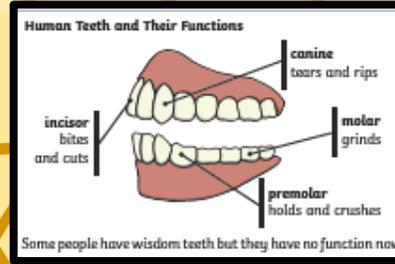


Science Knowledge Organiser – Year 4 Biology: Animals including humans

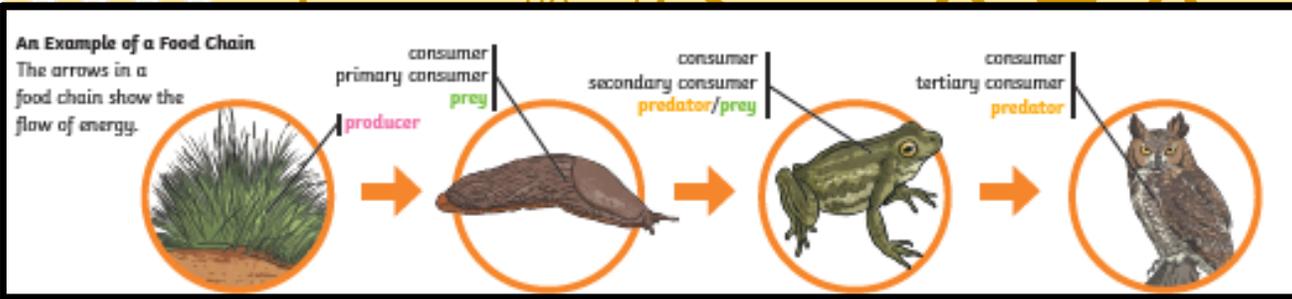
Previous knowledge.

- To be able to identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- To be able to identify that humans and some other animals have skeletons and muscles for support, protection and movement



What I will learn in this unit.

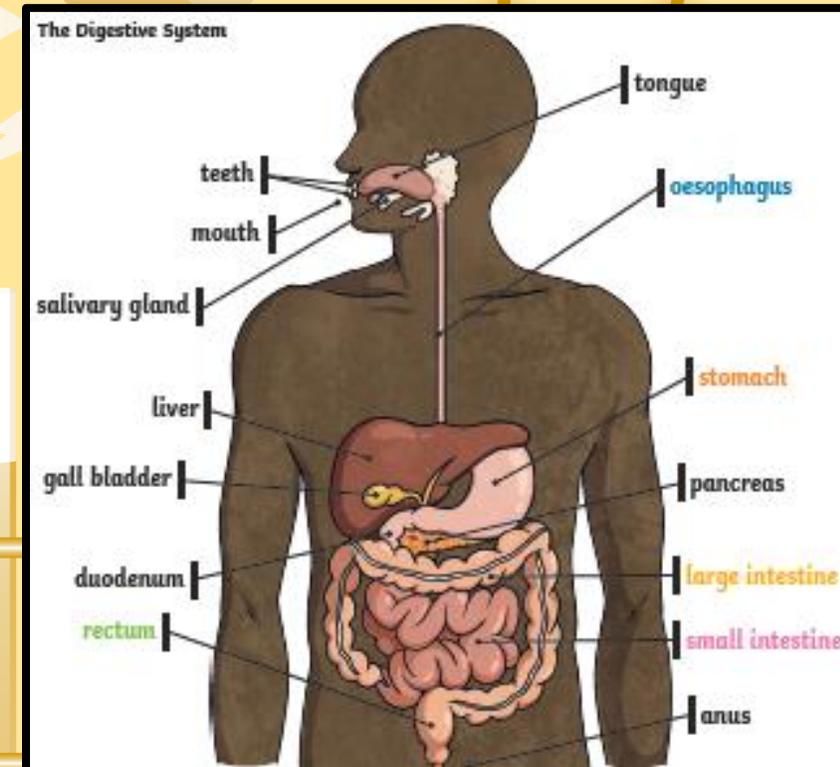
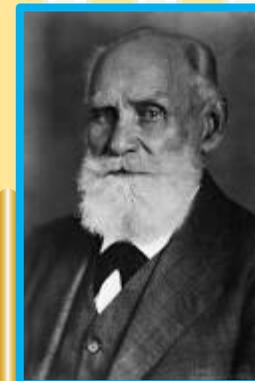
- To be able to describe the simple functions of the basic parts of the digestive system in humans
- To be able to identify the different types of teeth in humans and their simple functions
- To be able to construct and interpret a variety of food chains, identifying producers, predators and prey



Word	Definition
organ	A part of the body which has a vital function
saliva	watery liquid secreted into the mouth by glands, providing lubrication for chewing and swallowing, and aiding digestion
nutrients	Food that is eaten to survive
bloodstream	How blood circulates through the body
digest	Break down food so it can be used by the body
undigested	Food that it not broken down in the body
primary consumer	An animal that eats a producer
producer	An organism that produces its own food
secondary consumer	An animal that eats a primary consumer

Scientist study: Ivan Pavlov (1849 - Russia)

Ivan Pavlov developed an experiment testing the concept of the conditioned reflex. He trained a hungry dog to salivate at the sound of a metronome or buzzer, which was previously associated with the sight of food. This aided humans in understanding the digestion system.



Previous knowledge.

- To be able to explore and compare the differences between things that are living, dead, and things that have never been alive
- To be able to identify that most living things live in habitats to which they are suited
- To be able to understand how animals and their habitats depend on each other
- To be able to identify and name a variety of plants and animals in their habitats

Science Knowledge Organiser – Year 4 Biology: Living things and their habitats

Life Processes

To stay alive and healthy, all living things need certain conditions that let them carry out the seven **life processes**:

- Movement
- Respiration
- Sensitivity
- Growth
- Reproduction
- Excretion
- Nutrition

What I will learn in this unit.

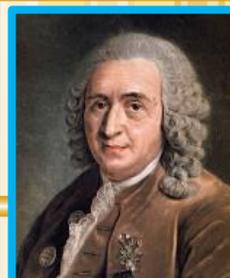
- To be able to recognise that living things can be grouped in a variety of ways
- To be able to explore and use classification keys to help group, identify and name a variety of living things
- To be able to recognise that environments can change and that this can sometimes pose dangers to living things.

Changes to an **environment** can be natural or caused by humans. Changes to an **environment** can have positive as well as negative effects. Here are some examples of things that can change an **environment**.

- | | | | |
|----------------|---|-------------------|--|
| Natural | <ul style="list-style-type: none"> • earthquakes • storms • floods • droughts • wildfires • the seasons | Human-Made | <ul style="list-style-type: none"> • deforestation • pollution • urbanisation • the introduction of new animal or plant species to an environment • creating new nature reserves |
|----------------|---|-------------------|--|

Plants and animals rely on the **environment** to give them everything they need. Therefore, when **habitats** change, it can be very dangerous to the plants and animals that live there.

Word	Definition
organism	This means 'living thing'
conservation	prevention of wasteful use of a resource
characteristics	The distinguishing features or qualities that are specific to a species
environment	An environment contains habitats and these include living and non-living things
species	A type/sort of living thing
kingdoms	Living things are divided into five different categories' depending on their characteristics
specimen	A particular plant or animals that sciences study to find out more about its species
classification	A way to sort or group things by their properties or features
extinct	When a species has no more members alive on the planet
endangered species	A plant or animals where there are not many of the species left and there is concern they may become extinct



Scientist study: George Cuvier (1769 - France)

All things must pass. But the idea that a species could go extinct is a relatively new one, first proposed by anatomist **Georges Cuvier** in Paris in 1796. He developed his **theory of catastrophes**. Accordingly, fossils show that animal and plant species are destroyed time and again by deluges and other natural cataclysms, and that new species evolve only after that.

Animals can be grouped in lots of different ways based upon their **characteristics**.

vertebrates

mammals fish birds reptiles amphibians

invertebrates

insects spiders worms slugs and snails

Vertebrates can be separated into five broad groups.

You can use **classification** keys to help group, identify and name a variety of living things. Here is an example of a **classification key**:

Invertebrate Classification Key

```

graph TD
    Q1[Does it have legs?] -- yes --> Q2[How many legs does it have?]
    Q1 -- no --> Q3[Does it have a segmented body?]
    
    Q2 -- many legs --> W[woodlouse]
    Q2 -- 8 legs --> Q4[Does it have an oval body?]
    Q2 -- 6 legs --> Q5[Does it have wing cases?]
    
    Q4 -- yes --> M[millipede]
    Q4 -- no --> C[centipede]
    
    Q5 -- yes --> H[harvestman]
    Q5 -- no --> Q6[Does it have pincers on its tail?]
    
    Q6 -- yes --> E[earwig]
    Q6 -- no --> B[beetle]
    
    Q3 -- yes --> Q7[Does it have a long, thin body?]
    Q3 -- no --> Q8[Does it have a shell?]
    
    Q7 -- yes --> EW[earthworm]
    Q7 -- no --> Q9[Does it have a long, thin body?]
    
    Q9 -- yes --> CAT[caterpillar]
    Q9 -- no --> ANT[ant]
    
    Q8 -- yes --> L[larvae]
    Q8 -- no --> S[snail]
    
    Q8 -- no --> SL[slug]
  
```

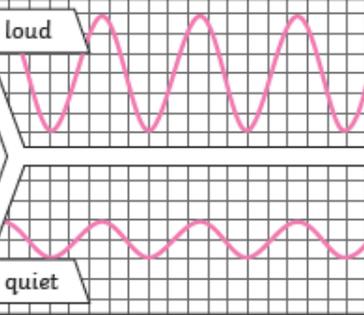
Sound is a type of energy. Sounds are created by **vibrations**. The louder the sound, the bigger the **vibration**.



What I will learn in this unit.

- To be able to identify how sounds are made, associating some of them with something vibrating
- To be able to recognise that vibrations from sounds, travel through a medium to the ear
- To be able to find patterns between the pitch of a sound and features of the object that produced it
- To be able to find patterns between the volume of a sound and the strength of the vibrations that produced it
- To be able to recognise that sounds get fainter as the distance from the sound source increases

The size of the **vibration** is called the **amplitude**. Louder sounds have a larger **amplitude**, and quieter sounds have a smaller **amplitude**.



Pitch is a measure of how high or low a sound is. A whistle being blown creates a **high-pitched** sound. A rumble of thunder is an example of a **low-pitched** sound.

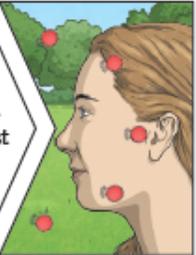


Sound can travel through solids, liquids and gases. Sound travels as a **wave**, **vibrating** the **particles** in the medium it is travelling in. Sound cannot travel through a vacuum.

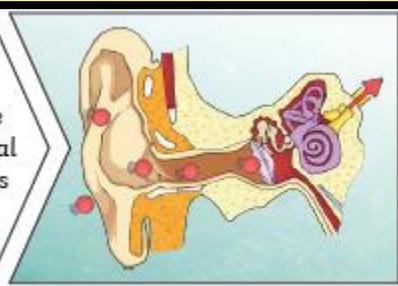
When you hit the drum, the drum skin **vibrates**. This makes the air **particles** closest to the drum start to **vibrate** as well.



The **vibrations** then pass to the next air **particle**, then the next, then the next. This carries on until the air **particles** closest to your ear **vibrate**, passing the **vibrations** into your **ear**.

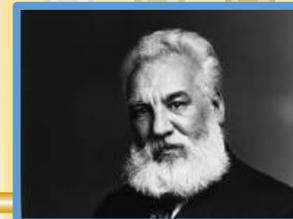


Inside your **ear**, the **vibrations** hit the **eardrum** and are then passed to the middle and then the inner **ear**. They are then changed into electrical signals and sent to your brain. Your brain tells you that you are hearing a sound.



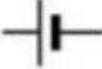
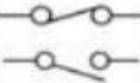
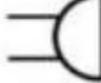
Scientist study: Alexander Graham-Bell (1847 - Scotland)

Alexander Graham Bell was a Scottish-born inventor, scientist and engineer who is credited with patenting the first practical telephone. He also co-founded the American Telephone and Telegraph Company in 1885



Word	Definition
vibration	A movement backward and forwards
pitch	How high or low a sound
sound wave	Vibrations travelling from a sound source
volume	The loudness of a sound
amplitude	The size of a vibration
soundproof	To prevent sound from passing
absorb sound	To take in sound energy
vacuum	A space where there is nothing
eardrum	A part of the ear which is a thin tough layer of skin. Sound waves make the ear drum vibrate

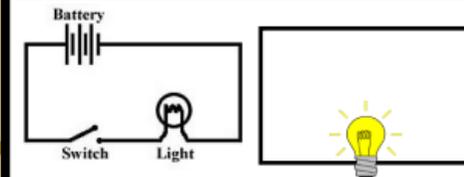
Some components of an electric circuit

	Wire	cell	switch	buzzer	lamp
Circuit Diagram					
Picture					

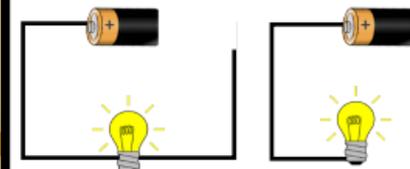
What I will learn in this unit.

- To be able to identify common appliances that run on electricity
- To be able to construct a simple series electrical circuit, identifying and naming its basic parts
- To be able to identify whether or not a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery
- To be able to recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- To be able to recognise some common conductors and insulators, and associated metals with being good conductors

Diagrams



These are complete **circuits** - they have a **battery (cell)** and a **component (bulb)**.
The **wires** are placed in the right places of the **battery** for the **circuit** to work.



These **circuits** will not work as they are incomplete.

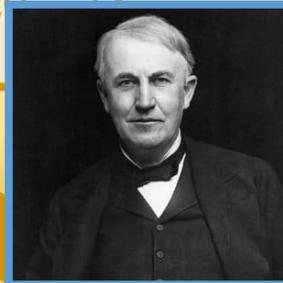
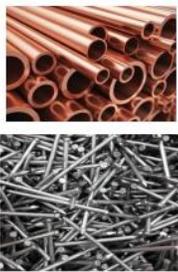
- Some **appliances** use **batteries** and some use **mains electricity**.
- **Batteries** come in different sizes depending on how much and for how long the **appliance** is used.
- Common **appliances** that use **electricity**.



Switches can be used to open or close a **circuit**. When off, a switch 'breaks' the **circuit** to stop the flow of **electricity**. When on, a switch 'completes' the circuit and allows the **electricity** to flow.



Some materials let electricity pass through them easily. These are known as **conductors**. Many metals are good electrical conductors such as copper, iron and steel.



Scientist study: Thomas Edison (1847 - America)

Thomas Alva Edison was a famous **American inventor**. He is best known for inventing 'domestic' lightbulbs to go in houses, and the electric power system that allows them to work. He came up with over 1000 successful inventions in his lifetime.

Some materials do **not** let electricity pass through them. These materials are known as **insulators**. Plastic, wood, glass and rubber are good electrical insulators.



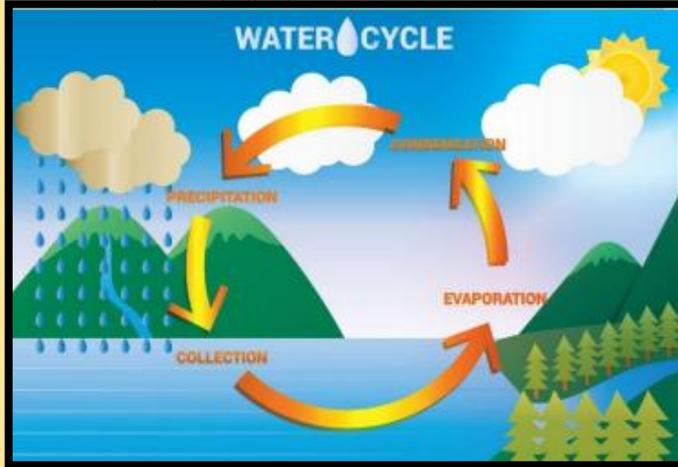
Word	Definition
components	The parts that something is made of
voltage	A collection of cells
batteries	Small device that provides power for some electrical items
cell	Converts energy to electricity
circuit	A complete route which an electric current can flow around
current	A flow of electricity through a wire or circuit
short circuit	An electrical circuit in a device of lower resistance
resistance	A measure of its opposition to the flow of electric current
conductor	A substance that heat or electricity can pass through
insulate	A non-conductor of electricity or heat

Previous knowledge.

- Identify and compare the suitability of a variety of everyday materials, for particular uses.

Science Knowledge Organiser – Year 4

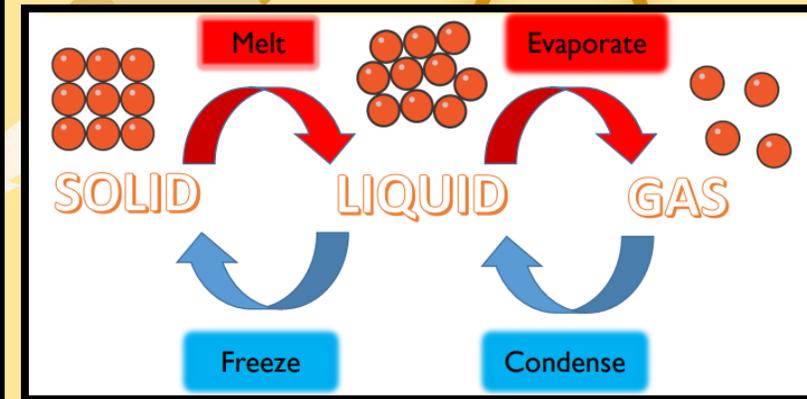
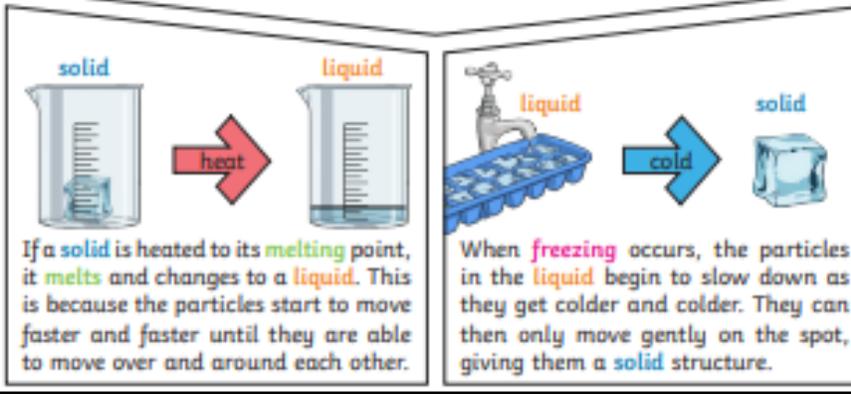
Chemistry: State of matter



20

Solid	Liquid	Gas
		
Particles in a solid are close together and cannot move. They can only vibrate.	Particles in a liquid are close together but can move around each other easily.	Particles in a gas are spread out and can move around very quickly in all directions.

When water and other **liquids** reach a certain temperature, they change state into a **solid** or a **gas**. The temperatures that these changes happen at are called the boiling, **melting** or **freezing** point.



Scientist study: Anders Celsius (1701 - Sweden)

Anders Celsius (1701-1744) was a Swedish astronomer who created a **temperature scale**, divided into small parts called degrees. In his scale, Celsius set the point at which water freezes as 100 degrees Celsius (100°C) and the point at which it boils at 0°C.

Word	Definition
States of matter	Materials that can be one of three states, solid, liquid, gas.
solid	A substance which has a fixed shape and volume
liquid	A substance that flows freely but is of a consistent volume
gases	A substance which expands freely to fill a whole container. It has no fixed shape or volume
precipitation	Liquid or solid particles that fall from a cloud
evaporation	Turn a liquid into a gas
condensation	Turn a gas into a liquid
particles	A tiny amount of something, you can't see them with your eyes