Kettlethorpe HIGH SCHOOL

Year 7

Knowledge Organiser Booklet

Name:

_____

_____

Tutor:

_____

Art | Computer Science | Dance & Drama | DT | English | Food H&C | Geography | Graphics | History | MFL | Music | PE | RE | Science | Textiles

THINK PINK!

If you see PINK in your books, make the corrections.

Capital letters

- sentence starts
- proper nouns
- the word 'I'

Commas

- to separate three or more items in a list
- use a pair of commas when you are inserting extra information in the middle of the sentence
- use after an adverbial

Before sunrise, Zac ate his breakfast.

Apostrophes

- to show that a letter or letters are missing: *I'm - haven't - don't*
- to show something belongs to something else: *The parents' meeting lasted an hour.*

1. Have you carefully reread your work?
2. Have you checked to see if you accidentally made any mistakes?
3. Are you proud of your work?

Common mistakes

There refers to a place or idea.

Their shows belonging.

They're is short for 'they are'.

use should have - not 'should of'

use could have - not 'could of'

use would have - not 'would of'

Spelling

- use the dictionary
- make sure to use subject specific vocabulary

APPLY THE RULES. BE CONSISTENT. CHECK FOR ACCURACY.

WWW - Descriptive comment on **what went well**

EBI - Descriptive comment saying your work would be **even better if**

Punctuation

Literacy LASTS...

colon

to introduce extra info

semi colon

to link connected sentences

exclamation mark

You only need one!

ellipsis

to leave a trailing thought...

full stop

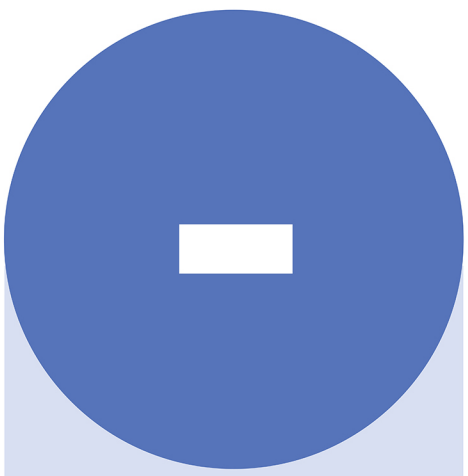
to end a sentence

comma

to add/separate information

brackets

to add extra information



dash

to add/separate information

apostrophe

for omission or possession

direct speech

"Are you listening?"

single quotation marks

to include quotes

question mark

at the end of a question

Do you know your roots?

Literacy LASTS...

-scop-

root meaning '***to see***'

sub-

prefix meaning '***under***'

hypo-

prefix meaning '***below***'

ex-

prefix meaning '***out of***'

con-

prefix meaning '***with***'

-logy

suffix meaning '***study of***'

-graph-

root meaning '***writing***'

-bio-

root meaning '***life***'

-techn-

root meaning '***art /skill***'

micro-

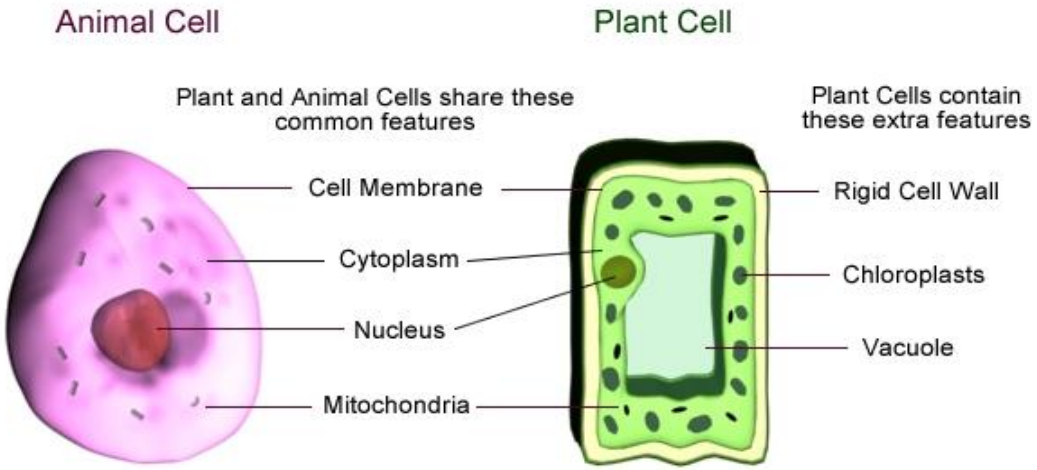
prefix meaning '***small***'

-chron-

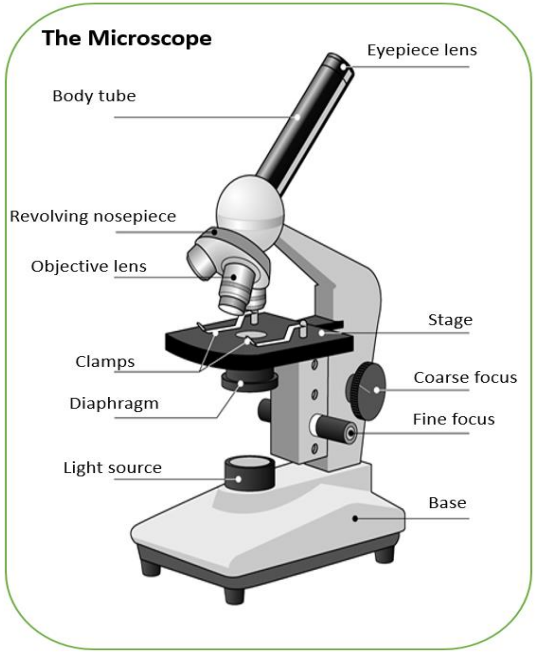
root meaning '***time***'

-phon-

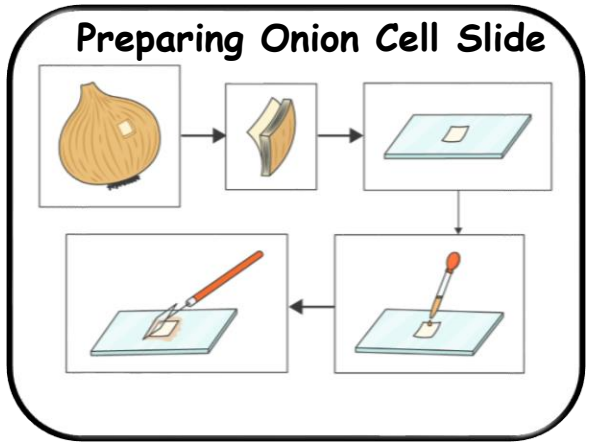
root meaning '***sound***'



Cells are the building blocks of all living organisms.

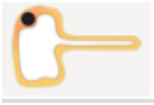
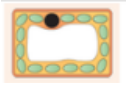


$$magnification = \frac{image\ size}{actual\ size}$$



Specialised cells

Specialised cells are found in multicellular organisms. Each specialised cell has a particular function within the organism.

	Type of cell	Function	Special features
Animal cells	Red blood cells 	To carry oxygen	- Large surface area, for oxygen to pass through - Contains haemoglobin, which joins with oxygen - Contains no nucleus
	Nerve cells 	To carry nerve impulses to different parts of the body	- Long - Connections at each end - Can carry electrical signals
	Sperm cell 	To reach the female cell and join with it	- Long tail for swimming - Head for getting into the female cell
Plant cells	Root hair cell 	To absorb water and minerals	- Large surface area
	Leaf cell 	To absorb sunlight for photosynthesis	- Large surface area - Lots of chloroplasts

Kettlethorpe HIGH SCHOOL

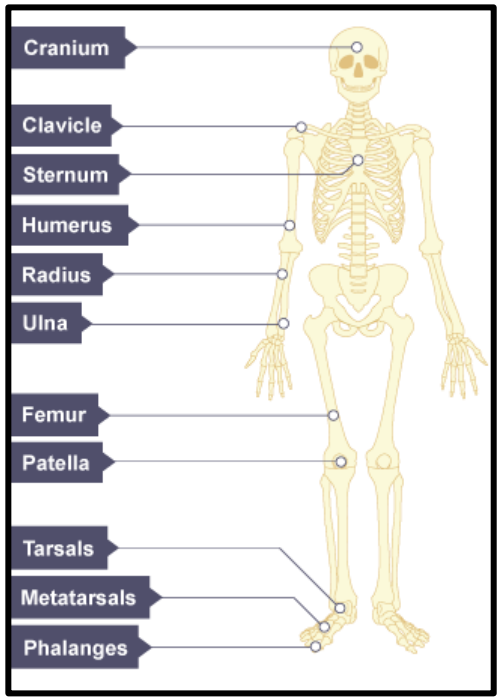
Key Stage 3 SCIENCE

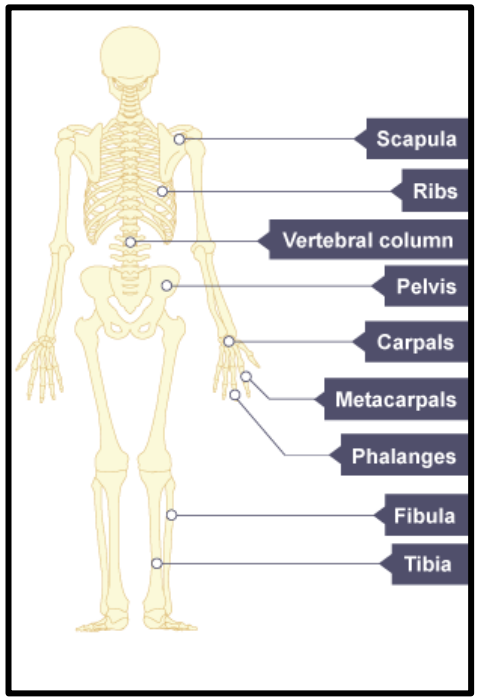
Year 7 (Term 1)| *Cells & Cell Movement*

Skeletal System

The skeletal system is made from bones and joints.
The skeleton has four main functions:

1) to **support** the body
2) to **protect** some of the vital organs of the body
3) to help the body **move**
4) to make **blood cells**



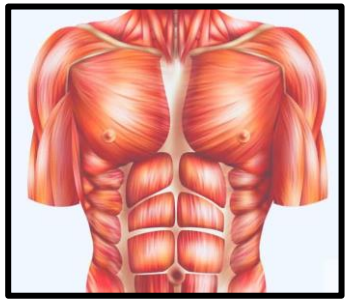


Joints

Joints are places where bones are able to move in different directions. Strong, cord-like tissues called **ligaments** attach to the ends of bones either side of joints.
Tendons attach the bones in the joint to muscles which contract and relax to move them.

Muscles

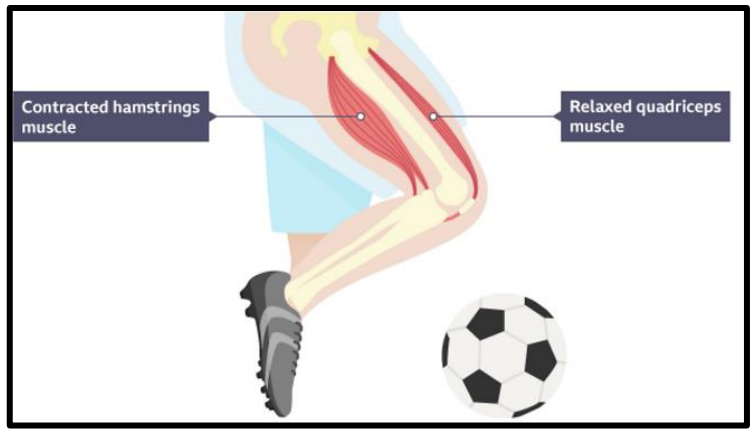
There are different types of muscle. Skeletal muscle is joined to bones. Its cells contract to make bones move and joints bend.

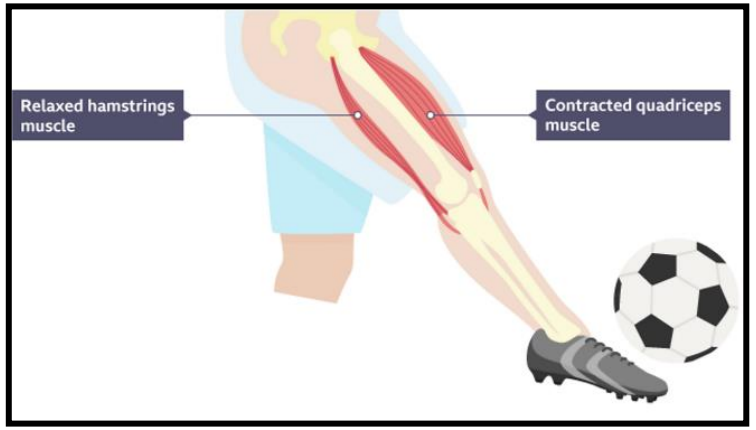


Antagonistic Muscle Pairs

The knee joint has two muscles that move the shin up or down. These are the hamstrings and the quadriceps. These are examples of **antagonistic muscles.**

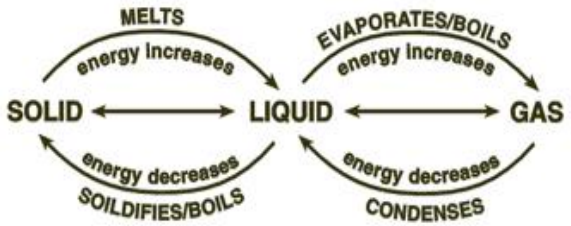
- To pull the shin backwards, the hamstrings **contract** and the quadriceps **relax**.
- To move the shin forwards, the quadriceps **contract** and the hamstrings **relax**.





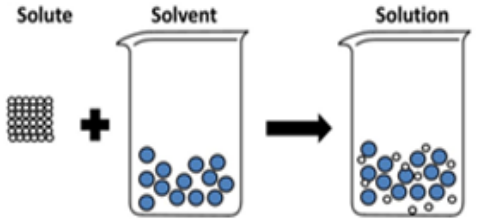
Changes of State

Changes of state take place when particles gain or lose energy.



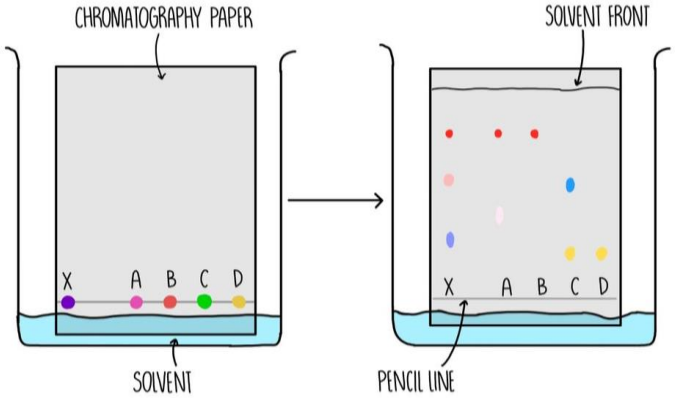
Solutions

A **solvent** is the liquid that can dissolve a solid (e.g. water).
A **solute** is the solid that can dissolve in a liquid (e.g. salt or sugar).
During **dissolving**, the solvent particles surround the solute particles and move them away, so they spread out in the solvent.
This makes a **solution.**



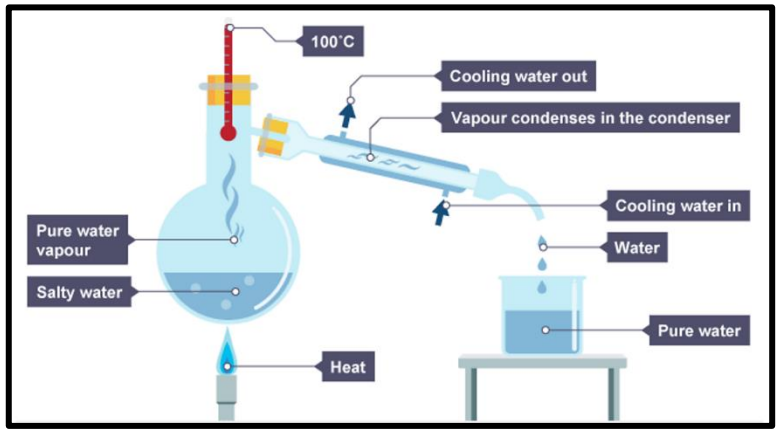
Chromatography

Chromatography is used to separate the compounds in a mixture according to how soluble they are.



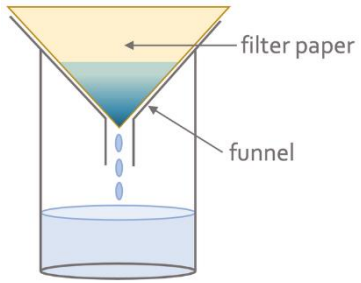
Distillation

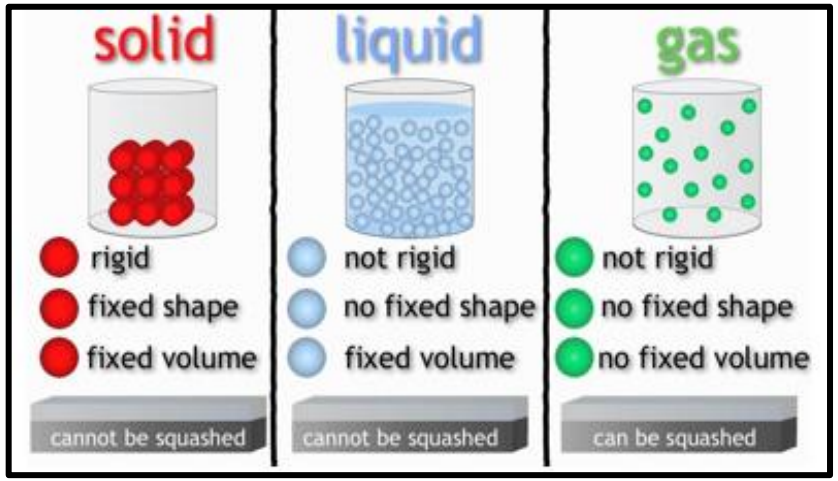
Distillation separates substances with different boiling points.
This is good for separating a mixture of liquids, e.g. ink and water.



Filtration

Filtration is the process which removes small insoluble particles from liquid.
Filter paper is used to separate the insoluble solid from the liquid.





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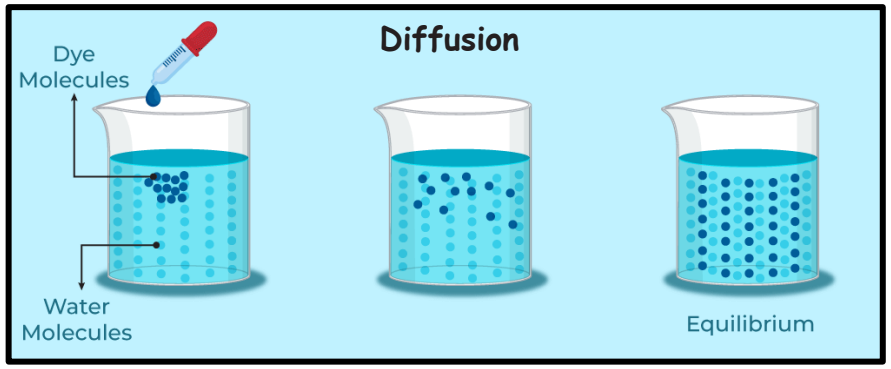
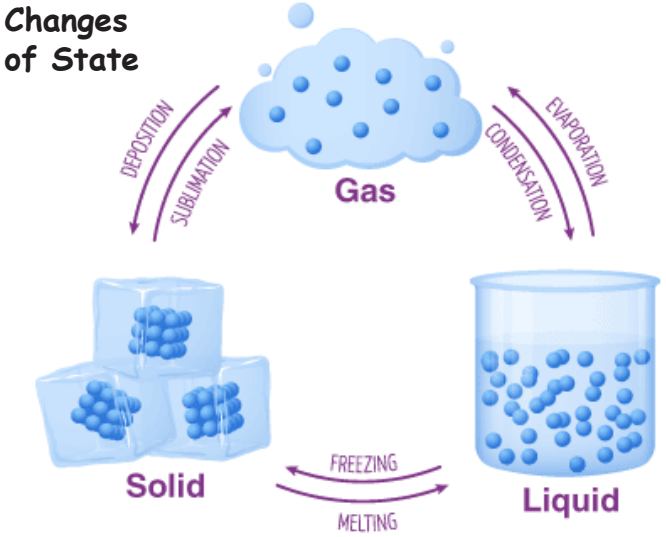
Key Stage 3 SCIENCE
Year 7 (Term 1)| *Particle Model & Separation techniques*

Diffusion

Diffusion is how smells spread out through the air and how concentrated liquids spread out when placed in water.
Diffusion happens on its own when the particles spread out from **an area of high concentration**, where there are many of them, **to areas of low concentration** where there are fewer of them.

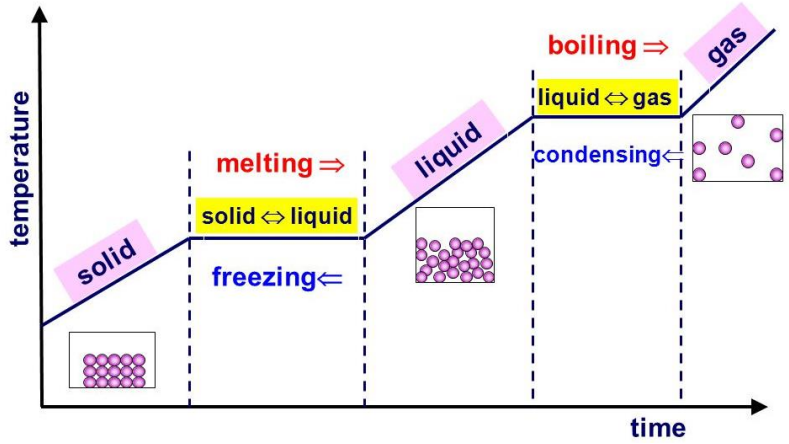


Changes of State



Cooling Curves

Changes of state can be investigated by measuring the temperature as a substance changes state.

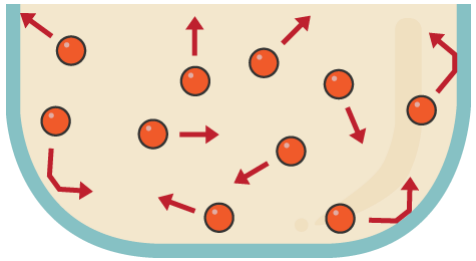


The temperature **stays the same** during a state change:

- during melting and evaporating, internal energy increases as the motion of particles increases and bonds are broken
- during condensing and freezing, internal energy decreases as the motion of particles decreases and new bonds are formed

Gas Pressure

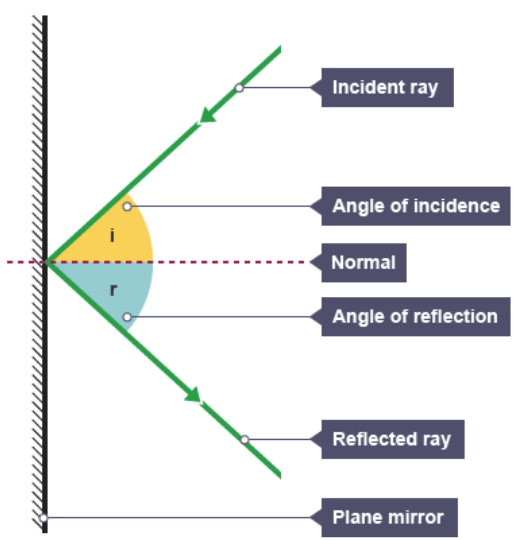
Gas pressure is caused when gas particles hit the walls of their container. The more often the particles hit the walls, and the faster they are moving when they do this, the higher the pressure.
If a gas is **heated**, its particles move around **more quickly**. They hit the walls of their contained harder and more often, which increases the pressure.



Particles of gas collide with each other and with their container walls.

Reflection of light

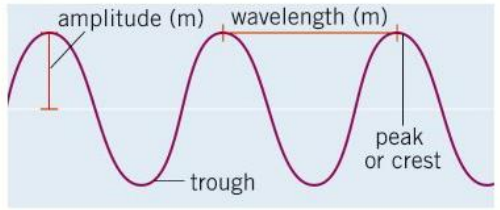
The diagram shows a ray of light reflected from a plane mirror.



When light is reflected from a plane mirror:

the angle of incidence, i = the angle of reflection, r

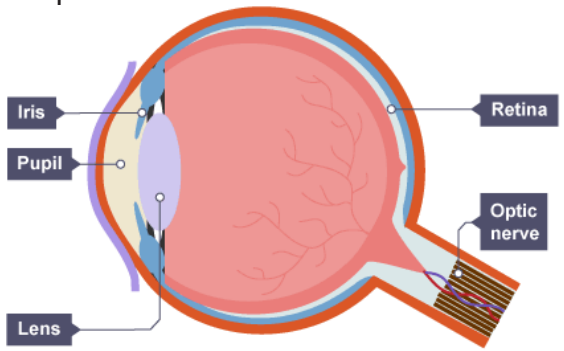
This is known as **the law of reflection**.



▲ This diagram shows the amplitude and wavelength of a wave.

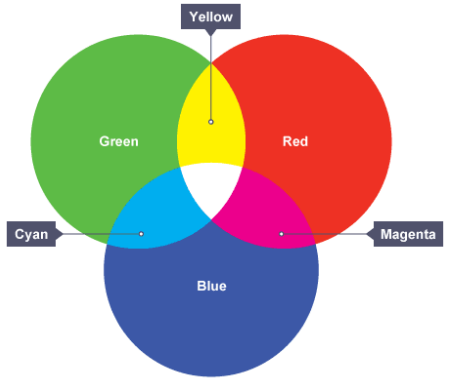
The Eye

The eye focuses light from an object onto a photo-sensitive material. However, in the eye, this material is the **retina**. The retina contains cells that are sensitive to light. They produce **electrical impulses** when they absorb light. These impulses are passed along the **optic nerve** to the **brain**, which interprets them as vision.



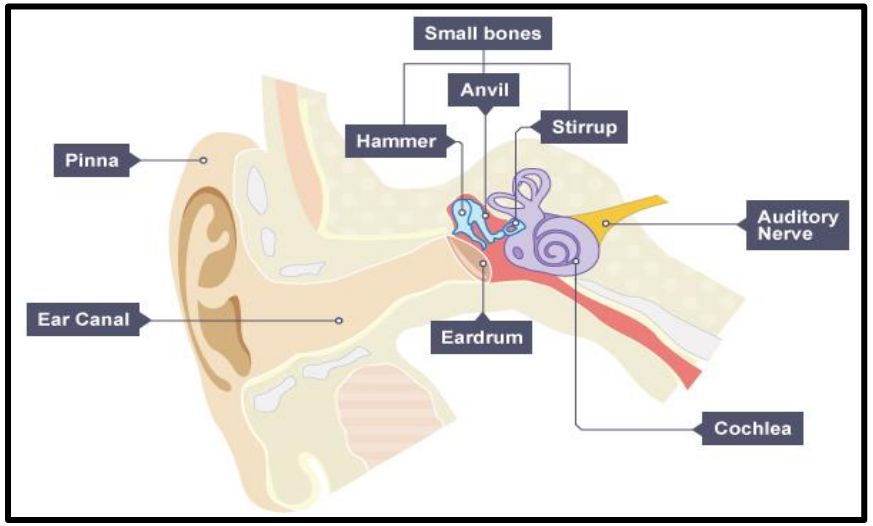
Seeing Colour

The light that we see is made up of many different colours.
There are three **primary colours**: red, green and blue.
If all three are mixed together we see **white light**.
They can be combined in different ways to make every other colour.
The colour of an object is determined by the wavelength of light that it reflects.



Hearing Sounds

We can detect sound using our ears. An ear has an **eardrum** inside, connected to three **small bones**.
The vibrations in the air make the eardrum **vibrate**, and these vibrations are passed through the three small bones (called **ossicles**) to a spiral structure called the **cochlea**.
Signals are passed from the cochlea to the brain through the **auditory nerve**, and our **brain** interprets these signals as sound.



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Key Stage 3 SCIENCE

Year 7 (Term 1)| *Light & Sound*

What is energy?
Energy is a quantity that is conserved - it cannot be created or destroyed.
Energy can be stored and transferred.
There are several **stores** of energy.

Generating electricity
Much of the energy that is transferred in our homes is supplied by electricity. There are a wide range of energy resources used to generate electricity.

Energy resources are systems that can store large amounts of energy. Energy resources can be divided into two categories:
1. **Renewable** resources - energy resources that can be replenished. They do not run out although we are using them.
2. **Non-renewable** resources - energy resources that cannot be replenished. These resources will eventually run out because we are using them.

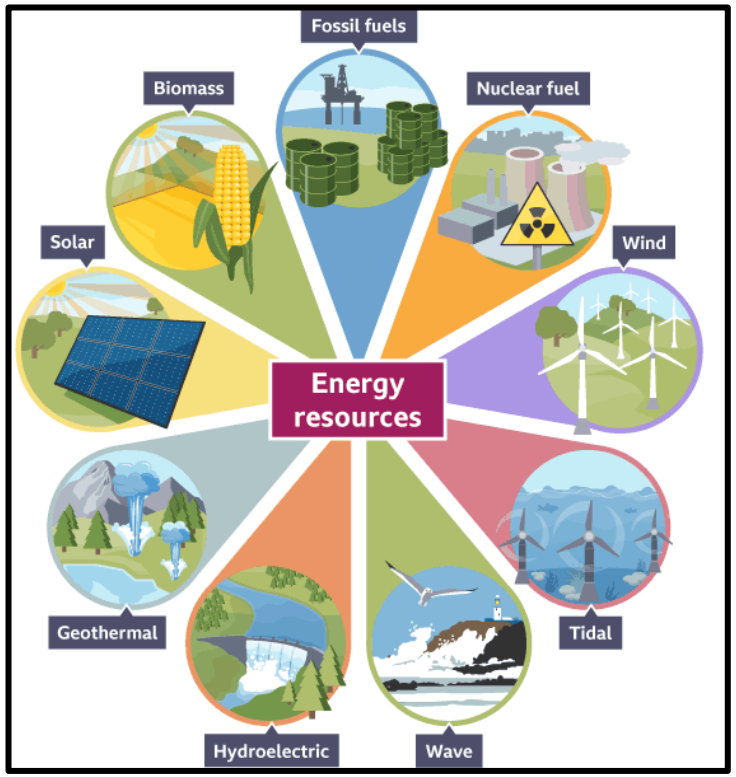
Kinetic energy store
The amount of energy in the kinetic energy store depends on the **speed** of the object.

Gravitational potential energy store
The amount of energy in the gravitational potential energy store depends on the **height** of the object.

Thermal energy
The amount of energy in the thermal energy store depends on the **temperature** of the object.

Chemical energy
Batteries, foods and fuels store energy in their chemical energy stores.
Transfer of energy from the chemical energy store occurs due to chemical reactions.

Elastic potential energy
The amount of energy in the elastic energy store depends on the amount of extension or compression.



Law of Conservation of Energy
The law of conservation of energy state: "energy cannot be created nor destroyed, only transferred from one store to another".

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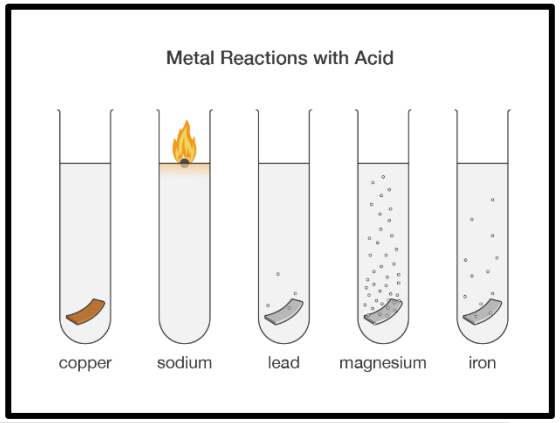
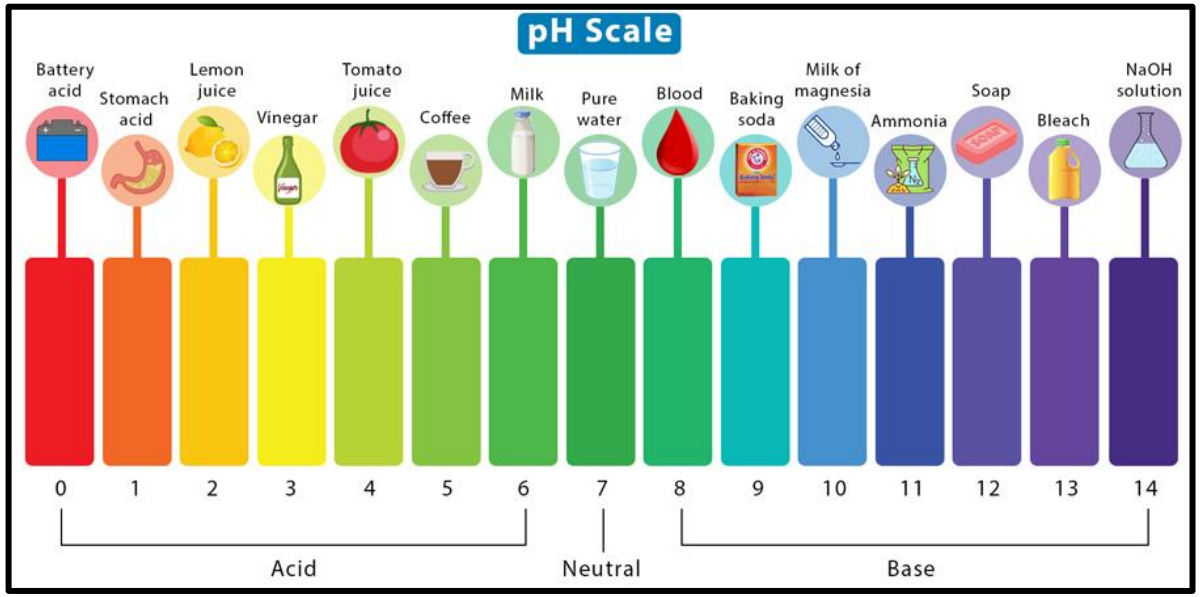
Key Stage 3 SCIENCE
Year 7 (Term 2)| *Energy Transfer*

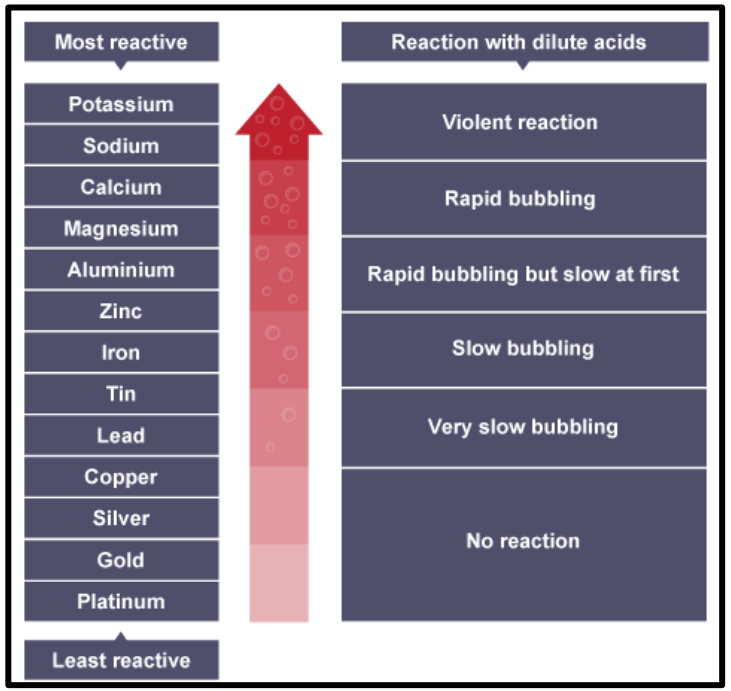
Reactions of Metals with Acids
Acids react with most metals. When an acid reacts with a metal, the products are a **salt** and **hydrogen**.
This is the general word equation for the reaction:

metal + acid → salt + hydrogen



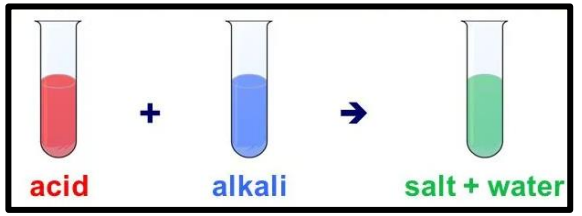


Displacement
Displacement reactions involve a metal and the compound of a different metal. A more reactive metal will displace or push out a less reactive metal from its compound in a displacement reaction. The less reactive metal is left uncombined after the reaction. It is no longer chemically bonded to any other elements. It is now a pure element.

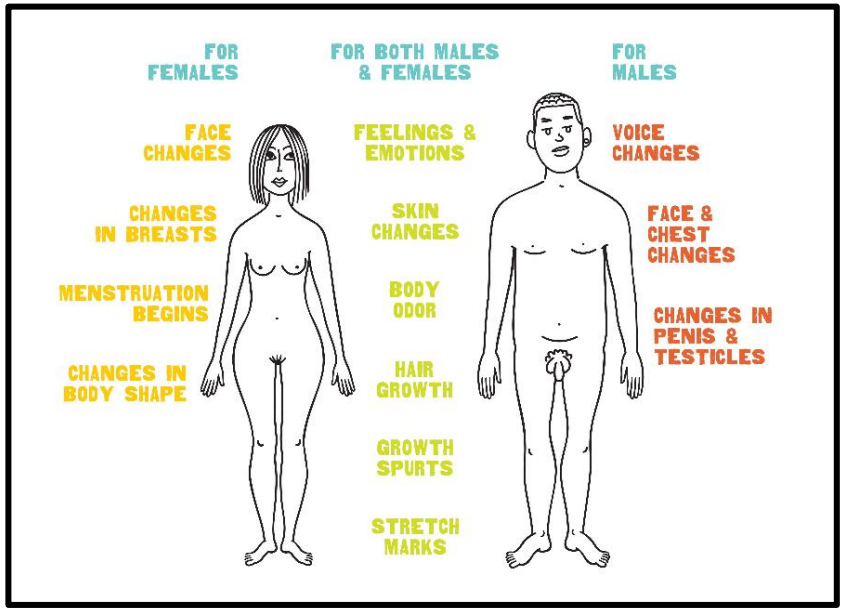


Reactions of Metals
Some metals are very **reactive**. This means they easily take part in chemical reactions to make new substances. Other metals are very **unreactive**, and do not easily take part in chemical reactions.
If we put the metals in order of their reactivity, from the most reactive down to the least reactive, we get a list called the **Reactivity Series** (left).

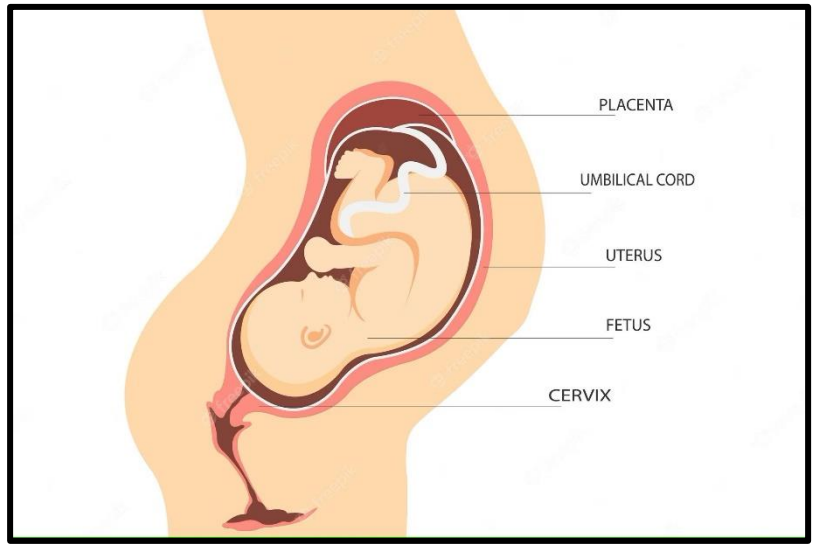
Neutralization
A chemical reaction that takes place between an acid and an alkali is called a neutralization reaction. It produces a salt and water. See diagram below.



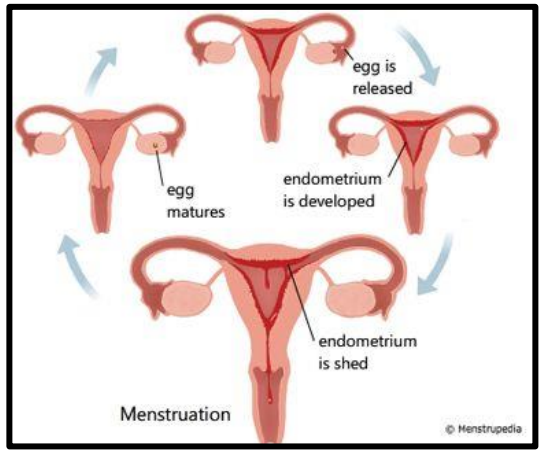
Using an indicator
An indicator is a substance which will change colour depending on the pH of the solution it is mixed with.
Examples of indicators are:
- Litmus
- Universal indicator
- Phenolphthalein
- Red cabbage

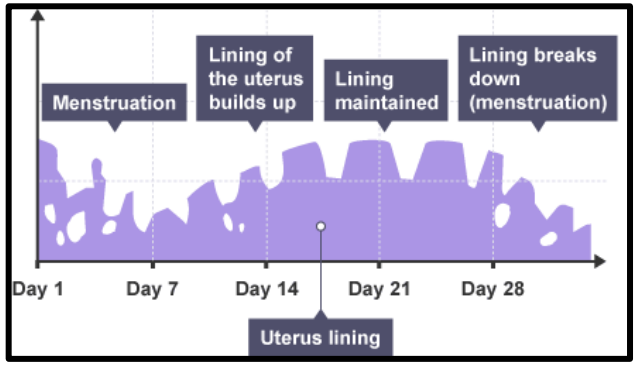


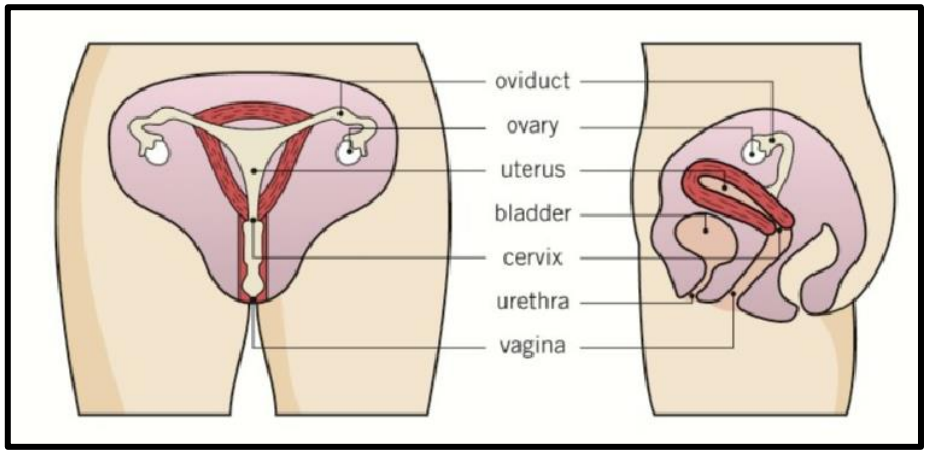
Puberty
Puberty is the stage in life when a child's body develops into an adult's body. Changes occur at puberty because of **hormones** – **testosterone** in **boys** and **oestrogen** in **girls**.



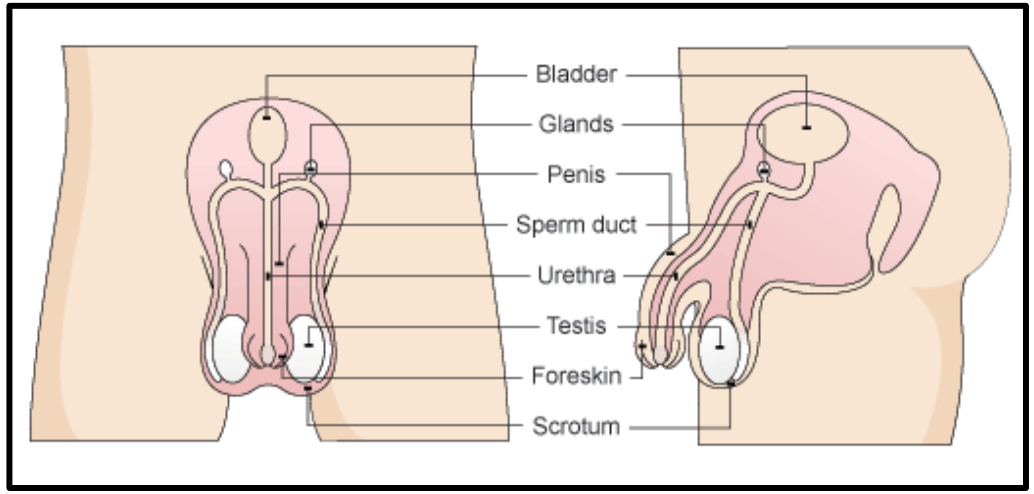
Menstrual Cycle
The menstrual cycle begins at puberty. It is an approximately 28-day cycle that prepares for pregnancy. The cycle stops during pregnancy. Hormone levels change during the cycle.







Pregnancy
Pregnancy occurs when an egg cell (mother) and sperm cell (father) fuse in a process called **fertilisation**.
If the fertilised egg implants in the uterus lining, pregnancy will occur, and a baby will develop. This lasts around 40 weeks (9 months).



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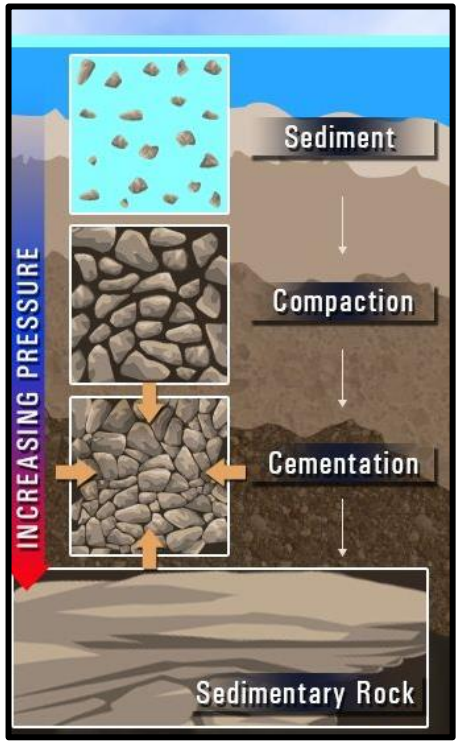
Key Stage 3 SCIENCE
Year 7 (Term 2)| Human *Reproduction*

Sedimentary Rocks

A river carries, or **transports**, pieces of broken rock as it flows along.
When the river reaches a lake or the sea, the rocks are **deposited**.
See diagram for sedimentary rock formation.

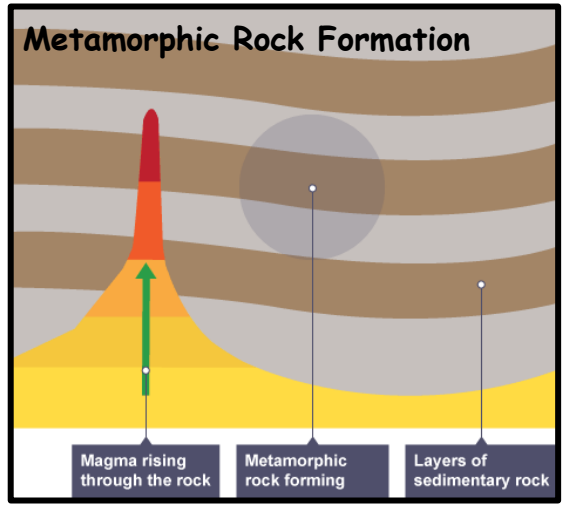
Examples of sedimentary rocks are:
- Chalk
- Sandstone
- Shale
- Mudstone

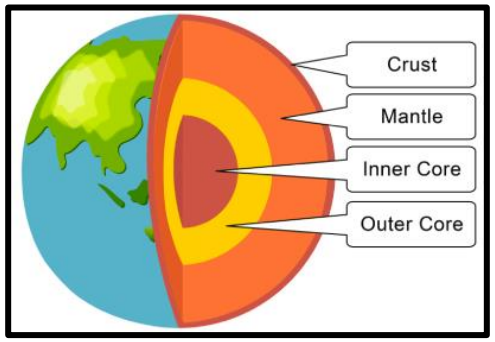


Metamorphic Rocks

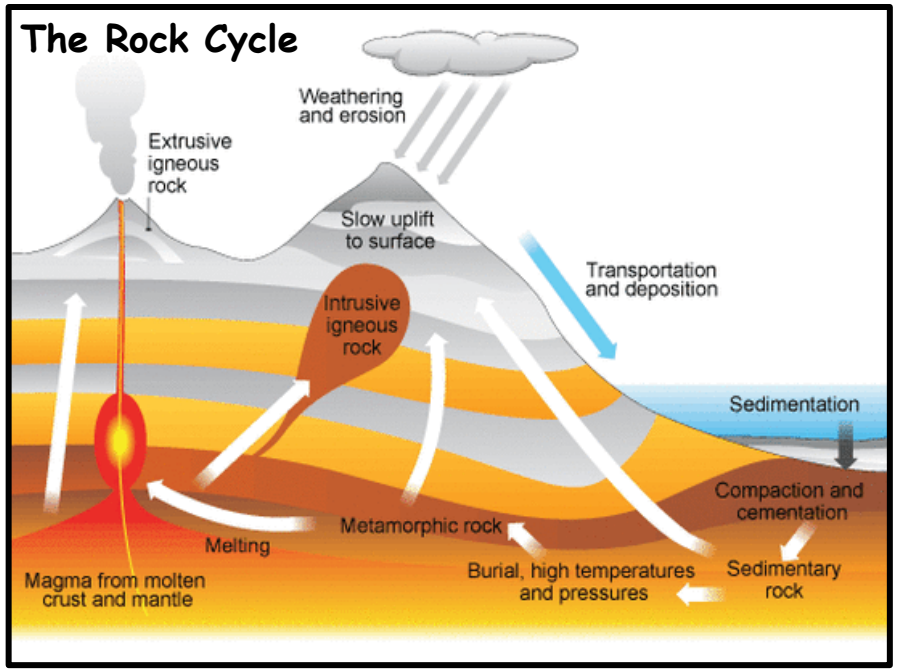
Metamorphic rocks are formed from other rocks that are changed because of heat or pressure. They are not made from molten rock – rocks that do melt form igneous rocks instead.
As a result, the rocks are heated and put under great **pressure**. They do not melt, but the minerals they contain are changed chemically, forming metamorphic rocks.

Examples of metamorphic rocks rocks are:
- Slate
- Marble
- Schist
- Gneiss



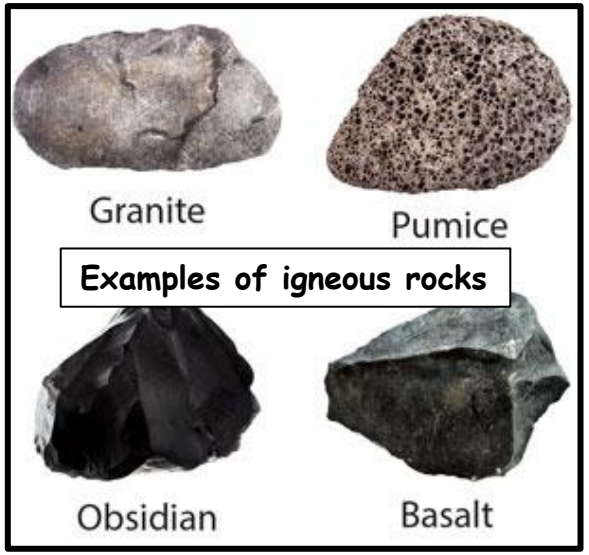


The Rock Cycle



Igneous Rocks

Igneous rocks are formed from molten rock that has cooled and solidified.
When the magma cools enough, it solidifies and igneous rock forms.
Igneous rocks contain randomly arranged interlocking **crystals**.
Extrusive igneous rocks form from magma that erupted onto the surface as **lava**, where it cooled quickly. On the other hand, **intrusive** igneous rocks form from magma that cooled slowly, deep underground.



Kettlethorpe HIGH SCHOOL

Key Stage 3 SCIENCE
Year 7 (Term 3)| *Earth Structure*

Solar System

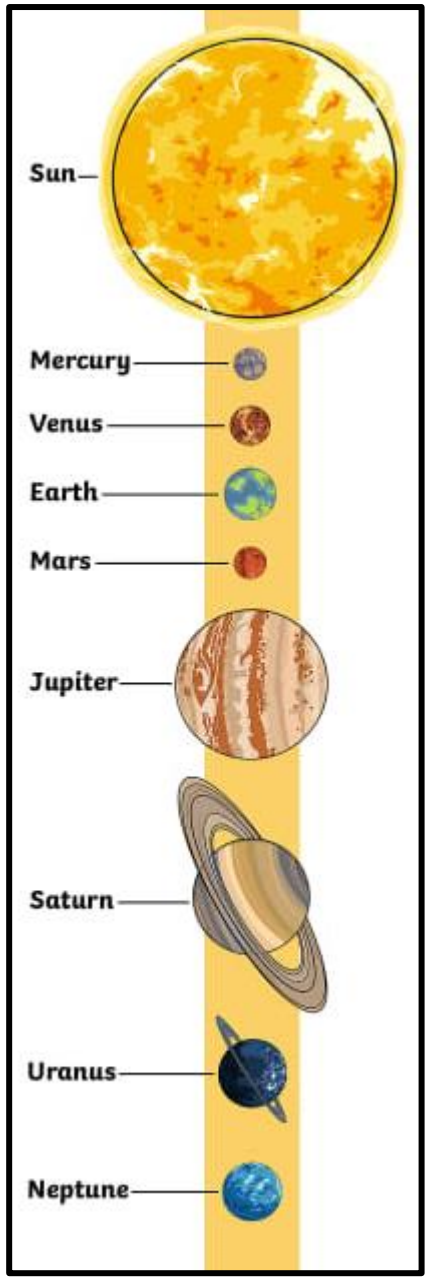
The solar system consists of the Sun, with planets and smaller objects such as asteroids and comets in orbit around it.

Starting with Mercury, which is the closest to the Sun, the planets are:

- Mercury
- Venus
- Earth
- Mars
- Jupiter
- Saturn
- Uranus
- Neptune

This sentence is a way to remember the correct order:

My **V**ery **E**asy **M**ethod **J**ust **S**peeds **U**p **N**aming.



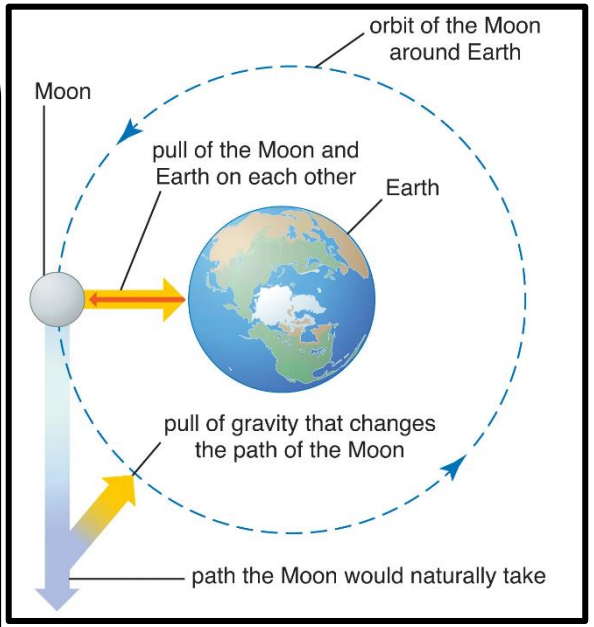
Gravity

Gravity is a force that attracts objects towards each other. The more mass an object has, the greater its force of gravity:

- gravity forces between the Earth and the Moon keep the Moon in orbit around the Earth
- gravity forces between the Sun and the Earth keep the Earth in orbit around the Sun

Mass

The **mass** of an object is the amount of **matter** or 'stuff' it contains. The more matter an object contains, the greater its mass. Mass is measured in **kilograms**, **kg**.

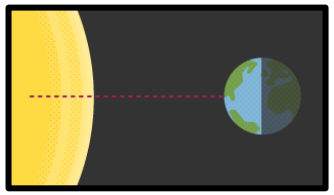


Weight

The **weight** of an object is the gravitational force between the object and the Earth. The weight of an object depends upon its mass and the gravitational field strength.

Day and night

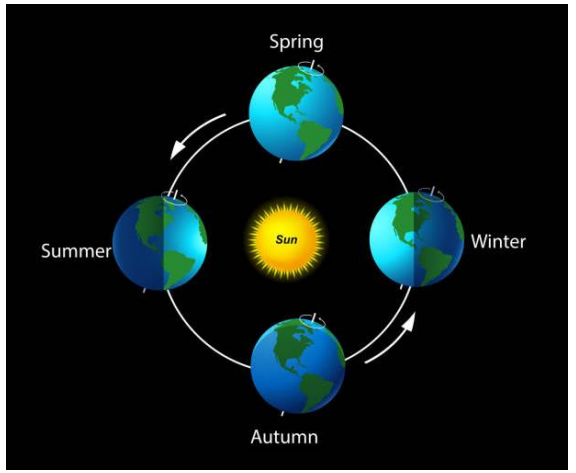
The Sun lights up one half of the Earth, and the other half is in shadow. As the Earth spins, we move from shadow to light and back to shadow and so on.



Seasons

We get different **seasons** (winter, spring, summer and autumn) because the Earth's axis is tilted. This is how it works:

- it is summer in the UK when the **Northern Hemisphere** is tilted towards the Sun
- it is winter in the UK when the northern hemisphere is tilted away from the Sun



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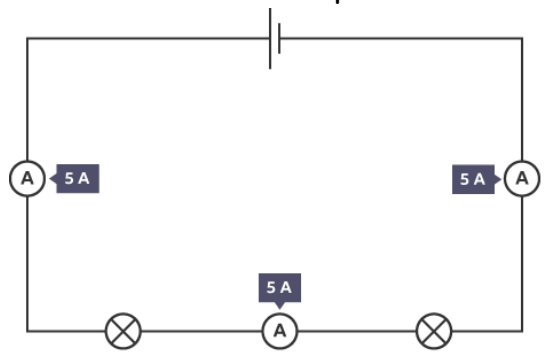
Key Stage 3 SCIENCE

Year 7 (Term 3)| *Space*

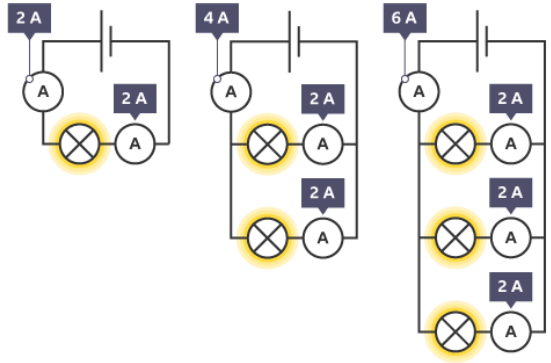
Series Circuits

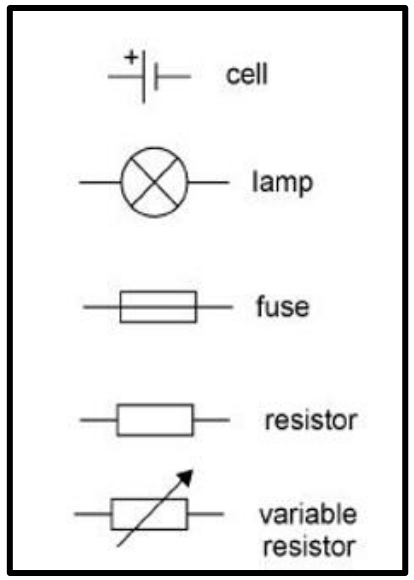
A series circuit contains one loop. The current in a series circuit is the same wherever the ammeter is placed in the circuit because there is only one loop/path. However, the potential difference is split as there is more than one component in the loop.

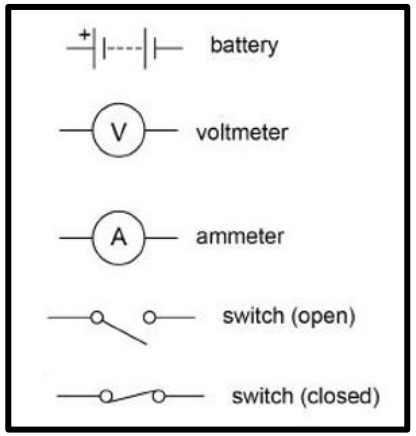


Parallel Circuits

A parallel circuit contains multiple loops. In a parallel circuit, the current splits across each loop. However, because there is only one component on each loop, the potential difference across each component is the same as the cell.







Contact Forces

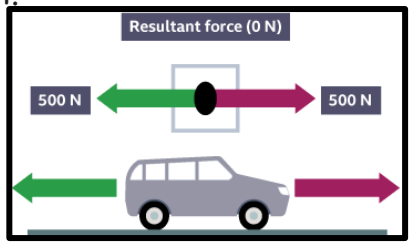
Contact forces act between two objects that are **physically touching**.
e.g. tension, friction, air resistance, upthrust, normal reaction force

Non-Contact Forces

Non-contact forces act between two objects that are **not** physically touching.
e.g. magnetism, electrostatic force, gravity

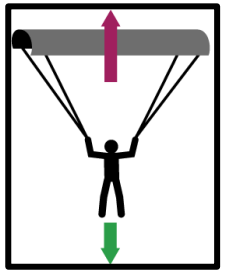
Balanced Forces

If the forces acting on the object are balanced there is no resultant force. This means the object could be travelling at a constant velocity. It could also be stationary or not moving at all.



Unbalanced Forces

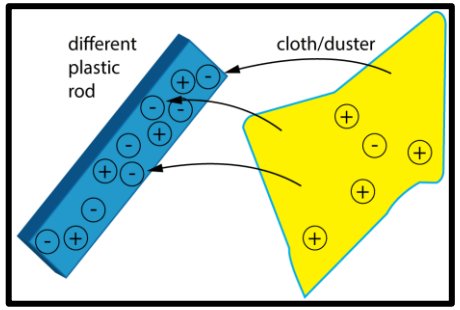
If the forces acting on the object are not balanced, then there is a resultant force acting on the object this means that the object is either accelerating or decelerating.



Static

When you rub two different materials against each other, they **become electrically charged**. This only works for electrically **insulated** objects and not with materials like metals, which conduct.
For example, if you rub an acetate plastic rod with a duster:

- **electrons** move from the rod to the duster
- the duster becomes **negatively charged** and the rod becomes positively charged



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Key Stage 3 SCIENCE

Year 7 (Term 3)| *Electricity & Forces*

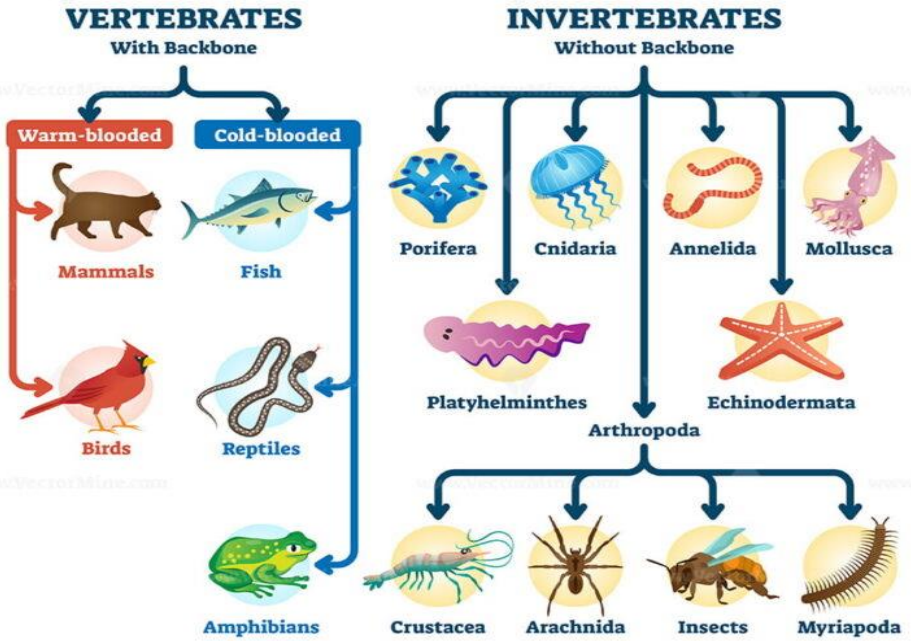
All food chains start with a green plant or algae – called **producers**.
Arrows point to the eater and show the flow of energy in the food chain.
Each stage is called a **trophic level**.

grass ➡ mouse ➡ snake ➡ owl

Organisms compete for resources like food, water, mates, space, light and minerals.

There are two types of competition:
Interspecific competition is between individuals of **different** species.
Intraspecific competition is between individuals of the **same** species.

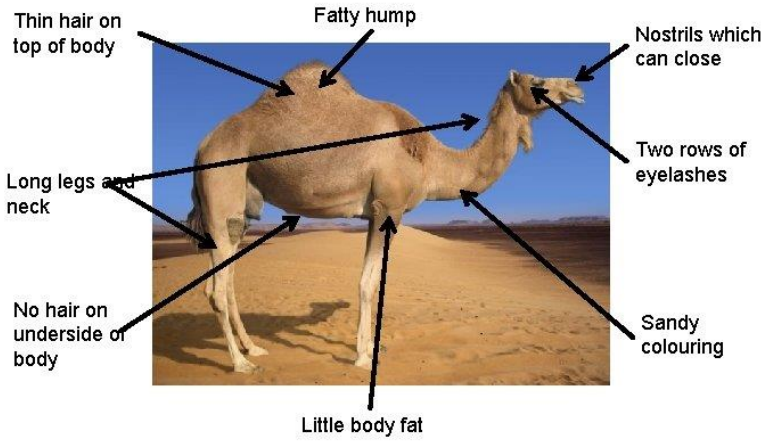
CLASSIFICATION OF ANIMALS



Classification

There are millions of different types of living **organisms**. Scientists **classify** things to make it easier to study them.

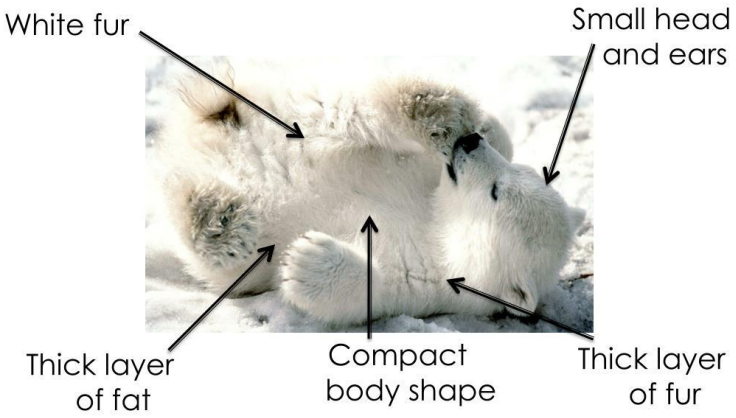
Adaptation of a camel to arid conditions



Adaptations

Adaptations are features of living organisms that help them survive. These can be to do with their physical appearance - **structural** adaptations –
Or they can be **behavioural** adaptations, which affect what the organisms do.

Adaptations of a polar bear to Arctic conditions



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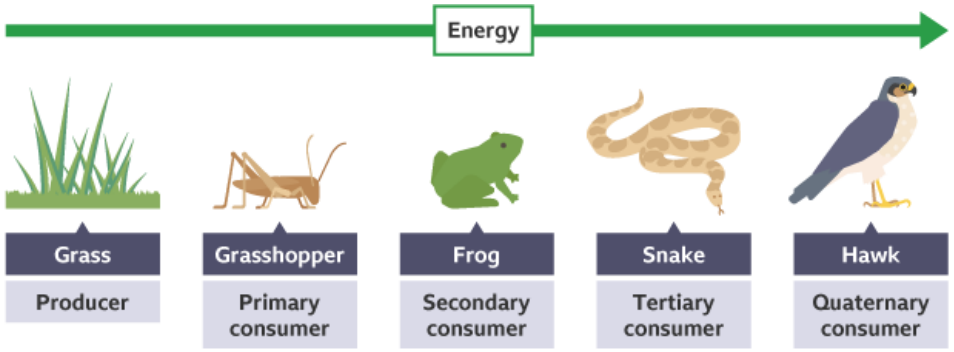
Key Stage 3 SCIENCE
Year 7 (Term 3)| *Interdependence*

Food Chains

A food chain is a list of organisms in a habitat that shows their feeding relationship, i.e what eats what. The organisms are joined by arrows which show the transfer of energy in food between them.



Food chains always start with a **producer**. This is usually a green plant or algae that completes photosynthesis to store energy from sunlight as glucose.

A **primary consumer** eats a producer. The rabbit is the primary consumer in the example food chain. This is in turn eaten by a **secondary consumer**, which is the fox.

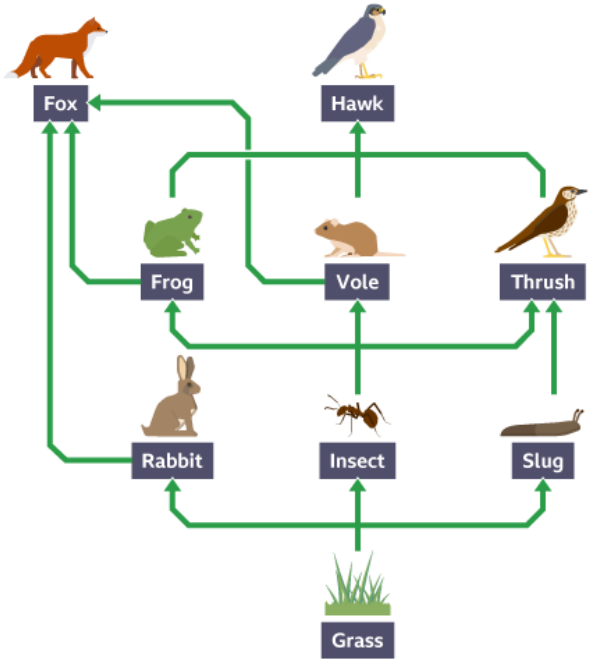
After this might be a **tertiary consumer** (which eats a secondary consumer) and possibly a **quaternary consumer** (which eats a tertiary consumer).

Food Webs

Most populations of organisms that live in a habitat usually have more than one food source.

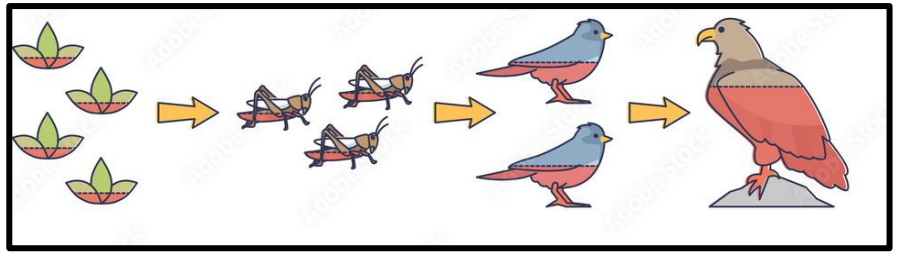
They usually consume more than one organism from the trophic level below.

This means that there are almost always more than one **food chain**, and these are interlinked into a **food web**.



Bioaccumulation

Toxic materials are poisonous. Some quickly break down into harmless substances in the environment. Others are persistent (they stay in the environment and do not break down). These substances in the food chain and damage the organisms in it, particularly in the **predators** at the end of the chain.



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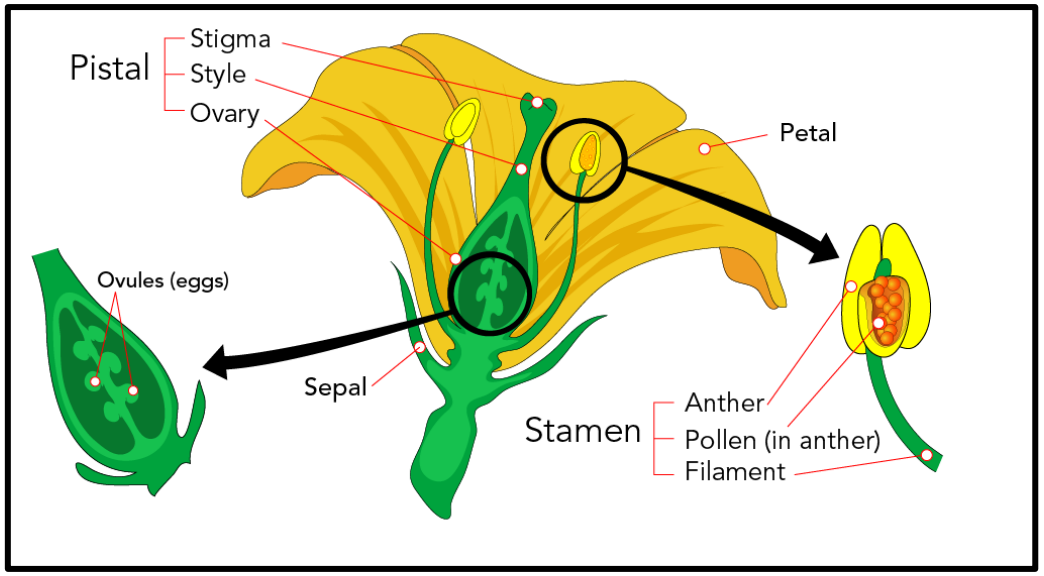
Key Stage 3 SCIENCE

Year 7 (Term 3)| *Ecosystems*

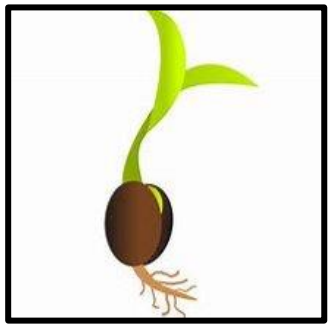


Pollination

Pollination is the transfer of pollen from the anthers of one flower to the stigma of another flower (of the same species).

In **wind** pollination, the wind carries the pollen from the anthers to the stigmas.

In insect pollination, insects carry the pollen from the anthers to stigmas (e.g. bees when they collect nectar pick up pollen and transfer it).



Seed Dispersal is Scattering Seeds

Seeds are dispersed or spread out so that they can grow without too much competition from each other.
Here are some ways in which the seed can be dispersed:

1) Wind dispersal

Dandelion fruit.

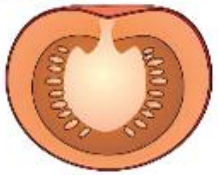
Parachutes catch the wind.

Sycamore fruit.

Wings help it fly away from the parent tree.

2) Animal dispersal

Tomato fruit.



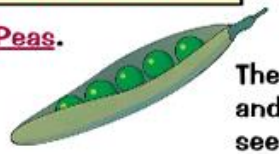
Fruit gets eaten. Seeds come out in the animals' droppings.

Burdock fruit.

Hooks catch animals' coats.

3) Explosions

Peas.



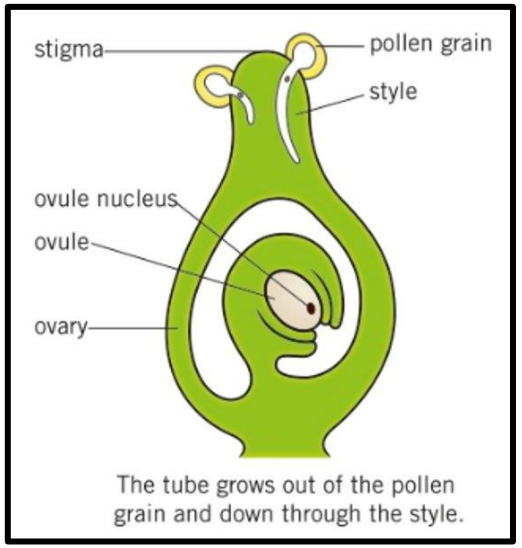
The pods dry out and flick the seed out.

4) Drop and Roll

The heavy fruit falls down from the tree. It splits when it hits the ground and the seeds roll out.

Horse Chestnut fruit.

The seeds then tend to be further dispersed by animals.



The tube grows out of the pollen grain and down through the style.

Fertilisation

After pollination, the pollen makes a pollen tube down the style to the ovary. When the pollen nucleus meets and fuses with the ovule, this is **fertilisation**.

A seed is then formed, and the ovary walls can become a fruit, depending on the plant species.

A new plant will grow once the seed germinates in the correct conditions.