

| Key Vocabulary | |
|--------------------|--|
| materials | The substance that something is made out of, e.g. wood, plastic, metal. |
| solids | One of the three states of matter. Solid particles are very close together, meaning solids , such as wood and glass, hold their shape. |
| liquids | This state of matter can flow and take the shape of the container because the particles are more loosely packed than solids and can move around each other. Examples of liquids include water and milk. |
| gases | One of the three states of matter. Gas particles are further apart than solid or liquid particles and they are free to move around. Examples of gases are oxygen and helium. |
| melting | The process of heating a solid until it changes into a liquid . |
| freezing | When a liquid cools and turns into a solid . |
| evaporating | When a liquid turns into a gas or vapour. |
| condensing | When a gas , such as water vapour, cools and turns into a liquid . |

Key Knowledge

Different **materials** are used for particular jobs based on their properties: electrical **conductivity**, flexibility, hardness, **insulators**, magnetism, solubility, thermal **conductivity**, **transparency**.



For example, glass is used for windows because it is hard and **transparent**. Oven gloves are made from a thermal **insulator** to keep the heat from burning your hand.



Changes of State



solid

The **solid** melts.



liquid

The **liquid** freezes.



liquid

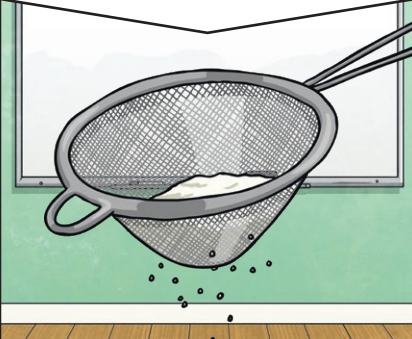
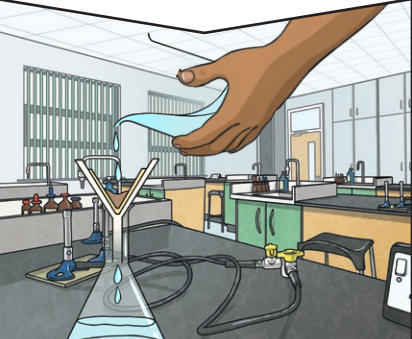
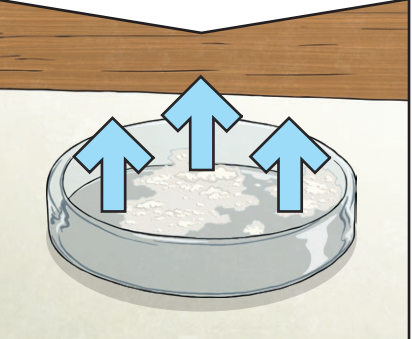
The **gas** condenses.



gas


The **liquid** evaporates.

| Key Vocabulary | |
|---------------------|--|
| conductor | A conductor is a material that heat or electricity can easily travel through. Most metals are both thermal conductors (they conduct heat) and electrical conductors (they conduct electricity). |
| insulator | An insulator is a material that does not let heat or electricity travel through them. Wood and plastic are both thermal and electrical insulators . |
| transparency | A transparent object lets light through so the object can be looked through, for example glass or some plastics. |

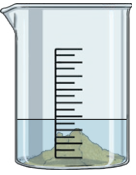
| Key Knowledge | | |
|--|---|--|
| Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by: | | |
| Sieving | Filtering | Evaporating |
|  |  |  |
| Smaller materials are able to fall through the holes in the sieve, separating them from larger particles. | The solid particles will get caught in the filter paper but the liquid will be able to get through. | The liquid changes into a gas , leaving the solid particles behind. |

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 often result in a new product being made from the old **materials** (reactants). For example, burning wood produces ash. Mixing vinegar and milk produces casein plastic.

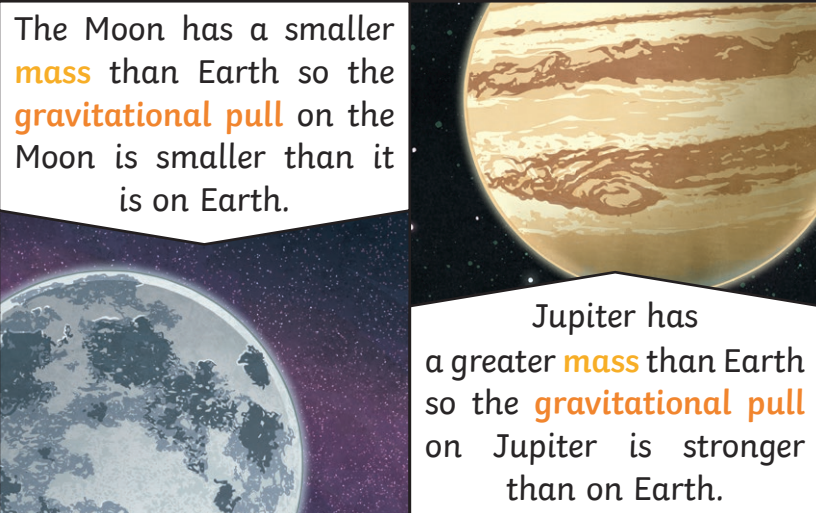


To look at all the planning resources linked to the Properties and Changes of Materials unit, [click here](#).

| Key Vocabulary | |
|-----------------------------------|---|
| forces | Pushes or pulls. |
| gravity | A pulling force exerted by the Earth (or anything else which has mass). |
| Earth's gravitational pull | The pull that Earth exerts on an object, pulling it towards Earth's centre. It is the Earth's gravitational pull which keeps us on the ground. |
| weight | The measure of the force of gravity on an object. |
| mass | A measure of how much matter (or 'stuff') is inside an object. |

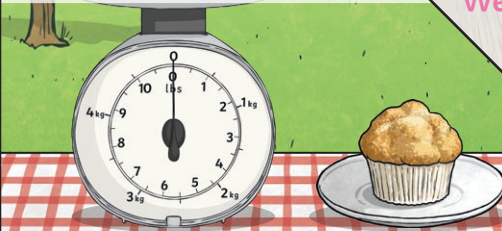
| Key Knowledge | | Isaac Newton |
|-------------------------------------|-------------------|---|
| Forces | |  |
| start to move. | stop moving. | |
| change direction. | move faster. | |
| Forces can make an object... | | |
| change its shape. | move more slowly. | |

The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.




Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.


Mass is how much matter is inside an object. It is measured in kilograms (kg).



Weight is how strongly **gravity** is pulling an object down. It is measured in newtons (N).



Isaac Newton is famously thought to have developed his theory of **gravity** when he saw an apple fall to the ground from an apple tree.



To look at all the planning resources linked to the Forces unit, [click here](#).

| Key Vocabulary | |
|-------------------------|---|
| friction | A force that acts between two surfaces or objects that are moving, or trying to move, across each other. |
| air resistance | A type of friction caused by air pushing against any moving object. |
| water resistance | A type of friction caused by water pushing against any moving object. |
| buoyancy | An upward force that a liquid applies to objects. |
| streamlined | When an object is shaped to minimise the effects of air or water resistance . |
| mechanism | Parts which work together in a machine. Examples of mechanisms are pulleys, gears and levers. |

Key Knowledge

Examples of **forces** in action:

Water resistance and **air resistance** are forms of **friction**. **Friction** is sometimes helpful and sometimes unhelpful. For example, **air resistance** is helpful as it stops the skydiver hitting the ground at high speed. **Friction** on a bike chain can make the bike harder to pedal so it is unhelpful.

This shark is **streamlined**.

It has a pointed nose to cut through the water, and a smooth, low, curved back to allow the water to flow over and around it.

It does not create much **water resistance** so it can move through the water quickly.

| Pulleys | Gears/Cogs | Levers |
|--|--|--|
| <p>Pulleys can be used to make a small force lift a lighter load. The more wheels in a pulley, the less force is needed to lift a weight.</p> | <p>Gears or cogs can be used to change the speed, force or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.</p> | <p>Levers can be used to make a small force lift a lighter load. A lever always rests on a pivot.</p> |

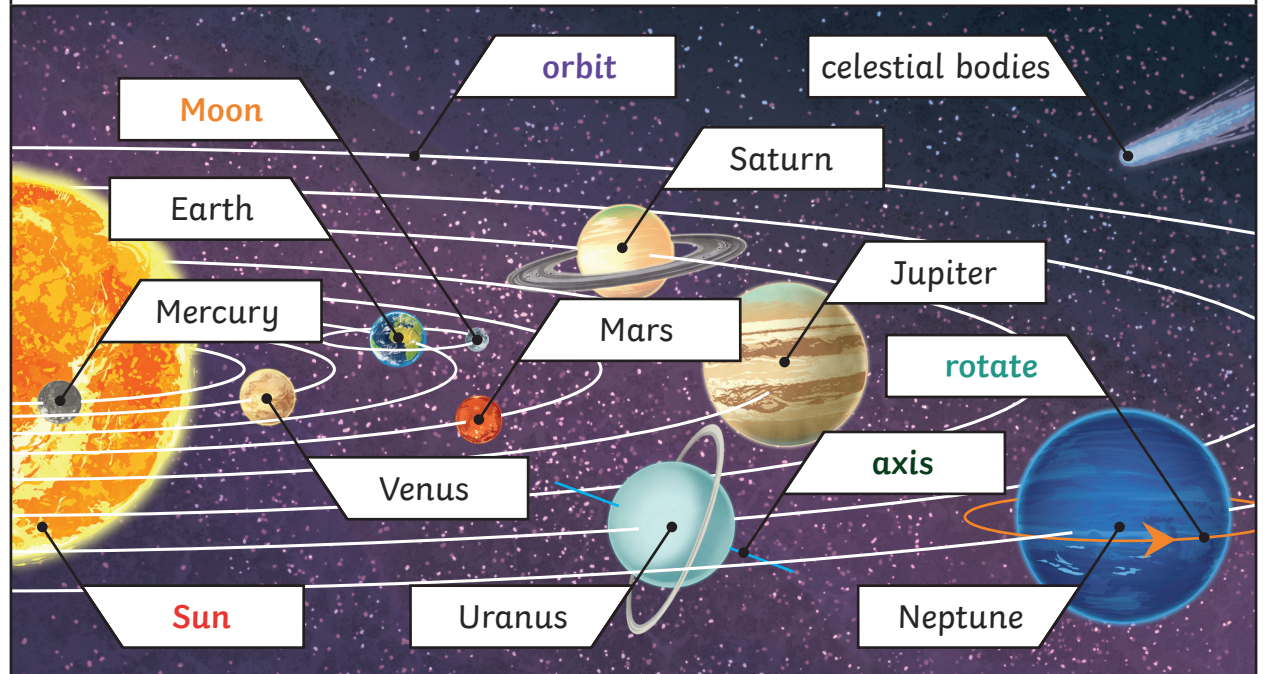
Key Vocabulary

| | |
|-------------------------|---|
| 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 | A large object, round or nearly round, that orbits a star . |
| sphere | A round 3D shape in the shape of a ball. |
| spherical bodies | Astronomical objects shapes like spheres . |
| satellite | Any object or body in space that orbits something else, for example: the Moon is a satellite of Earth. |

Key Knowledge

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

Our Solar System (not to scale)

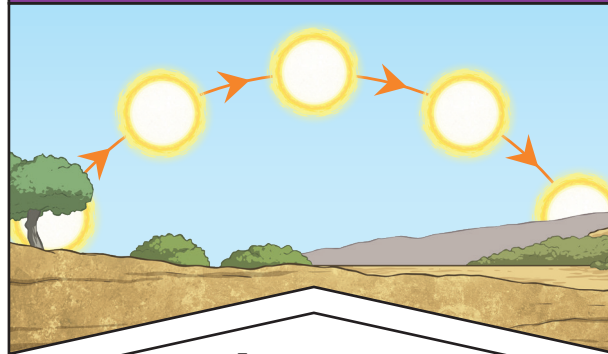


Pluto used to be considered a **planet** but was reclassified as a dwarf **planet** in 2006.

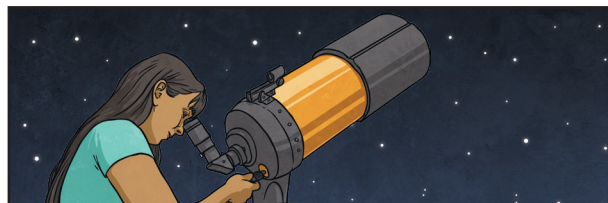
The **Moon orbits** Earth in an oval-shaped path while spinning on its **axis**. At various times in a month, the **Moon** appears to be different shapes. This is because as the **Moon rotates** round Earth, the **Sun** lights up different parts of it.

| Key Vocabulary | |
|---------------------------|--|
| orbit | To move in a regular, repeating curved path around another object. |
| rotate | To spin. E.g. Earth rotates on its own axis . |
| axis | An imaginary line that a body rotates around. E.g. Earth's axis (imaginary line) runs from the North Pole to the South Pole. |
| geocentric model | A belief people used to have that other planets and the Sun orbited around Earth. |
| heliocentric model | The structure of the Solar System where the planets orbit around the Sun . |
| astronomer | Someone who studies or is an expert in astronomy (space science). |

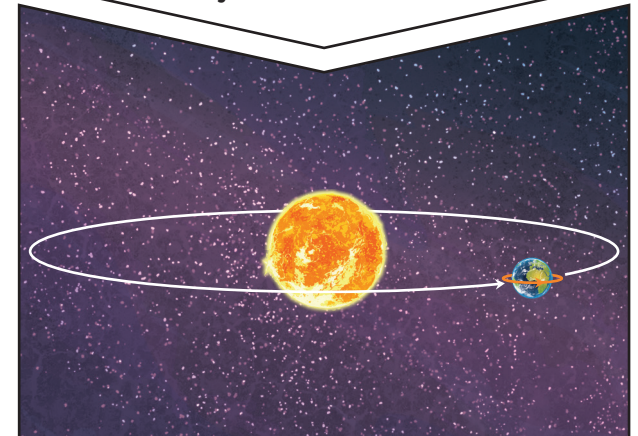
Key Knowledge



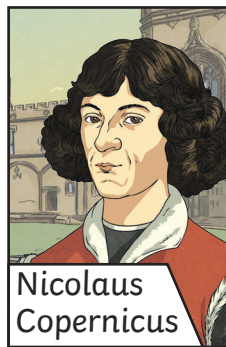
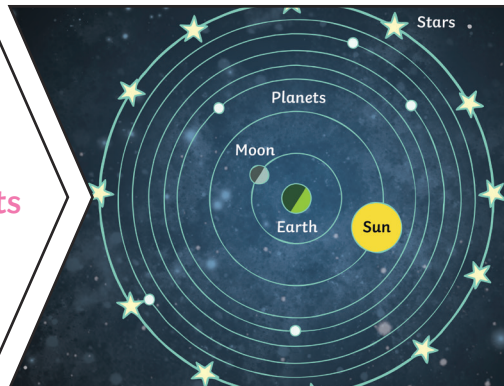
It appears to us that the **Sun** moves across the sky during the day but the **Sun** does not move at all. It seems to us that the **Sun** moves because of the movements of Earth.



Earth **rotates** (spins) on its **axis**. It does a full **rotation** once in every 24 hours. At the same time that Earth is **rotating**, it is also **orbiting** (revolving) 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**.

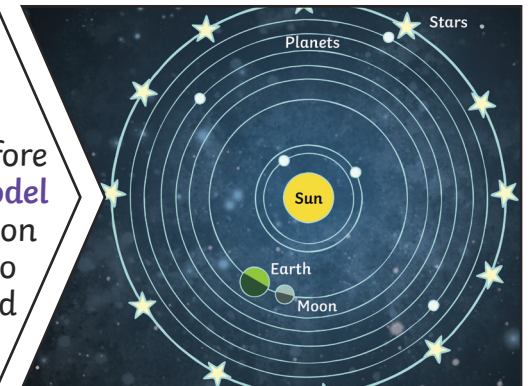


Geocentric model
Years ago people believed that **planets** moved around the Earth.



Nicolaus Copernicus

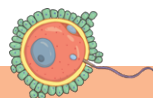
The work and ideas of many **astronomers** (such as Copernicus and Kepler) combined over many years before the idea of the **heliocentric model** was developed. Galileo's work on gravity allowed **astronomers** to understand how **planets** stayed in **orbit**.



Key Knowledge

fertilisation

The male and female sex cells fuse together.

**prenatal**

The cells develop and grow into a foetus inside the mother's uterus. After around nine months, the baby is born.

infancy

Rapid growth and development. Children learn to walk and talk.

childhood

Children learn new skills and become more independent.

adolescence

The body starts to change over a few years. The changes occur to enable reproduction during adulthood. Much more independent.

middle adulthood

Ability to reproduce decreases. There may be hair loss or hair may turn grey.

late adulthood

Leading a healthy lifestyle can help to slow down the decline in fitness and health which occurs during this stage.

early adulthood

The human body is at its peak of fitness and strength.

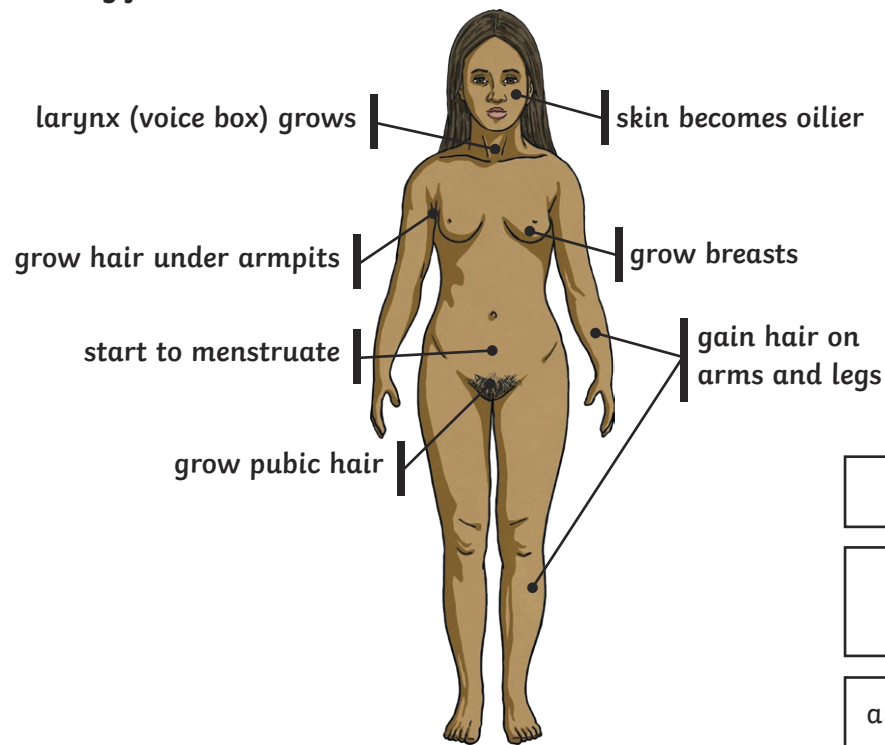
Key Vocabulary

| | |
|-----------------------------|---|
| fertilisation | The process of the male and female sex cells fusing together. |
| prenatal | The stage of development from the time of fertilisation to the time of birth. |
| gestation | The process or time when prenatal development takes place before birth. |
| reproduce | To produce young. |
| asexual reproduction | A process where one parent produces new life. |
| sexual reproduction | A process where two parents – one male and one female – are required to produce new life. |
| life cycle | The changes a living thing goes through, including reproduction. |

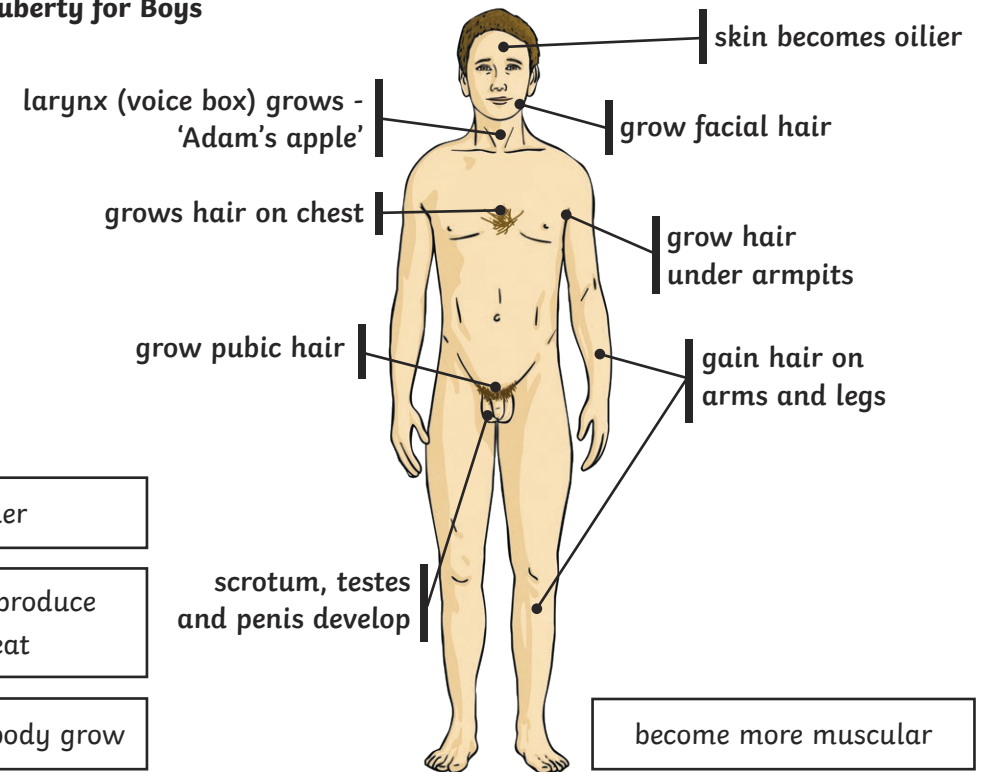
To look at all the planning resources linked to the Animals Including Humans unit click [here](#).

Key Knowledge

Puberty for Girls



Puberty for Boys



grow taller

sweat glands produce more sweat

all parts of the body grow

Key Vocabulary

| | |
|------------------------|--|
| adolescence | The social and emotional stage of development between childhood and adulthood . |
| puberty | The physical stage of development between childhood and adulthood . |
| menstruation | When the female body discharges the lining of the uterus. This happens approximately once a month. |
| adulthood | The stage of development when a human is fully grown and mature. |
| life expectancy | The length of time, on average, that a particular animal is expected to live. |