

Let's do some Science!

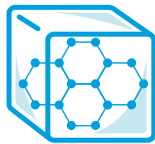


Solids, liquids and gases are called the **three states of matter.**

All substances are made from **atoms** or **molecules** (atoms joined together), also known as **particles**. The way that these particles move around determines whether the substance is a solid, liquid or gas.

Solids

In a solid, the particles are touching and packed closely together. They are fixed and cannot move.

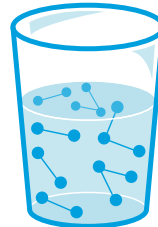


The properties of solids include:

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

Liquids

In a liquid, the particles are mainly touching, but some gaps have appeared in the structure.



These gaps allow the particles to move, and so the particles are arranged randomly.

The properties of liquids include:

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

Gases

In a gas, the particles are widely spaced and entirely free to move. They can whizz around at high speed.



The properties of gases include:

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

Changing states of matter

Evaporation and condensation

Liquids and gases can be changed from one state to another by heating or cooling.

Heat can turn a liquid into a gas, and cooling can cause a gas to turn into a liquid.

Heating – fresh water boils at 100°C.

If water (liquid) is heated, it changes to water vapour (gas). This change is called evaporation.



Cooling

If water vapour (gas) is cooled down, it changes into water (liquid). This change is called condensation.

Freezing and melting

Solids and liquids can be changed from one state to another by heating or cooling.

Heat melts a solid and turns it into a liquid. Cooling freezes a liquid into a solid.

Heating

If ice (solid) is heated, it changes to water (liquid). This change is called melting.

Cooling – fresh water freezes at 0°C.

If water (liquid) is cooled, it changes to ice (solid). This change is called freezing.



Activity time



Water is a naturally occurring material which can be found in three states of matter: solid, liquid and gas. In the different states, the particles are:

- Really close together (when it's a solid)
- Mainly touching, but some gaps have appeared in the structure (when it's a liquid)
- Widely spaced and entirely free to move (when it's a gas).

Look at the following materials and write them in the correct box.

Wood Oxygen Milk Feather Ice Helium Syrup Steam Pencil Water Air Sea

Solid	Liquid	Gas

Quiz time

- Q1 What is the chemical name for water? _____
- Q2 Fresh water freezes at what temperature? _____
- Q3 What do we call water in its solid state? _____
- Q4 What do we call water as a gas? _____
- Q5 Fresh water boils at what temperature? _____
- Q6 When water is heated it changes from a liquid to a gas. The process is called _____
- Q7 When water vapour cools it changes from a gas to a liquid. The process is called _____
- Q8 When water is cooled it changes from a liquid to a solid. The process is called _____
- Q9 When ice is heated it changes from a solid to a liquid. The process is called _____
- Q10 Water on earth is constantly moving and recycled over and over again.
What is the recycling process called? _____

ANSWERS

- Quiz**
1. H₂O 2. 0°C 3. Ice 4. Steam/water vapour 5. 100°C 6. Evaporation
7. Condensation 8. Freezing 9. Boiling 10. The water cycle
- Solid** – Wood, ice, pencil, feather **Liquid** – Milk, syrup, water, sea **Gas** - Steam, air, helium, oxygen