

Home Learning Booklet



Knowledge Goals Year 9 Half Term 1

How to self-test

Mind mapping

- Mind mapping is simply a diagram to visually represent or outline information.
- Use information gathered from your knowledge goals booklet to create mind maps, make sure to use colour and images, keep writing to the bare minimum.

How to mind map:



Information for parents on knowledge retrieval



Flash cards

Use your knowledge goals booklet to make flash cards. Write the questions on one side and on the other record the answer. Test yourself or work with a friend to make sure you know all the key information for each topic.

How to mind map:



How should students use the Knowledge Goals booklets?

Your Knowledge Goals booklet provide the essential knowledge that you need to learn in each subject this half term. You are **expected to spend one hour a night during the week 'learning' the content**. You will be assessed during lessons using 'low stake' quizzing. **Your teacher may choose to set you additional homework.**

How can parents support?

- Read through the organiser with your child – if you don't understand the content then ask them to explain it to you – 'teaching' you helps them to reinforce their learning.
- Test them regularly on the spellings of key words until they are perfect. Get them to make a glossary (list) of key words with definitions or a list of formulae.
- Read sections out to them, missing out key words or phrases that they have to fill in. Miss out more and more until they are word perfect.

Subject Index

Suggested Homework Schedule (1 hour of independent study per night).

To help you get organized, we have planned out your weekly home learning to cover all subjects. You may choose to create your own version:

Subject	Page No
Art	6
Biology	8
Chemistry	10
Computer Science	12
Drama	14
English Language	16
Food technology	17
French	19
Geography	21
History	23
Materials	25
Pdev	29
PE	31
Physics	33
Maths	35
Music	39
PRE	41
Spanish	43
Freya model templates	45

Week A

Day	Subject 1 (20mins)	Subject 2 (20mins)	Subject 3 (20mins)
Monday	Art	English Language	Physics
Tuesday	Biology	Technology	Maths
Wednesday	Chemistry	Spanish	Music
Thursday	Computer Science	Geography	RS
Friday	Design Technology	History	PE

Week B

Day	Subject 1 (20mins)	Subject 2 (20mins)	Subject 3 (20mins)
Monday	Drama	Personal Development	Teir 2 Vocab
Tuesday	Maths	English	Physics
Wednesday	Chemistry	English	Music
Thursday	Teir 2 Vocab	Maths	Biology
Friday			

Literacy Tier 2 Vocabulary

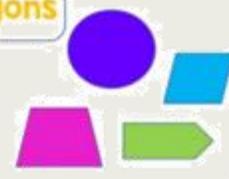
These words are all 'tier 2' words; in other words, they are seen as 'academic vocabulary' and if you know them, can understand them and use them, you will do better in your exams and be able to communicate more precisely and effectively in life.

#	Key word	Definition
1	Justify/justification	
2	Analyse	
3	Context	
4	Infer/inference	
5	Compare/comparison	
6	Imply/implication	
7	Annotate	
8	Exemplify	
9	Consequence	
10	Evaluate	

Literacy Tier 2 Frayer Model

examples

Definition	Characteristics
Examples	Non-examples

Definition	Characteristics
A shape with equal length sides and equal angles between each side. They differ from irregular polygons in that they not only cannot have unequal length sides or angles, but they can also not have curved lines.	Enclosed shape of straight sides Sides are equal length Angles are equal between the sides No curved lines Can be drawn on flat surface
Regular Polygons	
Examples 	Non-examples 

DEFINITION	CHARACTERISTICS
The multiple created when a positive integer is multiplied by the same positive integer	<ul style="list-style-type: none"> The process of creating a square number is called "squaring" and is shown using an exponent of 2 (c^2)
Square Number	
EXAMPLES	NON-EXAMPLES
$4 (-2^2)$ $9 (-3^2)$ $100 (=10^2)$ $484 (=22^2)$ $1 (-1^2)$ $10\,000 (=100^2)$	$2 (\neq 1^2)$ 10 1000 5 -4 $\%$

Definition:	Characteristics:
A cold-blooded, air breathing animal that has scales instead of hair or feathers. There are around 6,000 species	<ul style="list-style-type: none"> - Dry, scaly skin - Reproduce by laying eggs - Cold blooded & air breathing - Backbone
Reptiles	
Examples:	Non-examples:
Four existing orders of reptiles: Turtles, crocodiles & alligators, lizards & snakes, and tortoises.	<ul style="list-style-type: none"> - Amphibians e.g. frogs - Mammals e.g. elephants - Fish e.g. sharks

Definition	Characteristics/Features
A change beginning around 1750 where a greater number of goods were produced in large factories rather than in homes or small family businesses.	<ul style="list-style-type: none"> improved agricultural production increase in population and number of cities steam-driven machinery used for transport and goods production use of coal as an energy source greater availability of iron
Industrial Revolution	
<ul style="list-style-type: none"> First mechanical reaper in 1834. Increase city size and density: London increased from 5 million in 1700 to nearly 9 million by 1800. Mass production of goods occurs: <ul style="list-style-type: none"> Britain: textile manufacture centralised to mills by 1780s USA: by 1914, the USA was producing more steel than Britain, Germany, France and Austria-Hungary combined. 	<ul style="list-style-type: none"> isolated communities with a hunter-gatherer economy people living as subsistence farmers on small plots people working fields by hand transport predominately by horse and cart
Examples	Non-Examples

Have a go at creating a Frayer Model for each of the 6 tier 2 words from this term (blank templates are at the back of the booklet for you to complete this activity).

Art year 9

Colour theory is the art and science of using colour. It covers how humans perceive colour (both physically and psychologically), how colours mix, match, and contrast with one another, and the messages that colours communicate. Colour theory is based on the colour wheel and its geometry, and it provides practical guidance for colour mixing and colour application in visual arts and design

The colour wheel is a wheel with 12 colours surrounding it. The three primary colours are placed in a triad, and the rest of the colors fill in around them, as they all come from the three primary colors.

The secondary colours fill in between the two primary colors that create them.

The last six colours are the intermediate colours, or the tertiary color previously mentioned. These colours comes from mixing a primary colour with an adjacent secondary colour (for example, blue and violet mixing to create blue-violet). These new colours are placed between the primary and secondary colour.

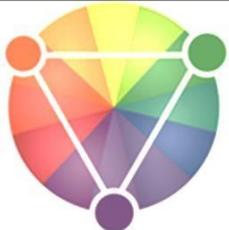
All of these colours together create a 12 colour wheel which can be used to visualize color matches, comparisons, as reference on how to mix different colors, and more.

The Primary Colors



Primary colors, according to traditional color theory, cannot be formed by mixing any other color.

The Secondary Colors



Secondary colors are the combination of 2 primary colors.

The Tertiary Colors



Tertiary colors combinations of 1 primary and 1 secondary color.

Contrasting colors

Colours opposite each other on the colour wheel. For example: red and green. These two colours are contrasting, and each of them pops and is highly noticeable to the eye against the other.

Harmony

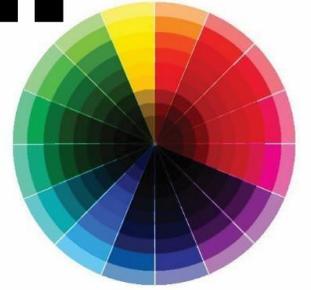
A combination of colours that lets the eye travel smoothly between them with no sharp contrasts catching the eye. Colour harmony can also refer to a colour scheme — any given arrangement or combination of colors.

Undertone

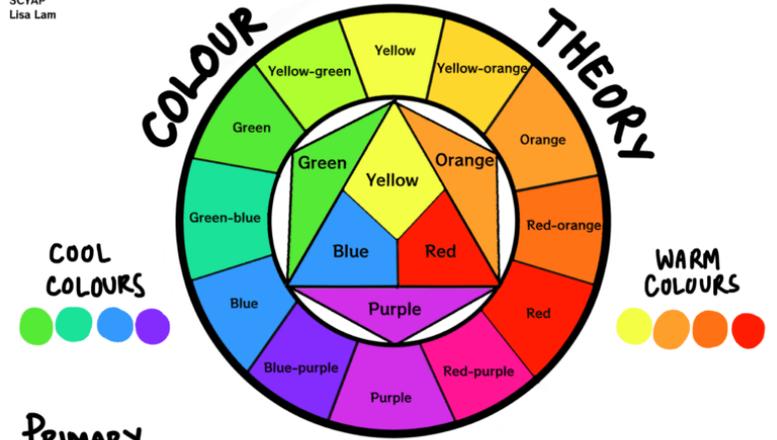
A color's undertone is a hint of a different color present in the colour. This helps to make the colour a different hue than its mass tone. For example, the undertone of olive green is yellow.

Primary		three main colors
Secondary		mix of primary colors
Tertiary		between secondary & primary
Complimentary		opposites on the color wheel
Analogous		colors next to each other
Split Complimentary		one color, with two analogous complimentary colors
Triadic		forms triangle on color wheel
Tetradic		forms a rectangle on the color wheel
Monochromatic		shades and tints of one color
Shades		base color + black
Tones		base color + gray
Tints		base color + white
Warm		reminds us of the sun
Cool		reminds us of the sky and earth
Neutral		usually not on color wheel

Colour Theory



SCYAP
Lisa Lam



PRIMARY

Mixing different amounts of the primary colours can make all the colours of the colour wheel.



SECONDARY

Mixing two primary colours make a secondary colour



TERTIARY

Primary colours and secondary colours mixed together.



COMPLEMENTARY

Colours opposite from each other on the colour wheel.



ANALOGOUS

Colours that are neighbours on the wheel.



MONOCHROMATIC

A colour with its tints and shades. Tints are colours mixed with white. Shades are colours mixed with black.



Formal elements of Art

The Visual Elements of line, shape, tone, colour, pattern, texture and form are the building blocks of composition in art. When we analyse any drawing, painting, sculpture or design, we examine these different parts to see how they combine to create the overall effect of the artwork

Line

Line is the beginning of all drawing. Line in an artwork can be used in many different ways. It can be used to create shape, pattern, form, structure, growth, depth, distance, rhythm, movement and a range of emotions.

Shape

Shape can be shown in a number of ways. Sometimes we can recognise the shapes, at other times, they can look like something we haven't seen before. This could be called 'abstract'.

Tone

Tone is the lightness or darkness of a colour. Tone can be changed by using white or black to make a colour lighter or darker.

Colour

Colour is the visual element that has the strongest effect on our emotions. We use colour to create the mood or atmosphere. For example, artwork that uses mainly reds and oranges, might make you feel angry.

Pattern

Pattern is made by repeating parts of the work. There are two basic types of pattern in art: Natural Pattern and Man-Made Pattern. The patterns could be made by repeating something in a certain way or completely random.

Texture

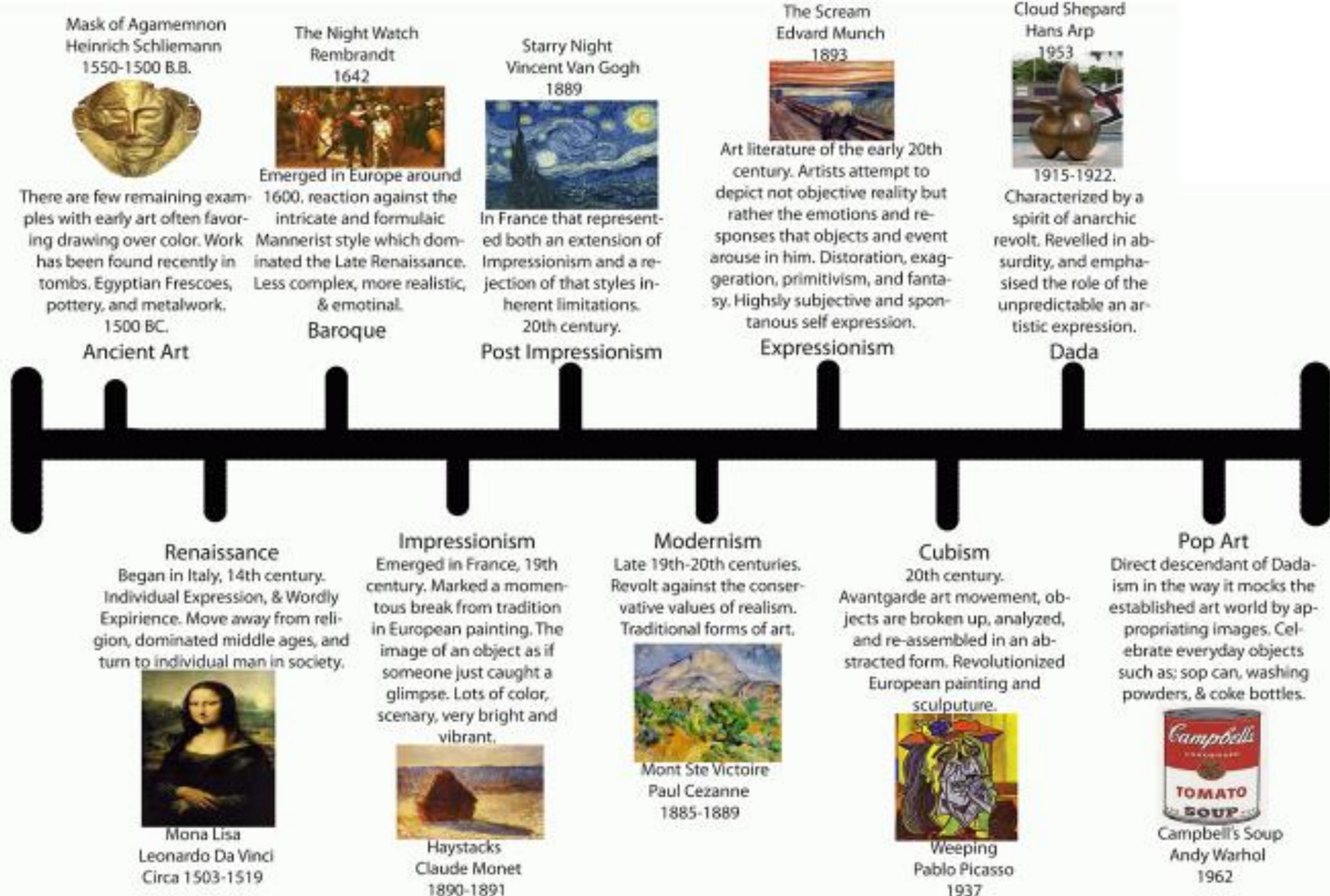
Texture is the surface effect used in art - the roughness or smoothness of the materials used to make the art.

Space

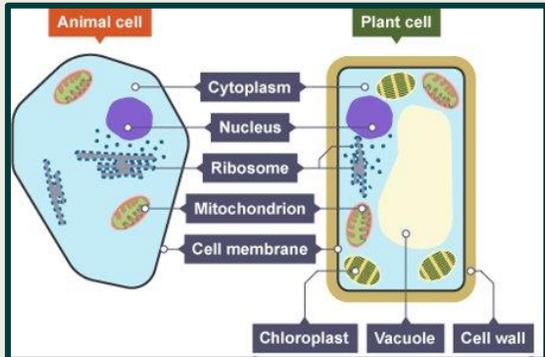
Space is an element of art by which positive and negative areas are defined or a sense of depth achieved in a work of art .

Shape / Form	Tone	Pattern / Texture	Colour	Line
Closed	Bright	Repeated	Bright	Fluent
Open	Dull	Uniform	Bold	Free
Distorted	Light	Geometric	Primary	Controlled
Flat	Dark	Organic	Secondary	Expressionistic
Organic	Faded	Random	Cold	Strong
Deep	Smooth	Symmetrical	Warm	Angular
Positive	Harsh	Irregular	Radiant	Delicate
Negative	Contrasting	Bold	Dull	Flowing
Foreground	Intense	Bumpy	Vivid	Simple
Background	Sombre	Rough	Contrasting	Thick
Composition	Strong	Smooth	Complementary	Thin
Elongated	Powerful	Broken	Monochrome	Horizontal
Compressed	Dramatic	Fine		Vertical
Large		Bold	Harmonious	Broken
Small		Flat	Natural	Overlapping
2D / 3D		Grid	Saturated	Faint
Blurred			Luminous	
Movement			Opaque	
Perspective			Translucent	
			Transparent	

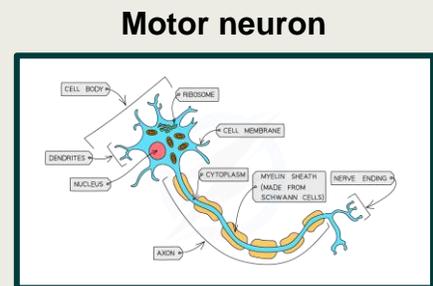
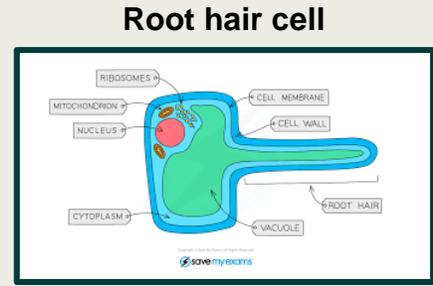
The Art timeline



Microbiology: Cellular Biology: Cell structure



Specialised Cell	How Structure Relates to Function
Sperm cell	Acrosome contains enzyme to break into egg; tail to swim; many mitochondria to provide energy to swim.
Nerve cell	Long to transmit electrical impulses over a distance.
Muscle cell	Contain protein fibres that can contract when energy is available, making the cells shorter.
Root hair cell	Long extension to increase surface area for water and mineral uptake; thin cell wall.
Xylem cell	Waterproofed cell wall; cells are hollow so water can move through.
Phloem cell	Some cells have lots of mitochondria for active transport; some cells have very little cytoplasm for sugars to move through easily.



Cell structure	Function	Eukaryotic cells (plant and animal)	Prokaryotic cells (bacterial)
Nucleus	Contains genetic information that controls the functions of the cells	Yes	No
Cell membrane	Controls what enters and leaves the cell	Yes	Yes
Cytoplasm	Site of all cellular activities and chemical reactions	Yes	Yes
Mitochondrion	Synthesises ATP from aerobic respiration	Yes	No
Chloroplast	Synthesises glucose from photosynthesis	Yes (plants only)	No
Ribosome	Synthesises proteins	Yes	Yes
Cell wall	Provides structural support	Yes (plants only)	Yes
Vacuole	Stores water and other substances	Yes (plants only)	No
Plasmid	A loop of DNA not enclosed within a nucleus	No	Yes

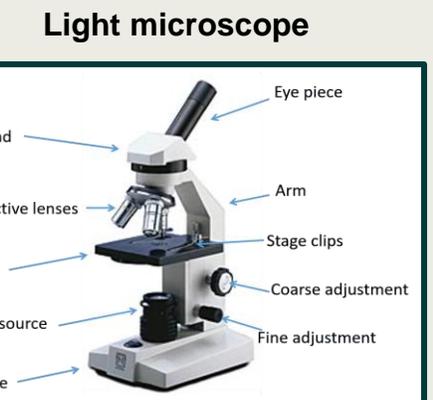
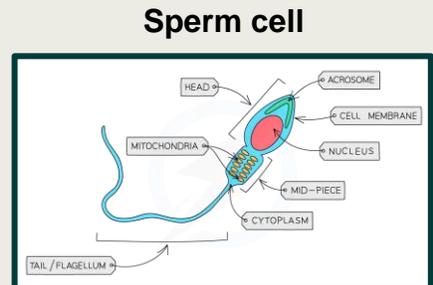
Magnification
The degree by which an object is enlarged.

$$\text{magnification} = \frac{\text{size of image}}{\text{size or real object}}$$

Resolution
The ability of a microscope to distinguish detail.

Light Microscope
Basic microscope with a maximum magnification of 1500x. Lower resolution.

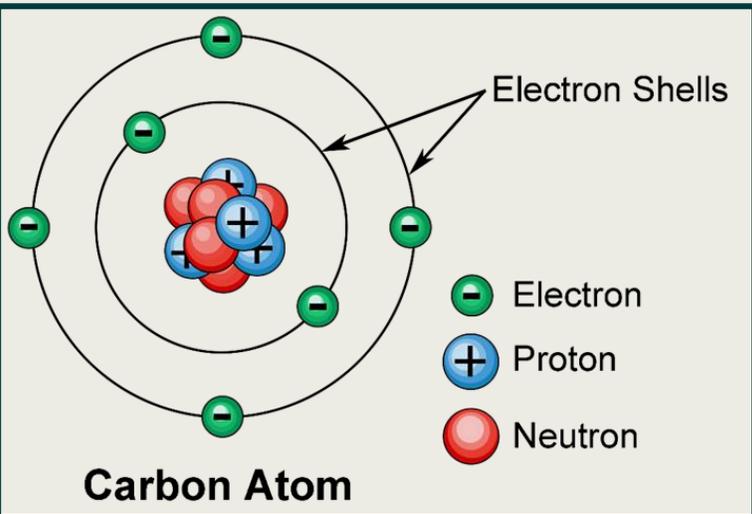
Electron Microscope
Has a much higher magnification (up to 500 000x) and resolving power than a light microscope. This means it can be used to study cells in much finer detail.



Knowledge Goals: Chemistry – Atomic structure

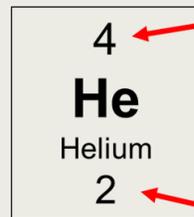
What is an atom?

- Atoms are the building blocks of all substances. They have a radius of 1×10^{-10} m (they are very small).
- An atom has a central **nucleus** made up of **protons** and **neutrons**.
- The nucleus is surrounded by **electrons** arranged in shells.



Sub-atomic particle	Relative Mass	Relative Charge
neutron	1	0 (neutral)
proton	1	+1 (positive)
electron	0	-1 (negative)

Atomic symbols – found on the periodic table



Mass number
The number of protons plus neutrons in the nucleus

Atomic Number
The number of protons in the nucleus

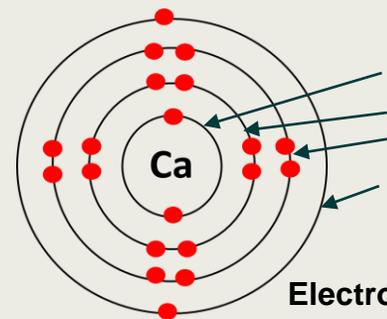
$$\text{Number of neutrons} = \text{Mass number} - \text{Atomic number}$$

$$\text{Number of electrons} = \text{number of protons}$$

Electrons

Electrons are found in **energy levels** (shells) orbiting the nucleus.

Electron arrangements follow a set of rules:



- 1st shell holds 2 electrons
- 2nd shell holds 8 electrons
- 3rd shell hold 8 electrons
- 4th shell holds 18 electrons

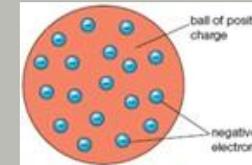
Electrons always fill from the middle shell and work outwards.

History of the atom

John Dalton

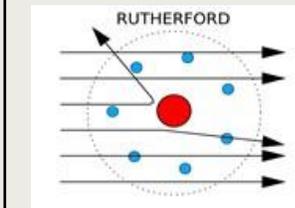
Everything is made of atoms

JJ Thomson



Plum pudding model - sphere of positively charged matter with electrons embedded in it.

Ernest Rutherford



'Gold foil' experiment showed that atoms are composed of mostly empty space, with a tiny, dense and positively charged nucleus.

Neils Bohr



Discovered that electrons are in different energy levels (shells) around the nucleus.

John Chadwick

Proved the existence of neutrons.

Isotope

An atom with the same number of protons but a different number of neutrons.



Knowledge Goals: Computer Science – Blender

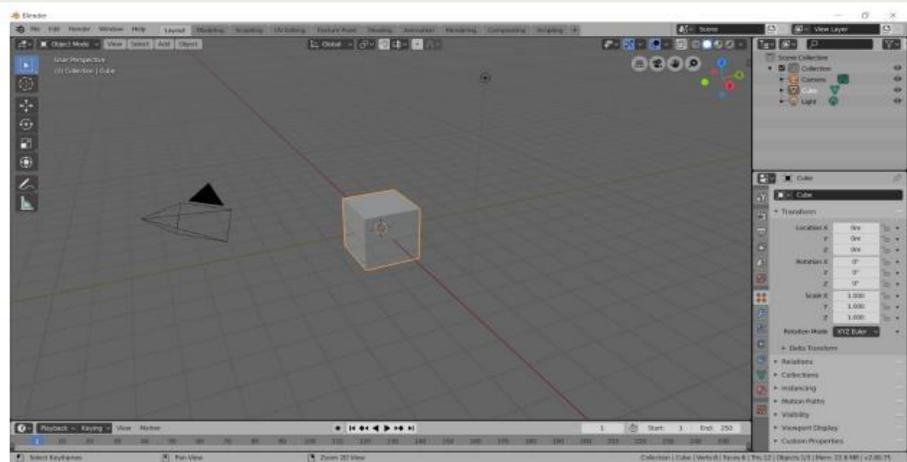


About Blender

Blender is the free and open source 3D creation suite. It supports the entirety of the 3D pipeline—modeling, rigging, animation, simulation, rendering, compositing and motion tracking, video editing and 2D animation pipeline.” Learn more about blender at blender.org

Opening Blender

This is what you will see when you first open Blender. This is called the 3D Viewport. This is where you will spend the majority of your time in Blender when you first get started. On the **left-hand side you have a small toolbar**. In the **center is your scene**. At the **bottom of the page is your timeline**. On the top right hand side you have a list of all the objects in your scene. This is called the Outliner. This is where you can name the objects in your scene. On the **bottom right-hand side you will find your properties panel**. This is where the majority of the settings can be found.



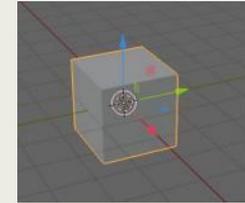
Adding Objects To Your Scene

(Shortcut: Shift + A) There is a menu at the top of the screen that has an “Add” button. This opens a dropdown menu. Most features that you will use most often can be found under mesh.



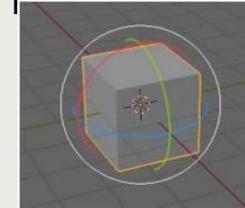
Moving Objects

in Blender The tools for moving objects in blender can be found on the left-hand-side toolbar. Selecting the button third from the top will allow you to move your object along the three axes (x,y,z). When you select this button, your object will look like this:



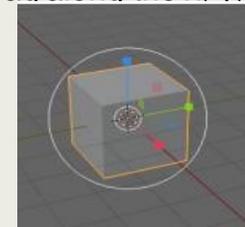
Rotating Objects

Underneath the move icon is the rotate icon. You can select any of the colored lines to rotate along an axis. Right click or hit escape to undo your rotation. (Shortcut: R)



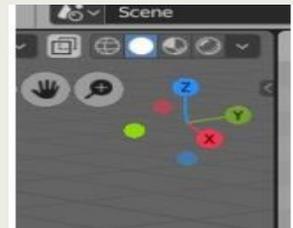
Scaling objects

Underneath the rotate button is the scale option. It will make your cube look like this>>: 3 These handles work the same as the move handles. You can use them to drag along the x, y, z axes



Moving Around in Blender

By holding down the middle mouse key, you can orbit the plane and rotate your viewpoint of the workspace. 2 By pressing shift + middle mouse button, you can pan across the plane. If you are on a laptop without a mouse you can also use this: (Which can be found in the top right hand corner of the workspace.)



Blender tutorials





Knowledge Goals: Drama

Conflict

Conflict as the dramatic

driver: Conflict is the engine of drama, propelling characters into action and driving the narrative forward. It introduces tension, stakes, and emotional depth, forcing characters to confront obstacles—internal or external—that reveal their desires, flaws, and growth. Without conflict, stories lack momentum and meaning, making it essential for engaging and transformative storytelling.

Direct Address: when a speaker or writer directly addresses an individual or group, using their name, a pronoun (like "you"), or other terms of address to identify the person being spoken to. It's a technique often used to create a sense of intimacy, engage the audience, or persuade the listener/reader.



Tension and atmosphere are built on stage through a careful blend of pacing, silence, lighting, sound, and performance. Emotional intensity grows when stakes are clear and characters are visibly affected by unfolding events. Sustaining this tension requires variation—moments of stillness contrasted with bursts of action or revelation—keeping the audience on edge. Subtle cues like a lingering pause, a dimming light, or a shift in tone can deepen suspense, making the atmosphere charged and immersive.

Expressionism in theatre emphasises emotional experience over realistic representation, using stylised visuals, fragmented dialogue, and distorted settings to reflect inner turmoil. In *Machinal*, this style heightens the protagonist's psychological oppression within a mechanised society, making her internal conflict palpable. The exaggerated, non-naturalistic elements intensify the storytelling, allowing audiences to viscerally engage with themes of alienation, control, and resistance



Knowledge Goals: Drama

Conflict

Half Term 1: Tier 3 Vocabulary

	Key word	Definition
1	Conflict	A serious disagreement or argument, typically a protracted one.
2	Ensemble	Collective group of actors, often likened to a Greek Chorus – they represent societal viewpoints and appear as teaching the audience a clear message or goal.
3	Dramatic Pause	a deliberate and significant silence used in speech or performance to heighten tension, create emphasis, or allow an audience to process information
4	Improvise	create and perform (music, drama, or verse) spontaneously or without preparation.
5	Transitions	These are the moments in between scenes/movement. It is the changing from one scene to another. It often adds fluidity to a performance.
6	Tension	A feeling in the body, where the muscles tighten and contract to create mood or atmosphere on stage.
7	Expressionism	a style of painting, music, or drama in which the artist or writer seeks to express the inner world of emotion rather than external reality.
8	Scenario	a written outline of a film, novel, or stage work giving details of the plot and individual scenes.

Knowledge Goals: English Lang

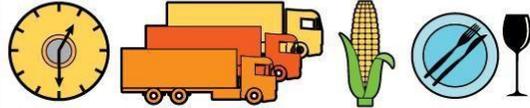
TEXT SELECTION	CORE ASSESSMENT SKILLS AND WHAT STUDENTS ARE AIMING TO BE ABLE TO WRITE:
<ul style="list-style-type: none"> • The Landlady by Roald Dahl • The Hand by Guy de Maupassant • Stories: Then & Now • Stories from Two Centuries • Dr Jekyll & Mr Hyde by Robert Louis Stevenson • Kissing the Witch: Old Tales in New Skins by Emma Donoghue • The Red Room by HG Wells • The Monkey's Paw by WW Jacobs • The Castle of Otranto by Horace Walpole • The Pit and the Pendulum by Edgar Allen Poe • Lamb to the Slaughter by Roald Dahl • Wide Sargasso Sea by Jean Rhys 	<p>(ALT) Application of language and structural techniques</p> <p>(EP) Effective Paragraphing</p> <p>(SV) Sentence Variety</p> <p>(AV) Ambitious Vocabulary</p> <p>(MA) Creation of mood and atmosphere</p> <p>Naturally, the gallery was empty on Wednesdays. The storm outside was wild and treacherous; ink-black clouds infested the skies. The watercolour hues in the West Wing twitch quietly as the windows start to shiver.</p> <p>Monet and Munch are more twitchy than the rest; they have good reasons to be more fearful. "You" someone utters in a distant corridor.</p> <p>Time is up.</p> <p>The dimmed lights flicker like a shrivelled candle burned to the wick; the Natural Art Gallery was about to change forever.</p>

Knowledge Goals: Food Technology

A **Head Chef** is a highly skilled professional cook who oversees the operations of a restaurant or dining facility

FOOD MILES

WHAT ARE THEY AND HOW DO THEY AFFECT OUR WORLD?



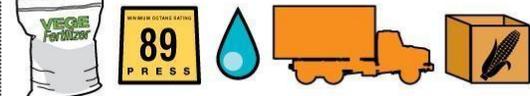
Time + distance FROM THE POINT & TIME WHERE FOOD IS **grown** TO WHERE IT IS **consumed**. THE SMALLER THE BETTER!

AMERICAN FOOD TRAVELS AN **average** OF 1,500 TO 2,500 MILES FROM FARM TO TABLE



GROWING FOOD CLOSER TO **home** ALLOWS US TO HAVE FRESHER FOODS, AND MORE VARIETIES OF FOODS

60-70% OF THE COST OF YOUR FOOD GOES TO **production inputs**



(FERTILIZER, OIL/GAS, WATER, ETC.), TRANSPORTATION, AND STORAGE THAT USE **limited** RESOURCES, PETROCHEMICALS, & GENERATE GREENHOUSE GASSES.

FOOD MILES ARE AMONG THE FASTEST-GROWING SOURCES OF GREENHOUSE GAS EMISSIONS



FRUITS AND VEGETABLES ALLOWED TO **grow to full ripeness** HAVE MORE NUTRITIONAL VALUE THAN CONVENTIONAL PRODUCE HARVESTED EARLY AND RIPPENED WITH CHEMICAL GASSES IN TRANSPORT AND STORAGE



AVOIDING CROSS-CONTAMINATION

Chemical-to-Food

- Label chemicals clearly
- Have a designated closet for chemicals
- Keep chemicals far away from your food



Food-to-Food

- Keep ready-to-eat foods away from raw foods or food allergens
- Use designated utensils, cutting boards, etc. for raw foods and allergens
- After handling allergens or raw foods, immediately change glove and wash your hands



Pest-to-Food

- Store food at least 6 inches above the floor
- Keep foods covered
- Keep a clean, sanitized, and tidy kitchen



The role of the EHO (Environmental Health Officer)



Checking ventilation

The role of the EHO

- They can visit randomly so long as it is deemed "a reasonable time"
- They sometimes visit as a result of a complaint
- Can close a business immediately if the risk is high
- They can offer advice to business'
- They can seize and detain food
- They can prosecute business'
- They can inspect training records of staff
- Monitor hygiene and cleaning standards
- Take temperatures of fridges, inspect how waste is disposed of, hand washing facilities and food storage

Medical Reasons

Name of medical condition	Food/drinks to avoid	Reason to avoid
Diabetes	Starchy food/ high in sugar	High in saturated fat. Can lead to heart disease, while excess sugars can cause unwanted weight gain and blood sugar spikes
Nut allergy	Nuts, blended cooking oil, margarine with nuts oils and often seeds	the immune system overreacts to proteins in these foods
Lactose intolerance	Milk, cheese, yogurt, processed food	cannot metabolize lactose properly; they lack lactase, an enzyme required in the digestive system to break down lactose . Patients typically experience bloating, flatulence, and diarrhoea
Gluten intolerance (coeliac)	Wheat, wholemeal, bran, pasta, rye, beer	Celiac disease is caused by a reaction to a gluten protein found in wheat, barley, rye, and sometimes oats. Symptoms include chronic diarrhoea , weight loss and fatigue

Fats, oils and lipids:

Too much fat is bad for you, but so is not enough.

Source

Saturated Fats

(From Animal sources. They are also called unhealthy fats. They are generally solid at room temperature)
Sausages / Bacon / Lard / Dairy

Unsaturated Fats

(These are healthier. They are often liquid at room temperature.)
Monounsaturated fats
- olive oil / avocados
Polyunsaturated fats
- sunflower oil / seeds

Omega-3

These are Polyunsaturated and called "healthy" fats as your body needs them but can't make them. They are good for your heart.
- Oily fish / Nuts / Seeds

Function

Energy
Warmth
Protection of organs
Source of fat soluble vitamins
Hormone production

Dietary Reference Values	DRI	
	Men	Women
Total fat	95g	70g
Sat fat	30g	20g

Too much
Obesity
Heart disease
Type 2 diabetes
Stroke
Cancer

Not enough
Vitamin deficiency (fat soluble)
Unprotected organs

Carbohydrates

There are 2 kinds, simple and complex - Sugar & Starches

Monosaccharides

Hexose, Pentose

Disaccharides

Glucose, Fructose

Polysaccharides

Starch, Glycogen

Source

Simple - these are sugars (monosaccharides, disaccharides)
Cakes, jam, soft drinks
Complex - these are starches (polysaccharides)
Bread, potatoes, Flour, Pasta, Rice.

Function

Simple
Quick burst of energy
Complex
Longer lasting energy

Free sugars

These give you no nutritional benefit other than energy.

Not enough

Can make blood sugar level drop
- hunger,
- dizziness,
- Tiredness
- Lack of energy
Our body will use protein for energy (leads to loss of muscle)

Too much

Excess is turned into fat
- Can cause obesity
- Too much sugar leads to dental problems
- Can lead to type 2 diabetes

Protein:

These are made up of **essential amino-acids** and **non-essential amino-acids**. (Our bodies can make non-essential amino acids, but we need to get essential amino acids from our food).

Source

- HBV - these have all the essential amino acids
- Meat, fish, dairy, eggs (animal sources)
- Tofu
- LBV - these are missing at least one essential amino acid
- Seeds, nuts, beans, pulses, cereals, Quorn (plant sources)

Function

Growth
Repair
maintenance



Not enough

Kwashiorkor
Oedema
Anaemia
Slow growth in children

Too much

Excess protein can be converted to energy. If unused turns to fat.

Dietary Reference Values

Age	Amount
1-3	15g
4-6	20g
7-10	28g
11-14	42g
15-18	55g
19-50	55g
50+	53g

Complementary actions

Combining 2 or more LBV proteins helps get a balance of essential amino acids. e.g. beans on toast.

Knowledge Goals: French

Les passe-temps Je joue ... au badminton/au basket au billard/au foot/au golf au hockey/au rugby au tennis/au volley à la pétanque	Hobbies I play ... badminton/basketball snooker/billiards/football/golf hockey/rugby tennis/volleyball French bowls
aux cartes/aux échecs du piano/du saxophone du violon de la batterie/de la guitare de l'accordéon (m) de l'harmonica (m)	cards/chess the piano/the saxophone the violin the drums/the guitar the accordion the harmonica

Le sport Je fais ... du footing du trampoline du vélo de la boxe de la danse de la natation	Sport I ... go jogging do trampolining go cycling do boxing go dancing go swimming
de l'équitation (f) de l'escalade (f) de l'escrime (f) des randonnées (f) Je fais ça depuis ... six mois/deux ans	go horse-riding go climbing do fencing go hiking I have been doing that for ... six months/two years

Les films une comédie un western un film fantastique un film d'action un film d'arts martiaux	Films a comedy a Western a fantasy film an action film a martial arts film
un film d'aventure un film d'horreur un film de gangsters un film de science-fiction	an adventure film a horror film a gangster film a science-fiction film

Sur mon téléphone portable/ ma tablette, ... je crée des playlists je télécharge de la musique je regarde des clips vidéo je joue à des jeux je fais des recherches pour mes devoirs je fais des achats j'écris des messages	On my phone/tablet ... I create playlists I download music I watch music videos I play games I do research for my homework
j'écris des articles pour mon blog je lis mes e-mails je vais sur des réseaux sociaux je prends des photos je mets mes photos sur Instagram ou Snapchat À mon avis, c'est ... génial/très pratique/indispensable	I buy things I write messages I write posts for my blog I read my emails I go onto social media sites I take photos I put my photos on Instagram or Snapchat In my opinion, it's ... great/very practical/essential

Acheter des billets Qu'est-ce qu'il y a au cinéma? La séance commence à quelle heure?	Buying tickets What's on at the cinema? At what time does the screening start?
Je peux vous aider? Je voudrais deux billets pour ...	Can I help you? I would like two tickets for ...
Pour quelle séance? Pour la séance de 19 heures. Ça coûte combien? Le tarif réduit, c'est 14 euros la place.	For which screening? For the screening at 7 p.m. How much does it cost? The reduced price is 14 euros per seat.

Les expressions de fréquence tous les jours tous les soirs tous les samedis une fois par semaine	Frequency expressions every day every evening every Saturday once a week
deux fois par semaine souvent de temps en temps rarement	twice a week often from time to time rarely

Les opinions Je trouve ça ... cool/génial passionnant/super	Opinions I find that ... cool/great exciting/super
ennuyeux/nul stupide	boring/rubbish stupid

Parler de sport Je préfère les sports individuels. Je préfère les sports d'équipe. Je trouve ça ... rigolo/facile/rapide Ça me fait du bien. Ça me détend.	Talking about sport I prefer individual sports. I prefer team sports. I find it/that ... fun/easy/fast It does me good. It relaxes me.
Ça booste le moral. C'est bon pour le corps et le mental. Quand je fais ça, ... je respire j'oublie mes soucis	It boosts my/your mood. It's good for the body and the mind. When I do/I'm doing it, ... I breathe I forget my worries

J'aime et je n'aime pas ... Ma passion, c'est ... le cinéma/le sport/la musique J'aime/J'adore/Je préfère ...	I like and I don't like ... My passion is ... the cinema/sport/music I like/love/prefer ...
Je n'aime pas/Je déteste ... le foot/jouer au foot la lecture/lire la photographie/prendre des photos	I don't like/hate ... football/playing football reading photography/taking photos



Knowledge Goals: Geography Globalisation



So what is 'globalisation'?



Battle in Seattle

The 1999 meeting of the World Trade Organization (WTO) was held in Seattle, Washington. This meeting was protested by thousands of people **opposed to globalisation**. The protests turned violent. Hundreds of people were arrested. Many were injured in confrontations with police. Many buildings were damaged. The incident is sometimes called "the Battle in Seattle."

Suez Canal blocked

The 224,000-tonne and 400m (440-yard) long container ship Ever Given ran aground in the Suez Canal Tuesday March 23, blocking vessels passing through one of the world's most important waterways.



How can **globalisation** be measured?



Why did the river in Tongxin (China) turn black?

The factory workers in Tongxin are poorly paid	China has few laws about how waste from factories should be disposed of	It is mostly rich countries such as the UK and USA that buy smart phones and tablets	Huge electronics factories have been built in Tongxin in the last 25 years	Around 75% of Chinas rivers are polluted	When a country joins the World Trade Organisation (WTO) it becomes easier to trade with other countries
The number of people with cancer has increased massively since it joined the WTO in 2001	The average iPhone 6 costs around £150 to make and is sold for over £500 in the UK	The villagers in Tongxin have been told to stay silent by the Chinese government and have been threatened with prison	The Chinese government has admitted the existence of "cancer villages" caused by toxic waste from factories	Children in Tongxin used to swim in the river in the summer months	80% of the worlds smart phones and tablets are made in China
Harmful chemicals are used in the production of electronic gadgets such as smart phones	Farmers used to allow their animals to drink from the river	The phones made in Tongxin are shipped all over the world	The factories make circuit boards, touch screens, smartphones and tablets	Apple pays a factory in Tongxin to manufacture its iPhone 5 and 6 phones as well as iPads	Women used to wash rice in the river before cooking it in their homes

Key:
■ Causes
■ Effects
■ Background (some of these could be causes - if particular link are made)

This link will help you find out more about why the Suez canal was blocked.

<https://www.youtube.com/watch?v=C06Q4Mft0yQ>

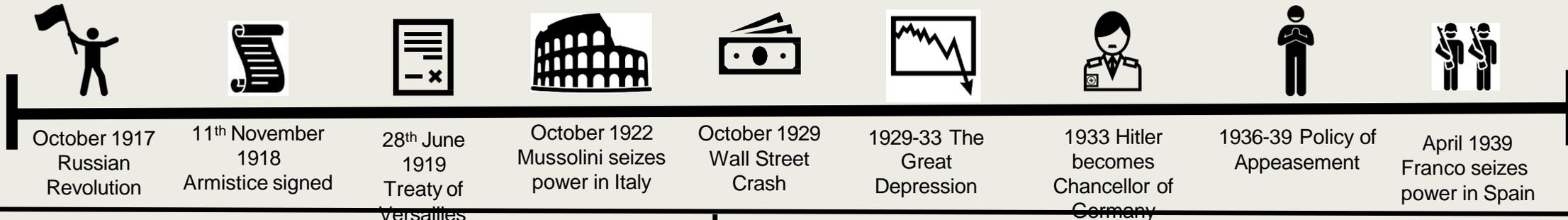


How many people did Greta Thunberg impact?
 Greta Thunberg has attracted international attention since her lone demonstration outside the Swedish Parliament in August 2018. Her "school strike for the climate" has now grown into a global movement that has brought more than **10 million people** onto streets worldwide to demand action on climate change.

Further revision:



Year 9 Key Topic 1 – The Interwar Years



Who turned to dictatorship between the wars?

Russia



The Russian Revolution took place in October 1917. The Bolshevik party, a communist organisation led by Vladimir Lenin seized power from the Tsar (Emperor). The Tsar ruled as an autocrat (dictator) and the Russian people suffered from lack of good leadership and care for the population. The Bolsheviks promised the people 'Bread, Land and Peace' in their campaign slogan. This was very popular.



Germany

Adolf Hitler came to power in Germany following the Great Depression. He was a fascist and wanted to expel all 'foreigners' from Germany. He rose to power because he used propaganda extremely effectively and the German government that he took over were unpopular with the people. He formed a dictatorship and arrested anyone who disagreed with his rule.



Italy



In 1922 Benito Mussolini seized power in Italy. He was a fascist who believed in making Italy the greatest nation on earth and having strict control over the population. He marched on Rome and forced the King to abdicate (step down). He was very talented in his use of the media and propaganda. He ruled Italy for 21 years under a strict military dictatorship and established a 'police state' which means citizens were secretly monitored.

Spain

Francisco Franco took control of Spain in 1939 after he attempted to take control in a military coup (revolution). This led to the Spanish Civil War, one of the most ferocious civil wars in history. He finally took power after his victory in this war. Franco established a military dictatorship in Spain for almost 40 years.



The Treaty of Versailles

This was the treaty signed at the end of World War One between Germany and the Allies (Britain, France and Russia). Germany was blamed for starting the war so the terms of the treaty were harsh. Germany was forced to accept the terms unless they wanted the war to re-start. The terms were:

Blame – Germany must accept full responsibility for starting the war.

Army – Germany's armed forces were limited to 100,000 men, 6 battleships, no submarines and no air force.

Reparations – Germany was forced to pay £6.6 billion in damages to other countries.

Territory – Germany had to give up sections of land to France and Poland and all overseas territory.



The Great Depression

The Great Depression was caused by the Wall Street Crash in October 1929. This was when the price of shares fell drastically and the whole world stock market crashed. This meant businesses went bankrupt, savings were lost and economies were ruined. This was particularly bad in America but also terrible for other nations, who were in debt to America. America asked for any loans to other countries to be re-paid. At this time, Germany was heavily in debt to America and now had to repay them. This caused a global crisis with rising unemployment, poverty and homelessness.



The Policy of Appeasement

During the 1930s the British and French governments followed a policy of **appeasement**. Neville Chamberlain, the British Prime Minister, was keen to avoid war. His policy was to appease Hitler, which usually meant giving into Hitler's territorial demands. **Arguments for** - Chamberlain had few alternatives to appeasement given the problems facing Britain in the 1930s, the policy of appeasement would avoid the slaughter of the Great War, France collapsed in 1940, this would suggest Chamberlain was correct not to place too much faith in them as allies, appeasement bought time. It allowed the British time to rearm.

Arguments against – it allowed Italy to take Abyssinia, it allowed the fascist powers to intervene in Spain, it resulted in the destruction of a successful democracy in



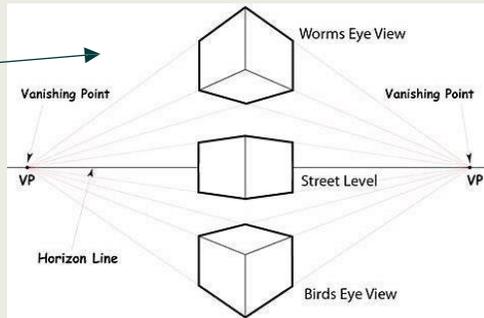
Knowledge Goals: Materials 1 - Passive Amplifier

Health and Safety

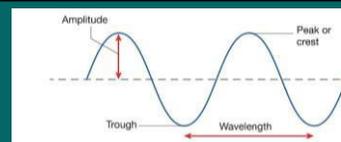
It is really important we **ASSESS** the **RISK** and **REDUCE** the **RISK** of Injury by **LISTENING** To the **TRAINING** and following the correct **PPE** usage

- Hair must be tied up in the workshop
- Blazers and ties must be removed
- Jewellery must be removed
- Only use machines you have been told to use and have been demonstrated to you
- Ensure you know where the emergency stop button is
- Do not eat or drink in the workshop
- No running

Two-point perspective - This shows an object from the side with two vanishing points. It gives the most realistic view of a product as it shows the item edge on, as we would see it. It is often used to produce realistic drawings of an object.

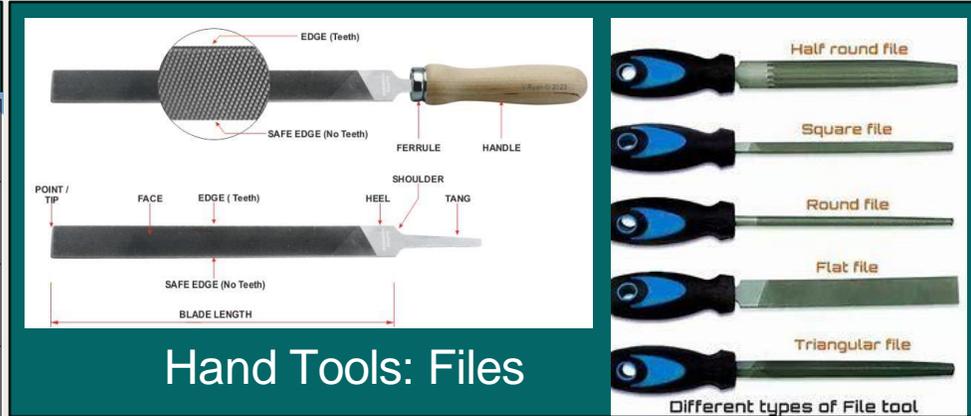


The loudness of a sound is a measure of the amplitude of the wave. The greater the amplitude, the louder the sound.



CAD – 2D Design Software

	Select Tool – Used when selecting drawing, moving drawing or lines and shapes.
	Circle Tool – Used to draw circles. Click and hold to extend the tool bar for more options.
	Line Tool – Used to draw lines. Click and hold to extend the tool bar for more options.
	Path Tool – Used to draw curves and curved lines. Click and hold to extend the tool bar for more options.
	Rectangle Tool – Used to draw rectangles and squares. Click and hold to extend the tool bar for more options.
	Double Path Tool – Used to draw curves and curved lines with a double line. Click and hold to extend the tool bar for more options.
	Text Tool – Used to add text to the design. Text style can be changed and altered to suit the design.
	Mirror Tool – Used to mirror and repeat a design. Found by holding down the Transform Tool
	Grid Lock – Used to show the grid spacing on the drawing.
	Delete Any – Deletes whole line in a drawing.
	Delete Part – Deletes part of lines to the nearest two intersections.



Hand Tools: Files

Hardwood

Hardwoods come from deciduous trees, which have large flat leaves that fall in the autumn. Hardwoods take longer to grow, are not easily sourced and are expensive to buy.

Examples: Beech (utensils), Oak (cabinet), Pine (window frame).

Labels: Wide tree trunk, Leaves commonly at the top of the tree, Tall trees with needles, Slim trunk.

Manufactured boards are usually made from timber waste and adhesive. To make them more aesthetically pleasing they are often veneered. They are cheap to buy.

Examples: Oak veneer on chipboard, MDF, Plywood, Chipboard.

Softwood

Softwoods come from coniferous trees. These often have pines or needles, and they stay evergreen all year round - they do not lose leaves in the autumn. They are faster growing than hardwoods, making them cheaper to buy, and are considered a sustainable material.

Examples: Pine, Spruce, Larch.

Manufactured Board

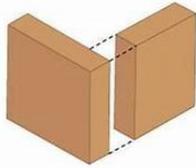
Knowledge Goals: Materials 1 - Sweet Dispenser

Wood Joints

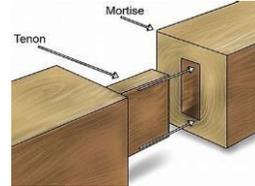
Dowel Joint



Butt Joint



Mortice and Tenon



Avoiding Design Fixation

SCAMPER



S SUBSTITUTE

Replace a think or concept with something else

C COMBINE

Unit? What? Who? Ideas? Materials?

A ADAPT

Adjust to a new purpose. Re-shape? Tune-up?

M MODIFY, MAGNIFY, MINIFY

Change the color, sound, motion form, size
Make it larger, stronger, thicker, higher, longer
Make it smaller, lighter, slower, less frequent, reduce

P PUT TO ANOTHER USE

Change when, where, location, time or how to use it.

E ELIMINATE

Omit, get rid of, cut out, simplify, weed out...

R REARRANGE, REVERSE

Change the order, sequence, pattern, layout, plan, scheme, regroup, redistribute...

Health and Safety

It is really important we **ASSESS** the **RISK** and **REDUCE** the **RISK** of Injury by **LISTENING** To the **TRAINING** and following the correct **PPE** usage

- Hair must be tied up in the workshop
- Blazers and ties must be removed
- Jewellery must be removed
- Only use machines you have been told to use and have beendemonstrated to you
- Ensure you know where the emergency stop button is
- Do not eat or drink in the workshop
- No running

6R's – Sustainability

Recycle - Take an existing product that has become waste and re-process the material for use in a new product.

Reuse - Take an existing product that's become waste and use the material or parts for another purpose, without processing it.

Reduce - Minimise the amount of material and energy used during the whole of a products life cycle.

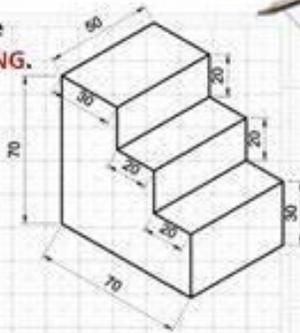
Refuse - Don't accept a product at all if you don't need it or if its environmentally or socially unsustainable.

Rethink - Our current lifestyles and the way we design and make.

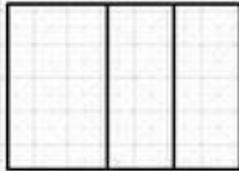
Repair - When a product breaks down or doesn't function properly, fix it.

Orthographic Projection

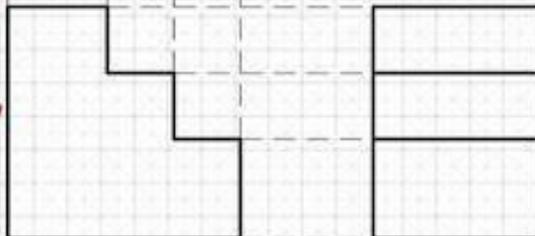
Now look at this example using a set of steps, I have included the dimensions on the **ISOMETRIC DRAWING**.



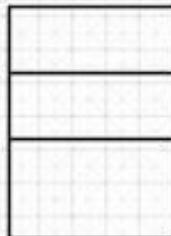
Plan View (Top)



Front View

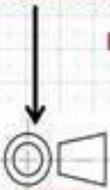


End View (Side)



Note how the three drawings are laid out, all in line with each other and each has been drawn to scale.

All of this means the drawing meets the required standard and should have the symbol for **3RD ANGLE ORTHOGRAPHIC PROJECTION**.



MENTAL HEALTH & EATING DISORDER STATISTICS

EATING DISORDERS AND MENTAL ILLNESSES COMMONLY OCCUR TOGETHER.

ONE STUDY OF PEOPLE HOSPITALIZED FOR AN EATING DISORDER FOUND THAT

97%

HAD AT LEAST ONE CO-OCCURRING MENTAL HEALTH DISORDER, WITH

94%

SUFFERING FROM MOOD DISORDERS LIKE MAJOR DEPRESSION

1/3

OF PEOPLE WITH BINGE EATING DISORDER ARE ALSO DIAGNOSED WITH MAJOR DEPRESSION

69%

OF PATIENTS WITH ANOREXIA NERVOSA ALSO HAVE OBSESSIVE-COMPULSIVE DISORDER

81%

OF PEOPLE WITH BULIMIA NERVOSA ALSO HAVE AN ANXIETY DISORDER

1/4

PEOPLE WITH AN EATING DISORDER ALSO HAVE SYMPTOMS OF POST-TRAUMATIC STRESS DISORDER

SOURCE: <https://www.nationalallianceoneatingdisorders.org/statistics/research/eating-disorders-under-the-co-occurring-disorders-heading>

Knowledge Goals: PDEV

Healthy	Unhealthy	Abusive
A healthy relationship means both you and your partner are:	You may be in an unhealthy relationship if your partner is:	Abuse is occurring in a relationship when one partner is:
<ul style="list-style-type: none"> Communicating Respectful Trusting Honest Equal Enjoying personal time away from each other Making mutual choices Economic/financial partners 	<ul style="list-style-type: none"> Not communicating Disrespectful Not trusting Dishonest Trying to take control Only spending time together Pressured into activities Unequal economically 	<ul style="list-style-type: none"> Communicating in a hurtful or threatening way Mistreating Accusing the other of cheating when it's untrue Denying their actions are abusive Controlling Isolating their partner from others

CYCLE OF ABUSE



Note: The Cycle of Abuse was originally created by psychologist Lenore Walker. The Cycle does not represent all cases of domestic violence.

DomesticShelters.org

MENTAL HEALTH

VS

MENTAL ILLNESS

What is Mental Health?

Mental health is a state of well being in which the person realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully and is able to make a contribution to his or her community.

Indicators of Good Mental Health

- Resiliency to Stress
- Empathy
- Flexibility
- Spirituality
- Optimism
- Stable Relationships
- Productive Behavior
- Respect for Self and Others
- Self Confidence
- Sense of Belonging
- Ability to take care of self and others
- Clear Thinking
- Sense of Well-being and Contentment

What is Mental Illness?

Mental Illness is defined as a health condition that affects a person's thinking, feeling, behavior or mood. Such conditions may affect someone's ability to relate to others and function each day.

Indicators of Mental Illness?

- Pulling Away from People and Usual Activities
- Feeling Numb or Like Nothing Matters
- Feeling Helpless or Hopeless
- Experiencing Severe Mood Swings
- Thinking of Harming Yourself or Others
- Inability to Perform Daily Tasks

Panel 1: A woman looks distressed. **He is controlling, and hits me when he's angry. I am afraid he'll kill me if I leave.**

Panel 2: A man looks angry. **She verbally and physically abuses me and if I tell anyone I worry it won't be taken seriously.**

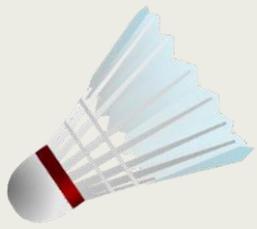
Panel 3: A woman looks sad. **She gaslights me constantly, and spreads lies about me.**

Panel 4: A woman looks sad. **They body-shame and undermine me in front of our friends.**

Signs you may be in an Abusive Relationship

- Acts in ways that scare you
- Discourages you from seeing friends and family
- Extreme jealousy of friends or time spent away
- You can never do anything right!!
- Prevents you from making your own decisions
- Insults or shames you
- Pressures you to partake in sexual activities or drugs and alcohol





Badminton

- ❑ **Serving** – I can perform the backhand and forehand serve with accuracy, landing the shuttle in the opponents' service box.
- ❑ **The Clears** – I know that the clear is a defensive stroke and can be used to slow the pace of the game and regain position on court
- ❑ **The Drop Shot** – I understand that the drop shot is an attacking shot and why.
- ❑ **The Smash** – I can hit the shuttle with power and land the shuttle mid court, showing good accuracy.
- ❑ **Net Play** – I can accurately hit the shuttle low over the net and land close to the net.
- ❑ **Game Play** – I know which side of the court to serve from depending on if the score is odd or even.



Hockey

- ❑ **Ball Control** – I can use reverse stick at the appropriate times to control the ball.
- ❑ **Passing** – I can demonstrate passes at increasing variety, speed and accuracy. On reception I rotate the stick forward to ensure the ball is trapped and available.
- ❑ **Dribbling** – I can move at speed with the ball avoiding challenges by changing speed or direction.
- ❑ **Tackling** – I can apply the block tackle effectively and safely in game situations on many occasions.
- ❑ **Game Situations** – I can organise effective attacking opportunities quickly in free hit situation.

Knowledge Goals: PE

Football

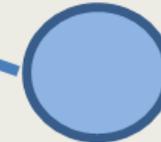


- ❑ **Ball Control** – I can control the ball with most body parts with some consistency
- ❑ **Passing** – I can occasionally pass the ball accurately using different parts of my foot whilst under *pressure*.
- ❑ **Defending** – I can decide whether to commit to a tackle or *jockey* my opponent.
- ❑ **Dribbling** – I can dribble the ball for some distance as long as it's on my stronger side.
- ❑ **Shooting** – I can accurately shoot from a moderate distance using different techniques.
- ❑ **Game Situations** – I move into space in games and communicate with teammates and can maintain *possession* while decision making.



Netball

- ❑ **Passing** – I can effectively pass a ball to a player in a game situation.
- ❑ **Footwork** – I can demonstrate good use of the footwork rule in a game situation. I can pivot on my landing foot consistently.
- ❑ **Attacking skills** – I am able to re-offer under pressure from a defender to create space to receive the ball.
- ❑ **Defending skills** – I am able to cleanly intercept a ball with two hands in a small game situation.
- ❑ **Game Situations** – I am able to demonstrate a basic set play in a game situation with little or no pressure.



Gymnastics

- ❑ **Floor** – I can perform a paired sequence, performing advanced movements showing consistently high levels of control and tension.
- ❑ **Jumps** – I can successfully incorporate a variety of jumps to change the level of a sequence.
- ❑ **Apparatus** – I can adapt the apparatus to perform a multi-move sequence using a range of vaults with correct technique.
- ❑ **Performance** – I can evaluate another group's sequence, making specific suggestions on how to improve the level of their performance.



Rugby

- ❑ **Evasion/Support Play** – I can demonstrate principles of attack when to penetrate or out flank. I can support in different formations including 'magic diamond'.
- ❑ **Passing & Catching** – I can pass and catch a ball over a longer distance with some accuracy, making decisions on the weight and length of the pass. Developing skills for quick passing to maximise potential overlaps
- ❑ **Tackling/Defensive Strategies** – I can demonstrate the principles of defence, denial of space, pressure, open gate, tackle, cover and regain possession
- ❑ **Rucks & Mauls** – I can set up a micro maul or micro ruck if none of the 'continuity' options are possible.
- ❑ **Game Play** – I can plan and execute set piece plays from a 'scrum' or 'line out'



Knowledge Goals: Physics – Energy + Heating

8 energy stores



Chemical



Elastic



Gravitational potential



Nuclear



Kinetic



Magnetic



Thermal



Electrostatic

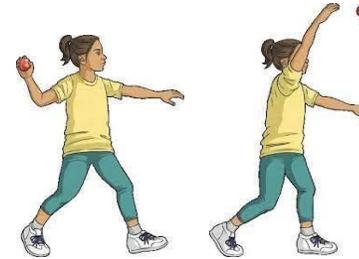
4 energy pathways

- Mechanical working – a force does work.
- Electrical working – work done by moving charges.
- Heating by particles – energy shifted by vibrating particles.
- Heating by radiation – energy shifted by electromagnetic radiation.

Describing energy shifts in systems

Arm throwing a ball

Chemical energy store of the arm is shifted to the **kinetic energy store** of the ball and arm by a force (**mechanical working**).



Descending a roller coaster ride

Gravitational energy store of the cars is shifted to the **kinetic energy store** of the cars by force of gravity (**mechanical working**).



Stopping a car

Kinetic energy store of wheels is shifted to the **thermal energy store** of the brakes by the force of friction (**mechanical working**).



Heating by particles

- Conduction in insulators (non-metals) is only caused by passing vibrations from atom to atom.
- Conduction in good conductors (metals) is caused by two processes: collisions between fast moving free electrons and metal ions, and passing vibrations from atom to atom.
- Conduction by collisions between fast moving free electrons is much faster than conduction by passing vibrations from atom to atom.
- Metals are good conductors because they contain free electrons.

Knowledge Goals: Maths

Unit 1 – Powers and Estimation

Topic	Video	Resource
Squares, cubes, roots.	Watch this	Complete this Check your work
Indices	Watch this	Complete this Check your work
**Fractional and negative indices	Watch this	Complete this Check your work
BIDMAS	Watch this	Complete this Check your work
Estimating	Watch this	Complete this Check your work
Standard Form	Watch this	Complete this Check your work
**Standard form Calculations	Watch This And this	Complete this Check your work
**Surds	Watch this	Complete this Check your work
**Error Intervals	Watch this	Complete this Check your work

**Extension tasks

Simplifying Surds

Method 1

Simplify $\sqrt{24}$

Here we are looking for the largest square number which is also a factor of 24.

Factors of 24:
1 x 24
2 x 12
3 x 8
4 x 6

So $\sqrt{24} = \sqrt{4 \times 6} = \sqrt{4} \times \sqrt{6} = 2\sqrt{6}$

Simplify $\sqrt{96}$

Here we are looking for the largest square number which is also a factor of 96.

Factors of 96:
1 x 96
2 x 48
3 x 32
4 x 24
6 x 16
8 x 12

So $\sqrt{96} = \sqrt{16 \times 6} = \sqrt{16} \times \sqrt{6} = 4\sqrt{6}$

Zero and negative indices

$x^0 = 1$

Any number divided by itself = 1

$\frac{a^6}{a^6} = a^6 \div a^6 = a^{6-6} = a^0 = 1$

Negative indices do not indicate negative solutions.

Looking at the sequence can help to understand negative powers.

$2^1 = 2$
 $2^0 = 1$
 $2^{-1} = \frac{1}{2}$
 $2^{-2} = \frac{1}{4}$

Powers of powers

$(x^a)^b = x^{ab}$

The same base and power is repeated. Use the addition law for indices.

$(2^3)^4 = 2^3 \times 2^3 \times 2^3 \times 2^3 = 2^{12}$

NOTICE the difference

$(2x^3)^4 = 2^4 \times 2^3 \times 2^3 \times 2^3 \times 2^3 = 16x^{12}$

The addition law applies ONLY to the powers. The integers still need to be multiplied.

Standard form calculations

Tip: Convert into ordinary numbers first and back to standard form at the end.

Method 1: $6 \times 10^5 + 8 \times 10^5 = 14 \times 10^5 = 1.4 \times 10^6$

Method 2: $600000 + 800000 = 1400000 = 1.4 \times 10^6$

Tip: Convert into ordinary numbers first and back to standard form at the end.

Method 1: $1.5 \times 10^3 + 0.3 \times 10^3 = 1.8 \times 10^3$

Method 2: $1500 + 300 = 1800 = 1.8 \times 10^3$

Tip: For multiplication and division you can look at the values for A and the powers of 10 as two separate calculations.

Example: $(1.5 \times 10^3) \times (0.3 \times 10^3) = 0.45 \times 10^6 = 4.5 \times 10^5$

Square and cube numbers

Square numbers

1, 4, 9, 16, ...

144 = $2 \times 2 \times 2 \times 2 \times 3 \times 3$

12×12

Prime factors can find square roots.

$\sqrt{144} = 12$

Cube numbers

1, 8, 27, 64, 125, ...

216 = $2 \times 2 \times 2 \times 3 \times 3 \times 3$

$6 \times 6 \times 6 = 216$

$\sqrt[3]{216} = 6$

Standard form

Any number between 1 and less than 10 $\rightarrow A \times 10^n$

Any integer

0.001 = $1 \times \frac{1}{1000} = 1 \times 10^{-3}$

Any value to the power 0 always = 1

Numbers in standard form with negative powers will be less than 1

Example: $3.2 \times 10^{-4} = 3.2 \times \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} = 0.00032$

Non-example: 0.8×10^4 (not between 1 and 10), $5.3 \times 10^{(0)}$ (power 0)

Other mental strategies for square roots

$\sqrt{810000} = \sqrt{81} \times \sqrt{10000} = 9 \times 100 = 900$

Estimation

Estimations are useful – especially when using fractions and decimals to check if your solution is possible.

Most estimations round to 1 significant figure.

$210 + 899 < 1200$

Estimations are useful – especially when using fractions and decimals to check if your solution is possible.

This is true because even if both numbers were rounded up, they would reach $300 + 900$

The correct estimation would be $200 + 900 = 1100$

Addition/ Subtraction Laws

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

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

Knowledge Goals: Maths

Unit 2 – Algebraic Manipulation

Topic	Video	Resource
Simplifying expressions	Watch this	Complete this Check your work
Substitution	Watch this	Complete this Check your work
Expanding and factorising (single bracket)	Watch this	Complete this Check your work
** Expanding and factorising quadratics	Watch this	Complete this Check your work
** Simplify algebraic Fractions	Watch this	Complete this Check your work
** Add and subtract algebraic fractions	Watch this	Complete this Check your work

**Extension tasks

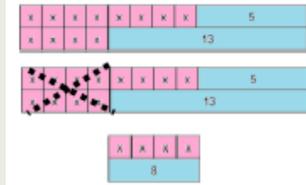
Topic/Skill	Definition/Tips	Example
1. Expression	A mathematical statement written using symbols, numbers or letters.	$3x + 2$ or $5y^2$
2. Equation	A statement showing that two expressions are equal	$2y - 17 = 15$
3. Identity	An equation that is true for all values of the variables An identity uses the symbol: \equiv	$2x \equiv x+x$
4. Formula	Shows the relationship between two or more variables	Area of a rectangle = length x width or $A = L \times W$
5. Simplifying Expressions	Collect 'like terms'. Be careful with negatives. x^2 and x are not like terms.	$2x + 3y + 4x - 5y + 3$ $= 6x - 2y + 3$ $3x + 4 - x^2 + 2x - 1 = 5x - x^2 + 3$
6. x times x	The answer is x^2 not $2x$.	Squaring is multiplying by itself, not by 2.
7. $p \times p \times p$	The answer is p^3 not $3p$	If $p=2$, then $p^3=2 \times 2 \times 2=8$, not $2 \times 3=6$
8. $p + p + p$	The answer is $3p$ not p^3	If $p=2$, then $2+2+2=6$, not $2^3 = 8$
9. Expand	To expand a bracket, multiply each term in the bracket by the expression outside the bracket.	$3(m + 7) = 3x + 21$
10. Factorise	The reverse of expanding . Factorising is writing an expression as a product of terms by ' taking out ' a common factor .	$6x - 15 = 3(2x - 5)$, where 3 is the common factor.

Topic/Skill	Definition/Tips	Example
1. Quadratic	A quadratic expression is of the form $ax^2 + bx + c$ where a, b and c are numbers, $a \neq 0$	Examples of quadratic expressions: x^2 $8x^2 - 3x + 7$ Examples of non-quadratic expressions: $2x^3 - 5x^2$ $9x - 1$
2. Factorising Quadratics	When a quadratic expression is in the form $x^2 + bx + c$ find the two numbers that add to give b and multiply to give c .	$x^2 + 7x + 10 = (x + 5)(x + 2)$ (because 5 and 2 add to give 7 and multiply to give 10) $x^2 + 2x - 8 = (x + 4)(x - 2)$ (because +4 and -2 add to give +2 and multiply to give -8)
3. Difference of Two Squares	An expression of the form $a^2 - b^2$ can be factorised to give $(a + b)(a - b)$	$x^2 - 25 = (x + 5)(x - 5)$ $16x^2 - 81 = (4x + 9)(4x - 9)$
4. Solving Quadratics ($ax^2 = b$)	Isolate the x^2 term and square root both sides. Remember there will be a positive and a negative solution.	$2x^2 = 98$ $x^2 = 49$ $x = \pm 7$
5. Solving Quadratics ($ax^2 + bx = 0$)	Factorise and then solve = 0 .	$x^2 - 3x = 0$ $x(x - 3) = 0$ $x = 0$ or $x = 3$
6. Solving Quadratics by Factorising ($a = 1$)	Factorise the quadratic in the usual way. Solve = 0 Make sure the equation = 0 before factorising.	Solve $x^2 + 3x - 10 = 0$ Factorise: $(x + 5)(x - 2) = 0$ $x = -5$ or $x = 2$

Knowledge Goals: Maths

Equations: unknown on both sides R

$$8x + 5 = 4x + 13$$



$$\begin{aligned} 8x + 5 &= 4x + 13 \\ -4x &\quad -4x \\ 4x + 5 &= 13 \\ -5 &\quad -5 \\ 4x &= 8 \\ \div 4 &\quad \div 4 \\ x &= 2 \end{aligned}$$

Unit 3 – Solving Equations		
Topic	Video	Resource
Solving linear equations	Watch this	Complete this Check your work
Forming and Solving Equations	Watch this	Complete this Check your work
Changing the subject	Watch this	Complete this Check your work
**Solving quadratic equations	Watch this	Complete this Check your work
Simultaneous Equations	Watch this	Complete this Check your work
**Factorising harder quadratics	Watch this	Complete this Check your work
**Harder changing the subject	Watch this	Complete this Check your work

Simultaneous Equations

Solve graphically

$x + y = 6$ $y = 2x$

Linear equations are straight lines. The point of intersection provides the x and y solution for both equations.

The solution that satisfies both equations is $x = 2$ and $y = 4$.

Solve by subtraction

$$\begin{aligned} 3x + 2y &= 18 \\ - (x + 2y) &= 10 \\ \hline 2x &= 8 \\ \div 2 &\quad \div 2 \\ x &= 4 \end{aligned}$$

$$\begin{aligned} x + 2y &= 10 \\ (4) + 2y &= 10 \\ -4 &\quad -4 \\ 2y &= 6 \\ \div 2 &\quad \div 2 \\ y &= 3 \end{aligned}$$

$x = 4$
 $y = 3$

Solve by addition

$$\begin{aligned} 3x + 2y &= 16 \\ + 6x - 2y &= 2 \\ \hline 9x &= 18 \\ \div 9 &\quad \div 9 \\ x &= 2 \end{aligned}$$

$$\begin{aligned} 3x + 2y &= 16 \\ 3(2) + 2(y) &= 16 \\ 6 + 2y &= 16 \\ -6 &\quad -6 \\ 2y &= 10 \\ y &= 5 \end{aligned}$$

$x = 2$
 $y = 5$

Solve by adjusting one

$$\begin{aligned} h + j &= 12 \\ 2h + 2j &= 29 \end{aligned}$$

No equivalent values

$$\begin{aligned} 2h + 2j &= 24 \\ 2h + 2j &= 29 \end{aligned}$$

By proportionally adjusting one of the equations – now solve the simultaneous equations choosing an addition or subtraction method.

Solve by adjusting both

$$\begin{aligned} 2x + 3y &= 39 \\ 5x - 2y &= -7 \end{aligned}$$

Use LCM to make equivalent x OR y values. Because of the negative values using zero pairs and y values is chosen choice.

$$\begin{aligned} 4x + 6y &= 78 \\ 15x - 6y &= -21 \end{aligned}$$

Now solve by addition.

**Extension tasks

Solve equations R

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

Expand the brackets

$$6x + 12 = 30$$

-12 -12

$$6x = 18$$

-6 -6

$$x = 3$$

Substitute to check your answer. This could be negative or a fraction or decimal.

Rearranging Formulae (one step)

$$x = y + z$$

Rearrange to make y the subject.

$$y = x - z$$

Using inverse operations or fact families will guide you through rearranging formulae.

Rearranging can also be checked by substitution.

Language of rearranging...

Make XXX the subject Change the subject Rearrange

Rearranging Formulae (two step)

In an equation (find x)

$$\begin{aligned} 4x - 3 &= 9 \\ +3 &\quad +3 \\ 4x &= 12 \\ \div 4 &\quad \div 4 \\ x &= 3 \end{aligned}$$

In a formula (make x the subject)

$$\begin{aligned} xy - s &= a \\ +s &\quad +s \\ xy &= a + s \\ \div y &\quad \div y \\ x &= \frac{a + s}{y} \end{aligned}$$

The steps are the same for solving and rearranging.

Rearranging is often needed when using $y = mx + c$.

e.g. Find the gradient of the line $2y - 4x = 9$

Make y the subject first

$$y = 4x + \frac{9}{2}$$

Gradient = $\frac{4}{2} = 2$

Knowledge Goals: Music

Reggae Music

Why is Reggae Music so important?

Reggae Music developed mainly as a mixture of three different styles of Caribbean Music: Mento, Ska and Rock Steady. Reggae music began to address social issues, and the lyrics typically deal with poverty and political issues. Reggae music has always been strongly linked to the Rastafarian religion, making the music culturally important. By far the most famous and influential Reggae artist is Bob Marley (1945-1981). Typical of Reggae, most of his songs deal with more light-hearted subjects such as religion, love, peace, poverty, anti-racism and political issues.

Bob Marley

Robert 'Nesta' Marley was born to a Jamaican mother and a British father. He grew up in a village in Jamaica and did not let culture influence his upbringing, believing he was on 'God's side' (rather than his Mum or Dad's heritage). After forming a band called 'The Wailers', Bob went on to write many famous songs, as well as a deeply spiritual person. Bob used the lyrics of his songs to fight for peace and a release from poverty.



Great Composers

Bob Marley
Buffalo Soldier

Toots and the Mayals
Pressure Drop

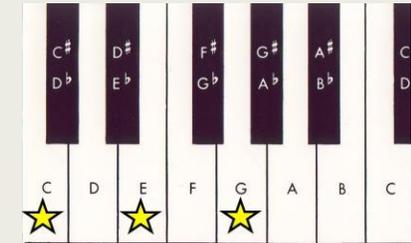
Desmond Dekker
The Israelites

Wider Listening

Explore the 'Two-Tone' movement of the 1980s with bands such as 'The Specials' and 'Madness'

Chords

A chord is where two or more notes are played at the same time. The most common type of chord is a triad and the easiest way to create a triad is:



Play one, miss one, play one, miss one, play one

Common triads include major and minor, where major feels happy and bright, and minor feels slightly sad

Off-Beat Rhythm

The weaker beats of the bar. An offbeat rhythm will stress these beats instead of stronger ones. In a song with 4 beats in a bar, this is beats 2 and 4

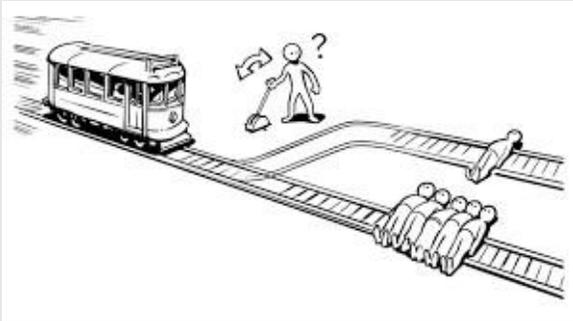
Key Features of Reggae

High-tuned snare intro
Lyrics that talk about politics and love
A simple verse chorus structure
Pop music instruments including guitar, bass, drums, and a trumpet, trombone and sax

Knowledge Goals: PRE Ethics

How do we make moral decisions?

Are you an absolute or relative moralist? Are some things always wrong or does it depend upon the situation? Should you always tell the truth? In this unit we will examine different ethical theories and ways of making moral decisions.



Find out more! Take this online lesson.



Genetic Engineering

Is it right to create a child with specific genetic make-up to save another? We explore the issue of saviour siblings and examine the arguments for and against the use of genetic engineering to eradicate hereditary conditions.



Discover a range of different views



What are the rights and wrongs of abortion?

There are powerful arguments for and against abortion. People with different beliefs may agree with many of these arguments.

Many religious believers are likely to have great sympathy with the argument that a person should be able to decide what happens to their own body. Yet for them the idea that life is sacred may outweigh other arguments, however good.

• **Pro-life** - some Christians, including many Roman Catholics, say that abortion is morally wrong because of their belief that human life begins at conception. They may make an exception if an abortion is essential in order to save the life of the mother (the principle of double effect), assuming all efforts have been made to save the foetus.

• **Pro-choice** - it is up to the woman to decide whether it is right for her to have an abortion because it is her body. Some Christians believe that a woman has a right to a safe abortion, and that it shows compassion if the law allows this.



Find out



Knowledge Goals: Spanish

¿Dónde vives? Vivo en el... norte/noreste/noroeste... sur/sureste/suroeste...	Where do you live? I live in the... north/northeast/northwest... south/southeast/southwest...	este/oeste/centro... de Inglaterra/Escocia de Gales/Irlanda (del Norte)	east/west/centre... of England/Scotland of Wales/(Northern) Ireland
¿Qué haces en verano? En verano/invierno... chateo en la red cocino para mi familia descargo canciones escribo correos hago natación/esquí/windsurf hago una barbacoa juego al baloncesto/fútbol	What do you do in summer? In summer/winter... I chat online I cook for my family I download songs I write emails I go swimming/skiing/windsurfing I have a barbecue I play basketball/football	monto a caballo/en bici nado en el mar salgo con mis amigos/as toco la guitarra trabajo como voluntario/a veo la tele voy al polideportivo/al parque/ a un centro comercial voy de paseo	I go horse/riding/cycling I swim in the sea I go out with my friends I play the guitar I work as a volunteer I watch TV I go to the sports centre/to the park/ to a shopping centre I go for a walk
¿Con qué frecuencia? siempre a menudo todos los días a veces	How often? always often every day sometimes	de vez en cuando una vez a la semana dos o tres veces al año (casi) nunca	from time to time once a week two or three times a year (almost) never
¿Qué tiempo hace? Hace buen/mal tiempo. Hace calor/frío/sol/viento. Llueve/Nieva. El tiempo es variable.	What's the weather like? It's good/bad weather. It's hot/cold/sunny/windy. It's raining/snowing. The weather is changeable.	El clima es caluroso/soleado. Hay niebla/tormenta. Hay chubascos. Está nublado.	The climate is hot/sunny. It's foggy/stormy. There are showers. It's cloudy.
¿Qué te gusta hacer? Soy adicto/a a... Soy un(a) fanático/a de... ya que/dado que/puesto que Prefiero... Me gusta... Me encanta/Me mola/Me chifla/ Me flipa/Me apasiona... No me gusta (nada)... Odio... A (mi padre) le gusta... Nos encanta... bucear estar al aire libre	What do you like doing? I'm addicted to... I'm a... fan/fanatic. given that/since I prefer... I like... I love... I don't like... (at all) I hate... (My dad) likes... We love... diving being outdoors	estar en contacto con los amigos hacer artes marciales hacer deportes acuáticos ir al cine/a la pista de hielo ir de compras leer (un montón de revistas) usar el ordenador ver películas Prefiero veranear... en el extranjero/en España en la costa/en el campo en la montaña/en la ciudad	being in touch with friends doing martial arts doing water sports going to the cinema/ice rink going shopping reading (loads of magazines) using the computer watching films I prefer to spend the summer... abroad/in Spain on the coast/in the country in the mountains/in the city
¿Adónde fuiste de vacaciones? hace una semana/un mes/un año hace dos semanas/meses/años fui de vacaciones a... Francia/Italia/Turquía ¿Con quién fuiste? Fui... con mi familia/institi	Where did you go on holiday? a week/month/year ago two weeks/months/years ago I went on holiday to... France/Italy/Turkey Who did you go with? I went... with my family/school	con mi mejor amigo/a solo/a ¿Cómo viajaste? Viajé... en autocar/avión en barco/coche/tren	with my best friend alone How did you travel? I travelled... by coach/plane by boat/car/train
¿Qué hiciste? primero luego más tarde después finalmente Lo mejor fue cuando... Lo peor fue cuando... aprendí a hacer vela comí muchos helados compré recuerdos descansé fui al acuario hice turismo	What did you do? first then later after finally The best thing was when... The worst thing was when... I learned to sail I ate lots of ice creams I bought souvenirs I rested I went to the aquarium I went sightseeing	llegué tarde al aeropuerto perdí mi móvil saqué fotos tomé el sol tuve un accidente en la playa vi un partido visité el Park Güell vomité en una montaña rusa Puedes... descubrir el Museo Picasso disfrutar del Barrio Gótico pasear por las Ramblas subir al Monumento a Colón ver los barcos en el puerto	I arrived at the airport late I lost my mobile I took photos I sunbathed I had an accident on the beach I saw/watched a match I visited Park Güell I was sick on a roller coaster You can... discover the Picasso Museum enjoy the gothic quarter walk along Las Ramblas go up the Columbus Monument see the boats in the port
¿Qué tal lo pasaste? Me gustó/Me encantó. Lo pasó bomba/fenomenal. Lo pasó bien/mal/fatal. Fue... inolvidable/increíble impresionante/flipante horroroso	How was it? I liked it/I loved it. I had a great time. I had a good/bad/awful time. It was... unforgettable/incredible impressive/awesome awful	un desastre ¿Qué tiempo hizo? Hizo buen/mal tiempo. Hizo calor/frío/sol/viento. Hubo niebla/tormenta. Llovió/Nevó.	a disaster What was the weather like? It was good/bad weather. It was hot/cold/sunny/windy. It was foggy/stormy. It rained/snowed.

¿Dónde vives? Vivo en el... norte/noreste/noroeste... sur/sureste/suroeste...	Where do you live? I live in the... north/northeast/northwest... south/southeast/southwest...	este/oeste/centro... de Inglaterra/Escocia de Gales/Irlanda (del Norte)	east/west/centre... of England/Scotland of Wales/(Northern) Ireland
¿Qué haces en verano? En verano/invierno... chateo en la red cocino para mi familia descargo canciones escribo correos hago natación/esquí/windsurf hago una barbacoa juego al baloncesto/fútbol	What do you do in summer? In summer/winter... I chat online I cook for my family I download songs I write emails I go swimming/skiing/windsurfing I have a barbecue I play basketball/football	monto a caballo/en bici nado en el mar salgo con mis amigos/as toco la guitarra trabajo como voluntario/a veo la tele voy al polideportivo/al parque/ a un centro comercial voy de paseo	I go horse/riding/cycling I swim in the sea I go out with my friends I play the guitar I work as a volunteer I watch TV I go to the sports centre/to the park/ to a shopping centre I go for a walk
¿Con qué frecuencia? siempre a menudo todos los días a veces	How often? always often every day sometimes	de vez en cuando una vez a la semana dos o tres veces al año (casi) nunca	from time to time once a week two or three times a year (almost) never
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¿Adónde fuiste de vacaciones? hace una semana/un mes/un año hace dos semanas/meses/años fui de vacaciones a... Francia/Italia/Turquía ¿Con quién fuiste? Fui... con mi familia/institi	Where did you go on holiday? a week/month/year ago two weeks/months/years ago I went on holiday to... France/Italy/Turkey Who did you go with? I went... with my family/school	con mi mejor amigo/a solo/a ¿Cómo viajaste? Viajé... en autocar/avión en barco/coche/tren	with my best friend alone How did you travel? I travelled... by coach/plane by boat/car/train
¿Qué hiciste? primero luego más tarde después finalmente Lo mejor fue cuando... Lo peor fue cuando... aprendí a hacer vela comí muchos helados compré recuerdos descansé fui al acuario hice turismo	What did you do? first then later after finally The best thing was when... The worst thing was when... I learned to sail I ate lots of ice creams I bought souvenirs I rested I went to the aquarium I went sightseeing	llegué tarde al aeropuerto perdí mi móvil saqué fotos tomé el sol tuve un accidente en la playa vi un partido visité el Park Güell vomité en una montaña rusa Puedes... descubrir el Museo Picasso disfrutar del Barrio Gótico pasear por las Ramblas subir al Monumento a Colón ver los barcos en el puerto	I arrived at the airport late I lost my mobile I took photos I sunbathed I had an accident on the beach I saw/watched a match I visited Park Güell I was sick on a roller coaster You can... discover the Picasso Museum enjoy the gothic quarter walk along Las Ramblas go up the Columbus Monument see the boats in the port
¿Qué tal lo pasaste? Me gustó/Me encantó. Lo pasó bomba/fenomenal. Lo pasó bien/mal/fatal. Fue... inolvidable/increíble impresionante/flipante horroroso	How was it? I liked it/I loved it. I had a great time. I had a good/bad/awful time. It was... unforgettable/incredible impressive/awesome awful	un desastre ¿Qué tiempo hizo? Hizo buen/mal tiempo. Hizo calor/frío/sol/viento. Hubo niebla/tormenta. Llovió/Nevó.	a disaster What was the weather like? It was good/bad weather. It was hot/cold/sunny/windy. It was foggy/stormy. It rained/snowed.

