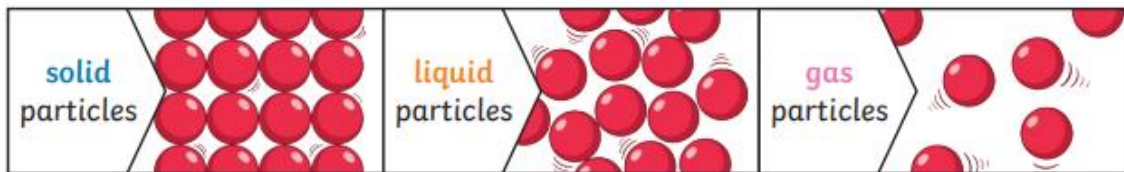


Knowledge Organiser Science: Properties and changes of materials

Key Vocabulary

solid	One of the three states of matter. Solid particles are very close together, meaning solids, such as wood or glass hold their shape.
liquid	Particles are more loosely packed than solids and can move around each other. This state of matter can flow and take the shape of their container e.g. milk is a liquid.
gas	Gas particles are further apart than solid or liquids and they are free to move around. Oxygen is a gas.
transparent	A material which lets light through e.g. glass
translucent	A material which allows some light through
opaque	A material which does not let light through
flexible	How a material bends, stretches
conductor	Electricity can easily travel through
insulator	Does not allow heat or electricity to travel through

Changes of state: Materials can change into solids, liquids and gases when heated or cooled.



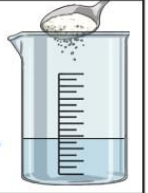
Concept: Chemistry

Key knowledge: materials are the substance that something is made out of. Different materials are used for particular jobs based on their properties: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, transparency

Dissolving

A solution is made when **solid** particles are mixed with **liquid** particles. **Materials** that will dissolve are known as soluble. **Materials** that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve.

Sugar is a soluble **material**.



Sand is an insoluble **material**.



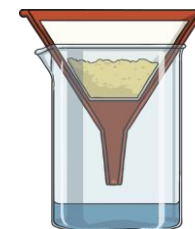
Irreversible changes results in a new product being made e.g. burning wood, mixing vinegar and milk.

Reversible changes (such as mixing and dissolving liquids and solids together) can be reversed by **separating** materials using these methods ...

sieve



filter



evaporate

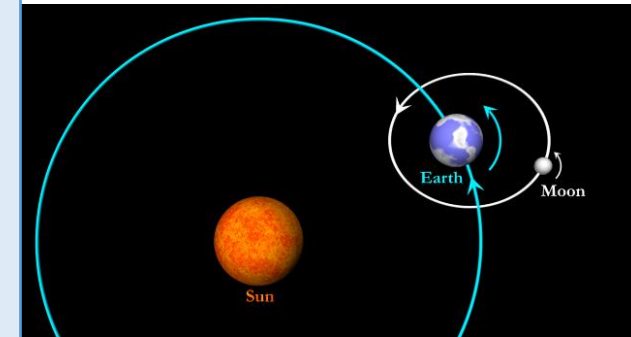


Knowledge Organiser Science: Earth and Space Concept: Forces

Key Vocabulary

Sun	A huge star that Earth and the other planets in our solar system orbit around.
Star	A giant ball of gas held together by its own gravity.
Moon	A natural satellite which orbits Earth or other planets.
planet	There are 8 planets in our solar system which orbit the sun.
sphere	A round 3d shape in the shape of a ball
spherical bodies	Astronomical objects like spheres
orbit	To move in a regular, repeating curved path around another object
axis	Earth's axis runs from the North Pole to the South Pole
rotate	To spin e.g. Earth rotates on its own axis

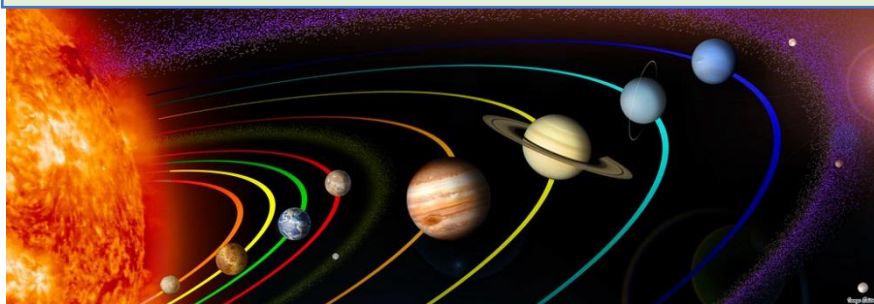
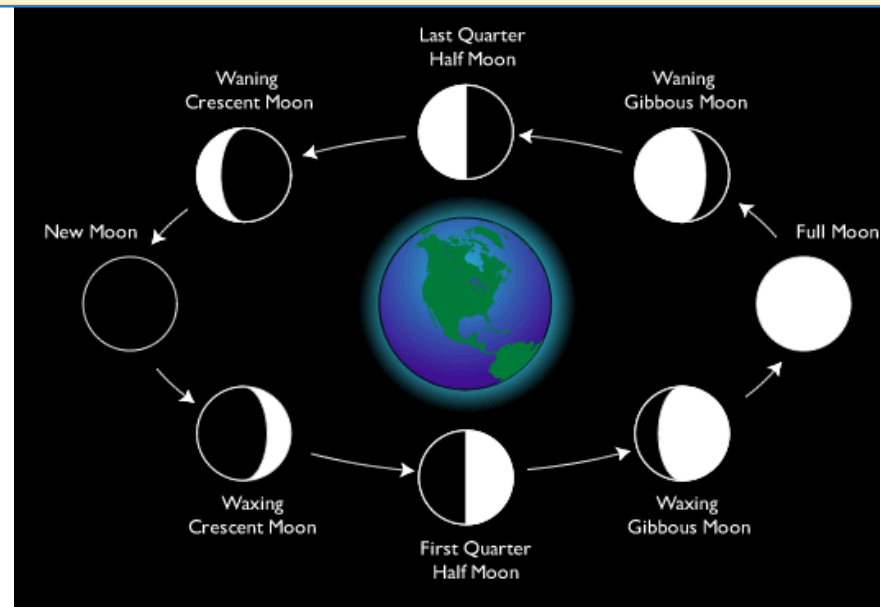
Earth rotates on its axis and does a full rotation once every 24 hours. At the same time that Earth is rotating, it is also orbiting around the sun. It takes a little more than 365 days to orbit the sun. Daytime occurs when the side of Earth is facing towards the sun. Night occurs when the side of Earth is facing away from the Sun.



The moon orbits earth in an oval shaped path while spinning on its axis. At various times in a month, the moon appears to be different shapes known as the phases of the moon. This is because as the moon rotates round Earth, the lights up different parts of it.

Mercury, Venus, Earth, Mars are rocky planets. They are mostly made of metal and rock. Jupiter, Saturn, Uranus, Neptune are mostly made up of gases (helium and hydrogen) although they do have cores made up of rock and metal.

The sun moves across the sky during the day but the Sun does not move at all. It seems to us that Sun moves because of the movements of Earth.

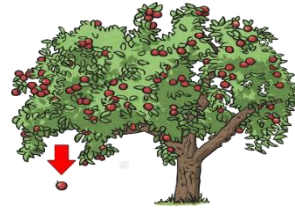


Knowledge Organiser Science: Forces Concept: Forces

Key Vocabulary

Forces	Pushes and pulls
Gravity	A pulling force exerted by the Earth, and other planets, that pull objects to the ground. It also keeps Earth and other planets in their orbit around the Sun.
Earth's Gravitational Pull	The gravitational pull is exerted by Earth onto an object. It pulls it to the Earth's centre. This is what keeps us on the ground.
Weight	The measure of force of gravity on an object. It is measured in newtons (N).
Mass	The measure of how much matter ('stuff') is inside and object. It is measured in kilograms (kg).
Friction	A force that acts between two objects that are moving or trying to move across each other.
Air Resistance	A type of friction caused by air pushing against a moving object.
Water Resistance	A type of friction caused by water pushing against a moving object.
Streamlined	When an object is shaped to minimise the effects of air and water resistance.
Mechanisms	Parts that work together, to allow a smaller force to move a greater load. Examples of mechanisms are levers, pulleys and gears.

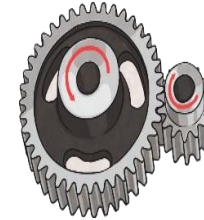
Gravity: *Isaac Newton* is believed to have developed his theory on **gravity** when he saw an apple fall from a tree.



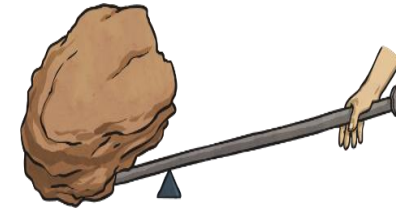
Streamline: Both the shark and plane are streamlined to combat **friction**. Can you see the similarities?



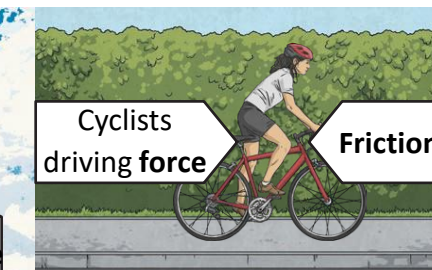
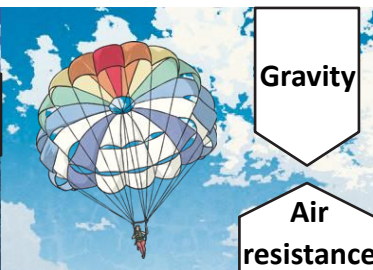
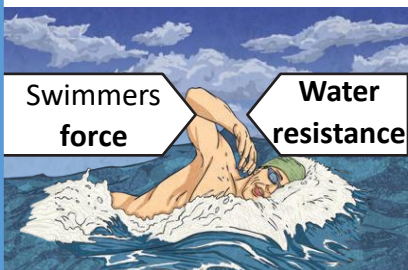
Examples of **mechanisms**: Pulleys- they can be used to so a smaller **force** can lift a load. The more wheels in a pulley system, the less force that is needed to lift the **weight**.



Gears- also known as cogs, can be used to change the **force**, speed or direction of a motion. When two gears are connected, they move in opposite directions.



Levers- they can be used to allow a small force to lift a heavier **weight**.



Examples of **forces** in action:

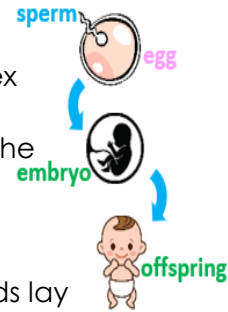
Water resistance and **air resistance** are types of **friction**. In some situation's **friction** can be helpful. For example, **air resistance** is helpful as it stops the skydiver hitting the ground at high speed. However, it can be unhelpful too. **Friction** on a bike chain can make it harder for the cyclist to pedal.

Key Vocabulary- new/ prior knowledge	
Evolution	The process of change to an animal or plant species over time.
Mutation	A change in genetic material.
Offspring	The young or child of a parent.
Asexual Reproduction	One parent is needed to create an offspring, which is the exact copy of the parent.
Sexual Reproduction	Two parents are needed to create an offspring, which are similar but not identical to either parent.
Fertilisation	When male and female sex cells fuse to create either a seed, or an embryo.
Germination	When the seed begins to grow.
Stamen	The male sex organ of a plant, which is made up of the anther and filament.
Carpel	The female sex organ of a plant, which is made up of the stigma, style and ovary.
Pollen	The male sex cell in a plant.
Sperm	The male sex cell in a mammal.
Ovary	The female sex organ, which produces eggs.
Embryo	An animal in its earliest stage of development. It develops into a baby.
Gestation	The length of a pregnancy.
Life Cycle	A series of changes that occur in plants or animals, between the beginning of their life and their death.
Dissect	To carefully cut something in order to examine it scientifically.

Some living things like plants contain **both** male and female sex cells. Others, like humans only contain **one**; either male or female.

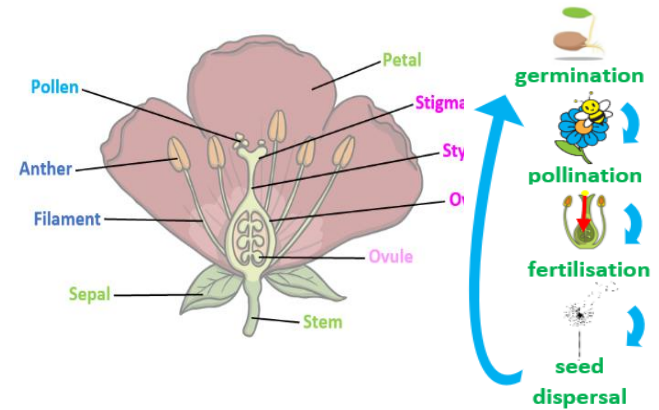
Mammal Reproduction

Mammals use **sexual reproduction** to produce their offspring. The **sperm** (male sex cell) **fertilises** the **egg** (female sex cell). This creates an **embryo**, which will grow inside the female for the **gestation** period, until the offspring is born. Most mammals give birth to live offspring. Whereas most amphibians, insects and birds lay eggs.

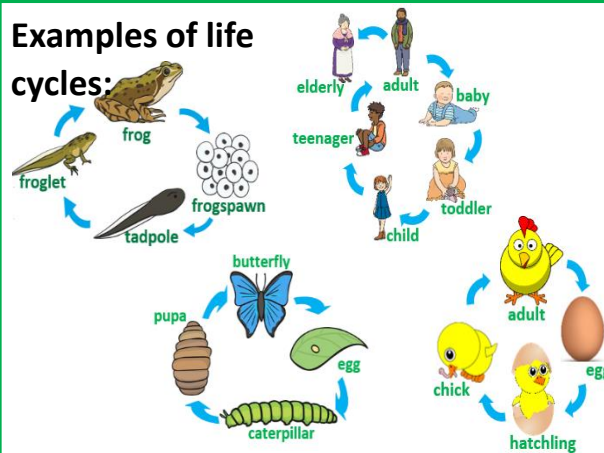


Plant Reproduction

Pollination occurs when **pollen** (male sex cell) from the **anther**, is transferred to the **stigma** by either insects or the wind. This then travels down to the **ovary** and meets the **ovule** (female sex cell/egg). **Fertilisation** occurs and a seed is formed. Seeds are then dispersed (spread) and **germination** can begin. This is **sexual reproduction** in plants. Some plants, such as potatoes and daffodils can reproduce offspring using **asexual reproduction**.



Examples of life cycles:



Metamorphosis

There are many similarities in the life cycles of mammals, birds, insects and amphibians. However, one difference is **metamorphosis** which is part of amphibian and insect life cycles. This is where the animal goes through a significant change to their structure as they grow. For example, the tadpole to frog and caterpillar to butterfly.

Knowledge Organiser Science: Animals including humans

Key Vocabulary

reproduce	when an animal or plant produces one or more individuals similar to itself
asexual reproduction	A process where one parent makes new life
sexual reproduction	A process where two parents – one male and one female – are required to produce new life
prenatal	The stage of development from fertilisation to the time of birth
organ	A part of your body that has a particular purpose
hormones	a chemical, usually occurring naturally in your body, that makes an organ of your body do something
vertebrate	A creature which has a spine
gestation period	the process in which babies grow inside their mother's body before they are born

Concept: Evolution, Living things (cells)

We already know:

- Animals can be grouped into vertebrates (and then further into fish, reptiles, amphibians, birds and mammals).
- Some examples of life cycles (including those of plants and humans)
- Reproduction and growth are two of the seven life processes.
- How to live a healthy lifestyle.

Puberty: Hormonal changes take place over a few years.

This is also known as puberty.

- Puberty is the change that happens in late childhood and adolescence where the body starts to change because of hormones.
- Some changes include growth in height, more sweat, hair growth on arms and legs, under the armpits and on genitals, and growth in parts of the body such as male genitals and breasts.
- Females begin to menstruate.

