

Living things that reproduce asexually include bacteria, mould, algae and fungi.

This means they reproduce by themselves!

Year 5 Autumn 1st Half Studying Living Things

Can you remember?

All living things can: move, respire, have senses, grow, reproduce, excrete and take in nutrition.

KEY VOCABULARY

Learn these words and their definitions.

Key Word	Definition
Sir David Attenborough	A natural scientist who has made many award-winning nature documentaries
Jane Goodall	A scientist who committed her life to studying the lives of chimpanzees and other primates.
naturalist	An expert in natural sciences and history.
metamorphosis	When insects and animals develop into adult forms through a cycle of changes.
endangered	A species of animal with very few alive.
documentary	A film or programme that researches, studies and provides a factual report on a subject.
asexual	Something that reproduces on its own.
reproduction	To make offspring.

Animals and birth



Most **mammals**, including humans, go through 'live birth.' This means that the mother gives birth to it as a live mammal, it is just a smaller version of an adult. These mammals will grow into adults over time.

Most **birds and reptiles** are born when the mother lays eggs and incubates them until they are ready to hatch. Once the egg is hatched, the baby is looked after by the mother for a period of time, and then leaves the nest to fend for itself.



Amphibians are a bit different. Many of these are born live or via eggs underwater, but complete a metamorphosis as adults and can live and breathe on land. An example of this is a frog. It starts as frogspawn, changes to a tadpole and then into a frog!



metamorphosis

Lesson Sequence



1. Learn about sexual reproduction



2. Learn about asexual reproduction



3. Describe the life cycle of an insect and amphibian



4. Describe the life cycles of a mammal, bird and reptile



5. Know about the life and work of Sir David Attenborough



6. Know about the life and work of Dame Jane Goodall

Sir David Attenborough and Dame Jane Goodall

Both Sir David Attenborough and Dame Jane Goodall are leading **naturalists**, and study living things. They both present the life of animals on earth and have made **important documentaries** so we can learn about the world around us.

Because of their impact on the world, they have both been awarded honours by the Queen!

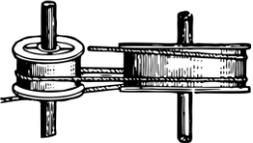


KEY VOCABULARY

Learn these words and their definitions.

Key Word	Definition
Sir Isaac Newton	An English physicist and mathematician, one of the most influential scientists in history.
gravity	A force that attracts something with mass towards earth, measured in Newtons per kilogram.
resistance	A force exerted on something to slow it down or stop it.
lever	A simple machine used to move an object or operate a machine.
gear	Toothed wheel that engages with another to change speed or direction of a machine.
pulley	A wheel which a cord passes through; it helps to raise heavy weights.
mass	The measure of how much matter is in an object.
friction	The force or resistance when one object rubs on another.

Year 5 Autumn 2nd Half Forces

Name	Picture	How it Works	Used For
Lever		Helps to reduce the amount of force needed to move or lift an object, by increasing the distance through which the force acts.	<ul style="list-style-type: none"> • stapler • door handle • claw of hammer • tweezers
Pulley		Helps to reverse the direction of the lifting force, therefore multiplying the force your body produces on the object.	<ul style="list-style-type: none"> • elevator • wells • theatre curtains • bulldozer
Gear		The 'teeth' on the gears turn one another, and in doing so, helps to increase the power of a turning force.	<ul style="list-style-type: none"> • cars • bikes • pendulum clock • vacuums

Lesson Sequence

- 1 • Describe the life and work of Sir Isaac Newton
- 2 • Explore gravity and air resistance
- 3 • Understand water resistance and friction
- 4 • Investigate mechanisms – levers and pulleys
- 5 • Investigate mechanisms - gears
- 6 • Predict if an object will float or sink

There are three additional lessons about Newton's laws of motion also available.

Sir Isaac Newton (1643-1726)

- Explained the three laws of motion
- Explained the theory of gravity, including gravitational pull of the Earth.
- Invented the reflecting telescope
- His physics book 'Principia' contained many theories of physics

Can you resist me?

Air resistance, otherwise known as **drag**, is the way air opposes the direction an object is travelling in and slows it down. A good example of this is a **parachute**, the large surface area **absorbs** the air resistance, and slows down the descent of the parachutist.



Water resistance is the way water slows down the speed of the item travelling through it. This is why high-speed boats have a narrow front end, so that they can easily glide through it.

Friction occurs when two surfaces rub against each other. The rougher the surface, the more friction is caused. For example, sand and carpet have lots of friction.



Natural resources which are used in every day life include: water, air, trees and plants, and cotton.

Year 5 Spring 1st Half Properties of Materials

Some insulating materials found in our houses include fibre glass loft insulation, cavity wall filler and double-glazed windows.

KEY VOCABULARY

Learn these words and their definitions.

Key Word	Definition
comparative test	Undertaking a test with a controlled variable to help answer questions.
elasticity	The ability of a material to resume its normal shape after being stretched or compressed.
plasticity	The ability for a material to be easily shaped or moulded.
crude oil	A natural oil formed by carbon deposits and organic materials.
perforate	To pierce or puncture something.
extraction	To remove something from its natural setting.
thermal conductivity	The ability of a material or substance to conduct or transfer heat.
inexhaustible	Something unable to be used completely because there's too much of it to be all used up.

Ways to test materials

Hardness

How resistant a material is to scratching and pressure.
Hard materials: hardwood, metal, plastics



Strength

The amount of force needed to break a material.
Strong materials: many metals and woods.



Elasticity

Ability of a material to turn to its original shape after the force is removed
Elastic materials: rubber bands, metal coil springs



Plasticity

Ability to retain the new shape when the force is removed.
Example materials: plasticine, clay.



Absorbency

Ability of a material to soak up liquid.
Absorbent materials: sponge, cotton wool, towel.



Waterproof

Resistant and repellent to a liquid
Waterproof materials: Many rubbers and plastics



Lesson Sequence

1

• Describe the properties of different materials

2

• Compare the uses of materials based on their properties

3

• Explore extracting useful substance from natural resources

4

• Explore the thermal conductivity of materials to improve energy efficiency

5

• Explore the work of Spencer Silver and Ruth Benerito

6

• Understand the mixture needed to make the perfect sandcastle

crude oil

Formed by the heating and compression of organic materials (plants, animals) over millions of years - such as algae or zooplankton.

Extracted by oil companies by drilling into the seabed and brining it up through intense pressure, and stored in containers.

Used to help make many plastic products and everyday items, meaning it is useful. However, can also be bad for environment.



Water is an example of a **chemical compound** - when two or more elements join together to form molecules.

Water is 2 Hydrogen (H) atoms + 1 Oxygen (O) atom = **H₂O**

Year 5 Spring 2nd Half Changes of Materials

A '**mixture**' in a scientific sense, can always be broken down into its component parts.

KEY VOCABULARY

Learn these words and their definitions.

Key Word	Definition
separate	To split or divide a substance into its distinct elements
solution	A mixture of two substances, the solute and the solvent
solute	A substance that is dissolved in liquid.
solvent	A substance that dissolves a solute, such as water.
irreversible	Impossible to change back to a previous condition or state.
compound	A substance formed when two or more chemical elements are bonded together.
physical change	A change in material in which no new substances are formed
chemical change	A change that results in the creation of few chemical substances.

5 ways to compare a **physical** and **chemical** change.

Property	Physical Change	Chemical Change
Explanation	Molecules are rearranged but the actual type of molecules stay the same.	The type and make-up of the molecules is changed and a new substance is formed.
Change	A temporary change that is easily reversed, and no new substance is formed.	A permanent change that is irreversible, with a new substance always being formed.
Energy	No energy is produced, and very little or no energy is absorbed.	Energy is produced, in the form of light or heat (for example) and energy is also absorbed.
Effects	Only has an effect on physical properties of a substance or object i.e. shape, size.	Changes both physical and chemical properties of a substance or object.
Examples	Freezing or boiling water, melting wax	Burning wood, eating food, rusting of metal.

Lesson Sequence

1

• Understand the actions of filtering, sieving and evaporating

2

• Discover how to dissolve something in a solution

3

• Understand that some changes are not reversible

4

• Explore permanent chemical change

5

• Know the difference between physical and chemical change

6

• Know the difference between elements, compounds and mixtures

Filtering



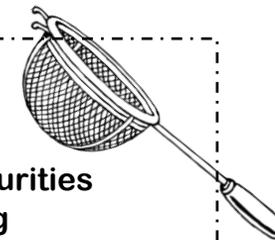
- Brewing coffee
- Cleaning a swimming pool
- Vacuum Cleaning

Evaporating



- Body sweat
- The water cycle
- Salt / crystal extraction

Sieving



- Removing impurities during cooking
- Sieving sand during building
- Mining for minerals

Separation Techniques

It takes the Earth 365.25 days to orbit the sun, which is why every four years we have a leap year of 366 days, to catch up with the orbit!

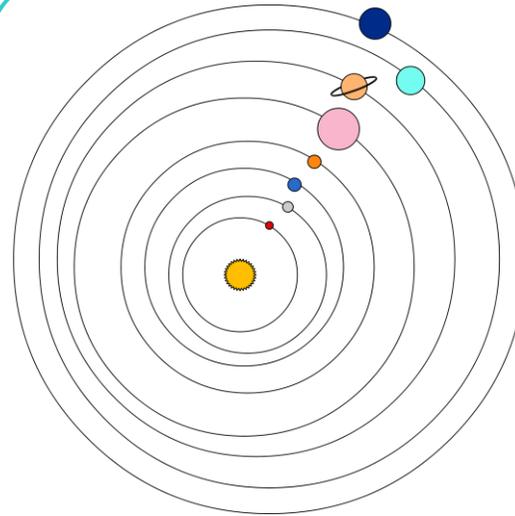
Year 5 Summer 1st Half Earth and Space

The Earth takes 24 hours to spin on its axis and complete one rotation, which is why our days are 24 hours long.

KEY VOCABULARY

Learn these words and their definitions.

Key Word	Definition
heliocentric	The modern model of the solar system, which places the sun at the centre.
geocentric	The old solar system model, which thought the Earth was at the centre.
solar system	The name for the sun and all the planets, asteroids, meteors and comets that orbit it.
astronomy	The study of space, planets and the universe as a whole.
Big Bang Theory	The most widely accepted scientific theory of how the Universe was made.
gravitational force	The force that causes two particles to pull towards each other.
orbit	The path of one celestial object around another i.e. the Moon around the Earth.
hemisphere	On Earth, there are two of these – the North and South, separated by the equator.



FROM THE SUN OUTWARDS:

Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune

This diagram is a good, simple way to remember the order of the planets and also to understand **planetary motion** and the way the planets **orbit** the sun. **Copernicus** developed the **heliocentric** theory that the sun was at the centre of the **solar system**. However, the **ellipses-shaped orbit** was an idea that was discovered by **Johannes Kepler** in the 17th century.

Lesson Sequence

1

• Describe Nicolaus Copernicus' ideas about planetary motion

2

• Describe the movement of Earth in space

3

• Learn about the planets in our solar system

4

• Describe the Big Bang Theory

5

• Learn about gravitational force

6

• Learn about comets, asteroids and meteors

gravitational force

We are constantly attracted to the Earth by its gravitational force. The reason the Moon doesn't fall to Earth because of gravity is because it constantly moves around us. Without the Earth's gravity, it would float away into space.

Comets, asteroids, and meteors

Comets are chunks of ice and rock with tails that orbit a long way around the Sun. Asteroids are chunks of rock and metal that orbit more closely to the Sun. Meteors are fragments of Asteroids that fly into the Earth's atmosphere and catch fire, leaving a bright streak in the sky.

During puberty, we can expect to grow, for hair to grow on our bodies and for genitalia to grow. It can also affect our mood due to hormonal changes.

Year 5 Summer 2nd Half Reproduction, Gestation and Growth

In old age, we can expect degeneration – for example: eyesight and hearing declines, we may get grey hair and our memories fade.

KEY VOCABULARY

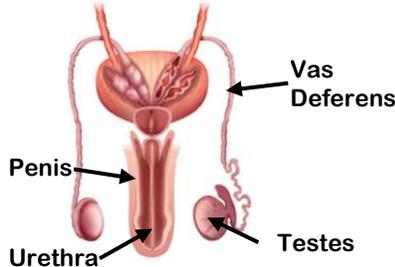
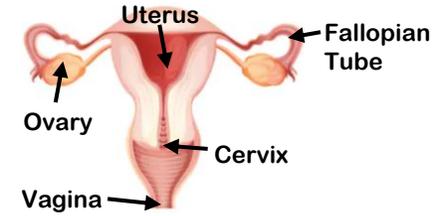
Learn these words and their definitions.

Key Word	Definition
reproduce	A make again or make a copy – to create new life.
puberty	The period of life when a person's sexual organs mature and other body changes take place.
adolescence	The period after puberty when a person develops from a child in to an adult.
hormone	A natural substance produced in the body that influences how we grow.
memory	How the mind stores and remembers information.
dormant	Not active or growing but having the ability to be active again in the future
gestation	The period of time and process between fertilisation and the birth of offspring.
fertilisation	When a sperm and egg join together to start a new life.

Reproductive Organs and Cells

Female Reproductive System

The female reproductive organs are designed to enable fertilisation and birth. Each month, a female releases an egg from her **ovary**, which travels down the **fallopian tube** towards the **uterus**. If it meets a male sperm and fertilises, the baby is grown inside the uterus. The entrance of the **vagina** is able to widen, which allows the new-born baby to emerge.

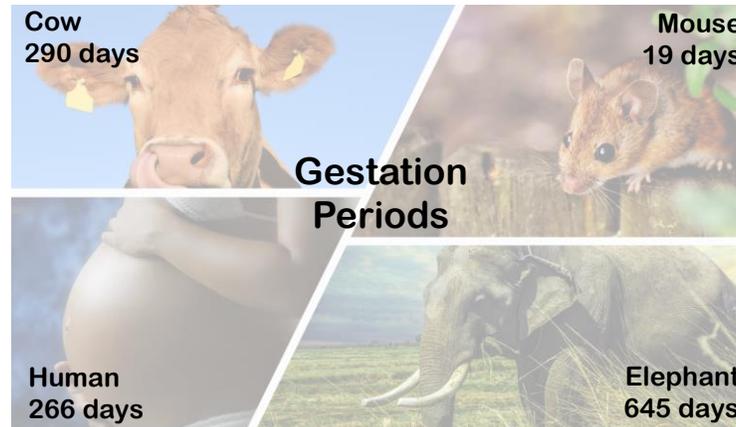


Male Reproductive System

The male reproductive system works by the **testes** producing and storing millions of tiny **sperm cells**. During sexual intercourse, the sperm travels through the **vas deferens** in a fluid called semen and into the **urethra**. During ejaculation, millions of sperm cells are released from the **penis** and one can fertilise a female egg – the start of making a baby.

Fertilisation

This is the point when the **sperm** and **egg cell** meet inside the female. When a male **ejaculates**, millions of sperm swim to meet the egg. Many of these are killed or destroyed, but a survivor will penetrate the egg. The sperm and the egg each contain 23 **chromosomes**; once these cells have fused together, a **zygote** is formed, which contains the 46 chromosomes which make up a human being.



Lesson Sequence



1. Know about life cycles



2. Explore gestation periods



3. Explore how propagation is used to grow plants



4. Describe the changes you go through from birth



5. Understand changes which happen in adolescence



6. Describe the changes as humans develop to old age

Death
Old Age
Adult
Adolescence
Childhood
Baby & Toddler
Birth

Stages of Life

