitutes across Whitechapel and Aldgate
1899	Education made compulsory and free for all children until the age of 12

History : The Industrial Revolution

Overarching enquiry question: To what extent did the Industrial Revolution bring about change in Britain?



The Industrial Revolution was a time of major **change** throughout Britain and Europe. Before **1715**, most people lived and worked in the **countryside** on the **farmland**, growing **crops** and animals for food. However, over time much 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**. Many people migrated to towns and cities to find work. As people lost their jobs, **families** became desperate and even had to send their **children** to work. This increase in poverty also led to an increase in **crime**, particularly in the **East End** of London. In **1888**, **Jack the Ripper** carried out 5 brutal murders across **Whitechapel**. He was never caught for his crimes. However, if people were caught for murder at this time, they could expect the **death penalty**. Other criminals could expect to be shipped to **Australia** to do **hard labour**. However, with all of the new inventions people's lives began to change dramatically, with positive consequences too. 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** also meant people could **travel** further and faster. The extent of change, however, varied politically, socially and economically.



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.
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.
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.
Political	Activities that involve ruling over an area. Including voting and making decisions about laws.
Economical	Involving trade, goods, imports, exports, money, jobs.
Social	Involving people and how they live, including their pastimes and living conditions.
Labour	Physical work.
Apprentice	someone who learns their job while working for someone.
Slops	Wastewater from a kitchen or toilet.
Ventilation	Making sure the room has air.

What sources should I know about/use?

The smell of human waste and industrial fumes hung over Victorian London. For centuries the River Thames had been used as a dumping ground for the capital's waste and as the population grew, so did the problem.



This is a cartoon representing the 'Great Stink'.

Nature of G-d

Jews believe in one G-d. This belief is called **Monotheism**.

1

G-d is the **Creator** of everything – He made the Universe and everything in it from nothing. He created it in 6 days and rested on the seventh, Shabbat. G-d is a single, whole, indivisible entity, beyond the full understanding of humankind. G-d **sustains** the world. He is everywhere and in everything. G-d is the source of all Jewish morality, beliefs and values. **‘Shechinah’** is the word used to describe the ‘presence’ of G-d. Whilst G-d cannot be seen, His presence can be felt through experiences such as prayer or wonder at the beauty of nature. People can bring the shechinah into their homes by lighting shabbat candles or having a mezuzah on the door. G-d has given Jews laws to follow and will judge them on how well they follow them. G-d is the only one Jews should pray to and praise.

‘In the beginning G-d created the heavens and the earth’ (Torah)

‘Here Oh Israel, the Lord our G-d, the Lord is one (Shema)

Life After Death

There is no one belief about life after death that all Jewish people hold. Judaism does not place too much emphasis on the next life (**Olam Habah**). They focus more on this life (**Olam Hazeh**) and living according to G-d’s mitzvot. Jews believe in the idea of reward and punishment. The most righteous souls will go directly to **Gan Eden** – a place close to G-d. Most people will go to **Gehenna** – a place where the soul is cleansed before going to Gan Eden. By following G-d’s commandments, a person will enjoy a relationship with G-d in the next world. Jews believe G-d gives every person a body and a soul. The body is created from dust and returns there after death. The soul is unique, breathed in by G-d and lives on after death.



Some Jews believe in reincarnation. Some Orthodox Jews believe in resurrection at the coming of the **Messiah**. The world to come is also open to all people who observe the 7 Noachide laws.

‘This world is a passageway to the world to come’

‘According to the effort is the reward’ (Ethics and the Fathers)

Key Moral Principles

Pursuing **Justice** is a sacred duty. Justice is bringing about what is right and fair. **Tikkun Olam** is Healing the world.



Jews can heal the world by engaging in actions that bring them closer to God. Tikkun Olam motivates Jews to get involved in social justice work. **Chessed** is loving kindness and **Tzedakah** is charity. Both of these are connected to justice. The Torah commands Jews to give one tenth of their earnings to charity and to do acts of kindness. **Sanctity** of life. Life is holy; it is a gift from God and only He can give it or take it away. It should be respected. **Pikuach Nefesh** is the obligation to preserve/save life which overrides all other **Mitzvot**.

‘The highest form of charity is to help a person to help themselves’ (Maimonides)

Messiah

Messiah means ‘anointed one’. He will be the future leader of the Jews, a future King of Israel, and a descendant of King David. He will rule in the ‘Messianic Age’. The Messiah will uphold the law of the Torah, rebuild the Temple in Jerusalem and unite humanity as one, ushering in world peace.



There is debate about what the Messianic age will look like. Some say the dead will be resurrected, others say it will be a time of peace and harmony. Jews focus on the coming of Messianic age in prayer. The idea of Messiah offers hope in troubled times. Reform Jews reject the idea of there being a person Messiah, but rather think that everyone should work together to make the world a better place.

‘There shall be war no more’ (Isaiah)

Covenants

Covenant means agreement and is a two way promise that can never be broken.




Abraham was the first **monotheist; a belief in only one G-d**. G-d made a covenant with Abraham; he would be the father of the Jewish people; his descendants would follow G-d and were promised the Land of Israel. Sign of the covenant is circumcision. G-d also made a covenant with Moses at Mount Sinai. The terms were: G-d would look after the people, as long as they obeyed his laws. G-d gave Moses the 10 commandments at Mount Sinai as part of the 613 which the Jews had to follow. Shabbat is the sign of this covenant.

Both of these covenants established a special relationship between G-d and the Jewish people.

‘I am the Lord Your G-d’ (first commandment)

MATHS Unit 1 - Indices and Standard Form

Topics	Key Skills	Key Vocabulary
<ul style="list-style-type: none"> ❑ Calculate with indices. ❑ Use index laws to simplify expressions. ❑ Estimate answers to calculations ❑ Write very large and very small numbers using standard form. ❑ Calculate with the four operations in standard form. 	 <ul style="list-style-type: none"> • Prior Knowledge: 223-224 • Indices: 172-175 • Standard Form: 300-303 	<ul style="list-style-type: none"> • Power – A small number above. Multiply the base by itself this many times. • Base – The big number with the power. • Simplify – Reduce something to its smallest part. • Evaluate – Find the numerical value. • Expression – A small piece of algebra • Term – A small piece of an expression • Standard Form – A shorter way to write very large or small numbers using powers of 10 • Reciprocal - What you get when you flip a fraction upside down.

Formulae & Rules

Index Laws

$$a^m \times a^n = a^{m+n}$$

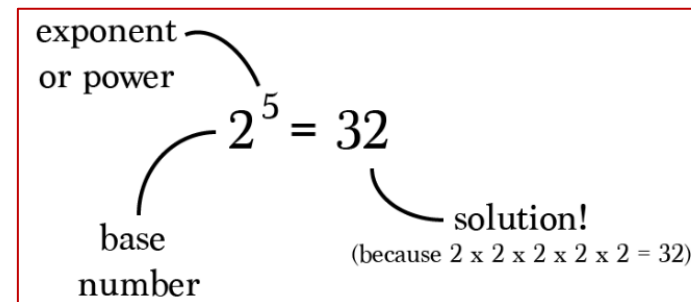
$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{m \times n}$$

$$a^{\frac{m}{n}} = (\sqrt[n]{a})^m$$

Things to Remember

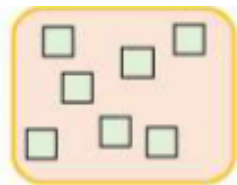
- Anything to the power of zero is one.
- If you have a negative power, first take the reciprocal and then change the power to be positive. Flip it and make the power positive.
- Numbers in standard form must have the first number between one and nine inclusive. For example, 12×10^2 should be adjusted to 1.2×10^3



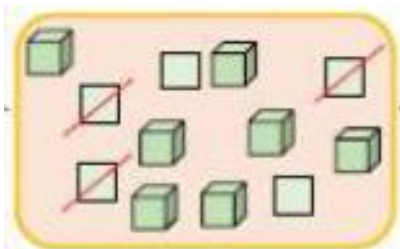
Addition and Subtraction With Indices

Imagine each different term as a different shape and collect them up.

$$5x^2 + 2x^2 = 7x^2$$



$$5x^2 + 6x^4 - 3x^2 + x^4 = 2x^2 + 7x^4$$



Letters with different powers are considered separately. You can't treat x^4 and x^2 as the same.

Multiplying and Dividing With Indices

When the bases are the same, you add the powers if you are multiplying and subtract the powers if you are dividing.

$$\begin{aligned} & 4b \times 3a \\ &= 4 \times b \times 3 \times a \\ &= 4 \times 3 \times a \times b \\ &= 12ab \end{aligned}$$

$$\begin{aligned} & 2b^3 \times 3b^2 \\ &= 2 \times b \times b \times b \times 3 \times b \times b \\ &= 2 \times 3 \times b \times b \times b \times b \times b \\ &= 6b^5 \end{aligned}$$

$$\begin{aligned} & \frac{6a^3b^2}{2a^2b} \\ &= \frac{6 \times a \times a \times a \times b \times b}{2 \times a \times a \times b} \\ &= \frac{\cancel{6} \times \cancel{a} \times \cancel{a} \times \cancel{a} \times \cancel{b} \times b}{\cancel{2} \times \cancel{a} \times \cancel{a} \times \cancel{b}} \\ &= 3ab \end{aligned}$$

Standard Form

$$4.2 \times 10^9$$

Must be 1 to 10 (but not 10!) (pointing to 4.2)

Must be x 10 (pointing to 10)

Must be an Integer (pointing to 9)

Calculations in Standard Form


For addition and subtraction – convert to normal numbers and then calculate. For multiplication and division – use the index laws

$$\begin{aligned} & 6 \times 10^5 + 8 \times 10^5 \\ &= 600000 + 800000 = 1400000 \\ &= 1.4 \times 10^5 \end{aligned}$$

$$\begin{aligned} & 1.5 \times 10^5 \div 0.3 \times 10^2 \\ &= 1.5 \div 0.3 \times 10^5 \div 10^3 \\ &= 5 \times 10^2 \end{aligned}$$

For multiplication and division – treat the numbers and the powers of 10 separately.

MATHS Unit 2: Expressions and Formulae

Topics	Key Skills	Key Vocabulary
<ul style="list-style-type: none"> ❑ Write and solve equations. ❑ Work with formulae, including substitution and changing the subject. ❑ Simplify and expand expressions with brackets or indices. 	 <ul style="list-style-type: none"> • Prior Knowledge: 9, 20 • Equations: 110,113,114,115 • Factorising: 117 • Brackets: 13,14,15 	<ul style="list-style-type: none"> • Term – A small numerical or algebraic statement. • Expression – A group of terms with algebra. There are no equal sign • Equation – An expression with an equal sign and two sides. The letters represent one • Identity – An equation that is true for all values of the unknown. • Formula – An equation with multiple unknowns or variables. • Variable – Another name for a letter in mathematical statement
Formulae & Rules		

Things to Remember

Examples of The Different Types of Algebraic Statements

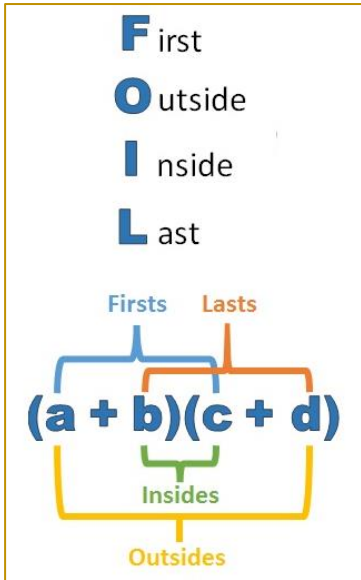
Expression: $2x + 2$

Equation: $2x + 2 = 4$

Identity: $2(x + 1) = 2x + 2$

Formula: $E = mc^2$

- Examples of the different 'types' of algebraic statements can be seen to the left.
- The method for expanding double brackets is to the right.
- Collect like terms by adding or subtracting terms that have the exact same variable or letter.
- $4x^2$ and $4x$ or 4 cannot be combined or collected in this way – each of them has a different (or no) variable.
- If substituting into a formula – always be careful with negative values – remember the rules. Two negatives make a positive!



Solving Equations – Balance Method

Whatever you do to one side of the equation you must do to the other.

<table style="border: 1px solid black; width: 100%; text-align: center;"> <tr><td style="background-color: #d9ead3; padding: 2px;">$2x + 4$</td><td style="background-color: #d9ead3; padding: 2px;">$2x + 4$</td><td style="background-color: #d9ead3; padding: 2px;">$2x + 4$</td></tr> <tr><td colspan="3" style="border-top: 1px solid black; padding: 2px;">30</td></tr> </table>	$2x + 4$	$2x + 4$	$2x + 4$	30			$3(2x + 4) = 30$ $6x + 12 = 30$ $-12 \quad -12$ $6x = 18$ $+6 \quad +6$ $x = 3$												
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Solving Equations With Unknowns On Both Sides

Get rid of the smallest unknown/variable first!

$4x + 5 = 3x + 24$	<table style="border: 1px solid black; width: 100%; text-align: center;"> <tr><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">5</td></tr> <tr><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">24</td><td></td></tr> </table>	x	x	x	x	5	x	x	x	24			
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x	x	x	24										
$-3x \quad -3x$													
$x + 5 = 24$	<table style="border: 1px solid black; width: 100%; text-align: center;"> <tr><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">5</td></tr> <tr><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">x</td><td style="background-color: #d9ead3; padding: 2px;">24</td></tr> </table>	x	x	x	x	x	5	x	x	x	x	x	24
x	x	x	x	x	5								
x	x	x	x	x	24								
$-5 \quad -5$													
$x = 19$													

Substituting into Formula

Do a direct swap with every letter replaced with the given number.

Substitute $w = 4$ and $y = -2$ into the formula below to find z :

$$z = 2w + 3y^2$$

$$z = 2(4) + 3(-2)^2$$

$$z = 2 \times 4 + 3 \times -2 \times -2$$

$$z = 8 + 12$$

$$z = 20$$

Changing the Subject of a Formula

Use the same balance method, as if you were solving the equation – just with more letters instead of numbers.

In an equation (find x)

$$4x - 3 = 9$$

$$+3 \quad +3$$

$$4x = 12$$

$$\div 4 \quad \div 4$$

$$x = 3$$

In a formula (make x the subject)

$$xy - s = a$$

$$+s \quad +s$$

$$xy = a + s$$

$$\div y \quad \div y$$

$$x = \frac{a + s}{y}$$

The steps are the same for solving and rearranging

Expanding Double Brackets – FOIL

$$(x + 4)(x - 3)$$

First: $x \times x = x^2$
 Outer: $x \times -3 = -3x$
 Inner: $4 \times x = 4x$
 Last: $4 \times -3 = -12$

$$x^2 - 3x + 4x - 12$$

$$= x^2 + 1x - 12$$


Harder Example

$$(2y - 7)(-3y - 9)$$

First: $2y \times -3y = -6y^2$
 Outer: $2y \times -9 = -18y$
 Inner: $-7 \times -3y = +21y$
 Last: $-7 \times -9 = +63$

$$-6y^2 - 18y + 21y + 63$$

$$= -6y^2 + 3y + 63$$

Topics	Key Skills	Key Vocabulary
<ul style="list-style-type: none"> ❑ Plan and carry out effective surveys to collect data. ❑ Calculate averages (mean, median, mode) and measures of spread (range) from a frequency table and grouped data. ❑ Create tables and graphs (scatter plot, stem and leaf) to analyse data. ❑ Describe and compare different sets of data 	 <ul style="list-style-type: none"> • Prior Knowledge: 319 • Collecting data: 281a • Averages: 51,52,55, 55a • Displaying data: 155,156,165,166 	<ul style="list-style-type: none"> • Data – A collection of information, facts or statistics. • Survey – A method of collecting data by asking questions. • Mean – An expected middle value. • Median – The middle number in an ordered list. • Mode – The most frequently occurring. • Range – Highest value subtract smallest value. • Sample Size – The number of data points collected, such as the number of people in a survey.
<h3>Key Formulae/Rules</h3>	<h3>Things to Remember</h3>	
<p style="text-align: center;">Calculating Mean</p> $\text{Mean} = \frac{\text{Sum of all values}}{\text{How many values}}$ <p style="text-align: center;">Calculating Mean from Frequency Table</p> $\text{Estimated Mean} = \frac{\text{Sum of } fx \text{ column}}{\text{Sum of } f \text{ column}}$	<ul style="list-style-type: none"> • You cannot always trust statistics presented as fact. Always be sure to question where the data comes from, how it was collected and why it was presented in that way. • Choosing the right sort of graph for your data is very important. Some examples and thoughts below: <ul style="list-style-type: none"> • Bar Chart – When your data has categories, or to highlight positives/negatives. • Pie Chart – If you wish to convey parts of a whole, or percentages. • Line Graph – If you have data over time, or you want to show patterns or trends. • Scatter Plot – If you have two distinct data categories you wish to investigate the link between. • When asked to compare two sets of data you should contrast one average (mean or median) and one measure of spread (range or interquartile range). 	

Model Answers and Examples

Carrying Out Surveys

- Balance the sample size with the time or resources required to carry it out. More responses is always best.
- Minimise sources of bias by being fair in how you select participants.
- Design questions that make collecting data easy - for example pre-grouping buckets for 'age'.

Organising and Displaying Data

You can organise your data in a table, and then display it in a chart.

If you have a lot of data you can create 'buckets' or 'classes' and group them together like in the table below.

Weight of box (w kg)	Frequency
$0 < w \leq 4$	11
$4 < w \leq 8$	16
$8 < w \leq 12$	29
$12 < w \leq 16$	26
$16 < w \leq 20$	20

Calculating Averages and Range

Data Set: 2,2,3,4,5,6,7,7,9

Mode: 2 and 7 (bimodal)

Median: 5

Range: $9 - 2 = 7$

Mean: 5

$$2 + 2 + 3 + 4 + 5 + 6 + 7 + 7 + 9 = 45$$

$$45 \div 9 = 5$$

Mean from Grouped Frequency Table

Multiply the middle of the class by the frequency (create a 'fx' column)

To estimate the mean: Add the fx column and divide by the total frequency.

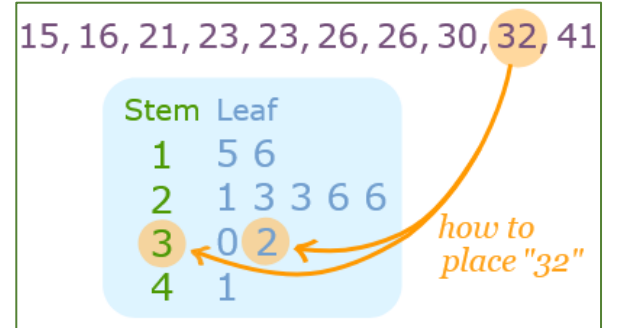
Weight of box (w kg)	Frequency	fx
$0 < w \leq 4$ (2)	11	$2 \times 11 = 22$
$4 < w \leq 8$ (6)	16	96
$8 < w \leq 12$ (10)	29	290
$12 < w \leq 16$ (14)	26	644
$16 < w \leq 20$ (18)	20	360

$$\text{Total: } \quad 102 \quad 1508$$

$$\text{Mean} = 1508 \div 102 = 14.8 \text{ (1dp)}$$

Back-to-Back Stem and Leaf

A normal stem and leaf is displayed below.



You can easily compare two data sets by plotting them back to back. The points scored in game 6 of the 1996 NBA championship are represented below:

Seattle		Chicago
7 4 4	0	7 9
9 8	1	0 0 2 7
3	2	2

It is immediately visually clear that there are clusters of higher scores for Chicago, which indicate that they won the game.

MATHS Unit 4 - Multiplicative Reasoning

Topics	Key Skills	Key Vocabulary
--------	------------	----------------

- ❑ Enlarge 2D shapes, including negative and fractional scale factors.
- ❑ Calculate percentage change.
- ❑ Solve problems using compound measures and rates of change.
- ❑ Best-buy and value problems.
- ❑ Solve direct and inverse proportion problems.



- **Enlargement:** 104,106,107,108
- **Percentage change:** 233
- **Best buy and value:** 210
- **Direct proportion:** 254
- **Inverse proportion:** 255

- **Scale Factor**– A number that links (by multiplication) two measurements.
- **Ratio** – Shows the relative size of two quantities.
- **Direct Proportion** – When a scale factor is applied to two different variables/quantities.
- **Inverse Proportion** – When a scale factor multiplies one quantity but divides another.
- **Enlarge** – Changing the size of a shape or quantity.

Key Formulae & Rules

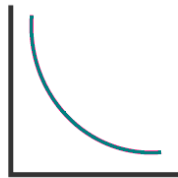
Percentage Change

$$= \frac{\text{Actual Difference}}{\text{Original Value}} \times 100$$

Proportion Graphs



Direct proportion



Inverse proportion

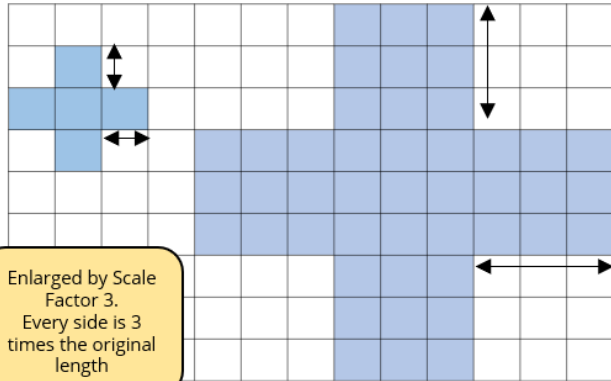
Things to Remember

- **Examples of direct proportion:**
 - Cost of Netflix versus the time subscribed.
 - Cost of petrol (Price Per Litre) at the service station.
- **Examples of inverse proportion:**
 - Time taken to fill a pool versus the number of taps running.
 - Time taken to paint a room versus the number of painters.

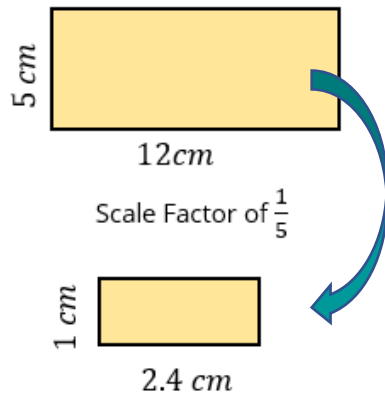
Model Answers and Examples

Enlargement

- Positive scale factor - each side gets bigger.



- Fractional scale factor - each side gets smaller.

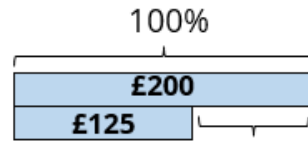


- A negative scale factor also changes the orientation of the shape.

Percentage Change

Calculate percentage change using the formula given.

I bought a phone for £200. A year later I sold it for £125.



$$\% \text{ Change} = \frac{\text{Actual Difference}}{\text{Original Value}} \times 100$$

$$\% \text{ Change} = \frac{-75}{200} \times 100 = -37.5\% \text{ lost}$$

Inverse Proportion

When one variable is multiplied by a scale factor the other is divided by it.

T is inversely proportional to G. When T=2 then G=20

T	1	2	8
G	40	20	5

Arrows indicate the relationships: from T=1 to T=2 (÷ 2), from T=2 to T=8 (× 4), from G=40 to G=20 (× 2), and from G=20 to G=5 (÷ 4).

Value for Money - Best Buy

This is a direct proportion relationship. When one variable is multiplied by a scale factor the other is multiplied by it as well.




To calculate which of the options is the best value for money you need to compare the cost of one *unit* of product.



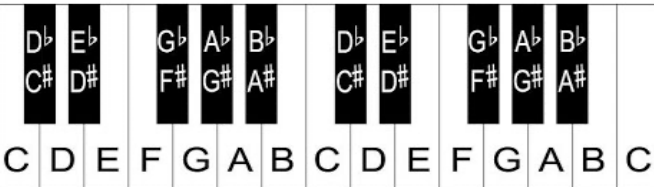
Shop A	Shop B
4 cans for £1.20	3 cans for 93p
↓ £1.20 ÷ 4	↓ £0.93 ÷ 3
1 can is £0.30 Or 30p	1 can is £0.31 Or 31p

This means that Shop A sells the cans slightly cheaper and is better value for money.

Best value is the most product for the lowest price per unit.

Term	Definition	Example
MC	Master of Ceremonies. They are the host of a staged event.	
Rapping	Rapping is talking in rhyme to the rhythm of a beat.	The Notorious B.I.G. , Snoop Dog, Kendrick Lamar and Eminem.
DJ	A Disk Jockey is the person who selects, plays, and announces records.	The person that provides the music for the event.
Vinyl	Analogue sound storage system typically on a black 12" format.	A format for listening to music, traditionally looks like a black large disk.
Turn Tables	The equipment that Vinyl is played on.	
Sampling	Using a preexisting recording in your composition.	If you use someone else's recording, you are sampling their track.
Drum machine	An electronic machine that produces drum sounds.	
Looping	Looping is when a digital sampler is used to repeat a sample over and over again.	You can repeat a sound an infinite number of times.

Keyboard Notes

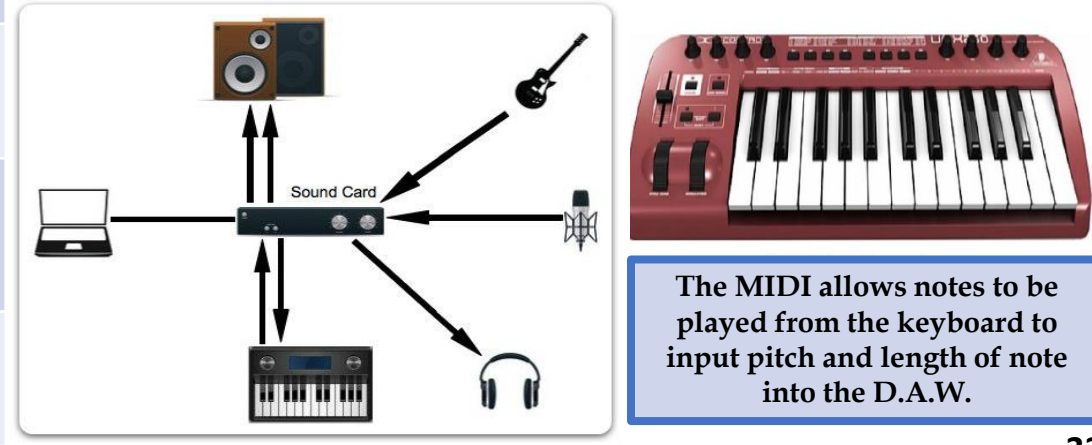


Hip Hop & Rap Artists

Post Malone, Khalid, Drake, Lil Nas X, Travis Scott, Juice WRLD, DaBaby, Cardi B, Lil Baby, Meek Mill, Chris Brown, Lil Wayne, Kanye West, Jay-Z.

Key Question	Answer
How is sound created?	Audio – By playing an instrument into the sound card via the input/singing into a microphone Software instruments– by MIDI information triggering sounds from a software instrument.
How can the sound be changed in a D.A.W?	Audio – Audio editing tools Software instrument track – MIDI editing tools e.g., quantize, lengthening, copy

Music Technology:
Check out the below instructions of how to set up and install your equipment

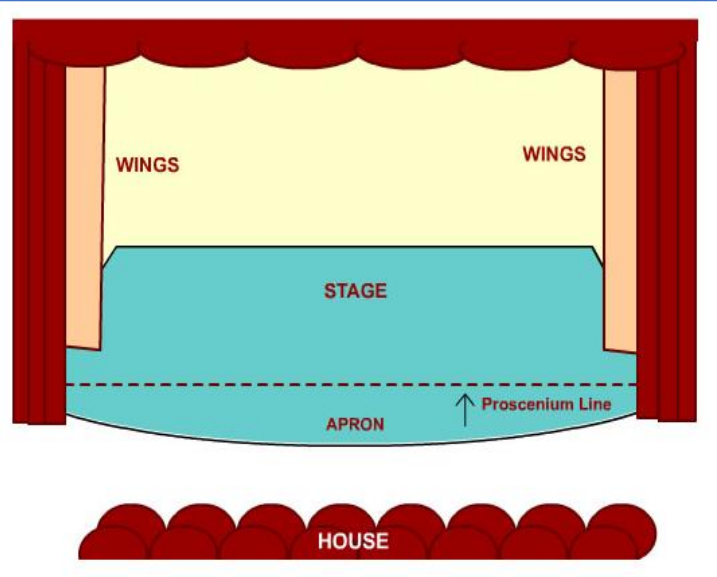


Musical Theatre

Musical theatre is a type of theatrical performance that combines songs, spoken words, acting and dance. The story of a musical is communicated through words, music, movement and technical design elements. Although musical theatre overlaps with other theatrical forms, it may be distinguished by the equal importance given to the music as compared with the dialogue, movement and other technical elements.


MUSICAL THEATRE

Proscenium Arch Stage



There are four main vocal ranges:

- **Soprano** = High female voice
- **Alto** = Low female voice
- **Tenor** = High male voice
- **Bass** = Low male voice



D	R	C	A	T	S	M	I	T	H												
Dynamics	Rhythm	Context	Articulation	Texture	Structure	Melody	Instrument	Tempo	Harmony												
Crescendo	Semi-breve 0 Minim Crotchet Quaver Semi-quaver Triplet Syncopation Dotted Time signature /Metre 3 4 6 4 4 8	<i>Baroque</i> CLASSICAL <i>Romantic</i> 20th Century Pop ROCK HIP HOP Jazz Blues Soul Folk <i>Reggae</i> <i>Changra</i> Fusion <i>Musical</i> Film Minimalism BAND ORCHESTRA <i>String Quartet</i> Choir Ensemble	Mel-is - ma - tic... Syl-lab - ic Staccato (short) Legato (smooth) Pizzicato/Picking Arco/Bowed Strummed Tremolo Glissando/Slide	Monophonic Homophonic Polyphonic Call and Response Canon Drone	Binary AB Ternary ABA Rondo ABACA Theme and Variation AAA Minuet and Trio A:BA:C DC:ABA 12 Bar Blues <table border="1"><tr><td>I</td><td>I</td><td>I</td><td>I</td></tr><tr><td>IV</td><td>IV</td><td>I</td><td>I</td></tr><tr><td>V</td><td>IV</td><td>I</td><td>I</td></tr></table> Verse Chorus Bridge	I	I	I	I	IV	IV	I	I	V	IV	I	I	High pitch Ascending Descending Low pitch Conjunct Disjunct Sequence Repetition Arpeggio Semitone Tone	Strings Woodwind Brass Percussion Voice	Vivace Allegro Allegretto Moderato Andante Adagio Lento	Major Minor Chords Key Signature Cadence Circle of 5ths
I	I	I	I																		
IV	IV	I	I																		
V	IV	I	I																		
Diminuendo	Loud/forte ff f mf mp p pp Quiet/piano							Accelerando Ritardando													

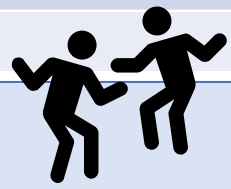
Stage Positions

The stage positions are always from the perspective of the actor!

Upstage Right (USR)	Upstage Centre (USC)	Upstage Left (USL)
Centre Stage Right (CSR)	Centre Stage (CS) 	Centre Stage Left (CSL)
Down Stage Right (DSR)	Down Stage Centre (DSC)	Down Stage Left (DSL)

Vocal Skills	Definition
P - Pitch	How high or low your voice sounds.
I – Intonation	How clearly you speak.
P - Pace	The speed in which you speak.
E – Emphasis	The importance you put on certain words.
D - Dynamics	The volume that you are speaking at.
B – Breath Control	How many breaths you take in a sentence.
A - Accent	The way you pronounce words.
P - Pause	How many breaks you take.

Physical Skills	Definition
P - Posture	The way you hold yourself.
E – Eye Contact	Where you are looking.
T - Tension	How tight or relaxed your body is.
F – Facial Expression	How you are changing your face.
L - Levels	The heights used within the performance.
A - Action	Movements that have specific meanings.
G - Gait	The way you are walking.
S - Space	The area that you are using.



Musical Theatre includes **choreographed** dance which is often performed in **ensemble**.

Choreographed = Planned dance steps **Ensemble** = All together in time

Whoa
 Never again will she get the best of me
 Never again will she take away my freedom
 And we won't forget the day we fought
 For the right to be a little bit naughty



Never again will the chokey door slam
 Never again will I be bullied, and
 Never again will I doubt it when
 My mummy says I'm a miracle
 Never again
 Never again will we live behind bars
 Never again, now that we know

We are revolting children
 Living in revolting times
 We sing revolting songs
 Using revolting rhymes
 We'll be revolting children
 'Til our revolting's done
 And we'll have the Trunchbull vaulting
 We're revolting (*repeat*)



We'll become a screaming horde
 Take out your hockey stick, and use it as a sword
 Never again will we be ignored
 We'll find out where the chalk is stored
 And draw rude pictures on the board
 It's not insulting
 We're revolting

We can S-P-L how we like
 If enough of us are wrong, wrong is right

Everyone, N-O-R-T-Y
 'Cause we're a little bit naughty
 You say we oughta stay inside the line
 But if we disobey at the same time
 There is nothing that the Trunchbull can do
 She can take her hammer and S-H-U

You didn't think you could push us too far
 But there's no going back now
 We are R-E-V-O-L-T-I-N
 C'mon
 We'll S-I-N-G
 U-S-I-N-G (yeah)
 We'll be R-E-V-O-L-T-I-N-G
 It is 2-L-8-4-U
 We are revolting



We are revolting children
 Living in revolting times
 We sing revolting songs
 Using revolting rhymes
 We'll be revolting children
 'Til our revolting's done
 It is 2-L-8-4-U

We are revolting children
 Living in revolting times
 We sing revolting songs (whoa)
 Using revolting rhymes
 We'll be revolting children
 'Til our revolting's done
 It is 2-L-8-4-U
 We are revolting!



Rules

Key Images

- The game starts with a **centre pass** and the ball must be caught in the **centre third**.
- You must comply with the **footwork** rule e.g. a 1-2 landing or a 2-footed landing.
- You only have 3 seconds to release the ball.
- When defending you must be 1 metre away from the player.
- There must be no **contact** with an opposing player.
- Only GS and GA may score a goal.
- You must stay in the correct area of the court for your position.
- Teams take it in turns to take a centre pass.
- The ball must be touched in each third of the court.
- You cannot catch the ball, drop it and then try to catch it again or bounce the ball.
- When **shooting** the ball must touch the ring or net or it is counted as passing the ball to yourself (**repossession**) and is a free pass to the other team.

The image shows a C trying to recover possession.



The image shows a GS attempting a shot.

Challenge Questions

Dig Deep & Discover

Watch an international or super league game of netball online or scan the code below to watch



SCAN ME

- What is the order you should pass the ball through starting from GK?
- Do/should the defenders always stay with their opposite player? If not, why not? What do international players do?
- Why might you get a penalty pass when playing netball? What is the difference when a penalty happens in the circle?

To find out information on joining a local club, [CLICK HERE](#) or scan code below

SCAN ME



Find more information on Netball as well as the rules by [CLICKING HERE](#) or by scanning the code below



SCAN ME

Key Vocabulary

Key Images

Rucking	A phase of the game where the ball goes to ground and one or more players from each team close around the ground.
Jackling	This is where defending players contest the ball at a ruck and win the ball
Scrumming	A type of restart in rugby where players interlock heads and push against opposition players.
Line outs	A type of restarting in rugby when the ball leaves either side-line of the pitch. Like in football, the team who didn't kick/throw the ball out usually gains control of a line-out (unless there was a penalty advantage).
Kicking	A way of moving the ball in rugby. The ball can be kicked forwards and there are different types of kicking which, if used effectively, can aid in attacking and defending.



The image shows a scrum taking place.
When does a scrum happen in rugby?

Challenge Questions

Dig Deep & Discover

Watch a premiership or international rugby game with focus on the kicking.

To find out information on joining a local club, [CLICK HERE](#) or scan code below

Recap on how to pass in rugby

When do players kick the ball?



Why do they kick the ball?

What types of kick do they use and what are the laws involved?

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

To find out information on joining a local club, [CLICK HERE](#)



[Click here](#) for Table Tennis foundation

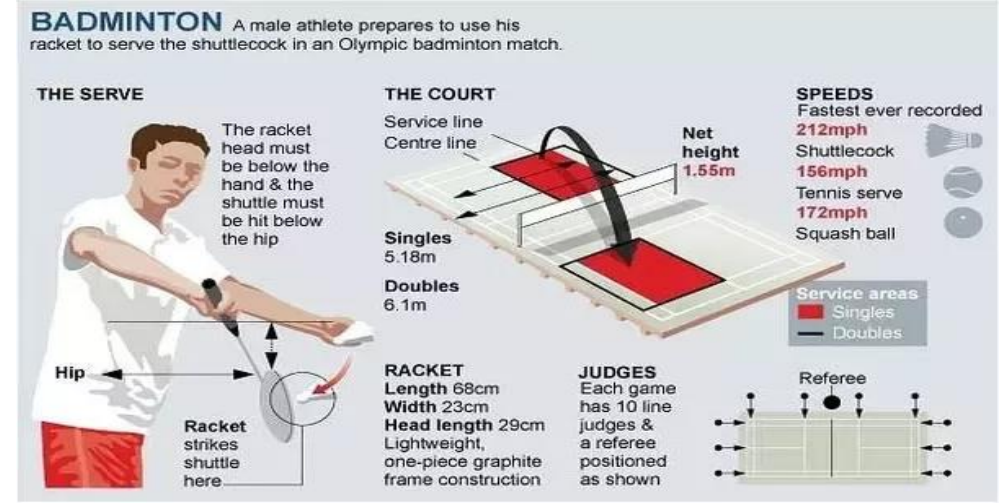


[Click here](#) for Table Tennis England



Key Vocabulary

- DROP SHOT** – A strategic shot play to land the shuttle as close as possible to the net on your opponent's side.
- SMASH** - The forehand smash shot is hit with power and speed downward into the opponent's court. The angle/steepness of the shuttlecock's trajectory make it hard for the opponent to return.
- UMPIRE** – An umpire is someone that ensures the match is conducted in accordance with the laws and rules created by the BWF.
- SERVICE JUDGE** – The Service Judge is responsible for judging that the server delivers a correct service, if not a fault will be called.
- LINE JUDGE** - A line judge is responsible for indicating whether a shuttle has landed “in” or “out” when the shuttle lands near the lines he/she has been assigned to monitor.



Challenge Questions

- List five rules that must be followed during either a singles or doubles badminton game.
- When may a “Let” be called during a game?
- If the game is tied at 20-20 how many point does the person have to win before they win the game?
- How many officials are present during a singles Badminton game?

Dig Deep & Discover

To find out information on joining a local club, [CLICK HERE](#) or scan code below



Find more information on Netball as well as the rules by [CLICKING HERE](#) or by scanning the code below



Progress check: How well have you performed in your four sports this term?

WWW:

Action Points:

My grade: Above Expected Below

A Year 9 PE student will:

- Be able to apply the rules and regulations in specific physical activities
- Be able to warm up independently and safely
- Develop and apply knowledge of a broad range of core skills in small game situations
- Demonstrate creativity in body movements by incorporating control, rhythm, timing

Science - Working Scientifically









KEY WORD	DEFINITION
Hazard	Something in an experiment that could cause harm
Risk	All hazards have a risk – it is the chance the hazard will harm
SI Unit	The standard unit we use in Science to make measurements
Conclusion	Look at your data and say what pattern or relationship you see
Correlation	There is a relationship between two variables but this does not mean one is causing the other. Scientists look for causation.
Flammable	Will set on fire easily
Corrosive	Will burn through skin or clothing
Irritant	Will cause irritation of the skin, eyes or mouth/throat
Toxic	Could be fatal if swallowed or inhaled (poisonous)
Harmful to Health	Will cause health problems if swallowed, or inhaled. This could be short term or long term
Environmental Hazard	Will cause damage to animals or plants if not disposed of correctly

					
flammable	corrosive	irritant	toxic	harmful to health	environmental hazard

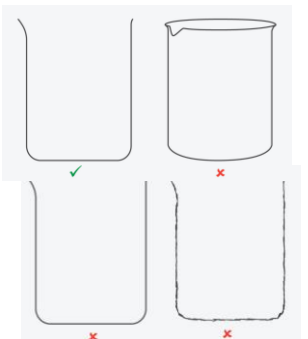
Risk Assessment: Plan for hazards by, identifying the hazard, think about what could increase the risk, and then consider the precautions you should take. E.g. tie back hair when using a Bunsen burner, because it could catch fire if it goes in the flame.

Prefix	Tera (T)	Giga (G)	Mega (M)	Kilo (k)	Deci (d)	Centi (cm)	Milli (m)	Micro (μ)	Nano (n)
Multiple of unit	10^{12}	10^9	10^6	10^3	10^{-1}	10^{-2}	10^{-3}	10^{-6}	10^{-9}

- Laboratory Rules:**
- Do not enter the laboratory without permission
 - Dress correctly for practical work, (tie your hair back, tuck in your ties, wear goggles)
 - Follow instructions from the person in charge
 - Make sure your working area is safe (tuck in stools, stand up, move bags/coats)
 - Never run in the laboratory
 - Do not eat or drink, there are many dangerous chemicals that may be on the desks
 - Do not taste or sniff chemicals, they can be harmful or toxic.
 - Do not leave a Bunsen unattended. It should be on a safety flame so others can see it.
 - Tell the teacher when an accident happens or something is broken

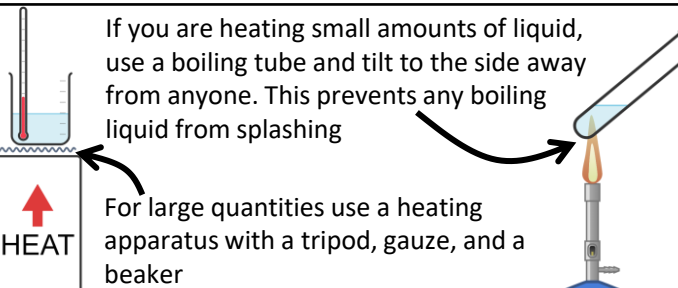
beaker		Used to stir and heat larger quantities of liquid
conical flask		Used to mix liquids together to do reactions
Evaporating basin		Used for evaporating liquids in crystallisation
boiling tube		Used to heat smaller quantities of liquid
Bunsen burner		Used as a heat source to do experiments
measuring cylinder		Measures out volumes of liquid
Round bottomed flask		Used for distillation.
funnel		Used to carefully pour, or filter liquids

When doing scientific drawings of equipment, draw in 2D, use a ruler and don't close off the tops of the equipment



Quantity	SI Unit
length	m or cm
mass	kg or g
force (weight)	N
temperature	$^{\circ}\text{C}$
time	s
area	m^2
volume	m^3
speed	m/s
energy	J
density	g/cm^3

If you are heating small amounts of liquid, use a boiling tube and tilt to the side away from anyone. This prevents any boiling liquid from splashing



For large quantities use a heating apparatus with a tripod, gauze, and a beaker

Science - Working scientifically

KEY WORD	DEFINITION
Independent Variable	What you change in an experiment
Dependent Variable	What you measure in an experiment
Control Variable	The things you keep the same in an experiment
Accuracy	How close your values are to their true value
Precision	How close all your values are to each other for the same measurement
Random Error	An unpredictable error that happens once in experiments
Systematic Error	An error that always happens in the same way every time
Reliability	How much your results are similar to each other, normally found by repeating the experiment
Discrete Data	Data that is words e.g. colours Discrete data is presented in a bar chart
Numerical Data	Data that is numbers e.g. time, height or temperature Numerical data is presented in a line graph.

Planning Investigations

Work out your **hypothesis**

Make a **prediction**

- **Change** only one variable
- **Measure** only one variable
- **Control** the other variables.

This makes it a **fair test**.

Write a method.

A **hypothesis** is an idea about how something works that can be tested in an **experiment**.

Scientists come up with **hypotheses** and then **test** them.

Scientists **peer-review** each others' work to make sure they are scientific. If they can **reproduce** the same results scientists start to believe they are true. Accepted hypotheses are referred to as **theories**.

Good data

Lab experiments are better than

rumour.

The bigger the sample size the better.

Evidence needs to be repeatable and reproducible
Evidence needs to be valid

A method should...

- Start with a list of equipment with a diagram
- Be in bullet points showing the order to do things
- Everything that was done needs to be listed so that someone else could take your **plan and reproduce the experiment exactly**.

Systematic errors happen the same way every time and are normally equipment issues e.g. not pressing zero on a balance makes it always a little bit wrong.

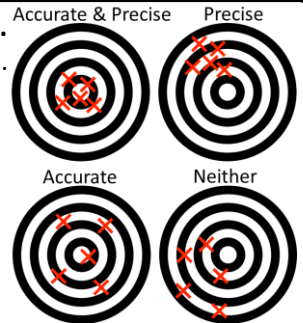
Random errors are one-off errors, normally caused by not measuring correctly e.g. not reading a measuring cylinder at eye level

In Science we want to be **accurate** and **precise** to reduce **error**.

- **Accuracy** is how close the measurement is to its true value. To make sure data is accurate, calculate the **mean**. Make sure that **outliers** are **not** included in the calculation.

$$\text{mean} = \frac{\text{add up all your values}}{\text{number of values}}$$

- **Precision** is how close the repeat measurements are.
- If repeat measurements are similar, or someone else does the experiment and gets similar results the data is **reliable**



Conclusion

A **conclusion** sums up what has been found out in an investigation.

The conclusion should be clearly structured and explained using **scientific knowledge**.

Science has limits

Some questions are unanswered – so far....

Bias and Issues

People who want to make a point can sometimes present data in a biased way.

Scientific developments are great, but they can raise issue:

- Economic
- Social
- Environmental
- Ethical

Putting results in **tables** makes it easier to understand.

- Put a **heading** in each column – including units if appropriate
- The **independent variable** should be in the first column
- The **dependent variable** should be in the second column

If the independent variable is **numerical** then they are written from lowest to highest

Wing Length (cm)	Time (s)
5	0.8
15	2.0

When drawing a graph, before you start plotting you should remember **SALT**

S: Choose a **SCALE** for the axes so that the graph is as big as possible on the page

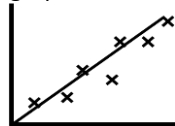
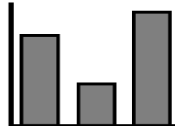
A: Using a pencil and ruler draw your **AXES**

L: **LABEL** the axes with the quantity and unit e.g. 'Temperature °C'

T: Write a **TITLE** for your graph

Bar charts for **discrete** data

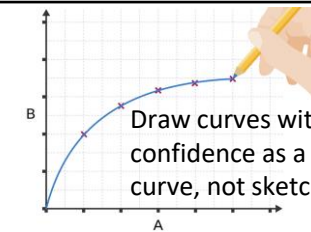
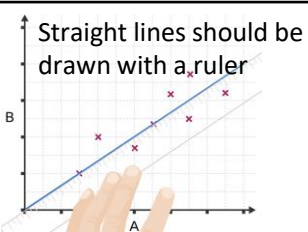
Line graphs for **numerical** data



Data that doesn't fit a **pattern** is an **anomaly**, and should be **ignored**

Once you have plotted a **line graph** you should draw a **line of best fit**.

This could be a **straight** line, or a **curve** and should go through as many points as possible



Evaluation: Are there **anomalies**? Have enough **results** been taken? Is there a big **spread** in your repeat measurements? Could different **apparatus** give you better results?

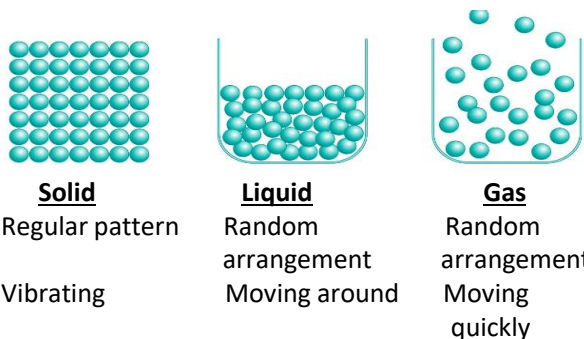
Chemistry: States of Matter, Atoms and the periodic table

Lesson sequence

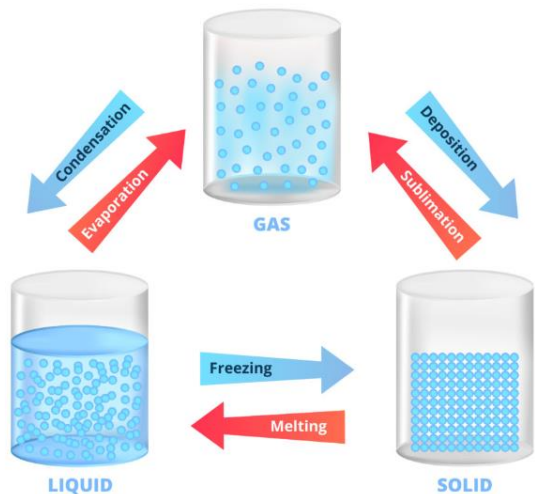
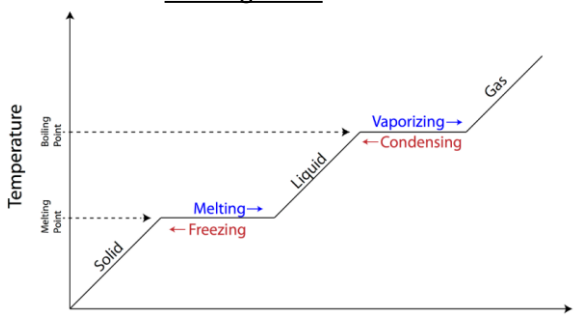
- 1.States of Matter
- 2.Structure of atoms
- 3.Detailed structure of atoms
- 4.Isotopes
- 5.Mendeleev's periodic table
- 6.The modern periodic table
- 7.Electron configuration

1. States of matter

Atom	The smallest independent particle. Everything is made of atoms.
Molecule	A particle made from two or more atoms bonded together.
Particle model	A theory that uses the idea of particles to explain the differences between solids, liquids and gases.

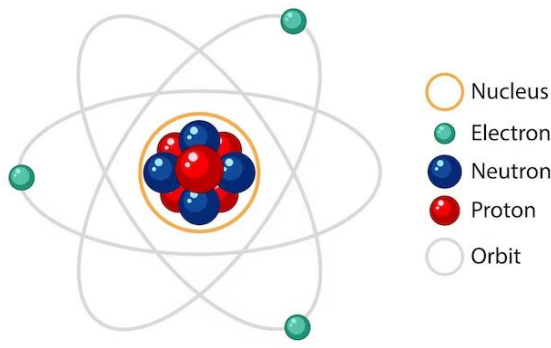


Heating curve



2. Structure of atoms

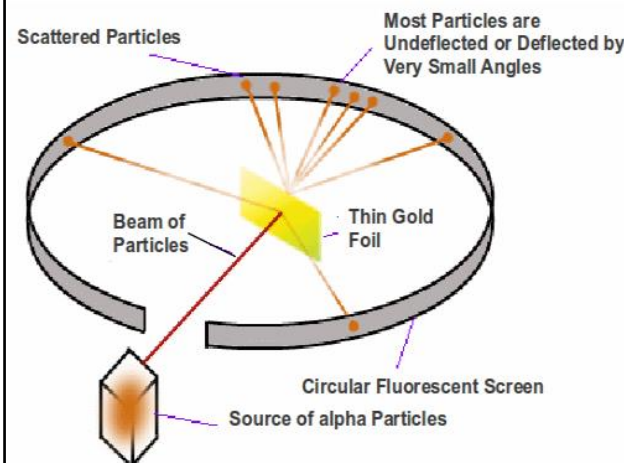
Atom	The smallest independent particle. Everything is made of atoms.
Size of atoms	About 1×10^{-10} m in diameter.
Dalton's model of atoms	<ul style="list-style-type: none"> - Tiny hard spheres - Can't be broken down - Can't be created or destroyed - Atoms of an element are identical - Different elements have different atoms
Subatomic particles	Smaller particles that atoms are made from – protons, neutrons and electrons



Sub-atomic particle	Mass	Charge
Proton	1	+1
Neutron	1	0
Electron	1/1865	-1

3. Detailed structure of atoms

Rutherford's experiment	Fired alpha particles at gold leaf, used a fluorescent screen to track where they went.
Rutherford's results	Most alpha particles went through, some scattered (changed direction).
Rutherford's explanation	Scattered particles hit a solid nucleus. Most did not hit it, therefore nucleus is small



Atomic number	The bottom number on the periodic table, gives the number of protons and electrons.
Atomic mass	The top number on the periodic table, gives the total protons and neutrons together.

Atomic Number

6

C

Symbol

Element Name

Carbon

Atomic Mass

12.01

Number of protons	Look up atomic number
Number of electrons	Look up atomic number
Number of neutrons	Atomic mass minus atomic number
Overall charge of an atom is zero because there are equal numbers of positive protons and negative electrons.	

4. Isotopes

Isotopes	Atoms with the same number of protons but different number of neutrons.
Describing isotopes	Mass after the name e.g Boron- 10 has mass of 10, Boron-11 has mass of 11
Relative atomic mass, RAM	The weighted average of the masses of all of the isotopes of an element.
Isotopic abundance	The percentage of an element that is made of a particular isotope.
Calculating relative atomic mass	Multiply each mass by the abundance % Add these up divide by 100

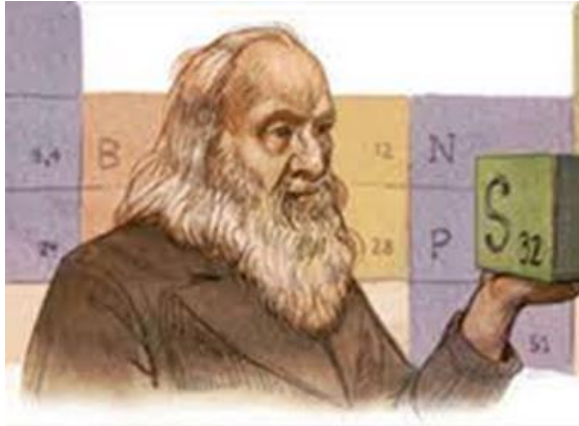
For example: Calculate the relative atomic mass of bromine which has 49% bromine-81 and 51% bromine 79.

$$\text{RAM} = \frac{(49 \times 81) + (51 \times 79)}{100} = 80$$

Chemistry: States of Matter, Atoms and the periodic table

5. Mendeleev's periodic table

Dmitri Mendeleev Russian chemist, developed the periodic table.



Mendeleev's periodic table Ordered by increasing atomic number, some elements were switched according to their properties.

	I	ПЕРИОДИЧЕСКАЯ СИСТЕМА ЭЛЕМЕНТОВ						VII	VIII
		II	III	IV	V	VI			
1									
2	Li	Be							
3	Na	Mg	Al						
4	K				V	Cr	Mn	Fe	
		Cu	Zn	Ga				Co	
5					Nb	Mo	Tc	Ru	
		Ag	Cd	In	Sn	Sb		Rh	
						Ta	W	Re	
6						Os	Ir	Pt	
		Au		Tl	Pb	Bi			
7									

Chemical properties Includes reaction with acid and formula of oxide.

Physical properties Includes melting point and density.

Gaps in Mendeleev's periodic table Mendeleev left gaps where no known element fitted and predicted these would be filled with newly discovered elements.

Eka-aluminium An element that Mendeleev thought would fill a gap. He predicted its properties, which matched gallium when discovered.

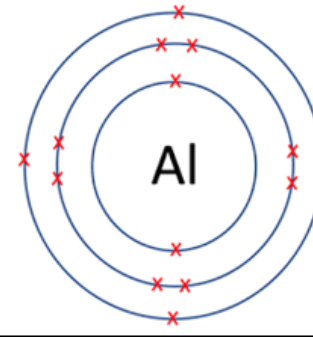
6. The modern periodic table

Atomic number	The modern periodic table is arranged in order of increasing atomic number
Noble gases	Gases that do not react: He, Ne, Ar, Kr. They were not in the original periodic table as they hadn't been discovered.
Moseley's experiment	Fired electrons at samples of elements and measured X-rays produced.
Moseley's results	Energy of x-rays produced proportional to the positive charge of the element.
Conclusion from Moseley's work	The atomic number must be the number of protons in the atoms.
Pair reversals	A few pairs of elements (like Ar and K) are not in order of atomic mass.
Explaining pair reversals	This shows that elements should be in order by increasing atomic number instead of mass number

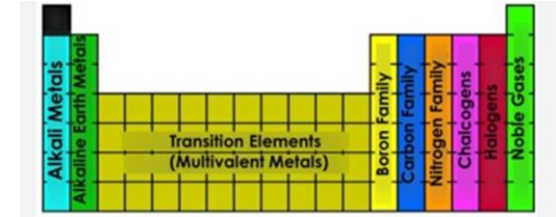
7. Electron configuration

Shells	Electrons orbit atoms in shells.
First shell	Holds up to two electrons.
Second shell	Holds up to eight electrons.
Third shell	Holds up to eight electrons.
Number of electrons	Given by the atomic number.
Filling shells	Fill shells from the first shell out. Move up a shell when current one is full.
Electron configuration	The number of electrons in each shell

Example: Aluminium 2.8.3



Outer shell	The last shell with any electrons in it
Groups	Columns in the periodic table. The group number is equal to the number of electrons in the outer shell.
Periods	Rows in the periodic table. The period number is equal to the number of shells of electrons
Example	2.8.8.5 This element is in group 5 as 5 electrons in outer shell This element is in period 4 as it has 4 shells of electrons

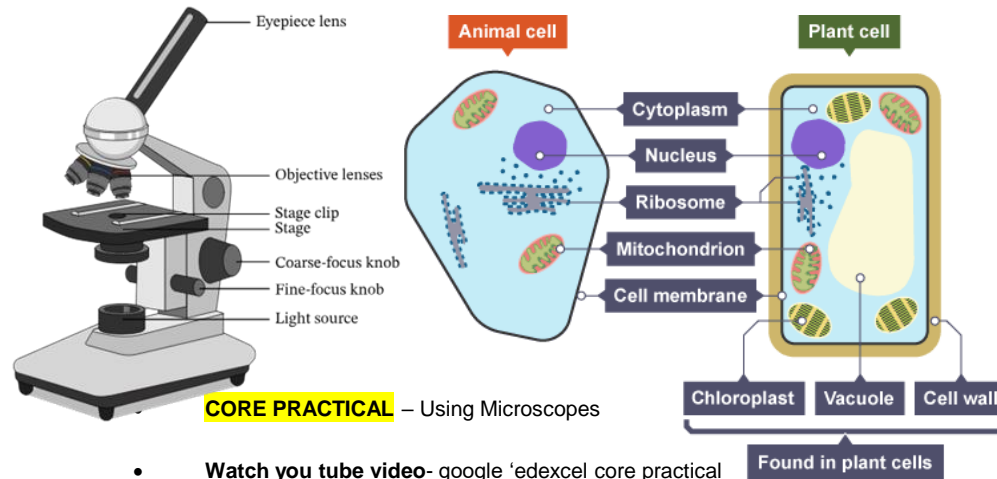


1		2		Key										3		4																			
relative atomic mass		atomic symbol		name										atomic (proton) number																					
7 Li lithium 3	9 Be beryllium 4	11 Na sodium 11	12 Mg magnesium 12	13 Al aluminium 13	14 Si silicon 14	15 P phosphorus 15	16 S sulfur 16	17 Cl chlorine 17	18 Ar argon 18	19 K potassium 19	20 Ca calcium 20	21 Sc scandium 21	22 Ti titanium 22	23 V vanadium 23	24 Cr chromium 24	25 Mn manganese 25	26 Fe iron 26	27 Co cobalt 27	28 Ni nickel 28	29 Cu copper 29	30 Zn zinc 30	31 Ga gallium 31	32 Ge germanium 32	33 As arsenic 33	34 Se selenium 34	35 Br bromine 35	36 Kr krypton 36								
37 Rb rubidium 37	38 Sr strontium 38	39 Y yttrium 39	40 Zr zirconium 40	41 Nb niobium 41	42 Mo molybdenum 42	43 Tc technetium 43	44 Ru ruthenium 44	45 Rh rhodium 45	46 Pd palladium 46	47 Ag silver 47	48 Cd cadmium 48	49 In indium 49	50 Sn tin 50	51 Sb antimony 51	52 Te tellurium 52	53 I iodine 53	54 Xe xenon 54	55 Cs caesium 55	56 Ba barium 56	57 La* lanthanum 57	72 Hf hafnium 72	73 Ta tantalum 73	74 W tungsten 74	75 Re rhenium 75	76 Os osmium 76	77 Ir iridium 77	78 Pt platinum 78	79 Au gold 79	80 Hg mercury 80	81 Tl thallium 81	82 Pb lead 82	83 Bi bismuth 83	84 Po polonium 84	85 At astatine 85	86 Rn radon 86

Biology key concepts

Lesson sequence

1. Microscopes
2. Plant and animal cells
3. Measuring cells
4. Specialised cells
5. Bacterial cells
6. Digestive enzymes
7. How enzymes work
8. Factors affecting enzymes
9. Core practical: enzymes and pH
10. Cell transport
11. Core practical: osmosis in potatoes



CORE PRACTICAL – Using Microscopes

- Watch you tube video- google 'edexcel core practical

3. Measuring cells

Micrograph	A picture produced by a microscope.
Light microscope	A microscope that uses light, can magnify up to 1500 times.
Electron microscope	A microscope that uses electrons to produce an image, can magnify up to 1,000,000 times.
Actual size of a cell	Actual size = measured size / magnification
Convert mm to μm	Micrometres (μm) = millimetres (mm) x 1000

6. Bacterial cells

Parts of a bacterial cell	All bacteria: Cell membrane, cell wall, cytoplasm, ribosomes, chromosomal DNA, plasmid DNA Some bacteria: flagellum.
Chromosomal DNA	Large piece of DNA containing most genes.
Plasmid DNA	Small loops of DNA containing a few genes.
Flagellum	A tail used for movement.
Eukaryotic cells	Cells with a nucleus.
Prokaryotic cells	Cells without a nucleus.
Standard form	A way of writing numbers in terms of powers of ten. E.g. $0.015 = 1.5 \times 10^{-2}$ $0.000458 = 4.56 \times 10^{-4}$ The index of ten (the 'minus' number) tell you which decimal point to start on.

1. Microscopes

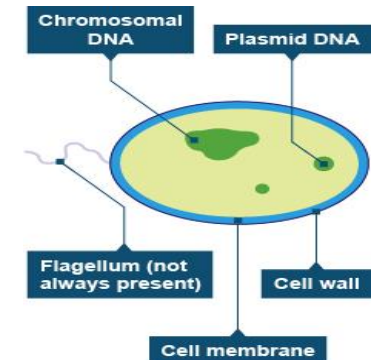
Magnification	The number of times bigger something appears under a microscope.
Eyepiece lens	The lens on a microscope that you look through.
Objective lens	The lens at the bottom of a microscope. There are normally three you can choose from.
Total magnification	Eyepiece lens x objective lens.
Resolution	The smallest distance between two points so that they can still be seen as two separate points.
Stains	Dyes added to microscope slides to show the details more clearly.

2. Plant and animal cells

Cell	The basic structural unit of all living things (the building blocks of life).
Cell membrane	Controls what enters and leaves the cell.
Cytoplasm	A jelly-like substance where chemical reactions take place.
Nucleus	Contains DNA and controls the cell.
Ribosome	Produces proteins.
Mitochondria	Releases energy by aerobic respiration.
Cell wall	Protects and supports the cell, made of cellulose.
Permanent vacuole	Stores sap and helps to support the cell.
Chloroplast	Where photosynthesis happens, contains chlorophyll.

5. Specialised cells

Small intestine cell	Job: To absorb small food molecules produced during digestion. Adaptations: Tiny folds called microvilli that increase their surface area.
Sperm cell	Job: Fertilise an egg and deliver male DNA. Adaptations: A tail to swim, mitochondria to give energy for swimming, an acrosome to break through the egg's jelly coat, haploid nucleus with only half the total DNA.
Egg cell	Job: To be fertilised by a sperm and then develop into an embryo. Adaptations: Jelly coat to protect the cell, many mitochondria and nutrients to provide energy for growth, haploid nucleus with only half the total DNA.
Ciliated epithelial cell	Job: To clear mucus out of your lungs (and other internal surfaces). Adaptations: Small hairs on the surface – called cilia – which wave to sweep mucus along.



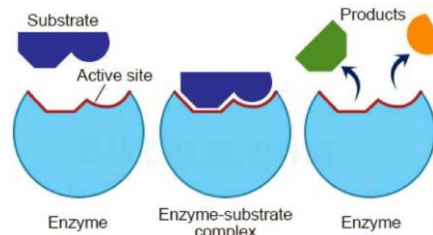
Biology key concepts

7. Digestive enzymes

Digestion	Breaking large food molecules down into ones small enough to be absorbed by the small intestine.
Catalyst	A substance that speeds up a chemical reaction without being used up.
Enzyme	A protein that works as a catalyst to speed up the reactions in our cells.
Digestive enzymes	Enzymes that break large food molecules down into smaller ones.
Amylase	Where found: saliva, small intestine. What it does: breaks down starch into simple sugars such as maltose
Lipase	Where found: small intestine. What it does: breaks down fats into fatty acids and glycerol
Protease	Where found: stomach (pepsin), small intestine (trypsin) What it does: breaks down proteins into amino acids

8. How enzymes work

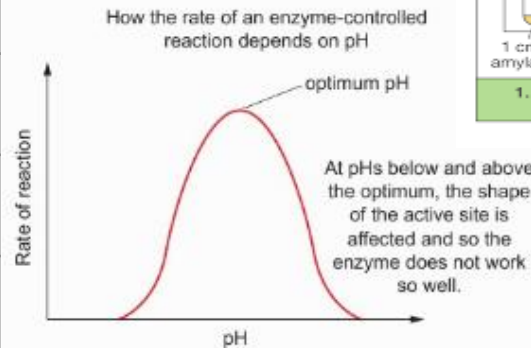
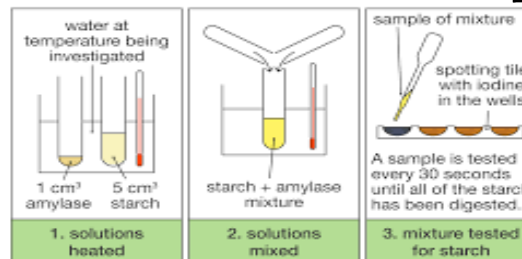
Substrate	The chemical(s) that an enzyme works on.
Active site	An area of an enzyme with the same shape as the substrate.
Lock and key mechanism	The substrate moves into the active site and reacts to form the products. The products leave the active site so another substrate can then enter and so on.
Specificity	Each enzyme can only work on one substrate because the shape of the active site has to match.
Denature	When the shape of the active site changes so the enzyme stops working.



10. Core practical – enzymes and pH (CP2)

key question	How does the rate that amylase works change as you change the pH?
Prepare your reactants	Place starch solution, amylase solution and pH 7 buffer into separate test tubes and warm them in a water bath at 40°C
Prepare your dropping tile	Place a few drops of iodine solution into each well of a spotting tile.
Start the reaction	Mix reactants together, start the stop watch and keep the mixture warm in the water bath.
Test for starch	Remove a small amount of mixture and place in a well on the spotting tile.
Vary the pH	Repeat with different pH buffers from pH 3 to pH 10
Results	The amylase works fastest around pH 7 and more slowly at pH high or lower than this.

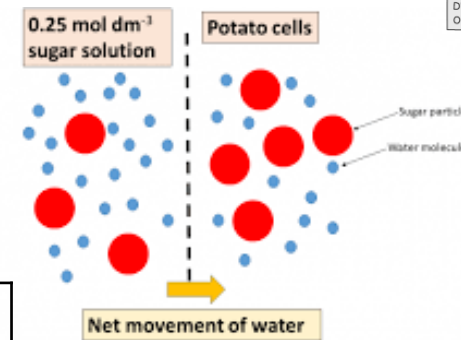
Investigating the Effect of Temperature on the Time Taken for Amylase to Digest Starch



CP3 – Results	Potato in weaker sucrose solutions gain mass because water enters potatoes by osmosis, those in stronger solutions lose mass as water leaves by osmosis.
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11. Cell transport

Concentration	The number of particles in a given volume (the strength of a solution).
Concentration gradient	The difference in concentration between two neighbouring areas.
Diffusion	The movement of particles from high to low concentration (down a concentration gradient).
Diffusion examples	Lungs: oxygen into blood, carbon dioxide out of blood Leaf: carbon dioxide into leaf, oxygen out of leaf.
Partially permeable membrane	A membrane that allows some molecules but not others to pass through it (like a cell membrane).
Osmosis	The movement of water across a partially permeable membrane from high water/low solute conc to low water/high solute conc.
Osmosis examples	Water into plant roots, water in/out of any cells.
Active transport	Using energy to move substances from low to high concentration (up a concentration gradient).
Active transport examples	Minerals being absorbed into plant roots.

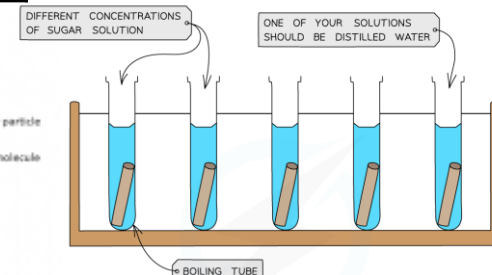


12. Core practical – osmosis in potatoes (CP3)

CP3 – Prepare potatoes	Cut six similar pieces of potato, blot them dry and weigh them.
CP3 – Run the experiment	Place each potato piece in a test tube with sucrose (sugar) solutions with concentrations from 0% to 50%
CP3 – Record results	Blot each potato piece dry and re-weigh it.
CP3 – Calculate percentage mass change	% change = (final value – starting value) / starting value x 100

- CORE PRACTICAL** – Osmosis in Potato Slices
- CORE PRACTICAL** – PH & Enzymes **Watch you tube video**- google 'edexcel core practical'

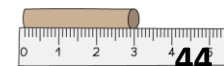
4 MEASURE 10cm³ OF EACH SUGAR OR SALT SOLUTION AND POUR INTO EACH BOILING TUBE. LABEL EACH BOILING TUBE CLEARLY



5 ADD ONE POTATO CYLINDER TO EACH BOILING TUBE AND LEAVE FOR A SPECIFIED AMOUNT OF TIME

AFTER A SET TIME

6 REMOVE THE POTATOES, BLOT DRY AND RECORD THE FINAL MASS AND LENGTH OF EACH



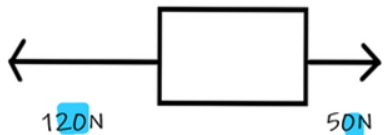
Physics: Motion

Lesson sequence

1. Vectors and scalars
2. Speed
3. Distance-time graphs
4. Acceleration
5. Velocity-time graphs

1. Vectors and scalars

Magnitude	A scientific word for size.
Scalar quantity	A quantity with magnitude (but no direction).
Scalar examples	Distance – 10 m Speed – 25 m/s Mass – e.g. 50 kg
Vector quantity	A quantity with magnitude and direction.
Vector examples	Displacement – 10 m north Velocity – 25 m/s east Force – 30 N left Acceleration – 3 m/s ² south Momentum – 400 N m/s right
Vector arrows	Vectors can be represented by arrows, with the length of the arrow representing the magnitude.



Displacement	The distance and direction travelled in a straight line.
Velocity	Your speed in a certain direction.

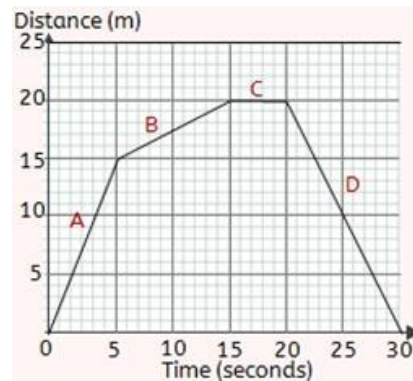
2. Speed

Units of speed	Metres per second, m/s.
Speed – word equation	Speed = distance / time $v = x/t$ Speed - m/s Distance - m Time - s
Instantaneous speed	Speed at a particular point in time.
Average speed	The average speed across the whole of a journey, calculate from $v = x/t$.

Calculating distance travelled	Distance = average speed x time $x = v \times t$
Measuring speed	Measure the distance between two points and time how long an object takes to pass, then calculate using $v = x/t$.
Light gates	Equipment that can be used for measuring time accurately with fast-moving objects to help find their speed.
Some typical speeds	Walking – 1-2 m/s Running – 3-8 m/s Cycling – 5-20 m/s Driving – 10-40 m/s Flying – 250 m/s

3. Distance-time graphs

Distance-time graph	A graph describing how your distance from the start changes over the course of a journey.
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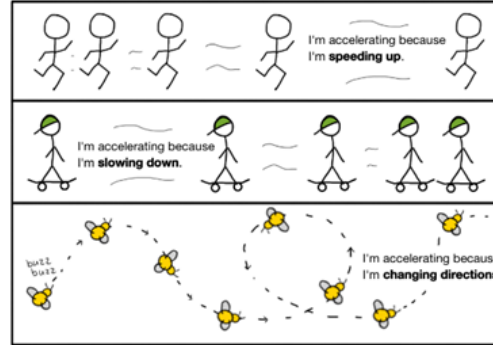


- A = steady speed going forwards
- B = slower steady speed
- C = stationary (as horizontal)
- D = steady speed going backwards

Distance-time graphs – line gradient	Steeper line = faster
Calculating speed from a distance-time graph	Speed = change in distance / change in time Speed = change in y / change in x

4. Acceleration

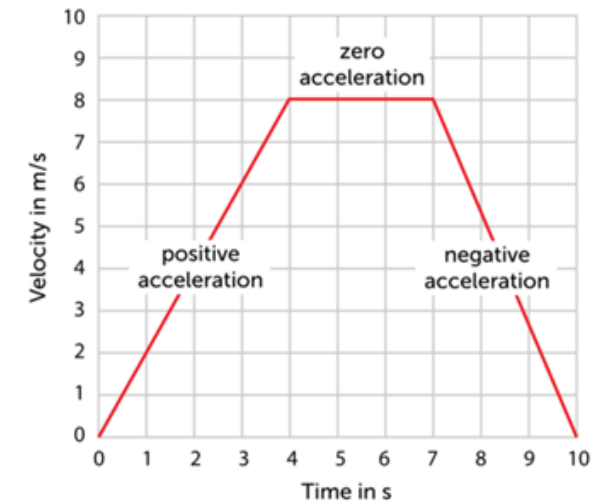
Acceleration	Changing velocity
You accelerate when...	- You change speed - You change direction



Units of acceleration	Metres per second squared, m/s ²
Positive and negative acceleration	Positive acceleration = speeding up Negative acceleration = slowing down
Deceleration	Slowing down, negative acceleration.
Acceleration – word equation	Acceleration = change in speed / time Acceleration - m/s ² Change in speed - m/s Time - s
Acceleration – symbol equation	$a = (v - u) / t$ a - acceleration v - final speed u - initial speed t - time
Linking acceleration and Velocity travelled	Use the equation: $x = (v^2 - u^2) / 2a$ x - Velocity travelled a - acceleration v - final speed u - initial speed
Acceleration due to gravity	9.8 m/s ² Can be rounded to 10 m/s ²

5. Velocity-time graphs

Velocity-time graph	A graph showing how your velocity (speed) changes over time. Time is on the x-axis, velocity is on the y-axis.
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Velocity-time graphs – constant speed	Horizontal line
Velocity-time graphs – acceleration	Speeding up – line sloping up Slowing down – line sloping down
Velocity-time graphs – line gradient	Steeper line = greater acceleration
Calculating acceleration on a velocity-time graph	Acceleration = change in velocity / change in time Acceleration = change in y / change in x
Calculating distance travelled from a velocity-time graph	Distance = area under the graph. Divide the graph into rectangles and triangles, find the area of each and add them together.

El tiempo en el presente
The weather in the present

¿Qué tiempo hace?	<i>What's the weather like?</i>
Hace buen/mal tiempo	<i>It's good/bad weather</i>
Hace calor/frío/sol/viento	<i>It's hot/cold/sunny/windy</i>
Llueve/Nieva	<i>It's raining/snowing</i>
Hay niebla/tormenta	<i>It is foggy/stormy</i>
El clima es caluroso/soleado	<i>The climate is hot/sunny</i>
Está nublado	<i>It's cloudy</i>

El tiempo en el pasado
The weather in the past

¿Qué tiempo hizo?	<i>What was the weather like?</i>
Hizo buen/mal tiempo	<i>It was good/bad weather</i>
Hizo calor/frío/sol/viento	<i>It was hot/cold/sunny/windy</i>
Hubo niebla/tormenta	<i>It was foggy/stormy</i>
Llovió/Nevó	<i>It rained/snowed</i>

El tiempo en el futuro
The weather in the future

¿Qué tiempo hará?	<i>What's the weather will be like?</i>
Hará buen/mal tiempo	<i>It will be good/bad weather.</i>
Hará calor/frío/sol/viento	<i>It will be hot/cold/sunny/windy</i>
Lloverá/Nevará	<i>It will rain/snow.</i>
Habrá niebla/tormenta	<i>It will be foggy/stormy.</i>
El clima será caluroso/soleado	<i>The climate will be hot/sunny.</i>
Estará nublado	<i>It will be cloudy.</i>



¿Dónde vives?
Where do you live?

Vivo en el....	<i>I live in the....</i>
norte/noreste/noroeste...	<i>north/northeast/northwest...</i>
sur/sureste/suroeste...	<i>south/southeast/southwest...</i>
este/oeste/centro...	<i>east/west/centre...</i>
de Inglaterra/Escocia	<i>of England/Scotland</i>
de Gales/Irlanda (del Norte)	<i>of Wales/(Northern) Ireland</i>

Las vacaciones Holidays

¿Qué haces en verano/invierno?	<i>What do you do in summer/winter?</i>
En verano/invierno...	<i>In summer/winter.</i>
chateo en la red	<i>I chat online</i>
hago natación/esquí/windsurf	<i>I go swimming/skiing/windsurfing</i>
juego al baloncesto/fútbol	<i>I play basketball/football</i>
monto a caballo/en bici	<i>I go horse riding/cycling</i>
nado en el mar	<i>I swim in the sea</i>
Voy de paseo	<i>I go for a walk</i>
salgo con mis amigos/as	<i>I go out with my friends</i>
¿Qué te gusta hacer?	<i>What do you like doing?</i>
Prefiero...	<i>I prefer...</i>
Me gusta...	<i>I like...</i>
Me encanta/mola/ chifla	<i>I love...</i>
Me flipa/Me apasiona...	<i>I love...</i>
No me gusta (nada)...	<i>I don't like... (at all)</i>
Odio...	<i>I hate...</i>
A (mi padre) le gusta...	<i>(My dad) likes...</i>
Nos encanta...	<i>We love...</i>
estar al aire libre	<i>being outdoors</i>
hacer deportes acuáticos	<i>doing water sports</i>
ir de compras	<i>going shopping</i>
Prefiero veranear...	<i>I prefer to spend the summer...</i>
en el extranjero/en España	<i>abroad/in Spain</i>
en la costa/en el campo	<i>on the coast/in the country in the mountains/in the city</i>
en la montaña/en la ciudad	



Las vacaciones (pasado)
Holidays in the past

¿Cuándo y adónde fuiste?	<i>When and where did you go?</i>
hace una semana/un mes/un año	<i>a week/month/year ago</i>
hace dos semanas/meses/años	<i>two weeks/months/years ago</i>
fui de vacaciones a...	<i>I went on holiday to...</i>
Francia/Italia/Turquía	<i>France/Italy/Turkey</i>
¿Cómo te fue?	<i>What was it like?</i>
Fue ...	<i>It was ...</i>
estupendo	<i>fantastic</i>
genial	<i>brilliant</i>
guay	<i>great, cool</i>
aburrido	<i>boring</i>
horrible	<i>awful</i>
un desastre	<i>a disaster</i>
¡Lo pasé bomba!	<i>I had a fantastic time!</i>
¿Cómo fuiste/ viajaste?	<i>How did you get there/travel?</i>
Fui..../Viajé...	<i>I went.../I travelled</i>
en autocar/avión	<i>by coach/plane</i>
en barco/coche/tren	<i>by boat/car/train</i>
¿Con quién fuiste?	<i>Who did you go with?</i>
Fui	<i>I went...</i>
Fuimos ...	<i>We went.....</i>
con mi familia/insti	<i>with my family/school</i>
con mi mejor amigo/a	<i>with my best friend</i>
solo/a	<i>alone</i>
¿Qué hiciste?	<i>What did you do?</i>
primero	<i>first</i>
luego	<i>then</i>
más tarde	<i>later</i>
después	<i>after</i>
finalmente	<i>finally</i>
Lo mejor fue cuando...	<i>The best thing was when...</i>
Lo peor fue cuando...	<i>The worst thing was when...</i>
comí muchos helados	<i>I ate lots of ice creams</i>
compré recuerdos	<i>I bought souvenirs</i>
fui al acuario	<i>I went to the aquarium</i>
hice turismo	<i>I went sightseeing</i>
perdí mi móvil	<i>I lost my mobile</i>
saqué fotos	<i>I took photos</i>
tomé el sol	<i>I sunbathed</i>
tuve un accidente en la playa	<i>I had an accident on the beach</i>
vi un partido	<i>I saw/watched a match</i>
visité el Park Güell	<i>I visited Park Güell</i>
vomitó en una montaña rusa	<i>I was sick on a roller coaster</i>



¿Qué tal lo pasaste?
How was it?

Me gustó/Me encantó.	<i>I liked it/I loved it.</i>
Lo pasé bomba/fenomenal.	<i>I had a great time.</i>
Lo pasé bien/mal/fatal.	<i>I had a good/bad/awful time.</i>
Fue...	<i>It was...</i>
inolvidable/increíble	<i>unforgettable/incredible</i>
impresionante/flipante	<i>impressive/awesome</i>
horroroso	<i>awful</i>
un desastre	<i>a disaster</i>



¿Con qué frecuencia?
How often?

siempre	<i>always</i>
a menudo	<i>often</i>
todos los días	<i>every day</i>
a veces	<i>sometimes</i>
de vez en cuando	<i>from time to time</i>
una vez a la semana	<i>once a week</i>
dos o tres veces al año	<i>two or three times a year</i>
(casi) nunca	<i>(almost) never</i>

¿Dónde te quedaste/alojaste?
Where did you stay?

Me alojé/Me quedé...	<i>I stayed...</i>
Nos alojamos/Nos quedamos...	<i>We stayed...</i>
en un albergue juvenil	<i>in a youth hostel</i>
en un apartamento	<i>in an apartment</i>
en un camping	<i>on a campsite</i>
en un hotel de cinco estrellas	<i>in a five-star hotel</i>
en un parador	<i>in a state-run luxury hotel</i>
en una casa rural	<i>in a house in the country</i>
en una pensión	<i>in a guest house</i>
Fui de crucero.	<i>I went on a cruise.</i>



SPANISH



Mis derechos	My rights
Tengo derecho...	I have the right...
al amor y a la familia	to love and to family
al juego	to play
a la educación	to education
a la libertad de expresión	to freedom of expression
a un medio ambiente sano	to a healthy environment
a vivir en armonía	to live in harmony
No puedo...	I cannot...
dar mi opinión	give my opinion
jugar con mis hermanos	play with my brothers and sisters
salir solo/a	go out alone
dormir	sleep
ir al insti(tuto)	go to school
respirar	breathe
porque...	because...
Soy un(a) chico/a	I am a boy/girl
tengo que ganar dinero	I have to earn money
hay mucha violencia	there is a lot of violence
en mi ciudad	in my city
mi padre grita mucho	my dad shouts a lot
tengo que trabajar	I have to work
el aire está contaminado	the air is polluted
No es justo porque...	It isn't fair because...
Es inaceptable porque...	It is unacceptable because...



Mi ciudad	My town / city
¿Cómo era tu ciudad antes?	What was your town / city like before?
Antes...	Before...
era (bastante) aburrida	it used to be (quite) boring
era (muy) peligrosa	it used to be (very) dangerous
estaba sucia	it used to be dirty
había mucha basura	there used to be a lot of rubbish
había mucha contaminación	there used to be a lot of pollution
había mucha violencia	there used to be a lot of violence
no había medios de transporte público	there didn't use to be means of public transport
no había nada para los jóvenes	there didn't use to be anything for young people
¿Cómo es ahora?	What is it like now?
Ahora...	Now...
está limpia	it is clean
hay menos basura	there is less rubbish
hay menos contaminación	there is less pollution
hay parques y espacios públicos muy bonitos	there are very nice parks and public spaces
hay una red de transporte muy buena	there is a very good transport network
hay muchas cosas para los jóvenes	there are lots of things for young people
no tiene barrios peligrosos	it doesn't have dangerous neighbourhoods

¿Cómo reducir a la mitad nuestros residuos?

Con el compostaje

50% son residuos orgánicos

Sistemas de separación y recogida

Compostaje

Restos orgánicos

Huerta

Compost

iReciclamos!	Let's recycle!
¿Qué se debería hacer para proteger el medio ambiente?	What should you/we do to protect the environment?
Para proteger el medio ambiente,...	In order to protect the environment,...
Se debería...	You/We should...
ahorrar energía en casa	save energy at home
apagar la luz	turn off the light
cerrar el grifo	turn off the tap
conservar el agua	save water
desenchufar los aparatos eléctricos	unplug electrical devices
ducharse en vez de bañarse	have a shower instead of a bath
ir en bici(cleta)	go by bike
reciclar el papel / el plástico / el vidrio	recycle paper / plastic / glass
usar transporte público	use public transport
No se debería...	You/We shouldn't...
malgastar el agua	waste water
tirar la basura al suelo	throw rubbish on the ground
usar bolsas de plástico	use plastic bags



El comercio justo	Fair trade
Tiene (diez) años.	He/She is (ten) years old.
Vive / Viven...	He/She lives / They live...
con su familia	with his/her family
en una plantación	on a plantation
Trabaja / Trabajan...	He/She works / They work...
(catorce) horas al día	(fourteen) hours a day
(seis) días a la semana	(six) days a week
para un patrón	for an employer
para una cooperativa	for a cooperative
Gana / Ganan (treinta) euros al mes.	He/She earns / They earn (thirty) euros a month.

Palabras muy frecuentes	High-frequency words
mi/mis	my
su/sus	his/her/their
nuestro/a/os/as	our
más... (que)	more... (than)
menos... (que)	less... (than)
para	(in order) to / for
hay	there is / there are
había	There was / were / used to be
a partir de ahora	from now on
además	in addition, furthermore

Poder

To be able to/can is a stem-changing verb that it is usually followed by the infinitive (-ar/-er/-ir)

No **pu**edo estudiar. I **can**'t study

Puede jugar. He/She **can** play.

Puedo	I can
Puedes	You can
Puede	He/she/it can
Podemos	We can
Podéis	You all can
Pueden	They can

Using "se debería"

Se debería means 'you/we should'. It is the conditional form of **se debe**. It is followed by the infinitive (-ar/-er/-ir).

The plural form is **ustedes**, which uses the "they" form of the verb.

Se debería apagar la luz You//we should turn off the light.

No se debería usar bolsas de plástico. You/we shouldn't use plastic bags.

Highly frequent verbs

Preterite		Imperfect		Present		Immediate future		Future		Conditional	
Me alojé Se alojó Nos alojamos	<i>I stayed</i> <i>S/he stayed</i> <i>We stayed</i>	Me alojaba Se alojaba Nos alojábamos	<i>I used to stay</i> <i>S/he used to stay</i> <i>We used to stay</i>	Me alojo Se aloja Nos alojamos	<i>I stay</i> <i>S/he stays</i> <i>We stay</i>	Voy a alojarme Va a alojarse Vamos a alojarnos	<i>I'm going to stay</i> <i>S/he is going to stay</i> <i>We are going to stay</i>	Me alojaré Se alojará Nos alojaremos	<i>I will stay</i> <i>S/he will stay</i> <i>We will stay</i>	Me gustaría alojarme Le gustaría alojarse Nos gustaría alojarnos	<i>I would like to stay</i> <i>S/he would like to stay</i> <i>We would like to stay</i>
Viajé Viajó Viajamos	<i>I travelled</i> <i>S/he travelled</i> <i>We travelled</i>	Viajaba Viajaba Viajábamos	<i>I used to travel</i> <i>S/he used to travel</i> <i>We used to travel</i>	Viajo Viaja Viajamos	<i>I travel</i> <i>S/he travels</i> <i>We travel</i>	Voy a viajar Va a viajar Vamos a viajar	<i>I'm going to travel</i> <i>S/he is going to travel</i> <i>We are going to travel</i>	Viajaré Viajará Viajaremos	<i>I will travel</i> <i>S/he will travel</i> <i>We will travel</i>	Me gustaría viajar Le gustaría viajar Nos gustaría viajar	<i>I would like to travel</i> <i>S/he would like to travel</i> <i>We would like to travel</i>
Fui Fue Fuimos	<i>I went</i> <i>S/he went</i> <i>We went</i>	Iba Iba Íbamos	<i>I used to go</i> <i>S/he used to go</i> <i>We used to go</i>	Voy Va Vamos	<i>I go</i> <i>S/he goes</i> <i>We go</i>	Voy a ir Va a ir Vamos a ir	<i>I'm going to go</i> <i>S/he is going to go</i> <i>We are going to go</i>	Iré Irá Iremos	<i>I will go</i> <i>S/he will go</i> <i>We will go</i>	Me gustaría ir Le gustaría ir Nos gustaría ir	<i>I would like to go</i> <i>S/he would like to go</i> <i>We would like to go</i>
Fui Fue Fuimos	<i>I went</i> <i>S/he went</i> <i>We went</i>	Era Era Éramos	<i>I was (used to be/description)</i> <i>S/he/it was (used to be/description)</i> <i>We were (used to be/description)</i>	Soy Es Somos	<i>I am</i> <i>S/he/it is</i> <i>We are</i>	Voy a ser Va a ser Vamos a ser	<i>I'm going to be</i> <i>S/he/it is going to be</i> <i>We are going to be</i>	Seré Será Seremos	<i>I will be</i> <i>S/he will be</i> <i>We will be</i>	Me gustaría ser Le gustaría ser Nos gustaría ser	<i>I would like to be</i> <i>S/he would like to be</i> <i>We would like to be</i>
Me gustó/gustaron Le gustó/gustaron Nos gustó/gustaron	<i>I liked</i> <i>S/he liked</i> <i>We liked</i>	Me gustaba(n) Le gustaba(n) Nos gustaba(n)	<i>I used to like</i> <i>S/he used to like</i> <i>We used to like</i>	Me gusta(n) Le gusta(n) Nos gusta(n)	<i>I like</i> <i>S/he likes</i> <i>We like</i>	Me va a gustar Le va a gustar Nos va a gustar	<i>I'm going to like</i> <i>S/he/it is going to like</i> <i>We are going to like</i>	Me gustará(n) Le gustará(n) Nos gustará(n)	<i>I will like</i> <i>S/he will like</i> <i>We will like</i>	Me gustaría Le gustaría Nos gustaría	<i>I would like</i> <i>S/he would like</i> <i>We would like</i>

SPANISH



Using "usted"

Use **usted** (polite form of "you") in formal situations, such as when booking a room. It uses the same verb endings as the "he/she/it" form of the verb.

The plural form is **ustedes**, which uses the "they" form of the verb.

¿Cómo se llama usted? *What are you (polite singular) called?*

¿De dónde son ustedes? *Where are you (polite plural) from?*

Verbs of opinion

Many verbs for giving opinions need a pronoun like "me@". These verbs all take pronoun: **gustar, encantar, chiflar, molar, apasionar, flipar**.

Change the pronoun to talk about other people:

me gusta	<i>I like</i>
te gusta	<i>You like</i>
le gusta	<i>S/he likes</i>
nos gusta	<i>We like</i>
os gusta	<i>You (pl) like</i>
les gusta	<i>They like</i>

To give your opinion of an activity, use the **infinitive** after these verbs. If you mention another person directly (for example by using their name), you need to add the word **a**.

A **mi padre** **le** chifla **cocinar**. *My dad loves cooking.*

También **le** gusta **bailar**. *He also loves dancing.*

Verbos de opinión *Opinion verbs*

Prefiero	<i>I prefer</i>
Me gusta	<i>I like</i>
Me chifla	<i>I love</i>
Me encanta	<i>I love</i>
Me mola	<i>I love</i>
No me gusta (nada)	<i>I do not like (at all)</i>
Odio	<i>I hate</i>

