

Materials

Key Knowledge

States of matter

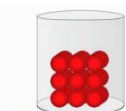
There are three distinct physical forms that matter can take in most environments.

- Solids
- Liquids
- Gases

Properties

All substances have properties that we can use to identify them

Solids



- rigid
- fixed shape
- fixed volume

Solids stay in one place and can be held. Solids keep their shape. They do not flow like liquids. Solids always take up the same amount of space. They do not spread out like gases. Solids can be cut or shaped. Even though they can be poured, sugar, salt and flour are all solids. Each particle of salt, for example, keeps the same shape and **volume**.

Liquids



- not rigid
- no fixed shape
- fixed volume

Liquids can flow or be poured easily. They are not easy to hold. Liquids change their shape depending on the container they are in. Even when liquids change their shape, they always take up the same amount of space. Their volume stays the same.

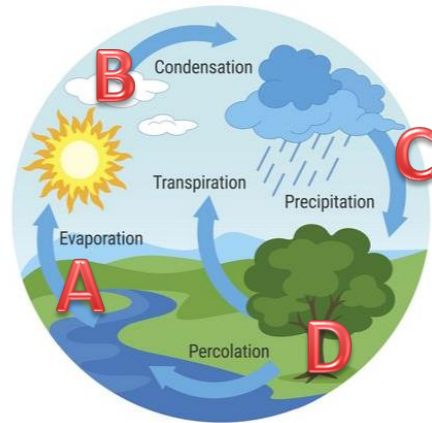
Gases



- not rigid
- no fixed shape
- no fixed volume

Gases are often invisible. Gases do not have a fixed shape. They spread out and change their shape and volume to fill up whatever container they are in. Gases can be squashed.

The Water Cycle



Water on the earth is constantly moving. It is recycled over and over again. This recycling process is called the **water cycle**.

A

Water evaporates into the air

The sun heats up water on land, and in rivers, lakes and seas and turns it into water vapour. This water vapour rises into the air.

B

Water vapour condenses into clouds

Water vapour in the air cools down and changes back into tiny drops of liquid water forming clouds.

C

Water falls as rain

The clouds get heavy and water falls back to the earth in the form of rain or snow.

D

Water returns to the sea

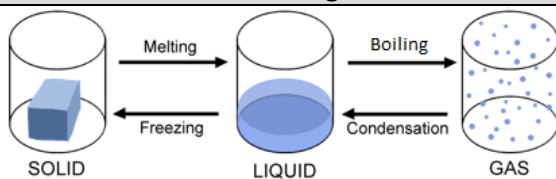
Rain water runs over the land and collects in lakes or rivers, which take it back to the sea. The cycle then starts all over again.

Changes of state

What does changes of state mean?

When a material changes from one material type to another, we say 'it has changed state'.

What are the changes of state?



Key Vocabulary

Evaporation

The process by which water changes from a liquid to a gas or vapour.

Condensation

The opposite of evaporation. It takes place when water vapour in the air **condenses** from a gas, turning back into a liquid form.

Transpiration

The evaporation of water from plant leaves.

At what temperature does each happen?

Freeze

When a liquid turns into ice or another solid as a result of extreme cold.

Volume

The amount of space a 3D shape takes up

Temperature

The measure of warmth or coldness of an object

Precipitation

Any type of water that forms in the Earth's atmosphere and then drops onto the surface of the Earth

Boiling

Water boils at exactly 100°C

Melting

Different solids melt at different temperatures.

- Ice melts at 0°C
- Chocolate melts at about 35°C

Evaporation and condensation

Water can evaporate and condense at any temperature. The warmer it is, the faster the evaporation takes place.

Celsius

The common scale in the UK for measuring temperature

Freezing

Water freezes at 0°C

Boiling

To become so hot that water bubbles and then turns into a gas (100°C)

Working scientifically

How can we identify solids, liquids and gases? Can matter change state? Do gases weigh anything? What is the relationship between temperature and evaporation?