

# Science Knowledge Organiser – Year 5 Biology: Living things and their habitats

## Previous knowledge.

- To be able to recognise that living things can be grouped in a variety of ways
- To be able to explore and use classification keys to help group, identify and name a variety of living things
- To be able to recognise that environments can change and that this can sometimes pose dangers to living things

Humans develop inside their mothers and are dependent on their parents for many years until they are old enough to look after themselves.



Amphibians such as frogs are laid in eggs then, once hatched, go through many changes until they become an adult.



Some animals, such as butterflies, go through **metamorphosis** to become an adult.



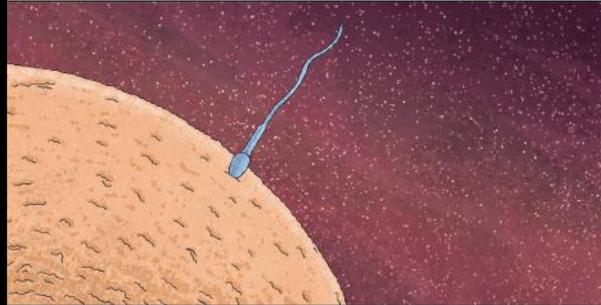
Birds are hatched from eggs and are looked after by their parents until they are able to live independently.



## Reproduction in mammals

Mammals use **sexual reproduction** to produce their offspring.

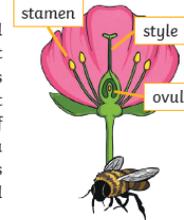
- The male sex cell, called the sperm, **fertilises** the female sex cells.
- The **fertilised** cell divides into different cells and will form a baby with a beating heart.
- The baby will grow inside the female until the end of the **gestation** period when the baby is born.



Echidnas and platypus are mammals but they lay eggs rather than giving birth to live young.

## Plants

Most plants contain both the male sex cell (pollen) and female sex cell (ovules), but most plants can't **fertilise** themselves. Wind and insects help to transfer pollen to a different plant. The pollen from the stamen of one plant is transferred to the stigma of another. The pollen then travels down a tube through the style and fuses with an ovule.



Some plants, such as strawberry plants, potatoes, spider plants and daffodils use **asexual reproduction** to create a new plant. They are identical to the parent plant.



## What I will learn in this unit.

- To be able to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- To be able to describe the life process of reproduction in some plants and animals.

Word	Definition
Metamorphosis	A change in an animal's body and behaviour
Reproduction	The process of new living things being made
species	A type/ sort of living thing
fertilisation	The action of fusing the male and female sex cells in order to develop an egg
gestation	The length of a pregnancy
pollination	The transfer of pollen to a stigma to allow fertilisation
asexual reproduction	One parent is needed to create offspring which is an exact copy of the parent

## Scientist study: David Attenborough (1926 - England)

Sir David Frederick Attenborough is an English broadcaster, biologist, natural historian and author. He is best known for writing and presenting, in conjunction with the BBC Natural History Unit, the nine natural history documentary series forming the Life collection, a comprehensive survey of animal and plant life on Earth.

While Attenborough's earlier work focused more on the wonders of the natural world, his later work has been more vocal in support of environmental causes. He has advocated for restoring planetary biodiversity, limiting population growth, switching to renewable energy, mitigating climate change, reducing meat consumption, and setting aside more areas for natural preservation.



# Science Knowledge Organiser – Year 5 Physics: Earth and Space

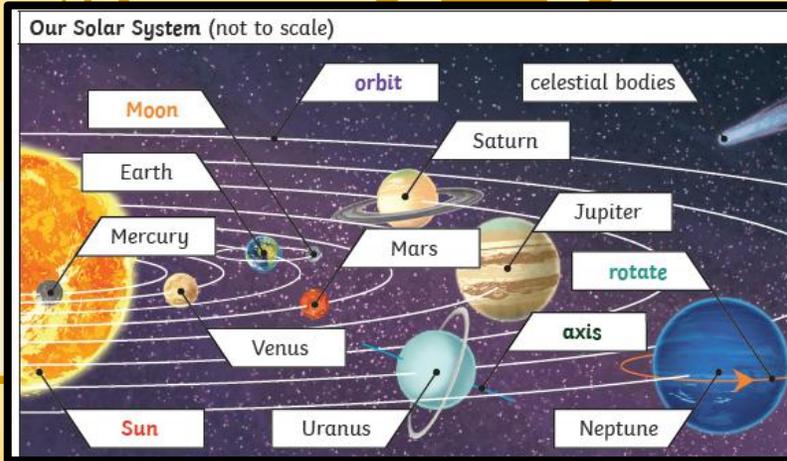
## What I will learn in this unit.

- To be able to describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- To be able to describe the movement of the Moon relative to the Earth
- To be able to describe the Sun, Earth and Moon as approximately spherical bodies
- To be able to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

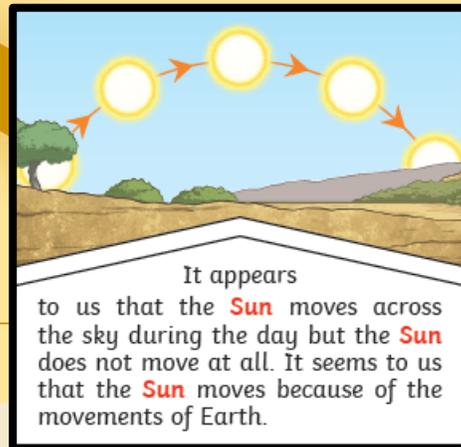
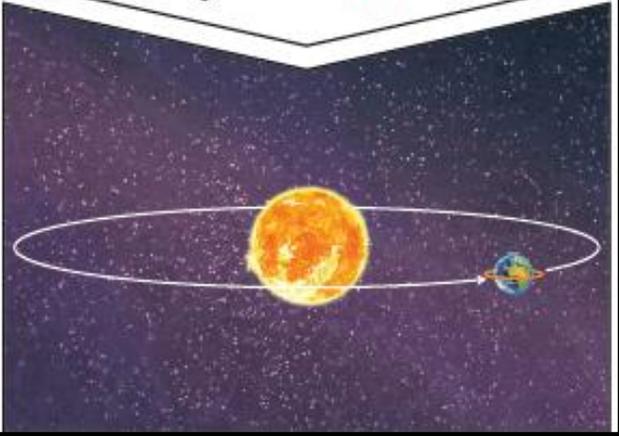
## Previous knowledge.

New learning

Word	Definition
solar system	The collection of eight planets and their moons in orbit round the sun, together with smaller bodies in the form of asteroids, meteoroids, and comets. The planets of the solar system are (in order of distance from the sun) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
orbiting	The curved path of a celestial object or spacecraft round a star, planet, or moon, especially a periodic elliptical revolution.
star	A giant ball of gas held together by its own gravity
rotate	Move or cause to move in a circle round an axis or centre.
axis	An imaginary line about which a body rotates
spherical bodies	Astronomical objects shaped like spheres
gravity	The force that attracts a body towards the centre of the earth, or towards any other physical body having mass.



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**.



## Scientist study: Stephen Hawkins (1942 - England)

Was born in January 8, 1942 in Oxford and died in March 14, 2018 in Cambridge

**Best known for:** Hawking radiation and the book *A Brief History of Time*. He grew up in a highly educated family. Both of his parents had attended Oxford University and his father, Frank, was a medical researcher.

Stephen enjoyed math and science in school where he earned the nickname "Einstein." He wanted to study math at university but Oxford didn't have a math degree at the time so he chose physics and chemistry instead. Stephen found college coursework to be very easy. He enjoyed being a member of the school's boat club as well as classical music. After graduation, he went to Cambridge to study for his PhD.



### Previous Knowledge.

- Identify and compare the suitability of a variety of everyday materials, for particular uses.
- I can compare and group materials together, according to whether they are solids, liquids or gases
- I can observe that some materials change state when they are heated or cooled

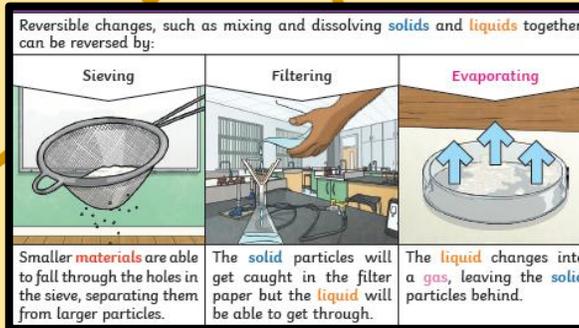
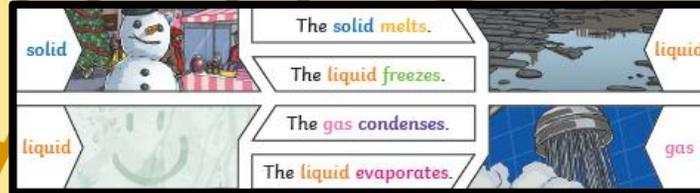
# Science Knowledge Organiser – Year 5 Chemistry: Properties and changing materials

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



### What I will learn in this unit.

- Identify and compare the suitability of a variety of everyday materials, for particular uses.
- I can compare and group materials together, according to whether they are solids, liquids or gases
- I can observe that some materials change state when they are heated or cooled



**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**.

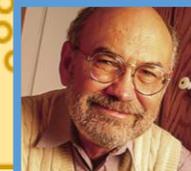


### Scientist study: investigate these inventors and compare their creations

Becky Schroeder - fluorescence material (1962 - America)

Spencer Silver- Post-It Notes (1941 - America)

Ruth Benerito - Wrinkle-Free Cotton (1916 - America)

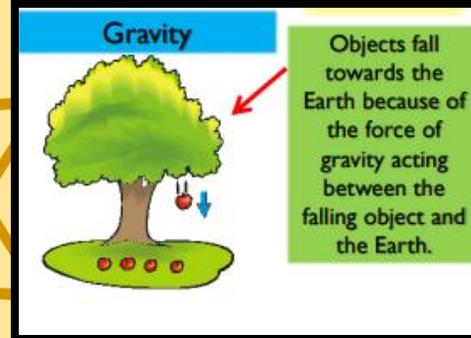


Word	Definition
<b>material</b>	The substance of which something is made
<b>melting</b>	The process of heating a solid until it changes into a liquid
<b>freezing</b>	When a liquid cools and turns into a solid
<b>evaporating</b>	When a liquid turns into a gas or vapour
<b>condensation</b>	When a gas or vapour cools and turns into a liquid
<b>conductor</b>	A material that heat or electricity can travel through
<b>insulator</b>	A material that does not let heat or electricity travel through
<b>soluble</b>	A <b>solid</b> materials particles will dissolve and combine with a liquids particles to make a solution
<b>insoluble</b>	A <b>solid</b> materials particles <b>will not</b> dissolve and combine with a liquids particles
<b>reversible changes</b>	The action of sieving, filtering or evaporating to separate materials
<b>irreversible changes</b>	Where the original material <b>cannot</b> be reclaimed, usually through burning

# Science Knowledge Organiser – Year 5 Physics: Forces

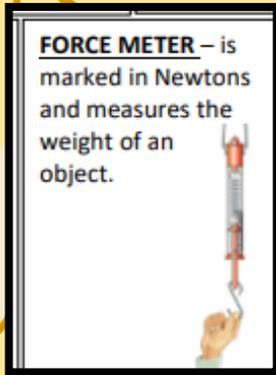
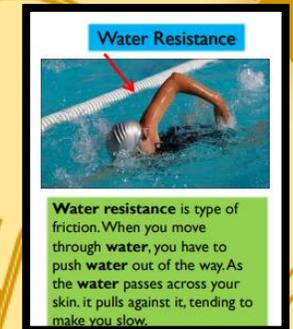
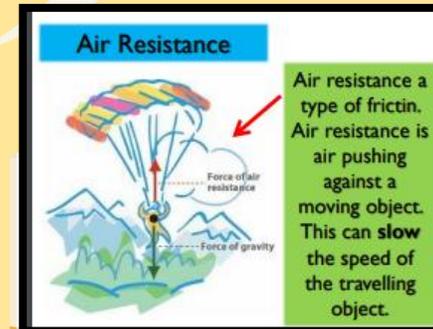
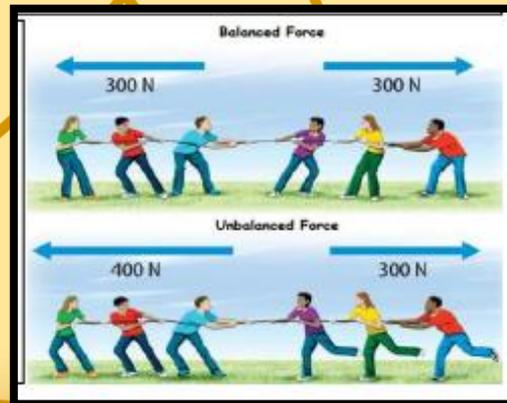
## What I will learn in this unit.

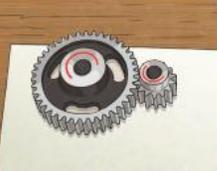
- I can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- I can identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- I can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.



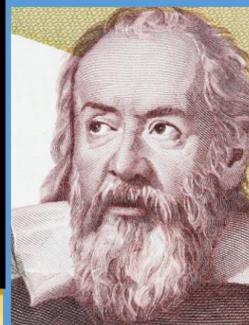
## Previous knowledge.

- I can compare how things move on different surfaces
- I can notice that some forces need contact between two objects, but magnetic forces can act at a distance
- I can observe how magnets attract or repel each other and attract some materials and not others describe magnets as having two poles
- I can predict whether two magnets will attract or repel each other, depending on which poles are facing.
- I can compare and group together a variety of everyday materials on the basis of whether they are attracted



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

Word	Definition
gravity	A pushing force exerted by the Earth
air resistance	The force that air exerts on a moving object
friction	The force between two moving surfaces
gravitational pull	The <u>pull on</u> objects to towards the centre of the Earth
Newton meter	A force meter to measure the size of a force
mass	The measure of how much matter is inside an object
tension	A state of being stretched tight
water resistance	The force that water exerts on a moving object
pulleys	a wheel with a grooved rim around that change the direction of a force
gears	A toothed wheel that works with others to change the speed of a mechanism
levers	A rigid bar resting on a pivot that is used to move heavy objects



## Scientist study: Galileo Galilei (1564 - Italy)

His full name was Galileo Galilei and he was an Italian scientist who opened the eyes of the world to a new way of thinking about how our solar system and astronomy in general works. For many years, scientists believed that the Sun and the planets revolved around the Earth. But Galileo was the first scientist to prove that this wasn't actually correct, and that in fact the Earth and the planets revolved around the sun. He also invented an improved telescope so that he could gaze far into space. He was the first to see Jupiter's moons and then realised that our moon was covered full of craters.

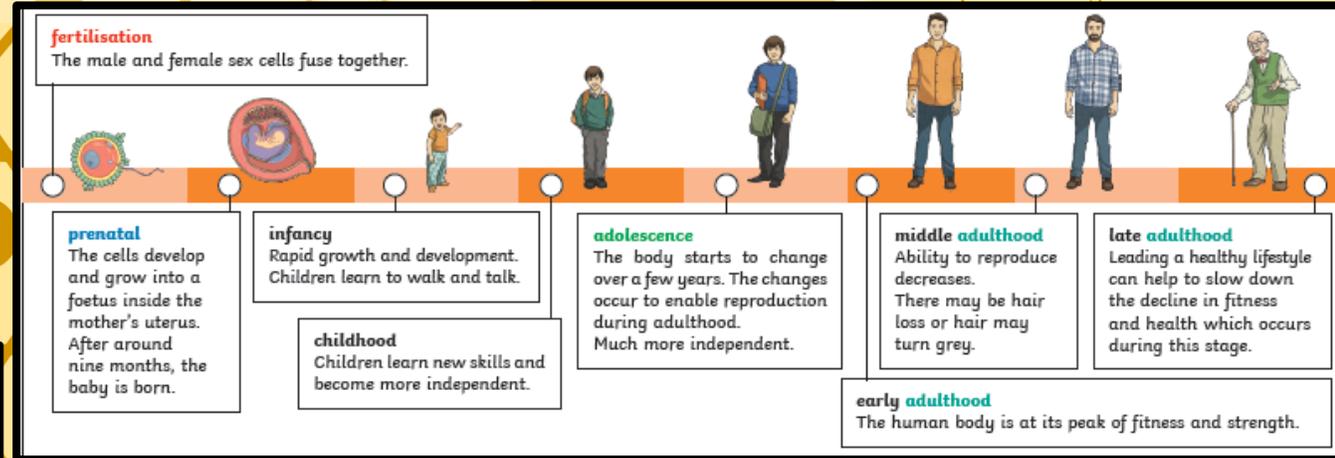
### Previous knowledge.

- To be able to describe the simple functions of the basic parts of the digestive system in humans
- Can notice that animals, including humans, have offspring which grow into adults
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

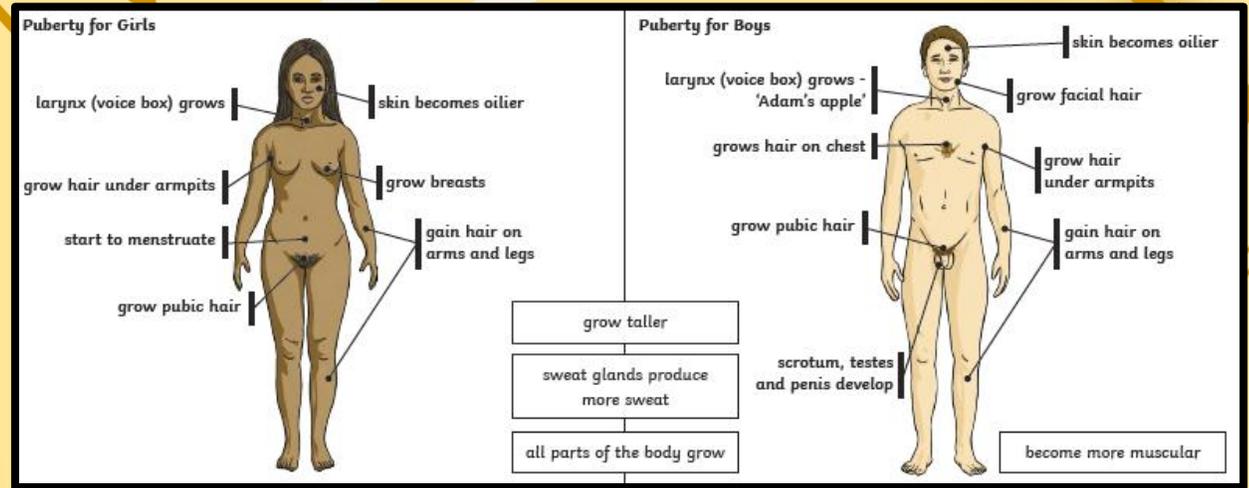
# Science Knowledge Organiser – Year 5 Biology: Humans and other animals

### What I will learn in this unit.

- To be able to describe the changes as humans develop into old age



Word	Definition
<b>fertilisation</b>	The process of the male and female sex cells fusing together.
<b>prenatal</b>	The stage of development between the time of fertilisation to the baby being born
<b>gestation</b>	The length of time a female is pregnant for
<b>asexual reproduction</b>	A process where one parent produces new life. Examples might be sea stars and stick insects
<b>sexual reproduction</b>	A process where two parents, one male and one female, produces new life
<b>adolescence</b>	The social and emotional stage of development between childhood and adulthood
<b>puberty</b>	The physical stage of development between childhood and adulthood
<b>menstruation</b>	Where the female body discharges the lining of the uterus, this happens once a month
<b>adulthood</b>	The stage of development when a human is fully grown and mature
<b>life expectancy</b>	The length of time, on average, that a particular animal is expected to live
<b>vaccine</b>	A substance used to stimulate the production of antibodies and provide immunity against one or several diseases
<b>immunisation</b>	the action of making a person or animal immune to infection, typically by inoculation
<b>eradicate</b>	destroy completely; put an end to. "this disease has been eradicated from the world" Through successful immunisation the world has eradicated Small pox, which killed over 300 million people. The last case was in 1977



### Scientist study: Sarah Gilbert (1962 - England)

Dame Sarah Catherine Gilbert DBE is an English vaccinologist who is a Professor of Vaccinology at the University of Oxford and co-founder of Vaccitech. She specialises in the development of vaccines against influenza and emerging viral pathogens.. Professor Gilbert co-developed the **Oxford AstraZeneca covid vaccine** which was one of the first vaccines available for use in the UK and around the world during the Covid pandemic, credited with saving a million lives.

