



Y4 Science Knowledge Organiser—States of Matter



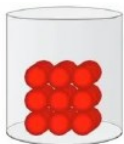
Key Knowledge

Learn these key facts—key points in red

Solids, Liquids and Gases

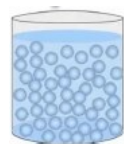
What is a solid?

When materials hold their shape. Their particles are closely packed and form a regular pattern. Their shape is fixed and they will always take up the same amount of space. Examples: Ice, Wood, Glass, Diamond.



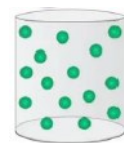
What is a liquid?

When materials hold the shape of the containers they are in and so can change shape. Their particles are close together but can move over each other. Liquids can be poured. Examples: Water, Milk, washing-up liquid.



What is a gas?

Gases can escape from open containers. They often cannot be seen. They have particles which can spread it and move in all directions.



Examples: Steam, Hydrogen, Oxygen, Carbon Dioxide.

Focus Scientists — Robert Boyle

Robert Boyle (1627-1691) studied the behaviour of gases, thought all materials were made of particles and linked states of matter with the movement of particles.



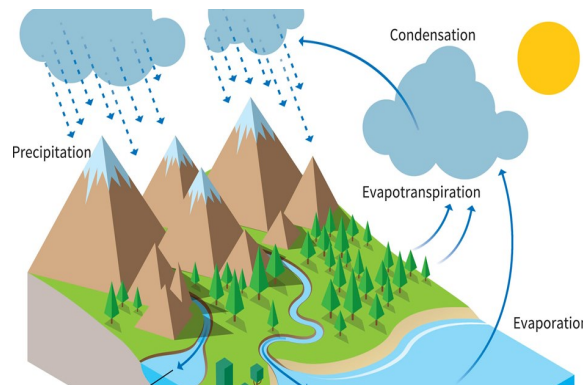
Dorothy Hodgkin Dorothy Hodgkin (1910-1994) is the only British woman to have won the Noble Prize for Chemistry. It was for her work on the structure of substances e.g. penicillin.



The Water Cycle

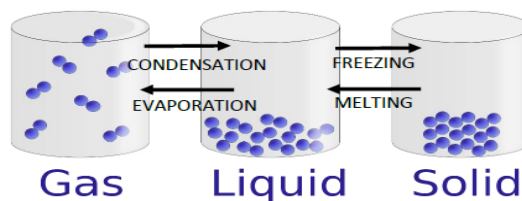
Water continually moves around the Earth in the water cycle. The Sun evaporates water into water vapour.

When the water vapour cools down it turns into liquid water and it rains. In very cold places the water freezes into snow or ice. Snow and ice, when warmed up, change into liquid water.



Changes of State (heating and cooling)

Warming solid ice makes it melt into liquid water. Adding more heat makes it evaporate, at 100°C, into steam (a gas). When it is cooled it condenses back into liquid water. If it is cooled to 0°C it freezes and forms solid ice.



Key Vocabulary

Understand these key words

Word

Definition

| | |
|----------------------------|---|
| solid | firm or stable in shape—with particles very close together. |
| liquid | a substance that flows easily but has constant volume—with particles close but moving around. |
| gas | a substance with no fixed shape that will expand to fill the whole of a container—particles far apart and moving around. |
| heating | raising the temperature of something. |
| cooling | lowering the temperature of something. |
| freezing | turning into ice or another solid as a result of cooling. |
| freezing point | the temperature at which a liquid turns into a solid when cooled. |
| melting | turning into a liquid as a result of heating. |
| melting point | the temperature at which a solid will melt. |
| temperature | a measure of how hot or cold something is. |
| condensation | the process of turning from vapour (a gas) into liquid. |
| evaporation | the process of turning from vapour (a gas) into liquid. |
| precipitation | rain, snow, sleet, dew, etc, formed by condensation of water vapour in the atmosphere. |
| 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. |
| reversible change | a change that can be changed back again. Melting and heating are examples of reversible changes. |
| irreversible change | a change that cannot be changed back again. Burning or mixing a liquid with bicarbonate of soda are examples of irreversible changes. |
| particles | a tiny amount or small piece. |