Science Knowledge Organiser

States of Matter	Year	4	Main Foci:	Chemistry

Year 4 Spring 1

What will I know by the end of the unit?

What are solids, liquids and gases?

- **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.**
- 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 poured.
  Solids always take up the same amount of space.

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 0ºC.

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 evaporation?

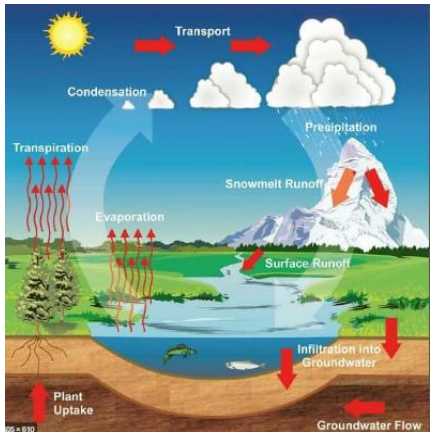
- To investigate the effect of temperature on drying washing

What is the **water cycle?**

- Present what you know about the water cycle using a variety of skills using appropriate vocabulary
  Observe **evaporation** and **condensation** in action

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 0ºC.
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



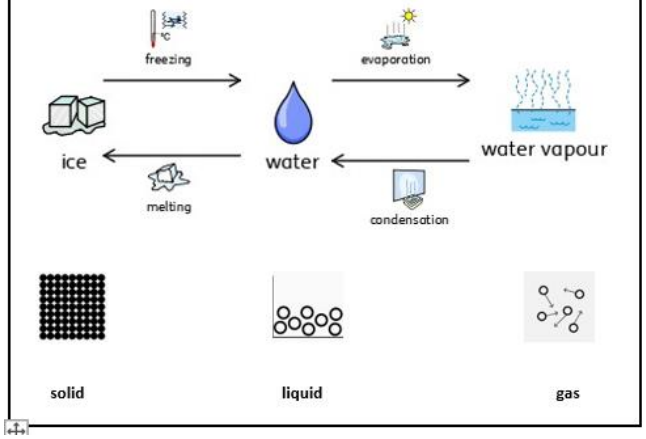
What I should already know:

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

Where this fits in – what comes next?

- In Year 5, compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- 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, including through filtering, sieving and evaporating
- 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, including changes associated with burning and the action of acid on bicarbonate of soda

Diagram



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