

Year 4 – Changes of State (Materials and changes of state)	
Links made with other subjects	Geography - Rivers and the Water Cycle English - Explanation text for the water cycle
The BIG Question	Is water always wet?
The BIG Outcome	Answer the question by drawing and/or annotating the water cycle
Science objectives (link to NC)	- 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 in degrees Celsius (°C) - identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
Prior knowledge What prior knowledge is needed for children to be successful in this unit?	Children already know: EYFS – Understanding the world - Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. Yr 1 - Comparing and Identifying materials Yr 2 - Changing shape and uses of material
Future learning Consider the conceptual knowledge within a subject that pupils need for future learning not just the recall of facts but the importance of concepts	This unit gives prior knowledge to: Yr 5 - Separating mixtures, Types of Change and Materials
Science strands	<div>Related Enquiry Questions</div> <div><div>Classifying</div><div>Based on the children’s own criteria: -classify solids (including grains, crystals, powders: physical properties) - classify liquids</div></div> <div><div>Observing over time</div><div>- Watch ice melt (ice hands). - Watch hand prints dry e.g. water hand prints on coloured paper towel. - Watch frozen liquids melt.</div></div> <div><div>Pattern Seeking</div><div>Not relevant</div></div> <div><div>Comparative testing</div><div>- What affects the melting rate of chocolate (size of pieces, temperature of water, type of chocolate)? - What affects the rate an ‘ice pole’ melts? - What affects the rate of evaporation? - Test the ‘runniness’ of liquids.</div></div> <div><div>Researching</div><div>- Research the melting point of metals. - Research the water cycle. (Children present what they’ve learned in different ways: create a model, write a song, write a story, create a PPT, etc.)</div></div>
Vocabulary/ Glossary	Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle
Knowledge	The knowledge that children will learn and remember:

Science Scheme of Work

(see italics for knowledge to remember)	<ol style="list-style-type: none"> <i>A solid keeps its shape and has a fixed volume.</i> <i>A liquid has a fixed volume but changes in shape to fit the container.</i> <i>A liquid can be poured and keeps a level, horizontal surface.</i> <i>A gas fills all available space; it has no fixed shape or volume.</i> Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. <i>Melting is a state change from solid to liquid.</i> <i>Freezing is a state change from liquid to solid.</i> <i>The freezing point of water is 0oC.</i> Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. <i>Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy.</i> <i>Condensation is the change back from a gas to a liquid caused by cooling.</i> <i>This is the water cycle</i> <i>.Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation.</i>
SEND expectations	<ol style="list-style-type: none"> <i>A solid keeps its shape and has a fixed volume.</i> <i>A liquid has a fixed volume but changes in shape to fit the container.</i> <i>A gas fills all available space; it has no fixed shape or volume.</i> <i>Melting is a state change from solid to liquid.</i> <i>Freezing is a state change from liquid to solid.</i> <i>Evaporation is the same state change as boiling (liquid to gas)</i> <i>Condensation is the change back from a gas to a liquid caused by cooling.</i> Water evaporates into sky then condenses into clouds. They get full and fall as rain. The cycle repeats.
Common misconceptions	<p>Some children may think:</p> <ul style="list-style-type: none"> 'solid' is another word for hard or opaque - solids are hard and cannot break or change shape easily and are often in one piece - substances made of very small particles like sugar or sand cannot be solids - particles in liquids are further apart than in solids and they take up more space - when air is pumped into balloons, they become lighter - water in different forms – steam, water, ice – are all different substances