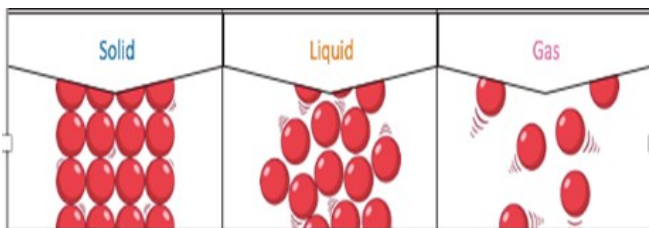


## What will I know by the end of this unit?

- There are three states of matter: **solid**, **liquid** and **gas**.
- 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 **solid** is heated to its **melting point**, it melts and changes to a **liquid**. This is because the particles start to move faster and faster until they are able to move over and around each other
- When **freezing** occurs, the particles in the liquid begin to slow down as they get colder. They can then only move gently on the spot, giving them a solid structure
- **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** 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 a cold surface.

## Particles in solids, liquids and gases



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.

# States of Matter

Science

Year 4

Topic: States of Matter

Strand: Chemistry

## What should I already know?

- Everyday objects are made from materials.
- Different materials have certain properties.

## Scientific Skills

- Ask questions about solids, liquids and gases.
- Compare and group materials together, according to whether they are solids, liquids or gases.
- Describe difference between solids, liquids and gases.
- Plan and set up a comparative or fair test.
- Make careful observations of materials
- Take accurate measurements using a thermometer.
- Research the temperature at which water cools and heats in degrees Celsius.
- Investigate the effect of temperature with evaporation.
- Make links to evaporation and condensation with how it fits into the water cycle

## Solid, Liquid and Gas



## The water cycle

The world's water moves between lakes, rivers, oceans, the atmosphere and the land in an ongoing cycle called - you guessed it! - the **water cycle**. As it goes through this continuous system, it can be a liquid (water), a gas (vapour) or a solid (ice).



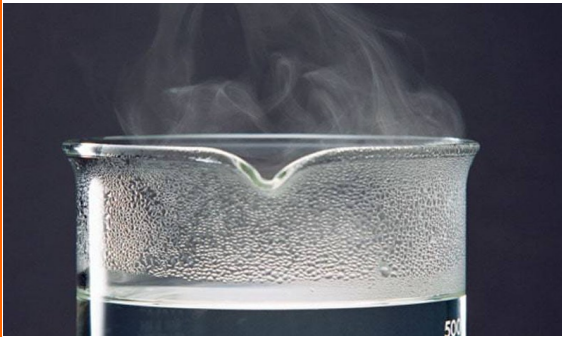
## Water vapour

When it is cold outside, sometimes you can see your own breath. The water vapour from your mouth condenses to form tiny water droplets and ice particles.



## Evaporation

Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into **water vapour (evaporation)**.



## Condensation

This **water vapour** rises, then cools down to form water **droplets** in clouds (**condensation**).



## Subject Specific 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>evaporate</b>	Turn a liquid into a gas.
		<b>condense</b>	Turn a gas into a liquid.
<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>precipitate</b>	Liquid or solid particles that fall from a cloud as rain, sleet, hail or snow.
		<b>melt</b>	This is when a solid changes to a liquid.
<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>freeze</b>	Liquid turns to a solid during the freezing process.
		<b>particles</b>	Are tiny bits of matter that make up everything in the universe.
<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>cycle</b>	A circle of events that repeat
		<b>vibrate</b>	A rapid motion back and forth
<b>water vapour</b>	This is water that takes the form of a gas. When water is boiled, it evaporates into a water vapour.		

## Thermometer

A **thermometer** is the instrument used to tell the air temperature.

A **thermometer** is usually made up of a small, hollow glass tube. At the bottom of the tube is a bulb, which holds a liquid such as alcohol or mercury. When there is an increase in heat, the liquid inside the bulb expands, pushing up into the tube.

There are two scales on a thermometer; Fahrenheit and Celsius (centigrade).

