

Knowledge Organiser

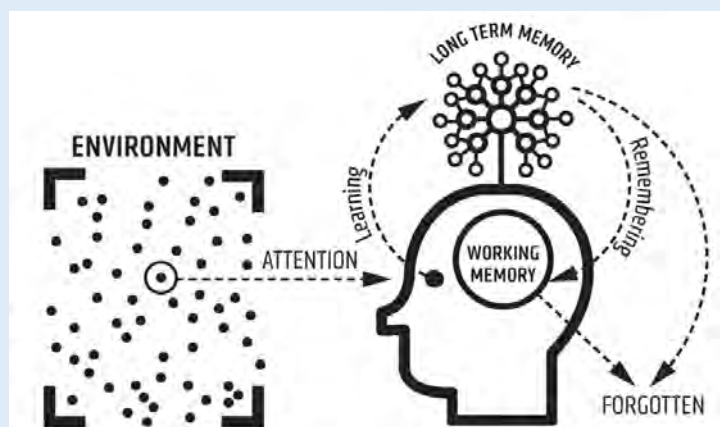
Booklet Year 9 Term 1



Our working memories can only store a limited amount of information, whereas our long term memories can store limitless information. To learn successfully, we need to store core knowledge into our long term memories, so we can retrieve it when we need it.

For instance if you are at work or in the shops and need to work out a 25% discount, you cant memorise 25% of every number, so you need to be able to quickly recall the method for calculating a percentage. Committing core knowledge to our long-term memories is a life-hack. It makes thinking about difficult things easier.

Using a knowledge organiser with regular retrieval activities is a way for you to store core knowledge & subject specific words, into your long term memory so it is there when you need it.



Contents

Clicking on the subjects below will take you directly to the knowledge organisers for each subject. These are to support learning that has taken place this past term. Use these to help reinforce the key knowledge. Use some of the strategies explained in the introduction to help you retain this important information.

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Blended Learning Expectations

Make sure you have access to a computer at home (If you don't please make pastoral staff aware or email langley.homelearning@taw.org.uk)

Download Microsoft Teams on both your phone and computer. (If you don't know how to do this please ask a member of staff or do this in your next computing lesson)













Spend at least 2 hours a week using teams EVERY WEEK. (Engagement in teams can be tracked and monitored). You need to be accessing each of your class teams and recapping on the previous learning or completing additional tasks set by your class teacher.













If you have any issues with teams (e.g. login problems or missing classes etc then please email langley.homelearning@taw.org.uk)

Teams is a tool to support ongoing learning and should **only be used for educational purposes.**



How to complete homework your teacher has set

	LOOK, COVER, WRITE, CHECK	DEFINITIONS TO KEY WORDS	FLASHCARDS	DUAL CODING
STAGE 1	<p>Look at & study an area of your knowledge organiser</p> 	<p>Write down the key words & definitions</p> 	<p>Write key words, dates/formulae, equations/quotes on one side & answers on the other</p> 	<p>Draw pictures/diagrams/ cartoon strips</p> 
STAGE 2	<p>Cover up your knowledge organiser and write everything you remember</p> 	<p>Cover up the definitions. How many can you remember? Repeat.</p> 	<p>Include pictures or diagrams if it helps. Read through them.</p> 	<p>Label your pictures/diagrams/ cartoon strips</p> 
STAGE 3	<p>Check. Correct mistakes in green and add anything you missed. Repeat</p> 	<p>Check. Correct mistakes in green pen. Which ones do you find hard to remember?</p> 	<p>Test yourself and get someone to test you.</p> 	<p>Explain out loud to yourself or family/friend what your images show</p> 

	SELF QUIZZING	MINDMAPS	PAIRED RETRIEVAL	SPEAK, COVER, WRITE, CHECK
STAGE 1	<p>Use your knowledge organiser to create quiz questions.</p> 	<p>Create a mindmap of everything you can remember from your knowledge organiser</p> 	<p>Give a family member/friend the knowledge organiser to hold</p> 	<p>Read out loud the information from the knowledge organiser several times.</p> 
STAGE 2	<p>Write down the answers to your quiz</p> 	<p>Check your knowledge organiser & use a green pen to make any corrections.</p> 	<p>Get them to test you using the knowledge organiser</p> 	<p>Cover up your knowledge organiser and write everything you remember</p> 
STAGE 3	<p>Keep self-quizzing until you get all the answers correct</p> 	<p>Add additional information to your mindmap or make connections to other knowledge</p> 	<p>Write down your answers to their questions</p> 	<p>Check. Correct mistakes in green and add anything you missed. Repeat.</p> 

Retrieval Placemat

Look at your knowledge organiser. Now cover it up and write down
Key vocabulary & definitions from memory:

First time: Look.
Cover. State 3 facts

Second time: Look.
Cover. State 3 facts

Third time: Look.
Cover. State 3 facts

Check & green pen your answers

Look at the knowledge organiser again. Now cover it up and
without looking, explain a concept or idea in your own words

Re-read your answer above. Look at the knowledge organiser
again. Now cover it up and improve on your previous explanation in
green pen.

Retrieval Relay

Look at your knowledge organiser. Now cover it up.

First time: Write down everything you can remember

Second time: Look. Cover. Write down everything you can remember

Third time: Look. Cover. Write down everything you can remember

Write down everything here that you didn't remember:

Vocabulary focus 1

Look at your knowledge organiser. Select a key word and write it here:

Write a definition of the key word in your own words - not the same as the one on the knowledge organiser:

Write a sentence with the key word in it:

Create a question where the key word is the answer:

What other words are connected to this key word?

Draw a picture or diagram to help you remember this key word:

Vocabulary focus 2

Definition:

Characteristics:

Key word:

Examples:

Non-examples:

What should my knowledge organiser homework look like?

The image shows a handwritten knowledge organiser on lined paper. It is annotated with arrows pointing to specific features:

- Date:** 13/07/21
- Topic clear:** Topic : Earthquakes
- Homework activity written and underlined:** Definitions to key words:
- Stages of homework activity in margin:** Stage 1, Stage 2 + 3 in green
- Key words in a different colour or underlined:** Epicentre, Seismic waves, Focus
- Green pen corrections:** A green arrow points to a correction in the definition of Focus: "must remember this" with a downward arrow pointing to "it starts" in the original text.

The handwritten text includes the following definitions:

Stage 1
Epicentre: Directly above the focus, where the seismic waves hit first.
Seismic waves: Energy waves from focus.
Focus: The point where pressure is released.

Stage 2 + 3 in green
Epicentre: Where the seismic waves hit first (directly above the focus)
Seismic waves: Energy waves (from the focus)
Focus: The point where it starts → where pressure is released
↓
must remember this

What should my knowledge organiser homework look like?

Homework activity written and underlined

Date

Key words in a different colour

Stages of homework activity as subtitles

Green pen corrections

20/7/21 Retrieval Placemat - Drama

Pitch - How high or low your voice is
Pace - The speed you speak at
Pause - A period of silence

1st line - 3 facts

- 1) Power is not the same as volume. You can have a powerful voice at a low volume.
- 2) Accents are local to an area e.g. Welsh
- 3) Articulation - pronouncing words carefully

2nd line - 3 facts

- 1) The speed you move your body at is called pace
- 2) How tightly you hold your muscles is called tension
- 3) Eye contact is when you look at someone object, audience member

3rd line - 3 facts

- 1) Posture is how you sit or stand ^{how you hold your body}
- 2) How you walk is called your gait
- 3) Gesture is a way of moving that means something. - usually the movement of your head, hand e.g. thumbs up.

In my own words
There are different vocal + physical techniques that can be used to create different characters.

2nd draft There are different vocal + physical techniques that can be used to create different characters e.g. the pace + volume ^{of your voice} and your facial expressions.

Art



Year 9: Unit 1: Drawing Skills

Drawing Skills

Threshold Concept (TC1) - Understand the elements of art and how these can be used to create a piece of artwork.

Threshold Concept (TC2) - Understand how measuring techniques can help with accuracy when drawing.

Bronze

- ... remember the seven elements of art.
- ... understand what a still-life is.

A **still life** is a work of art showing **anything that does not move or is lifeless** (inanimate). Still life includes objects which are either natural (food, flowers, plants, rocks, shells, etc.) or man-made (shoes, drinking glasses, books, vases, jewellery, coins, etc.)

Formal Elements of Art

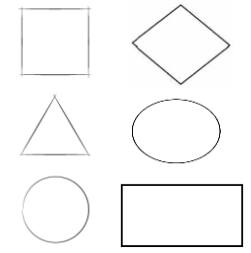
- Colour** – what you see when light reflects off something.
- Line** – a mark made which can be long, short, scribbled, straight etc.
- Shape** – a 2D area which is enclosed by a line.
- Form** – a shape which has 3 dimensions.
- Tone** – how light or dark something is.
- Texture** – how something looks or feels (visual or actual) rough etc.
- Pattern** – a symbol or shape that can be random or repeated.

Pencils come in different grades, the softer the pencil, the darker the tone.
H = Hard B = Black
The most useful pencils for shading are 2B and 4B. If your pencil has no grade it is most likely HB which is 'hard black'.



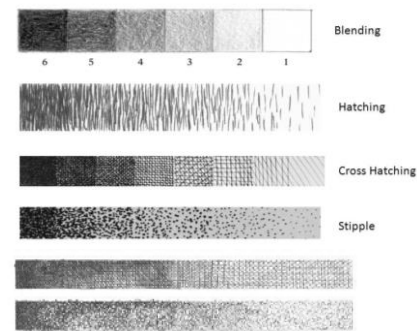
Colour Wheel

Basic Shapes



Key words
Graphite,
Formal elements
Tonal scale, Hatching
Cross hatching,
Ellipse, Symmetrical
Mark making,
Geometric shapes,
Parallel, Still life

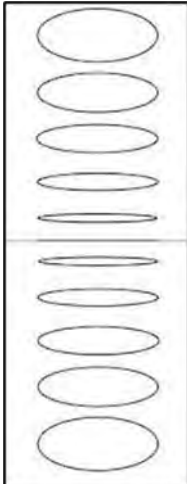
Shading Techniques



Shoe Drawing



Ellipses



Mark making

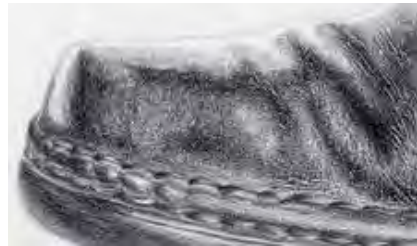
To make drawings look more realistic, try to use different marks to show textures and surfaces. You can do this by changing the direction, pressure and length of your marks.

Pattern

The stitching on the shoe and the eyelets that the laces are threaded through are a textured pattern which is repeated in your shoe drawing.

Texture

Visual texture is accomplished by carefully using a combination of tonal shading and the different shading techniques.



A tonal drawing does not need colour to be added.



Draw edges not outlines!



Measuring with a pencil

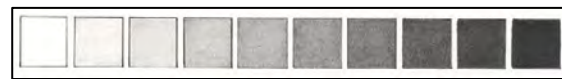


Line



Working out the measurements of the shoe and drawing the outline first is crucial before adding tone and texture.

Tonal Scale





Year 9: Unit 2: Structures (Composition)

Composition

TC34 - Recognise different structures in the world.

TC35 - Understand how symmetry, simple geometric shapes, measuring techniques and the grid method can help with accuracy when drawing.

TC22 - Understand how to create a range of tonal values with biro.

TC17 - Understand that art does not always have to have a blank background on which to work.

Keywords

- Tonal scale
- Hatching
- Cross hatching
- Ellipse
- Symmetrical
- Composition
- Technique

Formal Elements of Art

- Colour, Line, Shape, Form, Tone, Texture
- Pattern



Burj Khalifa
Dubai



Santiago Calatrava. NY City,
World Trade Centre Oculus,



Insect structure



St Andrews, Birmingham City



Structure of a seashell



Lucy Jones

Artists who have used a pre-prepared background for their work



Guitar, 1913
Georges Braque

A structure is something that is constructed such as a building or it can be something organic. It can also be something made up of components such as an organisation.

Bronze Composition

- ... understand what a 'structure' is.
- ... research, recognise and name different structures throughout the world.
- ... understand what 'contemporary' means.
- ... understand that many artists, including contemporary artists, have used structures as inspiration for their artwork.
- ... understand what a collaged/textured background is.
- ... understand there is an order in which the work needs to be done.
- ... understand how the grid method can aid accuracy of drawing.
- ... understand how to draw simple geometric shapes to help plan a drawing.
- ... understand the techniques of using graphite/biro to create a range of tonal values.



Monet



Lucy Jones

Artists who use structure as inspiration for their work.



David Moreno



Ian Murphy

Abstract artwork inspired by the Ironbridge images.

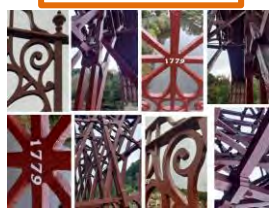


Louis Jovier

Produce a copy of one of Ian Murphy's artworks.

The already-prepared background of a piece of artwork creates a setting or atmosphere that looks professional.

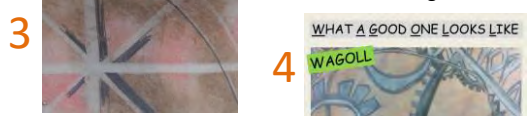
Variety of Ironbridge images



Chalk, pencil, black pencil, and eraser drawing techniques

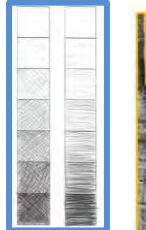
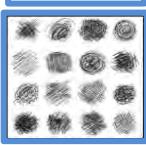


1 Chalk background. 2 Using the eraser, mark in abstract lines inspired by the images.



3 Start to include shading using the graphite and black pencil.

Ballpoint pen drawing techniques



Ian Murphy is an artist who was born in Wigan (England) in 1963. He produces artwork around natural and urban environments.

Earlier in his life he completed a Fine Art and Art and Design A level course in his hometown. Ian Murphy then went to Sheffield University to do a BA (Hons) degree in **Fine Art**, painting and printmaking.

Drawing is very important in his work and he often draws in a sketchbook **on location**, and often travels in search of new locations. He also **paints and prints**, and includes **collage** in his work too. His work is very **atmospheric**.

Fine Art: A type of art (such as painting, sculpture, or music) that is done to create beautiful things. (A type of art that is creative and appreciated because it is imaginative and pleasing to the eye).

Urban: relating to, or characteristic of a town or city.

Natural Environment: includes all living and non-living things occurring naturally.

Technique 1: Drawing freehand

- When **starting to draw**, begin with **basic shapes** and draw them **very very softly**.
- Use **measuring techniques**, i.e. compare the size of one part against another to get the proportions of your drawing correct. Image A is a square!
- Compare heights of different parts.** (Which parts are at the same level?)
- Look at the **negative space** in and around the main part of your image to help you draw more accurately.

Image A, Image B, Image C



Rule of Thirds



Grid Method





Year 9: Unit 2: Structures (Clay work)

Clay work

TC24 - Many artists over the years have used clay as a material to produce their artwork.

TC26 - Understand the different stages of clay.

TC27 - Understand basic clay techniques.

Formal Elements of Art

Colour, Line, Shape, Form, Tone, Texture, Pattern

Keywords

Composition, Technique, Slip, Plastic, Leather hard, Bisqueware,

Bronze

Claywork

... understand what 'ceramic' means.

... understand that clay can be used as a medium for artwork.

... understand how to make simple shapes using clay.

... select appropriate colours for an industrial style relief.

The 6 Stages of Clay

1. SLIP
Watered down clay that can be used as a pottery glue

2. PLASTIC
Clay you can easily shape and model.

3. LEATHER HARD
Clay that has dried and is good for carving.

4. Bone Dry
Clay that is dry and ready to be fired. Very fragile, also called greenware.

5. BISQUEWARE
Clay that has been fired once in the kiln. It cannot be turned back into wet clay.

6. GLAZEWARE
Clay that has had glazes and glass added to it and has then been fired again in the kiln.



The six stages of clay

Ceramic means that the item is made of clay and it is permanently hardened by heat.

Relief is a sculptural technique where the sculpted elements remain attached to a solid background of the same material. The term **relief** is from the Latin verb relevo, to raise. To create a sculpture in **relief** is to give the impression that the sculpted material has been raised above the background plane (surface).



A **relief** is a wall-mounted sculpture in which the three-dimensional elements are raised from a flat base.



Chris Gryder



Rachel Dein



Natalie Blake

Artist who have used clay as a material to produce their artwork.



Yr11 Sealife project where clay was used as a material to produce artwork.

Clay Techniques: Slip, Score and Blend



Antoni Gaudi



Clay Relief

Glazes



Tivoli red glaze



Sea green glaze



Fiord blue glaze



Gold brown glaze



Iron oxide



Slip



Modelling Simple Shapes



Tile work



Bone dry



Plastic

Computing



Read through your knowledge organiser. Next, cover it up or put it away and try to write down as many of the key facts that you can remember. Use your knowledge organiser to check the facts you have written down. Correct any you may have got wrong.

Computing Year 9 Unit: Cybersecurity

Threshold concept—

- Understand the difference between data and information
- Understand the basics of the legislation which relate to computers
- Understand some threats and prevention methods which can be used in Cybersecurity

Keyword	Definition
Data	Facts and statistics collected together for reference or analysis.
Information	Facts provided or learned about something or someone
Data privacy	Intended to keep data safe against improper access, theft or loss
Data Protection Act	Controls how your personal information is used by organisations, businesses or the government
Hacking	The gaining of unauthorised access to data in a system or computer.
DDoS	A denial of service technique that uses numerous systems to perform the attack simultaneously.
Computer Misuse Act	An Act to make provision for securing computer material against unauthorised access or modification
Brute force attack	A brute-force attack consists of an attacker submitting many passwords or pass-phrases with the hope of eventually guessing correctly.
Malware	Software that compromises the operation of a system by performing an unauthorised function or process.
Malicious	Intending or intended to do harm.
Network	One or more computers connected together

Data

Data is just facts and figures:

Man City 1
Liverpool 2
Chelsea 3

Information

Information is created when that data is given context:

These are football teams that play in the premier league and their positions in the league table.

Viruses



Common ways to catch a computer virus:

- Downloading it from an email attachment
- Clicking on a webpage pop-up window without reading it
- Downloading files from illegal websites

Data Protection Act (2018)



Organisations must use data:

- Fairly, openly and in accordance with the law
- For a specific and stated reason
- Only in a way that is necessary and sufficient for the purpose for which it was collected
- Which is accurate and up to date
- Only for as long as it is needed

They must also protect data from loss, damage, and unauthorised access.

The Computer Misuse Act (1990)

Makes it illegal to:

- Gain unauthorised access to computer material
- Gain unauthorised access to computer material with intent to commit or facilitate other offences
- Impair the operation of a computer without the authorisation to do so

Types of hackers

Unethical hackers



Gain unauthorised access to or control of a computer system.

Reasons someone might do unethical hacking:

- To steal data
- To disrupt services
- For financial gain
- For political reasons
- For fun

Ethical hackers



Gain access to a computer system with the permission of its owner to help them identify vulnerabilities in their computer systems.

Companies pay penetration testers to hack into their computer systems and tell them how to improve the security of their computer systems. These penetration testers are ethical hackers.

Case study: WannaCry

In 2017, the WannaCry ransomware spread globally through computers running Microsoft Windows. Many organisations were impacted from hospitals to schools, banks and charities.



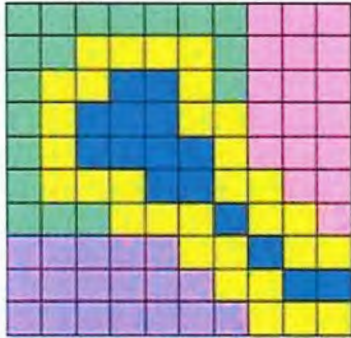
Computing Year 9 Unit: Media— Photo Editing

Threshold concept—

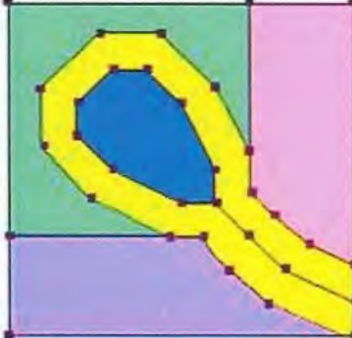
- Understand what a real-world problem is.
- Draw basic vector shapes
- Understand what the purpose of a vector graphic is

Keyword	Definition
Graphics	Graphic refers to a design or visual image displayed on a variety of surfaces, including canvas, paper, walls, signs, or a computer monitor. They are created for entertainment, branding, or providing information.
Pixels	Small squares which make up a graphic
RGB	Red Green Blue
CMYK	Cyan Magenta Yellow Black
Toolbar	Holds the many tools we have to work with. There are tools for making selections, for cropping and re-touching images, for adding shapes and type, and many more!
Layer	layering is stacking various images, graphics, or text on top of one another.
Filter	Filters are digital effects used to modify images and selections to create effects, repair images, and move pixels.


Bitmap vs Vector




BITMAP



VECTOR



Images are represented pixels (Picture Elements).
TVs and monitors produce pixel colours using Red, Green and Blue light (RGB)
All screen colours can be produced just from RGB



Printed media pixel colours are produced from Cyan, Magenta and Yellow ink (CMY).
It is very difficult to colour match between CMY and RGB

Common vector image file types		
File Type	Advantages	Disadvantages
.EPS (vector)	Most common vector type Standard for sharing in print publishing industry	Not widely supported in editing software Generally Adobe only software
.SVG (vector)	Scalable without image quality reduction International standard for vector graphics High quality printing possible	Not widely supported in software Files sizes can be large wit many elements
.PDF (vector)	Widely supported by many devices Free to view PDF files Small file size	Not free to edit PDF files Text difficult to edit, text is treated as images

Vector Drawing

- Vector drawings are computer graphic images that are made using 2-D shapes.
- The drawings are connected by lines and curves to form polygons and other shapes, forming a complete picture.
- There are lots of different apps and programs that can help us to complete vector drawings, including Google Drawings and Adobe Illustrator.
- Many techniques, e.g. zooming, rotating, resizing & duplicating, can help to create accurate images.

Design and Technology



You can make your own questions. This process takes a lot of time, but if you create a study group you can each create a few questions and trade. However it is important that you write what Key facts or knowledge you expect to see in any answer.

- Threshold Concept
- To recognise there are different types of forces and these can effect the way a structure is designed to prevent failure.
 - Materials are chosen for their physical and mechanical properties.
 - How successful a structure is depends on how it is designed, constructed and used.

There are 4 types of structure:

- Man made
- Natural

- Frame
- Shell

Any structure can be described using a combination of these



A Natural Frame Structure



A manmade Shell Structure



A Natural Shell Structure



A Manmade Frame Structure

All Structure do the following things:

- They Support something (Like a Pillar)
- They Span a Distance (Like a bridge)
- The Enclose a space (like a house)
- The Protect something (Like a car)

Using this information can you?

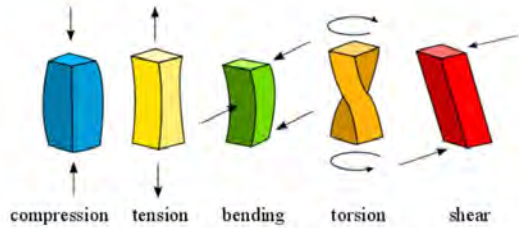
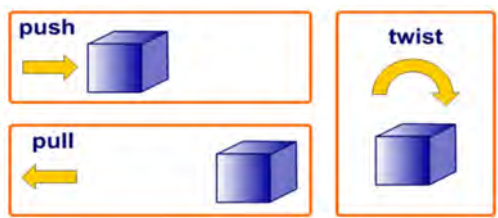
- Define what a structure is
- Name the different types of structure



You should be able to use this knowledge to describe any structure. eg A house is a manmade shell structure to protect people from the weather or a Tree is a natural frame structure to support leaves.

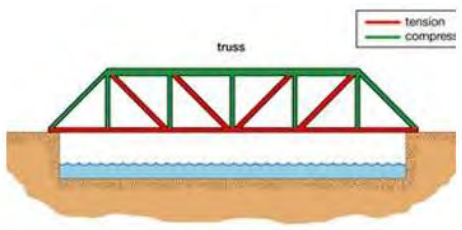
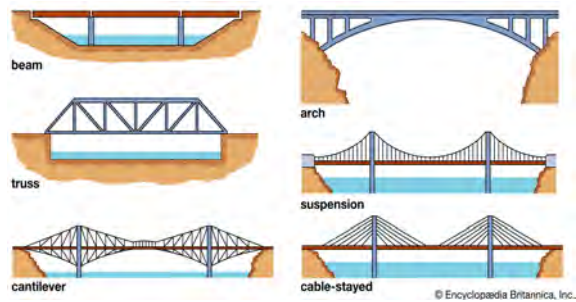
External forces are those that act on a structure to try and make it move. There are three basic forces Push, Pull and Twist. It can be hard to see forces acting on something but you can see the affect

When the forces that push, pull or twist act on structure they can force that structure to change or undergo stress we use more technical language than just push, pull etc. We use language that refers to the effect (the internal forces) rather than the action



A bridge is a Manmade, frame structure that spans a distance. There are many different types of bridge that all work in different ways

Understanding how forces act on a structure let us design bridges that can support a great deal of weight.



The parts in tension will have to be able to resist being stretched and those in compression will have to resist being squashed.



Material Properties

Each material has properties that make them good for specific tasks, eg cotton is **lightweight** and **absorbent**. The properties of materials must be considered when designing a product, eg a steel pan handle would **conduct** too much heat and burn the user, whereas beech would be more appropriate as it is **tough** but a poor **conductor** of heat

These are some examples of material properties you would need to know

- Conductivity.
- Corrosion Resistance.
- Density.
- Ductility / Malleability.
- Elasticity
- Toughness.
- Hardness.
- Plasticity



Unit guiding question: How can we share design ideas with other people?



Follow this Link to tutorials on the Telford Langley School D&T YouTube channel.

The threshold concept that is truly essential to enable you to access future learning is ...

To understand that ideas can be graphically communicated to other people.

To understand that appropriate 3D drawing techniques can enhance design ideas

To understand that Computers can streamline the design process.

You Will:

- Be able to add simple notes and labels on designs.
- To recognise the different styles of 3D drawing commonly used.
- To be able to use basic rendering techniques.
- To know what CAD is.
- To be able to use CAD to produce simple shapes
- To be able to use drawings and CAD to produce a simple design



The only two angles you need in isometric drawing are 30 degrees and 90 degrees. You never draw horizontally.

A grid is used to help you draw. Staying on the grid lines makes sure you are drawing at the correct angles.

There are different ways to



Perspective drawing



Oblique

Isometric drawings do not attempt to show any perspective at all. This means that dimensions and proportions are shown accurately.



Isometric

Enhancing drawings. Tone is used to enhance 3D drawings. Tone is how light or dark something is and by showing shadows and highlights we can make drawings look more realistic and 3 dimensional.



Line Drawing



Coloured



Rendered using shade and tone



THICK AND THIN LINE TECHNIQUE

Applying thick and thin line technique to a drawing is one of many ways that a designer can enhance the form (shape) of a design drawing.

Look carefully at your drawing and imagine a spider walking over the shape.

If the spider is able to disappear around an edge, then this edge will be drawn with a thick line.

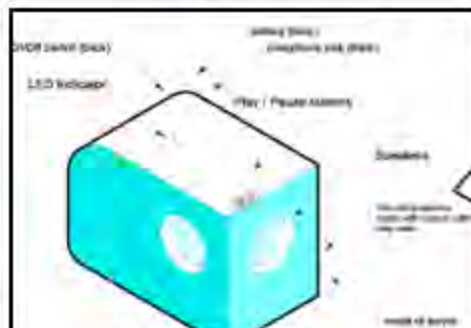
If the spider is still visible once it has crawled over an edge, then this edge will be drawn with a thin line.

TASK

Go back to the three isometric drawings you did and add thick and thin lines. Try adding a hole to one of them.

Top Tip!

Follow the spider and make sure the thick lines are correct before you put them in.



Computer Aided Design

(CAD) is used to make more accurate drawings and **ANNOTATION** is added to describe parts of our designs and communicate our ideas.



Threshold Concept:

Different food costs different amounts.



All around the world, people choose to eat different food for many different reasons. One very important factor for most people is the cost of the food. There are ways we can cut down on food bills:

- ✓ If the food has been grown or reared locally, travelling and storage costs are reduced
- ✓ Check the price difference between value brands and premium products.
- ✓ Check out the price per 100g or per 100ml when choosing food
- ✓ Check the frozen and canned vegetable section and buy items that are cheaper so you always have a variety in the freezer and the cupboard.
- ✓ Bulk buy meat and fish and freeze in smaller portions until you are ready to use them. Take time to plan your meals and then compile a shopping list of everything you need.
- ✓ Using leftovers is a great way to save money and reduce food waste.



The way food is prepared and made, along with customs, and the use of local and seasonal ingredients, often combine to create dishes unique to a particular region. Understanding about global cuisine not only allows us to enjoy a huge range of styles and flavours, but also encourages dialogue around culture and inclusivity.

Threshold Concept:

Food is produced all around the world and that different countries and cultures eat different foods



Threshold Concept:

Allergies to food and food intolerances can cause a person to become unwell and that all prepacked food requires a food label that displays certain mandatory information.

Most people can eat food, without any problems, although they may have different likes or dislikes that influence what they choose. However, some people react to certain food and eating them may cause uncomfortable symptoms or, in rare cases, a severe illness. Food intolerance is the general term used to describe a range of adverse responses to food, including allergic reactions, adverse reactions resulting from enzyme deficiencies, pharmacological reactions and other non-defined responses. Allergy sufferers are protected by Natasha's Law, requiring food businesses to include full ingredients labelling on pre-packed for direct sale foods. This information helps people that have food allergies, intolerances or dietary needs to make safe and informed choices when they are choosing food items.

Threshold Concept:

Wasting food has environmental and economic



Every year in the UK, seven to ten million tons of food are wasted. It is thought that approximately 50% of the food wasted is still edible. The cost of food waste is significant – estimates show that it costs an average family £700 per year. Reducing the amount of food consumers waste not only has financial benefits but also environmental benefits. There are many ways in which consumers can help reduce food waste when buying food, cooking and storing food.

Threshold Concept:

There is a dependent relationship between diet, nutrition and health.




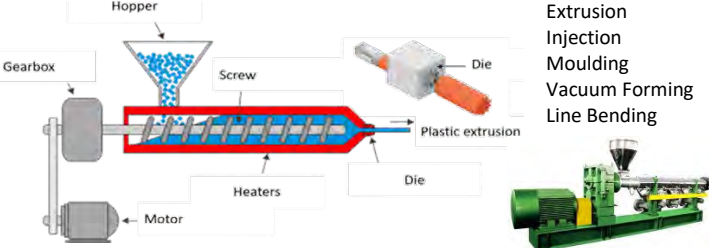

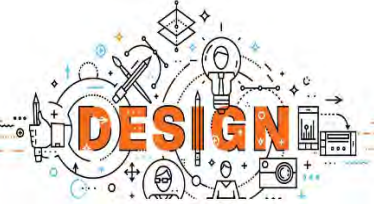








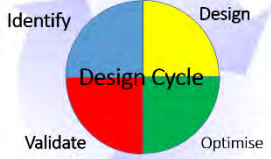







Poor diet is now the biggest risk factor for preventable ill health in England. A healthy diet helps children grow and develop properly and reduces their risk of chronic diseases. Adults who eat a healthy diet live longer and have a lower risk of obesity, heart disease, type 2 diabetes, and certain cancers. as well as affecting our physical health, what we eat may also affect the way we feel. Improving your diet may help to: improve your mood, give you more energy and help you think more clearly.



Year 9 Knowledge Organiser – Design and Technology - Resistant Materials

To understand Plastic is an important and key material used in everyday life

Understand that Plastic comes in many different types and can be used to manufacture a wide range of products

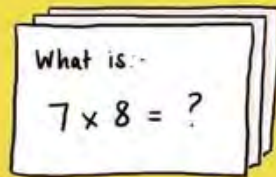
Subject Area	Required Knowledge - Bronze		Links
	<p>Materials knowledge:</p> <ul style="list-style-type: none"> Know the 2 main groups of Plastic and that it is sourced from Crude Oil To know plastic is suited to a variety of manufacturing processes Know there is a third group of plastic called BIO plastic 	 <p>Extrusion Injection Moulding Vacuum Forming Line Bending</p>	 <p>SCAN ME</p>
	<p>Iteration Design process:</p> <ul style="list-style-type: none"> Understand a design brief is a list of customer requirements Can improve their design ideas by analysing its strengths and weaknesses Describes their design work in detail using annotation Understand how evaluation helps the design process. 	<p>A is for Aesthetics </p> <p>C is for Cost </p> <p>C is for Customer </p> <p>E is for Environment </p> <p>S is for Size </p> <p>S is for Safety </p> <p>F is for Function </p> <p>M is for Material </p> 	 <p>SCAN ME</p>
	<p>Practical skills:</p> <ul style="list-style-type: none"> Use CAD to draw their design accurately Understand that CAM is used for manufacturing To model their idea using card prototypes produced using CAD/CAM To understand how Line Bending is used to form shapes from plastic 		 <p>SCAN ME</p>
	<p>Environmental.</p> <ul style="list-style-type: none"> Understands the potential effect extracting, processing and disposal of plastics can have on the environment Understand the benefit of recycling plastic products to reduce the demand on crude oil 		 <p>SCAN ME</p>

	<ul style="list-style-type: none">• Understand that Crude Oil is not sustainable as a source for manufacturing• To understand the 6R's		
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Drama

FLASHCARDS

Create your own flashcards, question on one side answer on the other. Can you make links between the cards?



You need to repeat the Q&A process for flashcards you fail on more frequently & less frequently for those you answer correctly

Create a flash card with all the key facts you want to learn (this can be drawn in your book). On the next page try writing down as many facts or as much of the knowledge as you can. If you find you are getting certain facts wrong then these are where you need to focus and relearn.

DNA – Denis Kelly

The script provides essential information to the actor and technical department. It suggests stage directions, pauses and the style of emotion the character should move or speak in. For the technical team, it prompts any lighting, sound or stage direction that is needed for the scene.

Director is responsible for the practical and creative interpretation of a script. They oversee the whole production.

A. Storyline

DNA was written in 2007 and is set in the early 21st Century. It's about a group of teenagers, who could be described as a 'gang' who have accidentally killed one of their classmates. When they realise their mistake, they try to cover up the crime but inadvertently implicate an innocent man.

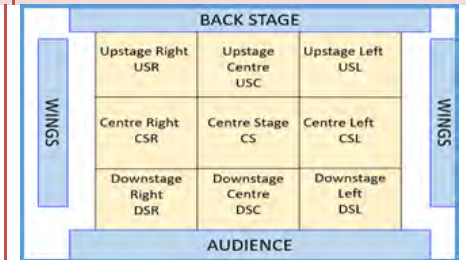
B. Themes

Bullying - The most obvious character who is bullied is Adam which happens before the beginning of the play and seemingly has caused his death. However, it is worth considering who the main bullies are and what types e.g. verbal, mental and physical.

Gangs – Adam is not only desperate to be part of the gang, but consider what the others are prepared to do to stay in the gang.

Power – There are numerous power struggles within the play and it shifts throughout. It is Cathy that ultimately takes on the role as gang leader in the end, we should consider why? Other themes are responsibility, violence, fear and friendship

C. Stage Positions



D. Characters

<u>Mark and Jan</u>	<u>Leah</u>	<u>Phil</u>	<u>Lou</u>	<u>John Tate</u>	<u>Danny</u>	<u>Richard</u>	<u>Cathy</u>	<u>Brian</u>	<u>Adam</u>
Mark and Jan act as narrators who explain what is happening. They are always together and help in the cover up.	Leah is a moral character who worries about the groups actions. She is insecure and seeks Phil's attention.	Phil is the group's leader for most of the play. He's quiet, emotionless, and manipulative.	Lou worries about the group getting caught. She follows whoever is in charge.	John Tate starts as the group leader, but his authority is weak, and he leaves early in the play.	Danny is a selfish character who is more worried about becoming a dentist than Adam's wellbeing.	Richard seems unhappy about the cover up, but he goes along with it. He challenged John Tate's leadership.	Cathy is violent and remorseless about Adam's death. She helps to kill Adam after he reappears.	Brian is the weakest group member. He's bullied into covering up Adam's death and he suffers a mental breakdown as a result.	Adam is bullied by the group and thought to be dead. He turns out to be alive, but Phil has him killed.

E. Types of Theatre



In The Round— the audience sit around the stage on all sides. Performers enter and exit through the audience on walkways.



Thrust stage sticks out into the audience, who sit on three sides. There is a back wall that can be used for hanging backdrops and large scenery.



Proscenium Arch— describes the frame that surrounds the stage. All the audience face the same way. The stage is raised. The seating is often tiered.

F. Vocal

Types of volume: Whisper, quiet, talking, loud, shouting.
Types of Pitch: Low, medium, high
Pause: Stillness in a scene or dialogue
Pace: Speed of dialogue
Tone: Emotionally influenced dialogue
Emphasis: Putting importance on a word

G. Physical

Gestures: Using movement to express emotion or direction
Facial expressions: Used to show emotion
Body language: Use to show the character profile/emotion
Levels: Used to show status/hierarchy
Gait: Character walk
Eye contact: Between actors/audience
Proxemics: Space between actors/audience

H. Performance Skills

Cross-cutting: To show contrast on stage.
Freeze Frame: To highlight a key moment.
Narration: To give the audience information about the story
Thought track: To give the audience information about a character
Direct address/aside: Speaking directly to the audience out of the scene
Multi-rolling: Playing more than one character

English

QUIZZING

Create practice questions on a topic. Swap your questions with a partner & answer.

Question - What is a metaphor?

- A comparison using 'like, as, than'.
- A comparison where one thing is another.
- A comparison with a human attribute.

You can make your own questions. This process takes a lot of time, but if you create a study group you can each create a few questions and trade. However it is important that you write what Key facts or knowledge you expect to see in any answer.

Threshold Concept- Year 9- Dr. Jekyll and Mr Hyde:

TC1 - Understanding texts

TC2 - Demonstrate an appreciation of the writer's craft through analysis and critically evaluative comments.

TC3 - Understanding the relationships between texts and the contexts in which they were written.

A plot and character summary of 'Dr. Jekyll and Mr Hyde:' Full text (if on MS Teams) = [Jekyll and Hyde Full Book.](#)

THE CHARACTERS

- Dr Henry Jekyll**
Can this respectable doctor resist the strange powers of Mr Hyde?
- Edward Hyde**
Who is this man and what is the mysterious hold he has over Dr Jekyll?
- Mr Utterson**
Mr Utterson is Dr Jekyll's friend and lawyer. Can he solve the mystery? Can he save his friend?
- Richard Enfield**
What information does Richard Enfield possess? Will he save or condemn Dr Jekyll?
- Poole**
Poole is Dr Jekyll's faithful butler. Can he save his master from himself?
- Dr Hastie Lanyon**
Dr Lanyon witnesses a terrifyingly strange event. How will he react?
- Inspector Newcomen**
Inspector Newcomen is one of Scotland Yard's finest. Can he discover Edward Hyde's true identity, and solve a brutal murder?

Using this information can you:

- Recount what happens from start to finish in the novella?
- Explain who the primary characters are, and what makes them unique?

You should use this information to get the base knowledge needed for R.L. Stevenson's story.

E.g. Edward Hyde has a hold on Dr. Jekyll ; he is mysterious and murders Carew and goes missing.

How to analyse the writer's craft- break the quotation up into smaller chunks. Example on Hyde.

with ape-like fury, he was trampling his victim under foot and hailing down a storm of blows

Ape-like = adjective and simile.

Reflects Hyde is an unevolved form of human being. He is overly aggressive, less intelligent and uglier than the normal human. His animalism is also captured in this comparison.

Verb: Trampling - suggests Hyde tries to overpower his victims physically (he is trying to walk all over them). It shows his lack of respect for people as he treats them like dirt under his shoe.

Pathetic fallacy- Hyde's assault is compared to hail - a physically painful weather. By comparing him to a storm, it suggests Hyde's violence is never ending. It may also suggest Hyde creates storms in the lives of others - he creates depression and fury in other people too.

In order to be successful, **you must know a range of different moments** from the whole story. For example, other moments where Hyde is important include:

- Hyde's introduction in Story of The Door. "damned Juggernaut"
- Utterson meets Hyde. "Satan's signature upon a face."
- Hyde's death at the end. "red door."

The relationships between Jekyll and Hyde and the historical context in which they are written.

Scientists robbed graves to do experiments on dead bodies- led to a shortage of corpses in Britain.

Mary Shelley wrote story about mad scientist who does experiments to bring dead bodies back to life (plays God).

INSPIRED

Religious writer creates a story about a scientist playing God and doing harmful experiments on himself.

Look out for other parts of the novella clearly inspired by the outside world. i.e. born gentleman, Deacon Brodie, Stevenson's family and their jobs.

Threshold Concept- Year 9- Writing stories:

TC5 - Communicate clearly, effectively, and imaginatively, selecting and adapting tone, style and register for different forms, purposes and audiences.

TC6 - Organise information and ideas, using structural and grammatical features to support coherence and cohesion of texts

TC7 - Use a range of sentence structures for clarity, purpose and effect, with accurate punctuation and spelling.

Imaginatively writing- use ambitious vocabulary and techniques and come up with an original idea by avoiding cliché!

When writing stories- be as ambitious as possible with your vocabulary and techniques.

Example 1- too simple and safe:

The sky was black and the air was cold. It was scary and I was afraid to be alone in the dark.

Example 1- an improvement:

The sky was a deep crimson and the freezing air gnawed at my whitened cheeks. It was intimidating; the idea of being isolated terrified me.

When planning and writing stories, ask yourself these questions:

- Which stories (books/TV/film/games) do I read/watch/play that inspire me?
- Do I know and regularly use a good range of story writing features, like similes metaphors and personification?
- Do I use the best possible vocabulary in my work to impress my reader?



Avoiding cliché.

An idea that is overused and shows a lack of original thought.

Common settings	Common characters	Common events
-Forests -Parks -England?	-Teenagers, -Narrators with no personality/appearance, -Creepy kids.	-Being chased, -Murdering, -Hauntings.

Don't use these! Think of uncommon settings/characters and use these instead. Your story will stand out far more for the right reasons!

Teenager in a forest X
Elderly explorer up mountain ✓

Use this structure to write a coherent story in the 40 minutes you get.

Don't overcomplicate your story. Try to avoid having more than

- ✓ 1 setting/timeframe,
- ✓ 2 characters,
- ✓ 1 incident.



Make your plot simple, instead be ambitious with your language choices.

Easy story structure- SCIT.

Section 1: Describe the **SETTING**. (detail)

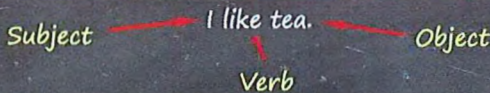
Section 2: Describe the main **CHARACTER**. (detail)

Section 3: Describe ONE **INCIDENT**. (short)

Section 4: Describe how the setting/character has **TRANSFORMED** by the event. (detail)

Sentence Types

Simple Sentences = 1 clause.



Compound Sentences = 2+ clauses joined by conjunctions (FANBOYS).

I like tea and I like coffee.

For, And, Nor, But, Or, Yet, So

Complex Sentences = main clause & subordinate (dependent) clause.

Although it was late, I wasn't tired.
(Subordinate clause) (Main clause)

Punctuation Marks

Full Stop • to end of a sentence	Comma , to separate items in a series	Colon : to introduce a list	Semicolon ; to join independent clauses
Question mark ? to end a question	Hyphen - to form compound words	Exclamation ! to end an exclamation	Apostrophe ' to show ownership / contraction
Quote " " at quote what others said	Brackets () to add additional information	Ellipsis ... to show words have been missed out <small>nagaRAJU</small>	

SPELLING MISTAKES IN ENGLISH

5minuteslanguage.com

✗	✓
accommodation	accommodation
across	across
adress	address
argument	argument
beginning	beginning
believe	believe
commitment	commitment
definitely	definitely
embarrass	embarrass
existence	existence
fourty	forty
greatful	grateful
immediatly	immediately
independence	independence
knowledge	knowledge
managable	manageable
millenium	millennium
necessary	necessary
noticable	noticeable
ocassion	occasion
oportunity	opportunity
preceeding	preceding
priviledge	privilege
pronounciation	pronunciation
recieve	receive
seperate	separate
surprise	surprise
tomorrow	tomorrow
truely	truly
wierd	weird

When writing stories try to use:

- All of the sentence types above, and some 1-word sentences, too!
- All of the punctuation marks above in an accurate fashion.
- Correct capital letters and spelling- avoid needless mistake.

Literacy





Sparx Maths



Make sure you are regularly testing your knowledge using the resources provided by the school on platforms such as Sparx, Educake and Linguascope. You will have been issued with user names and passwords to access your accounts.

Literacy Knowledge Organiser

<u>Key Punctuation</u>	
<p>Full Stop </p> <p>Full stops are used at the end of a statement.</p>	<p>Question Mark </p> <p>Use these to indicate a question is being asked.</p>
<p>Comma </p> <p>Use commas in lists and to separate extra information.</p>	<p>Apostrophe </p> <p>Use apostrophes to show possession or missing letters.</p>
<p>Colon </p> <p>Use this to introduce a list or to join two parts of a sentence.</p>	<p>Semi-colon </p> <p>Use this to join two closely related, equally important parts of a sentence.</p>
<p>Exclamation Mark </p> <p>Use this to emphasise strong feelings such as shock, surprise or anger.</p>	<p>Brackets </p> <p>Use these to add extra, non-essential, information to a sentence.</p>


<u>Frequently Misused Words:</u>	
	
Alot	A lot
Would of	Would have
Eachother	Each other
Aswell	As well
Inbetween	In between

<u>Homophones</u>	
<p>There – Place or position.</p> <p>Their – belonging to them.</p> <p>They're – They are.</p>	<p>Where – Place or position.</p> <p>Were – Plural past tense of 'to be'.</p> <p>We're – We are/We were.</p>

<p>To – Preposition to show motion.</p> <p>Too – Adverb meaning 'also'.</p> <p>Two – Number.</p>	<p>Your – belonging to you.</p> <p>You're – You are.</p>
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Spelling Strategies


Pictures

H +  ear = hear

Other versions of the word

definite, finite, finish

Invent Mnemonics

Accommodation = Cosy Cottages; Magnificent Mansions 

Necessary = 1 collar, 2 socks 

Word origins


satis – enough

bicycle – two wheels

Critical self-checking

Does it look right?

Dictionary



Look,
Say,
Cover,

Syllables

Ad - ver - tise - ment

Words within words

business –
bus in ess
separate –
there's a rat in separate

Write,
Check

Letter Pattern Links

light bright sight
fight might

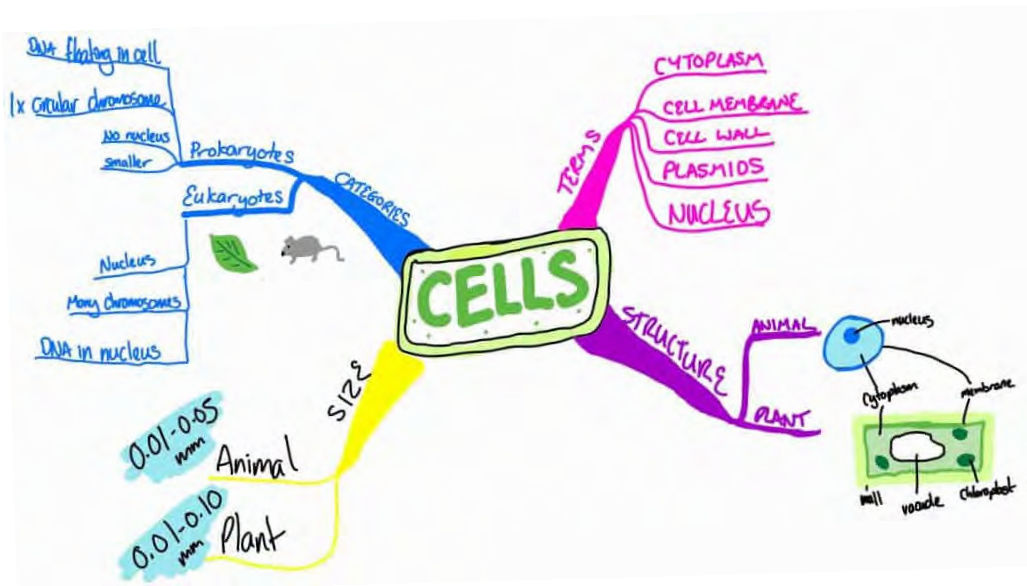
Parts of a sentence: subject, verb, object.	Examples: Every sentence must have a subject and verb.
subject: the person or thing carrying out the action. object: the person or thing that receives the action of the verb.	John ran to the shops. The opera was sung by the soprano.
Active Voice: When the subject of a sentence performs the verb's action, we say that the sentence is in the <i>active voice</i> .	Passive voice: When the subject is acted on by the verb. The passive voice is always constructed with a different form of <i>to be</i> plus the verb's past participle and contains <i>by</i> .
Arthur read an interesting novel.	An interesting novel was read by Arthur.
The progressive tense: a verb tense used to show an ongoing action in progress at some point in time.	Examples: The verbs in the progressive form use a form of "to be" + the present participle (an -ing verb).
Past progressive: contains was, were + an -ing verb.	She was playing football. We were eating dinner.
Present progressive: contains is, are, am + an -ing verb.	He is reading a book. They are making a cake. I am painting a picture.
Main clause: a clause that can form a complete sentence standing alone. Contains a subject and verb. If the main clause comes first no comma is needed.	Subordinate clause: a clause, typically introduced by a subordinating conjunction, that adds extra information and cannot stand alone.
I still had energy for my lessons.	I still had energy for my lessons even though I cycled to school.
I crept inside the room.	Although I was feeling scared, I crept inside the room.
Synonyms: words that have the same or similar meanings.	Antonyms: words that have the opposite meaning
talk-speak big-large	hot-cold light-dark

Hyphens: are used to combine words that have a combined meaning or are linked in the grammar of a sentence. They help avoid confusion.	Examples: three-year-old rock-forming minerals long-term
Man eating shark- suggests the man is eating shark.	Man-eating shark – suggests the shark eats man.
Semi colons, colons and dashes can be used to separate boundaries between two clauses.	Example:
Semi colons(:) separate two main clauses and are normally used instead of a coordinating conjunction.	Some people like sweets; others like chocolate.
Colons(:) are used to introduce related information.	He was missing two things: his hat and his coat.
Dashes- can be used in place of a colon when you want to emphasize the conclusion of your sentence.	The house rule is simple- clean up after yourself.
Semi colons, colons and bullet points can also be used in lists.	Example:
Semi colons(:) they are also used to separate items in a list that contain commas already.	My dream band would be: Ray, vocals; Arthur, guitar and backing vocals; Rifat, bass; and Tom, drums.
Colons(:) they are also used to present a list.	I ordered the following: eggs, beans, sausage, bacon and a cup of tea.
Bullet points. make a list easier to read. There are no capital letters or full stops needed.	Remember to: <ul style="list-style-type: none"> • wash up everything in the sink • dry the dishes with the towel • pack everything away on the shelf
Subjunctive form: it is used to express wishes, hopes, commands, demands or suggestions. Usually it is the third-person form of the verb with the -s dropped, but the verb to be is a special case.	Example: I wish I were able to fly. It is vital that she attend the meeting. If I were you, I'd accept the offer. I demand that they be counted again.

Simple tenses		Example	Perfect tense	Example
Past - when an action took place at a specific time and is <u>now finished</u> .		I <u>walked</u> into the monster's cave.	Past perfect - is used to say when an action was completed in the past. The past tense of 'to have' + past participle of verb.	I had walked in the monster's cave.
Present - when an action is taking <u>place now</u> .		I <u>walk</u> into the monster's cave.		
Future - when an action will take place <u>in the future</u> .		I <u>will walk</u> into the monster's cave.		
Progressive tenses		Example	Present perfect - is used to say when: 1) An action has recently finished using 'just', 2) An action that has started in the past and is still going. 3) The time period has not finished. 4) When the time period is not important or known. 5) The action is repeated in a period between the past and now. The past tense of 'to have' + past participle of verb.	I have just walked in the monster's cave. I have worked in the bank for five years. I have not seen her today. I have studied French, Russian and German. I have eaten at that restaurant several times.
Past progressive - used for a continuous action in the past. The past tense of 'to be' + present participle of the verb (verb ends in -ing).		I was walking in the monster's cave. He/She was ... You/We/They were ...		
Present progressive - used for an action that is happening at the moment of speaking. The present tense of 'to be' + present participle of the verb (verb ends in -ing).		I am walking in the monster's cave. He/She is ... You/We/They are ...		
Future progressive - used for an action that is will be continuing in the future. The present tense of 'to be' + present participle of the verb (verb ends in -ing).		I will be walking into the monster's cave. He/She will be ... You/We/They will be ...		

Word class: Nouns		Word class:	
Proper noun - name, place, month- always starts with a capital letter	e.g. John, South Woodford, March <u>James</u> went to the supermarket.	Adjective - describes a noun	e.g. blue, small, gentle The <u>white</u> snow blanketed the floor.
Concrete nouns - things you experience through your five senses	e.g. table, pencil, chocolate, music In my bag I have many things including an <u>apple</u> .	Verb - an action, state or occurrence	e.g. run, was, work The sun <u>is</u> hot so I <u>play</u> in the garden.
Abstract nouns - ideas and concepts; you can't touch them	e.g. truth, justice, anger I feel <u>hope</u> for the future.	Adverb - modifies the meaning of an adjective, verb or other adverb.	e.g. slowly, regularly, soon I liked the cuddly rabbit <u>best</u> .
Pronoun - replaces a proper noun or common noun	e.g. he, she, they, it John had a bookmark; <u>he</u> used it in his book.	Expresses manner, place, time or degree	
Collective noun - a noun that refers to a group of individuals	e.g. herd, class, pack A <u>gaggle</u> of geese were at the pond.		
Word class: Determiner	A modifying word that determines the kind of reference a noun or noun group has	Word class:	
Article - tells us the definite or indefinite	e.g. a/an, the <u>The</u> tree is beautiful in autumn.	Prepositions - show the relationship between the noun or pronoun and other words in a sentence. They describe, for example, the position of something, the time when something happens, or the way in which something is done	e.g. after, in, with He moved here <u>after</u> the end of the war.
Quantifier - indicates quantity	e.g. few, many, some <u>Lots</u> of fun was had at the party.		
Possessives - indicates who it belongs to	e.g. my, its, his That is <u>her</u> coat.	Co-ordinating conjunction - a conjunction placed between words, phrases, clauses, or sentences of equal importance (main clause)	e.g. for, and, nor, but, or, yet, so I like chocolate <u>but</u> I don't like sweets.
Demonstratives - points to something specific	e.g. this, that, those <u>These</u> computers are for sale.	Subordinating conjunction - a conjunction that introduces a subordinating clause	e.g. while, since, although I went to the cinema <u>after</u> I had eaten my dinner.
Numbers - tells us how many	e.g. one, two, three <u>Seven</u> dwarves accompanied Snow White.		

Geography

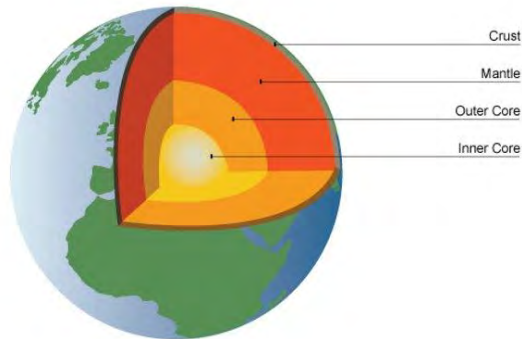


Organise your ideas into a concept map, like the one below that summarises 'cells'. In a concept map, you take the main ideas and link them together with phrases that explain the relationship between the concepts. But, always try to make the concept map from memory first! Then check it with the knowledge organiser

Tectonics Knowledge Organiser

Structure of the Earth

The Earth has four main layers - the **inner core**, the **outer core**, the **mantle** and the **crust**.



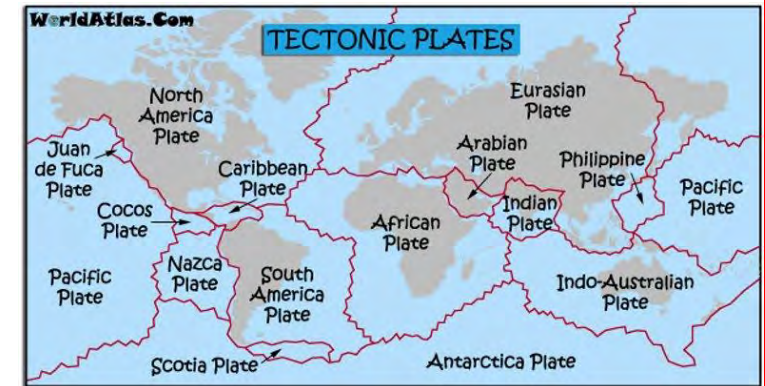
- The **inner core** is extremely hot and is a very dense solid.
- The **outer core** is 2,000 km thick and is a liquid.
- The **mantle** is semi-molten and about 3,000 km thick.
- The **crust** is the rocky outer layer; it is thin compared to the other sections, approximately 5 to 70 km thick.

Plate tectonics

Plate margin: where two or more plates meet

Convection currents: movement within the Earth's mantle caused by the heat of the core

The Earth's crust is broken up into huge slabs called plates. The plates float on the mantle and are constantly moving by **convection currents**. When these plates move, they bump into, move away from, or rub up against other plates at the **plate margins**. How these plates move in relation to other plates dictates what type of plate margin it is and helps us understand what types of hazards will occur there.



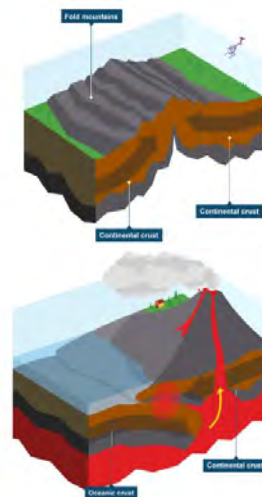
Constructive plate margin

A constructive plate margin occurs when **plates move apart**. Volcanoes are formed as magma wells 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.



Destructive plate margin

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 buoyant 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 margin

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

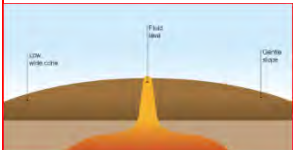
Friction is eventually overcome and the plates slip past in a sudden movement. The shockwaves created produce an earthquake. **E.g.** The North American and Pacific plates forming the San Andreas Fault in California.



Tectonics Knowledge Organiser

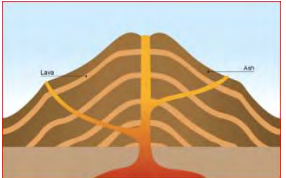
Volcanoes

Volcanoes are vents to the interior of the planet - they allow magma from the mantle to spill out as lava onto the Earth's crust. There are 2 types of volcanoes, shield and composite.



A **shield volcano** has gently sloping sides and runny lava that covers a wide area.

A **composite volcano** is steep sided and cone-shaped, it is made up of layers of ash and lava. The lava is sticky so it does not flow far.



Case Study: Iceland



This volcano began erupting lava on 20th March 2010.

Impacts of the eruption include:

- Melting of large amounts of ice which led to flooding in Southern Iceland
- Ash from the volcano contaminated their local water supplies
- All over Europe airplanes were grounded until the air cleared
- The ash deposited iron into the North Atlantic triggering a plankton bloom

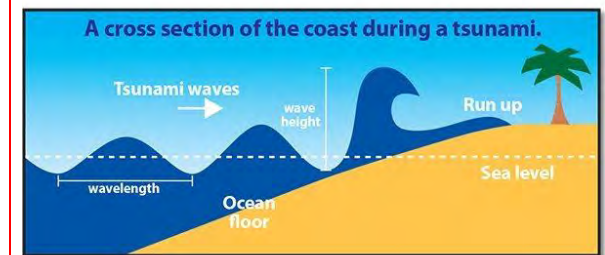
Earthquakes

Earthquakes are the sudden violent shaking of the ground. This happens because the Earth's plates are constantly moving. Sometimes, because of **friction**, plates try to move and become stuck. **Pressure** builds up because the plates are still trying to move. When the pressure is released, it sends out huge amounts of **energy** causing the Earth's surface to shake violently. The point inside the Earth's crust where the earthquake originates from is known as the **focus**. The earthquake's energy is released in **seismic** waves and they spread out from the focus. The **epicentre** is the point on the Earth's surface directly above the focus. The seismic waves are most powerful at the epicentre.



Tsunami

Tsunami is a Japanese word which means 'harbour wave'. A tsunami is a large sea wave caused by the displacement of a large volume of water. They can be caused by earthquakes triggered by moving sections of the Earth's crust under the ocean. Tsunamis have many social, economic, and environmental impacts depending on where they hit and their size.



Case study: Haiti vs Japan Earthquakes

	Haiti 2010 (LIC)	Japan 2011 (HIC)
Magnitude	7.0	9.0
Death Toll	250,000	15,894
Injured	300,000	6,152
Social Impacts	Over a million made homeless, schools and hospitals destroyed, looting and violence	500,000 people evacuated
Economic Impacts	20,000 businesses lost, roads and bridges destroyed	56 bridges and 26 railways destroyed or damaged
Environmental Impacts	Contaminated water supplies	Triggered tsunami & nuclear meltdown
Cost to rebuild	\$10/ £7.8 Billion	\$309/ £189 Billion

Managing hazards

There are 3 things we can do to lessen the affects of earthquakes, the 3 Ps.

Prediction - Using technology to estimate when and where we think an earthquake is going to happen. **We often know where one will happen but it is difficult to figure out when it will.**

Protection - Putting measures in place to help protect people during an earthquake. The most important and common one is **building special buildings that will not collapse - aseismic**

Preparation - This is all about getting ready for when the next one comes. It includes **special drills and practices so people know what to do, and preparing materials in advance.**

History



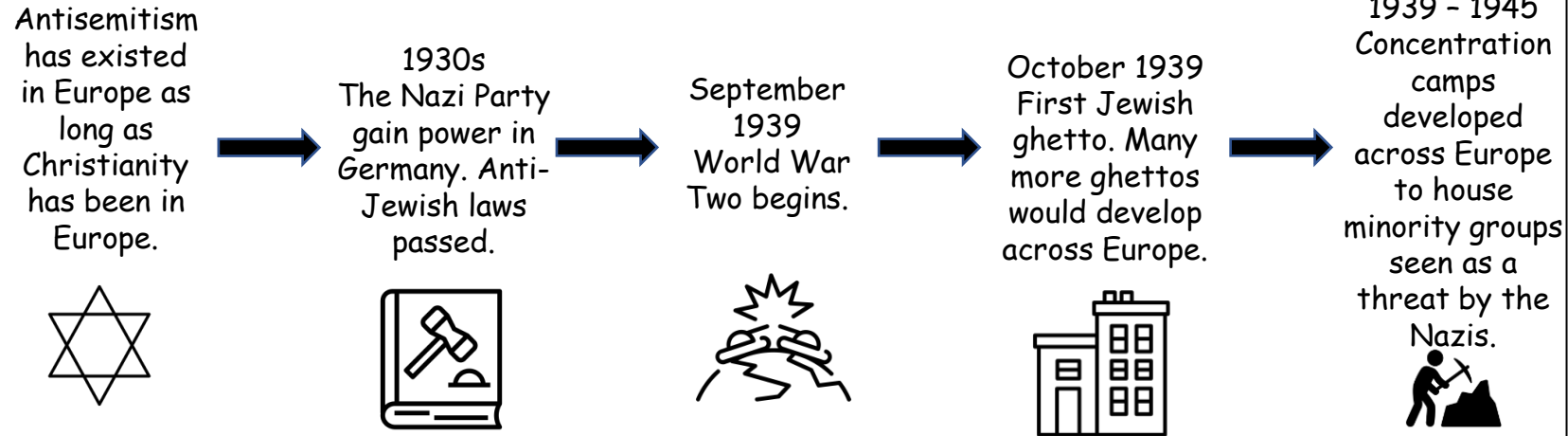
You can make your own questions. This process takes a lot of time, but if you create a study group you can each create a few questions and trade. However it is important that you write what Key facts or knowledge you expect to see in any answer.

Year 9 - History Knowledge Organiser - Unit 1 - What impact did the Holocaust have globally?

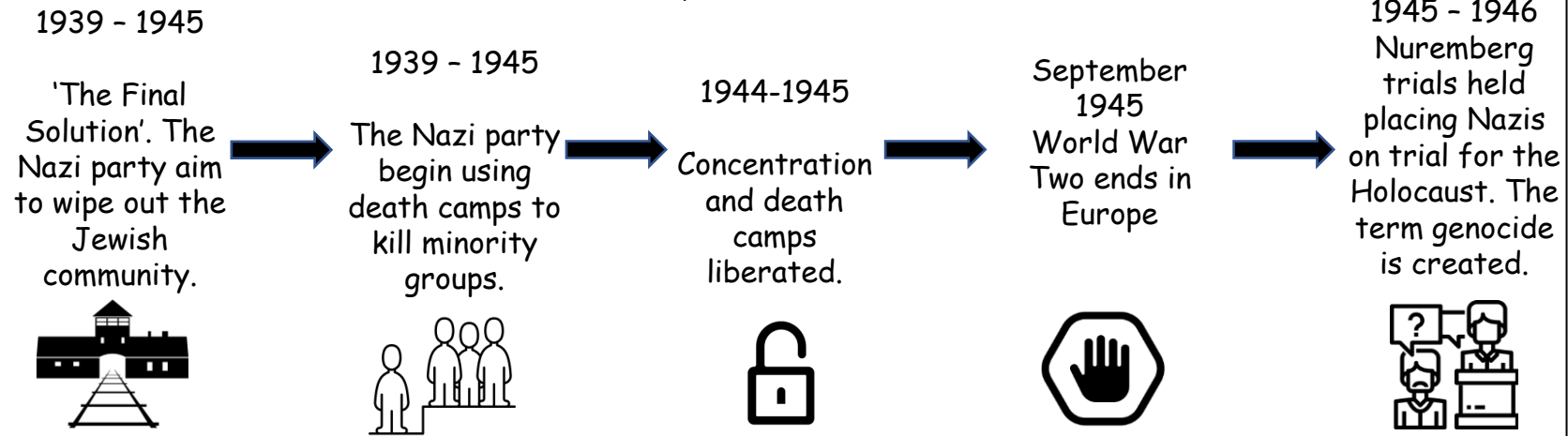
Key Terms

Antisemitism	The hatred and mistreatment of the Jewish community.
Genocide	The attempted destruction in part or whole of a group such as racial, religious or nationality.
Nazi	The political party led by Adolf Hitler which led Germany between 1933-1945.
Ghetto	An area of a town or city which is designated for one group to live in only.
Concentration Camp	A camp where minority groups were sent during the Holocaust to work and were mistreated.
Death Camp	One of 6 camps set up by the Nazi party to kill minority groups on mass.
Legacy	The long-lasting impact of events. Can be positive or negative and can lead to change.

Key events in order



Key events in order



Threshold Concepts linked to this unit:

TC27	The Holocaust was the first event classed as a genocide however it linked to the persecution of minority groups which had been previously persecuted within Europe
TC28	The Holocaust was a significant event globally and its legacy can still be felt today

Key fact

The Holocaust is considered one of the most important parts of history for all students to be taught about. This allows us to learn about what happened so we can identify if history tries to repeat itself, so we can stop it.

Maths

QUIZZING

Create practice questions on a topic. Swap your questions with a partner & answer.

Question - What is a metaphor?

- A comparison using 'like, as, than'.
- A comparison where one thing is another.
- A comparison with a human attribute.

You can make your own questions. This process takes a lot of time, but if you create a study group you can each create a few questions and trade. However it is important that you write what Key facts or knowledge you expect to see in any answer.

YEAR 9 — REASONING WITH ALGEBRA... Straight Line Graphs

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

- Compare gradients
- Compare intercepts
- Understand and use $y = mx + c$
- Find the equation of a line from a graph
- Interpret gradient and intercepts of real-life graphs

Keywords

Gradient: the steepness of a line

Intercept: where two lines cross. The y-intercept: where the line meets the y-axis

Parallel: two lines that never meet with the same gradient

Co-ordinate: a set of values that show an exact position on a graph

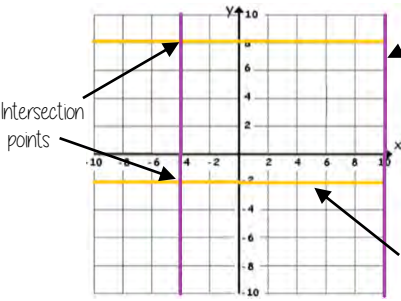
Linear: linear graphs (straight line) — linear common difference by addition/ subtraction

Asymptote: a straight line that a graph will never meet

Reciprocal: a pair of numbers that multiply together to give 1

Perpendicular: two lines that meet at a right angle

Lines parallel to the axes



All the points on this line have a x coordinate of 10

Lines parallel to the y axis take the form $x = a$ and are vertical

Lines parallel to the x axis take the form $y = a$ and are horizontal

All the points on this line have a y coordinate of -2 eg (3, -2) (7, -2) (-2, -2) all lay on this line because the y coordinate is -2

'a' can be ANY positive or negative value including 0

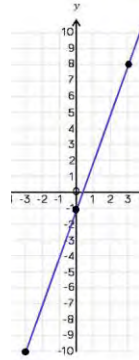
Plotting $y = mx + c$ graphs

$y = 3x - 1$ → 3 x the x coordinate then - 1

x	-3	0	3
y	-10	-1	8

Draw a table to display this information

This represents a coordinate pair (-3, -10)



You only need two points to form a straight line

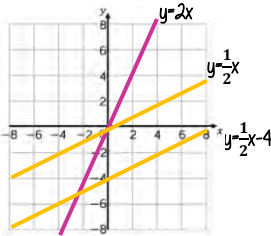
Plotting more points helps you decide if your calculations are correct (if they do make a straight line)

Remember to join the points to make a line

Compare Gradients

$y = mx + c$

The coefficient of x (the number in front of x) tells us the gradient of the line



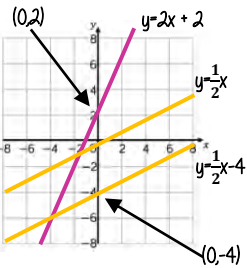
The greater the gradient — the steeper the line

Parallel lines have the same gradient

Positive gradients
Negative gradients

Compare Intercepts

$y = mx + c$ ← The value of c is the point at which the line crosses the y-axis Y intercept



The coordinate of a y intercept will always be (0,c)

Lines with the same y-intercept cross in the same place

$y = mx + c$

The coefficient of x (the number in front of x) tells us the gradient of the line

$y = mx + c$ ← The value of c is the point at which the line crosses the y-axis Y intercept
y and x are coordinates

The value of c is the point at which the line crosses the y-axis Y intercept

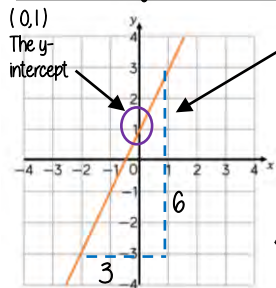
The equation of a line can be rearranged. Eg

$y = c + mx$

$c = y - mx$

Identify which coefficient you are identifying or comparing

Find the equation from a graph



The Gradient $\frac{6}{3} = 2$

$y = 2x + 1$

The direction of the line indicates a positive gradient

Positive gradients
Negative gradients

Real life graphs

A plumber charges a £25 callout fee, and then £12.50 for every hour. Complete the table of values to show the cost of hiring the plumber.

Time (h)	0	1	2	3	8
Cost (£)	£25				£125

In real life graphs like this values will always be positive because they measure distances or objects which cannot be negative.

Direct Proportion graphs

To represent direct proportion the graph must start at the origin

A box of pens costs £2.30

Complete the table of values to show the cost of buying boxes of pens.

Boxes	0	1	2	3	8
Cost (£)		£2.30			

When you have 0 pens this has 0 cost. The gradient shows the price per pen.

The y-intercept shows the minimum charge. The gradient represents the price per mile

YEAR 9 — REASONING WITH ALGEBRA...

Forming and Solving Equations

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

- Solve inequalities with negative numbers
- Solve equations with unknowns on both sides
- Solve inequalities with unknowns on both sides
- Substitute into formulae and equations
- Rearrange formulae

Keywords

Inequality: an inequality compares two values showing if one is greater than, less than or equal to another

Variable: a quantity that may change within the context of the problem

Rearrange: Change the order

Inverse operation: the operation that reverses the action

Substitute: replace a variable with a numerical value

Solve: find a numerical value that satisfies an equation

Solve equations with brackets



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

$$6x + 12 = 30$$

$$6x = 18$$

$$x = 3$$

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

Expand the brackets

$$6x + 12 = 30$$

$$-12 \quad -12$$

$$6x = 18$$

$$-6 \quad -6$$

$$x = 3$$

Form and solve inequalities



Two more than treble my number is greater than 11

Find the possible range of values

$$3x + 2 > 11$$

Solve

$$x \leftarrow -3 \leftarrow -2 \leftarrow 11$$

$$x > 3$$

Inequalities with negatives

Method 1 Make x positive first

$$2 - 3x > 17$$

$$+3x \quad +3x$$

$$2 > 17 + 3x$$

$$-17 \quad -17$$

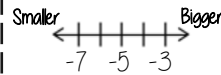
$$-15 > 3x$$

$$\div 3 \quad \div 3$$

$$-5 > x$$

x is true for any value smaller than -5

✓ CHECK IT!
 $2 - 3(-6) = 20$
 TRUE/ CORRECT



Equations with unknown on both sides

$$4x + 5 = 3x + 24$$

$$-3x \quad -3x$$

$$x + 5 = 24$$

$$-5 \quad -5$$

$$x = 19$$

$$x \quad x \quad x \quad x \quad 5$$

$$x \quad x \quad x \quad 24$$

Inequalities with unknown on both sides

Solving inequalities has the same method as equations

$$5(x + 4) < 3(x + 2)$$

$$5x + 20 < 3x + 6$$

$$2x + 20 < 6$$

$$2x < -14$$

$$x < -7$$

Check it!

$$5(-8 + 4) < 3(-8 + 2)$$

$$5(-4) < 3(-6)$$

$$-20 < -18$$

✓ -20 IS smaller than -18

Method 2 Keep the negative x

$$2 - 3x > 17$$

$$-2 \quad -2$$

$$-3x > 15$$

$$\div -3 \quad \div -3$$

$$x > -5$$

x is true for any value bigger than -5

This cannot be true...

$$x < -5$$

When you multiply or divide x by a negative you need to reverse the inequality

Formulae and Equations

Substitute in values

Formulae — all expressed in symbols

Equations — include numbers and can be solved

Rearranging Formulae (one step)

$$x = y + z$$

$$x = y + z$$

Rearrange to make y the subject.

$$y = x - z$$

$$y \rightarrow +z \rightarrow x$$

$$y \leftarrow -z \leftarrow x$$

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)

$$4x - 3 = 9$$

$$+3 \quad +3$$

$$4x = 12$$

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

$$x = 3$$

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

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

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

YEAR 9 — REASONING WITH ALGEBRA...

Testing conjectures

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

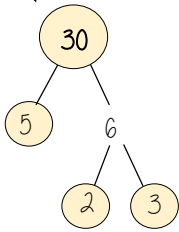
- Use factors, multiples and primes
- Reason True or False
- Reason Always, sometimes never true
- Show that reasoning
- Make conjectures about number
- Expand binomials
- Make conjectures with algebra
- Explore the 100 grid

Keywords

- Multiples:** found by multiplying any number by positive integers
- Factor:** integers that multiply together to get another number.
- Prime:** an integer with only 2 factors.
- HCF:** highest common factor (biggest factor two or more numbers share)
- LCM:** lowest common multiple (the first time the times table of two or more numbers match)
- Verify:** the process of making sure a solution is correct
- Proof:** logical mathematical arguments used to show the truth of a statement
- Binomial:** a polynomial with two terms
- Quadratic:** a polynomial with four terms (often simplified to three terms)

Factors, Multiples and Primes

Multiplication part-whole models



All three prime factor trees represent the same decomposition

HCF – Highest common factor

HCF of 18 and 30

18: 1, 2, 3, 6, 9, 18

30: 1, 2, 3, 5, 6, 10, 15, 30

Common factors are factors two or more numbers share

LCM – Lowest common multiple

LCM of 9 and 12

9: 9, 18, 27, 36, 45, 54

12: 12, 24, 36, 48, 60

Common multiples are multiples two or more numbers share



True or False?

Conjecture

A pattern that is noticed for many cases

1, 2, 4, ...
The numbers in the sequence are doubling each time.

Counterexamples



This sequence isn't doubling it is adding 2 each time

Only **one** counterexample is needed to disprove a conjecture

Always, Sometimes, Never true.

Always Every value always supports the statement

Sometimes Examples show the statement being true and counter examples to show when it is false.

Never No example supports the statement

Examples to try

- 0 and 1
- Fractions
- Negative numbers

Show that

Numerical verification

Show the stages to a solution with numerical values

Algebraic verification

Show algebraic properties of the solution
You may want to use pictorial images to support this

Proof

Simple proofs using algebra

Compare the left hand side of an equation with the right hand side – are they the same or different?

Conjectures



Even
(2n)

Multiple of 2



Odd
(2n + 1)

One more than any even

Use numerical verification first
Use pictorial verification – the representations of numbers of odd and even

Exploring the 100 square

In terms of 'n' is used to make generalisations about relationships between numbers

Positions of numbers in relation to n form expressions

Eg one space to the right of n
 $n + 1$

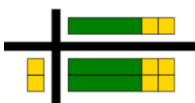
Eg One row below n
 $n + 10$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

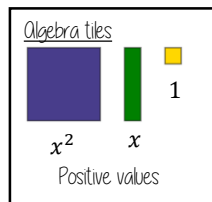
The size of the grid for generalisation changes the relationship statements

Expanding binomials

$$2(x + 2) \equiv 2x + 4$$

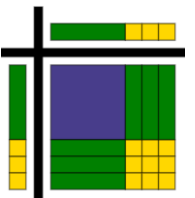


Algebra tiles can represent a binomial expansion
Has two terms



Algebra tiles
 x^2 x 1
Positive values

$$(x + 3)(x + 3) \equiv x^2 + 6x + 9$$



This is a quadratic
It has four terms which simplified to three terms

The order of the binomial has no impact on the outcome.
eg $(x + 3)(3 + x)$

YEAR 9 — CONSTRUCTING IN 2D/3D... 3D Shapes

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

- Name 2D & 3D shapes
- Recognise Prisms
- Sketch and recognise nets
- Draw plans and elevations
- Find areas of 2D shapes
- Find Surface area for cubes, cuboids, triangular prisms and cylinders
- Find the volume of 3D shapes

Keywords

2D: two dimensions to the shape e.g length and width

3D: three dimensions to the shape e.g length, width and height

Vertex: a point where two or more line segments meet

Edge: a line on the boundary joining two vertex

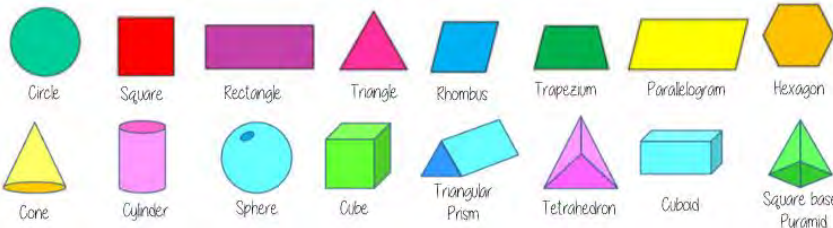
Face: a flat surface on a solid object

Cross-section: a view inside a solid shape made by cutting through it

Plan: a drawing of something when drawn from above (sometimes birds eye view)

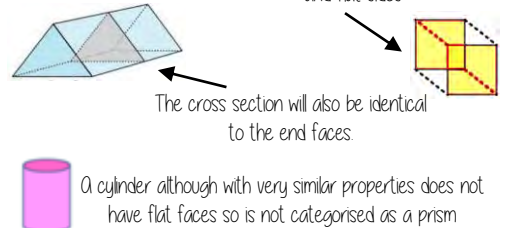
Perspective: a way to give illustration of a 3D shape when drawn on a flat surface.

Name 2D & 3D shapes

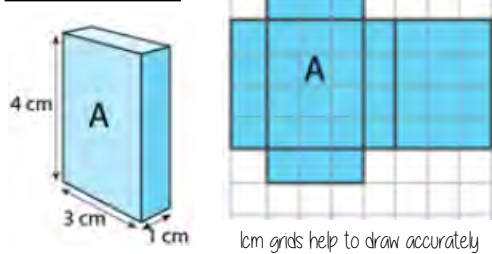


Recognise prisms

A solid object with two identical ends and flat sides

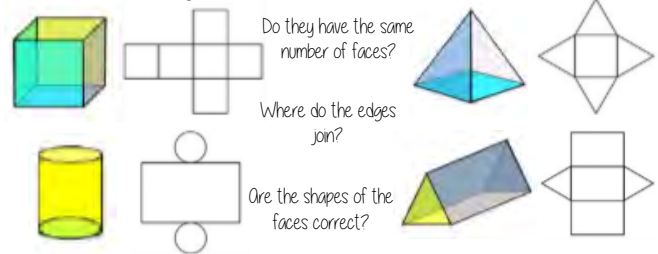


Nets of cuboids

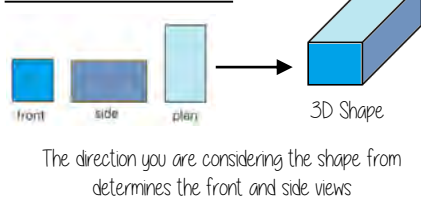


Visualise the folding of the net. Will it make the cuboid with all sides touching

Sketch and recognise nets

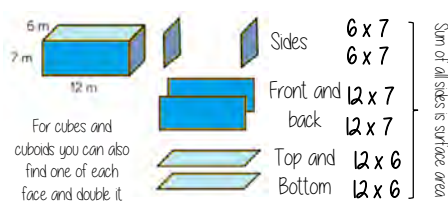


Plans and elevations



Surface area

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



For other shapes - not all the sides are the same, so calculate the individually

Volumes

Volume is the 3D space it takes up — also known as capacity if using liquids to fill the space



Counting cubes

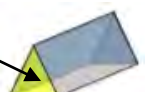
Some 3D shape volumes can be calculated by counting the number of cubes that fit inside the shape

Cubes/ Cuboids = base x width x height

Remember multiplication is commutative



Cross section



Prisms and cylinders = area cross section x height

Height can also be described as depth

Areas — square units
Volumes — cube units

Areas and volumes can be left in terms of π

Area of 2D shapes

Rectangle: Base x Height
Triangle: $\frac{1}{2} \times$ Base x Perpendicular height

Parallelogram/ Rhombus: Base x Perpendicular height

Area of a trapezium: $(a + b) \times h$

Area of a circle: $\pi \times \text{radius}^2$

Surface area - cylinders

The area of the circle: $\pi \times \text{radius}^2$



The width of this face is the same as the circumference: $\pi \times \text{diameter} \times \text{height}$

$2 \times \pi \times \text{radius}^2 + \pi \times \text{diameter} \times \text{height}$

Numeracy



Make sure you are regularly testing your knowledge using the resources provided by the school on platforms such as Sparx, Educake and Linguascope. You will have been issued with user names and passwords to access your accounts.

Numeracy - numbers

have a sense of the size of a number and where it fits in the number system

What do I need to be able to do?

- Know the definition of a digit
- Know that the place of a digit gives its value
- Each column of the number system, increases or decreases by a factor of 10
- The importance of the decimal point
- There are positive and negative values, and how they fit onto a number line.

Keywords

- Digit:** A single figure used in the number system
- Place value:** The columns where the digit is placed, to give its value
- Integer:** a whole number
- Decimal Point:** A mathematical symbol that gives definition to a value less than a whole number
- Positive number:** A value greater than zero
- Negative number:** A value less than zero
- Fraction:** Name given to a part of a whole number

Digits There are **TEN** digits The number **10**, uses two digits, 1 and 0

0 zero **1** one **2** two **3** three **4** four **5** five **6** six **7** seven **8** eight **9** nine

Place Value

TM	M	HTh	TTh	Th	H	T	o	†	h	th
Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousand	Hundreds	Tens	Ones	tenths	hundredths	thousandths
10 000 000	1 000 000	100 000	10 000	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
								0.1	0.01	0.001

Decimal point

Integers are whole numbers. They are before the decimal point

Decimal numbers are after the decimal point

2 4 . 7 8 Twenty four, point seven eight

Two tens, four ones, seven tenths, and eight hundredths

78 or **0.78** Seventy eight, then zero point seven eight, **not** zero point seventy eight

Place Value

10 000 000	1 000 000	100 000	10 000	1000	100	10	1	0.1	0.01	0.01
------------	-----------	---------	--------	------	-----	----	---	-----	------	------

In this direction,
each column is 10 times bigger
 $\times 10$

In this direction,
each column is 10 times smaller
 $\div 10$

Fraction

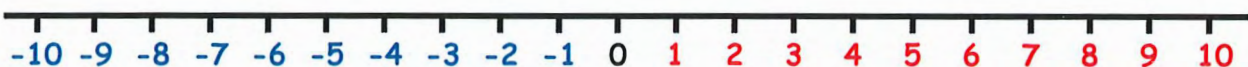
A value that is less than a whole one

$\frac{1}{2}$, half of a whole.

A fraction can be written as a decimal number

0.5 is also a half or
5 tenths, using place value

Positive and Negative Values (**NOT minus**)



Negative values Less than zero
 < 0

In this direction, numbers get smaller

In this direction, numbers get bigger

Positive values Greater than zero
 > 0

Numeracy - number facts

Know number facts. Number bonds, times tables, doubles and halves

What do I need to be able to do?

- Know number bonds up to 10
- Using the inverse of adding, know number families
- Square numbers
- Multiplication tables
- Use strategies to calculate the double of a number, or its half.

Keywords

Number bond: A relationship between 2 numbers that give a known value

Fact families: Extending a number bond to include other facts that use the inverse operation

Inverse operation: The opposite calculation

Square numbers: The answer calculated when a value has been multiplied by itself

Multiplication tables: The answers to each value below and including 10, multiplied by each value below and including 10. Usually set into a grid

Calculation strategies: Use prior knowledge to further calculate an answer

Number bonds

These all add to 10

$1 + 9 = 10$

$9 + 1 = 10$

$2 + 8 = 10$

$8 + 2 = 10$

$3 + 7 = 10$

$7 + 3 = 10$

$4 + 6 = 10$

$6 + 4 = 10$

$5 + 5 = 10$

Inverse Operation



add



subtract



subtract



add



multiply



divide



divide



multiply

opposite

Fact Families By using the inverse of addition, number bonds using subtraction can extend knowledge to include more facts

$1 + 9 = 10$	$2 + 8 = 10$	$3 + 7 = 10$	$4 + 6 = 10$
$9 + 1 = 10$	$8 + 2 = 10$	$7 + 3 = 10$	$6 + 4 = 10$
$10 - 1 = 9$	$10 - 2 = 8$	$10 - 3 = 7$	$10 - 4 = 6$
$10 - 9 = 1$	$10 - 8 = 2$	$10 - 7 = 3$	$10 - 6 = 4$
$5 + 5 = 10$		$10 - 5 = 5$	

$6 + 4 = 10$	$7 + 3 = 10$	$8 + 2 = 10$	$9 + 1 = 10$
$4 + 6 = 10$	$3 + 7 = 10$	$2 + 8 = 10$	$1 + 9 = 10$
$10 - 6 = 4$	$10 - 7 = 3$	$10 - 8 = 2$	$10 - 9 = 1$
$10 - 4 = 6$	$10 - 3 = 7$	$10 - 2 = 8$	$10 - 1 = 9$
$10 + 0 = 10$		$10 - 0 = 10$	

Double and Half

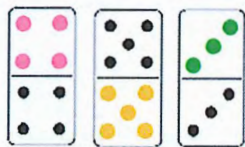
Double of a number is to multiply by 2 or add

Double 3, 2×3 , $3 + 3 = 6$

Chunk it!!

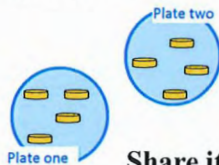
Double 14

$$\begin{array}{r} 10 + 4 \\ \times 2 \\ \hline 20 + 8 = 28 \end{array}$$



$8 \div 2 = 4$

Cut in half



Share it

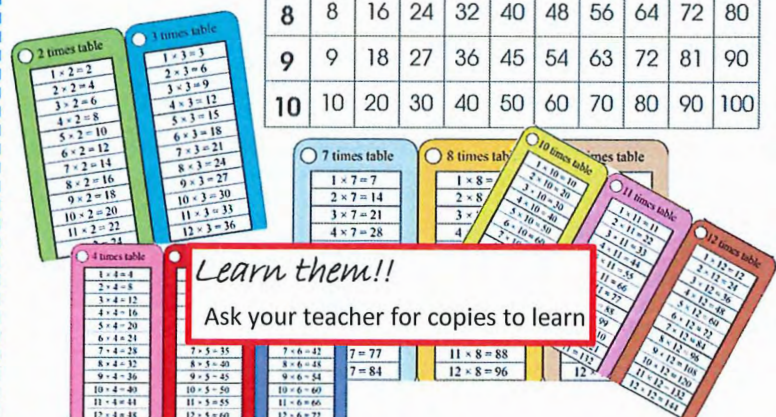
Multiplication Tables

$3 \times 6 = 18$

x	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Square Numbers

$1 \times 1 = 1$	$6 \times 6 = 36$
$2 \times 2 = 4$	$7 \times 7 = 49$
$3 \times 3 = 9$	$8 \times 8 = 64$
$4 \times 4 = 16$	$9 \times 9 = 81$
$5 \times 5 = 25$	$10 \times 10 = 100$



Numeracy - mental calculations

Use what you know

What do I need to be able to do?

- Be familiar with Number Facts
- Be familiar with Number Bonds
- Look for patterns to help with calculations
- Multiplication tables
- Use strategies that you can work in your head
- Recall facts

Keywords

- Number bond:** A relationship between 2 numbers that give a known value
- Fact families:** Extending a number bond to include other facts that use the inverse operation
- Multiplication tables:** The answers to each value below and including 10, multiplied by each value below and including 10. Usually set into a grid
- Calculation strategies:** Use prior knowledge to further calculate an answer
- Prior Knowledge:** Previously learned facts are used as recall to understand and complete more tasks
- Fact Families:** lists of sums that give the inverse of the calculation

Prior Knowledge

Everything you've learned from before
'Keep practising'

Patterns in numbers

Even numbers end in **2, 4, 6, 8, 0**

Odd numbers end in **1, 3, 5, 7, 9**

Adding 9

Ten's column increases by 1 each time

One's column decreases by 1 each time

9
18
27
36
45
54
63

Numbers that end in **5** or **0**
can be divided by **5**

Number bonds work with larger numbers

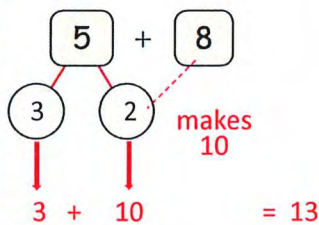
$$4 + 6 = 10$$

$$40 + 60 = 100$$

$$400 + 600 = 1000$$

Strategies in calculations

Regrouping to make 10.



Estimating an answer

Round the numbers to make a 'best guess'

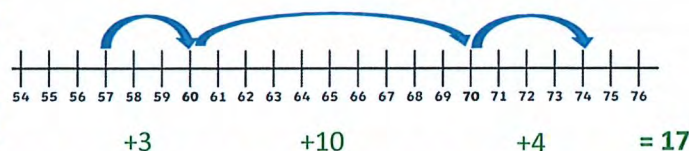
$$74 - 57 \text{ is about } 70 - 60 = 10$$

(Actual answer is 17)

Adding to subtract

This may seem difficult, but will become easier with practice.

$$74 - 57 = 17$$



Recall Facts

Being familiar with a common fact, helps with other calculations. Try to find as many as you can. Remember to use Fact Families

There are five twenty's in 100

$$100 \div 5 = 20, \quad 20 \times 5 = 100, \quad 100 \div 20 = 5$$

$\frac{1}{10}$ is the same as $\div 10$

Multiplication Tables

Learn as many of these as possible

2 times table	3 times table	4 times table	5 times table	6 times table	7 times table	8 times table	9 times table	10 times table	11 times table	12 times table
1 x 2 = 2	1 x 3 = 3	1 x 4 = 4	1 x 5 = 5	1 x 6 = 6	1 x 7 = 7	1 x 8 = 8	1 x 9 = 9	1 x 10 = 10	1 x 11 = 11	1 x 12 = 12
2 x 2 = 4	2 x 3 = 6	2 x 4 = 8	2 x 5 = 10	2 x 6 = 12	2 x 7 = 14	2 x 8 = 16	2 x 9 = 18	2 x 10 = 20	2 x 11 = 22	2 x 12 = 24
3 x 2 = 6	3 x 3 = 9	3 x 4 = 12	3 x 5 = 15	3 x 6 = 18	3 x 7 = 21	3 x 8 = 24	3 x 9 = 27	3 x 10 = 30	3 x 11 = 33	3 x 12 = 36
4 x 2 = 8	4 x 3 = 12	4 x 4 = 16	4 x 5 = 20	4 x 6 = 24	4 x 7 = 28	4 x 8 = 32	4 x 9 = 36	4 x 10 = 40	4 x 11 = 44	4 x 12 = 48
5 x 2 = 10	5 x 3 = 15	5 x 4 = 20	5 x 5 = 25	5 x 6 = 30	5 x 7 = 35	5 x 8 = 40	5 x 9 = 45	5 x 10 = 50	5 x 11 = 55	5 x 12 = 60
6 x 2 = 12	6 x 3 = 18	6 x 4 = 24	6 x 5 = 30	6 x 6 = 36	6 x 7 = 42	6 x 8 = 48	6 x 9 = 54	6 x 10 = 60	6 x 11 = 66	6 x 12 = 72
7 x 2 = 14	7 x 3 = 21	7 x 4 = 28	7 x 5 = 35	7 x 6 = 42	7 x 7 = 49	7 x 8 = 56	7 x 9 = 63	7 x 10 = 70	7 x 11 = 77	7 x 12 = 84
8 x 2 = 16	8 x 3 = 24	8 x 4 = 32	8 x 5 = 40	8 x 6 = 48	8 x 7 = 56	8 x 8 = 64	8 x 9 = 72	8 x 10 = 80	8 x 11 = 88	8 x 12 = 96
9 x 2 = 18	9 x 3 = 27	9 x 4 = 36	9 x 5 = 45	9 x 6 = 54	9 x 7 = 63	9 x 8 = 72	9 x 9 = 81	9 x 10 = 90	9 x 11 = 99	9 x 12 = 108
10 x 2 = 20	10 x 3 = 30	10 x 4 = 40	10 x 5 = 50	10 x 6 = 60	10 x 7 = 70	10 x 8 = 80	10 x 9 = 90	10 x 10 = 100	10 x 11 = 110	10 x 12 = 120
11 x 2 = 22	11 x 3 = 33	11 x 4 = 44	11 x 5 = 55	11 x 6 = 66	11 x 7 = 77	11 x 8 = 88	11 x 9 = 99	11 x 10 = 110	11 x 11 = 121	11 x 12 = 132
12 x 2 = 24	12 x 3 = 36	12 x 4 = 48	12 x 5 = 60	12 x 6 = 72	12 x 7 = 84	12 x 8 = 96	12 x 9 = 108	12 x 10 = 120	12 x 11 = 132	12 x 12 = 144

Numeracy – accurate calculations

Use a variety of strategies, both written and mental

What do I need to be able to do?

- Know Place value
- Know the units in measure, including money
- Know how to estimate an answer by rounding

Keywords

- Exact value:** Always use all the information and give an answer to the same amount of place value. Do not give an estimate
- Appropriate answer:** Give an answer that is appropriate to the units used.
- Estimate:** Giving an approximate will sometimes be enough for the type of question asked. This can be easier for mental calculations
- Rounding:** Use an appropriate point to round the given values to aid with calculations

Exact Value

Use decimal places ...

ones	t	h	th
	tenths	hundredths	thousandths
1	1	1	1
10	100	1000	
0.1	0.01	0.001	

Decimal numbers are after the decimal point

or fractions $\frac{1}{3} = 0.3333333333 \dots$

A fraction will give a more accurate value than some decimals

Appropriate Answer

1) Add 3.5m and 4m

Answer **7.5m** NOT 750cm

Use the same unit as the question when given

2) Share £2 between 7 people

200 pence \div 7 = 28.57142857 pence

A small part of a penny would not be appropriate. Round to the nearest whole unit

Answer **28p**

In this example, 28p can be found, but not 29p

Estimate

Give an estimate to this question $24.8 + 76.5$

28.7 is nearly 30, 76.5 is nearly 80 $30 + 80 = 110$

Rounding

Know how to an appropriate cut off point, both with decimals and whole numbers.
This will give an accurate calculation

Decimals

ones	tenths	hundredths	thousandths	tens of thousandths
1	3	6		
0	1	5	3	
7	0	3	2	8

Count the number of decimal places. Look at the next digit.
If this is 5 or more, round up. Less than 5 round down.

Rounding 1.36 to 1 decimal place becomes **1.4**

Rounding 0.153 to 2 decimal places becomes **0.15**

Rounding 7.0328 to 3 decimal places becomes **7.033**

Whole numbers

Rounding to the nearest 10, 100, 1000 will help with mental calculations

Everything you've learned from before

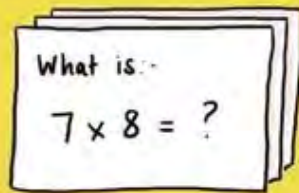
'Keep practising'

This will help with mental calculations

MFL - French

FLASHCARDS

Create your own flashcards, question on one side answer on the other. Can you make links between the cards?



You need to repeat the Q&A process for flashcards you fail on more frequently & less frequently for those you answer correctly

Create a flash card with all the key facts you want to learn (this can be drawn in your book). On the next page try writing down as many facts or as much of the knowledge as you can. If you find you are getting certain facts wrong then these are where you need to focus and relearn.

French Year 9 Autumn Term - Healthy Living

Objective: To discuss healthy living

Threshold Concepts:

- In French, like in English, the near future tense is used to express what is going to happen.
- In French there is no present progressive tense, so it is formed using the present tense of the verb "aller", together with an infinitive (ending in -er, -ir, -re).
- In French the word "depuis" (translated as "for") is used to refer to how long something has been happening. In English this is used with the present perfect progressive tense (have been ...ing); in French it is used with the present tense.
- In French there is no one word for "will". Forming the simple future tense involves conjugating the chosen infinitive verb with an ending specific to the subject pronoun. There are a several common infinitives which have an irregular stem to which the simple future tense ending must be added.

Sport and Fitness - Essential Language

Pour être un bon sportif,... - In order to be a good sportsperson,...
 Il faut - You must
 avoir un bon programme d'entraînement - have a good training programme
 bien manger - eat well
 bien dormir - sleep well
 être motivé - be motivated
 aimer la compétition - like competition
 jouer dans une équipe - play in a team
 faire du sport tous les jours - do sport everyday
 Pour arriver en forme - In order to get fit

Negatives

To form the negative, the two parts must go around the verb. The "ne" part goes before the verb and "pas" goes after the verb.



Je ne mange pas - I don't eat

Je ne bois pas - I don't drink

When the verb starts with a vowel, "ne" is shortened to n'. **Je n'aime pas - I don't like**



Opinion On Sport - Essential Vocabulary

J'aime - I like 
 Je n'aime pas - I don't like 
 jouer dans une équipe - play in a team
 Ça booste le moral - that boosts morale
 C'est fatigant - it's tiring
 C'est ennuyeux - it's boring
 Le sport diminue le stress - Sport reduces stress
 Le sport est bon pour le moral - Sport is good for morale
 Le fitness est important dans la vie - Fitness is important in life
 Ça me fatigue - It makes me tired
 Il faut apprendre à suivre les règles - You must learn to follow the rules

À mon avis,... - In my opinion...
 Moi, je trouve ça très ennuyeux de (+inf) - I find it very boring to...
 Je pense que... - I think that...
 Je suis d'accord avec... - I agree with...
 Je ne suis pas d'accord avec... - I do not agree with.

Near Future Tense

To form the near future tense, you take the correct form of "aller"(to go) followed by the infinitive.

Je vais - I go / am going
Tu vas - You go / are going
Il / elle va - he / she goes / is going
On va - we go / are going
Nous allons - we go / are going
Vous allez - you go / are going
Ils / elles vont - they go / are going



Je vais manger - I am going to eat
 Il va faire - He is going to do
 On va jouer - We are going to play

Simple Future Tense - Regular Verbs

To form the simple future tense, you take the future stem and then add the correct verb endings.

Je mangerai - I will eat
Tu mangeras - You will eat
Il/elle/on mangera - He/she/we will eat
Nous mangerons - We will eat
Vous mangerez - You will eat
Ils/ells mangeront - They will eat



For -re verbs, drop the "e" from the infinitive to make the stem.

Je boirai - I will drink



Healthy Eating - Essential Vocabulary

les boissons gazeuses - fizzy drinks
 les chips - crisps
 l'eau - water
 les légumes - vegetables
 les légumes secs - pulses
 la nourriture salée - salty food
 les œufs - eggs
 le pain - bread
 le poisson - fish
 les pommes de terre - potatoes
 les produits laitiers - dairy products
 le repas - meal
 le sel - salt
 les sucreries - sweets/confectionery
 la viande - meat
 manger équilibré - to have a balanced diet
 je mange sain - I eat healthily
 je ne mange pas sain - I don't eat healthily
 je mange des... - I eat...
 je ne mange pas de... - I don't eat...
 je ne mange jamais de... - I never eat...



Music



Sparx Maths



Make sure you are regularly testing your knowledge using the resources provided by the school on platforms such as Sparx, Educake and Linguascope. You will have been issued with user names and passwords to access your accounts.

Hooks and Riffs

Exploring Repeated Musical Patterns



A. Key Words

HOOK – A ‘musical hook’ is usually the ‘catchy bit’ of the song that you will remember. It is often short and used and repeated in different places throughout the piece. HOOKS can either be a:

MELODIC HOOK – a HOOK based on the instruments and the singers

RHYTHMIC HOOK – a HOOK based on the patterns in the drums and bass parts or a

VERBAL/LYRICAL HOOK – a HOOK based on the rhyming and/or repeated words of the chorus.

RIFF – A repeated musical pattern often used in the introduction and instrumental breaks in a song or piece of music. RIFFS can be rhythmic, melodic or lyrical, short and repeated.

OSTINATO – A repeated musical pattern. The same meaning as the word RIFF but used when describing repeated musical patterns in “classical” and some “World” music.

BASS LINE – The lowest pitched part of the music often played on bass instruments such as the bass guitar or double bass. RIFFS are often used in BASS LINES.

MELODY – The main “tune” of a song or piece of music, played higher in pitch than the BASS LINE and it may also contain RIFFS or HOOKS. In “Classical Music”, the melody line is often performed “with” an OSTINATO pattern below.

B. Famous Hooks, Riffs and Ostinatos

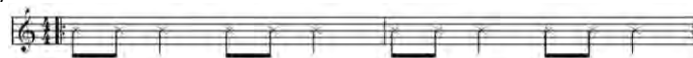
Bass Line Riff from “Sweet Dreams” – The Eurythmics



Riff from “Word Up” – Cameo



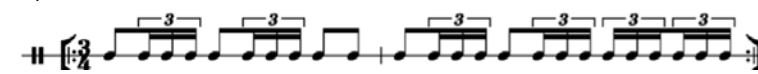
Rhythmic Riff from “We Will Rock You” – Queen



Vocal and Melodic Hook from “We Will Rock You” – Queen



Rhythmic Ostinato from “Bolero” - Ravel



Bass Line Ostinato from “Habanera” from ‘Carmen’ - Bizet



Ostinato from 2nd Movement of Symphony No.101 (The Clock) - Haydn



C. Music Theory

REPEAT SYMBOL – A musical symbol used in staff notation consisting of two vertical dots followed by double bar lines showing the performer should go back to either the start of the piece or to the corresponding sign facing the other way and repeat that section of music.



TREBLE CLEF – A musical symbol showing that notes are to be performed at a higher pitch. Also called the G clef since it indicates that the second line up is the note G.



BASS CLEF – A musical symbol showing that notes are to be performed at a lower pitch. The BASS LINE part is often written using the BASS CLEF. Also called the F clef since it indicates that the fourth line up is the note F.



PE

Year 9 PE Autumn Knowledge Organiser

Head



Leadership

Qualities of a good sports leader

1. Set an example
2. Awareness
3. Passion
4. Enthusiasm
5. Ability
6. Communication
7. Motivational skills
8. Visionary



Head



Key Rules

Use the QR codes to look at the rules for the activities you are taking part in this term.

Badminton



Football



Rugby



Netball



Gymnastics



Basketball



Heart



Respect

It is important to be respectful to others at all times but can be even more important when working with others in PE. To be respectful to others you must;

- Treat others as you wish to be treated
- Follow instructions
- Use equipment properly
- Play fairly
- Accept that everyone is different

Self Motivation

- Stay positive
- Set small targets
- Reward yourself for your achievements
- Remember the why

Hands



Consistent skills

Skills are physical movements that are performed during physical activity.

When you participate in physical activity it is important to perform skills **consistently** even when under pressure during competition.

A skill will be consistent when you can;

- Repeat the skill over and over again.
- Perform the skill with confidence.
- Perform the skill under control.



Can you name 6 skills for the activity your are completing?

Here are some examples to start you off;

Badminton – serve

Football – short passing

Netball – shooting

Rugby – receiving

Gymnastics – forward roll

Basketball – dribbling

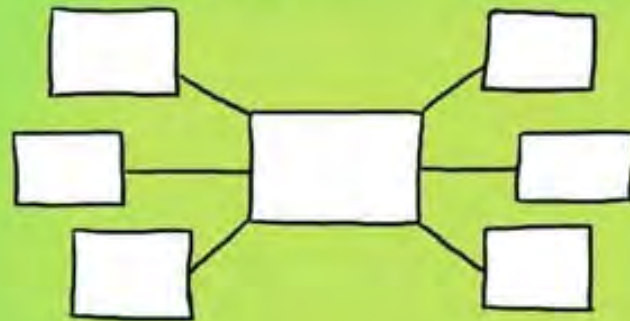
Can you describe how skills would change during competition?

For example serving in badminton can be short and low or long and high so you can outwit your opponent.

PSHE

BRAIN DUMP

Write, draw a picture, create a mind-map on everything you know about a topic.



Give yourself a time limit, say 3 minutes, then have a look at your books & add a few things you forgot.

Year 9 - PSHE - Health and Wellbeing

Key Terms

County Lines	Movement of drugs from cities to rural areas and towns by gangs
Screen Addiction	Excessive use of technology, including gaming, social media and the internet
Social Media Validation	Approval and acceptance based on social media responses such as 'likes'
Body Image	A persons feeling about their body and how they think it is perceived by others
Body Positive	Thinking and talking in a positive manner about your body

PSHE covers a variety of topics that focus developing understanding in four key areas, personal, social, health and economic.

Social Media

Social media companies use your search and viewing history to show you content they think you will enjoy. This is known as a filter bubble.

Use of social media can become addictive, manage your screen time carefully and engage in other hobbies.

Key Skills

- Active listening and communication
- Team work
- Negotiation and self advocacy
- Leadership
- Presentation and debate

County Lines and Knife Crime

- County lines gangs may target young or vulnerable people as they are easier to manipulate
- Carrying a knife in public can result in a prison sentence.
- Carrying a knife could result in serious injury or death.

If you suspect someone needs support or advice please speak to your student support officer, a trusted adult or call/visit Childline.org.uk

Online Safety and Gambling

Pictures and posts posted online can contain location information. Gambling can become addictive and is becoming more popular with young people. Loot boxes are items within computer games which are accessed either through game play or are purchased Loot boxes are usually randomised rewards; therefore, users do not know what is in the loot box before opening it.

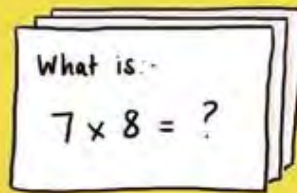
Threshold Concepts:

TC1	That there are factors that contribute to young people joining gangs
TC2	That there are consequences of carrying weapons and strategies for managing pressure to carry a weapon
TC3	That internal and external influences can affect decisions which impact on health and wellbeing
TC4	That the media and social media can impact on how people think about themselves and express themselves, including regarding body image, physical and mental health
TC5	That internal and external influences can affect decisions which impact on health and wellbeing
TC6	That the media and social media can impact on how people think about themselves and express themselves, including regarding body image, physical and mental health

RS

FLASHCARDS

Create your own flashcards, question on one side answer on the other. Can you make links between the cards?



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Year 9 - Religious Studies Knowledge Organiser - Islam

Five Pillars of Islam

- Shahadah
- Salah
- Zakat
- Sawm
- Hajj

Salah

- Prayer five times a day
- Face towards Makkah and the Ka'bah
- Wudu - Ritual cleansing prayers are compulsory. They involve a series of standing up, bowing and prostrating.

Nature of God

God = Allah
99 Names for Allah which Muslims often learn

Sawm

- Night of Power - The Prophet Muhammad's (PBUH) first revelation
- Ramadan - Islamic holy month
- Gates of Hell are closed and the Devil is chained up

Islam

- Founder = Prophet Muhammad (PBUH)
- Symbol = Crescent Moon and Star
- Place of worship = Mosque
- Holy writing = Qur'an
- 2 main sects - Sunni and Shia
- One of the Abrahamic Religions (along with Christianity and Judaism)
- Islam = Submission
- Qu'ran = Recitation



Hajj

- Pilgrimage
- Must do once in a lifetime
- Ihram = Sacred state, white robes
- Tawaf = Walking around the Ka'bah seven times
- Running between the two mounts of Safa and Marwa
- Praying at Arafat
- Stoning evil at Mina

Zakat

- Zakat is the compulsory giving of a set proportion of money
- Zakat is 2.5% of wealth over a certain limit (Nisab)
- Sadaqah = any donations or good deeds beyond Zakat

Threshold Concepts:

TC1	To understand that religious beliefs are interpreted differently, even within the same religion or denomination.
TC2	To understand that religious practices have varying levels of adoption.
TC3	To understand that misconceptions exist surrounding religious beliefs and practices that need addressing.
TC4	To understand that religious values can be accepted and adopted by non-religious believers.
TC5	To understand the varying impact of modern, often secular based, challenges to religious beliefs
TC6	To understand the influence key beliefs, teachings and practices have on religious believers, and at times non-religious believers, today (individuals, society and community).
TC7	To understand the variety of sources of authority within religion and the different approaches to them.
TC8	To understand the symbolisms found within religion.

Year 9 - Religious Studies Knowledge Organiser - Debate and Controversy

Cosmological Argument

- Also known as 'cause' and 'effect'
- Everything has a cause, only God could be the cause of us

Design Argument

- Paley's Watch Argument - if you found a watch in the desert you wouldn't think it was there by accident. Something must have made it. We are so complex that something must have made us - the only being capable of that is God

Big Bang and Evolution

- Scientific way of explaining how life came to be on this planet

Humanism

Atheist = someone who does not believe in a God or Gods.

Agnostic = someone who is unsure about something (a common term used for someone unsure about God's existence).

Theist = a person who does believe God or Gods exists.

Humanist = an agnostic / atheist with a moral, scientific worldview.

The Problem of Evil

- Natural Evil = Suffering beyond people's control, caused by nature
- Moral Evil = Evil actions deliberately carried out by people
- Omnipotent = Have unlimited power
- Omniscient = Know everything
- Omnibenevolent = unlimited goodness
- Omnipresent = Everywhere at the same time
- The existence of evil and suffering is often said to be one of the strongest arguments against the existence of God

Euthanasia

- Euthanasia = The painless killing of a patient suffering from an incurable and painful disease or in an irreversible coma

Religion and Drug Use

- A drug is a substance that can be natural or manufactured in a laboratory, which if introduced into the body has an effect on the way the body and mind work
- Buddhism, Islam and Sikhism forbid the use of illegal drugs for the same reason that they forbid alcohol and tobacco
- Christianity, Hinduism and Judaism also teach against the use of illegal drugs

Threshold Concepts:

TC1 To understand that religious beliefs are interpreted differently, even within the same religion or denomination.

TC2 To understand that religious practices have varying levels of adoption.

TC3 To understand that misconceptions exist surrounding religious beliefs and practices that need addressing.

TC4 To understand that religious values can be accepted and adopted by non-religious believers.

TC5 To understand the varying impact of modern, often secular based, challenges to religious beliefs

TC6 To understand the influence key beliefs, teachings and practices have on religious believers, and at times non-religious believers, today (individuals, society and community).

TC7 To understand the variety of sources of authority within religion and the different approaches to them.

TC8 To understand the symbolisms found within religion.

Just War

- Just War = A war that is fought for the right reasons and in the right way

Poverty

- Poverty = Being without money, food or other basic needs of life

RSE



Read through your knowledge organiser. Next, cover it up or put it away and try to write down as many of the key facts that you can remember. Use your knowledge organiser to check the fact you have written down. Correct any you may have got wrong.

Year 9 - RSE - Respectful Relationships

Key Terms

Body Shaming	The action of humiliating someone by making comments about their body shape or size
Body Image	A person's perception of their physical self
LGBTQIA+	Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual +
Equality	The state of being equal
Self-Esteem	How we value and perceive ourselves

RSE covers a variety of topics and focuses on developing understanding of different aspects of relationships. This includes with yourself, friendships, romantic and sexual relationships

Reproductive Systems

Biologically Male - Penis, Scrotum, Testicle, Sperm, Testosterone, Prostate

Biologically Female - Vagina, Vulva, Labia, Clitoris, Uterus, Ovaries, Cervix, Fallopian Tubes

Key Skills

- Active listening and communication
- Teamwork
- Presentation and debate

Self Esteem

During puberty and teenage years there are many changes. This can affect how a person feels about themselves.

It's important to be kind to yourself as go through this process

Masculinity and Women's Rights

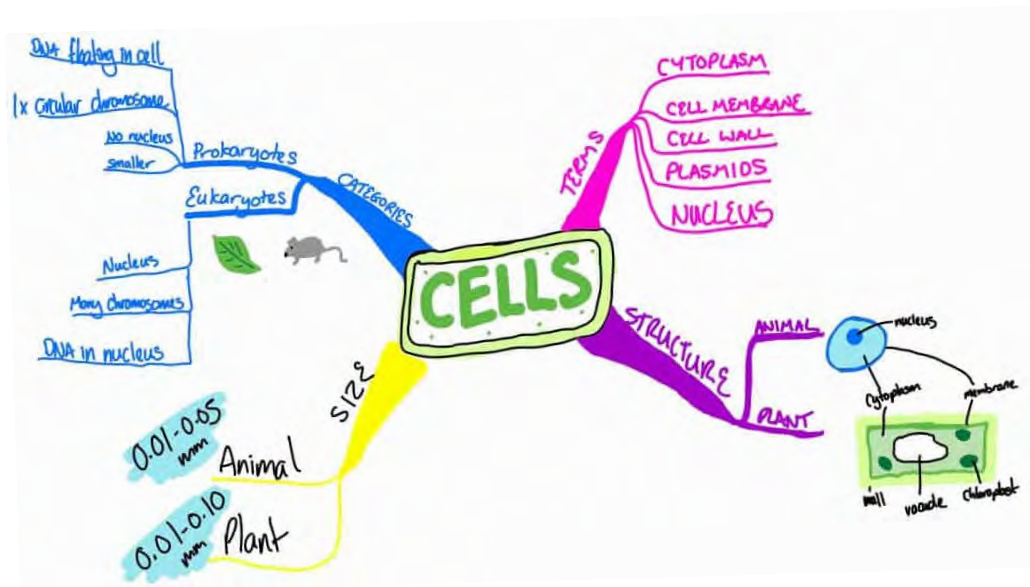
There are lots of stereotypes about men and women. Men are expected to be physically tough and not show emotions.

Women have traditionally been expected to be wives and mothers. There are still differences between men and women in terms of pay - this is called the 'Gender Pay Gap'.

Threshold Concepts:

TC1	That prejudice-based language and behaviour, offline and online, including sexism, homophobia, biphobia, transphobia, racism, ableism and faith-based prejudice is unacceptable
TC2	That promoting inclusion and challenging discrimination is important
TC3	To know that on any issue there will be a range of viewpoints
TC4	That we are all unique; that recognising and demonstrating personal strengths build self-confidence, self-esteem and good health and wellbeing
TC5	That there are strategies to understand and build resilience, as well as how to respond to disappointments and setbacks
TC6	That there are strategies to manage the physical and mental changes that are a typical part of growing up, including puberty and menstrual wellbeing

Science



Organise your ideas into a concept map, like the one below that summarises 'cells'. In a concept map, you take the main ideas and link them together with phrases that explain the relationship between the concepts. But, always try to make the concept map from memory first! Then check it with the knowledge organiser

Infection and response

Threshold Concept

Pathogens are microorganisms that cause disease

Communicable and non-communicable disease:

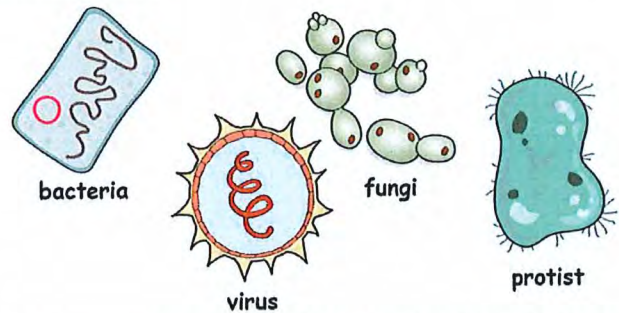
- Communicable, which can be transferred from one person to another, or from one organism to another, eg in humans, these include measles, food poisoning and malaria
- Non-communicable, which are not transferred between people or other organisms



Keywords

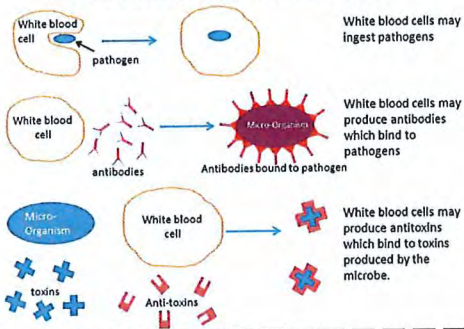
- **Pathogens:** A microorganism that causes disease e.g. bacteria, virus, protist, fungus.
- **Microorganism:** Are so small they can only be seen using a microscope.
- **Virus:** A disease causing agent about 1/100th of the size of a bacterial cell. Can only replicate within host body cell/
- **Bacteria:** A single celled microorganism without a true nucleus, some cause disease.
- **Fungi:** A microorganism that can cause disease, and that produces spores that can spread to other organisms.

Pathogens

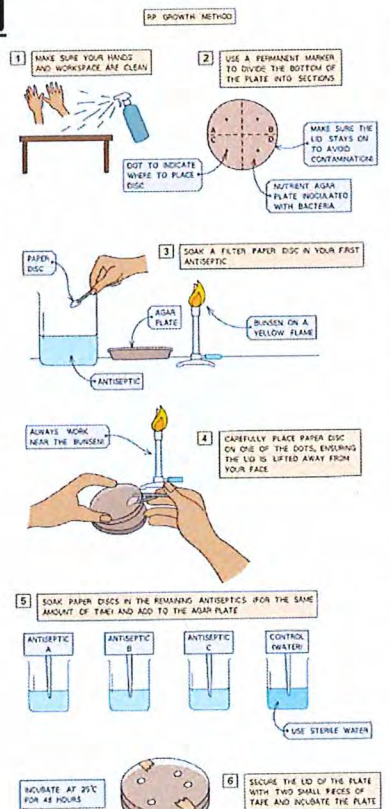


Fighting against disease

How white blood cells protect us from disease

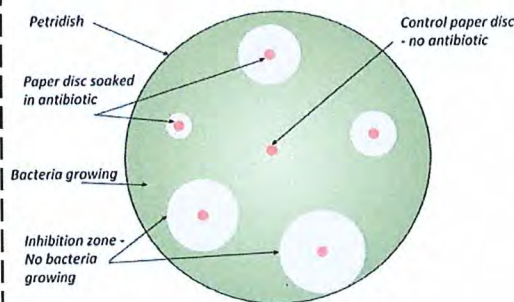


Required practical



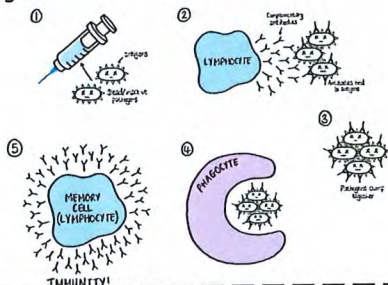
Antibiotics vs painkillers

- Antibiotics are substances that slow down or stop the growth of bacteria.
- Painkillers are chemicals that relieve the symptoms but do not kill the pathogens.



Vaccinations

Vaccines allow a dead or altered form of the disease causing pathogen to be introduced into the body, which contain a specific antigen.



Equations for this topic

Electricity (Part 1)

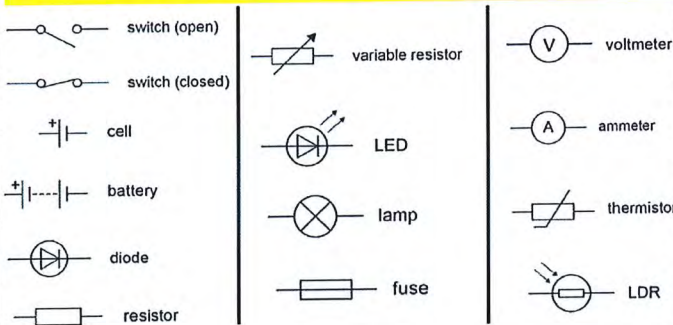
Threshold Concept

Electricity is the flow of electrons.

Circuit Symbols



An electronic circuit can include lots of different components. All of which can be represented with a symbol:



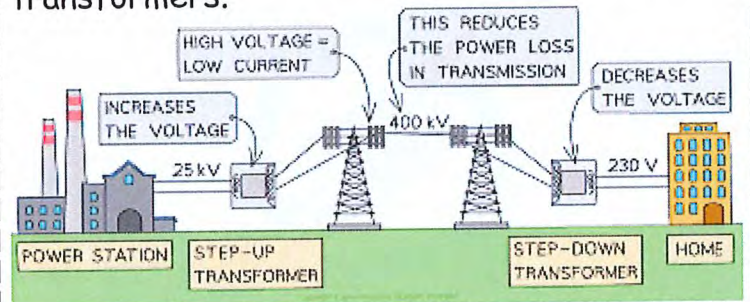
Keywords

- **Electron:** a stable subatomic particle with a charge of negative electricity, found in all atoms and acting as the primary carrier of electricity in solids.
- **Electricity:** is the presence or flow of charged particles.
- **Charge:** is a property of a body which experiences a force in an electric field. Charge is measured in coulombs (C).
- **Current:** Current is the rate of flow of electric charge around a circuit.



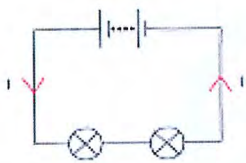
National Grid

The **National Grid** distributes electricity across the country. The National Grid connects power stations to homes, workplaces and public buildings all around the country through a system of cables and transformers.



Series and Parallel circuits

SERIES



THE CURRENT IS THE SAME EVERYWHERE

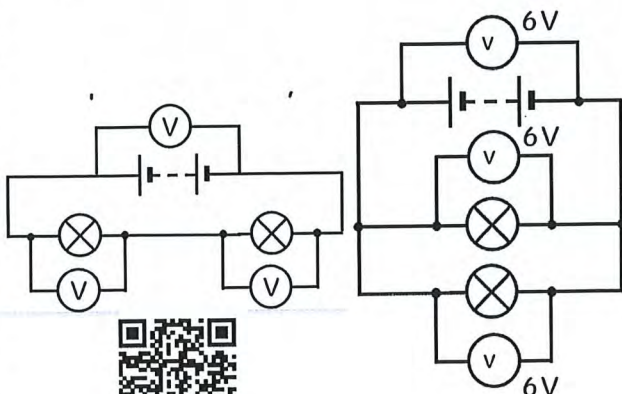
PARALLEL



THE CURRENT SPLITS INTO TWO SMALLER CURRENTS

In a series circuit, the potential difference/voltage supplied by the battery is **shared** by the components.

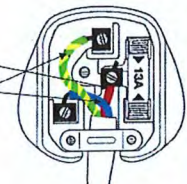
In a parallel circuit, the potential difference across each bulb is the **same** as the potential difference across the battery.



Practical

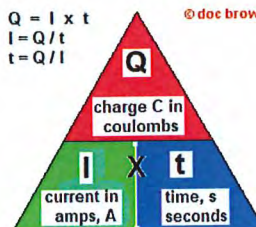
Wiring a plug

- The live wire.
- The neutral wire.
- The earth wire.

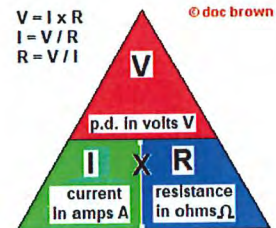


Equations for this topic

$Q = I \times t$
 $I = Q/t$
 $t = Q/I$



$V = I \times R$
 $I = V/R$
 $R = V/I$



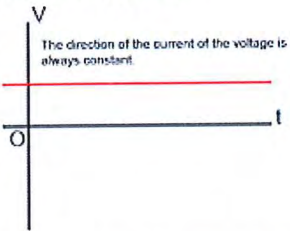
Electricity Part 2

Threshold Concept

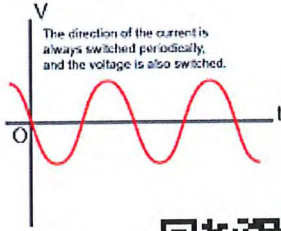
Potential Difference is the push that causes current to flow.

Alternating and Direct current (ACDC)

Direct Current (DC)



Alternating Current (AC)



Electricity can flow either as direct or alternating current, and is used in homes to power electrical appliances.



Keywords

- **Energy transfer:** the change of energy from one form to another.
- **Current:** Current is the rate of flow of electric charge around a circuit.
- **Resistance:** is a measure of the opposition to current flow in an electrical circuit.
- **Potential difference (voltage):** is the difference in the amount of energy that charge carriers have between two points in a circuit.

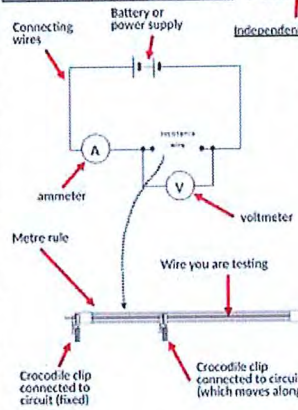
Required Practical's



Resistance

Required practical Physics 3
Resistance in circuits Combined Science 15

Use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include:
A - the length of a wire at constant temperature
B - combinations of resistors in series and parallel



Possible sources of significant error (which you can attempt to control): inaccurate attachment of crocodile clips; heating effect of electric current; misreading metre rule; misreading ammeter or voltmeter.

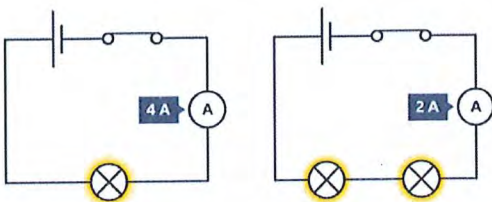
Method A steps:

- Connect the circuit as shown
- Record in a table:
 - length of the wire between the crocodile clips
 - the readings on the ammeter
 - the readings on the voltmeter
- Move the crocodile clip and record the new ammeter and voltmeter readings. Note that the voltmeter reading may not change.
- Repeat this to obtain several pairs of meter readings for different lengths of wire
- Calculate and record the resistance for each length of wire using the equation $R = V/I$

Resistance

Resistance (R) is a measure of how difficult it is for current to flow. Resistance is measured in units called ohms (Ω).

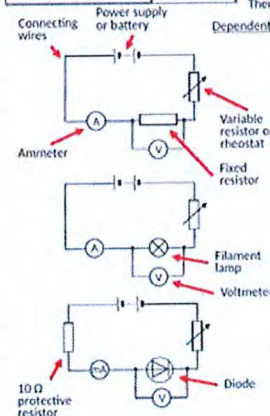
The more resistance there is in a circuit, the less current will flow.



I-V characteristics

Required practical Physics 4
I-V characteristics Combined Science 16

Use circuit diagrams to construct appropriate circuits to investigate the current-potential difference characteristics of a variety of circuit elements including a filament lamp, a diode and a resistor at constant temperature.



Possible sources of significant error (which you can attempt to control): misreading ammeter or voltmeter; inaccurate graphing

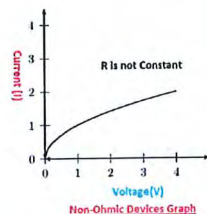
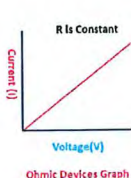
Method steps:

- Connect the circuit
- Record the readings on the ammeter and voltmeter in a suitable table.
- Adjust the variable resistor and record the new ammeter and voltmeter readings. Repeat this to obtain several pairs of readings
- Swap the connections on the battery (the readings on the ammeter and voltmeter should now be negative)
- Continue to record pairs of readings of current and potential difference with the battery reversed
- Swap the leads on the battery back to their original positions
- Replace the resistor with the lamp.
- Repeat the steps above with the lamp in place of the resistor
- Swap the leads on the battery back to their original positions.
- If you can, reduce the battery potential difference to less than 5 V
- Replace the ammeter with a milliammeter (or change the setting on the multimeter)
- Replace the lamp with the diode. Connect the positive side of the diode to the milliammeter.
- Repeat steps above to obtain pairs of readings of potential difference and current for the diode.

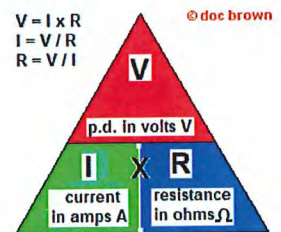
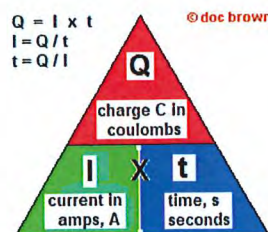
Ohm's Law

Ohm's law states that current is directly proportional to potential difference (providing the temperature remains constant).

What is Ohm's Law



Equations for this topic



Bonding Part 1

Threshold Concept

How do 100 elements make up everything in the universe?

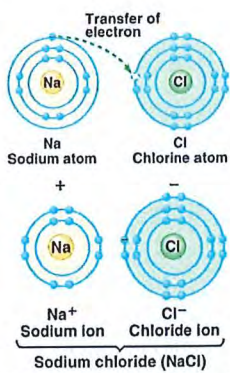
Forming ions

An ion is a charged particle.

Atoms will lose or gain electrons to get a full outer shell.

The **metal** atom **loses electrons** to become a **positive ion**

The **non-metal** atom **gains electrons** to become a **negative ion**.



Use task 3-5

Keywords

Electron - a subatomic particle with a negative charge

Electrostatic attraction - strong attraction between oppositely charged ions

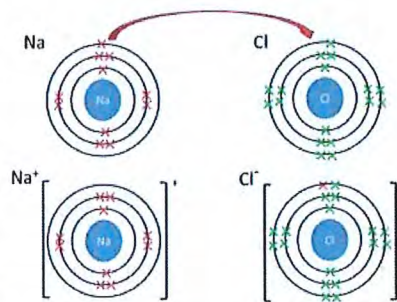
Weak intermolecular forces - force of attraction between atoms, elements and molecules

Delocalised electron - free moving electron that isn't a part of any atom

Ion - a charged particle

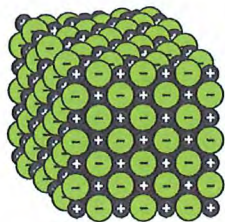
Ionic bonds

Ionic bonds are formed between metals and non-metals. Metals **lose** electrons and **non-metals** gain electrons. The oppositely charged ions attract one another forming an ionic bond.



Ionic compounds and properties

Positive and negative ions join together to form a giant ionic lattice



electrostatic attraction is strong

Ionic compounds have a high M.P

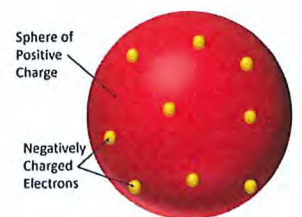
Lots of energy needed to overcome attraction



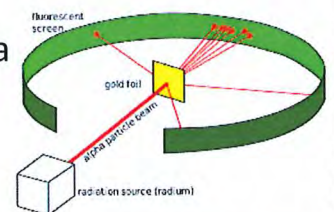
Ionic compounds don't conduct when solid because the ions are locked in position. When molten or dissolved the ions are free to move and can conduct

History of the atom

JJ Thomson - Suggested the plum pudding model. Atoms were a ball of positive charge with negative particles scattered within.



Ernest Rutherford - Alpha scattering experiment. Found that atoms has a very small, positive nucleus and the majority of atoms are empty space.



Bonding Part 2

Threshold Concept

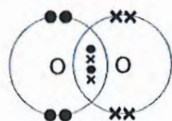
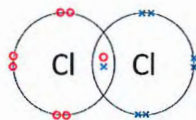
How do 100 elements make up everything in the universe?

Covalent bonds

Two non-metals will form a covalent bond. The atoms share electrons to make themselves stable.



- 1 shared pair = a single bond
- 2 shared pairs = a double bond
- 3 shared pairs = a triple bond



Keywords

Electron - a subatomic particle with a negative charge

Electrostatic attraction - strong attraction between oppositely charged ions

Weak intermolecular forces - force of attraction between atoms, elements and molecules

Delocalised electron - free moving electron that isn't a part of any atom

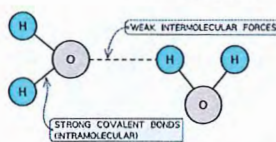
Ion - a charged particle

Simple Covalent compounds

Simple covalent compounds have strong covalent bonds between atoms and weak intermolecular forces between molecules.

Properties - low m.p and b.p

- cannot conduct electricity



Giant Covalent Structures

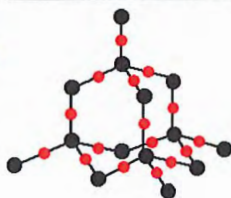
Diamond



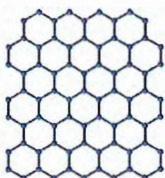
Graphite



Silicon dioxide



Graphene



Fullerenes



Metallic bonding

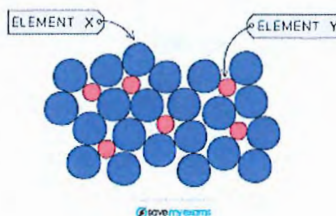
Metals consist of a giant metallic structure. They are positive metal ions surrounded by a sea of delocalised electrons



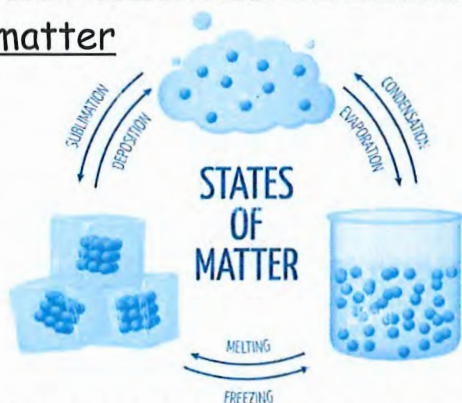
Alloys

Alloys are a mixture of metals and another element.

Alloys are stronger than metals as the different sized atoms distort the layers



States of matter



Alloys

Alloys are a mixture of metals and another element.

Alloys are stronger than metals as the different sized atoms distort the layers

