

<b>Year 4 – States of matter</b>	<b>Main Outcomes:</b> <ul style="list-style-type: none"> <li>• Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>• 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).</li> <li>• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>	<b>Focus: Science – chemistry</b>
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<b>What should I already know?</b>	<b>Vocabulary</b>	<b>Meaning</b>
Not studied until year 4.	category	a group of things that are the same in some way
	Celsius (°C)	a scale for measuring <b>temperature</b> , in which water <b>freezes</b> at 0 <b>degrees</b> and <b>boils</b> at 100 <b>degrees</b>
	classify	putting things into groups
	condensation (condense, condensing)	a process by which a substance changes from a gaseous <b>state (gas)</b> to a <b>liquid state</b>
	degrees	a set change in <b>temperature</b> measured against a given scale (e.g. <b>Celsius</b> or <b>Fahrenheit</b> )
	discuss (discussion)	to talk or write about a subject in detail, especially, considering different ideas and opinions related to it
	energy	the ability to do work; <b>energy</b> makes things move
	evaporation (evaporate, evaporating)	the process by which a <b>liquid</b> turns into a <b>gas</b> as a result of increased <b>energy</b> in its <b>particles</b>
	evidence	a collection of facts or information that suggests whether something is true or false
	explain	a response to a question
	Fahrenheit (°F)	a scale for measuring <b>temperature</b> , in which water <b>freezes</b> at 32 <b>degrees</b> and <b>boils</b> at 212 <b>degrees</b> . It is represented by the symbol °F
	freeze (freezing)	a change of <b>state</b> from <b>liquid</b> to <b>solid</b> . It occurs when the <b>particles</b> in a <b>liquid</b> lose <b>energy</b> , usually due to a drop in <b>temperature</b>
	gas	a <b>state of matter</b> ; <b>gases</b> do not have a shape; they spread out to <b>fill</b> their container
	liquid	a <b>state of matter</b> ; <b>liquids</b> can flow and take up the shape of their container
	material	any substance that has a name. For example: chalk, paper, wood, iron, air, water, clay, plastic, rubber, stone, leather, wax
	matter	anything that has weight and takes up space
	melting (melt)	a change of <b>state</b> from <b>solid</b> to <b>liquid</b> . It occurs when the <b>particles</b> in a <b>solid</b> gain <b>energy</b> , usually due to a rise in <b>temperature</b>
	particle	an extremely tiny piece of matter
	precipitation (precipitate)	any <b>liquid</b> or frozen water that forms in the atmosphere and falls back to the Earth. It comes in many forms, like rain, sleet, and snow
	solid (solidifying)	a <b>state of matter</b> ; <b>solids</b> keep their shape and can be held
	state (of matter)	<b>solid, liquid</b> or <b>gas</b> ; <b>materials</b> can be in any of these three <b>states</b>
	temperature	a measure of how hot something is
	thermometer	an instrument for measuring <b>temperature</b>
	transpiration	the process by which plants give off water <b>vapour</b> through the stomata (openings) in their leaves
	vapour	<b>liquid</b> in its <b>gaseous state</b>
	volume	the occupancy of an object in a three-dimensional space
	water cycle	the path that all water follows as it moves around Earth in different <b>states</b>
<b>What I will do</b>	<b>Resources</b>	
I will have weekly or blocked science lessons. In lessons, I will be taught a skill and I will gain knowledge and understanding through the process of scientific enquiry (observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources).	Hamilton Science planning: states of matter <a href="https://www.hamilton-trust.org.uk/science/year-4-science/states-matter-states-matter-scientists/">https://www.hamilton-trust.org.uk/science/year-4-science/states-matter-states-matter-scientists/</a> (all planning also saved on SharePoint).	
Possible lines of enquiry		
<ul style="list-style-type: none"> <li>• Explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container).</li> <li>• Observe water as a solid, a liquid and a gas and note the changes to water when it is heated or cooled.</li> </ul>		

Knowledge to understand		Skills to learn
<p>There are three <b>states of matter</b> that a <b>material</b> can be in.</p>	<p><b>Solids</b> – they can be held, shaped or cut; their shape and volume don't change.  <b>Liquids</b> – they can flow; they change shape to match their container, but don't change volume.  <b>Gases</b> – most gases are invisible; they change their shape and <b>volume</b> to fill their container.</p>	<ul style="list-style-type: none"> <li>➤ asking relevant questions and using different types of scientific enquiries to answer them</li> <li>➤ setting up simple practical enquiries, comparative and fair tests</li> <li>➤ making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>➤ recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>➤ reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>➤ using straightforward scientific evidence to answer questions or to support their findings.</li> </ul> <p>Cross-curricular (maths)</p> <ul style="list-style-type: none"> <li>➤ count backwards through 0 to include negative numbers</li> <li>➤ understand and use a greater range of scales in their representations</li> <li>➤ begin to relate the graphical representation of data to recording change over time</li> </ul>
<p><b>Materials</b> can change <b>state</b> when they are heated or cooled.</p>	<p>When a <b>liquid</b> is heated, it <b>evaporates</b> or <b>boils</b> to form a <b>gas</b>. <b>Evaporation</b> or boiling is fast when it's hot and slow when it's cold.                  When a <b>gas</b> is cooled, it <b>condenses</b> to form a <b>liquid</b>.                  When a <b>solid</b> is heated, it <b>melts</b> to form a <b>liquid</b>.                  When a <b>liquid</b> is cooled, it <b>freezes</b> to form a <b>solid</b>.</p>	
<p><b>Materials</b> change between <b>solids, liquids</b> and <b>gases</b> at certain <b>temperatures</b>.</p>	<p>For example, water <b>melts</b> or <b>freezes</b> at 0°C, and <b>boils</b> or <b>condenses</b> at 100°C.                  Iron changes from <b>solid</b> to <b>liquid</b> (melts) at 1538°C.</p>	
<p>The <b>water cycle</b> is the continuous journey water takes from the sea, to the sky, to the land and back to the sea.                  The movement of water around our planet is vital to life as it supports plants and animals.</p>	<p>Heat from the Sun makes water <b>evaporate</b>.  <b>Water vapour condenses</b> into tiny droplets which form clouds.                  Water falls back to the ground as rain.</p>	
Evidence of Learning		Equipment to become familiar with
<p>Science books                  Photos                  Videos                  Pupil conferencing                  Teaching and learning observations                  Learning walks                  Data analysis</p>		<p>Cameras                  Weighing scales                  Magnifying glasses                  Thermometers</p>
How will I know what I've learnt?		
<p>See KS2 teacher assessment exemplification for science  <a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/763065/2018_key_stage_2_teacher_assessment_exemplification_science.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/763065/2018_key_stage_2_teacher_assessment_exemplification_science.pdf</a>                  See also Hamilton Science_Assessment_Y4 (saved in planning folder on Sharepoint).                  KS2 quizzes:  <a href="https://gcequiz.com/quiz/ks2-science-quizzes">https://gcequiz.com/quiz/ks2-science-quizzes</a>  <a href="https://churchfieldsjunior.com/test-your-skills-science/">https://churchfieldsjunior.com/test-your-skills-science/</a></p>		