

# Y4 – States of matter

<b>Inspiration</b> Creativity ( problem solving)	<b>Partnership with parents</b> Community – links to DT
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<b>Key Questions</b> <ul style="list-style-type: none"> <li>- How could we sort/group these materials?</li> <li>- How does water change if we heat/cool it?</li> <li>- What other materials change when heated or cooled?</li> <li>- Do all materials have the same melting point?</li> <li>- How are gases used in everyday life?</li> <li>- What is the water cycle?</li> </ul>	<b>Working Scientifically</b> <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>- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</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 results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>- identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>- using straightforward scientific evidence to answer questions or to support their findings.</li> </ul>	<i>Also covered in:</i> Y1 – Everyday materials Y2 – Uses of everyday materials Y5 – Properties and changes of materials
<b>At the end of this unit, children will be able to:</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>		

**Knowledge**

- Matter makes up our planet and the whole universe. On Earth, all matter exists in one of three different states; solid, liquid and gas. A solid can hold its shape. A liquid like water forms a pool and takes the shape of any container it is put in. It flows or runs but it can't be stretched or squeezed. A gas can flow, expand and be squeezed. If it is put in an unsealed container, it escapes. Matter is all made up of particles. Particles are so tiny, we can't see them! Use drama to model the three states.
- Depending on its temperature, matter can change state. There are ways in which a material can change state such as by heating, cooling, evaporating and condensation. This can happen because the particles in gases are spread out and have more energy than those in liquids and so can move around much more. The particles in liquids are less tightly packed and have less energy than those in gases so move less. The particles in solids are packed tightly and can barely move at all. We can give energy to the particles by heating them up.
- Melting is the process of changing a solid into a liquid. Freezing is the process of changing a liquid into a solid. Evaporation is the process of changing a liquid into a gas. Condensation is the process of changing a gas into a liquid.
- Know that different materials have different melting points. Plan an investigation of 3 familiar materials - ice, chocolate and butter. Use a thermometer to measure temperature and record results in a table. and discuss how accurate their predictions were and whether melting is a reversible change.
- Some changes are reversible - capable of being reversed so that the previous state is restored and some are irreversible - not capable of being reversed.
- The water cycle - Water on Earth is constantly moving. It is recycled over and over again. This recycling process is called the water cycle. 1. Water evaporates into the air. The sun heats up water on land, in rivers, lakes and seas and turns it into water vapour. The water vapour rises into the air. 2. Water vapour condenses into clouds. Water vapour in the air cools down and changes back into tiny drops of liquid water, forming clouds. 3. Water falls as precipitation. The clouds get heavy and water falls back to the ground in the form of rain or snow. 4. Water returns to the sea. Rain water runs over the land and collects in lakes or rivers, which take it back to the sea. The cycle starts all over again. The water cycle is the journey water takes as it moves from the land to the sky and back again. It follows a cycle of evaporation, condensation, precipitation and collection.

<b>Topic Specific Vocabulary</b> Solid, liquid, gas, particles, temperature, melting, freezing, evaporation, condensation, reversible, irreversible, state, matter, particle, grain, category, classify, group, solidifying, thermometer, temperature, Celsius, degrees, water cycle, precipitation, evaporation, condensation, sun, atmosphere, clouds, climate, water vapour, rain, hail, snow, cloud, sleet, run off, ocean river.	<b>NC Subject content</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>
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**Subject Specific/Academic Vocabulary**  
 This vocabulary should be explicitly taught in context. Other tier 2 words should also be explored as they are encountered.

Year 3	Year 4	Year 5	Year 6
Benefit, impact, issues, occur, process, sequence, source, variables	Appropriate, consequences, identified, procedure, range, relevant, significant, specific, theory, transfer	Factors, affect, analyse, contribute, demonstrate, outcome, react, volume,	Component, exclude, function, imply, initial, justify, sufficient.

**We are scientists**