

# Year 4 Knowledge Organisers

Science

# Year 4

# Electricity

## Key vocabulary

|                      |   |
|----------------------|---|
| <b>electricity</b>   | The flow of an electric current or charge through a material, e.g. from a power source through wires to an appliance.   |
| <b>generate</b>      | To make or produce.   |
| <b>renewable</b>     | A source of electricity that will not run out. These include solar, nuclear, geothermal, hydro and wind.  |
| <b>non-renewable</b> | This source of energy will eventually run out and so will no longer be able to be used to make electricity. These include fossil fuels – coal, oil and natural gas. |
| <b>appliances</b>    | A piece of equipment or device designed to perform a particular job, such as a washing machine or mobile phone.   |
| <b>battery</b>       | A device that stores electrical energy as a chemical.   |
| <b>electricity</b>   | The flow of an electric current or charge through a material, e.g. from a power source through wires to an appliance.   |

Lightning and static **electricity** are examples of **electricity** occurring naturally but for us to use **electricity** to power **appliances**, we need to make it.



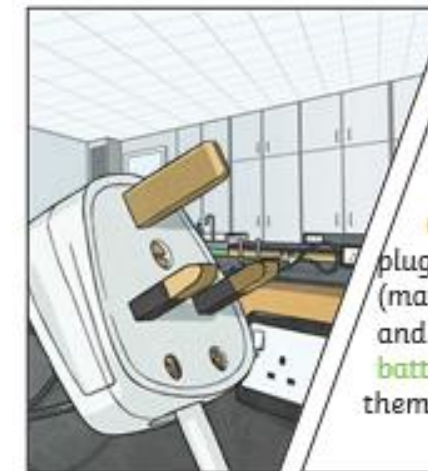
Coal, oil and natural gases are fossil fuels which, when burnt, produce heat which can be used to **generate electricity**.

**Electricity** can be **generated** from wind power used to turn windmills and hydroelectric power from water used in dams.

The Sun's rays can be converted into **electricity** by solar panels.



Nuclear energy is created when atoms are split. This creates heat which can be used to **generate electricity**. Geothermal energy is heat from the Earth that is converted into **electricity**.



Many everyday **appliances** rely on **electricity** for them to work. Some **appliances** need to be plugged into a socket (mains **electricity**) and others have a **battery** to make them work.



# Year 4

# Electricity

## Key vocabulary

### circuit

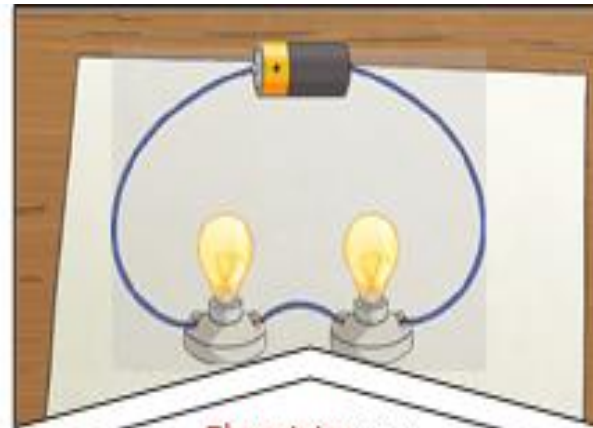
A pathway that electricity can flow around. It includes wires and a power supply and may include bulbs, switches or buzzers.

There are two types of electric current.

**Mains electricity:** power stations send an electric charge through wires to transformers and pylons. Then, underground wires carry the electricity into our homes via wires in the walls and out through plug sockets.



**Battery electricity:** batteries store chemicals which produce an electric current. Eventually, even rechargeable batteries will stop producing an electric current.



Electricity can only flow around a complete **circuit** that has no gaps. There must be wires connected to both the positive and negative end of the power supply/**battery**.

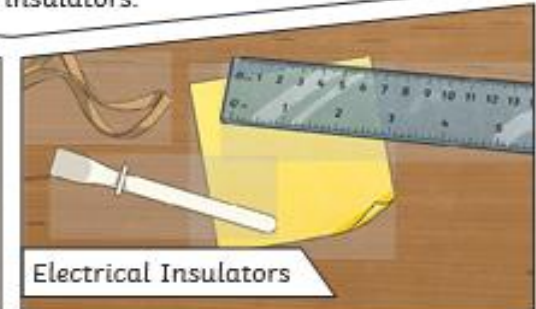
Switches can be used to open or close the **circuit**. When off, a switch 'breaks' the **circuit** to stop the flow of **electrons**. When the switch is on, the **circuit** is complete and the **electrons** are able to flow around the **circuit**.



A conductor of **electricity** is a material that is made up of free **electrons** which can be made to move in one direction, creating an electric current. Metals are good conductors. Electrical insulators have no free **electrons** and so no electric current can be made. Wood, plastic and glass are good insulators.



Electrical Conductors



Electrical Insulators

# Year 4

# Animals Including Humans

## Key vocabulary

### Digest

Break down food so it can be used by the body.

### Oesophagus

A muscular tube which moves food from the mouth to the stomach.

### Stomach

An organ in the digestive system where food is broken down with stomach acid and by being churned around.

### Small intestine

Part of the intestine where nutrients are absorbed into the body.

### Large intestine

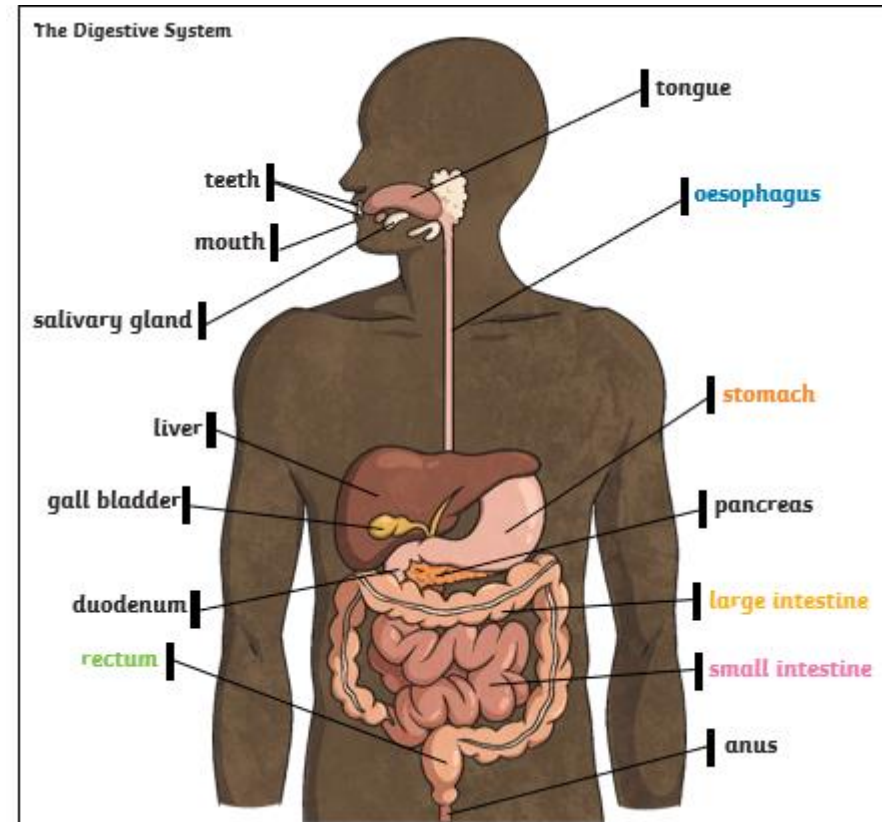
Part of the intestine where water is absorbed from remaining waste food. Stools are formed in the large intestine

### Rectum

Part of the digestive system where stools are stored before leaving the body through the anus.

### Salivary gland

Can be found in the mouth and helps to break down the food.

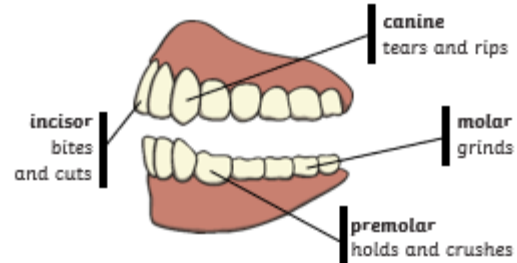




# Year 4

# Animals Including Humans

## Human Teeth and Their Functions



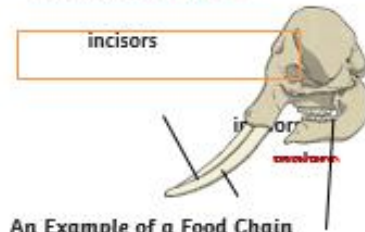
Some people have wisdom teeth but they have no function now.

## To help prevent tooth decay:

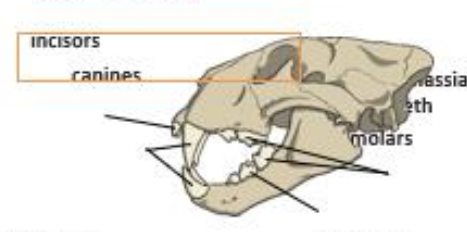
- limit sugary food and drink;
- brush teeth twice daily using a fluoride toothpaste;
- visit your dentist regularly.

The teeth of an animal are designed to eat different foods depending on the diet of the animal. Examples of a **herbivore**, a **carnivore** and an **omnivore** skull:

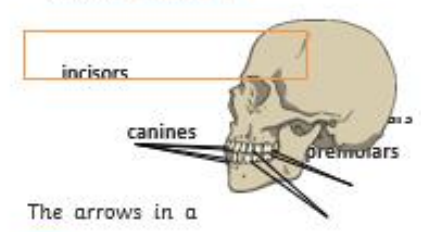
### Elephant - **herbivore**



### Lion - **carnivore**

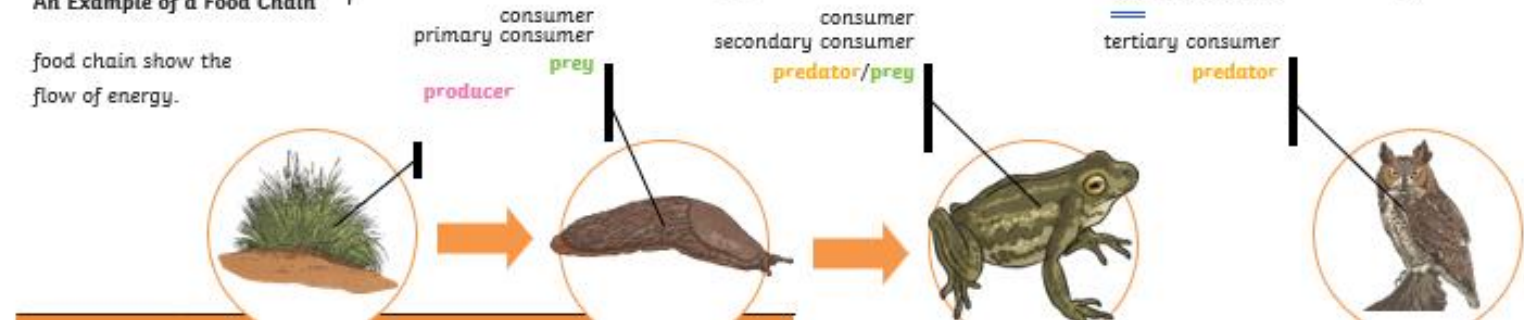


### Human - **omnivore**



## An Example of a Food Chain

food chain show the flow of energy.



**herbivore**

An animal that eats plants.

**carnivore**

An animal that feeds on other animals.

**omnivore**

An animal that eats plants and animals.

**producer**

A plant that produces its own food.

**predator**

An animal that hunts and eats other animals.

**prey**

An animal that gets hunted and eaten by another animal.

# Year 4

# 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**:

**M**ovement  
**R**espiration  
**S**ensitivity

**G**rowth  
**R**eproduction  
**E**xcretion  
**N**utrition

|                           |  |
|---------------------------|--|
| <b>organisms</b>          | This is another word that can be used to mean 'living things'.   |
| <b>life processes</b>     | The things living things do to stay alive.   |
| <b>respiration</b>        | A process where plants and animals use oxygen gas from the air to help turn their food into energy.  |
| <b>sensitivity</b>        | The way living things react to changes in their <b>environment</b> .   |
| <b>reproduction</b>       | The process through which young are produced.  |
| <b>excretion</b>          | The process by which living things get rid of waste products.  |
| <b>nutrition</b>          | Food which provides living things with energy to live and stay healthy.  |
| <b>habitat</b>            | The specific area or place in which particular animals or plants may live.   |
| <b>environment</b>        | An <b>environment</b> contains many <b>habitats</b> and these include areas where there are both living and non-living things.             |
| <b>endangered species</b> | A plant or animal where there are not many of their species left and scientists are concerned that the species may become <b>extinct</b> . |
| <b>extinct</b>            | When a species has no more members alive on the planet, it is <b>extinct</b> .   |

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*

- earthquakes
- storms
- floods
- droughts
- wildfires
- the seasons

*Human-Made*

- deforestation
- pollution
- urbanisation
- the introduction of new animal or plant species to an environment
- wildfires

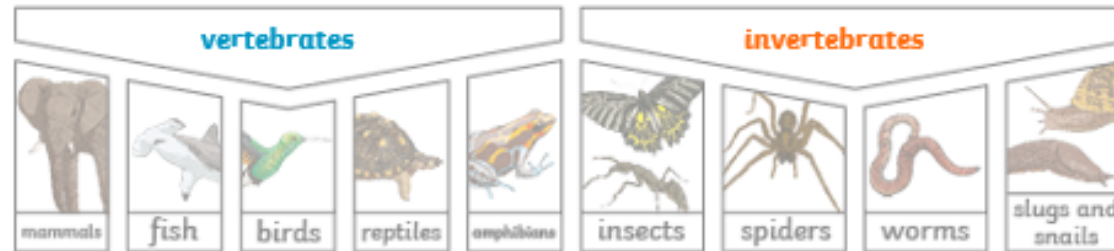
Plants and animals rely on the **environment** to give them everything they need. Therefore, when **habitats** change, it can be very dangerous to the plants and animals that live there.

| Key Vocabulary         |  |
|------------------------|--|
| <b>classification</b>  | This is where plants or animals are placed into groups according to their similarities |
| <b>vertebrates</b>     | Animals with a backbone.   |
| <b>invertebrates</b>   | Animals without a backbone.  |
| <b>specimen</b>        | A particular plant or animal that scientists study to find out about its species.      |
| <b>characteristics</b> | The distinguishing features or qualities that are specific to a species.               |

Plants can be sorted into many different groups. For example:



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



**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:

You could sort **invertebrates** you might see around school in different ways, such as in this example. The vast majority of living things on the planet are **invertebrates**.

## Invertebrate Classification Key





# Year 4

# Sound

## Key vocabulary

|                   |   |
|-------------------|---|
| <b>vibration</b>  | A movement backwards and forwards.                            |
| <b>sound wave</b> | Vibrations travelling from a sound source.                    |
| <b>volume</b>     | The loudness of a sound.                                      |
| <b>amplitude</b>  | The size of a vibration. A larger amplitude = a louder sound. |
| <b>pitch</b>      | How low or high a sound is.                                   |

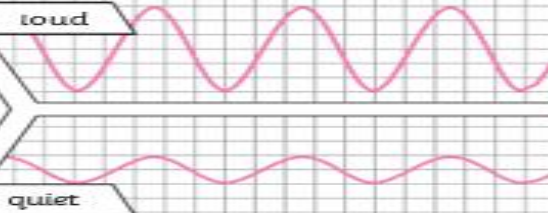
Sound is a type of energy. Sounds are created by **vibrations**. The louder the sound, the bigger the **vibration**.



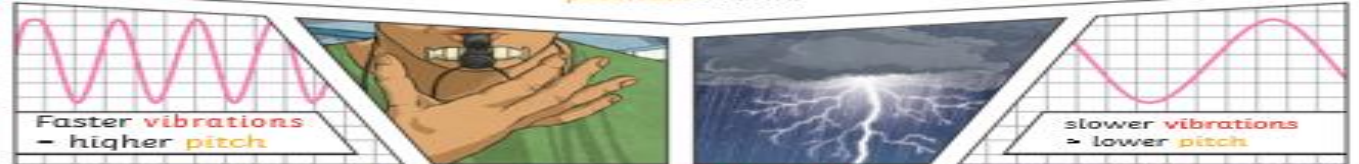
**Pitch** is a measure of how high or low a sound is. A whistle being blown creates a high-pitched sound. A rumble of thunder is an example of a low-pitched sound.



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.



You can change the **pitch** of a sound in different ways depending on the type of instrument you are playing.

For example, if you are playing a xylophone, striking the smaller bars with the beater causes faster **vibrations** and so a higher **pitched** note. Striking the larger bars **causes** slower **vibrations** and produces a lower note.





# Year 4

# Sound

## Key vocabulary

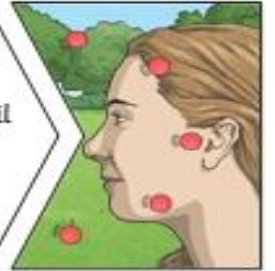
|              |  |
|--------------|--|
| ear          | An organ used for hearing.   |
| particles    | Solids, liquids and gases are made of particles. They are so small we are unable to see them.  |
| distance     | A measurement of length between two points.  |
| soundproof   | To prevent sound from passing.   |
| absorb sound | To take in sound energy. Absorbent materials have the effect of muffling sound.  |
| vacuum       | A space where there is nothing. There are no particles in a vacuum.  |
| eardrum      | A part of the ear which is a thin, tough layer of tissue that is stretched out like a drum skin. It separates the outer ear from the middle and inner ear. Sound waves make the eardrum vibrate. |

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.

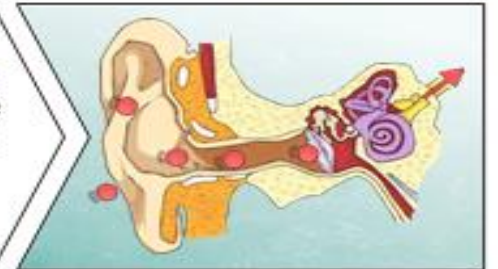
When you hit the drum, the drum skin **vibrates**. This makes the air **particles** closest to the drum start to **vibrate** as well.



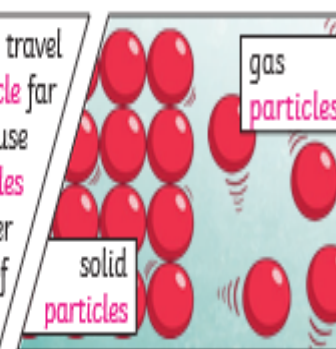
The **vibrations** then pass to the next air **particle**, then the next, then the next. This carries on until the air **particles** closest to your ear **vibrate**, passing the **vibrations** into your **ear**.



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.



Sound energy can travel from **particle** to **particle** far easier in a solid because the **vibrating particles** are closer together than in other states of matter.



If you throw a stone in a pond, it will produce ripples. As the ripples spread out across the pond, they become smaller. When sound **vibrations** spread out over a **distance**, the sound becomes quieter, just like ripples in a pond.



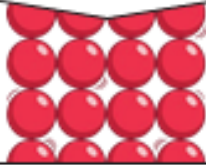
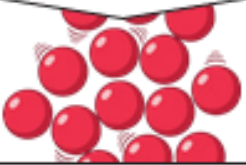
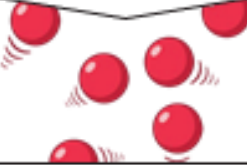
# Year 4

# States of Matter

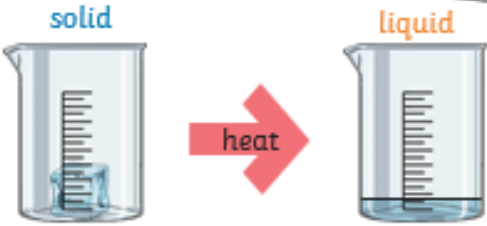
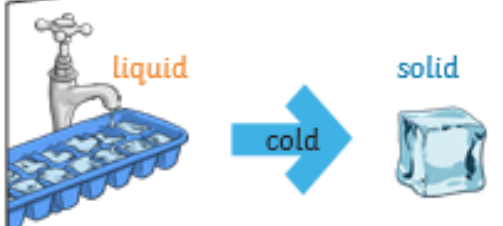
## Key vocabulary

|                         |   |
|-------------------------|---|
| <b>states of matter</b> | Materials can be one of three states: solids, liquids or gases. Some materials can change from one state to another and back again.   |
| <b>solids</b>           | These are materials that keep their shape unless a force is applied to them. They can be hard, soft or even squashy. Solids take up the same amount of space no matter what has happened to them. |
| <b>liquids</b>          | Liquids take the shape of their container. They can change shape but do not change the amount of space they take up. They can flow or be poured.  |
| <b>gases</b>            | Gases can spread out to completely fill the container or room they are in. They do not have any fixed shape but they do have a mass.  |
| <b>water vapour</b>     | This is water that takes the form of a gas. When water is boiled, it evaporates into a water vapour.  |

There are three states of matter.

| Solid  | Liquid   | Gas  |
|--|--|--|
|     |     |           |
| Particles in a <b>solid</b> are close together and cannot move. They can only vibrate. | Particles in a <b>liquid</b> are close together but can move around each other easily. | Particles in a <b>gas</b> 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.

|   |   |
|---|---|
|   |   |
| If a <b>solid</b> is heated to its <b>melting</b> point, it <b>melts</b> and changes to a <b>liquid</b> . This is because the particles start to move faster and faster until they are able to move over and around each other. | When <b>freezing</b> occurs, the particles in the <b>liquid</b> begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a <b>solid</b> structure. |

# Year 4

# States of Matter

## Key vocabulary

|                      |  |
|----------------------|--|
| <b>melt</b>          | This is when a solid changes to a liquid.                                      |
| <b>freeze</b>        | Liquid turns to a solid during the freezing process.                           |
| <b>evaporate</b>     | Turn a liquid into a gas.  |
| <b>condense</b>      | Turn a gas into a liquid.  |
| <b>precipitation</b> | Liquid or solid particles that fall from a cloud as rain, sleet, hail or snow. |

### Evaporation



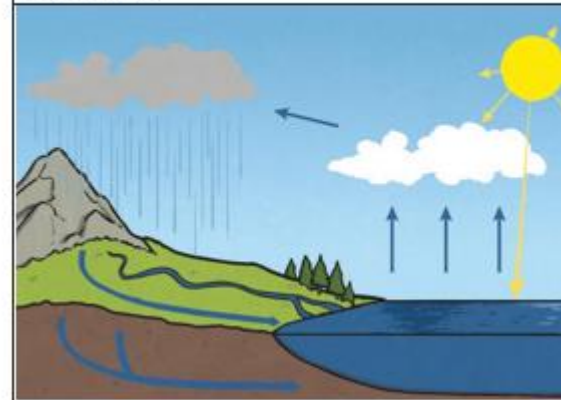
Evaporation occurs when water turns into **water vapour**. This happens very quickly when the water is hot, like in a kettle, but it can also happen slowly, like a puddle **evaporating** in the warm air.

### Condensation



Condensation is when **water vapour** is cooled down and turns into water. You can see this when droplets of water form on a window. The **water vapour** in the air cools when it touches the cold surface.

Condensation and evaporation occur within the water cycle.



1. Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into **water vapour**.
2. This **water vapour** rises, then cools down to form water droplets in clouds (**condensation**).
3. When the droplets get too heavy, they fall back to the earth as rain, sleet, hail or snow (**precipitation**).