



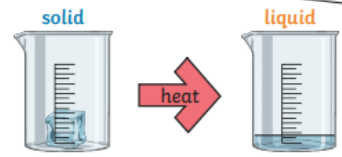
Year 4

# Knowledge organiser Freezing and Melting

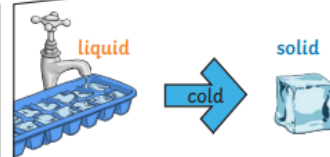
## Key Vocabulary

<b>states of matter</b>	Materials can be one of three states: <b>solids</b> , <b>liquids</b> or <b>gases</b> . 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. <b>Solids</b> take up the same amount of space no matter what has happened to them.
<b>liquids</b>	<b>Liquids</b> 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>	<b>Gases</b> 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 <b>gas</b> . When water is boiled, it <b>evaporates</b> into a <b>water vapour</b> .
<b>melt</b>	This is when a <b>solid</b> changes to a <b>liquid</b> .
<b>freeze</b>	<b>Liquid</b> turns to a <b>solid</b> during the <b>freezing</b> process.
<b>evaporate</b>	Turn a <b>liquid</b> into a <b>gas</b> .
<b>condense</b>	Turn a <b>gas</b> into a <b>liquid</b> .
<b>precipitation</b>	<b>Liquid</b> or <b>solid</b> particles that fall from a cloud as rain, sleet, hail or snow.

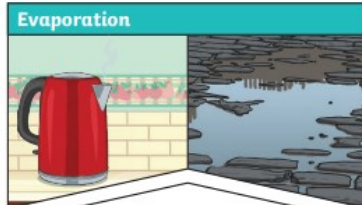
When water and other **liquids** reach a certain temperature, they change state into a **solid** or a **gas**. The temperatures that these changes happen at are called the **boiling**, **melting** or **freezing** point.



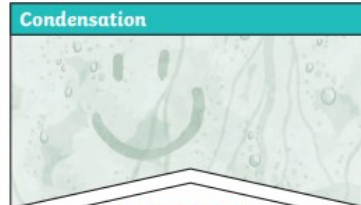
If a **solid** is heated to its **melting** point, it **melts** and changes to a **liquid**. This is because the particles start to move faster and faster until they are able to move over and around each other.



When **freezing** occurs, the particles in the **liquid** begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a **solid** structure.



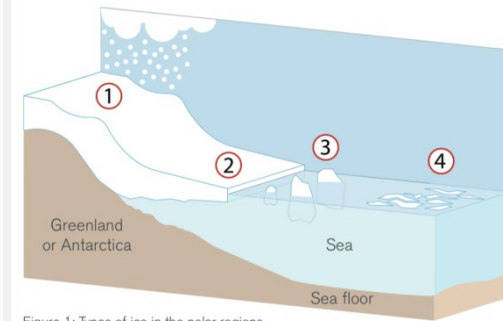
**Evaporation** occurs when water turns into **water vapour**. This happens very quickly when the water is hot, like in a kettle, but it can also happen slowly, like a puddle **evaporating** in the warm air.



**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 the cold surface.

<b>solid</b>	Particles are close together, but random. They can move over each other.		Keeps its shape unless a force is applied to it. Remains the same volume.
<b>liquid</b>	Particles are spread out and can move about quickly in all directions.		Does not keep its shape. Can spread out to fill the space it is in.
<b>gas</b>	Particles are closely-packed in a regular pattern. They vibrate on the spot.		Takes the shape of the container it is in. Stays the same volume.

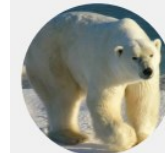
## All about ice



- Ice sheet**
  - Forms over thousands of years from rain and snow.
  - Only found in Greenland and Antarctica.
  - Must be at least 50,000km<sup>2</sup>.
- Ice shelf**
  - An ice sheet that extends over the sea.
- Icebergs**
  - Bits of ice shelf that have broken off.
- Sea ice**
  - Forms when the sea freezes.
  - Only a few years old.
  - Seasonal.

Figure 1: Types of ice in the polar regions.

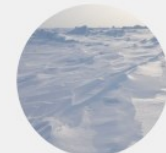
## Why is ice important?



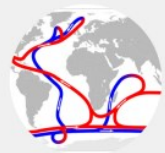
Habitat



Ocean conveyor pump



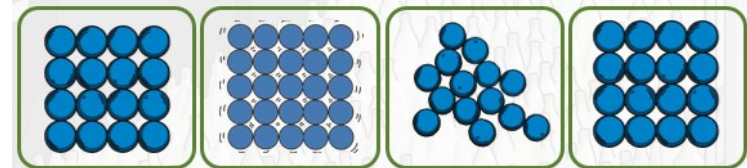
Albedo effect



Fresh water store

## Glass, Plastics and Metal Recycling

Glass, plastic and metal recycling all involve changes of state:



Material starts as a collection of solids with strong bonds between the molecules in the different items.

Heat is applied which causes the molecules to vibrate faster.

When the material reaches its melting point, the energy from the heat causes the bonds between the molecules to become weaker. The material melts and changes state to become a liquid. There are holes between the molecules which allows the different items to mix together as one liquid.

When the material is removed from the heat and cools, the bonds between the molecules become stronger and the material becomes a solid. This may be in a mould to make a new recycled product or it may be to produce a recycled raw material.