

Knowledge Organiser

Booklet Year 9 Term 2

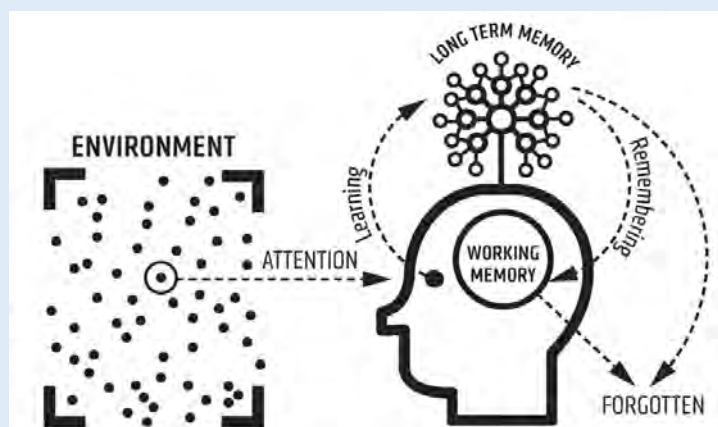


Our working memories can only store a limited amount of information, whereas our long term memories can store limitless information. To learn successfully, we need to store core knowledge into our long term memories, so we can retrieve it when we need it.

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.

Click here to be taken to the knowledge organiser part of the school website.



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:

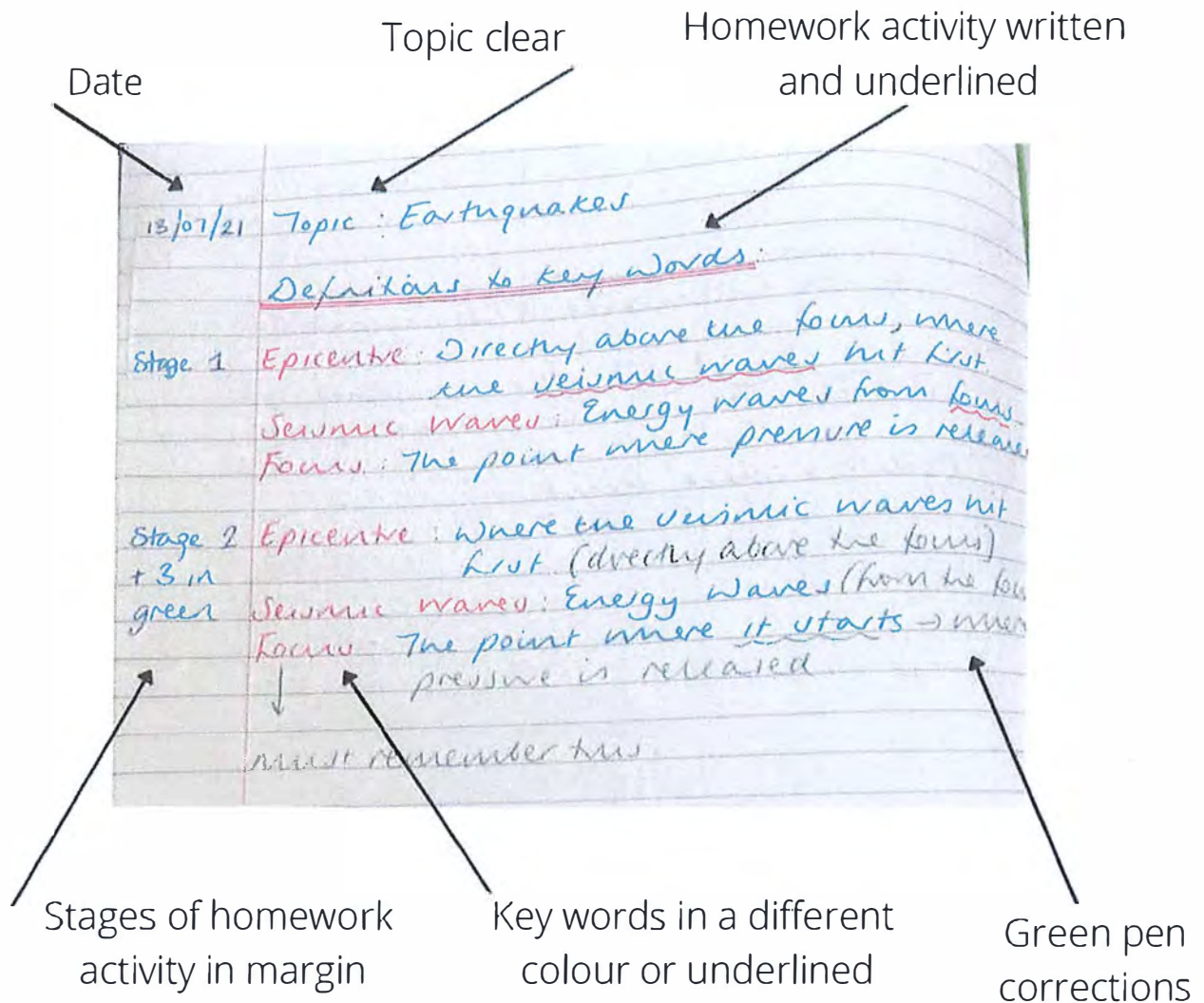
Characteristics:

Key word:

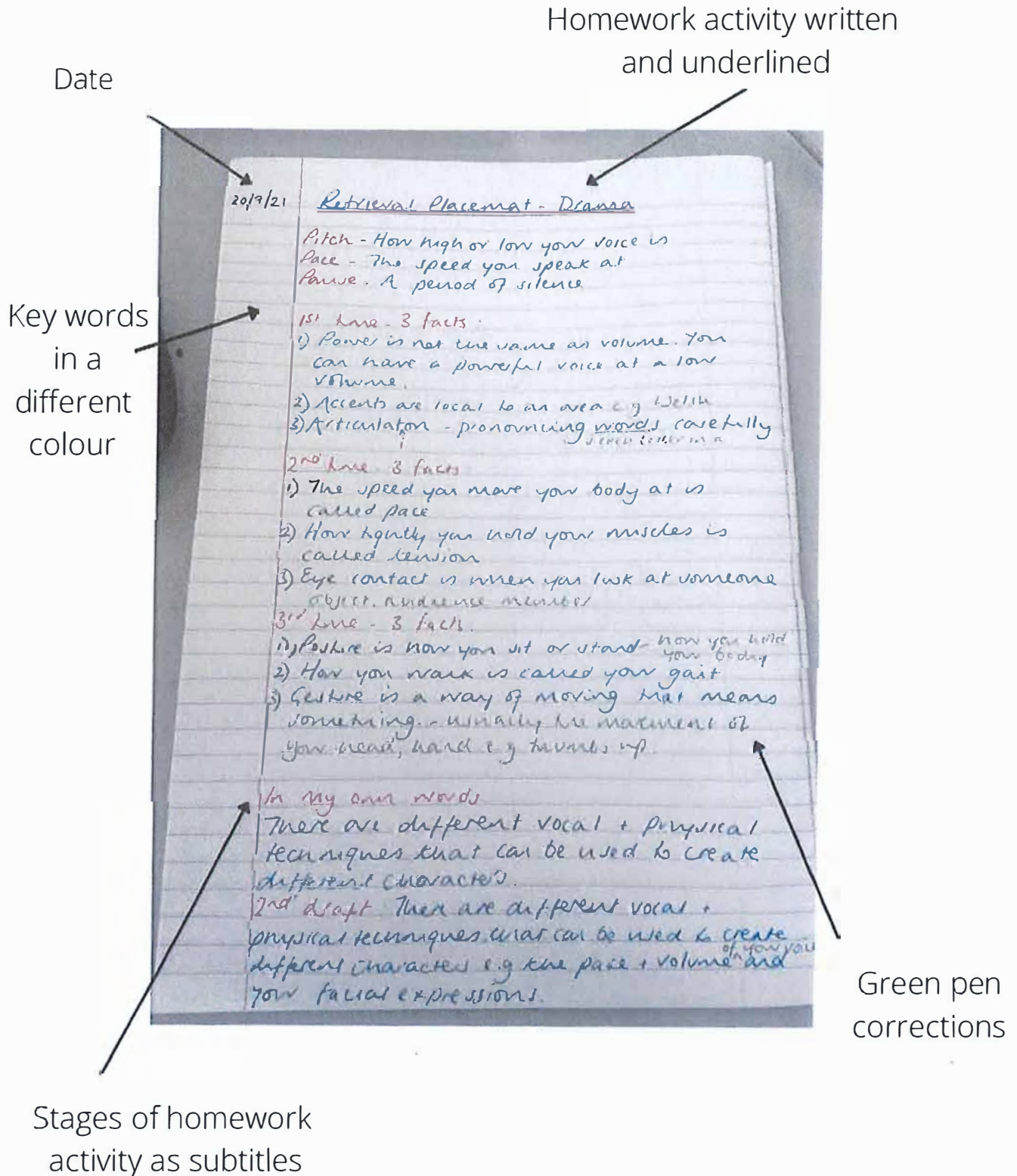
Examples:

Non-examples:

What should my knowledge organiser homework look like?



What should my knowledge organiser homework look like?



Art



Year 9: Unit 3: Structures

Structures

TC36 - Understand the design process.

TC37 - Understand that there may be an order for an effective outcome to be completed.

TC38 - Understand that individual parts may need to be completed before being brought together for the final outcome to be finalised.

Bronze

... understand what 'relief' means.

... understand what 'materials and processes' mean.

... understand how to use equipment safely.

... understand what 'manipulate' means.

... understand how to use different materials.

... select appropriate colours for an Ironbridge composition.

... understand what 'annotation' means.

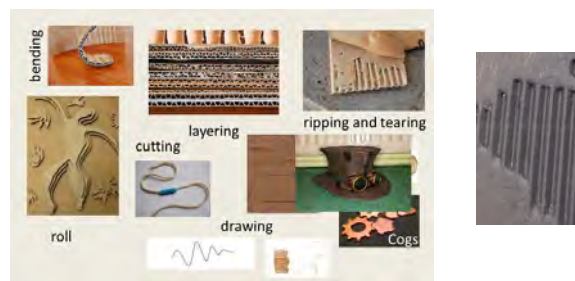
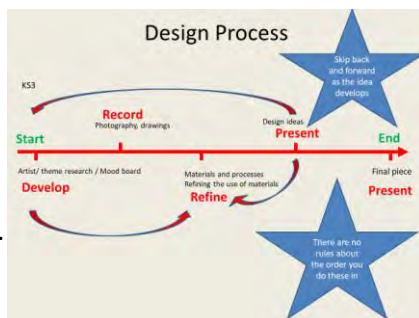
A **relief** is a piece of art in which the three-dimensional elements are raised from a flat surface.

Mod Roc (Texture)	
Toilet Tissue (Texture)	
Acrylic paint (Colour & Texture)	
Paint Effects	
Foam	
Cardboard / String / Tissue	
Wire	

WHY?

- Foam**
 - Foam panel using a sharp pencil and ruler.
 - Foam panel with surround and rivets.
- Cardboard**
 - Distressed corrugated cardboard.
 - Cardboard with tissue texture.
 - Cardboard panelling.
 - Distressed thick cardboard.
- Wire**
 - Wire drawing.
 - Spring.

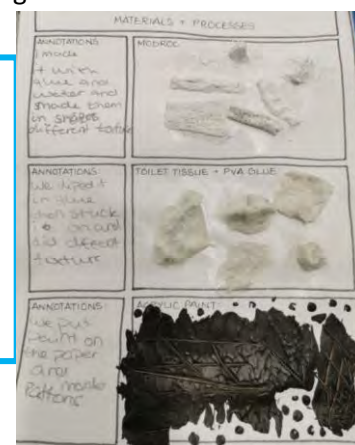
Further ideas are explored to discover new features / effects.



- Modroc**
- Toilet tissue and PVA**
- Acrylic paint**

Relief is a sculptural technique where the sculpted parts remain attached to a solid background. 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 surface.

Annotating your work is a useful way of remembering how you did something. This may be useful when considering using the process in a future project.



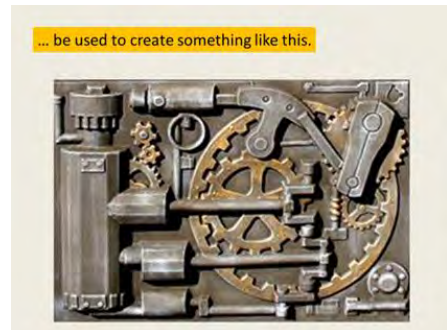
Formal Elements of Art
Colour,
Line,
Shape,
Form, Tone,
Texture
Pattern

Keywords
Tonal Scale
Hatching
Cross Hatching
Ellipse
Symmetrical
Composition
Technique
Modroc
Distressed

To **manipulate** is the ability to move and position materials with the hands.

For equipment to be used safely all instructions should be followed during the lesson.

- Analysing and Evaluating Your Artwork
- What have you done?
 - What materials did you use?
 - Is the effect something you wanted to achieve? What could you use the effect for? (Is it useful?)
 - What could you do to develop or refine the process to improve your project?





Year 9: Unit 4 Structures

Structures

TC36 - Understand the design process.

TC37 - Understand that there may be an order for an effective outcome to be completed.

TC38 - Understand that individual parts may need to be completed before being brought together for the final outcome to be finalised.

Formal Elements of Art

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

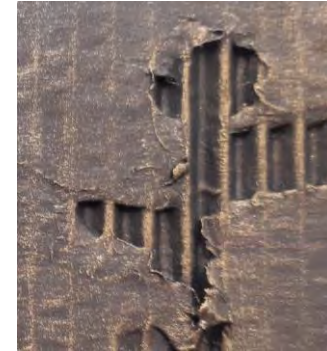
Keywords

Tonal Scale
Hatching
Cross Hatching
Ellipse
Symmetrical Composition
Technique
Modroc
Distressed

Bronze

- ... understand what 'relief' means.
- ... understand what 'materials and processes' mean.
- ... understand how to use equipment safely.
- ... understand what 'manipulate' means.
- ... understand how to use different materials.
- ... select appropriate colours for an Ironbridge composition.
- ... understand what 'annotation' means.

The substance used to make something is called a **material**. **Process** means studying how the work was made and which techniques were used.



'Tissue paper is soaked in PVA glue. When it's dry, painted black and dry brushed with metallic paint can look like welded metal.



Card can also be painted to look like an old, rusty corrugated fence panel.

All of the individual pieces are made first. They are then arranged and glued down at the end to complete the composition.

Acrylic paint colours available to use:
Black, burnt umber, burnt sienna, gold, silver, pewter, bronze, copper

The Design Process is a way of figuring out what you need to do and then doing it, it's about working out a clear and meaningful goal.

The Design Process helps you to plan and develop your work, experimenting with and refining your use of materials.

As your ideas develop, you can skip back and forth within your design, continually improving and moving your project on towards your final piece.



WAGOLL



but incomplete!

Computing



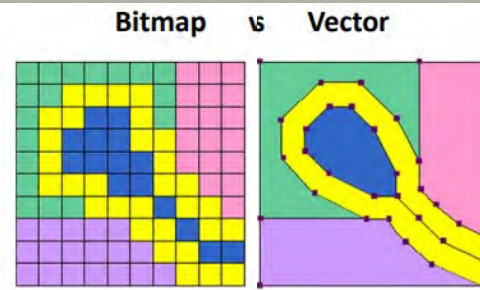
Read through your knowledge organiser. Next, cover it up or put it away and try to write down as many of the key facts that you can remember. Use your knowledge organiser to check the facts you have written down. Correct any you may have got wrong.

Computing Year 9 Unit: Media— Vector graphics

Threshold concept—

- Understand what a real-world problem is.
- Understand digital mediums can be used to communicate to a range of people
- Understand the role of Photoshop to be used to create digital mediums

Keyword	Definition
Manipulate	To change
Path	A connecting line between two paths
Node	A point that can be changed in a shape
Vector	Mathematically based pictures. Made up of lines, shapes etc (objects). Easily scalable (as they are not pixel based).
Graphic	A graphic is an image or visual representation of an object. Therefore, computer graphics are simply images displayed on a computer screen.



Bitmap or Vector image?

- Will the image need to be resized?
- Will the image need to be drawn to scale?
- Will the image need to be realistic?
- Are there any restrictions on file size?

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 with 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.

Types of compression

LOSSY Lossy compression removes some of the detail. The quality of the digital image will be reduced. Great for digital images you intend to post online, but no so great if you intend to print your digital image to put in a photo album or photo frame.

LOSSLESS Lossless compression doesn't remove any of the detail. The quality of the digital image will be really good. Great for digital images you intend to print, to put in a photo album or photo frame, but no so great if you intend to post your digital image online.

Editing tools

Zoom in/out
Allows you to enlarge an area of the graphic (zoom in) to see it more clearly. Zoom out to see the whole graphic.

Layers
Allows you to separate parts of a graphic into different layers, making it much easier to edit the graphic.

Brightness/Contrast
Brightness will lighten/darken the image. Contrast makes the lights lighter and darks darker.

Desaturate
Desaturation turns colour photos black & white. Try 'colour splash' to enhance a desaturated photo.

Crop
Allows you to chop off parts of an image you don't want to see. This will also change the dimensions of the image.

Resize
Allows you to change the dimensions of an image. You can also resize parts of the image if layers are used.

Rotate
Allows you to turn your images clockwise/anti-clockwise by a certain degrees.

Filters
You can apply different filters to your photo, such as Mosaic Tiles, Stained Glass and Chalk & Charcoal.

Computing Year 9 Unit:

Python programming with sequences of data

Part 1

Threshold concept—

- Can understand the fundamental principles of computer science, including abstraction, logic, algorithms, and data representation
- Can analyse problems in computational terms

Keyword	Definition
Sequence	One of the three basic programming constructs. Instructions that are carried one after the other in order.
Variable	A storage location with a name. The data in a variable can be changed after being initially set
Selection	One of the three basic programming constructs. Instructions that can evaluate a Boolean expression and branch off to one or more alternative paths.
Operators	Used to compare two expressions
Iteration	One of the three basic programming constructs. A selection of code that can be repeated either a set number of times (count-controlled) or a variable number of times based on the evaluation of a Boolean expression (condition-controlled).
Syntax error	An error that has occurred because the programmer has not followed the rules of the programming language they're using

Output

The `print` function is used to write output to the screen. `print` takes one or more arguments (strings or variables between the brackets) and writes the data to the screen.

Output Examples

```
print("Hello World!")
```

```
print("Hello", name, "nice to meet you")
```

Variable Assignment

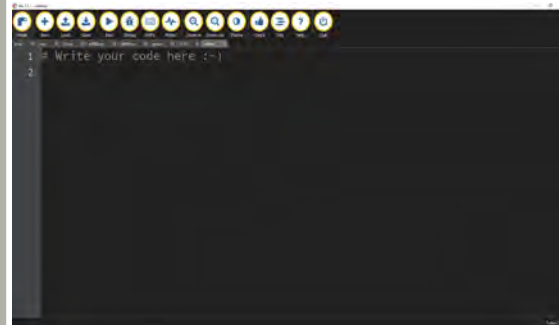
Variable assignments **are not** equations. Variable assignments are instructions for the computer. This means that the data stored in a variable can change throughout the runtime of the program.

Assignment examples

```
# Example 1
```

```
name = "Bob"
```

```
# Example 2
```



Input

The `input` function is used to prompt the user to enter some data using the keyboard. `input` can take a string argument which is used as a prompt to the user to tell them what data the computer is expecting.

Type Casting

When inputting a number, the `int` function can be used to convert the number to an integer so that your program can perform mathematical operations on it. This is a form of type casting. Look at **Example 2** below to see this being done.

Input Examples

```
# Example 1
```

```
name = input("What is your name?")
```

```
# Example 2
```

```
age = int(input("What is your age?"))
```

Selection

An `if` statement can be used to implement selection in Python. It is optionally followed by an `elif` and/or `else` statement.

Selection Examples

```
# Example 1
```

```
if age >= 18:
```

```
    print("You can watch the film")
```

```
else:
```

```
    print("You can't watch the film")
```

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.

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.

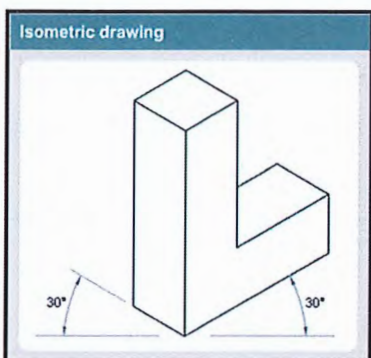
The threshold concept that is truly essential to enable you to access future learning is ...
To understand that ideas can be graphically communicated to other people.

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

To understand that Computers can streamline the design process.

You Will:

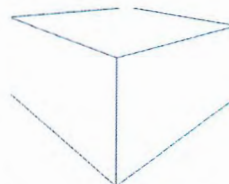
- Be able to add simple notes and labels on designs.
- To recognise the different styles of 3D drawing commonly used.
- To be able to use basic rendering techniques.
- To know what CAD is.
- To be able to use CAD to produce simple shapes
- To be able to use drawings and CAD to produce a simple design



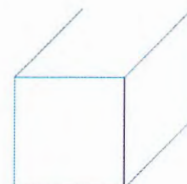
The only two angles you need in isometric drawing are 30 degrees and 90 degrees. You never draw horizontally.

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

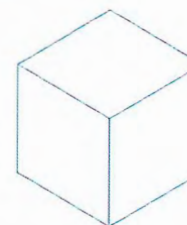


Perspective drawing



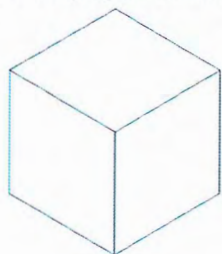
Oblique

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.



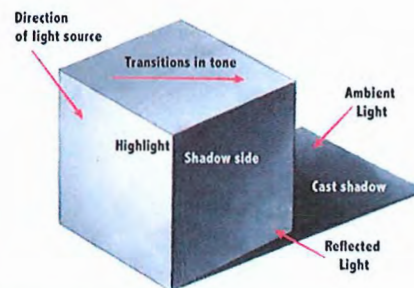
Line Drawing



Coloured



Rendered using shade and tone



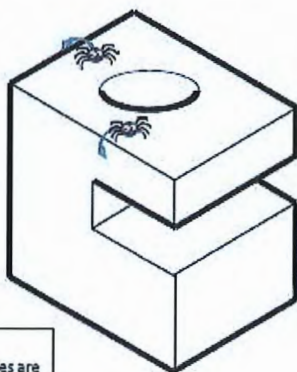
THICK AND THIN LINE TECHNIQUE

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.

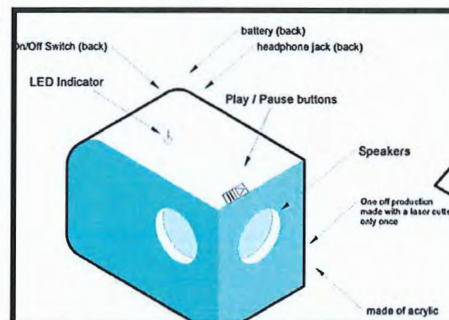
If the spider is able to disappear around an edge, then this edge will be drawn with a thick line.

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.

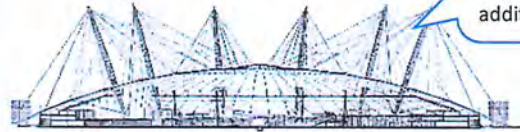


LEXICON Here are some of the words you will use in – Year 9 – RM.

Words can often have more than one meaning.



3D – 3 Dimension. A model is a 3D version of our 2D sketches



Develop – Add extra detail or information to a design or concept. Include fine detail, include additional purpose or function.

Recyclable – Capable of being returned into the raw material



Renewable – Capable of sustained use without running out.

Analyse – A detailed look at an item – to list the positive and negative points



Evaluate – Similar to analyse. Evaluate is to compare the information, detail or components to a set of measured values



Solution – An answer to a problem. (Note: a liquid can also be a solution)



Annotate – adding a note to a diagram, sketch or drawing. It adds information which cannot be easily seen from the drawing itself. It is more than just a label!

Extracted – To remove from. To gain from i.e. "I extracted the information from the paragraph"



Source – Its origin or start. Where something came from originally (a material, a river or an idea).

A speech bubble graphic is commonly found in comic books to show which character is talking.

Concept – An idea which at this stage is un-proven. A concept sketch shows the idea but with a basic level of detail



Iteration – Continual improvement. To look for and make improvements to an idea or concept – then to look for improvements to the improvements



Sustainable – Can be used without running out (see renewable). The supply is manageable. A good example of a sustainable material is wood



Design Brief – The instructions which detail and describe what is required from the task



Properties – Physical mechanical components such as; density, mass, hardness, and toughness which the material possesses

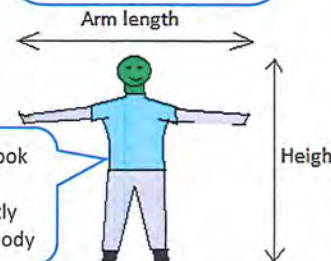


Thermoplastic – A polymer with weak cross link bonding, capable of being reheated and reshaped. **(RECYCLABLE)**

Design – An idea or a concept which has been drawn to include details and features



Proportion – Correctly sized to look realistic. i.e. the arms and legs are correctly proportioned to the rest of the body



Thermosetting plastic – A polymer with strong cross link bonding. **Cannot be reheated or reshaped (NON-RECYCLABLE)**



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.



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

compression tension bending torsion shear

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

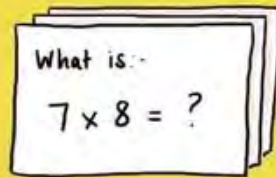
These are some examples of material properties you would need to know

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

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.

Production Skills

A: Production Roles

<p>Director The person responsible for the overall vision and interpretation of the play. They work with actors, designers, and other members of the production team to bring the script to life.</p>	<p>Assistant Director Supports the Director in their duties and may also be responsible for rehearsals and communicating the Director's vision to the cast and crew.</p>	<p>Stage Manager The person responsible for the smooth running of the production, including overseeing rehearsals, calling cues, and ensuring that the performance runs according to schedule.</p>	<p>Technical Director Oversees the technical elements of the production, including set design, lighting, and sound.</p>	<p>Set Designer Designs and creates the visual elements of the production, including the set, props, and costumes.</p>	<p>Lighting Designer Designs the lighting plan for the production, creating mood and atmosphere with light.</p>	<p>Sound Designer Designs and implements the sound elements of the production, including music, sound effects, and audio reinforcement.</p>	<p>Costume Designer Designs and creates the costumes for the production, considering the period, style, and character of the play.</p>	<p>Choreographer Creates and coordinates the movement and dance elements of the production.</p>
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B. Types of Theatre



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

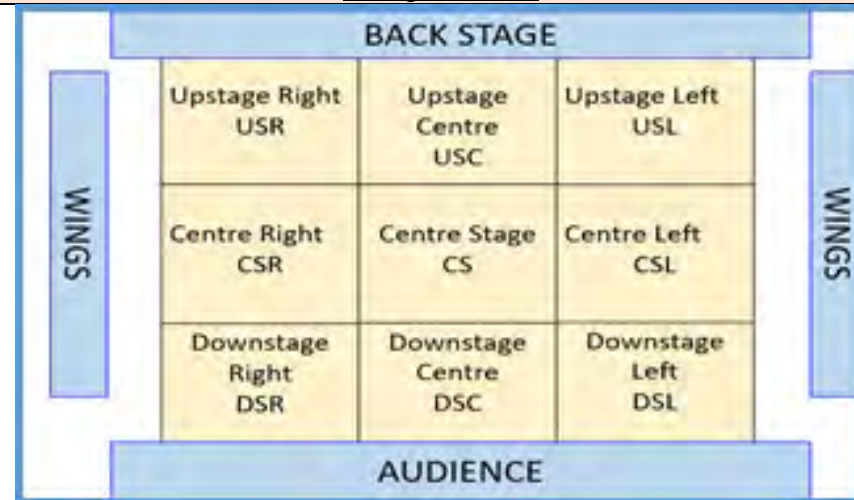


Thrust stage sticks out into the audience, who sit on three sides. There is a back wall that can be used for hanging backdrops and large scenery.



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.

C. Stage Positions





Types of Light



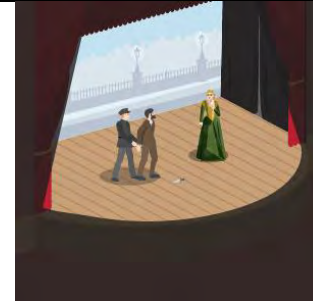
Profile Spotlight

- Hard Edge effect
- Used to light specific characters or elements on stage
- Can be static or moved by a person or computer ('follow spot')
- Can be fitted with coloured filters



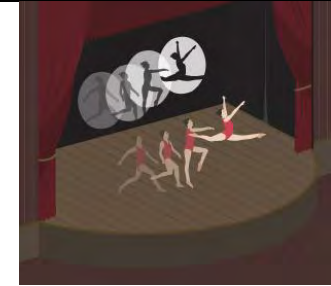
Fresnel

- Soft edged light
- Diffusing lens (look for the rings on the glass)
- Can be combined with others to create a good overall light
- Can be fitted with coloured filters



Floodlight

- Wide-angled light (covers a wide area)
- Little control over the spread of the light (risk of spill)
- Good for a general wash
- Can be fitted with coloured filters

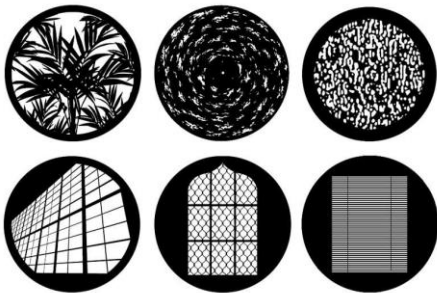


Strobe

- Flashing light, used for special effects
- Old movie effect
- Makes actors' movements appear jerky

Lighting Accessories

Gobo



A small stencilled circular disk used to create projected image or pattern.

Gels/Colour filter



Coloured filters which change the colour of the light output.

Barn doors



Metal flaps that can open and close to change the shape of the light output. Fixed to the front of **fresnel**.

Cyclorama



A fabric hung from a batten at the back of the stage, on which light can be cast to create effects.

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- Twelfth Night:

TC1 - Understanding texts

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

A plot and character summary of 'Macbeth:' Full translation (if on MS Teams) = [Twelfth Night Modern](#)

TWELFTH NIGHT: ONE PAGE SUMMARY

<p>Identical twins Viola and Sebastian are separated by a shipwreck.</p>	<p>Viola disguises herself as a boy named Cesario.</p>	<p>"Cesario" is hired by Orsino as a page boy.</p>
<p>Viola falls in love with Orsino.</p>	<p>Orsino sends "Cesario" to woo the countess Olivia on his behalf.</p>	<p>Olivia falls in love with "Cesario".</p>
<p>Olivia's uncle and servants trick Olivia's steward, Malvolio, into believing that Olivia is in love with him.</p>	<p>Malvolio wears yellow stockings and is locked up for being a madman.</p>	<p>Sebastian arrives in town.</p>
<p>Olivia marries "Cesario" (actually Sebastian).</p>	<p>Viola and Sebastian are reunited.</p>	<p>Everyone gets married.</p>

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TWELFTH NIGHT: Dramatis Personae

<p>VIOLA - a.k.a. "Cesario" - Twin sister of Sebastian - Surprisingly effective cross-dresser</p>	<p>SEBASTIAN - a.k.a. "Roderigo" - Twin brother of Viola - Good at surviving shipwrecks</p>	<p>ORSINO - Duke of Illyria - In love with Olivia - Melodramatic - Kind of fancies boys?</p>
<p>OLIVIA - Capable countess - In mourning for her dead brother - Kind of fancies girls?</p>	<p>SIR TOBY - Olivia's cousin - Perpetual drunkard - Big bully</p>	<p>MALVOLIO - Olivia's steward - Self-important and totally humourless - Secretly in love with Olivia</p>



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 William Shakespeare's play.

E.g. Malvolio is secretly in love with Olivia and is locked up for being crazy for wearing yellow stockings.

Extend yourself by: developing knowledge of the minor characters in the play.

How to analyse the writer's craft- label up the scene to form a good plan of what to say. Example on Duke Orsino below:

Illyria. A room in Duke Orsino's palace.
(Duke of Illyria, Curio; Lords; Musicians; Valentine)

Enter Orsino, Duke of Illyria, Curio, and other Lords; Musicians attending.

ORSINO
If music be the food of love, play on,
Give me excess of it; that surfeiting,
The appetite may sicken, and so die.
That strain again, it had a dying fall;
O, it came o'er my ear like the sweet sound
That breathes upon a bank of violets,
Stealing and giving odor. Enough, no more;
'Tis not so sweet now as it was before.

1
2
3
4
5
6
7
8

Setting = shows how wealthy Orsino is- he doesn't just have a house, he has a palace.

Stage direction = Orsino enters first showing he has the most power.

Simile = Has had a positive experience in love, by saying it is like the sweet music he hears playing.

2 lines later, appears bored of the music- maybe shows he gets bored of love quickly, too!

How to label up scenes when analysing.



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

- Orsino loves Olivia. "My desires, like fell and cruel hounds"
- Orsino is angry that Olivia is in love with Viola/Cesario "I'll sacrifice the lamb that I do love"
- Orsino is tricked by Viola's disguise: I have unclasped / To thee the book even of my secret soul"

Developing this further- discussing audience reaction.

A really effective way to showcase your understanding of the text is by exploring how different audience members may react to different characters/moments. This is how we do this:



ORIGINAL AUDIENCE MIGHT THINK:

Malvolio is foolish to keep chasing a woman is clearly not interested. They would laugh at him for being tricked so easily and perhaps even join in with the other characters in mocking him.

MODERNS AUDIENCES MIGHT THINK

That Malvolio should be treated more fairly by those around him and should be made aware of how much of an idiot he is making himself look. They are likely to be more sympathetic to his mistreatment.



Try to consider, as you read the play, your own reactions to characters/ events. Discuss these reactions with your classmates and see if you all think the same/ react differently!






Threshold Concept- Year 9- Conflict Poetry and Romantic Poetry:

TC1 - Understanding texts

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

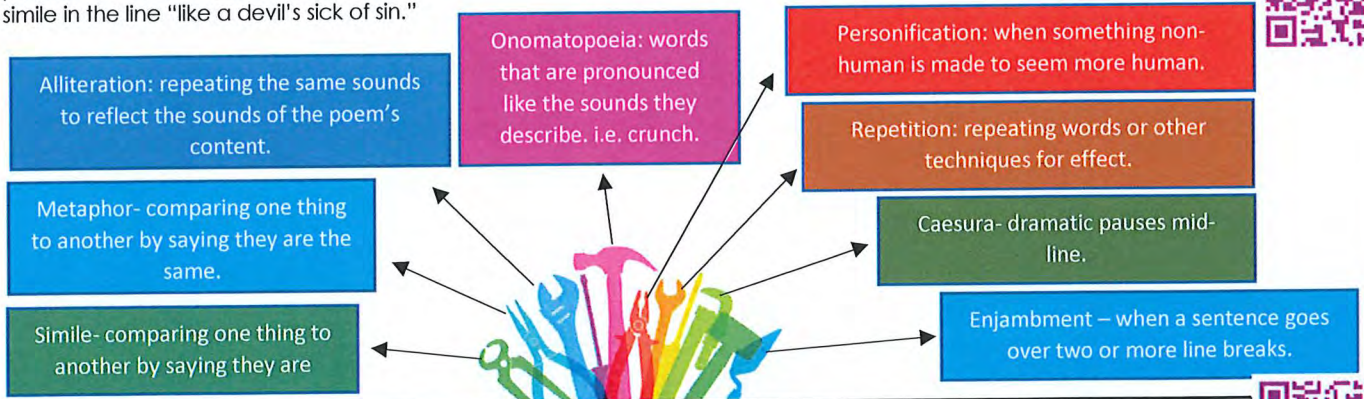
TC3 - Show understanding of the relationships between texts, and the contexts in which they were written.

1 sentence summaries of each poem: Video of all poems summarised (if on MS Teams) = [Summary of the Poems.](#)

 The conflict poems 	 The Romantic poems. 	 <p>You should use this info to get the base knowledge needed for each poem.</p> <p>Using this information can you:</p> <ul style="list-style-type: none"> • Recount the main idea from each poem? • Begin to recount quotations/words/the background in the poems? <p>E.g. London is a poem about all the wrong things the poet sees in the capital of England.</p>
<p>The Manhunt - a woman hunts for her husband, who has been come back from war a different man.</p> <p>The Soldier - a sonnet about the glory of dying in battle.</p> <p>A Wife in London - a woman receives a letter about the death of her husband who was fighting in The Boer War.</p> <p>Dulce Et Decorum Est - a soldier writes about how horrible WW1 truly is.</p> <p>Mametz Wood - a poem about farmers digging up soldiers' bodies in an old battlefield.</p>	<p>Sonnet 43 - a 14 line poem that lists all the way the voice loves someone.</p> <p>London - the poet writes about the disgusting things he can see and hear in the city.</p> <p>She Walks in Beauty - the poet writes about the beautiful of a grieving woman.</p> <p>To Autumn - a poem dedicated to all the greatness of the season.</p> <p>Ozymandias - a sonnet set in a desert about how powerful people all eventually lose their power.</p>	

How to analyse the poet's choices- common poetic features writers use on purpose.

Can you identify these in each of the poems? i.e. Dulce Et Decorum Est uses a simile in the line "like a devil's sick of sin."



Linking the content of the poem to the writer's life/ the history behind it!

This links to the context of the poem, because...

Key terms for conflict poetry:

Patriotism - national pride.

Propaganda - misleading writing that encourages people to think/feel/do something politically.

Shell shock/PTSD - When your mind relives past traumatic events, through memories and nightmares.

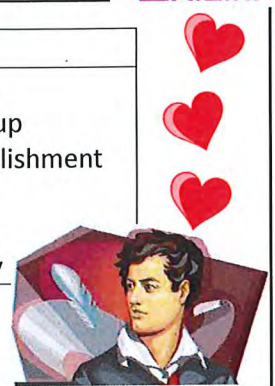


What the Romantic poets loved/hated:

Loved	Hated
Nature	Factories
Childhood	Growing up
Everyday people	The Establishment
Religion/God	Science
The Past	Progress
Equality	Inequality

Using this information can you:

- Identify these beliefs/values/ ideas in the poem?
- Explain what the writer's views of those things are?



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

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

Frequently Misused Words:


	
Alot	A lot
Would of	Would have
Eachother	Each other
Aswell	As well
Inbetween	In between

Homophones


There – Place or position. Their – belonging to them. They're – They are.	Where – Place or position. Were – Plural past tense of 'to be'. We're – We are/We were.
To – Preposition to show motion. Too – Adverb meaning 'also'. Two – Number.	Your – belonging to you. You're – You are.


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,
 Write,
 Check

Syllables
 Ad - ver - tise - ment

Words within words
 business –
 bus in ess
 separate –
 there's a rat in separate

Letter Pattern Links

light bright sight
 fight might

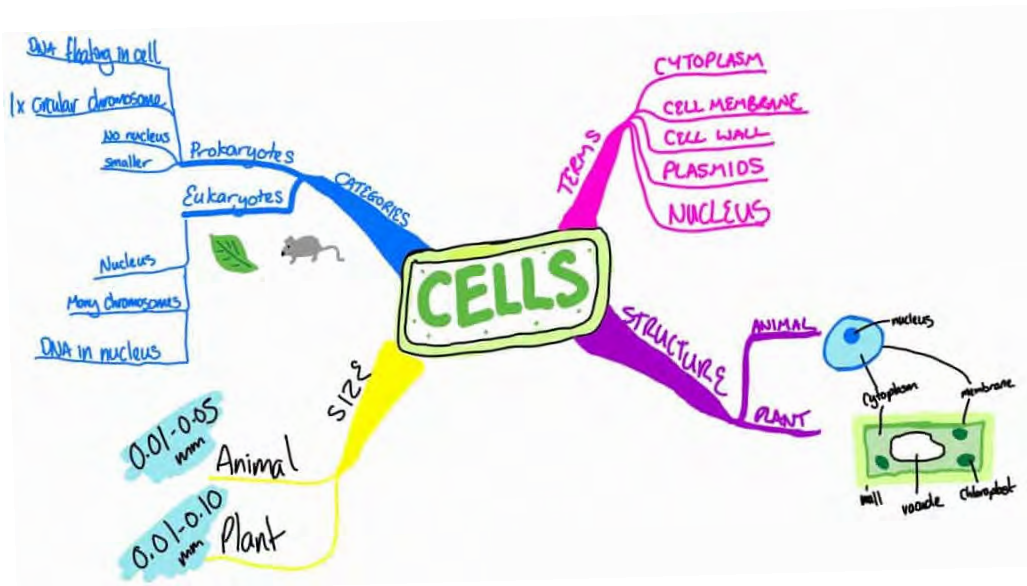
Parts of a sentence: <i>subject, verb, object.</i>	Examples: Every sentence must have a subject and verb .
subject: the person or thing carrying out the action. object: the person or thing that receives the action of the verb.	John ran to the shops. The opera was sung by the soprano.
Active Voice: When 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.	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.
Possessives - indicates who it belongs to	e.g. my, its, his That is <u>her</u> coat.	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.
Demonstratives - points to something specific	e.g. this, that, those <u>These</u> computers are for sale.		
Numbers - tells us how many	e.g. one, two, three <u>Seven</u> dwarves accompanied Snow White.		

Geography

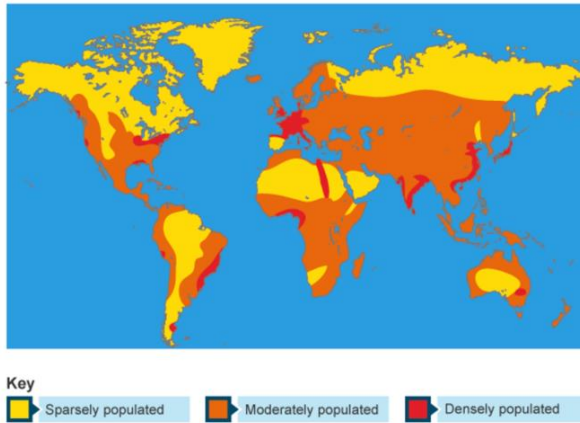


Organise your ideas into a concept map, like the one below that summarises 'cells'. In a concept map, you take the main ideas and link them together with phrases that explain the relationship between the concepts. But, always try to make the concept map from memory first! Then check it with the knowledge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

YEAR 9 Population Knowledge Organiser

Population density

Population density refers to the number of people living in an area. It is worked out by dividing the number of people in an area by the size of the area. If there are few people living in an area this means that it is **sparsely populated**, while a **densely populated** area has many people living there.



Factors affecting population density

Factors that can lead to dense populations include:

- flat or gently sloping land
- mild climate
- good soils
- lowland
- water
- good transport and communication links, e.g. ports
- places to work
- resources, e.g. coal, oil

Factors that can lead to sparse populations include:

- steep slopes
- harsh climate - very hot or very cold
- dense forest
- dry conditions
- isolated areas with poor transport links
- few jobs
- lack of resources

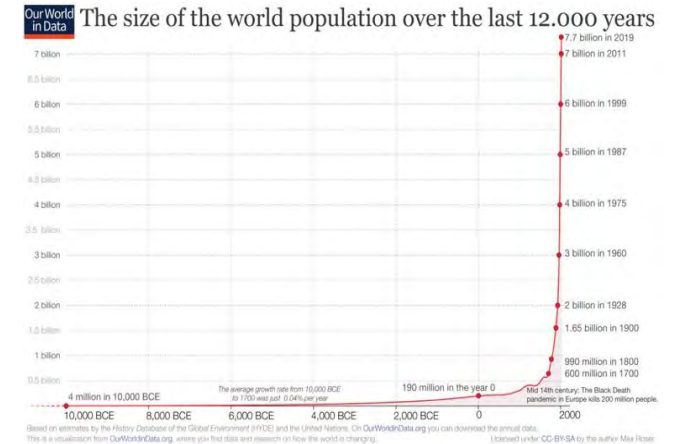
Population changes

The world's population has changed over time. During the 1st century AD, the world population was about 300,000 people. The current population is over 8 billion, and most of the growth has taken place within the last 100 years.

What causes population to change?

- births
- deaths
- migration

Overtime, as healthcare has improved, death rates have continued to fall. The introduction of vaccines has also helped to protect people from diseases. As a result, **life expectancy** has increased.

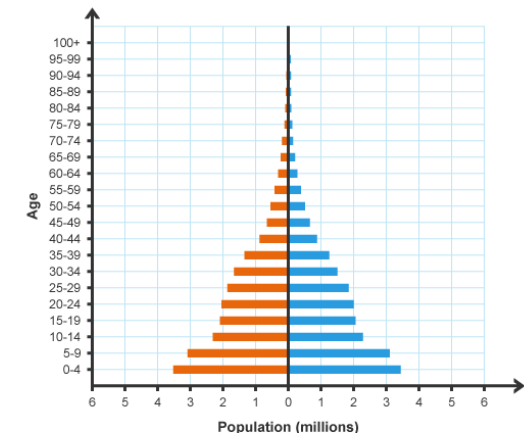


Population Pyramids

Population structures are shown using population pyramids. A population structure refers to the number of males and females in each age group that are found within a specific place.

What does this mean?

- A wide base means there are lots of young people, and suggests a **high birth rate**.
- A narrow base means a smaller proportion of young people, suggesting a **low birth rate**.
- A thin middle, short pyramid means a smaller ageing population, suggesting that there is not a **long-life expectancy**.



While improvements in healthcare have historically lowered death rates, increased access to contraception has lowered birth rates.

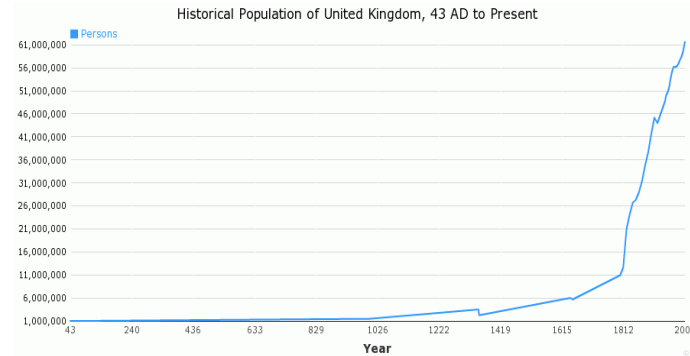
YEAR 9 Population Knowledge Organiser

Key Words

- Ageing Population** – a country with a high proportion of people over the age of 65.
- Birth Rate** – the number of people born per 1000 of the population.
- Death Rate** – the number of people who die per 1000 of the population.
- Densely Populated** – many people living in an area.
- Fertility Rate** – the average number of babies born, per woman in her lifetime.
- Life Expectancy** - the average number of years a person is expected to live.
- Population Density** – the average number of people living in a place per square kilometre.
- Population Growth Rate** – a measure of how quickly the number of people in an area increases.
- Sparsely Populated** – few people living in an area.
- GNI per person** – a measure of people’s wealth.
- Sustainable** – can be carried on into the future without harming people’s quality of life, the economy or the environment.

The UK’s population is growing why?

- **Natural Increase** – more births than deaths
- People are living longer – **ageing population**
- People moving here from other countries – **immigrants** – more immigrants than **emigrants** (people leaving the UK to live in other countries)



Migration Push factors

These are the reasons for why someone would want to move away from a place:

- Lack of services
- War
- Famine (starvation/food shortages)
- Few Jobs
- Natural Disasters

Pull factors

These are the reasons for why someone would want to move to a place:

- Higher quality of life (better homes, etc.)
 - Access to education
 - “Bright Lights” of the city
 - Better healthcare
- Better job opportunities

The Future Key Points

With a global population continuing to rise – the greater the demand for resources – there will be competition for these.
Impacts – habitat loss, more waste, climate change.

Ageing Populations – **HIC’s** – pressure on the working population to support and health care systems – immigrants will be needed.

Very young populations – **LIC’s** – competition for jobs – people may have to emigrate.

Population Growth Around the World

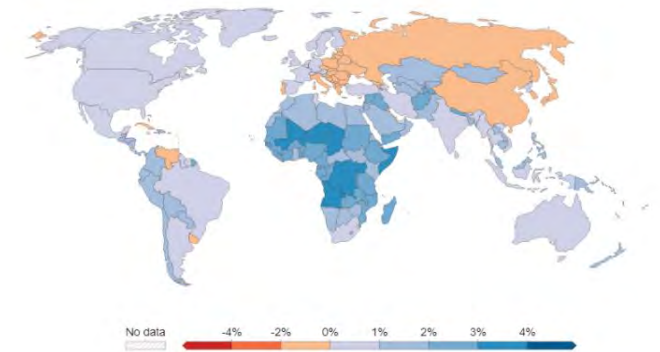
The Earth’s population is growing, but not at the same rate around the world.

HIC’s – low **fertility rates** – why? Women are better educated and go out to work so generally have fewer children. With high costs of living parents opt for smaller families which also helps the planet. Contraception is widely available.

LIC’s – high **fertility rates** – why? Children needed to work and support their families, girls are poorly educated, drop out of school, marry young and have lots of children. Many young women have no access to advice about family planning so have little control over how many children they have.

Population growth rate, 2021

Annual rate of population change from 1950, including UN projections to 2100 based on its median scenario. This takes births, deaths and migration into account.



Source: United Nations - Population Division (2022)

OurWorldInData.org/world-population-growth/ - CC BY

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 2 - How did Russia change between 1800 and 1989?

Key Terms

Autocracy	A country ruled by one person. All things are controlled by that person.
Serf	The name given to Russian peasants/ farmers.
Tsar	The King of Russia.
Bolshevik	The name of the Political party with led a Revolution in Russia in 1917.
Revolution	A great change. This could be a change in technology or leadership.
Communism	A belief system that everyone is equal and everything should be shared by all.
Capitalism	A belief system that people can be in different social classes and earn money based on their work.

Key events in order



Key individuals

Tsar Nichols II

Last Tsar of Russia. Led Russia into World War One showing its weakness. Led the country autocratically meaning he controlled everything. The serfs did not like him.

Lenin

First Communist leader of Russia. Led the Bolshevik Revolution and developed the USSR in 1922. Considered a hero in Russia for the changes he made.

Stalin

Second Communist leader of Russia. Introduced 5 year plans to try and change Russia, they were harsh and did not always work. He also introduced Gulags and led Russia through the 'Red Terror'

Threshold Concepts linked to this unit:

TC29 The development of Russia from Autocratic rule to Communist Nation had a significant impact globally and for the people of Russia.

TC30 The outlook on the significance of individuals and events will change over time.

Key fact

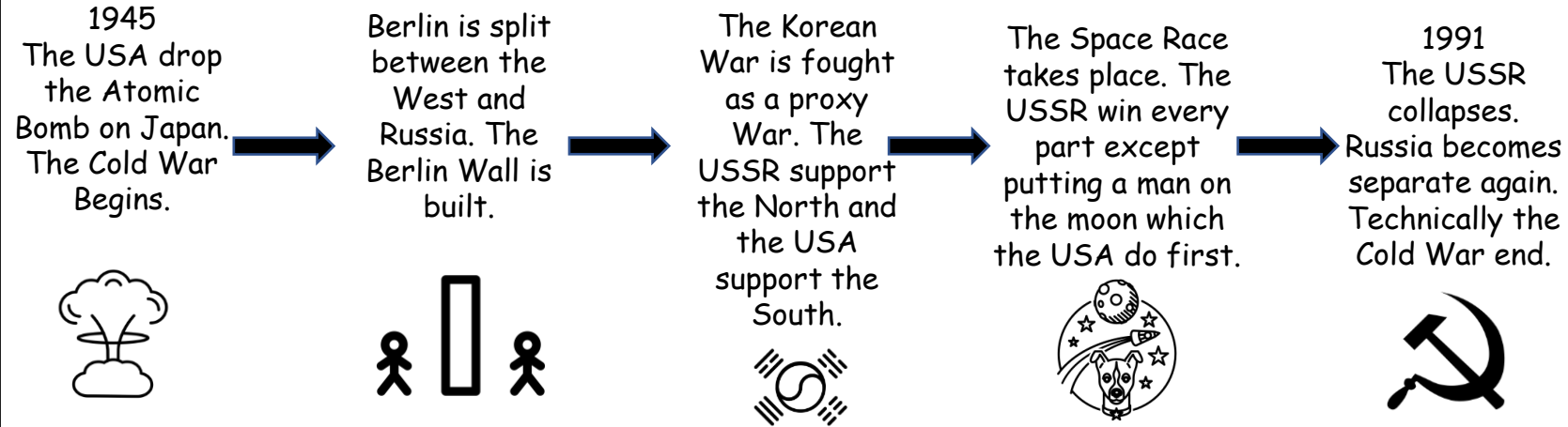
Russia has been an important part of global history for hundreds of years. Russia's biggest impact has been since the Bolshevik Revolution in 1917 when Russia became a Communist country. This would lead to the Cold War.

Year 9 - History Knowledge Organiser - Unit 3 - What was the Cold War?

Key Terms

Cold War	A war fought between countries with no fighting taking place.
Communism	A belief system that everyone is equal and everything should be shared by all.
Capitalism	A belief system that people can be in different social classes and earn money based on their work.
Proxy War	A war where larger countries support smaller countries and fight each other through the smaller countries.
Space Race	The name given to the race to moon carried out between the USA and USSR
USSR	The collection of countries joined with Russia as a large communist superpower.

Key events in order



Key differences between Communism and Capitalism

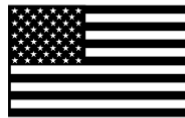


Capitalism

Main Superpower: USA

Main ideas:

- 1) Private property can be owned.
- 2) Different social classes exist and you can improve.
- 3) You can earn your own money and become wealthy.



Communism

Main Superpower: USSR

Main ideas:

- 1) Everyone is equal and everything is controlled by the state.
- 2) Everything you do is for the good of the state not for your own improvement.



Threshold Concepts linked to this unit:

TC31 The Cold War shows that it is possible for superpowers to fight against each other without actively entering combat.

TC32 Tensions can arise between countries for a number of reasons including ideological differences.

Key fact

The Cold War is considered by some to still be taking place. Some Historians see this is a war between Communism and Capitalism rather than between the USA and USSR. Some say as long as these 2 ideas exist then the Cold War will too.

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 NUMBER... Numbers

@whisto_maths

What do I need to be able to do?

- By the end of this unit you should be able to:
- Identify integers, real and rational numbers
 - Work with directed number
 - Solve problems with number
 - Find HCF/ LCM
 - Add/ Subtract fractions
 - Multiply/ Divide fractions
 - Write numbers in standard form

Keywords

- Integer:** a whole number that is positive or negative
Rational: a number that can be made by dividing two integers
Irrational: a number that cannot be made by dividing two integers
Inverse operation: the operation that reverses the action
Quotient: the result of a division
Product: the result of a multiplication
Multiples: found by multiplying any number by positive integers
Factor: integers that multiply together to get another number

Integers, real and rational numbers

Rational – root word: ratio

Real numbers: $\frac{2}{3}$ stems from 2 | $\frac{2}{3}$ of the whole

Irrational numbers: $\sqrt{2}$ the solution is a decimal that never ends and does not repeat

The square root of a negative is not a real number and cannot be found

HCF/LCM

1 is a common factor of all numbers

Common factors are factors two or more numbers share

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

HCF = 6

LCM – Lowest common multiple

LCM of 9 and 12

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

12: 12, 24, 36, 48, 60

LCM = 36

The first time their multiples match

Standard form

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

$$6 \times 10^5 + 8 \times 10^5$$

$$= 600000 + 800000$$

$$= 1400000$$

$$= 1.4 \times 10^6$$

$$(1.5 \times 10^5) \div (0.3 \times 10^3)$$

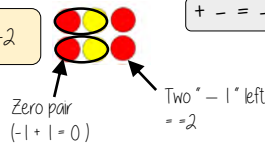
$$15 \div 0.3 \times 10^5 \div 10^3$$

$$= 5 \times 10^2$$

Directed number

Addition

$$2 + -4 = -2$$



Subtraction

$$2 - -1 = 3$$

Representation for calculation

$$2 - -1 = 3$$

Take away one

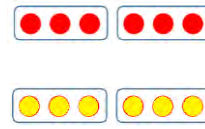
Start with the representation of 2

Generalisation

$$- - = +$$

"Subtract" – means take away or remove

Multiplication



$$-2 \times -3 = 6$$

Divisions are the inverse operations

Red = -1
Yellow = 1

The act of making counters into their negative is turning them over



$$a = 5$$

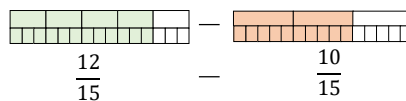
$$b = -4$$

Brackets around negative substitutions helps remove calculation errors

$$2a - b = 2 \times 5 - (-4) = 10 + 4 = 14$$

Addition/ Subtraction of fractions

$$\frac{4}{5} - \frac{2}{3}$$



$$= \frac{2}{15}$$

Use equivalent fractions to find a common multiple for both denominators

Multiplication/ Division of fractions

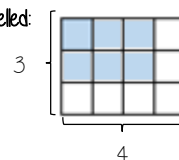
$$\frac{3}{4} \times \frac{2}{3}$$

This many columns

This many rows

$$\frac{3}{4} \times \frac{2}{3} = \frac{6}{12}$$

Modelled:



Parts shaded

Total number of parts in the diagram

Remember to use reciprocals

$$2 \div \frac{3}{4}$$

$$2 \times \frac{4}{3}$$

Multiplying by a reciprocal gives the same outcome

Represented



$$= \frac{8}{3}$$

YEAR 9 — REASONING WITH NUMBER... Using Percentages

@whisto_maths

What do I need to be able to do?

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

- Use FDP equivalence
- Calculate percentage increase and decrease
- Express percentage change
- Solve reverse percentage problems
- Solve percentage problems (calculator and non calculator problems)

Keywords

Percent: parts per 100 — written using the % symbol

Decimal: a number in our base 10 number system. Numbers to the right of the decimal place are called decimals.

Fraction: a fraction represents how many parts of a whole value you have.

Equivalent: of equal value.

Reduce: to make smaller in value.

Growth: to increase/ to grow.

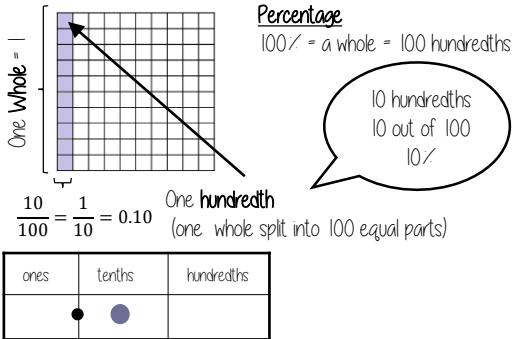
Integer: whole number, can be positive, negative or zero.

Invest: use money with the goal of it increasing in value over time (usually in a bank).

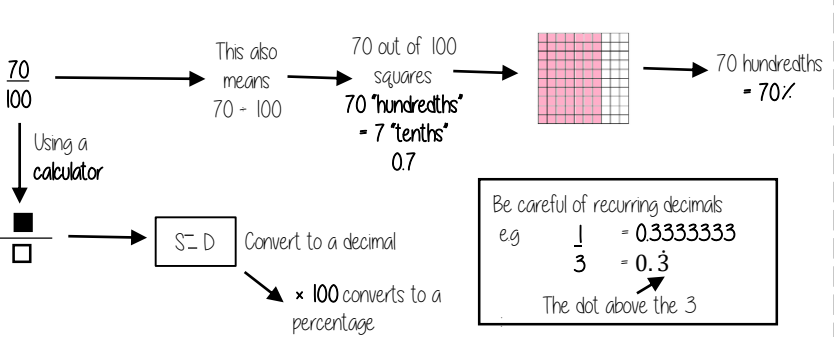
Multiplier: the number you are multiplying by.

Profit: the income take away any expenses/ costs.

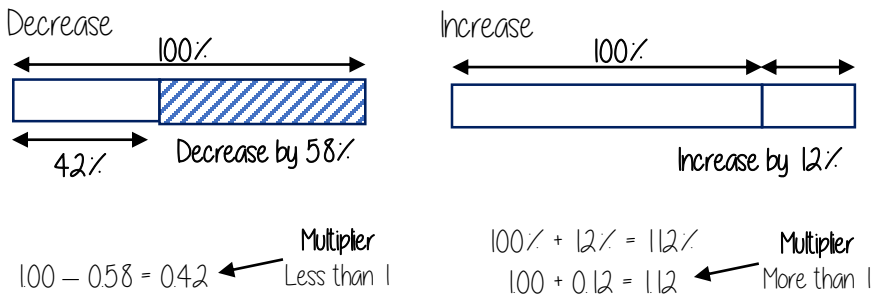
FDP Equivalence



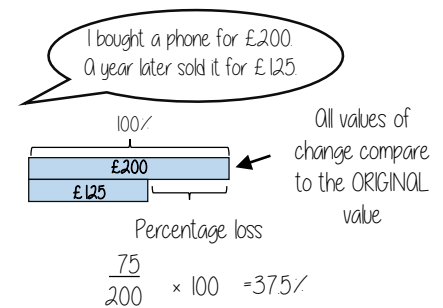
Converting FDP



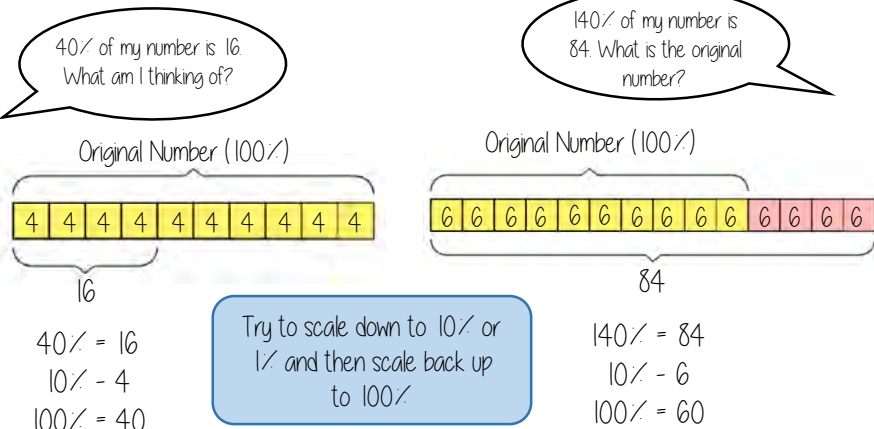
Percentage Increase/ Decrease



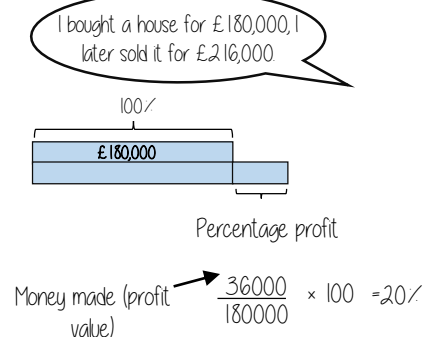
Percentage change



Reverse Percentages



$$\frac{\text{Difference in values}}{\text{Original value}} \times 100$$



YEAR 9 — REASONING WITH NUMBER... Maths & Money

@whisto_maths

What do I need to be able to do?

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

- Solve problems with bills and bank statements
- Calculate simple interest
- Calculate compound interest
- Calculate wages and taxes
- Solve problems with exchange rates
- Solve unit pricing problems

Keywords

- Credit:** money being placed into a bank account
- Debit:** money that leaves a bank account
- Balance:** the amount of money in a bank account
- Expense:** a cost/ outgoing
- Deposit:** an initial payment (often a way of securing an item you will later pay for)
- Multiplier:** a number you are multiplying by. (Multiplier more than 1 = increasing, less than 1 = decreasing)
- Per Annum:** each year
- Currency:** the type of money a country uses.
- Unitary:** one — the cost of one.

Bills and Bank Statements

Bills — tell you the amount items cost and can show how much money you need to pay.

Some can include a total
Look for different units
(Is it in pence or pounds)

Menu	Price
Milk	89p
Tea	£1.50

Bank Statements

Bank statement can have negative balances if the money spent is higher than the money coming into the account

Date	Description	Credit	Debit	Balance
19 th Sept	Salary	£1500		£1500
19 th Sept	Mortgage		£600	£900
25 th Sept	Bday Money	£15		£915

Simple Interest

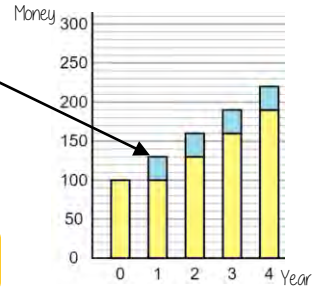
For each year of investment the interest remains the same

$$\frac{\text{Principal amount} \times \text{Interest Rate} \times \text{Years}}{100}$$

Principal amount is the amount invested in the account
e.g Invest £100 at 30% simple interest for 4 years

$$\frac{100 \times 30 \times 4}{100} = £120$$

This account earned **£120** interest.
At the end of year 4 they have **£220**



Compound Interest

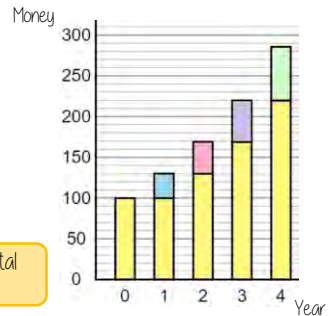
Interest is added to the current value of investment at the end of each year so the next year's interest is greater.

$$\text{Principal amount} \times \text{Multiplier}^{\text{Years}}$$

e.g Invest £100 at 30% compound interest for 4 years

$$100 \times 1.3^4 = £285.61$$

This account has **£285.61** in total at the end of the 4 years.



Value Added Tax (VAT)

VAT is payable to the government by a business. In the UK VAT is 20% and added to items that are bought.

Essential items such as food do not include VAT.

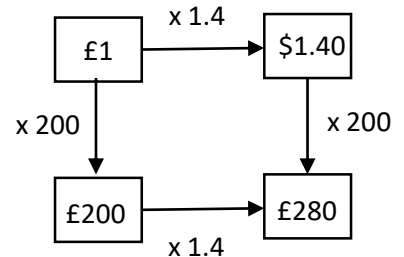
Wages and Taxes

Salaries fall into tax brackets — which means they pay this much each month from their salary.

Taxable Income	Tax Rate
£12 501 to £50 000	20%
£50 001 to £150 000	40%
over £150 000	45%

Over time:
Time and a half — means 1.5 times their hourly rate
Double — 2 times their hourly rate

Exchange Rates



When making estimates it is also useful to use estimates to check if our solution is reasonable.

Use inverse operations to reverse the exchange process

Common Currencies

United Kingdom	£	Pounds
United States of America	\$	Dollars
Europe	€	Euros

Unit Pricing

4 Oranges £1	5 cupcakes £1.20
-----------------	---------------------

$$\begin{array}{l} 4 = £1.00 \\ 2 = £0.50 \\ 1 = £0.25 \end{array} \left. \begin{array}{l} \div 2 \\ \div 2 \end{array} \right\} \begin{array}{l} 5 = £1.20 \\ 1 = £0.20 \end{array}$$

Cost per Unit

To calculate unit per cost you divide by the cost.

Cupcakes are the best value as one item has the cheapest value

There is a directly proportional relationship between the cost and number of units.

YEAR 9 — REASONING WITH GEOMETRY... Deduction

@whisto_maths

What do I need to be able to do?

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

- Identify angles in parallel lines
- Solve angle problems
- Make conjectures with angles
- Make conjectures with shapes

Keywords

- Parallel:** two straight lines that never meet with the same gradient
Perpendicular: two straight lines that meet at 90°
Transversal: a line that crosses at least two other lines.
Sum: the result of adding two or more numbers.
Conjecture: a statement that might be true but is not proven
Equation: a statement that says two things are equal
Polygon: a 2D shape made from straight edges.
Counterexample: an example that disproves a statement

Alternate angles

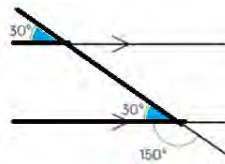
Because alternate angles are equal the highlighted angles are the same size



R

Corresponding angles

Because corresponding angles are equal the highlighted angles are the same size

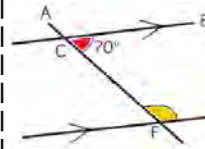


R

Co-interior angles

Because co-interior angles have a sum of 180° the highlighted angle is 110°

As angles on a line add up to 180° co-interior angles can also be calculated from applying alternate/ corresponding rules first



R

Solving angle problems

Link angle facts to algebra

Form an equation

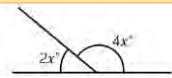
State the reason

Solve

Angles on a straight Line



180°



$$2x + 4x = 180^\circ$$

The sum of angles on a straight line is 180°

$$2x + 4x = 180^\circ$$

$$6x = 180^\circ$$

$$x = 30^\circ$$



Vertically opposite angles

Equal

Angles around a point

360°



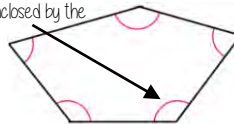
Triangles

Sum of angles is 180°

Isosceles have the same base angles

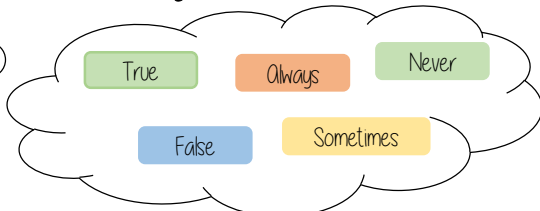
Interior Angles

The angles enclosed by the polygon



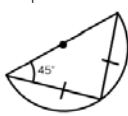
$$(\text{number of sides} - 2) \times 180$$

Making conjectures with angles



Proving a conjecture

A pattern is noticed for many cases



Apply the angle rules

The sum of angles in a triangle is 180°

$$180 - 70 - 20 = 90$$

$$180 - 85 - 5 = 90$$

$$180 - 45 - 45 = 90$$

Disproving a conjecture

Only one counterexample is needed to disprove a conjecture

Make conjecture

The angle that meets the circumference in a semi circle is 90°

Making conjectures with shapes

Keywords and facts to recall with shape

Area: the amount of space inside a shape

Perimeter: the length around a shape

Regular Polygons: All sides and angles are equal

Quadrilateral Facts



Square

All sides equal size
 All angles 90°
 Opposite sides are parallel



Rectangle

All angles 90°
 Opposite sides are parallel



Rhombus

All sides equal size
 Opposite angles are equal



Parallelogram

Opposite sides are parallel
 Opposite angles are equal
 Co-interior angles



Kite

No parallel lines
 Equal lengths on top sides
 Equal lengths on bottom sides
 One pair of equal angles

YEAR 9 — REASONING WITH GEOMETRY... Rotation & Translation

@whisto_maths

What do I need to be able to do?

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

- Identify the order of rotational symmetry
- Rotate a shape about a point on the shape
- Rotate a shape about a point not on a shape
- Translate by a given vector
- Compare rotations and reflections

Keywords

Rotate: a rotation is a circular movement

Symmetry: when two or more parts are identical after a transformation

Regular: a regular shape has angles and sides of equal lengths

Invariant: a point that does not move after a transformation

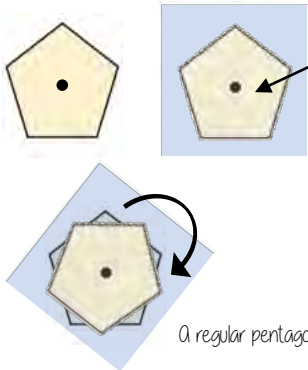
Vertex: a point two edges meet

Horizontal: from side to side

Vertical: from up to down

Rotational Symmetry

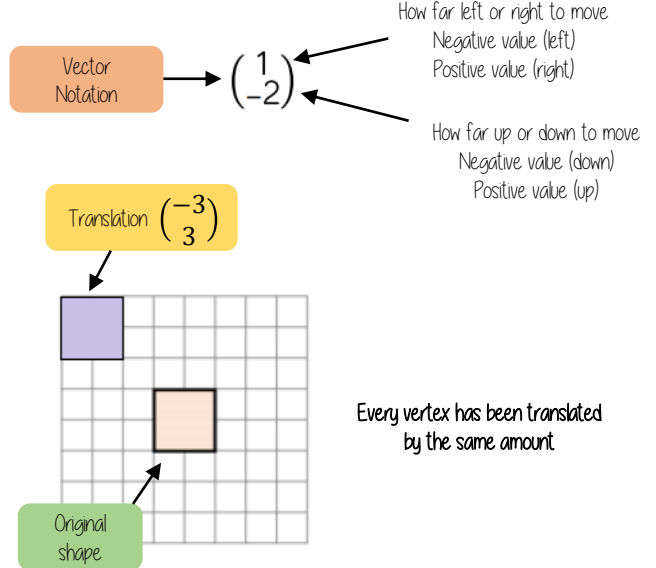
Tracing paper helps check rotational symmetry



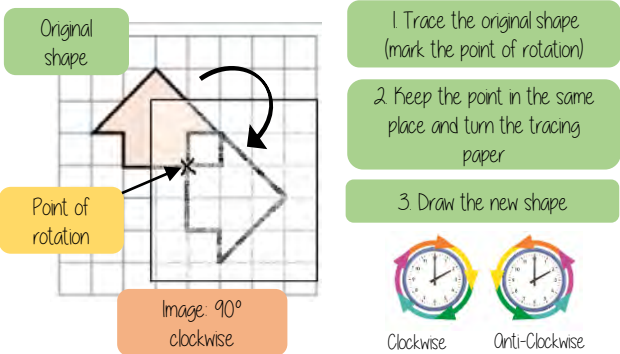
- 1 Trace your shape (mark the centre point)
- 2 Rotate your tracing paper on top of the original through 360°
- 3 Count the times it fits back into itself

A regular pentagon has rotational symmetry of order 5

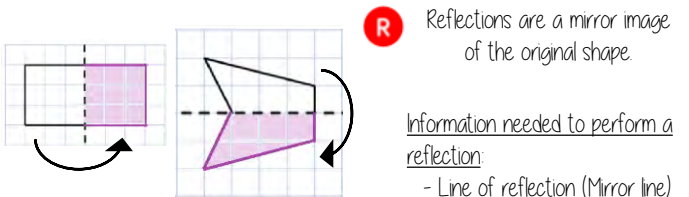
Translation and vector notation



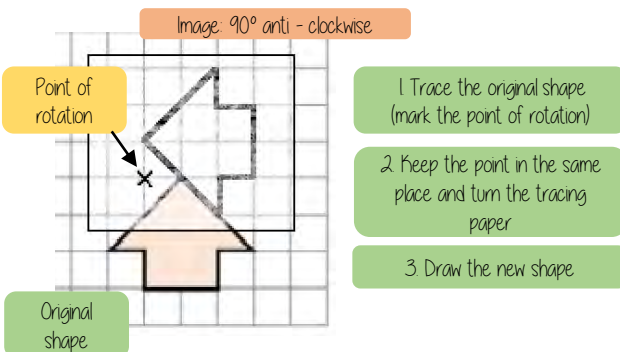
Rotate from a point (in a shape)



Compare rotations and reflections



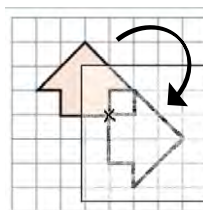
Rotate from a point (outside a shape)



Rotations are the movement of a shape in a circular motion

Information needed to perform a rotation:

- Point of rotation
- Direction of rotation
- Degrees of rotation



YEAR 9 — REASONING WITH GEOMETRY... Pythagoras' theorem

@whisto_maths

What do I need to be able to do?

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

- Use square and cube roots
- Identify the hypotenuse
- Calculate the hypotenuse
- Find a missing side in a Right angled triangle
- Use Pythagoras' theorem on axes
- Explore proofs of Pythagoras' theorem

Keywords

Square number: the output of a number multiplied by itself

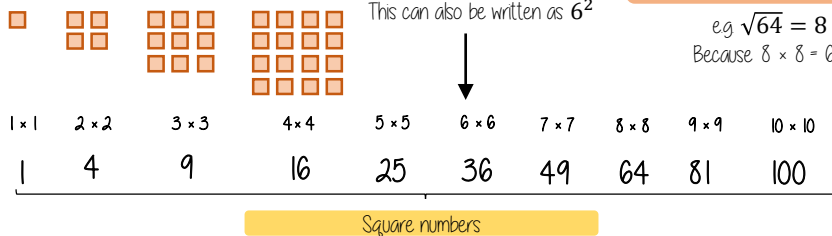
Square root: a value that can be multiplied by itself to give a square number

Hypotenuse: the largest side on a right angled triangle. Always opposite the right angle.

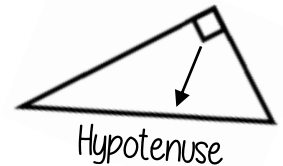
Opposite: the side opposite the angle of interest

Adjacent: the side next to the angle of interest

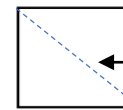
Squares and square roots



Identify the hypotenuse

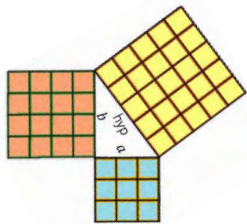


The hypotenuse is always the longest side on a triangle because it is opposite the biggest angle.



Polygons can still have a hypotenuse if it is split up into triangles and opposite a right angle

Determine if a triangle is right-angled



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

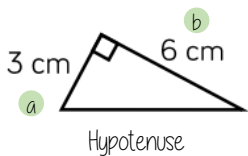
$$a^2 + b^2 = \text{hypotenuse}^2$$

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

$$\begin{aligned} 3^2 + 4^2 &= 5^2 \\ 9 + 16 &= 25 \end{aligned}$$

Substituting the numbers into the theorem shows that this is a right-angled triangle

Calculate the hypotenuse



Either of the short sides can be labelled a or b

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

1 Substitute in the values for a and b

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

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

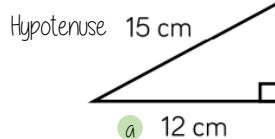
$$45 = \text{hypotenuse}^2$$

2 To find the hypotenuse square root the sum of the squares of the shorter sides

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

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

Calculate missing sides



Either of the short sides can be labelled a or b

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

$$12^2 + b^2 = 15^2$$

1 Substitute in the values you are given

$$144 + b^2 = 225$$

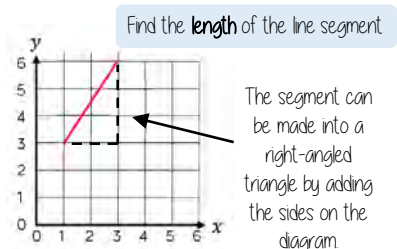
Rearrange the equation by subtracting the shorter square from the hypotenuse squared

Square root to find the length of the side

$$b^2 = 111$$

$$b = \sqrt{111} = 10.54\text{ cm}$$

Pythagoras' theorem on a coordinate axis



The line segment is the hypotenuse

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

The lengths of a and b are the sides of the triangle.

Be careful to check the scale on the axes

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 Knowledge Organiser

Multiplication and Division Facts:

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

Prime Numbers up to 100:

2	3	7	11	13	17	19	23	29	31	37	41
43	47	53	59	61	67	71	73	79	83	89	97

Finding Percentages by hand:

Find 50%	Divide by 2
Find 10%	Divide by 10
Find 1%	Divide by 100

Fraction, Percentages and Equivalents:

<u>Fraction</u>	<u>Decimals</u>	<u>Percentage</u>
1/2	0.5	50%
1/4	0.25	25%
3/4	0.75	75%
1/3	0.3	33.3%
2/3	0.6	66.6%
1/5	0.2	20%
1/10	0.1	10%

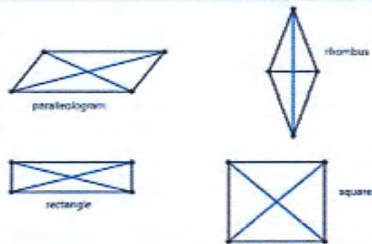
Place Value Table

Million	H Th	T Th	Th	H	T	U	•	Tenths	Hundreths	Thousandths
1,000,000	100,000	10,000	1000	100	10	1		1/10	1/100	1/1000

2D Shapes

Properties of shapes

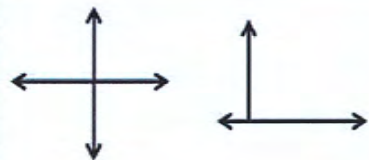
Diagonal: A diagonal is a straight line that joins any two corners which are not adjacent. Diagonals do not always cut a shape in half or go through the middle.



Parallel lines: Parallel lines are the same distance apart no matter how long they are. Parallel lines can never cross each other.

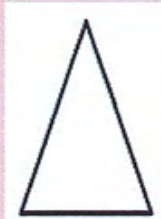


Perpendicular lines: Lines are perpendicular if they meet at right angles.



Triangles

Equilateral:



- Three sides are the same length
- Three equal angles

Isosceles:



- Two sides are the same length
- Two angles are equal

Scalene:



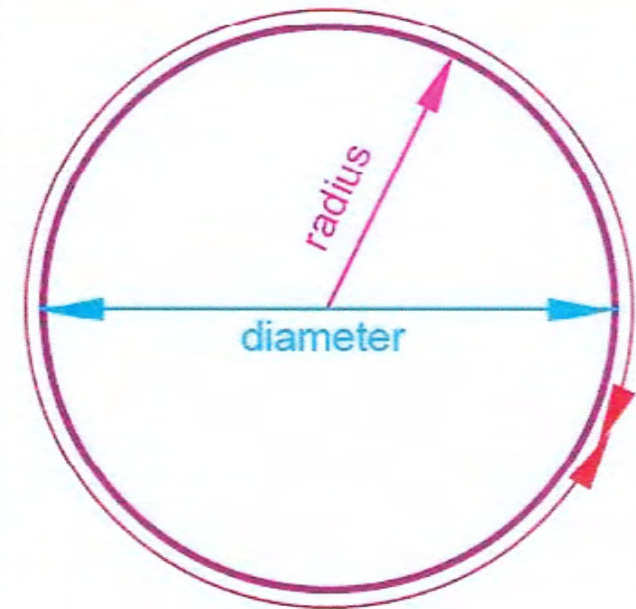
- No sides are the same length
- All angles are different sizes

Right-angled:



- Contains one right angle
- Can be isosceles or scalene

Parts of a circle



Radius:

A straight line from the centre of a circle to the circumference.

Diameter:

A straight line from one side of a circle to the other. It must go through the centre.

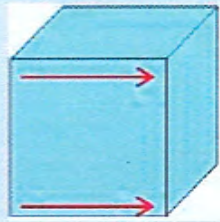
Circumference

The distance all the way round a circle. It is the perimeter of a circle.

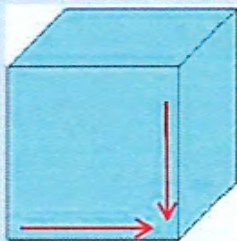
3D Shapes

Edges

Parallel edges: Parallel edges are the same distance apart no matter how long they are.



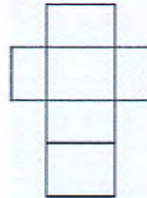
Perpendicular edges: Edges are perpendicular if they meet at right angles.



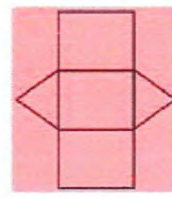
Nets of 3D shapes



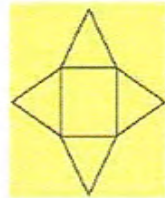
Cube
Faces: 6
Edges: 12
Vertices: 8



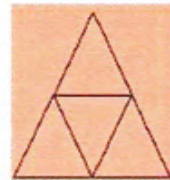
Cuboid
Faces: 6
Edges: 12
Vertices: 8



Triangular Prism
Faces: 5
Edges: 9
Vertices: 6



Square-based Pyramid
Faces: 5
Edges: 8
Vertices: 5



Tetrahedron
(Triangular-based Pyramid)
Faces: 4
Edges: 6
Vertices: 4



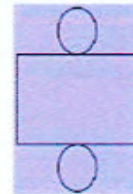
Cone
Faces: 2
Edges: 1
Vertices: 0 or 1



Hexagonal Prism
Faces: 8
Edges: 18
Vertices: 12



Hexagonal Pyramid
Faces: 7
Edges: 12
Vertices: 7

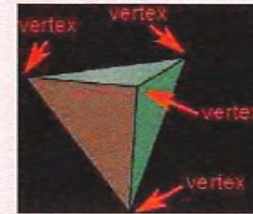


Cylinder
Faces: 3
Edges: 2
Vertices: 0

Vocabulary

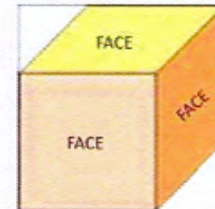
A vertex is a point at which two or more lines meet in an object or shape.

Vertex:



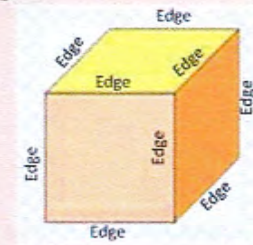
A face is the side of a solid shape. It usually means flat faces. The base of a shape is also a face.

Face:



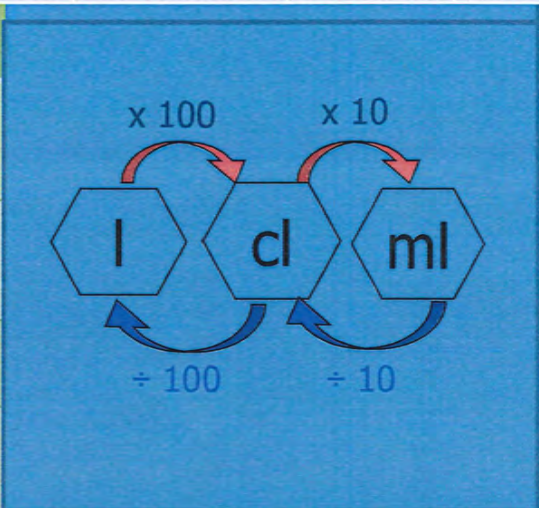
The edge of a shape is where two faces meet. An edge can be curved or straight.

Edge:



Conversion facts: Capacity		Some key vocabulary- word origins			
1 litre = 1000 ml		Milli	one thousand	Mass	How heavy something is
1 cl = 10 ml		Centi	one hundredth	Capacity	How much something can hold
		Kilo	one thousand	Length	How long or wide something is

Key Vocabulary	
Convert	Change from one metric to another. For example: changing from seconds to minutes.
Conversion fact	A fact used to help you convert between metrics. For example: there are 60 minutes in an hour.
millilitre	A unit of measure used to measure a small capacity or volume
litre	A unit of measure used to measure a large capacity or volume
centilitre	A unit of measure used to measure a small capacity or volume



Volume

Volume = Length x Width x Depth
 = 8 cm x 5 cm x 3 cm
 = 120 cm³

- To calculate volume: length x width x depth
- What is it?: the amount of space that a substance or object occupies

Example question

There are two containers. One of them holds 750 millilitres and other 0.5 litres.
 Which container holds the greater amount? How much more does it hold? Give your answer in millilitres.

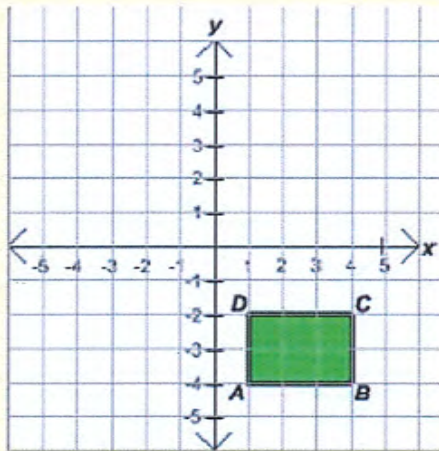
- Step 1:** Ensure all units are the same. Convert all to millilitres.
- Step 2:** Use the conversion fact that will help you. In this case it would be that there are 1000ml in 1 litre.
- Step 3:** Now you are ready to select the correct operation required

Measurement: Capacity

What is appropriate to measure with...	
Litres	bottles of water, a bath
Millilitres	a jug of milk, medicine on a spoon, toothpaste
Centilitre	a small glass of liquid

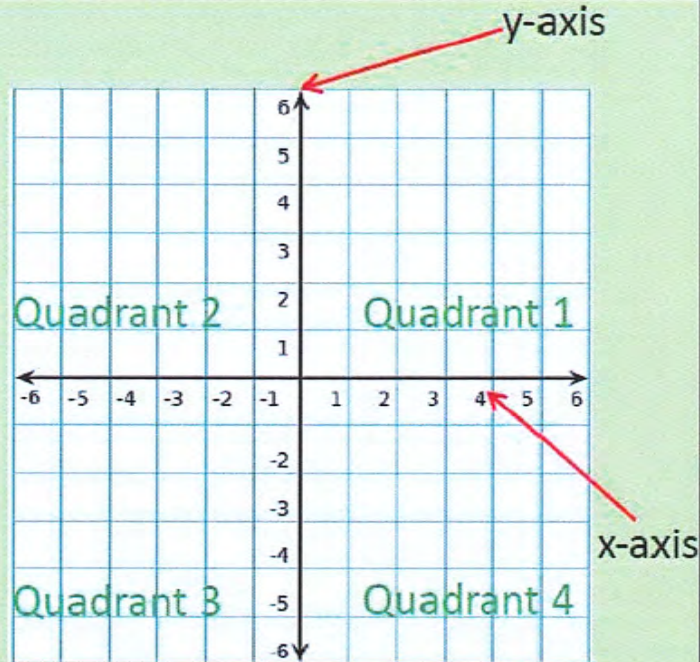
Describing positions

When identifying or plotting points on a coordinate grid, the first number will always represent the **x axis** and the second number will always represent the **y axis**.



E.g. The location of point A is (1, -4)
 The location of point B is (4, -4)
 The location of point C is (4, -2)
 The location of point D is (1, -2)

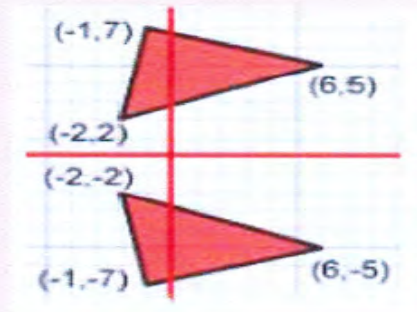
Coordinates



Quadrant	The axes of a graph divide the graph into four quadrants.
x-axis	The horizontal axis of a graph is called the x axis.
y-axis	The vertical axis of a graph is called the y axis.
Coordinates	Coordinates are two numbers or letters that describe a position on maps, graphs and charts.

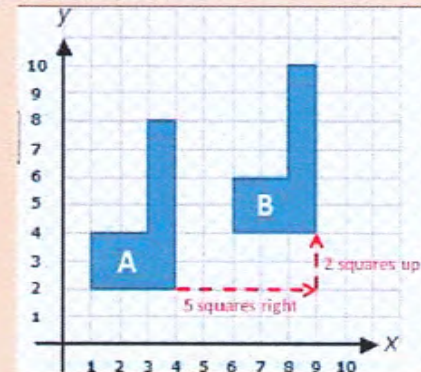
Reflection

When you reflect a shape, you draw its mirror image in a different quadrant/quadrants. The reflected shape will have different coordinates.



Translation

When you translate a shape, you slide it to a different position. You do not turn or rotate the shape. In the example below, shape A has been translated 2 squares up and 5 squares right.



Conversion facts: Length	Some key vocabulary- word origins			
100cm = 1 m	Milli	one thousand	Mass	How heavy something is
10mm = 1cm	Centi	one hundredth	Capacity	How much something can hold
1 km = 1000 m	Kilo	one thousand	Length	How long or wide something is

Key Vocabulary	
Convert	Change from one metric to another. For example: changing from seconds to minutes.
Conversion fact	A fact used to help you convert between metrics. For example: there are 60 minutes in an hour.
Perimeter	The measurement around the outside of a shape
Area	The amount of space inside the boundary of a flat (2-dimensional) object such as a triangle or circle
Composite shape	A shape that can be divided into more than one of the basic shapes is said to be a composite shape
Metres	the unit of length in the metric system, equal to 100 centimetres
kilometres	a metric unit of measurement equal to 1,000 metres
miles	a unit of linear measure equal to 1,760 yards
metric	A system of measurement using centimetres, metres, kilometres
imperial	Non-metric units: ounce, pound, stone, inch, foot, yard, mile, acre, pint, gallon

Measurement: Length

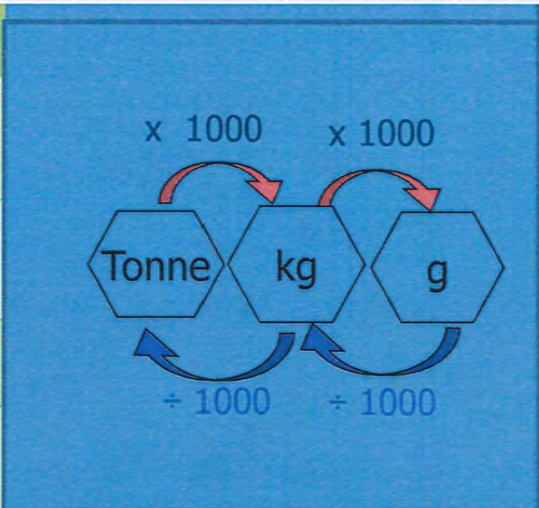
Example conversion

e.g metres to centimetres:
 $0.8\text{m} = 0.8 \times 100 = 80\text{ cm}$
 $0.06\text{m} = 0.06 \times 100 = 6\text{ cm}$

What is appropriate to measure with...	
Millimetres	a staple, a pile of papers
Centimetres	a rug, a table, how tall we are
Metres	width of a room, playground
Kilometres	the distance from one city to another, the distance a plane flies

Conversion facts: Mass		Some key vocabulary- word origins			
1 kg = 1000 grams	1 tonne = 1000 kilograms	Milli	one thousand	Mass	How heavy something is
		Centi	one hundredth	Capacity	How much something can hold
		Kilo	one thousand	Length	How long or wide something is

Key Vocabulary	
Convert	Change from one metric to another. For example: changing from seconds to minutes.
Conversion fact	A fact used to help you convert between metrics. For example: there are 60 minutes in an hour.
gram	A metric unit of mass equal to one thousandth of a kilogram.
kilogram	A metric unit of mass equal to one thousand grams
tonne	A tonne is a metric unit used to measure mass or weight. A tonne equals 1000 kilograms



Example conversion

A pineapple has a mass of 2.12 kg.
Find the mass in grams.

1 kg = 1000 g

2.12 kg →

- Make sure you know your appropriate conversion fact
- Multiply or divide as needed
- Ensure you are using the correct metric units (grams, kilograms)

Example question

A box contains bags of crisps. Each bag of crisps contains 25 grams. Altogether, the bags of crisps inside the box weight 1 kilogram. How many bags of crisps are inside the box?

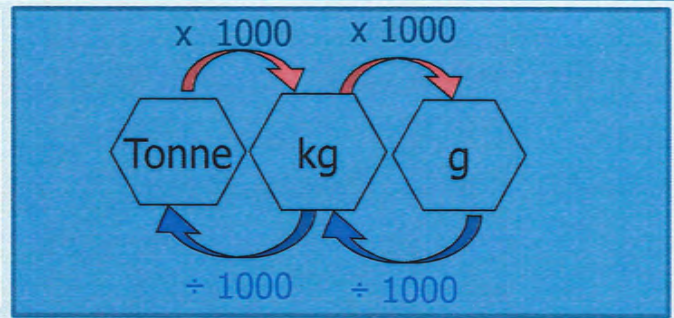
- **Step 1:** Ensure all units are the same. Convert all to grams.
- **Step 2:** Use the conversion fact that will help you. In this case it would be that there are 1000g in 1kg.
- **Step 3:** Now you are ready to select the correct operation required

Measurement: Mass

What is appropriate to measure with...	
Milligrams	Medicine, vitamins and other small objects
Grams	paperclips, a loaf of bread
Kilograms	people, a bag of sand
Tonnes	car, truck, a large cargo box

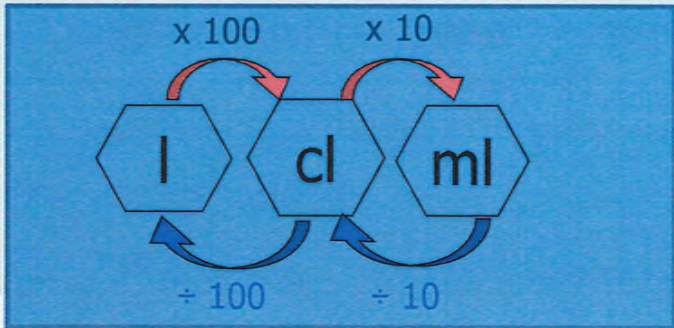
1. Conversion facts: Mass	
1 kg = 1000 grams	
1 tonne = 1000 kilograms	

What is appropriate to measure with...	
Grams	paperclips, a loaf of bread
Kilograms	people, a bag of sand
Tonnes	car, truck, a large cargo box



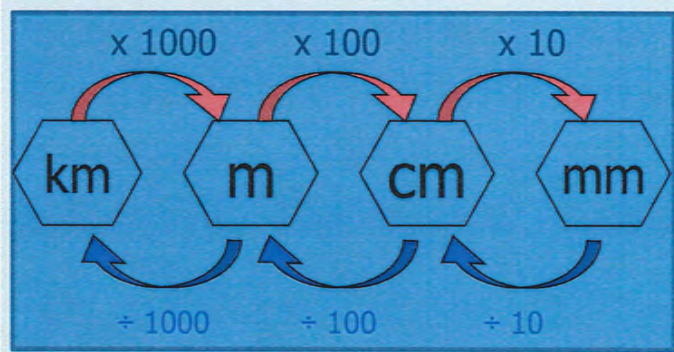
2. Conversion facts: Capacity	
1 litre = 1000 ml	
1 cl = 10 ml	

What is appropriate to measure with...	
Litres	bottles of water, a bath
Millilitres	a jug of milk, medicine on a spoon, toothpaste
Centilitre	a small glass of liquid



3. Conversion facts: Length	
100cm = 1 m	
10mm = 1cm	
1 km = 1000 m	

What is appropriate to measure with...	
Millimetres	a staple, a pile of papers
Centimetres	a rug, a table, how tall we are
Metres	width of a room, playground
Kilometres	the distance from one city to another, the distance a plane flies

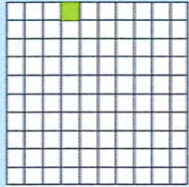


4. Some key vocabulary- word origins

Milli	one thousand	Mass	How heavy something is
Centi	one hundredth	Capacity	How much something can hold
Kilo	one thousand	Length	How long or wide something is

Important ideas

%



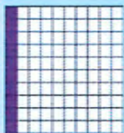
Percent
This is the symbol given to show 'how much' out of 100.

To find 1% divide by 100

To find 10% divide by 10

Percentage to fraction

10%



out of 100

10 / 100
simplified to 1/10

Percentage to decimal

Divide the percentage by 100
How many times does the number fit into 100
 $100 \div 10 = 0.1$

Percentage of an amount question

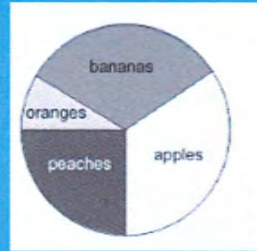
55% of 640

55% =
10% + 10% + 10% + 10% +
10% + 5%
OR
(10% X 5) + (10%/2)

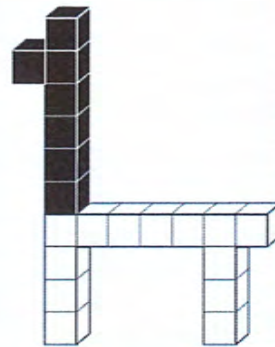
Find 10%
 $640 \div 10 = 64$

Find 5%
(this is half of 10%)
5%=32
 $55\% = (5 \times 64) + (32) = 352$

Pie charts represent 100% of an amount



This model is made with 20 cubes.



What percentage of the cubes in the model is black?

Count the total. 20
Count the black cubes 7.
Represent as a fraction 7/20.
make denominator 100
35%

Important equivalences to remember

Percentage	Fraction	Decimal
100%	100 / 100	1
75%	75 / 100 = 15/20	0.75
50	50 / 100 = 1/2	0.5
25%	25 / 100 = 1/4	0.25
20%	20 / 100 = 1/5	0.2
10%	10 / 100 = 1/10	0.1
5%	5 / 100 = 1/20	0.05
1%	1 / 100	0.01

Key Vocabulary

'of' means multiply	To find 10% divide by 10	Increase rise	Decrease Fall, less
---------------------	--------------------------	---------------	---------------------

Decimal to percentage

0.1 = 10% = 0.10, 0.9=0.90=90%
One decimal place is out of 10

0.01 = 1%, 0.03 = 3%, 0.09=9%
Two decimal places is out of 100

Fraction to percentage

1/5 Multiply whole fraction to make denominator 100

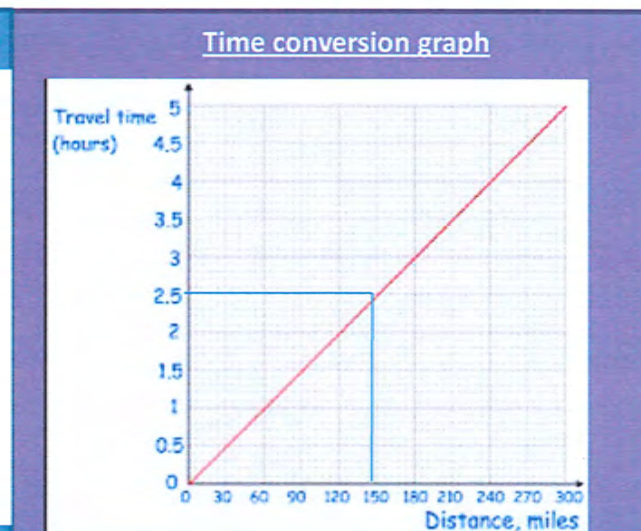
20/100 Take numerator and place % sign
20%

Large Roman Numerals	
50 + 70	L + LXX
100 + 350	C + CCCL
150 + 340	CL + CCCXL
1000 + 3000	M + MMM
500 + 600	D + DC
2018 + 1990	MMXVIII + MCMXC
2550 + 190	MDL + CCXC

Example question

Mr Mowz got off the train at 00:30 on Boxing day. He had travelled for 55 mins. What time did he board the train? What day was it?

00:00—25 mins = 23:35
It was 23:35 on Christmas Day.



4. Key Vocabulary

Convert	Change from one metric to another. For example: changing from seconds to minutes.
Conversion fact	A fact used to help you convert between metrics. For example: there are 60 minutes in an hour.
Timetable	A chart showing arrival and departure times
Schedule	A plan for carrying out a process or procedure
Conversion graph	a line graph used to convert one unit to another
Duration	How long something lasts for
Leap year	a year, occurring once every four years, which has 366 days including 29 February
Millenium	a period of a thousand years
Century	a period of one hundred years.

Measurement: Time

- This time conversion graph compares time with the distance travelled in miles
- For example, after 2.5 hours the distance travelled is 150 miles
- Always use a ruler to ensure accuracy

Conversion facts

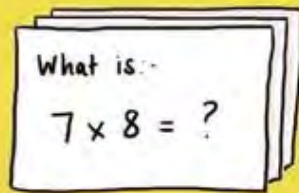
- There are 24 hours in one day
- There are 365 days in one year
- There are 10 years in a decade
- There are 100 years in one century
- There are 1000 years in a millennium

To convert from seconds to hours: convert to minutes first.

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 - Holidays in Provence

Objective: To discuss a trip to Provence

Threshold Concepts:

Questions in French can be formed by inverting the verb and the subject of the sentence.

In French, there is no one word for "would". To express the conditional tense, pronoun-specific endings are added to the infinitive.

Activités en Provence

Je voudrais.. - I would like...

visiter les ruines romanes - to see the roman ruins

descendre le rivi re en cano  - to go down the river on a canoe

aller au festival de film - to go to a film festival

regarder un combat de taureau - to see a bull fight

faire du shopping - to do shopping

faire de l' quitation -to do horse riding

faire de l'escalade - do climbing

faire de la planche   voile - to do windsurfing

faire de la plong e - to do diving

faire de l'escalade - to do climbing

Questions about holidays

O  passes-tu les vacances?

Where do you spend your holidays?

Avec qui passes-tu les vacances?

Who do you spend your holidays with?

Combien de temps restes-tu en vacances?

How long do you spend on holiday?

Que fais-tu quand tu es en vacances?

What do you do on holiday?

Je vais ...

au bord de la mer - to the sea-side

  la campagne - to the countryside

  la montagne - to the mountains

en colo - to a holiday camp

avec ma famille - with my family

avec mes copains - with my friends

pour une semaine - for a week

pour quinze jours - for fifteen days

The Conditional Tense

The conditional tense is used to say what you « would » do.

To say what you would like to do, use « **je voudrais** » plus an infinitive verb:

Je voudrais habiter   Cannes - I would like to live in Cannes

Je voudrais aller au festival de film - I would like to go to film festival

To form the conditional tense, you use the infinitive and add different endings, depending on the pronoun you are using.

For « je » you add « -ais ».

Je jouerais - I would play.

There are some irregular verbs:

J'irais - I would go

Je serais - I would be

Je ferais - I would do

J'aurais - I would have

Click on the QR code, to revise and practise the conditional tense.



Question Words

O ? - Where

Avec qui? Who with?

Combien de temps? For how long?

Que? - what?

To make a question in French, you put the question word at the start of the sentence and then you invert (swap around) the verb and the subject.



The Perfect Tense with avoir

To form the perfect you need to use the verb **avoir** in the present tense:

j'ai - i have

tu as - you have

il / elle a - he / she has

on a / nous avons - we have

You then add the past participle:

-er verbs =   (j'ai jou )

-re verbs = u (j'ai perdu)

-re verbs = i (j'ai fini)

There are some irregular past participles you need to know:

J'ai fait - I did

J'ai bu - I drank

J'ai vu - I saw

The Perfect Tense with  tre

There are 14 verbs which use  tre to form the perfect tense:

Je suis - I am

Tu es - You are

Il / elle est - he / she is

On est - we are

The most important verb which uses  tre is "aller"

Je suis all  - I went



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.

What Makes a Good Song?

Exploring Popular Songs and Musical Arrangements



A. Popular Song Structure

SONG STRUCTURE – How a song is made up of or divided into different sections (see below) and the order in which these sections occur. To work out the structure of a song, it's helpful to analyse the **LYRICS** and listen to a recording for the song (for instrumental sections).

INTRO – often shortened to 'intro', the first section of a song which sets the mood of the song and is sometimes, but not always, an instrumental section using the song's chord pattern.

VERSES – songs normally have several verses. Verses introduce the song's theme and have the same melody but different lyrics for each verse which helps develop the song's narrative and story. Songs made up entirely of verses are called **STROPHIC**.

LINK – a optional short section often used to join different parts of a song together, often instrumental, and sometimes joins verses together or appears at other points within a song.

PRE-CHORUS – an optional section of music that occurs before the **CHORUS** which helps the music move forward and "prepare" for what is to come.

CHORUS – occurs several times within a song and contains the most memorable **HOOK/RIFF**. The chorus relays the message of the song and is repeated with the same melody and lyrics each time it is heard. In popular songs, the chorus is often repeated several times towards the end of the song.

MIDDLE 8/BRIDGE – a section (often 8 bars in length) that provides contrasting musical material often featuring an instrumental or vocal solo using new musical material allowing the performer to display their technical skill on their instrument or voice.

CODA/OUTRO – The final section of a popular song which brings it to an end (Coda is Italian for "tail"!)

B. Key Words

LYRICS – The words of a song, usually consisting of **VERSES** and a **CHORUS**.

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 be either **MELODIC, RHYTHMIC** or **VERBAL/LYRICAL**.

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.

MELODY – The main tune of the song often sung by the **LEAD SINGER**.

COUNTER-MELODY – An 'extra' melody often performed 'on top of' the main melody that 'fits' with it a **DESCANT** or **INSTRUMENTAL SOLO**.

TEXTURE – The layers that make up a song e.g., *Melody, Counter-Melody, Hooks/Riffs, Chords, Accompaniment, Bass Line.*

C. Lead Sheet Notation and Arrangements

A **LEAD SHEET** is a form of musical **NOTATION** that contains only the essential elements of a popular song such as the **MELODY, LYRICS, RIFFS, CHORDS** (often as guitar chord symbols) and **BASS LINE**; it is not as developed as a **FULL SCORE ARRANGEMENT** and is open to interpretation by



performers who need to use and adapt the given elements to create their own musical **ARRANGEMENT**: their "version" of an existing song.

COVER (VERSION) – A new performance, remake or recording by someone other than the original artist or composer of the song.

D. Conjunct and Disjunct Melodic Motion

CONJUNCT MELODIC MOTION – Melodies which move mainly by step or use notes which are next to or close to one another.

DISJUNCT MELODIC MOTION – Melodies which move mainly by leap or use notes which are not next to or close to one another.

MELODIC RANGE – The distance between the lowest and highest pitched notes in a melody.

Conjunct



Disjunct



E. Song Timbre and Sonority (Instruments that are used to Accompany Songs)



Pop Bands often feature a **DRUM KIT** and **PERCUSSION** to provide the rhythm along with **ELECTRIC GUITARS (LEAD GUITAR, RHYTHM GUITAR and BASS GUITAR)** and **KEYBOARDS**. Sometimes **ACOUSTIC INSTRUMENTS** are used such as the **PIANO** or **ACOUSTIC GUITAR**. **ORCHESTRAL INSTRUMENTS** are often found in pop songs such as the **STRINGS, SAXOPHONE, TROMBONE** and **TRUMPET**.



Singers are essential to a pop song - **LEAD SINGER** – Often the "frontline" member of the band (most famous) who sings most of the melody line to the song. **BACKING SINGERS** support the lead singer providing **HARMONY** or a **COUNTER-MELODY** (a melody that is often higher in pitch and different, but still 'fits with' the main melody) and do not sing all the time but just at certain points within a pop song e.g. in the chorus.

PE



Year 9 PE Spring Knowledge Organiser

In the spring term, students will learn to **plan and implement** tactics, to show good **sportsmanship** in lessons, and perform **advanced skills** during a match or a game.

Head



Plan and Implement

Students will learn what it means to plan and implement (put in place) tactics in a competitive situation.

For example:

In badminton - the tactic could be to play to the space to make the opponent run more.

In basketball – the tactic could be passing wide on the court to make use of the space.

Have a think about other sports, and what tactics you could use in them.

Heart



Sportsmanship

Showing good sportsmanship is an important attribute for students to learn in PE. Here's what it might look like:

- Congratulating an opponent on a good performance or winning.
- Shaking hands with the opponent after the game.
 - Respecting the decisions of referees or officials.
- Show good support to others involved in the game.

Hands



Advanced skills

Starting to perform more advanced skills during physical activity is key to students progressing practically.

Can you think of a skill, and then how you would make it more advanced?

Here's an example:

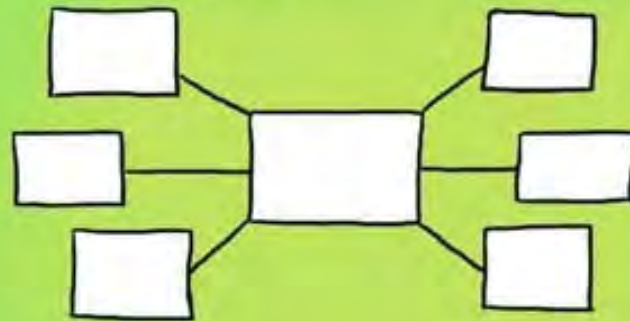
- Passing in netball → making a pass with a defender pressuring you in netball.

See if you can name 3 more in different sports you have done so far at school.

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

Drug	A substance that can affect how your mind and body works
Stimulant	A type of drug that can increase the activity of the body
Addiction	An uncontrollable need to drink alcohol, take drugs or engage in a particular activity
Volatile Substances	Substances that include glues, cleaning fluids, paint, lighter fuels, aerosol and nail polish remover

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

Eating Habits

The Eatwell Guide is used to help us all eat a balanced diet.

Eating five fruits and vegetables a day is beneficial for your health They are a great source of vitamins, minerals and fibre.

Key Skills

- Active listening and communication
- Teamwork
- Negotiation and self advocacy
- Leadership
- Presentation and debate

Drugs and Addiction

Drugs are substances that change a person's mental or physical state. They can affect the way your brain works, how you feel and behave and your understanding and your senses.

There are three key factors to drug addiction; the individual, the situation and the substance.



Physical Wellbeing and Exercise

The NHS suggests that young people aim for an average of at least 60 minutes of moderate or vigorous intensity physical activity a day across the week.

Physical activity can help to reduce stress and anxiety and reduce your health risks later in life.

Our enrichment program offers many opportunities to engage in team sports to improve your physical health.

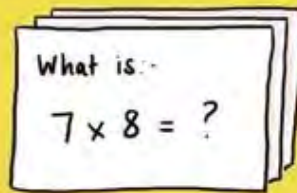
Threshold Concepts:

TC7	That there are misconceptions, social norms and cultural values relating to drug, alcohol and tobacco use
TC8	That there are strategies to manage a range of influences on drug, alcohol and tobacco use, including peers
TC9	That there are personal and social risks and consequences of substance use and misuse including occasional use
TC10	That there are benefits of physical activity and exercise for physical and mental health and wellbeing

RS

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.

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.
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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 facts you have written down. Correct any you may have got wrong.

Year 9 - RSE - Respectful Relationships

Key Terms

Stereotyping	An incorrect assumption about a group of people
Disability	A physical or mental condition which limits a person's ability to move, process information, or perform necessary functions
Human Rights	The basic rights and freedoms that belong to every person in the world, from birth until death
Islamophobia	Dislike of or <u>prejudice</u> against Islam or Muslims

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

Equality Act 2010

What counts as discrimination under the Equality Act 2010?

1. **Direct Discrimination** - Someone is treated less favourably than someone else due to a protected characteristic
2. **Indirect Discrimination** - This is where a rule or new policy applies to everyone but because of a protected characteristic it disadvantages someone unfairly
3. **Victimisation** - Someone is maltreated because they have raised a grievance under the equality Act 2010
4. **Harassment** - Unwanted attention or conduct related to a characteristic creating an intimidating or hostile environment for the person concerned

Key Skills

- Active listening and communication
- Teamwork
- Presentation and debate

Harassment and Stalking

Stalking - To follow someone around without their consent, sometimes consistently and sometimes taking photos or footage.

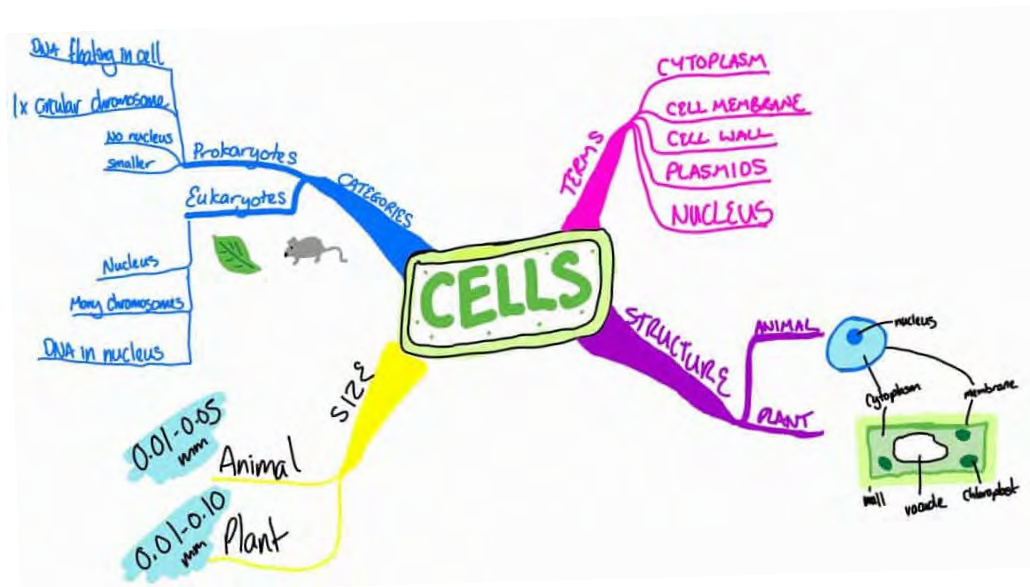
Harassment - When someone behaves in a way which offends you or makes you feel distressed or intimidated. Harassment is a form of discrimination under the Equality Act 2010.

If you feel unsafe talk to someone you trust

Threshold Concepts:

TC7	Know that stereotyping, prejudice and discrimination has an effect on individuals and relationships
TC8	That prejudice-based language and behaviour, offline and online, including sexism, homophobia, biphobia, transphobia, racism, ableism and faith-based prejudice is unacceptable
TC9	That the Equality Act 2010 provides legal rights, responsibilities and protections

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

Bonding Part 2

Threshold Concept

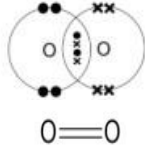
How do 100 elements make up everything in the universe?

Covalent bonds

Two nonmetals 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

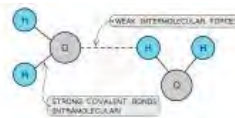
Delocalised electron - free moving electron that isn't a part of any atom

Ion - a charged particle

Simple Covalent compounds

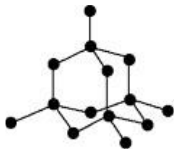
Simple covalent compounds have strong covalent bonds between atoms and weak intermolecular forces between molecules

Properties – low m.p and b.p
- cannot conduct electricity

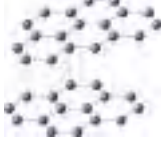


Giant Covalent Structures

Diamond



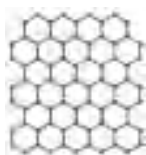
Graphite



Silicon dioxide



Graphene



Fullerenes



Metallic bonding

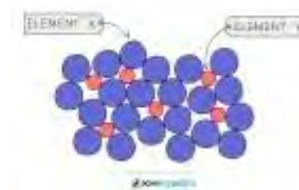
Metals consist of a giant metallic structure. They are positive metal ions surrounded by a sea of delocalised electrons



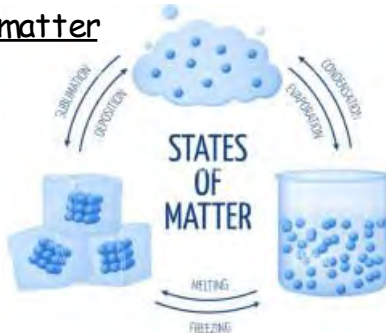
Alloys

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



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Infection and response

Threshold Concept

Pathogens are microorganisms that cause disease

Communicable and non-communicable disease:

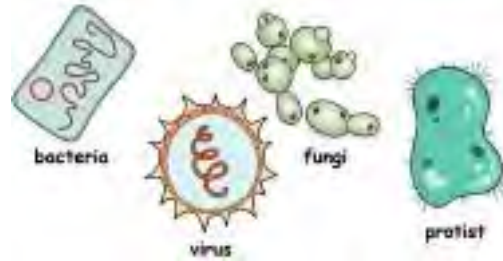
- Communicable, which can be transferred from one person to another, or from one organism to another, eg in humans, these include measles, food poisoning and malaria
- Non-communicable, which are not transferred between people or other organisms



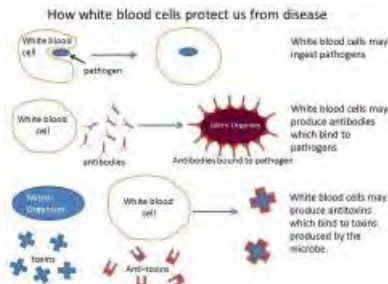
Keywords

- **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 $1/100^{\text{th}}$ 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.

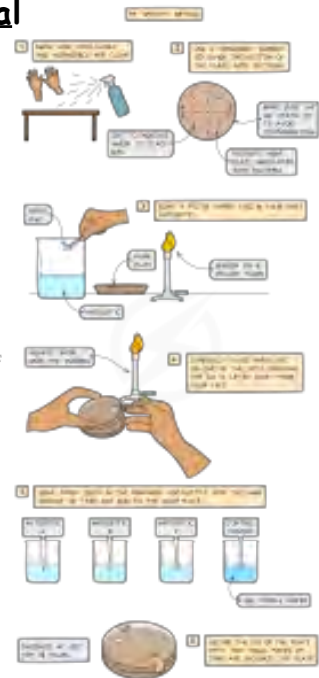
Pathogens



Fighting against disease



Required practical



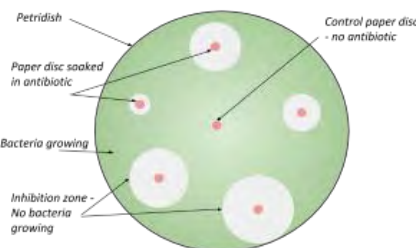
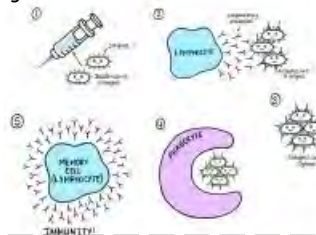
Antibiotics vs painkillers

- 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

Homeostasis

Threshold Concept

Homeostasis is organisms maintaining a constant internal environment

The nervous system:

- The central nervous system (CNS) - the brain and spinal cord.
- The peripheral nervous system - nerve cells that carry information to or from the CNS.



Keywords

- **Nerves:** Specialised cells which carry electrical impulses
- **Hormones:** Chemical messenger produced in glands and carried by the blood to specific organs in the body.
- **Organism:** Living things that are capable of reacting to stimuli, reproduction, growth, and homeostasis.
- **Regulate:** control or maintain the rate or speed of a process so that it operates properly.
- **Response:** as a result of the stimulus that is detected by the receptor a response is caused

Synapse:



Body controls:

Homeostasis maintains optimal conditions for enzyme action throughout the body, as well as all cell functions.

In the human body, these include the control of:

1. Blood glucose concentration
2. Body temperature
3. Water levels

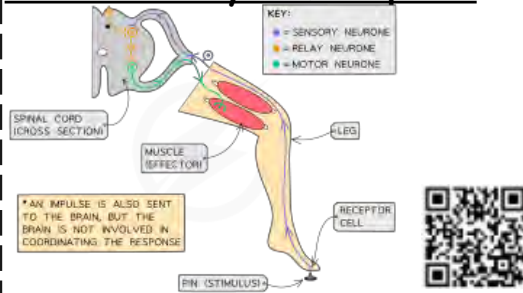


The menstrual cycle

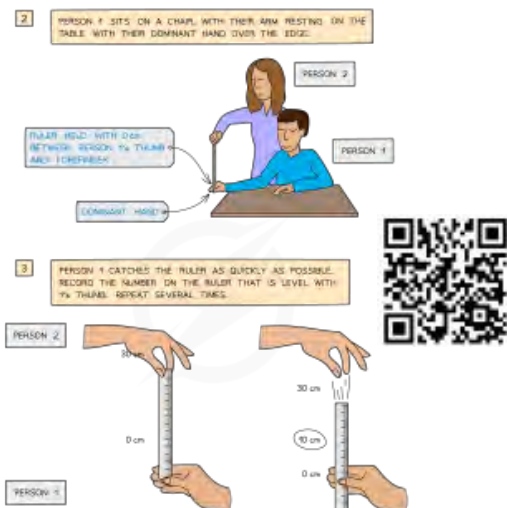
1. The menstrual cycle is the reproductive cycle in women, which starts with a period (menstruation), if the woman is not pregnant.
2. There are four hormones involved: follicle stimulating hormone, luteinising hormone, oestrogen & progesterone.
3. FSH (released by the pituitary gland) causes eggs to mature in the ovaries.
4. FSH stimulates ovaries to produce oestrogen.
5. Oestrogen inhibits further release of FSH and stimulates release of LH.
6. LH (released by the pituitary gland) stimulates the release of an egg (ovulation) from an ovary.
7. LH stimulates secretion of progesterone by the empty follicle.
8. Progesterone inhibits the release of LH and FSH.
9. Oestrogen and progesterone maintain the lining of the uterus.



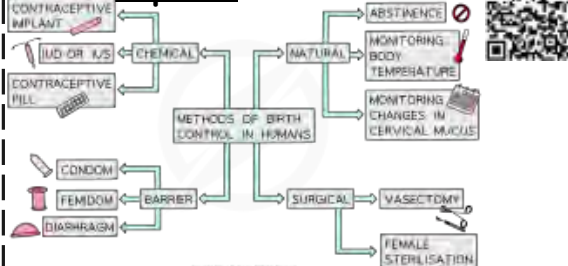
The nervous system response:



Required practical: Reaction time



Contraception:



Equations for this topic

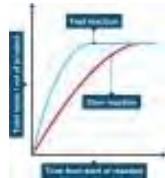
Rates of Reaction

Threshold Concept

All particles must collide with a minimum amount of energy in order to react

Rate of reaction

Rate of reaction is how fast reactants are changed into products



Collision theory and activation energy

The rate of reaction is directly proportional to the number of successful collisions.

To react, particles must first **collide** with enough **activation energy** to be successful.



Keywords

Particle - A particle is the smallest possible unit of matter

Energy - Energy is what holds the atoms in a molecule together

Collision - If the two molecules A and B are to react, they must get close enough to break and make the new bonds that are needed in the products

Reactant - A substance put into a chemical reaction

Product - A substance made in a chemical reaction

Catalysts

Catalysts: increase the rate of a reaction without getting used up. Catalysts decrease the activation energy required to begin the reaction.

Catalysts are often used in industry to speed up chemical processes.



Factors affecting rate of reaction

Effect of Temperature:

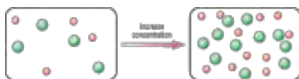
Increasing the temperature increases the speed that particles are moving. This means there are more frequent collisions, and those collisions have more energy.



Video of all

Effect of Concentration:

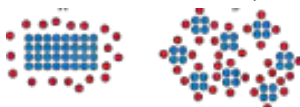
Increasing concentration increases the number of reacting particles. This increases the frequency of collisions.



Effect of Surface Area:

Increasing the surface area increases the proportion of (solid) particles available to react.

This increases the frequency of collisions.



Measuring rate of reaction

There are various ways to measure quantity of reactant used or quantity of product formed. Measuring the volume of gas collected can be the easiest way to measure.



The units of rate depend on what you are measuring. For example, when measuring gas in cm^3 you will end up with rate units of cm^3/s . When measuring the change in mass (g), you will end up with units of g/s.

$$\text{mean rate of reaction} = \frac{\text{quantity of reactant used}}{\text{time taken}}$$

$$\text{mean rate of reaction} = \frac{\text{quantity of product formed}}{\text{time taken}}$$



Required Practical



Equations for this topic

Motion

Threshold Concept

Speed equals distance travelled in a given time

Speed, distance, time

- Speed is measured in metres per second (m/s)
- Distance is measured in metres (m)
- Time is measured in second (s)



Keywords

- **Speed:** Distance travelled in a certain time
- **Distance:** how far an object has travelled. It is a scalar quantity
- **Time:** how long something takes
- **Metres** a unit measurement of distance (m)
- **Seconds:** a unit measurement of time (s)

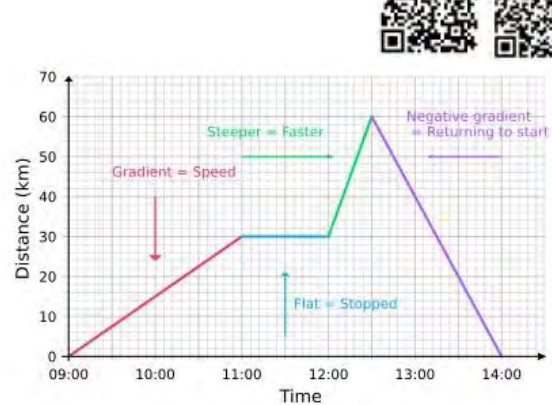
Scalar and vector quantities

Scalar - a measurement of something. They only have **MAGNITUDE** (size)

Vector - a measurement of something. They have **DIRECTION & MAGNITUDE** (size)



Distance - Time Graphs

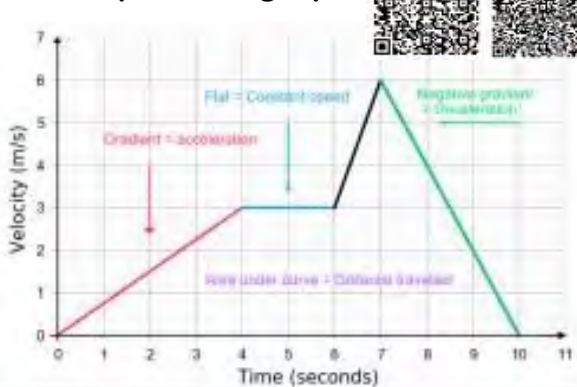


Terminal velocity

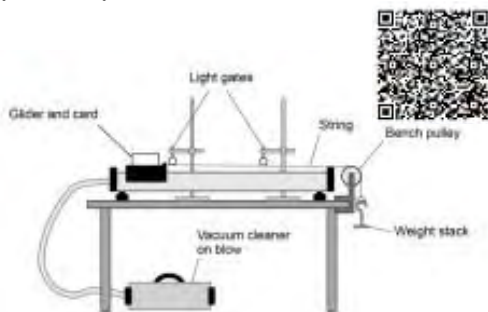
At terminal velocity, the object moves at a steady speed in a constant direction because the **resultant force** acting on it is zero



Velocity - Time graphs



Required practical - Acceleration



Equations for this topic

$$\text{Speed} = \text{Distance} \div \text{Time}$$

$$\text{Change in Velocity} = \text{Acceleration} \times \text{Time}$$

$$\text{Force} = \text{Mass} \times \text{Acceleration}$$