


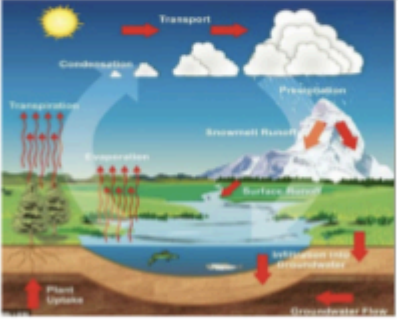
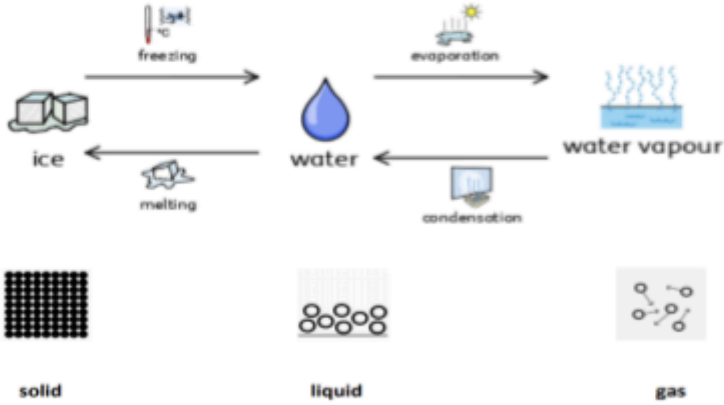


Caroline Haslett Primary School - Science Topic: States of Matter Y4

What should I already know?		What will I know by the end of the unit?	
<ul style="list-style-type: none"> Why some materials are used for certain purposes because of their properties The water cycle, and the processes of evaporation, condensation and precipitation. 		<p>What is a particle?</p> <ul style="list-style-type: none"> 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. 	
Vocabulary			
condensation	small drops of water which form when water vapour or steam touches a cold surface , such as a window	<p>What is a solid?</p> 	<ul style="list-style-type: none"> 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 be poured. Solids always take up the same amount of space.
cooling	lowering the temperature of something	<p>What is a liquid?</p> 	<ul style="list-style-type: none"> 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.
evaporation	to turn from liquid into gas; pass away in the form of vapour .	<p>What is a gas?</p> 	<ul style="list-style-type: none"> In the gas state, particles can escape from open containers. Gases have particles which are spread out and move in all directions.
freezing	If a liquid or a substance containing a liquid freezes , it becomes solid because of low temperatures	<p>What happens to the particles in water when it is heated or cooled?</p> <ul style="list-style-type: none"> 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. 	
freezing point	The freezing point of a particular substance is the temperature at which it freezes . The freezing point of water is 0°C.	<p>What is the water cycle?</p> <p>(see separate knowledge organiser Geography - The Water Cycle)</p> 	
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		
Diagram			
			
Investigate!			
<ul style="list-style-type: none"> Group materials according to their states. Explain the particle structure of solids, liquids and gases. Explore the effect of temperature on substances such as chocolate, butter, cream. Compare their melting points and place them in a table. Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting. Analyse and interpret different forms of data (tables, graphs) to show the effects of temperature on states of matter. Present what you know about the water cycle using a variety of skills using appropriate vocabulary (The Water Cycle Knowledge Organiser). Observe evaporation and condensation in action by using bowls of water and mirrors /glass (The Water Cycle Knowledge Organiser). 			

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<p>Working scientifically</p>	<p>An observation involves looking closely at objects, materials and living things. Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.</p> <p>Scientific enquiries can be set up and carried out by following or planning a method. Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately. A prediction is a statement about what might happen in an investigation, based on some prior knowledge or understanding.</p> <p>A fair test is one in which only one variable is changed and all others remain constant. Observations can be made regularly to identify changes over time. Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections. Take accurate measurements in standard units, using a range of equipment eg. data loggers plus sensors, timers (seconds, minutes and hours), thermometers (°C), and metre sticks, rulers or trundle wheels (millimetres, centimetres, metres). Gather, record, classify and present observations and measurements in a variety of ways (pictorial representations, timelines, diagrams, keys, tables, charts, labelled diagrams, and graphs).</p> <p>Use scientific vocabulary to report and answer questions about their findings based on evidence collected. Draw simple conclusions and identify next steps, improvements and further questions. Results are information, such as data or observations, that have been found out from an investigation. A conclusion is the answer to a question that uses the evidence collected.</p>
<p>Materials and their properties</p>	<p>Materials can be grouped according to whether they are solids, liquids or gases. Solids stay in one place and can be held. Some solids can be squashed, bent, twisted and stretched. Examples of solids include wood, metal, plastic and clay. Liquids move around (flow) easily and are difficult to hold. Liquids take the shape of the container in which they are held. Examples of liquids include water, juice and milk. Gases spread out to fill the available space and cannot be held. Air is a mixture of gases.</p> <p>Group and sort materials into solids, liquids or gases. Heating or cooling materials can bring about a change of state. This change of state can be reversible or irreversible. The temperature at which materials change state varies depending on the material. Water changes state from solid (ice) ⇌ liquid (water) at 0°C and from liquid (water) ⇌ gas (water vapour) at 100°C. The process of changing from a solid to liquid is called melting. The reverse process of changing from a liquid to a solid is called freezing. The process of changing from a liquid to a gas is called evaporation. The reverse process of changing from a gas to a liquid is called condensation. Observe and explain that some materials change state when they are heated or cooled and measure or research the temperature in degrees Celsius (°C) at which materials change state.</p> <p>The water cycle has four stages: evaporation, condensation, precipitation, collection. Water in lakes, rivers and streams is warmed by the Sun, causing the liquid water to evaporate and rise into the air as water vapour. As the water vapour rises, it cools and condenses to form liquid water droplets in clouds. The clouds become full of water, until the water falls back to the ground as precipitation (rain, hail, snow and ice). The fallen water collects back in lakes, rivers and streams. Evaporation and condensation are caused by temperature changes. Describe the water cycle using words or diagrams and explain the part played by evaporation and condensation.</p>