Colney Heath School ~ Science		
Topic: Solids, Liquids and Gases (States of Matter)	**Year: 4**	**Chemistry**

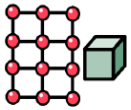
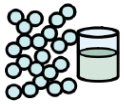
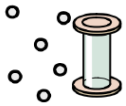
What should I already know?

An object is made from/of a material.
Materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions are the properties of a material.
Matter (stuff) is made from tiny building blocks. Water is a liquid and when it freezes it becomes a solid. When you heat ice it melts.

Vocabulary

Sublimation	When a solid turns into a gas without passing through the liquid state.
Water Vapour	Water in the gaseous state, esp when due to evaporation at a temperature below the boiling point.
Process	A series of actions used to produce something or reach a goal.
Vibration	When something vibrates, it shakes with repeated small, quick movements.
Properties	The way in which an object behaves.
Freezing Point	If a liquid or a substance containing a liquid freezes, it becomes a solid because of low temperatures. The freezing point of a particular substance is the temperature at which it freezes. The freezing point of water is 0°C.

Diagrams

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 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.

Vocabulary

Matter	Objects that take up space and have mass are called matter. Everything around you is made up of matter.
Evaporation	When liquid turns into a gas. Water changes into water vapour.
Condensation	When gas turns into a liquid. Small drops of water form when water vapour or steam touches a cold surface, such as a window.
Temperature	A measure of how cold or hot something is and can be measured with a thermometer.
Celsius	A temperature scale °C .
Reversible	A change that can be reversed or undone.
Irreversible	A change that cannot be reversed or changed back again.
Melting point	Melting is the change of a substance from a solid to a liquid through heat or pressure and the melting point of a particular substance is the temperature at which it melts.

The Big Picture	By the end of our project we will know that
Chemistry C1: All matter (stuff) in the universe is made up of tiny building blocks. C2: The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc). C3: Matter can change if the arrangement of these building blocks changes.	Things are made of particles (tiny building blocks) and these are organized differently in different states : solids, liquids or gases. Some materials can change from one state to another and back again. 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. There are bonds between the particles (building blocks) in a solid; as temperature increases, these bonds are somewhat overcome as the particles absorb energy and solids can change into liquids; with a further increase in temperature, the particles become even more energetic and the bonds are overcome entirely so the liquid changes into a gas. When solids turn into liquids, this is called melting and the reverse process is called freezing. When liquids turn into gases, this is called evaporation and the reverse process is called condensation. When a solid turns into a gas without passing through the liquid state, this is called sublimation. The melting point of water is 0 degrees Celsius 0°C and that the boiling point of water is 100 degrees Celsius 100°C . The Water Cycle (see separate Geography Knowledge Organiser for this) is an example of how changes of the states of water work in nature.