

Topic: States of Matter

Year: 4

Strand: Chemistry

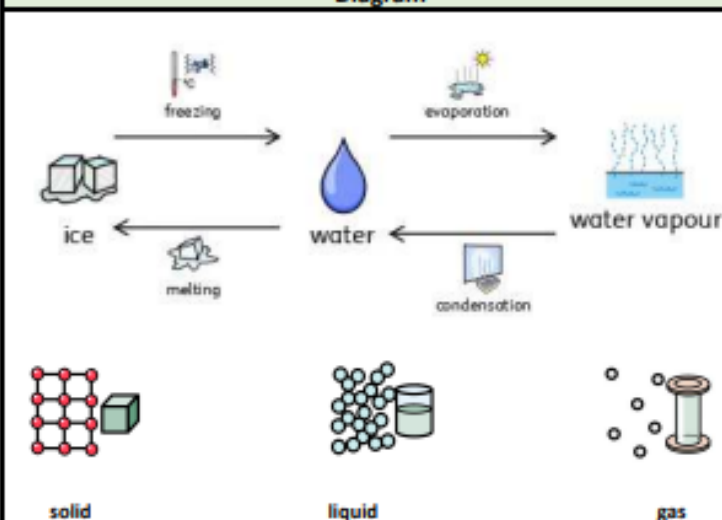
What should I already know?

- Why some materials are used for certain purposes because of their **properties**
- The **water cycle**, and the **processes** of **evaporation**, **condensation** and **precipitation**.

Vocabulary

condensation	small drops of water which form when water vapour or steam touches a cold surface , such as a window
cooling	lowering the temperature of something
evaporation	to turn from liquid into gas ; pass away in the form of vapour .
freezing	If a liquid or a substance containing a liquid freezes , it becomes solid because of low temperatures
freezing point	The freezing point of a particular substance is the temperature at which it freezes . The freezing point of water is 0°C.
gas	a form of matter that is neither liquid nor solid . A gas rapidly spreads out when it is warmed and contracts when it is cooled .
heating	raising the temperature of something
liquid	in a form that flows easily and is neither a solid nor a gas .
melting	to change from a solid to a liquid state through heat or pressure
melting point	The melting point of a particular substance is the temperature at which it melts .
particles	a tiny amount or small piece
precipitation	rain, snow, sleet, dew, etc, formed by condensation of water vapour in the atmosphere
process	a series of actions used to produce something or reach a goal.
properties	the ways in which an object behaves
solid	having a firm shape or form that can be measured in length, width, and height; not like a liquid or a gas
temperature	a measure of how hot or cold something is
vibrations	when something vibrates , it shakes with repeated small, quick movements
water cycle	the process by which water on the earth evaporates , then condenses in the atmosphere, and then returns to earth in the form of precipitation .
water vapour	water in the gaseous state, esp when due to evaporation at a temperature below the boiling point

Diagram

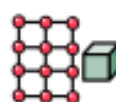


What will I know by the end of the unit?

What is a particle?

- Particles** are what materials are made from.
- They are so small that we cannot see them with our eyes.
- The **properties** of a substance depend on what its particles are like, how they move and how they are arranged
- Particles** behave differently in **solids**, **liquids** and **gases**.

What is a solid?



- In the **solid** state, the material holds its shape.
- Solids** have **vibrating particles** which are closely packed in and form a regular pattern.
- This explains the fixed shape of a solid and why it can't be poured.
- Solids** always take up the same amount of space.

What is a liquid?



- In the **liquid** state, the material holds the shape of the container it is in.
- This means that **liquids** can change shape, depending on the container.
- Liquids** have **particles** which are close together but random.
- Liquid particles** can move over each other.
- Liquids** can be poured.

What is a gas?



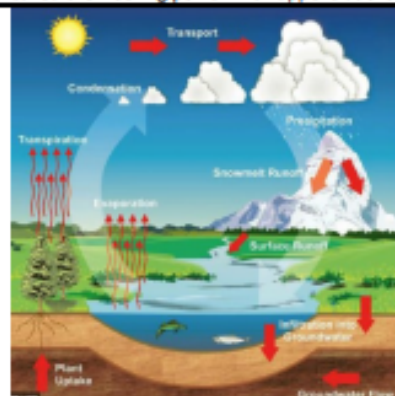
- In the **gas** state, **particles** can escape from open containers.
- Gases** have **particles** which are spread out and move in all directions.

What happens to the particles in water when it is heated or cooled?

- When water (in its **liquid** form) is **heated**, the particles start to move faster and faster until they have enough energy to move about more freely. The water has **evaporated** into a **water vapour**.
- When water is **cooled**, the particles start to slow down until a solid structure (ice) is formed. The water has **frozen**.
- The **temperature** at which water turns to ice is called the **freezing point**. This happens at 0°C.

What is the water cycle?

(see separate knowledge organiser Geography - The Water Cycle)



Investigate!

- Group materials according to their states.
- Explain the **particle** structure of **solids**, **liquids** and **gases**.
- Explore the effect of **temperature** on substances such as chocolate, butter, cream. Compare their **melting points** and place them in a table.
- Research the **temperature** at which materials change state, for example, when iron **melts** or when oxygen **condenses** into a **liquid**.
- Observe and record **evaporation** over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of **temperature** on washing drying or snowmen melting.
- Analyse and interpret different forms of data (tables, graphs) to show the effects of **temperature** on states of matter.
- Present what you know about the water cycle using a variety of skills using appropriate vocabulary (The Water Cycle Knowledge Organiser).
- Observe **evaporation** and **condensation** in action by using bowls of water and mirrors /glass (The Water Cycle Knowledge Organiser).