


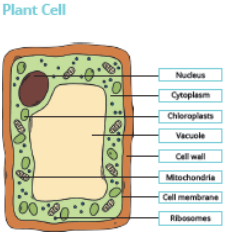
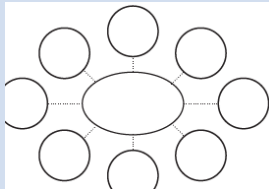






Summer 2 - Year 9 Name:

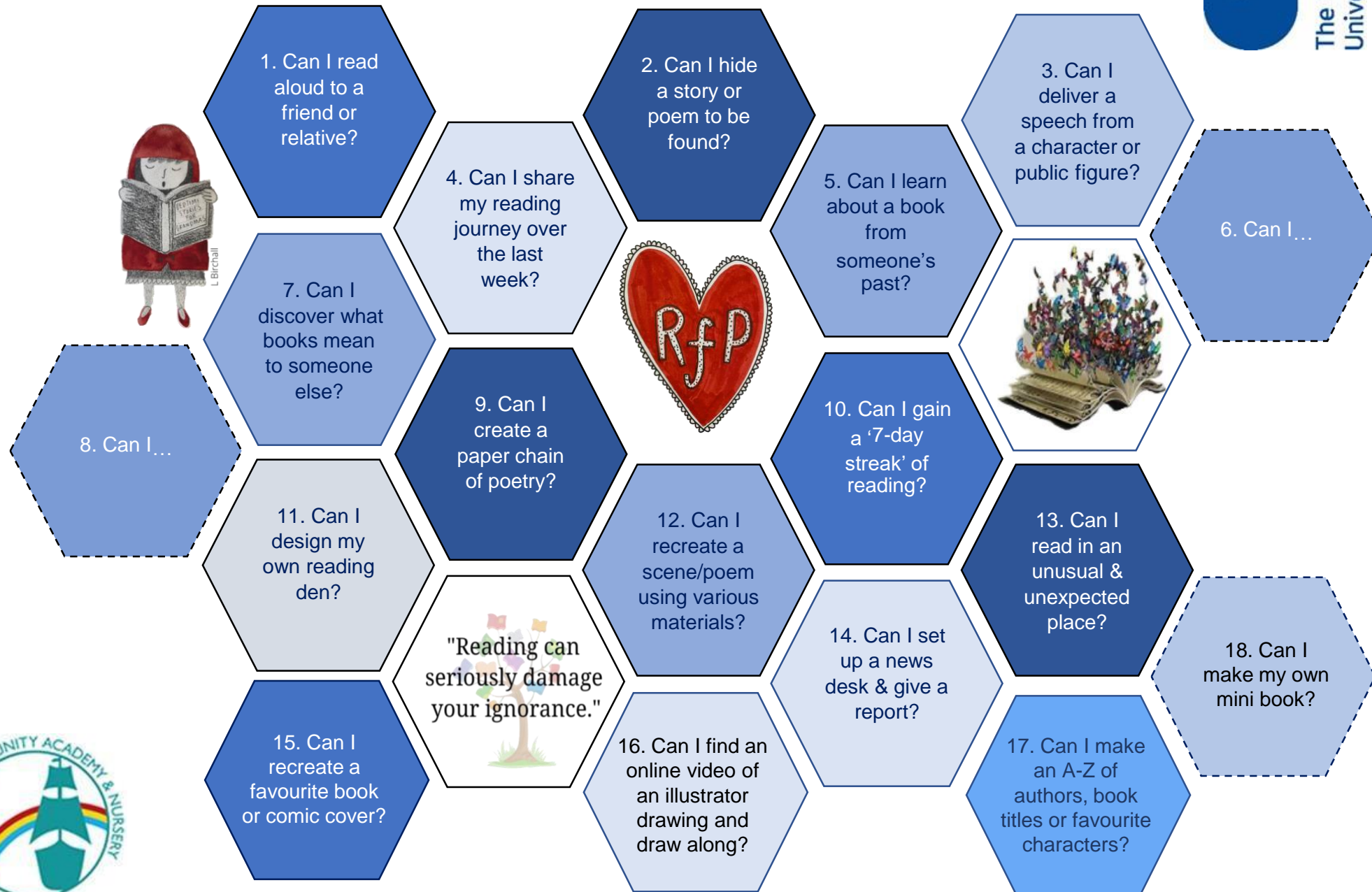
Just reading through your books or a knowledge organiser is not always an effective way to revise. Instead, you should do something with the information. Choose an example of the revision methods on the pages or see if you can come up with another method.

The knowledge is evolutionary not revolutionary. Approximately half the knowledge is new and half helps you revise. Many of the activities are changing. We hope you enjoy them.

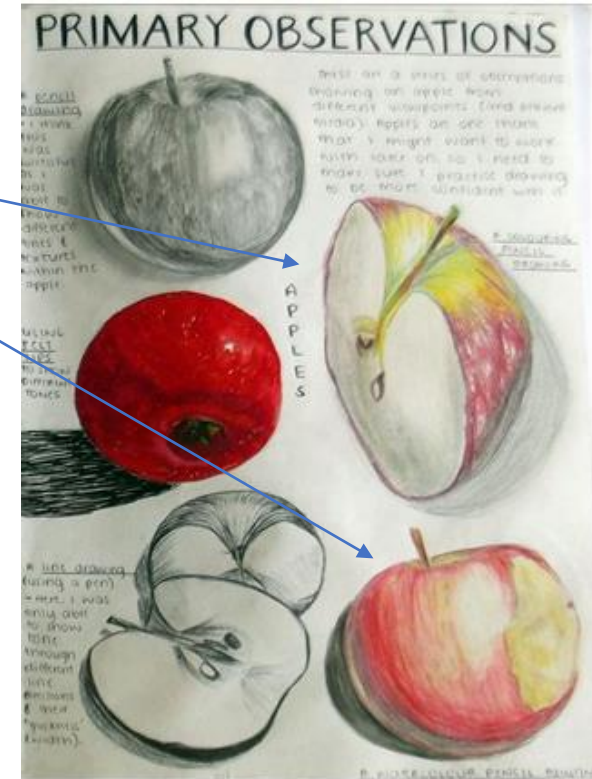
Subject	Page Number	Subject	Page Number
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Science	21	Maths	40
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Idea	Explanation
<p>Make some flash cards or PowerPoint slides. Make top trumps.</p> 	<p>Write down key words, quotation, questions or equations on one side of a card. On the other side, write the definition or answer. Use them to test yourself.</p>
<p>Make a poster.</p> 	<p>Turn your notes into posters with lots of colour and illustrations. Summarising the key information in a different way is an effective way of learning and your brain will remember the colours more easily. Do the title last!</p>
<p>Draw spider diagrams, or for the adventurous mind maps.</p> 	<p>Write the topic/keyword in the centre of your page. Add everything you know in subtopics. Then explore each subtopic in turn adding more ideas. Colour/pictures help you recall.</p>
<p>Write a song or a rap.</p> 	<p>Are there songs that stick your head. Change the lyrics to the information you want to learn. If you record and listen back it will be a more fun way of revising.</p>
<p>Plan a lesson</p> 	<p>If you teach something to someone else the chance of recalling it is really high. This has been found to be the most effective way of learning something for the long term.</p>
<p>Write a story or comic strip.</p> 	<p>Take the keywords or facts that you need to learn and turn them into a story or a cartoon. The sillier the story the more likely you are to remember it.</p>
<p>Write a quiz. Design a game.</p> 	<p>Playing is how we learn as young children and it is a very powerful way of learning throughout life. If we enjoy the game it helps us remember.</p>

Sharing the Love of Reading: 11-16-year olds



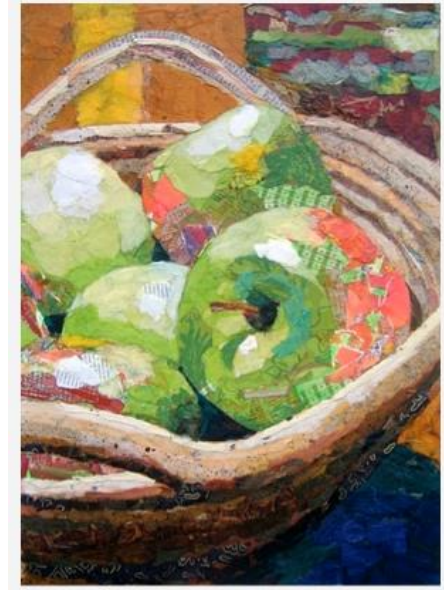
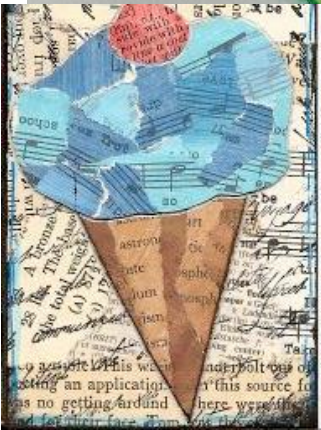
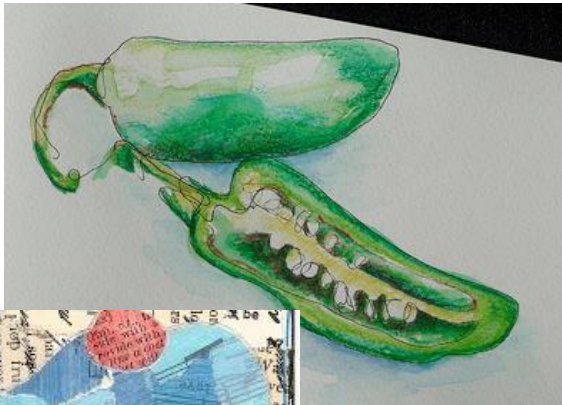
- Bird eye angle - pencil
- Side view – colouring pencil
- Bottom angle – biro study
- In year 9 this term we will be looking at Food in Art.
We will look at how artists have represented food in their art work.
- You will make drawings and paintings of food at different scales hopefully from life.
- An artist who did this was **Claus Oldenburg** who enlarged everyday food items to huge sizes and displayed them in galleries and outside. Find out some facts about him.



These are some you could try to draw: Tomato, Peppers, Chilli, Lemon, Mango, Passion fruit, Cucumber, Strawberry, Apple, Pear, Eggplant



- Try Drawing a piece of food on a large scale:
- 1: **Unhealthy Food called.....**
 - Draw this food item in pencil and colouring pencil
 - 2: **Healthy food called.....**
 - Draw this food item in pencil and create a tonal collage



1


Methods of Recording

Observational drawing	Drawing from looking at images or objects
First hand observation	Drawing directly from looking at objects in front of you
Second hand observation	Drawing from looking at images of objects
Photographs	Using a camera or smartphone to record images will class as first hand observation
Sketches	Basic sketches and doodles can act as a starting point for development

Stages of Drawing


Basic shapes → Accurate shapes → Detail → Shade

2




Tonal shade
Produce a range of tones by varying the pressure and layering consider using softer pencils for darker shades


Alternative shade techniques




Cross hatching



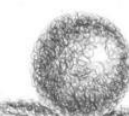
Hatching




Contour lines



Stippling



Scribble



Pattern

3

Annotation

Describes writing notes, using images and explaining your thoughts to show the development of your work.

Step 1 Describe
What is this an image of?
What have you done here?
What was this stage of the project for?

Step 2 Explain
How was this work made?
How did you produce particular effects? How did you decide on the composition?

Step 3 Reflect
Why did you use these specific methods? Why do particular parts work better than others? Why might you do things differently next time?

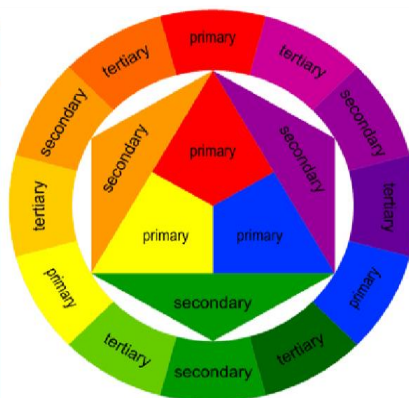
- 1- Formal elements are taught e.g. how to sketch and use tone to create a 3D effect. You will explore the colour wheel and how to use the basic materials in Art.
- 2-“The Greenman” – This project introduces you to facial proportions and how to blend oil pastels effectively. We also learn about clay and create small 3D Greenman faces. Examples of world renowned pieces of art are discussed.
- 3-“Perspective Landscapes”- This project introduces students to the concept of perspective and distance in Art. You learn about the technique of one-point perspective to create a feeling of depth in a landscape.

1

Media	The substance that an artist use to make art
Materials	The same as media but can also refer to the basis of the art work eg, canvas, paper, clay
Techniques	The method used to complete the art work, can be generic such as painting or more focus such as blending
Processes	The method used to create artwork that usually follows a range of steps rather than just one skill

3

Colour Theory	
Primary= RED, YELLOW, BLUE	Complimentary; Colours opposite on the colour wheel
Secondary= Primary+Primary	Harmonious; Colours next to each other on the wheel
Tertiary= Secondary+Primary	Monochromatic; shades, tones & tints of one colour
Shades – add black	Hue – the pigment
Tint – add white	Warm; RED, ORANGE YELLOW. Cold; BLUE, GREEN, PURPLE



2

Pencil		The basic tool for drawing, can be used for linear work or for shading
Biro		Drawings can be completed in biro and shaded using hatching or cross hatching
Pastel (chalk/oil)		Oil and chalk pastels can be used to blend colours smoothly, chalk pastels give a lighter effect
Coloured pencil		Coloured pencil can be layered to blend colours, some are water soluble
Acrylic paint		A thick heavy paint that can be used smoothly or to create texture
Watercolour		A solid or liquid paint that is to be used watered down and layered
Gouache		A pure pigment paint that can be used like watercolours or more thickly for an opaque effect
Pressprint		A polystyrene sheet that can be drawn into to print white lines – can be used as more than 1 layer
Monoprint		Where ink is transferred onto paper by drawing over a prepared surface
Collograph		A printing plate constructed of collaged materials
Card construction		Sculptures created by building up layers of card or fitting together
Wire		Thick or thin wire manipulated to create 2d or 3d forms
Clay		A soft substance used for sculpting, when fired can be glazed to create shiny colourful surfaces
Batik		A fabric technique using hot wax to resist coloured inks
Silk painting		Fabric inks painted onto silk, Gutta can be used as an outliner to prevent colours mixing

1 Formal Elements of Art

LINE	the path left by a moving point, e.g. a pencil or a brush dipped in paint. It can take many forms. e.g. horizontal, diagonal or curved.
TONE	means the lightness or darkness of something. This could be a <u>shade</u> or how <u>dark</u> or <u>light</u> a <u>colour</u> appears
TEXTURE	the surface quality of something, the way something feels or looks like it feels. There are two types : <u>Actual</u> and <u>Visual</u>
SHAPE	an area enclosed by a <u>line</u> . It could be just an outline or it could be <u>shaded</u> in.
PATTERN	a design that is created by repeating <u>lines</u> , <u>shapes</u> , <u>tones</u> or <u>colours</u> . can be <u>manmade</u> , like a <u>design</u> on fabric, or <u>natural</u> , such as the markings on animal fur.
COLOUR	There are 2 types including Primary and Secondary . By mixing any two <u>Primary</u> together we get a <u>Secondary</u>

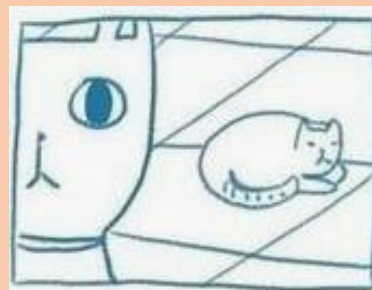
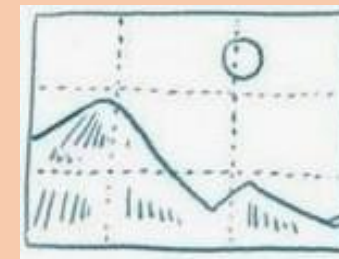
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A Rough	A Visual/ Maquette	Final Piece
A basic sketch of a final idea	A small image or model created in selected materials	An image or sculpture pulling all preparatory work together

2

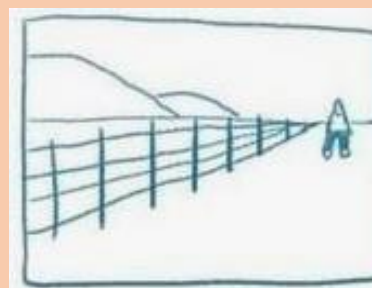
Composition Layouts

Rule of thirds – Place focal objects at 1/3 or 2/3 of the image horizontally or vertically. Not in the middle



Balance elements. If there is an emphasis on one side balance it out with smaller objects on the other

Simplify and fill. Enlarge or crop the image to fill the space



Use lines. Lines will draw the viewer in, they don't have to be straight, consider S or C

Pewter

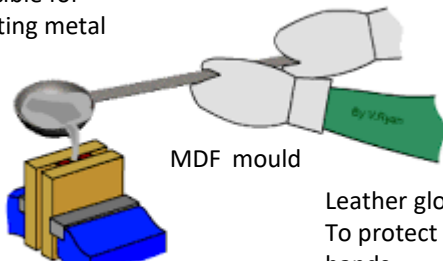
Pewter is a grey metal which is made by mixing tin and lead. Pewter was often used in former times to make ornaments or containers for eating and drinking. It's melting point is about 240°C.

Pewter casting



Recognise what safety equipment is needed and when it is necessary

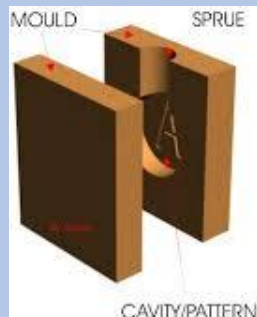
Crucible for Melting metal



MDF mould

Vice for holding The mould

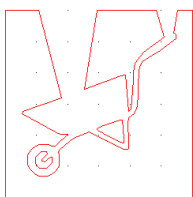
Leather gloves
To protect your hands



CAD mould

60mm x 60mm
Runner – where you pour in the pewter

Riser – allows the pewter to fill a complicated mould by forcing the metal up the riser



1 Cut off the sprue with a junior hacksaw



2 File sharp edges with a file



3 Use a pillar drill to make a hole for your keyring



4 Use wet and dry sandpaper to smooth the pewter



5 Use a polisher to shine your metal keyring



Hardwoods



Beech
Oak
Ash
Teak

Comes from deciduous trees

This is a broad-leaved tree which loses its leaves in the winter.

Softwoods



Pine
Spruce
Cedar
Fir

Comes from coniferous trees

This tree is an evergreen (green all year), needle-leaved, cone-bearing tree.

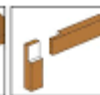
Butt

Lap

Housing

Dovetail

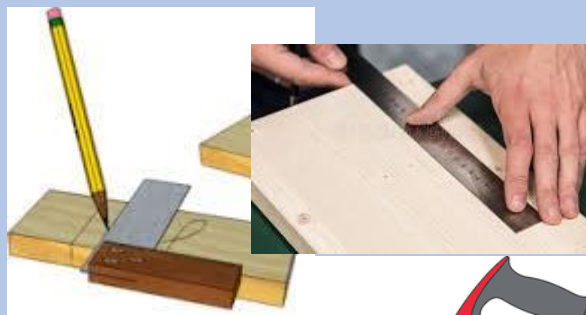
Comb



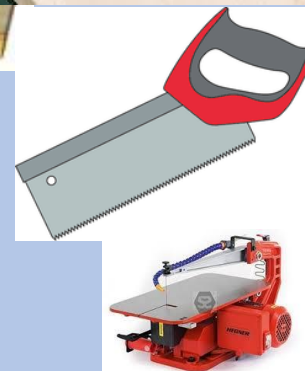
© Teaching with a Mountain

Choose a wood joint, determined by what you are making and how it will be used.

Measuring, marking out and cutting pine to make a box



Use a ruler to measure accurately, use a set square to mark accurate angles and use a tenon saw or fret saw to cut wood.



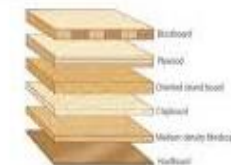
Pine and MDF

Wood comes in 3 categories: soft wood, hard wood and manufactured wood. They have different properties and are used for many things.

Manufactured boards

Making boards and sheets from wood or wood products

- Veneers
- Sawdust
- Wood fibres
- Wood strips
- Wood flakes



Life Cycle Assessment

Is a technique to assess environmental impacts associated with all the stages of a product's life from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling.

LCA is also used in new product research and development, when environmental footprint is important to the future marketing or cost structure of a product.



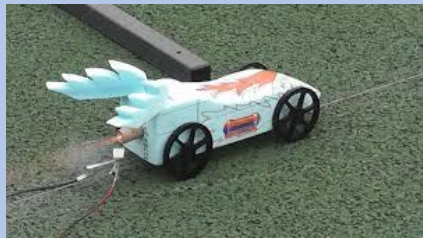
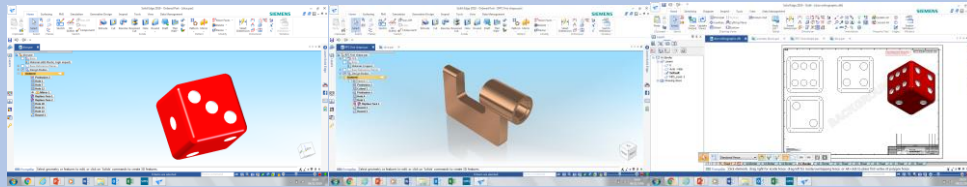
FSC

The FSC system allows businesses and consumers to identify, purchase and use wood, paper and other forest products made with materials from well-managed forests and/or recycled sources. FSC helps take care of forests and the people and wildlife who call them home. So you can keep your life full of forest products while keeping our forests full of life. Forests are good for us. They provide a great environment for hiking and other outdoor pursuits and are even proven to have therapeutic properties.

3D CAD

At Open Academy we use Solid Edge 3D CAD programme.

CAD (computer-aided design) software is used by architects, engineers, drafters, artists, and others to create precision drawings or technical illustrations.



Rocket cars

Aerodynamics is the study of how gases interact with moving bodies. Because the gas that we encounter most is air, aerodynamics is primarily concerned with the forces of drag and lift, which are caused by air passing over and around solid bodies.

Automotive aerodynamics is the study of the aerodynamics of road vehicles. Its main goals are reducing drag and wind noise, minimizing noise emission, and preventing undesired lift forces and other causes of aerodynamic instability at high speeds.

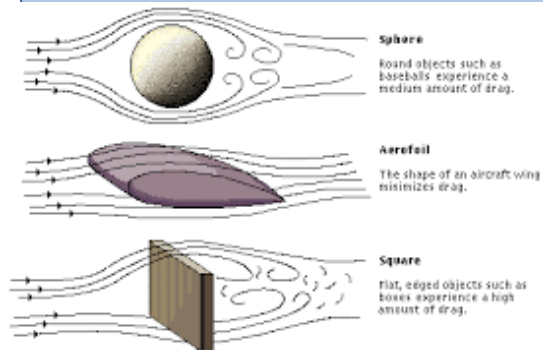
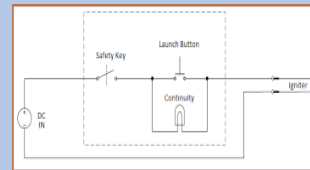
The most aerodynamic shape is typically known as the teardrop - it's the shape water forms when it runs down a window because it's been pushed into that position by the air flowing over it on the way down.

Rocket motor

The rocket motor is the device in the model that creates the thrust force that propels the car along the wire. It creates the fire, smoke, and noise that make rocketry so exciting to watch.

Simple rocket launch detonator

The safety key is activated and causes a buzzer to sound. This alerts the user that the launch button is ready. The launch button is pressed which heats the wire and ignites the rocket.



Modelling/Prototyping

It is always a good idea to make models of your ideas, before deciding on the final design. Models can be computer generated or manufactured by hand, to a scale. This will help you determine whether your idea is going to work or needs modifying. A model allows you to test your solution quickly and cheaply. You could ask your client / customer if the design is what they are looking for?

Advanced modelling

What is modelling?

Modelling is a very important area of product design. It is the point where you have an idea and need to realise it in 3D - this can be done at any stage of the design process. Some designers prefer to produce models or prototypes at earlier stages than others.

You can model using practical materials such as modelling card, foam etc

The alternative to solid modelling is to use 3D CAD.



Modelling materials and equipment

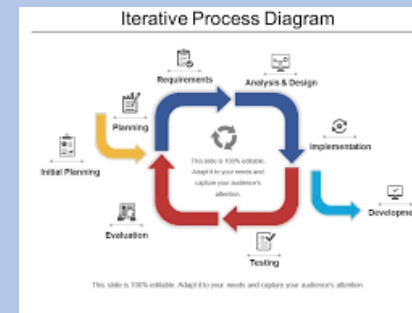
3D prototyping

Rapid prototyping is a group of techniques used to quickly fabricate a scale model of a physical part or assembly using three-dimensional computer aided design (CAD) data. Construction of the part or assembly is usually done using 3D printing or "additive layer manufacturing" technology



Iterative Design Process

Iterative design is a design methodology based on a cyclic process of prototyping, testing, analysing, and refining a product or process. Based on the results of testing the most recent iteration of a design, changes and refinements are made



Micro-organisms

Micro-organisms are tiny forms of life. They can only be seen under a microscope and are sometimes called microbes.

They spoil food and make it unsafe to eat because they contaminate it with their waste products, their physical presence and the toxins they produce.

What micro-organisms can spoil food and make it unsafe to eat?

There are three groups of micro-organisms that you need to know about that spoil food and cause food poisoning. These are..

- Bacteria
- Moulds
- Yeasts

Micro organisms need 5 conditions to grow and multiply:

1. A warm temperature
2. Plenty of moisture (water)
3. Plenty of food
4. The right PH level (not too acidic or alkaline)
5. Enough time (bacteria split every 10-20 minutes)

High risk foods

- High risk food have ideal conditions for bacteria
- High risk foods are ready to eat foods that could grow harmful bacteria
- They are moist and high in protein which is food for bacteria.
- High risk foods have a short shelf life - you can't keep them for long or the bacteria might multiply to dangerous levels.

Examples of high risk foods:

Cooked meat, fish and poultry, dairy products (eggs, cheese etc.), gravies, stocks and sauces, shellfish, cooked rice

Example exam questions:

What five conditions to bacteria need to grow and multiply? (5 marks)

What is a high risk food? (5 marks)

Storing food safely

Cooking (75°C)	The danger zone (5°C-63°C)
<ul style="list-style-type: none">• Cooking food above 75°C kills bacteria• Re-heat food properly, only once. Reheat food so 75°C for at least 3 minutes• Check the food is 75°C with a temperature probe	<ul style="list-style-type: none">• Bacteria can grow and multiply quickly between 5°C to 63°C.• This is called the danger zone• The optimum temperature for bacterial growth is 37°C
Chilling (0°C - 5°C)	Freezing (-18°C)
<ul style="list-style-type: none">• Keeping food between 0°C and 5°C slows down the growth of bacteria• This extends the shelf life of food• Chilling food doesn't change the properties much - food looks and tastes the same	<ul style="list-style-type: none">• Freezing food below -18°C stops bacteria growing - they become dormant• Freezing generally extends shelf life and the nutrients aren't lost• It doesn't kill the bacteria though. They become active again once the food defrosts.

Preparing self for cooking

- Tie hair back to prevent hair and dandruff falling in food
- Take off coats and blazers
- Wear an apron to prevent bacteria transferring from our clothes to our food
- Wash hands with hot soapy water to kill bacteria

Preparing the room for cooking

- Sanitise all work surfaces
- Check equipment is clean and dry
- Tuck all stools in as they can be a trip hazard
- Put all high risk foods in the fridge to slow bacteria growth

Wash your hands after:

- Coughing
- Sneezing
- Tying shoe laces
- Going to the toilet
- Touching hair or face

Nutrients

Macro nutrients - needed in large quantities in the diet. The three macro nutrients are: PROTEIN, CARBOHYDRATES, FAT

Micro nutrients - needed in small quantities in the diet. The two micro nutrients are: VITAMINS, MINERALS

Protein

Proteins are made up of amino acids, often referred to as the 'building blocks' of the body. Non-essential amino acids can be made by the body, however, essential amino acids can't be made by the body and we must get from the food we eat.

High biological Value (HBV) proteins contain all the essential amino acids we need and generally come from animal sources. Low biological value (LBV) proteins are missing one or more essential amino acids and generally come from plant sources.

Food sources

HBV - beef, pork, lamb, poultry (chicken, turkey, duck), fish, cheese, butter milk

LBV - beans, chickpeas, lentils, peas, nuts, seeds, found in smaller amounts in some vegetables such as spinach and broccoli.

Function

Needed for growth from childhood to adulthood and the growth of nails, hair and muscle mass, repair of muscles, tissues and organs after illness or injury and to make enzymes for digestion and antibodies to stop us getting ill.

Types: High biological Value (HBV) and Low biological Value (LBV)

Carbohydrates

There are two types of carbohydrates, complex and simple. They are also known as starchy (complex) and sugary (simple).

Food sources

Starchy - bread, rice, pasta, potatoes, bagels, oats, flour, cereal and some vegetables.

Simple - fruit, some vegetables, chocolate, sweets, biscuits, cakes

Function

Starchy/complex carbohydrates are digested slowly meaning blood sugar levels gradually increase providing a slow, steady release of energy. (long term energy).

Sugary/simple carbohydrates are digested quickly and provide short term energy

Types: Starchy, sugary and fibrous

Example exam questions:

What are the two types of fat? (2 marks)

Explain the difference between a HBV and LBV protein (6 marks)

What percentage of our daily energy should come from fats? (1 mark)

What are the main differences between saturated and unsaturated fats? (6 marks)

How can one make healthy choices when choosing complex carbohydrates? (2 marks)

Fat

There are two types of fat, saturated and non saturated. Saturated fats are classed as 'unhealthy fats', they are solid at room temperature and are generally animal based.

Unsaturated fats are classed as 'healthier fats' and are liquid or soft at room temperature and come from plant based sources.

Food sources

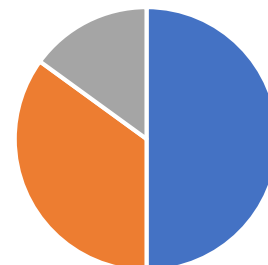
Animal -beef, chicken skin, processed meat (sausages, salami, pepperoni), bacon, butter, cheese, full fat milk

Plant - vegetable oils (sunflower, olive, rapeseed), avocado, nuts, seeds

Function

Keeps us warm (provides insulation), secondary source of energy, protects vital organs and bones.

Energy



■ Carbohydrates ■ Fat ■ Protein ■

Energy intake

50% - carbohydrates

35% - Fat

15% - Protein

Dietary related health problems

Diabetes

What is it?

Diabetes lets your blood glucose levels run out of control. Insulin is a hormone that allows glucose to be absorbed by the body. If there is too much glucose in the blood, the pancreas produces insulin to reduce the blood glucose level. Type 2 diabetes is a disorder where blood glucose levels stay too high - the pancreas either can't produce enough insulin or the body resists it.

Causes

- Being over weight or obese
- Excessive sugar in the diet can leave to obesity, increasing the risk of type 2 diabetes - this is affecting more young people.

Health problems

- Poor eye sight, limb numbness, kidney failure and CHD.
- Tired and thirsty
- The body passes out glucose by passing urine more often

Obesity

What is it?

It is very common, it affects roughly 1 in 4 adults in the UK. Body Mass Index (BMI) is often used to check if someone is overweight or obese.

Causes

- An incorrect balance of energy - a person consumes more calories than they burn off.
- Eating lots of foods high in fat and sugar
- Having a sedentary lifestyle (little or no physical activity)

Health problems

- Increases your blood pressure and raises cholesterol levels - this puts you at higher risk of coronary heart disease
- Greater risk of developing type 2 diabetes
- Breathing difficulties, tiredness and low self-esteem are all common

Anaemia - can be caused by an Iron Deficiency

What is it?

Iron is needed to make red blood cells - these cells carry oxygen from the lungs and travel in your blood around your body. People with anaemia have a reduced amount of blood cells.

Causes

- Not eating enough iron-rich foods
- Women lose iron during their periods
- Pregnant women lose iron to their baby during pregnancy

Health problems

Tiredness, pale complexion, heart palpitations, headaches, abnormal fingernails

Coronary Heart Disease (CHD)

What is it?

Your cardiovascular system consists of your heart and blood vessels. CHD is when coronary arteries (which supply the heart with blood full of oxygen) are narrowed because they are filled with fatty deposits.

Causes

- Eating lots of saturated fats
- Being physically inactive - exercise keeps the heart and cardiovascular system healthy
- Smoking - this damages the lining of arteries
- High blood pressure

Health problems

- Chest pains (angina)
- Blood clots can form which suddenly block flow to the heart, the heart doesn't get enough oxygen which can cause a heart attack (which can be fatal)

Dietary related health problems

Too much sugar can cause:

1. Weight gain (which can lead to obesity)
2. Tooth decay
3. Diabetes (your body cannot produce enough/any insulin to regulate your blood sugar levels)

Too much salt can cause:

1. High blood pressure (this can increase your risk of heart disease and a stroke).

Too much saturated fat can cause:

1. Weight gain (which can lead to obesity)
2. Raise cholesterol (this narrows arteries making it harder for the blood to travel around, putting you at risk of heart disease).

Example exam questions:

Explain three causes of obesity (6 marks)

What is the function of sugary and starchy carbohydrates (2 marks)

Why is protein especially important for children? (2 marks)

What are the functions of fat? (3 marks)

List 5 food sources of plant based protein (5 marks)

How does starch thicken a sauce (2 marks)

Give an example of fruit that turns brown due to enzyme browning (1 mark)

Which is the best type of flour to use when bread making and why. (3 marks)

Skeletal issues

Rickets - Soft and weak bones, this occurs in children with a calcium or vitamin D deficiency. Can cause pain in the bones.

Osteoporosis - It is a bone disease that weakens bones and makes them brittle, increasing the chance of them breaking from simply falls.

Tooth decay - Plaque is a sticky substance that contains lots of bacteria. It builds up on your teeth over time. Bacteria feeds on sugars and create acids that can destroy tooth enamel and cause tooth decay.

Food Science

Starch gelatinisation

The starch particles absorb the liquid and swell when heated. The starch granules burst open and release their starch into the liquid. This causes the liquid to thicken. The more starch, the thicker the liquid.

Enzyme Browning

Enzymes in fruit cause them to ripen. When you slice fruits, the oxygen in the air turns the fruit brown. Enzymes in the fruit speed up this process. E.g. apples and pears.

Shortening

Shortening gives foods a crumbly texture. When you rub butter into flour you cover the flour particles with fat, this gives the flour a waterproof coating. This prevents the long gluten molecules from forming when the liquid is added to the flour. This means the dough cannot become stretchy and baked goods like shortbread keep a 'short' (firm and crumbly) hence the name shortening.

Bread making

<u>Ingredient</u>	<u>Function</u>
Strong white bread flour	High in gluten to give the bread structure. Bulking ingredient of the dough.
Salt	Gives flavour.
Sugar	Food for the yeast so it can multiply quickly.
Yeast	When given food (sugar) and warmth and moisture (water) it ferments producing co2 and alcohol which helps the dough rise and become light and fluffy.
Warm water	This activates the yeast so it can start to ferment. 14

The Eatwell guide



The Eatwell guide

The Eatwell guide is a government guide designed to show you the proportions of different foods groups you should eat over a day or more.

Tips on making healthy choices from the eatwell guide:

Fruit and vegetables: eat 5 portions of fruit and vegetables a day, this should make up 1/3 of your plate a day, fresh, frozen, canned, dried and fruit juice/smoothies all count, don't exceed 150ml of fruit juice/smoothie a day as it can cause tooth decay, try snacking on fruit over high sugar and fat foods,

Potatoes, bread, rice, pasta and other starchy carbohydrates: choose non-sugary cereals, leave the skin on potatoes, choose wholemeal options of foods such as bread, rice and pasta.

Oils and spreads: choose unsaturated fats such as vegetable oils and margarine over butter, use in small amounts.

Dairy and alternatives: choose lower fat options such as skimmed milk and low fat and salt cheese, choose low sugar yogurts and add fruit as a natural sweetener.

Beans, pulses, fish, eggs, meat and other proteins: eat more beans and pulses as they are high in fibre and fill you up for longer, cut the visible fat off meat, choose lower fat meat options, eat 2 portions of fish a week.

Water: drink 2-3 litres of water a day, choose lower sugar option drinks.

8 Guidelines for Healthy Eating

1. Base your meals on starchy carbohydrates	<ul style="list-style-type: none">• This should make up 1/3 of your diet• Chose high fibre, whole grain options e.g. pasta, rice• Try to include one starchy food with each meal	5. Eat less salt - no more than 6g a day for adults	<ul style="list-style-type: none">• Eating too much salt can raise blood pressure, this puts you at high risk of heart disease or a stroke• Most of the salt you eat is already in food, check the labels to help you choose low salt options
2. Eat lots of fruit and vegetables	<ul style="list-style-type: none">• Try adding a banana to cereal or swap crisps for fruit• Always serve main meals with two vegetables• Beans and pulses can count as 1 of your 5 portions	6. Get active and be a healthy weight	<ul style="list-style-type: none">• Regular exercise can reduce your risk of getting serious health conditions• Aim for 150 minutes of exercise a week
3. Eat more fish - including one portion of oily fish	<ul style="list-style-type: none">• Fish is a source of protein and vitamins and minerals• It contains omega 3 (good for eyes, skin, brain heart)• Oily fish includes: salmon, herring, mackerel, sardines	7. Don't get thirsty	<ul style="list-style-type: none">• 6-8 cups a day, 2-3 litres• Avoid sugary and fizzy drinks as they're bad for teeth• Remember fruit juice and smoothies is also high in sugar
4. Cut down on saturated fat and sugar	<ul style="list-style-type: none">• All types of fat are high in energy and should be eaten in small amounts• Excess sugar can cause weight gain and tooth decay	8. Don't skip breakfast	<ul style="list-style-type: none">• Kick starts you for the day• choose healthy low fat, sugar and salt and high fibre• Choose low sugar cereals and granola

Food Packaging

Food packaging

Food is packaged to protect the product during transport and whilst sitting on shelves.

Why is food labelling important?

Symbols on packaging show important information to customers.

Example exam questions:

Seasonal produce and air miles

What are the advantage of buying locally produced, seasonal produce? (6 marks)

Explain the disadvantages of buying imported foods. (10 marks)

Explain the term 'air miles' (3 marks)











Explain the term 'seasonal produce' (3 marks)

How might a restaurant use the fact they only use

Food packaging

Compare the two dishes and explain which dish is a healthier choice. Use the traffic light system to help you with your answer (6 marks).

Why is it important to include a vegetarian symbol on food packaging of vegetarian products? (2 marks)

				
Giving farmers a fair price for their products.	Forest Stewardship Council - helping effectively manage forests.	Suitable for home freezing.	Eggs have been produced to the highest standards of food safety.	Vegetarian approved - free from animal products.
				
This product can be recycled.	A British organisation that promotes and regulates food quality.	Tidy man - do not litter.	Food which abides by the Islamic law. The Islamic way of slaughtering is cutting the throat and draining the blood.	An ethical food label - helping farm animals have a good life.

Reference intake

You'll see reference intakes referred to on food labels. They show you the maximum amount of calories and nutrients you should eat in a day. Most packaging has a colour coded label on the front to help you make healthy choices.

Reference in take amounts:

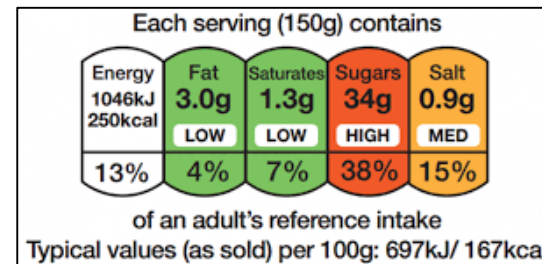
Kcal (calories) - 2000

Total Fat -70g

Saturated fat - 20g

Sugar - 90g

Salt - less that 6g



Red means HIGH in that nutrient
Amber means MEDIUM in that nutrient
Green means LOW in that nutrient

Reference intakes are not meant to be targets. They just give you a rough idea of how much energy you should be eating each day, and how much fat, sugar, salt and so on.

The percentages represent how much of your reference intake is in the product, e.g. the product has 3.0g of FAT in it, that is 4% of 70g of fat.

Fitness testing for performance			
Component of fitness	Fitness test	Advantages	Disadvantages
Aerobic Endurance	Multistage fitness test Cones are placed 20m apart. You run between the sounds of the beep which gradually gets faster.	<ul style="list-style-type: none"> You can test many people at once Tests maximum effort 	<ul style="list-style-type: none"> Scores can be subjective The conditions can affect the result
Agility	Illinois Agility test Using a set course, compete in quickest time possible	<ul style="list-style-type: none"> Cheap and easy 	<ul style="list-style-type: none"> Human error or weather can affect the results
Body Composition	Body Mass index (BMI) $\text{BMI} = \text{Weight (kg)} \div \text{Height (m)} \times \text{Height (m)}$	<ul style="list-style-type: none"> Easy to complete 	<ul style="list-style-type: none"> Misleading results
	Skinfold test Use callipers to measure skin on bicep, tricep, shoulder blade and hip.	<ul style="list-style-type: none"> Accurate percentage of body fat 	<ul style="list-style-type: none"> Specialist equipment needed
Flexibility	Sit and reach test Both feet against the box reaching forward and measure in centimetres.	<ul style="list-style-type: none"> Quick and easy Well known 	<ul style="list-style-type: none"> Arms and leg length can affect result
Muscular Endurance	Sit up and press up tests Count how many sit ups or press ups completed in one minute	<ul style="list-style-type: none"> Quick and easy Little equipment needed 	<ul style="list-style-type: none"> Incorrect technique will affect results
Muscular Strength	Grip Dynamometer 3 attempts to squeeze dynamometer and measure	<ul style="list-style-type: none"> Simple and easy Lots of data 	<ul style="list-style-type: none"> Equipment affects result
Power	Vertical Jump test Standing side on, jump and mark the wall with chalk, jumping as high as possible.	<ul style="list-style-type: none"> Quick and easy 	<ul style="list-style-type: none"> Technique can affect results

Components of Physical Fitness**Aerobic Endurance**

The ability of the heart and lungs to work hard to supply nutrients and oxygen to the muscles during exercise.

Muscular Endurance

The ability of the muscles to work efficiently for long periods of time

Speed

The ability to cover a distance quickly. There are 3 types of speed (Accelerative speed, Pure speed and Speed Endurance.

Muscular Strength

The maximum force, measured in kilograms (Kg) or newtons (N) that can be generated by a muscle or group of muscles.

Flexibility

The range of motion in all joints of the body and the ability to move a joint fluidly through its complete range of movement.

Body Composition

The amount of fat to fat-free muscle mass.

Components of Skill-related Fitness**Agility**

The ability of a sports performer to quickly change direction without losing balance or time

Balance

The ability to maintain your centre of mass over a base of support. There are two forms of balance (static which is maintaining balance in a stationary position and Dynamic which is maintaining balance while in motion)

Co-ordination

The ability of the body to work together to move smoothly and accurately

Power

The ability to use strength and speed. It is the work done in a unit of time and is calculated in the following way $\text{Power} = \text{Force (Kg)} \times \text{Distance (m)} / \text{time (mins or seconds)}$

Reaction time

The time taken for a sports performer to respond to a stimulus, for example, the time taken for a sprinter to react to the starter gun.

Methods of training

Circuit training — This involves a number of different activities that can be sport-specific or tailored to help improve certain levels of fitness.

Continuous training — This is training at a steady pace, moderate intensity to develop aerobic endurance. At least 30 minutes of steady running is an example of continuous training.

Fartlek training — This is a form of continuous training but the intensity is changed by running at different speeds over different terrains.

Interval training — This method requires periods of exercise followed by rest and recovery periods.

Plyometric training — This training develops sport-specific explosive power and strength.

Flexibility training — The method to develop flexibility at a joint. This is conducted using stretching. The three stretching categories are Static, Ballistic and Proprioceptive Neuromuscular Facilitation (PNF)

Speed training — Speed training can take many forms and can be sport specific. The three types of sprints are Acceleration, Interval and Hollow sprints.

Weight training — Weight training is a form of interval training and involves using reps and sets of reps.



10-12 Lunge Twists



15-20 Arm Circles



8-10 Burpees



8-10 Tricep Dips



10-20 Squats

Can you try these exercises at home? They are easy, free and works wonders for your core!

Fitness questions

(Complete this using either a computer or paper)

1.



Which fitness test is this?

2. What form of exercise can be used in continuous training?
3. Provide an advantage of the multistage fitness test
4. Which method of training uses reps and sets?
5. 'The ability of the muscles to work efficiently for long periods of time' is a definition of which fitness component?
6. How would you work out your BMI?
7. What is Plyometric training?
8. What are the three stretching categories?
9. Why would incorrect techniques affect the reliability of the press up or sit up test?
10. This is a skin calliper. What does this measure?



Using the link below or scan the code, to access BBC Bitesize to revise and test yourself on Health and Fitness training.

www.bbc.co.uk/bitesize/topics/zp9d7ty



Create a two week fitness programme for a British athlete. Your athlete is training for the Olympic Games. Consider the FITT principle, methods of training and fitness tests your athlete could use to help.

You could use this template as an idea.

	Activity	Method of training	Component of fitness or test
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

Once you have created this programme, complete this for yourself to test the quality of your programme.

Enzymes

An enzyme is a biological catalyst; enzymes speed up chemical reactions without being changed or used up.



This happens because the enzyme lowers the activation energy required for the reaction to occur. Enzymes are made up of chains of amino acids folded into a globular shape.

Enzymes have an active site which the substrate (reactants) fits into. Enzymes are very specific and will only catalyse one specific reaction. If the reactants are not the complimentary shape, the enzyme will not work for that reaction.

Enzymes also work optimally at specific conditions of pH and temperature. In extremes of pH or temperature, the enzyme will denature. This means that the bonds holding together the 3D shape of the active site will break and the active shape will deform. The substrate will not be able to fit into the active site anymore and the enzyme cannot function.

Enzyme	Reactant	Product
amylase	starch	sugars (glucose)
protease	protein	amino acids
lipase	lipid	glycerol and fatty acids

The products of digestion are used to build new carbohydrates and proteins and some of the glucose is used for respiration.

Bile is produced in the liver and stored in the gall bladder. It is an alkaline substance which neutralises the hydrochloric acid in the stomach. It also works to emulsify fats into small droplets. The fat droplets have a higher surface area and so the rate of their digestion by lipase is increased.

The Heart and Blood Vessels

The heart is a large muscular organ which pumps blood carrying oxygen or waste products around the body. The lungs are the site of gas exchange where oxygen from the air is exchanged for waste carbon dioxide in the blood. Oxygen is used in the respiration reaction to release energy for the cells and carbon dioxide is made as a waste product during the reaction.



The three types of blood vessels, shown above, are each adapted to carry out their specific function.

Capillaries are narrow vessels which form networks to closely supply cells and organs between the veins and arteries. The walls of the capillaries are only one cell thick, which provides a short diffusion pathway to increase the rate at which substances are transferred.

The table below compares the structure and function of arteries and veins:

	Artery	Vein
direction of blood flow	away from the heart	towards the heart
oxygenated or deoxygenated blood?	oxygenated (except the pulmonary artery)	deoxygenated (except the pulmonary vein)
pressure	high	low (negative)
wall structure	thick, elastic, muscular, connective tissue for strength	thin, less muscular, less connective tissue
lumen (channel inside the vessel)	narrow	wide (with valves)

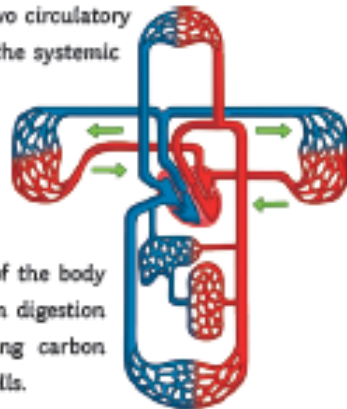
The Heart as a Double Pump

The heart works as a double pump for two circulatory systems; the pulmonary circulation and the systemic circulation.

The pulmonary circulation serves the lungs and bring deoxygenated blood to exchange waste carbon dioxide gas for oxygen at the alveoli.

The systemic circulation serves the rest of the body and transports oxygen and nutrients from digestion to the cells of the body, whilst carrying carbon dioxide and other waste away from the cells.

The systemic circulation flows through the whole body. This means the blood is flowing at a much higher pressure than in the pulmonary circuit.

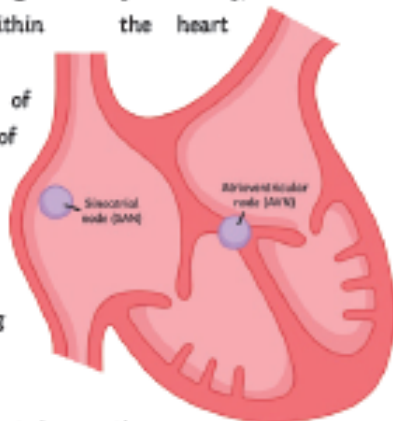


The Heart as Pacemaker

The rate of the heart beating is very carefully, and automatically, controlled within the heart itself.

Located in the muscular walls of the heart are small groups of cells which act as pacemakers.

They produce electrical impulses which stimulate the surrounding muscle to contract, squeezing the chambers of the heart and pumping the blood.



The sino-atrial node (SAN) is located near the right atrium and it stimulates the atria to contract.

The atrio-ventricular node (AVN) is located in between the ventricles and stimulates them to contract.

Artificial pacemakers can be surgically implanted into a person if their heart nodes are not functioning correctly.



Coronary Heart Disease

Coronary heart disease is a condition resulting from blockages in the coronary arteries. These are the main arteries which supply blood to the heart itself and they can become blocked by build-up of fatty deposits.

In the UK and around the world, coronary heart disease is a major cause of many deaths.

The main symptoms can include chest pain, heart attack or heart failure. Yet, not all people suffer the same symptoms, if any at all.

Lifestyle factors can increase the risk of a person developing coronary heart disease.

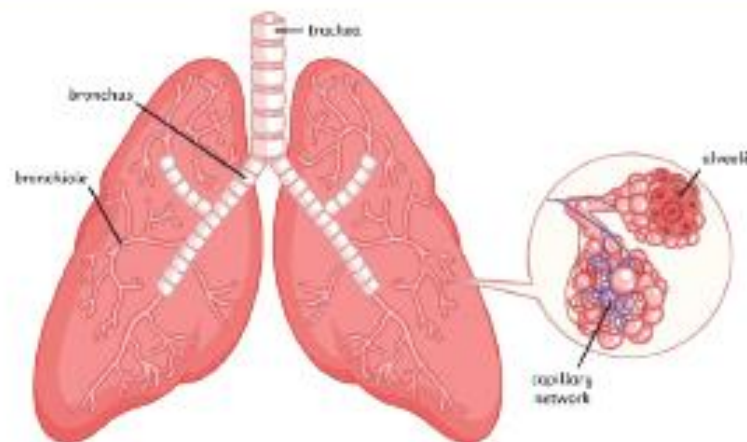
Diet – a high-fat diet (containing lots of saturated fat) can lead to higher cholesterol levels and this cholesterol forms the fatty deposits which damage and block the arteries.

Smoking – chemicals in cigarette smoke, including nicotine and carbon monoxide, increase the risk of heart disease. Carbon monoxide reduces the amount of oxygen which can be transported by the red blood cells and nicotine causes an increased heart rate. The lack of oxygen to the heart and increased pressure can lead to heart attacks.

Stress – prolonged exposure to stress or stressful situations (such as high pressure jobs) can lead to high blood pressure and an increased risk of heart disease.

Drugs – illegal drugs (e.g. ecstasy and cannabis) can lead to increased heart rate and blood pressure, increasing the risk of heart disease.

Alcohol – regularly exceeding unit guidelines for alcohol can lead to increased blood pressure and risk of heart disease.



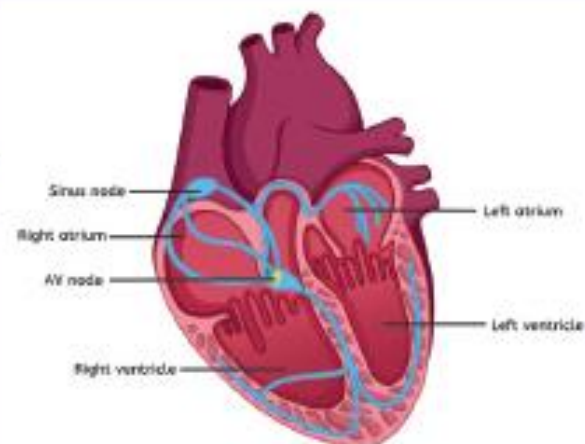
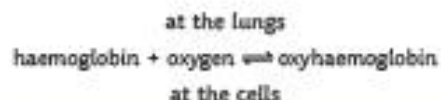
Blood

Blood is composed of red blood cells (erythrocytes), white blood cells and platelets, all suspended within a plasma (a tissue).

The plasma transports the different blood cells around the body as well as carbon dioxide, nutrients, urea and hormones. It also distributes the heat throughout the body.

Red blood cells transport oxygen attached to the haem group in their structure. It has a biconcave shape to increase surface area and does not contain a nucleus so it can bind with more oxygen molecules.

White blood cells form part of the immune system and ingest pathogens and produce antibodies. Platelets are important blood clotting factors.



The right atrium receives deoxygenated blood via the vena cava. It is then pumped down through the valves into the right ventricle. From here, it is forced up through the pulmonary artery towards the lungs where it exchanges carbon dioxide for oxygen. The oxygenated blood then enters the left atrium via the pulmonary vein and down into the left ventricle. The muscular wall of the left ventricle is much thicker so it can pump the blood more forcefully out of the heart and around the entire body, via the aorta.

The blood only flows in one direction. This is because there are valves in the heart which close under pressure and prevent the backward flow of blood.



Rate Calculations for Blood Flow

The number of beats the heart performs each minute is called the pulse (or heart rate).

It is easily measured by counting the number of beats in a given time, e.g. 15s, and finding the total beats per minute.

Typically, a lower resting pulse rate indicates a greater level of physical fitness. During exercise, and for some time after, the pulse rate increases while the heart is working to provide more oxygen to the muscles.

Cardiac output is a measure of the volume of blood pumped by the heart each minute. Stroke volume is a measure of the volume of blood pumped from the heart each contraction (heart beat).

Cardiac output (cm^3/min) = heart rate (bpm) \times stroke volume (cm^3/beat)

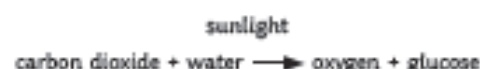
Cancer

Cancer is the result of uncontrolled cell growth and division. The uncontrolled growth of cells is called a tumour.

Benign Tumour	Malignant Tumour
<ul style="list-style-type: none"> Usually grows slowly. Usually grows within a membrane and can be easily removed. Does not normally grow back. Does not spread around the body. Can cause damage to organs and be life-threatening. 	<ul style="list-style-type: none"> cancerous Usually grows rapidly. Can spread around the body, via the bloodstream. Cells can break away and cause secondary tumours to grow in other areas of the body (metastasis).

Plant Tissues, Organs and Systems

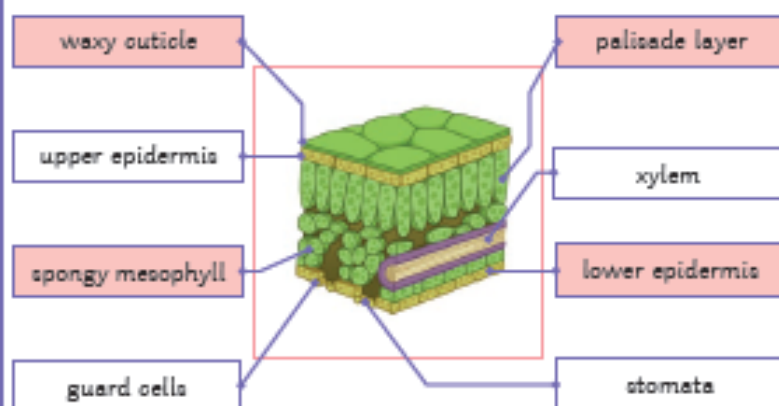
Leaves are plant organs and their main function is to absorb sunlight energy for use in photosynthesis. Within the cells are small organelles called chloroplasts which contain a green pigment called chlorophyll. This is the part of the plant which absorbs the sunlight and where photosynthesis occurs.



Leaves are adapted to carry out their function. Leaves are typically flat and thin with a large surface area. This means they have a maximum area to absorb the sunlight and carbon dioxide. The thin shape reduces the distance for diffusion of water and gases.

Leaves contain vessels called xylem and phloem. The xylem transport water and dissolved minerals toward the leaves. The phloem transport glucose and other products from photosynthesis around the plant.

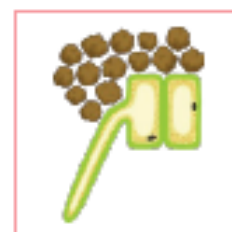
The large air spaces between the cells of the spongy mesophyll layer allow for the diffusion of gases. Carbon dioxide enters the leaves and oxygen exits the leaves.



The guard cells are specially adapted cells located on the underside of the leaf. They are positioned in pairs, surrounding the stomata (a small opening in the epidermis layer). The guard cells change shape to open and close the stomata, controlling the rate of gas exchange in the leaf.

Root Hair Cells

Plants absorb water by osmosis through the root hair cells of the roots. Dissolved in the water are important minerals for the plant's growth and development, which are absorbed by active transport.

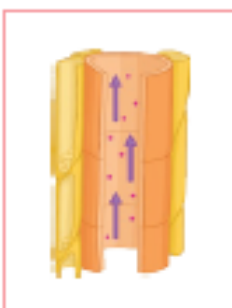


The root hair cells are adapted to their function with the following features:

- Finger-like projection in the membrane increases the surface area available for water and minerals to be absorbed across.
- The narrow shape of the projection can squeeze into small spaces between soil particles, bringing it closer and reducing the distance of the diffusion pathway.
- The cell has many mitochondria, which release energy required for the active transport of some substances.

Xylem and Phloem

Xylem vessels transport water through the plant, from roots to leaves. They are made up of dead, lignified cells, which are joined end to end with no walls between them, forming a long central tube down the middle. The movement of the water, and dissolved minerals, along the xylem is in a transpiration stream.



Xylem vessels also provide support and strength to the plant structure. They are found in the middle of roots so they aren't crushed within the soil. They are found in the middle of the stem to provide strength and prevent bending. In the leaves, they are found in vascular bundles alongside the phloem and can be seen as the veins which network across the leaf.

Crude Oil

Hydrocarbons are compounds that are made up of the elements hydrogen and carbon only.

Crude oil is a non-renewable resource, a fossil fuel. Crude oil is made up of a mixture of compounds, most of which are long- and short-chain hydrocarbons.

Most of the compounds in crude oil are hydrocarbons called alkanes. The alkanes form a homologous series. This is a family of hydrocarbons that all share the same general formula and have chemical properties that are similar.

Alkanes are held together by single bonds.

The general formula for an alkane is C_nH_{2n+2} .

They differ from the neighbouring alkane with the addition of a CH_2 .

Alkanes are saturated hydrocarbons. This means that all their bonds are taken up and they cannot bond to any more atoms.

Alkanes have similar chemical properties but have different physical properties due to differences in chain length. The longer the chain, the higher the boiling point of the hydrocarbon.

The first four alkanes are: methane, ethane, propane and butane.

A mnemonic to help you remember the order of the alkanes: mice eat paper bags.



Fractional Distillation

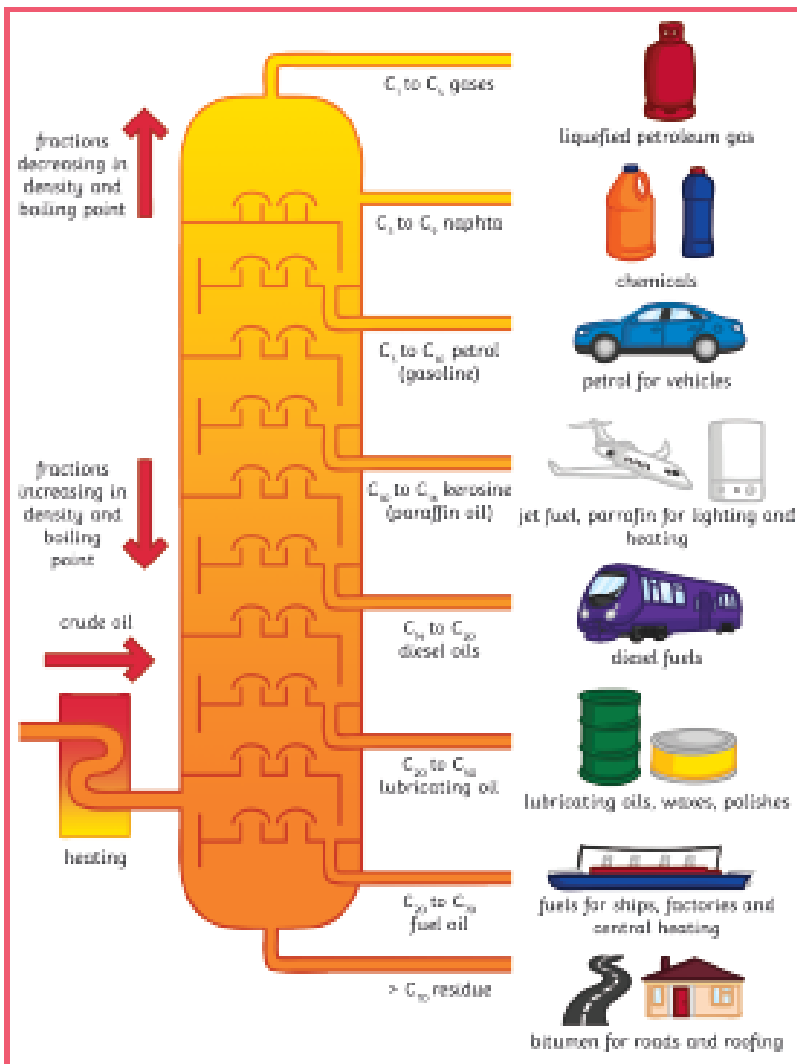
Fractional distillation is used to separate a mixture of long-chain hydrocarbons in crude oil into smaller, more useful fractions.

Hydrocarbons have different boiling points depending on their chain length. Each fraction contains hydrocarbons of a similar chain length. These fractions will boil at different temperatures due to the difference in sizes of the molecules. The different parts of crude oil are called fractions because they are a small part of the original mixture.

Crude oil is heated and enters at all column called a fractioning column. The column is hot at the bottom and decreases in temperature toward the top. As the crude oil is heated, it begins to evaporate and its vapours begin to rise up through the column. These vapours condense at the different fractions.

Short-chain hydrocarbons are found at the top of the column. This is because shorter chain molecules are held together by weak intermolecular forces resulting in low boiling points. These shorter chain hydrocarbons leave the column as gas.

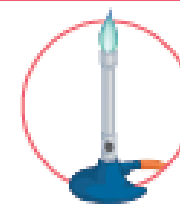
Long-chain hydrocarbons are found at the bottom of the column and are held together by strong intermolecular forces, resulting in high boiling points.



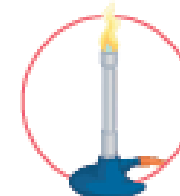
Name of Alkane	Structural Formula	Molecular Formula
methane	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$	CH_4
ethane	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$	C_2H_6
propane	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	C_3H_8
butane	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$	C_4H_{10}

Combustion

Complete combustion occurs when there is enough oxygen for a fuel to burn. A hydrocarbon will react with oxygen to produce carbon dioxide and water.



Incomplete combustion occurs when there isn't enough oxygen for a fuel to burn. The products in this reaction are water and poisonous carbon monoxide.



Cracking

Cracking is an example of a thermal decomposition reaction. Long-chain hydrocarbons can be broken down into shorter, more useful hydrocarbon chains.

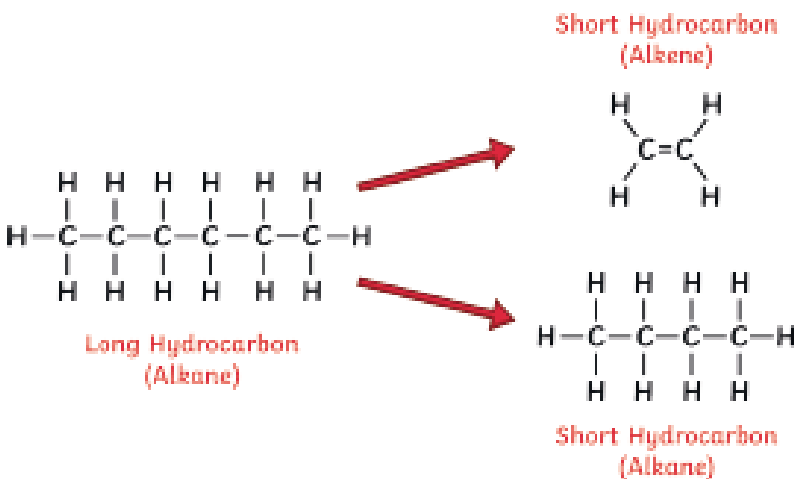
Cracking can be carried out with a catalyst in catalytic cracking or with steam in steam cracking.

Catalytic cracking involves heating a hydrocarbon to a high temperature (550°C) and passing over a hot catalyst.

Cracking of a long-chain hydrocarbon produces a short-chain alkane and an alkene.

Alkenes are another type of hydrocarbon that is double bonded. The general formula for an alkene is C_nH_{2n} .

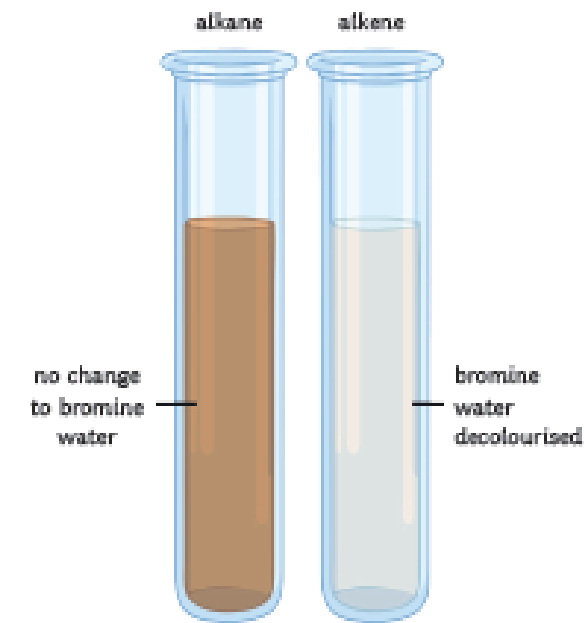
Alkenes are unsaturated hydrocarbons. In a chemical reaction, the double bond of the alkenes can break. This allows other atoms to bond to it.



Test for Alkanes

Bromine, when added to an alkane, will remain brown/orange. Alkanes are saturated hydrocarbons, they have no double bonds which could be broken to accept the bromine molecule and so remain orange.

Bromine, when added to an alkene, will change from brown/orange to colourless. This is because alkenes are unsaturated hydrocarbons. The double bond breaks and the bromine molecule is accepted.



Making Polymers

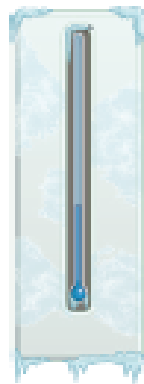
The fractional distillation of crude oil and cracking produces an array of hydrocarbons that are key to our everyday lives.

Alkenes are used to produce plastics such as poly(ethene) which is used to make plastic bags, drinks bottles and dustbins. Poly(propene), another polymer, forms very strong, tough plastic.

Short-Chain Molecules

Increasing Chain Length

Long-Chain Molecules



As chain length increases, the boiling point of the hydrocarbon chains also increases.



thin



Viscosity describes how easily a substance can flow e.g. treacle is very viscous; it is thick.

thick



Flammability is a measure of how easily a substance burns.



Required Practical

Investigating Resistance in a Wire

Independent variable: length of the wire.

Dependent variable: resistance.

Control variables: type of metal, diameter of the wire.

Conclusion: As the length of the wire increases, the resistance of the wire also increases.

Investigating Series and Parallel Circuits with Resistors

Independent variable: circuit type (series, parallel).

Dependent variable: resistance.

Control variables: number of resistors, type of power source.

Conclusion: Adding resistors in series increases the total resistance of the circuit. In a parallel circuit, the more resistors you add, the smaller the resistance.

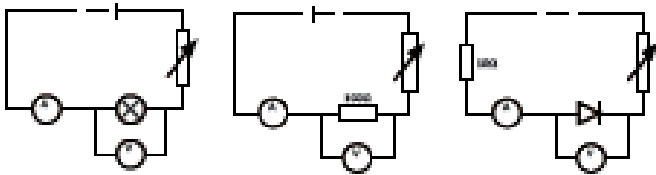
Investigating I-V Relationships in Circuits (Using a filament bulb, ohmic conductor, diode.)

Independent variable: potential difference/volts (V).

Dependent variable: current (A).

Control variable: number of components (e.g. 1 filament bulb, 1 resistor), type of power source.

Set up the circuits as shown below and measure the current and the potential difference.



Draw graphs of the results once collected.

Equations and Maths

Equations

Charge: $Q = It$

Potential difference: $V = IR$

Energy transferred: $E = Pt$

Energy transferred: $E = QV$

Power: $P = VI$

Power: $P = I^2R$

Maths

1kW = 1000W

0.5kW = 500W

Charge

Electric current is the flow of electric charge. It only flows when the circuit is complete.

The charge is the current flowing past a point in a given time. Charge is measured in coulombs (C).

Calculating Charge

charge flow (C) =

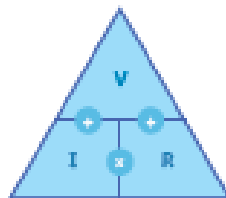
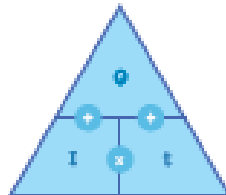
current (A) \times time (s)

$Q = It$

potential difference =

current \times resistance

$V (V) = I (A) \times R (\Omega)$



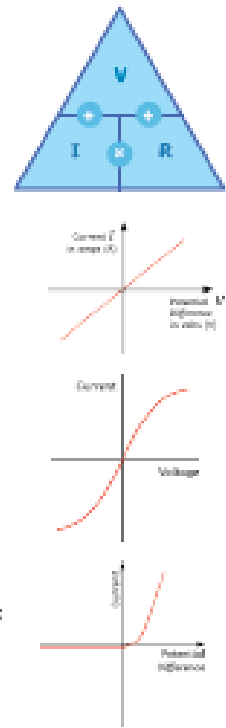
Resistance

voltage (V) = current (A) \times resistance (Ω)

$V = IR$

Graphs of I-V Characteristics for Components in a Circuit

1. **Ohmic conductor:** the current is directly proportional to the potential difference - it is a straight line (at a constant temperature).
2. **Filament lamp:** as the current increases, so does the temperature. This makes it harder for the current to flow. The graph becomes less steep.
3. **Diode:** current only flows in one direction. The resistance is very high in the other direction which means no current can flow.



Current and Circuit Symbols

Current: the flow of electrical charge.

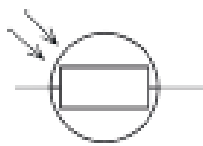
Potential difference (voltage): the push of electrical charge.

Resistance: slows down the flow of electricity.

cell		closed switch		fuse	
resistor		ammeter		LDR	
battery		voltmeter		LED	
variable resistor		bulb		thermistor	
open switch		diode			

Circuit Devices

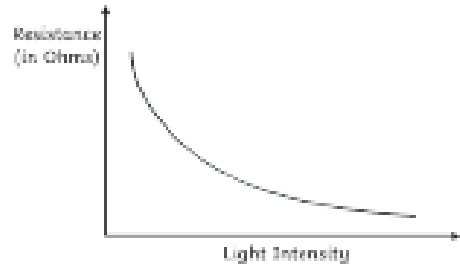
LDR – Light Dependent Resistor



An LDR is dependent on light intensity. In bright light the resistance falls and at night the resistance is higher.

Uses of LDRs: outdoor night lights, burglar detectors.

Light Dependent Resistor (LDR)

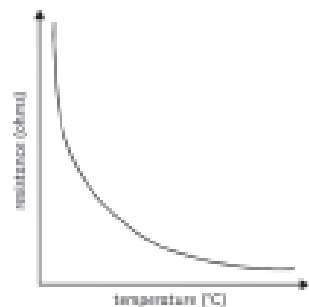


Thermistor



A thermistor is a temperature dependent resistor. If it is hot, then the resistance is less. If it becomes cold, then the resistance increases.

Uses of thermistors: temperature detectors.



Series and Parallel Circuits

Series Circuits

Once one of the components is broken then all the components will stop working.

Potential difference – the total p.d. of the supply is shared between all the components.

$$V_{\text{total}} = V_1 + V_2$$

Current – wherever the ammeter is placed in a series circuit the reading is the same.

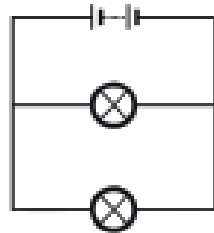
$$I_1 = I_2 = I_3$$

Resistance – In a series circuit, the resistance will add up to make the total resistance.

$$R_{\text{total}} = R_1 + R_2$$

Parallel Circuits

They are much more common - if one component stops working, it will not affect the others. This means they are more useful.



Potential Difference – this is the same for all components.

$$V_1 = V_2$$

Current – the total current is the total of all the currents through all the components.

$$I_{\text{total}} = I_1 + I_2 + I_3$$

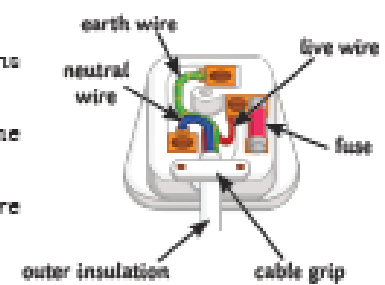
Resistance – adding resistance reduces the total resistance.

Electricity in the Home

AC – alternating current. Constantly changing direction - UK mains supply is 230V and has a frequency of 50 hertz (Hz).

DC – direct current. Supplied by batteries and only flows in one direction.

Cables – most have three wires: live, neutral and earth. They are covered in plastic insulation for safety.



Live wire – provides the potential difference from the mains.

Neutral wire – completes the circuit.

Earth wire – protection. Stops the appliance from becoming live. Carries a current if there is a fault. Touching the live wire can cause the current to flow through your body. This causes an electric shock.

Energy Transferred – this depends on how long the appliance is on for and its power.

$$\text{energy transferred (J)} = \text{power (W)} \times \text{time (s)} \quad E = Pt$$

Energy is transferred around a circuit when the charge moves.

$$\text{energy transferred (J)} = \text{charge flow (C)} \times \text{potential difference (V)} \quad E = QV$$

$$\text{power (W)} = \text{potential difference (V)} \times \text{current (A)} \quad P = VI$$

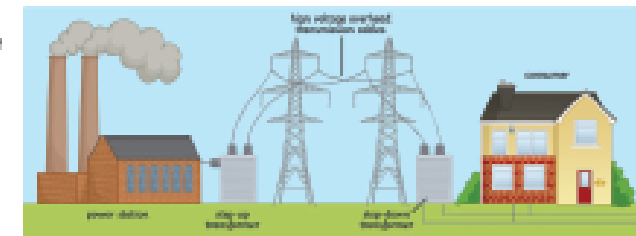
$$\text{power (W)} = \text{current}^2 \text{ (A)} \times \text{resistance } (\Omega) \quad P = I^2R$$

The National Grid

The National Grid is a system of cables and transformers. They transfer electrical power from the power station to where it is needed. Power stations are able to change the amount of electricity that is produced to meet the demands. For example, more energy may be needed in the evenings when people come home from work or school. Electricity is transferred at a low current, but a high voltage so less energy is being lost as it travels through the cables.

Step-up transformers – increase the voltage as the electricity flows through the cables.

Step-down transformers – decrease the potential difference to make it safe.



Activity: Use a video conferencing piece of software to explain the contents of this knowledge organiser to someone in your family who is not technically savvy. Break the knowledge down into lessons which you can do one a week.

Summary

Computers use **binary** - the digits 0 and 1 - to store data. A **binary digit**, or **bit**, is the smallest unit of data in computing. ... **Binary numbers** are made up of **binary digits (bits)**. The circuits in a computer's processor are made up of billions of transistors

Boolean algebra and **truth tables** can be used to describe logical expressions. The most common Boolean operators are **AND**, **OR** and **NOT** (always in capitals). Each operator has a standard symbol that can be used when drawing logic gate circuits.

A bit pattern could represent different types of data including text, image, sound and integer.

Computers require input hardware, processing hardware and output hardware. The hardware that defines a computer is the **CPU** and **memory**. Without these a computer could not function. The CPU and memory work together to run programs.

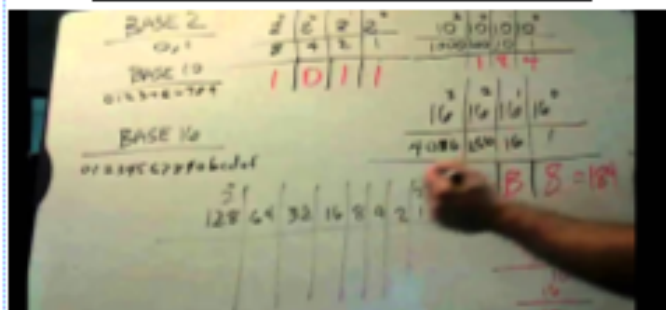
CPU - executes programs using the **fetch-decode-execute cycle**.

Memory - stores program operations and data while a program is being executed. There are several types of memory, including: registers, cache, RAM and virtual memory.

Key Vocabulary

Clock speed	The speed of a computer CPU, measured in hertz.
Cache	A piece of temporary memory. It can refer to a part of the RAM, storage disk, CPU, or an area for storing web pages.
CPU	Central Processing Unit - the brains of the computer that processes program instructions. Also called a microprocessor .
Execute	To run a computer program.
GHz	Gigahertz. One billion hertz per second = one gigahertz. This is a measure of frequency and is used to describe bus speeds and CPU clock speeds.
Hardware	The physical parts of a computer system, e.g. a graphics card, hard disk drive and CD drive.
Mother-board	The circuit board inside a computer that houses the CPU, memory and connections to other devices.
RAM	Memory that is constantly being written to and read from. It does not retain its contents without a constant supply of power, i.e. when a computer is turned off, everything stored in its RAM is lost.
Registers	The section of high speed memory within the CPU that stores data to be processed.
Software	Software is the programs that run on a computer.
Virtual memory	A section of a computer storage drive which is temporarily used as RAM.

Decimal, binary and hexa decimal



Central Processing Unit

The Central Processing Unit or CPU is arguably the most important component of a computer.

You can think of the CPU as being like the brain in a human.

It is responsible for all of a computer's processing.

The Fetch - Decode - Execute cycle

The CPU operates by repeating three operations:

FETCH - causes the next instruction and any data involved to be fetched from main memory

DECODE - decodes the instruction to make sure it can be carried out

EXECUTE - carries out the instruction

Repeat ...

Boolean Algebra

NOT Gate



$Q = \text{NOT}(A)$

Truth Table

Input A	Output Q
0	1
1	0

AND Gate



$Q = A \text{ AND } B$

Truth Table

Input A	Input B	Output Q
0	0	0
0	1	0
1	0	0
1	1	1

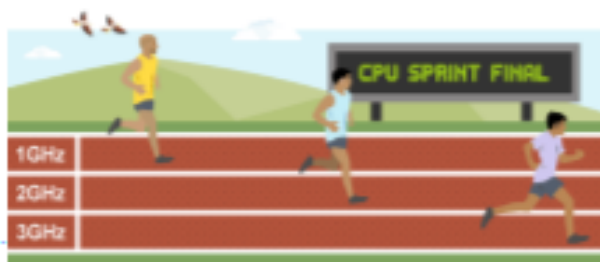
NAND Gate



$Q = A \text{ NAND } B$

Truth Table

Input A	Input B	Output Q
0	0	1
0	1	1
1	0	1
1	1	0

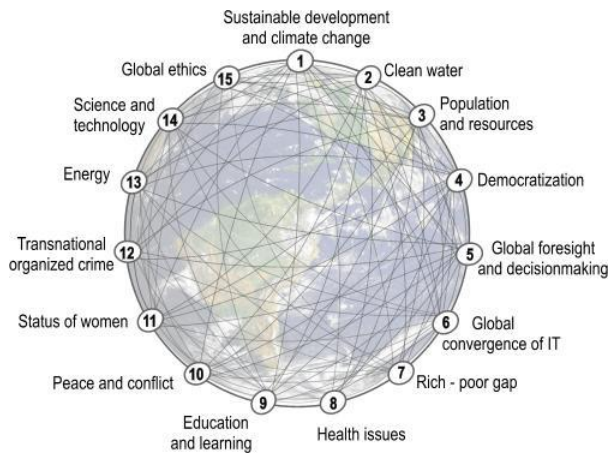


PC Components



<http://bit.ly/2Qxi9ab>





Year 9 Knowledge organiser: Global challenges



Produce a Poster explaining these ideas.

1. I can describe global scale challenges
2. I can describe how human populations are un-equal
3. I can describe how human activities are damaging the environment
4. I can explain why opinions vary on solving global challenges
5. I can discuss ideas for a sustainable future

Topics covered

- ✓ Types of challenges
- ✓ Population and resources
- ✓ Poverty and Wealth inequality
- ✓ Settlements and environmental quality
- ✓ Resource exploitation and environment
- ✓ Ecosystems and biodiversity
- ✓ Global Warming and Climate Change

Skills

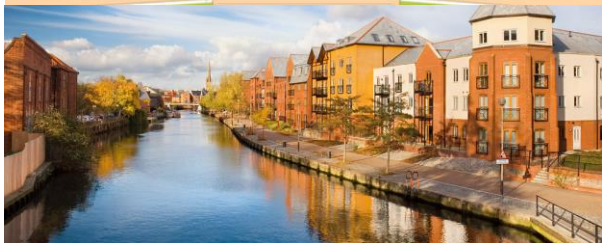
- ❑ To research using ICT
- ❑ To interpret a variety of graphs/infographics
- ❑ To use mapping to investigate deforestation and urbanisation
- ❑ To understand different opinions and viewpoints
- ❑ To write a detailed piece of extended writing
- ❑ To use ICT/MS Office to present to my class

Places and Environments

- ❖ Amazon rainforest
- ❖ Antarctica and Arctic
- ❖ India
- ❖ China
- ❖ Germany
- ❖ Tuvalu
- ❖ Maldives

Key Terms Used in this Unit

- Over-population
- Resource Consumption
- Water access
- Electrification
- Literacy
- Environmental Hazards
- Freedom
- Standard of Living
- Greenhouse gases
- Disease
- Global warming
- Climate Change
- Biodegradable plastics
- Pollution
- Deforestation
- Biodiversity
- Sustainability
- Transport
- Conservation



Topics covered

- ✓ What is Norwich like?
- ✓ Natural/man-made features
- How is Norwich changing?
- ✓ Do geographical ideas and theories work in Norwich?
- ✓ What are data types?
- ✓ How can I collect data?
- ✓ How can I present data?
- ✓ What does my data tell me?

Designed by KMU for Open Academy 2019

Year 9 Knowledge Organiser: Local Fieldwork Project – Norwich



Produce a piece of fieldwork on these topics using the ideas on this knowledge organiser.

1. I can define my local area
2. I can describe different areas within Norwich
3. I can ask geographical questions about my local area
4. I can test ideas and theories about my local area
5. I can report on the findings of my local area investigation

Skills

- ❑ To use GIS (digital mapping) to describe/locate my local area
- ❑ To use mapping to investigate features
- ❑ To collect primary (my own) data on my local environment (could also be secondary data)
- ❑ To construct tables/graphs/sketches to record observations
- ❑ To write a detailed analysis of results

Places and Environments

- ❖ Open Academy
- ❖ Heartsease
- ❖ Norwich
- ❖ Trowse
- ❖ Riverside
- ❖ Anglia Square
- ❖ Gentlemans Walk
- ❖ Chapelfield

Key Terms Used in this Unit

- ❑ Primary data
- ❑ Secondary data
- ❑ Hypothesis
- ❑ Transect
- ❑ Sampling
- ❑ Bi-polar analysis
- ❑ Fieldsketch
- ❑ Pie chart
- ❑ Scattergraph
- ❑ Radar graph
- ❑ Correlation
- ❑ Proportional symbols
- ❑ Averages (mean/mode/median)
- ❑ Conclusion
- ❑ Judgement
- ❑ Reliability
- ❑ Limitations
- ❑ Evaluation

Year 9 Spanish Summer Term 1. En la ciudad (2.6) & Los medios de comunicación (3.1)

En la ciudad	In the city
¿Qué hay en Barcelona?	What is there in Barcelona?
En Barcelona hay muchas cosas: el acuario, el cine IMAX ...	In Barcelona there are many things: the aquarium, the IMAX cinema ...
¿Adónde vas?	Where are you going (to)?
Voy ...	I'm going ...
al acuario	to the aquarium
al Camp Nou	to the Camp Nou (football) stadium
al cine IMAX	to the IMAX cinema
al monumento a Colón	to the Columbus Monument
al museo Picasso	to the Picasso Museum
al Tibidabo	to the Tibidabo funfair
a la playa de la Barceloneta y el mar	to Barceloneta beach and the sea
a la plaza de Cataluña	to the Plaza Catalunya
a la Sagrada Familia	to the Sagrada Familia church

a la torre Agbar	to the Agbar Tower
a la Villa Olímpica	to the Olympic Village
a las Ramblas	to the Ramblas

Me gusta Barcelona porque ...	I like Barcelona because ...
me encanta ...	I love ...
me gusta mucho ...	I really like ...
ir de compras	going shopping
mirar pinturas	looking at paintings
montar en las atracciones del parque	going on the rides at the funfair
sacar fotos	taking photos
tomar el sol	sunbathing
ver partidos de fútbol	watching football matches
ver películas	watching films
ver tiburones	watching sharks

Le gusta (mucho) ...	He/She (really) likes ...
----------------------	---------------------------

De compras	Shopping
¿Dónde se puede comprar ...?	Where can you buy ...?
carne	meat
comida	food
ropa	clothes
¿Dónde se pueden comprar ...?	Where can you buy ...?
pasteles	cakes
joyas	jewellery
zapatos	shoes
libros	books
CDs	CDs
Se puede(n) comprar ...	You can buy ...
en ...	in ...
un supermercado	a supermarket
una cafetería	a café
una carnicería	a butcher's
una joyería	a jeweller's
una librería	a bookshop
una panadería	a baker's/bread shop
una pastelería	a cake shop
una tienda de música	a music shop
una tienda de ropa	a clothes shop
una zapatería	a shoe shop

Year 9 Spanish Summer Term 1. En la ciudad (2.6) & Los medios de comunicación (3.1)

Las direcciones	
	Directions
Perdón ...	Excuse me ...
¿Dónde está el museo Picasso?	Where is the Picasso Museum?
¿Dónde están las Ramblas?	Where are the Ramblas?
A ver ...	Let's see ...
Bueno ...	Well ...
Pues ...	Well ...
Sigue todo recto.	Go straight on.
Dobla a la derecha.	Turn right.
Cruza la plaza.	Cross the square.
Toma la segunda calle a la derecha.	Take the second (street) on the right.
Toma la segunda calle a la izquierda.	Take the second (street) on the left.
Está a la derecha.	It's on the right.
Está a la izquierda.	It's on the left.
Está aquí.	It's here.

Soy turista ...	I'm a tourist ...
Hoy ...	Today ...
Estoy en Barcelona.	I'm in Barcelona.
Es genial.	It's great.
descansé un poco	I had a little rest
Lo pasé fenomenal.	I had a wonderful time.
Me gustó.	I liked it.
No me gustó.	I didn't like it.

Mañana ...	Tomorrow ...
Pasado mañana ...	The day after tomorrow ...
voy a ir al Tibidabo	I'm going to go to the Tibidabo
voy a ir de compras	I'm going to go shopping
voy a comprar unas camisetas	I'm going to buy some T-shirts

Palabras muy útiles	Very useful words
a (al)	to (to the)
hay	there is/there are
¿dónde?	where?
¿adónde?	(to) where?
en	in, at
hoy	today
Ayer	yesterday

Estrategia

The gender of nouns

You can often work out whether a noun is masculine or feminine by looking at the ending of the word:

- Most nouns ending in **-o**, **-or** and **-ón** are masculine.
- Most nouns ending in **-a**, **-dad** and **-ción** are feminine.

But be careful! There are exceptions, for example:

el problema la foto

To check, use a dictionary: look for the abbreviations *nm* (masculine noun) and *nf* (feminine noun).

Can you work out the gender of these nouns from Module 6 without using a dictionary?

- ciudad
- supermercado
- pastelería
- pintor
- tiburón
- canción

Year 9 Spanish Summer Term 1. En la ciudad (2.6) & Los medios de comunicación (3.1)

Mi ordenador	<i>The computer</i>
¿Qué haces con tu ordenador?	<i>What do you do with your computer?</i>
Leo y escribo correos.	<i>I read and write emails.</i>
Descargo música.	<i>I download music.</i>
Navego por internet.	<i>I surf the net.</i>
Juego.	<i>I play games.</i>
Chateo.	<i>I chat online.</i>
Hago mis deberes.	<i>I do my homework.</i>
Veo DVDs.	<i>I watch DVDs.</i>
Compro regalos.	<i>I buy presents.</i>
todos los días	<i>every day</i>
dos veces a la semana	<i>twice a week</i>
los fines de semana	<i>at weekends</i>
a veces	<i>sometimes</i>
nunca	<i>never</i>
La televisión	<i>Television</i>
¿Cuál es tu programa favorito?	<i>What's your favourite television programme?</i>
Mi programa favorito es ...	<i>My favourite programme is ...</i>
Es ...	<i>It's ...</i>
un concurso	<i>a game show</i>
un documental	<i>a documentary</i>

un programa de deporte	<i>a sports show</i>
un programa de música	<i>a music show</i>
un programa de tele-realidad	<i>a reality show</i>
el telediario	<i>the news</i>
el tiempo	<i>the weather</i>
una comedia	<i>a comedy</i>
una serie de policías	<i>a detective series</i>
una telenovela	<i>a soap opera</i>
¿Por qué te gusta?	<i>Why do you like it?</i>
Me gusta/Me gustan...	<i>I like...</i>
Me encanta/Me encantan ...	<i>I love ...</i>
No me gusta/No me gustan ...	<i>I don't like ...</i>
porque es ...	<i>because it is</i>
porque son ...	<i>because they are ...</i>
aburridos/as	<i>boring</i>
divertidos/as	<i>entertaining</i>
educativos/as	<i>educational</i>
emocionantes	<i>moving</i>
informativos/as	<i>informative</i>

interesantes	<i>interesting</i>
malos/as	<i>bad</i>
tontos/as	<i>stupid</i>
un rollo	<i>a drag</i>
Las películas	<i>Films</i>
¿Qué tipo de películas prefieres?	<i>What sort of films do you prefer?</i>
Prefiero...	<i>I prefer...</i>
las películas de ...	<i>... films</i>
acción	<i>action</i>
amor	<i>romantic</i>
artes marciales	<i>martial arts</i>
ciencia-ficción	<i>sci-fi</i>
guerra	<i>war</i>
terror	<i>horror</i>
las películas del Oeste	<i>Westerns</i>
las comedias	<i>comedies</i>
los dibujos animados	<i>cartoons/animations</i>
Más o menos	<i>More or less</i>
más ... que	<i>more ... than</i>
menos ... que	<i>less ... than</i>
Los dibujos animados son más divertidos que las películas de terror.	<i>Cartoons are funnier than horror films.</i>

Key words	
Tsar	Monarch or emperor of Russia
Autocracy	A political system where the country is ruled by one monarch who holds all political power
Revolution	A sudden and significant change to the political system in a country, usually involving the overthrow of the previous government or ruler
Bolshevik	Name of the Russian Communist Party who take control of Russia in 1917
Lenin	Leader of the Bolsheviks until his death in 1924
1905 Revolution	Russia's first Revolution in which the Tsar's power is threatened but survives with some minor changes
February Revolution	Takes place in 1917 and sees the overthrow of the Tsar and his replacement with the 'Provisional Government'
October Revolution	Takes place in 1917, led by the Bolsheviks, and sees the overthrow of the Provisional Government
Jack the Ripper	Nickname given to a serial killer who killed at least five prostitutes in Whitechapel in 1888
Whitechapel	The very poor area of London in which 'Jack the Ripper' carried out his murders.

Russia in 1905

By 1905, the vast majority of Russia was still a backward country mostly based on farming. Peasants worked hard and were often vulnerable to famine and disease. However, they were very religious and very loyal to the Tsar of Russia.

In 1905 Russia had its first Revolution. Although the protesters mostly did not wish to overthrow the Tsar they did demand some changes. This had 3 main causes:

- Ongoing poverty and inequality in Russia, and as inflation, hunger and taxation increased the peasants began to protest
- The Russian army/navy were humiliated by the Japanese in the Russo-Japanese war, so people were angry and some blamed the Tsar
- Bloody Sunday was a protest in the capital city of St. Petersburg where the Tsar ordered his troops to shoot the protesters

Despite a large amount of opposition in 1905, Tsar Nicholas II was able to survive and introduce only very limited changes.

However, in 1917 there were two revolutions in Russia that changed the country forever. On the right are some of the key features of both.

February 1917 Revolution	October 1917 Revolution
Caused by the Tsar's failure to end the war despite its effects on the Russian people.	Caused by the Provisional Government's failure to end the war, despite promising they would.
Caused by increasing demands for democracy in Russia by many different political groups.	Caused by the actions of the Communists who wanted Russia to become a Communist country.
Caused by ongoing poverty and suffering in Russia.	Caused by ongoing poverty and suffering in Russia.
Led to the creation of a Provisional Government who planned to bring in free elections	Led to the replacement of the Provisional Government with a Communist government
Although they imprisoned much of their opposition, the Government eventually lost control and the Bolsheviks took power	Once in power, the Bolsheviks fought the Russian Civil War against those who wanted the Tsar to return. They won and remained in power.

'Jack the Ripper'

In Whitechapel in 1888 the murders of five prostitutes were strongly suspected to be the work of a single person. Although the murderer was never caught, he was given the name 'Jack the Ripper'.

The murders took place in the area of Whitechapel, London. It was possible for the killer to escape partly because the crime rate in Whitechapel was so high.

Prostitutes were often victims of violent crime; they were alone with men, spent a lot of time out at night and many had no family able to protect them.

The victims

1. Mary Ann Nichols— 31st August 1888

Mary was found dead in the middle of the street. She had had her throat cut and her belly sliced open.

2. Annie Chapman— 8th September 1888

Annie Chapman was found in a yard, again with her throat cut and her belly sliced open. The fact that many people were close by suggests the killer was silent. Elizabeth Long reported seeing Annie talking to a foreign gentleman with a shabby genteel appearance.

3. Elizabeth Stride— 30th September 1888

Elizabeth Stride was found dead in a pub back yard. Her throat had been cut however the killer had been disturbed before he could mutilate her body. This seemed to anger him and he went in search of another victim.

4. Catherine Eddowes— 30th September 1888

Later that same night Catherine Eddowes was murdered in Mitre Square. The killer was clearly frustrated by his earlier failure as the cuts were deeper and more frantic than the others.

5. Mary Jane Kelly— 9th November 1888

This was the most gruesome of the murders. Mary Kelly invited the murderer back to her home where the murder took place. Jack the Ripper spent hours mutilating her body. This was the most gruesome murder by far.

Why wasn't the killer caught?

It is likely that, had he been around today, Jack the Ripper would have been caught. However there were several reasons why he was able to get away with it.

Some of these have to do with the failures of the Police at the time:

- The police ignored and sometimes destroyed key evidence, such as writing on Catherine Eddowes' wall (a crime scene)
- The two police forces involved did not communicate well with each other
- The police offered no reward for information
- Much of the evidence the police used came from unreliable witnesses

However, there were also factors outside of Police control:

- Whitechapel was like a maze which made it easy for criminals to hide and escape
- The press were very critical of the police and mocked even some of their sensible tactics
- Many fake letters were sent to the police, claiming to be from the killer.

The aim of a knowledge organiser is to do what it says on the tin – to help you organise and consolidate your knowledge! Of course, there are an infinite number of ways in which this can be done, and will depend very much on the choices of the individual. Below you will find some suggestions of possible tasks that could be completed with the use of your knowledge organiser.

Re-write this information for a primary school child. This is harder than it sounds! What key words will you need to define for them?

Re-write a page using 10 key facts or illustrations.

Produce a timeline of all the main events – either on one particular topic or, for a challenge, everything you have studied so far!

Design a museum; what artefacts would you include to represent the facts in the knowledge organiser?

Design a time capsule; what would you put in it to represent History learned so far in each knowledge organiser?

Write a 20 question quiz (with answers). You could send this to a friend in your year, a member of your family or test yourself in 2 weeks' time.

Write a creative story – pick one of the historical figures and do it from their point of view.

Write a role play from a moment in History using the knowledge organiser. Involve other people from your family!

Make a poster titled “Keep Calm and learn about History”. Use the knowledge organiser to illustrate.

Write a monologue from one of the historical figures. How would they feel about the events going on around them?

Teach a History lesson to someone else in your house using the knowledge organiser.

Pick an event in History and produce a cartoon strip or storyboard from it.

Pick an event in History and draw the scene.

Pick an event or person from the knowledge organiser and explain why they are the most important event or theme to learn about in History.

Pick an event and write a creative news article about it.

Imagine you can have a tea party with someone from History from the KO. Who would you invite and why? What would you talk about and what would you eat/drink?

Vocabulary to learn

Superlative
Surreal
Strewn
Unsettling
Detritus
Veteran
Advocate
Demeanour
Content
Tone
Delivery
Engaging
Unrest
Civilian
Dissidence
Conformity
Democracy
Controversial
Explanatory
Introduction
Conclusion
Alternative
Informative

Structure analysis checklist:

- Zoom in/out
- Repetition of an image/idea
- Links and connections between paragraphs
- Shifts:
 - inside to outside (and vice versa)
 - focus
 - time
 - topic
 - setting/place
 - mood/atmosphere
 - description to dialogue (and vice versa)

Language analysis checklist:

- Link to task
- Relevant quote
- Meaning of quote
- Method named
- Effects explained
- Word zoomed in on
- Meaning of word
- Implied meanings
- Aim higher: layers of meaning

Evaluate

- The impressions you have of the text in relation to a statement
- The methods the writer has used to create these impressions
- How the particular **methods** create these impressions

Methods

- **Linguistic devices** – *simile, metaphor, personification, repetition, rhetorical question etc.*
- **Word choices** – *nouns, adjectives, verbs, adverbs etc.*
- **Sentence forms** – *fragment, simple, compound, complex*

Checklist:

1. Capitals
2. Full stop .
3. Exclamation !
4. Question ?
5. Comma ,
6. Apostrophe ' ,
7. Ellipsis ...
8. Semi colon ;
9. Colon :

Descriptor from GCSE assessment criteria

Level 4: simple vocabulary
Bad Good Light Happy

Level 5: effective vocabulary
Negative Positive Bright Jolly

Level 6: sophisticated vocabulary
Awful Fantastic Brilliant Ecstatic

Levels 7-9: ambitious vocabulary
Immoral Virtuous Dazzling Elated

Literary devices and word class

- Metaphor – a literal comparison – *she was a monster*
- Personification – human qualities – *the grass danced in the wind*
- Simile – as/like/as if – *he was like a man possessed*
- Onomatopoeia – the sound words – *bang, pop, sizzle*
- Alliteration – same starting sounds – *really rather raucous*
- Lists – to emphasise many reasons
- Verbs – doing words
- Adjectives – describing words
- Nouns – objects or abstract things e.g. love
- Adverbs – describe doing words e.g. wrote **neatly**
- connotations of words – associations – night-time = mystery

Activities:

- Look up and define any of the key words in the purple box that you don't feel confident with.
- Look, cover and copy the key words in the purple box. Do this each day until you get the spelling of them correct. You could complete your learning of these words by getting a parent or sibling to test you on all of them.
- Read the extract from *The Hobbit* by J. R. R Tolkien the next page. Write down all of the adjectives you can see. Next to them, using a thesaurus if you have one, write synonyms that are more ambitious. For example, 'nice' – 'pleasant', 'gracious', 'congenial'.
- Draw a picture of a Hobbit hole. Surround it with words you would use to describe them (adjectives).
- Using the blue box to help you, try to create 10 metaphors. Use the theme of fantasy to inspire them. Example – the tree waved like a huge crowd moving towards the entrance to a music concert.
- Using the blue box to help you, create 10 similes. Use the theme of fantasy to inspire them. Example – the stars moved across the sky like fireworks sparkling across the dark sky.
- Write a short story (200–300 words) that fantasy. Use first or third person and past or present tense, but make sure that this is consistent throughout. Use as many of the literary devices in the blue box as you can and make sure you include nouns, adjectives, verbs and adverbs that are ambitious and effective. Plan your story before you begin, using the narrative arc model on the next page.
- Read a book that explores elements of fantasy (there is a link below). Then, write a review of it (100–200 words), detailing what you found most enjoyable and perhaps, what you didn't like so much. Imagine you are writing it for a website that young readers will look at to decide what to read next. The link below will take you to free audio books... including *The Hobbit*! 😊
- After reading this extract one student said that the author has described the hobbit as a fussy character. Using language structure and form explain your opinion of this statement.
- Analyse a piece of your writing and write a commentary of your choices. Explain why you have used certain word and language device choices.

<https://stories.audible.com/start-listen>.

In a hole in the ground there lived a hobbit. Not a nasty, dirty, wet hole, filled with the ends of worms and an oozy smell, nor yet a dry, bare, sandy hole with nothing in it to sit down on or to eat: it was a hobbit hole, and that means comfort. It had a perfectly round door like a porthole, painted green, with a shiny yellow brass knob in the exact middle. The door opened on to a tube shaped hall like a tunnel: a very comfortable tunnel without smoke, with panelled walls, and floors tiled and carpeted, provided with polished chairs, and lots and lots of pegs for hats and coats the hobbit was fond of visitors. The tunnel wound on and on, going fairly but not quite straight into the side of the hill The Hill, as all the people for many miles round called it and many little round doors opened out of it, first on one side and then on another. No going upstairs for the hobbit: bedrooms, bathrooms, cellars, pantries (lots of these), wardrobes (he had whole rooms devoted to clothes), kitchens, dining rooms, all were on the same floor, and indeed on the same passage. The best rooms were all on the left-hand side (going in), for these were the only ones to have windows, deep set round windows looking over his garden and meadows beyond, sloping down to the river. This hobbit was a very well-to-do hobbit, and his name was Baggins. The Bagginses had lived in the neighbourhood of The Hill for time out of mind, and people considered them very respectable, not only because most of them were rich, but also because they never had any adventures or did anything unexpected: you could tell what a Baggins would say on any question without the bother of asking him. This is a story of how a Baggins had an adventure, found himself doing and saying things altogether unexpected. He may have lost the neighbours' respect, but he gained well, you will see whether he gained anything in the end. The mother of our particular hobbit ... what is a hobbit? I suppose hobbits need some description nowadays, since they have become rare and shy of the Big People, as they call us. They are (or were) a little people, about half our height, and smaller than the bearded Dwarves. Hobbits have no beards. There is little or no magic about them, except the ordinary everyday sort which helps them to disappear quietly and quickly when large stupid folk like you and me come blundering along, making a noise like elephants which they can hear a mile off. They are inclined to be fat in the stomach; they dress in bright colours (chiefly green and yellow) ; wear no shoes, because their feet grow natural leathery soles and thick warm brown hair like the stuff on their heads (which is curly) ; have long clever brown fingers, good natured faces, and laugh deep fruity laughs (especially after dinner, which they have twice a day when they can get it). Now you know enough to go on with. As I was saying, the mother of this hobbit of Bilbo Baggins, that is was the fabulous Belladonna Took, one of the three remarkable daughters of the Old Took, head of the hobbits who lived across The Water, the small river that ran at the foot of The Hill. It was often said (in other families) that long ago one of the Took ancestors must have taken a fairy wife. That was, of course, absurd, but certainly there was still something not entirely hobbitlike about them, and once in a while members of the Took clan would go and have adventures.

Probability

What do I need to be able to do?

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

- Add, Subtract and multiply fractions
- Find probabilities using likely outcomes
- Use probability that sums to 1
- Estimate probabilities
- Use Venn diagrams and frequency trees
- Use sample space diagrams
- Calculate probability for independent events
- Use tree diagrams

Keywords

- Event: one or more outcomes from an experiment
- Outcome: the result of an experiment
- Intersection elements (parts) that are common to both sets
- Union: the combination of elements in two sets
- Expected Value: the value/ outcome that a prediction would suggest you will get
- Universal Set: the set that has all the elements
- Systematic: ordering values or outcomes with a strategy and sequence
- Product: the answer when two or more values are multiplied together.

Odd, Subtract and multiply fractions

Addition and Subtraction

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

Multiplication

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



Use equivalent fractions to find a common multiple for both denominators

$$\frac{3}{4} \times \frac{2}{3} = \frac{6}{12} = \frac{1}{2}$$



Modelled

Total number of parts in the diagram

Experimental data

Theoretical probability

What we expect to happen

Experimental probability

What actually happens when we try it out

The probability becomes more accurate with more trials

Theoretical probability is proportional

Sample space

The possible outcomes from rolling a die

	1	2	3	4	5	6
H	1H	2H	3H	4H	5H	6H
T	1T	2T	3T	4T	5T	6T

The possible outcomes from tossing a coin

$$P(\text{Even}) = \frac{3}{6} = \frac{1}{2}$$

number and (also)

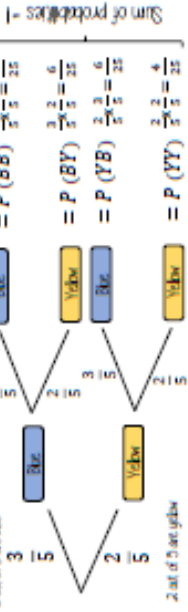
Independent events

The outcome of two events happening. The outcome of the first event has no bearing on the outcome of the other

Tree diagram for independent events

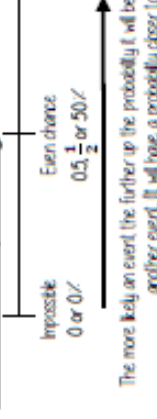
Label has a bag with 3 blue counters and 2 yellow. She picks a counter and replaces it before the second pick.

Because they are replaced the second pick has the same probability



$$P(A \text{ and } B) = P(A) \times P(B)$$

Likelihood of a probability



The more likely an event the further up the probability it will be in comparison to another event. It will have a probability closer to 1



Sum to 1

Probability is always a value between 0 and 1

The probability of getting a blue ball is $\frac{1}{4}$

∴ The probability of NOT getting a blue ball is $\frac{3}{4}$

The sum of the probabilities is 1

Tables, Venn diagrams, Frequency trees

Frequency trees

60 people visited the zoo on Saturday morning. 26 of them were adults. 13 of the adults' favourite animal was an elephant. 24 of the children's favourite animal was an elephant.

Two-way table

	Adult	Child	Total
Elephant	13	24	37
Other	13	10	23
Total	26	34	60

Venn diagram



in set A AND set B

$P(A \cap B)$

in set A OR set B

$P(A \cup B)$

in set A

$P(A)$

NOT in set A

$P(A')$

Frequency trees and two-way tables can show the same information

The total column on two-way tables show the possible denominators

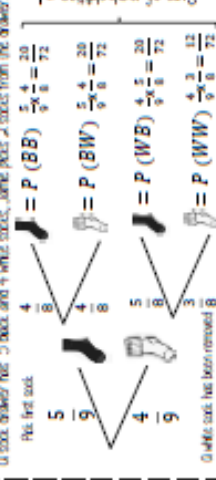
$$P(\text{Adult}) = \frac{26}{60}$$

$$P(\text{Child with favourite animal as elephant}) = \frac{24}{37}$$

Dependent events

Tree diagram for dependent events

0 red, 4 white, 5 black and 4 white marbles. Jane picks 2 marbles from the drawer



The outcome of the first event has an impact on the second event

NOTE: as 'balls' are removed from the drawer the number of balls in that drawer is also reduced ∴ the denominator is also reduced for the second pick.

Ratios and fractions

What do I need to be able to do?

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

- Compare quantities using ratio
- Link ratios and fractions and make comparisons
- Share in a given ratio
- Link Ratio and scales and graphs
- Solve problems with currency conversions
- Solve 'best buy' problems
- Combine ratios

Keywords

Ratio: a statement of how two numbers compare

Equivalent: of equal value

Proportion: a statement that links two ratios

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

Fraction: represents how many parts of a whole

Denominator: the number below the line on a fraction. The number represents the total number of parts.

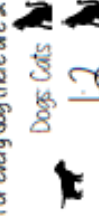
Numerator: the number above the line on a fraction. The top number. Represents how many parts are taken

Origin (0,0) on a graph. The point the two axes cross

Gradient: The steepness of a line

Compare with ratio

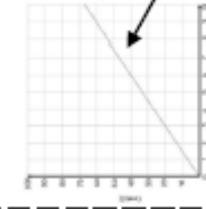
"For every dog there are 2 cats"



Units have the be of the same value to compare ratios

The ratio has to be written in the same order as the information is given
e.g. 2. I would represent 2 dogs for every 1 cat.

Ratio and graphs

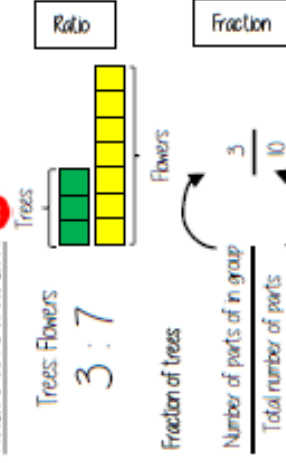


Graphs with a constant ratio are directly proportional

- Form a straight line
- Pass through (0,0)

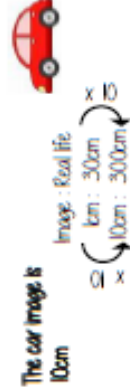
The gradient is the constant ratio

Ratios and fraction



Ratio and scale

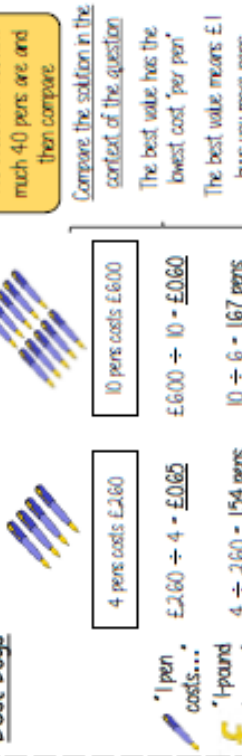
A picture of a car is drawn with a scale of 1:30



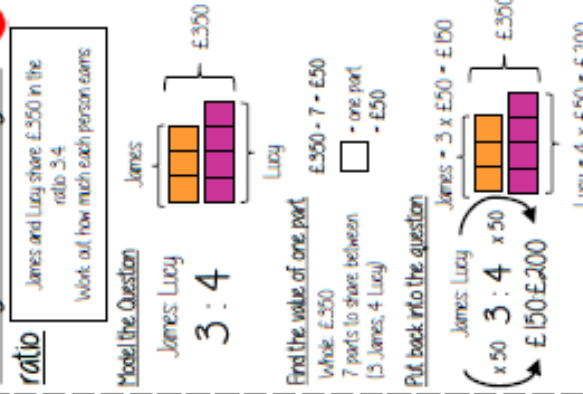
Conversion between currencies



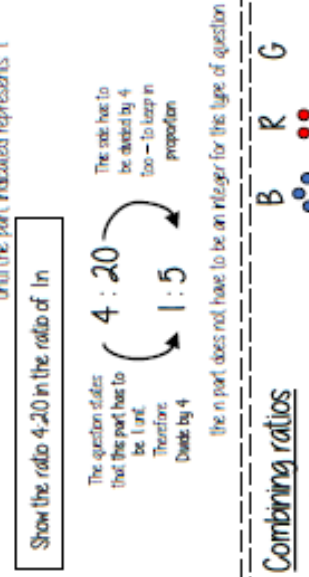
Best buys



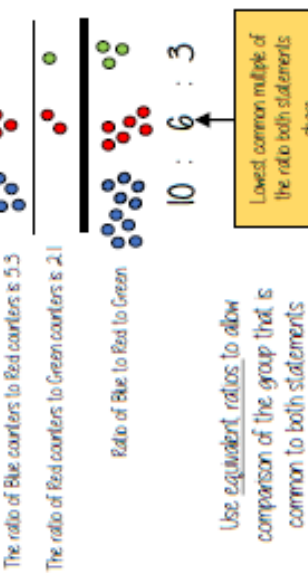
Sharing a whole into a given ratio



Ratios in In and n:1



Combining ratios



Year 9 RS: How do Muslims interact with culture and society?

Key words	
Allah	The God in Islam
Quran	The Holy book in Islam
Mosque	The place of worship in Islam
Muhammad	The last prophet in Islam
Irham	The set of white clothing that all Muslims wear whilst on Hajj
Tawaf	Walking 7 times in an anti-clockwise direction around the Kaaba in Mecca.
Mecca	The holy city in Saudi Arabia.
Eid ul Fitr	A celebration or festival that occurs at the end of Ramadan.
Ramadan	A holy month of fasting and prayer.

The 5 Pillars of Islam.

- Muslims take an oath to only worship Allah and that they believe that Muhammad is the messenger of Allah.
- Muslims pray 5 times a day.
- Muslims give charity (Zakat) to the poor.
- Muslims fast during the month of Ramadan.
- Hajj is the pilgrimage to Makkah.

Muslims are monotheistic and worship one, all-knowing God, who in Arabic is known as Allah. Followers of Islam aim to live a life of complete submission to Allah. They believe that nothing can happen without Allah's permission, but humans have free will.

The Shahadah (1ST Pillar)

The Shahadah is the first pillar of Islam. It is the belief that there is only one God and that Muhammad is His messenger. The Shahadah is the Muslim declaration of faith in Allah. It is the pillar on which all the other pillars are based. Muslims will say the Shahadah many times during their lives. In particular they will:

- Repeat it many times each day. Whisper it into the ear of their new-born baby.
- Teach it to their children as soon as they are old enough to learn it. Hope that it will be the last words to cross their lips before they die.

There is no God but Allah and Muhammad is the messenger' of Allah.'

Salah (2nd Pillar)

Salah is the second pillar of Islam, 'Salah' means 'prayer' in Arabic. It is every Muslim's duty to pray to Allah five times a day.

Muslims often stand shoulder to shoulder when praying as a sign of the equality of humans before Allah.

Salah does not have to take place in a Mosque. It can be carried out in any public place as long as: it begins with washing (called wudu). This is a special kind of washing. The place is clean. Muslims use a prayer mat to make sure of this. All prayer mats have a directional arch on them, which is pointed to Makkah.

Activity:

Compare Islam with another religion. Write a table showing the similarities and differences. For the brave add in more religions.

Hajj (5th Pillar)

Hajj is the fifth pillar of Islam. It is a journey to Makkah to take part in a very special ceremony which lasts three to five days.

Every adult Muslim should go on Hajj at least once in their life. Some Muslims save for many years to be able to afford to go.

Hajj shows that everyone is equal in the eyes of Allah. Everyone wears the same clothes and does the same things.

The Ka'aba is a special building that stands in the centre of Mecca. Thousands of Muslims walking around the Ka'aba at the same time. The walk around it in an anti-clockwise direction, seven times.

Hajj takes place every year during the month of Ramadan. Pilgrims travel to the city of Makkah from all over the world.

Hajj promotes equality and fellowship amongst Muslims. It creates a sense of belonging and brotherhood amongst them.

They are given special titles after they return from Hajj. A man is called a Hajji and a woman is called a Hajja.

Zakah (3rd Pillar)

Zakah is the third pillar of Islam. It means charity. It is the amount of money that every Muslim who is financially able must pay to support people who are poor and needy. Zakah should be given once a year, and should be paid to a mosque or to Zakah organisations such as Islamic relief or Muslim Hands. Every Muslim must give 2.5% of their surplus money to Zakah. Zakah money helps people less fortunate than those who give it. Paying Zakah is a test of honesty—a Muslim cannot live happily with himself if he does not pay Zakah.

Sawm (4th Pillar)

Sawm is the fourth pillar of Islam. It means fasting. When fasting, Muslims do not eat or drink anything. Muslims practise Sawm by fasting every year in the month of Ramadan. During Ramadan, Muslims fast from until sunset.

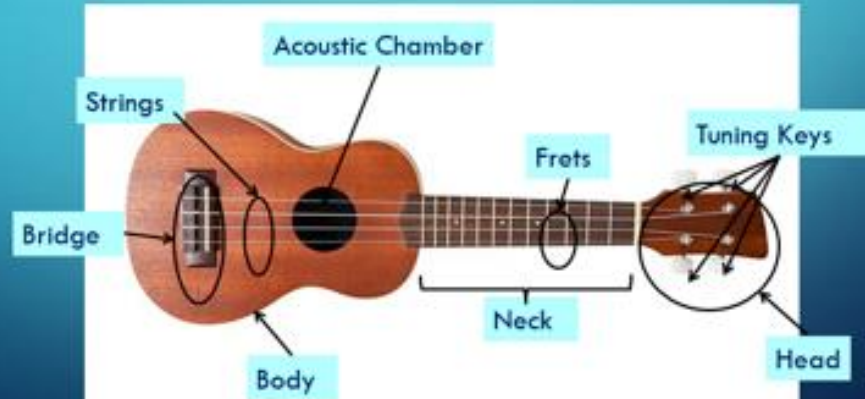
By practising Sawm, a Muslim develops sympathy for suffering. It also demonstrates discipline and obedience to Allah

Muslims do not have to fast if they are under 12, too old, pregnant, breastfeeding, travelling or sick. At the end of each day the family gets together to break their fast as a group. They eat dates and drink water before anything else each night because this is what Muhammad recommended. During Ramadan, Muslims who are fasting will eat a large meal, before the sun rises (dawn) in order to set themselves up for a day without food and water.

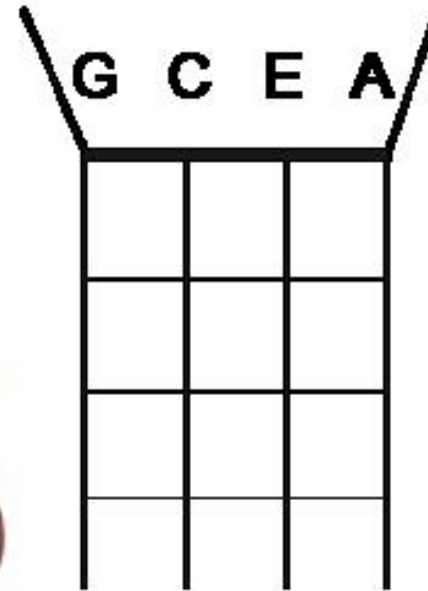


Year 9 Music Knowledge Organiser

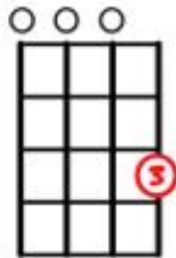
THE UKULELE



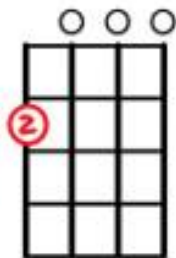
Ukulele Tuning



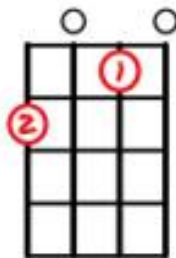
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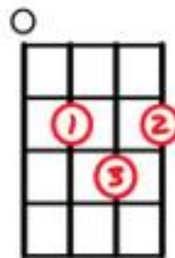
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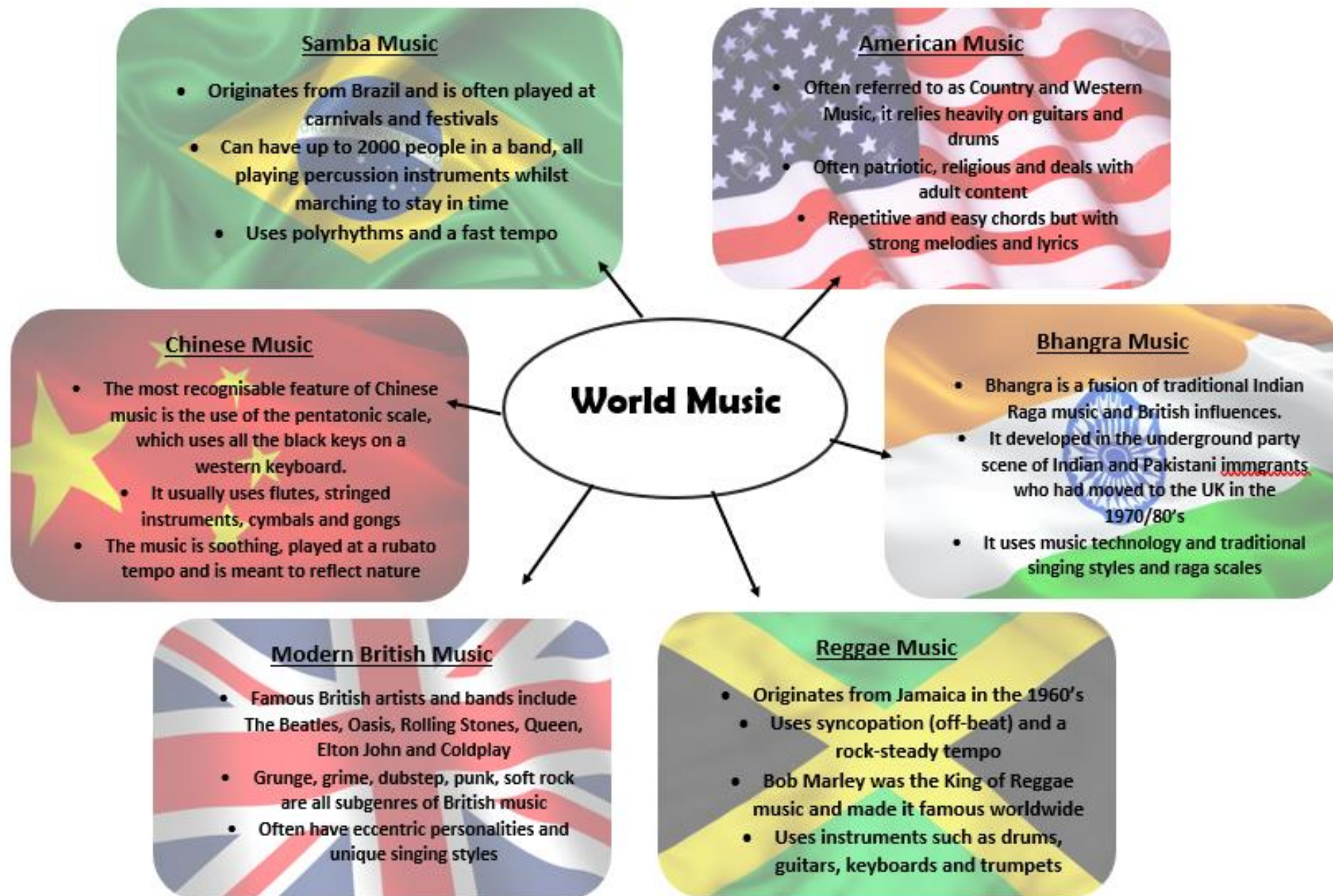


F



G





Songwriting

- 1) Decide on the structure on your song using introductions, verses, choruses and bridges
- 2) Choose your chord progression for each section
- 3) Add a single melody line to each section using improvisation before settling on a repeating pattern that can be altered slightly in pitch or reversed to add contrast and interest
- 4) Add harmony using appropriate intervals
- 5) Add lyrics
- 6) Finally, choose which instruments to use in your arrangement

Common Chord Progressions

Major Keys: C, D, F, G & A

I IV V

C	F	G
D	G	A
F	Bb	C
G	C	D
A	D	E

I vi IV V

C	Am	F	G
D	Bm	G	A
F	Dm	Bb	C
G	Em	C	D
A	F#m	D	E

ii V I

Dm7	G7	Cmaj7
Em7	A7	Dmaj7
Gm7	C7	Fmaj7
Am7	D7	Gmaj7
Bm7	E7	Amaj7

I vi ii V

C	Am	Dm	G
D	Bm	Em	A
F	Dm	Gm	C
G	Em	Am	D
A	F#m	Bm	E

I V vi IV

C	G	Am	F
D	A	Bm	G
F	C	Dm	Bb
G	D	Em	C
A	E	F#m	D

I IV vi V

C	F	Am	G
D	G	Bm	A
F	Bb	Dm	C
G	C	Em	D
A	D	F#m	E

I iii IV V

C	Em	F	G
D	F#m	G	A
F	Am	Bb	C
G	Bm	C	D
A	C#m	D	E

I IV I V

C	F	C	G
D	G	D	A
F	Bb	F	C
G	C	G	D
A	D	A	E

I IV ii V

C	F	Dm	G
D	G	Em	A
F	Bb	Gm	C
G	C	Am	D
A	D	Bm	E

www.piano-keyboard-guide.com

