

## Year 4 – States of Matter – In a State

### What it looked like last year as part of Rocks

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.
- Describe in simple terms how fossils are formed
- Recognise that soils are made from rocks and organic matter.

### Vocabulary (definitions)

**states of matter** – solid, liquid or gas.

**melting point** - the temperature at which a given solid will melt.

**boiling point** - the temperature at which a liquid boils and turns to vapour.

**Evaporation** - the process of turning from liquid into vapour

state change    temperature    freezing  
melting            water cycle

### What it looks like next year

- Compare and group together every day materials on the basis of their properties.
- Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated.
- Give reasons based on evidence from comparative and fair tests for the particular uses of everyday materials, including metals, wood and plastic.
- Demonstrate that dissolving, mixing and changes of state are reversible changes.
- Explain that some changes result in the formation of new materials and that this kind of change is not usually reversible.

### Sequence of Learning

1. Explore properties of solids and liquids.
2. Carry out a fair test to show melting and freezing.
3. Explore how materials behave when they are heated and cooled.
4. Explore the properties of air and group materials into the three states of matter.
5. Explore and carry out a test to show evaporation.
6. Research the boiling points of different liquids.
7. Observe and discuss condensation.
8. Explore the role of evaporation and condensation in the water cycle.

### Cultural Capital

- To be able to compare and group materials together, according to whether they are solids, liquids or gases.
- To be able to observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens at degrees Celsius (°C)
- To be able to identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
- The real life knowledge that links is: Grouping & Classifying, observing and fair tests.
- The jobs it can be used in are: Chemist, Weather Forecaster, Water Company, Chef, Engineering.

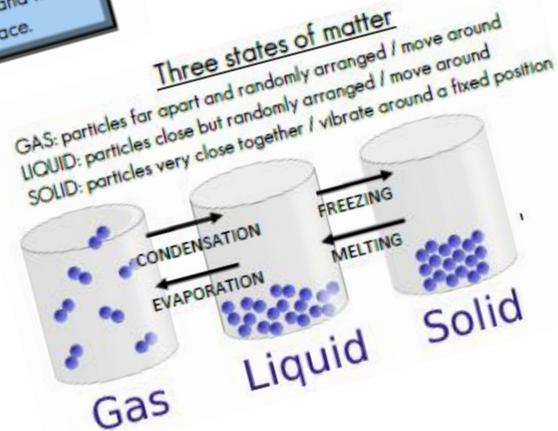
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### Principles of Teaching Science.

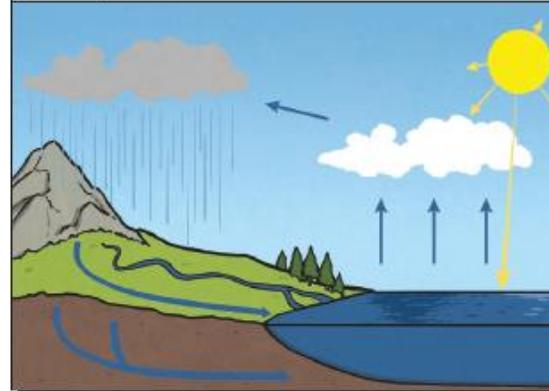
- E**xploring – when we look at how things work in the world
- Q**uestioning – when we question what will happen
- U**nderstanding – when we use scientific language to explain
- I**nvestigating – when we can explore and are hands on
- P**redicting – when we use our previous knowledge to say what we think will happen

**FEATURES**

- Solids hold their shape. (Salt, sand and sugar are tiny solids so they pour like a liquid but they pile up and are not wet.)
- Liquids form a pool not a pile!
- Gases escape from an unsealed container and fill the entire volume of space.

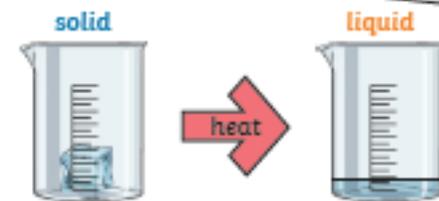


Condensation and evaporation occur within the water cycle.

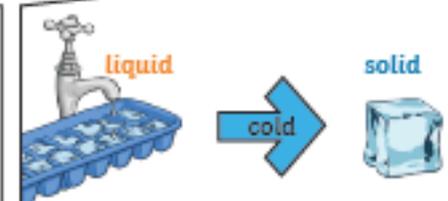


1. Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into **water vapour**.
2. This **water vapour** rises, then cools down to form water droplets in clouds (**condensation**).
3. When the droplets get too heavy, they fall back to the earth as rain, sleet, hail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

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.