

Year 4

Unit: States of matter

Prior learning

Year 1 – Tell the difference between an object and the material it is made from.
Year 1 – Identify and name a variety of everyday materials and describe their properties.
Year 2 – Identify and compare the suitability of a variety of everyday materials.
Year 2 – Find out how the shapes of solid objects can be changed by squashing, bending, twisting and stretching.

Later learning (not in Year 4)

Year 5 – Compare and group materials based on their properties.
Year 5 – Know that some materials will dissolve in liquid to form a solution.
Year 5 – Understand how mixtures might be separated.
Year 5 – Demonstrate that dissolving, mixing and changes of state are reversible changes.
Year 5 – Know that some changes can be reversed, and others cannot.

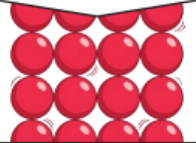
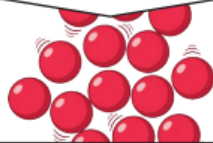
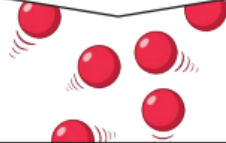
Key Questions:

What is the arrangement of particles in a solid?
How would you describe the particles in a liquid?
What is the freezing point of water?
Name the process that describes the change from water to ice.
Explain why puddles get smaller after it has rained.

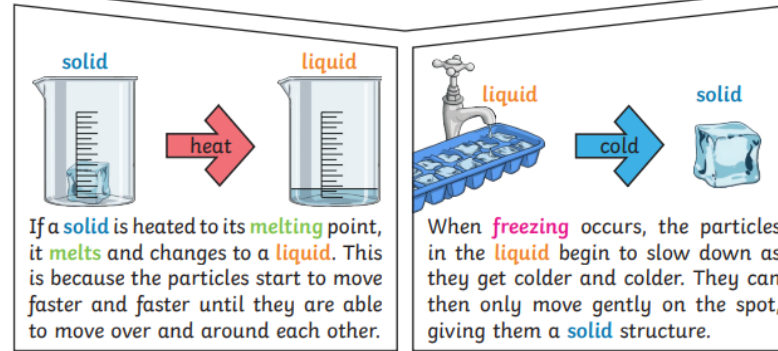
Intent:

Compare and group materials together, according to whether they are solids, liquids, or gases.
Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens.
Identify the part played by evaporation and condensation in the water cycle, and associate the rate of evaporation with temperature.

There are three states of matter.

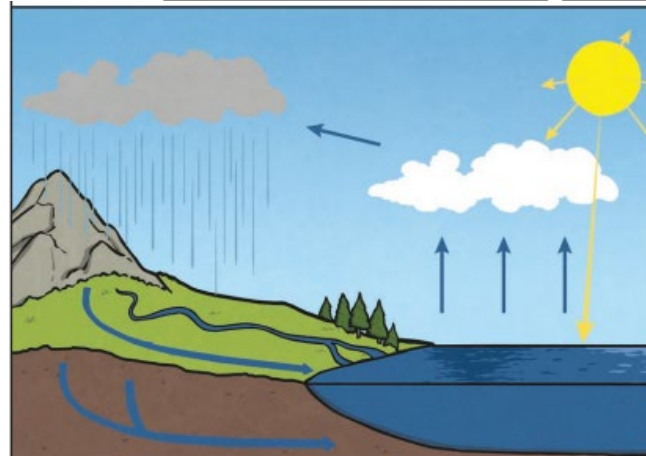
| Solid | Liquid | Gas |
|--|--|--|
|  |  |  |
| Particles in a solid are close together and cannot move. They can only vibrate. | Particles in a liquid are close together but can move around each other easily. | Particles in a gas are spread out and can move around very quickly in all directions. |

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.

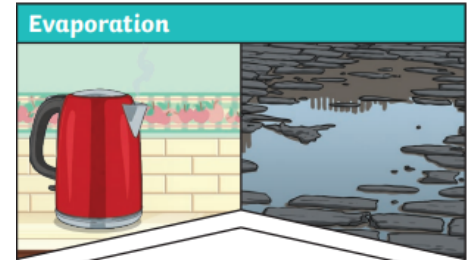


If a **solid** is heated to its **melting** point, it **melts** and changes to a **liquid**. This is because the particles start to move faster and faster until they are able to move over and around each other.

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.



1. Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into **water vapour**.
2. This **water vapour** rises, then cools down to form water droplets in clouds (**condensation**).
3. When the droplets get too heavy, they fall back to the earth as rain, sleet, hail or snow (**precipitation**).



Evaporation

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

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.

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 to 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 pint | 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, det, 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 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 its gas state, especially when due to evaporation at a temperature below the boiling point of 100°C. |