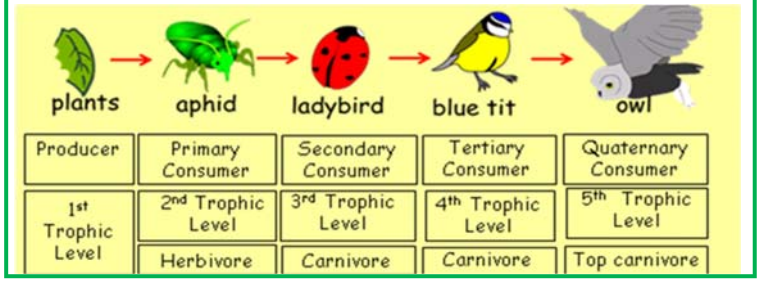
Biology - food chains and food webs

Food chains show the **flow of energy** as one organism eats another. The source of all energy in the food chain is the **sun** (from light). They always starts with a producer.

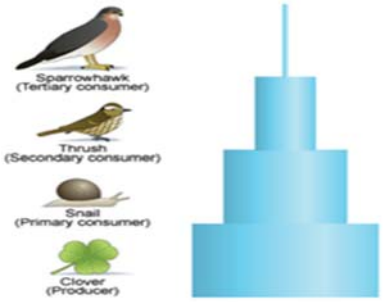
A **food web** shows all of the different food chains within a community. Organisms in the same food chain are **interdependent.** If the number of plants increased, so would the number of aphids. What if the number of owls decreased?



Biology – pyramids of number

A **pyramid of number** tells us the quantities of the different plants and animals in a food chain. The producers are always at the **bottom.**

A **pyramid of biomass** shows the mass of all the living things at each level of the food chain.

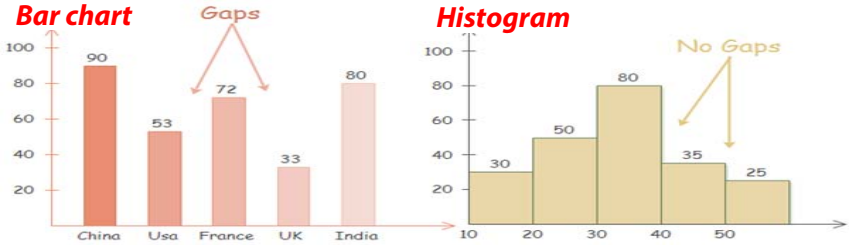


Biology – variation

Variation is all the differences which exist between members of the same species. There are two kinds of variation;

Continuous variation is variation that can have any value within a range. A **histogram** is used to represent continuous variation. Examples of continuous variation: height, weight, heart rate, finger length and leaf length.

Discontinuous variation is variation that has distinct groups or categories. A **bar chart** is used to represent discontinuous variation. Examples of discontinuous variation: eye colour and blood group.



Biology key word bank

Producer - organisms which can make their food using energy from sun light (plants).

Primary consumer - organisms which eat producers (herbivores).

Secondary consumers - organisms which eat primary consumers (carnivores).

Tertiary consumers - organisms which eat secondary consumers (carnivores).

Predator - an animal that hunts down and eats prey.

Prey - an animal that is hunted by a predator.

Herbivore - an animal that just eats plants.

Carnivore - an animal that just eats meat from other animals.

Omnivore - an animal that eats both plants and animals.

Species - organisms with similar characteristics which can reproduce to produce fertile offspring.

Endangered - a species that is very low in numbers and at risk of becoming extinct.

Extinct - a species that no longer exists.

Adaptation - A feature that helps an organism to survive in it's environment. E.g. Polar bears thick fur keeps it warm.

Chemistry – atoms, elements, compounds and mixtures

Particle – any atom or molecule

Molecule – one or more atoms joined together e.g. H_2, CO_2

Atom	A single sphere that makes up matter	
Element	Made up of only one type of atom	
Compound	Two or more different elements chemically joined together	
Mixture	Two or more different atoms or compounds that are mixed together but not chemically joined together	

Compound	Number of elements	Number of atoms
H_2O	2	3
$CaCO_3$	3	5
H_2SO_4	3	7

Test for **oxygen**: Relights a glowing splint

Test for **carbon dioxide**: Turns limewater cloudy

Test for **hydrogen**: Lit splint makes a squeaky pop sound

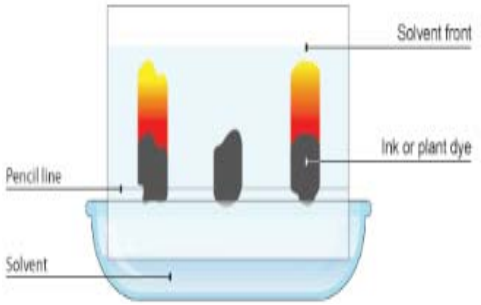
Chemistry – separation techniques

Pure - A substance made of one element or compound.

Mixtures are ***impure***.

Chromatography

Used for separating dissolved substances that have different colours, such as inks and plant dyes. Some of the coloured substances dissolve better than others (they are more soluble), so they travel further .

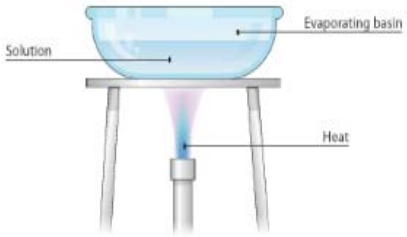


Chemistry – separation techniques

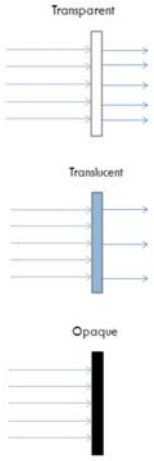
Filtration - This is good for separating an **insoluble solid** from a liquid. (An insoluble substance is one that does not dissolve). Sand, for example, can be separated from a mixture of sand and water using filtration. That's because sand does not dissolve in water.

Chemistry – separation techniques

Evaporation - This is good for separating a **soluble solid** from a liquid (a soluble substance does dissolve, to form a solution). For example copper sulphate crystals can be separated from copper sulphate solution using evaporation. Remember that it is the water that evaporates away, not the solution.



Physics – light



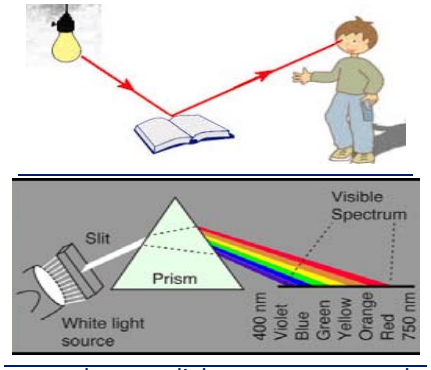
Transparent - ALL light is transmitted through the material

Translucent - Some light is transmitted but some light is absorbed into the material

Opaque - ALL light is absorbed into the material

Light is a transverse wave which travels at different speeds through different materials (mediums). When it hits a surface at an angle, it is **refracted**. This means it changes direction.

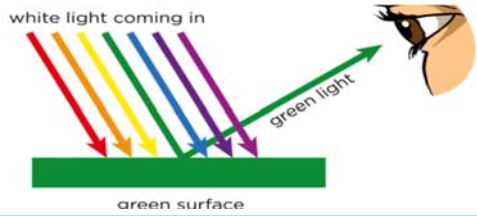
Physics – reflection



Unlike sound waves, light waves can travel through a vacuum (empty space).
White light is a mixture of many different colours and can be split up into a spectrum of these colours using a prism. All of these different colours travel at the same speed.

Physics – colour

When light hits a surface, some of it is **absorbed** and some of it is **reflected**. The light that is reflected is the colour of the object in that light. For example, a blue object absorbs all the colours of the spectrum except blue: it reflects blue light. Objects appear black in white light because they absorb all colours and reflect none.

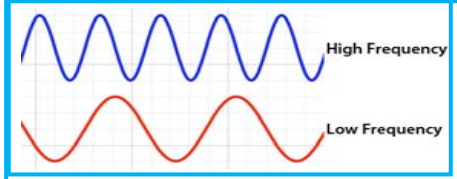


Physics - sound

When an object or substance **vibrates**, it produces sound. Sounds waves are a longitudinal wave. These sound waves can only travel through a **solid, liquid or gas**. They cannot travel through empty space.
Sound travels faster through **solids** than liquids and gases. This is because the particles of solids are **closely packed together** meaning vibrations can easily be passed on.

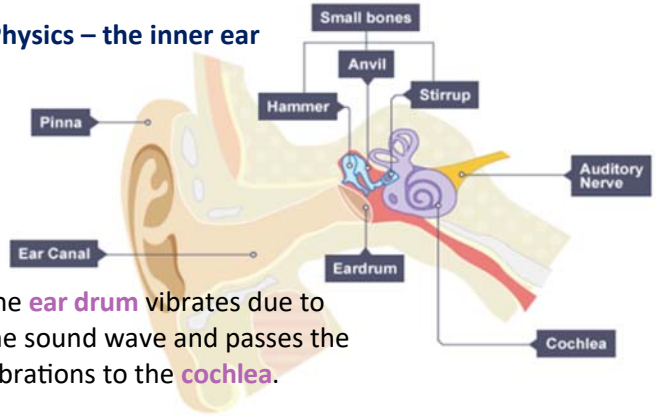
The **amplitude** of a wave determines the volume of a sound (how loud it is)
The **frequency** of a wave determines the pitch of a sound. Frequency is measured in Hertz (Hz).
High frequency = high pitch **Low frequency** = low pitch

Ultrasound is sound with very high frequency (above 20,000Hz). It is too high for humans to hear. It is used in medical scans and sonar.



Light waves travel much faster than sound waves. This is why you see lightening before you hear thunder.

Physics – the inner ear



The ear drum vibrates due to the sound wave and passes the vibrations to the cochlea.

Physics – echoes

Sound waves can **reflect** off surfaces. We hear sound reflections as **echoes**. Hard, smooth surfaces are particularly good at reflecting sound. This is why empty rooms produce lots of echoes.