

## Y4 Science – States of Matter

### Targets to be covered

- Pupils should compare and group materials together, according to whether they are solids, liquids or gases.
- Pupils should 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)
- Pupils should identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

### Learning Ladders

- I can group materials by whether they are a solid, liquid or gas.
- I can compare and describe solids, gases and liquids.
- I can observe how materials change state when heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).
- I can use the terms evaporation and condensation when describing the water cycle.

### Working Scientifically

- I can set up simple practical enquiries, comparative and fair tests.
- I can make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- I can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- I can identify differences, similarities or changes related to simple scientific ideas and processes.
- I can use straightforward scientific evidence to answer questions or to support their findings.

### Key Vocabulary

states of matter, solid, liquid, gas, melting, freezing, melting point, boiling point, evaporation, condensation, precipitation, temperature, water cycle

| Week | Order of Study                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| 1    | <p><b>Pre-assessment quiz – to be done first</b></p> <p>Part of Lesson 1 from Developing Experts: Compare and group, solids, liquids and gases.</p> <p><b><u>LI : I can group materials by whether they are a solid, liquid or gas.</u></b></p> <p><b><u>LI: I can compare and describe solids, gases and liquids.</u></b></p> <p><b>BQ: What are solids, liquids and gases like?</b></p> <p><b>Type of Scientific Enquiry - Identifying and classifying - Grouping materials and objects into solids, liquids, and gases.</b></p> <p><b>Starter</b> – Match the word (state of matter, particle, volume, matter, bond) to each definition and then mark by going through them on the Developing Experts website.</p> <p><b>Main lesson</b> – Go through the presentation on lesson 1 from Developing Experts. Chn start by observing the three images on the screen and discuss what the similarities and differences are between them. Then go through the vocab from the starter again. Move</p> |

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|   | <p>on to look at Ruth Norton from Norton's Dairy. She has to change substances from liquids to solid regularly as part of her job. Look at the info about the states of matter. Pause after each section – what every day items can the children think of that are solids/liquids/gases? Then children describe the difference between solids, liquids and gases. Now watch the video of Ruth Norton from Norton's Dairy showing the separation of solids and liquids.</p> <p><b>Task</b> – Chn to complete the worksheet 1 on solids/liquids/gases and the challenge section.</p> <p><b>Plenary</b> – Review the vocab from the starter.</p> <p><b>Resources needed:</b> lesson 1 worksheet, developing experts presentation (online) <a href="https://www.developingexperts.com/s/missions/163">https://www.developingexperts.com/s/missions/163</a></p> <p><b>Key terminology</b> – states of matter, solids, liquids, gases, particle, volume, matter, bond</p>                                                                                                                                                                                                                                                                                          |
| 2 | <p>Part of Lesson 2 from Developing Experts: Investigate the effect temperature has on changing state.</p> <p><b>LI: I can observe how materials change state when heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).</b></p> <p><b>Type of Scientific Enquiry - Observation over time –</b></p> <p><b>BQ: How does the mass of an ice cube change over time?</b></p> <p>Teacher to have a big ice cube in a bowl at the start of the day. Present children with the enquiry question and children will then predict what they think will happen throughout the day (on the worksheet).</p> <p>Go through the relevant slides on the Developing Experts presentation for lesson 2 'investigate the effect temperature has on changing state.'<br/><a href="https://www.developingexperts.com/s/missions/840">https://www.developingexperts.com/s/missions/840</a></p> <p>Throughout the day, make observations every hour throughout the day by taking the temperature and plotting on a class line graph.</p> <p><b>Resources needed:</b> ice cubes, bowl, thermometer, worksheet 2, graph paper</p> <p><b>Key terminology</b> – state change, melting, freezing, heating, boiling, solid, liquid</p> |
| 3 | <p>Lesson 5 from Developing Experts: Evaporation and condensation.</p> <p><b>LI: I can use the terms evaporation and condensation when describing the water cycle.</b></p> <p><b>BQ: How do particles change within each state?</b></p> <p><b>Starter</b> – Introduce/reintroduce chn to scientific concepts: melting, freezing, heating, boiling.</p> <p>Then go through key vocabulary for today's lesson on Developing Experts (evaporation, condensation, absorb, heat, water vapour)<br/><a href="https://www.developingexperts.com/s/missions/164">https://www.developingexperts.com/s/missions/164</a></p> <p><b>Main lesson</b> – Then present the children with the water and a kettle. Ask them what change might we be showing from the key vocabulary (evaporation). Make their prediction on the worksheet. Then use the water to boil to show evaporation. Discuss</p>                                                                                                                                                                                                                                                                                                                                                                         |

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|   | <p>how water began as a liquid, and what the particles looked like, what happened during heating/boiling and that the water is now water vapour which is a gas. Show that the particles now look like. Then discuss condensation - measure or research the temperature at which this happens in degrees Celsius (°C). Go through the DE presentation.</p> <p><b>Task</b> – Children to complete the worksheet.</p> <p><b>Plenary</b> – Recap the key concepts/vocab. Children to write about these in their learning journey sentences.</p> <p><b>Resources needed:</b> kettle, water, worksheet 2</p> <p><b>Key terminology</b> – state change, melting, freezing, heating, boiling, evaporation, condensation, absorb, water vapour</p>                                                                                                                                                        |
| 4 | <p>Water cycle</p> <p><b>LI: I can use the terms evaporation and condensation when describing the water cycle.</b></p> <p><b>BQ: What is the water cycle and how does it work?</b></p> <p><b>Main lesson</b> - Go through the key vocabulary (water cycle, evaporation, condensation, precipitation). Show the children the water cycle and discuss what happens – where is evaporation? Condensation? Precipitation? Play the water cycle song.<br/> <a href="https://www.youtube.com/watch?v=TWb4KIM2vts">https://www.youtube.com/watch?v=TWb4KIM2vts</a></p> <p><b>Task</b> - Create a water cycle poster, <u>labelling evaporation, condensation and precipitation</u>.</p> <p><b>Plenary</b> – Plickers quiz on key scientific concepts in the water cycle.</p> <p><b>Resources needed:</b> paper</p> <p><b>Key terminology</b> – water cycle, evaporation, condensation, precipitation</p> |
| 5 | <p><b>Assessment time</b> – Children complete the quiz to review understanding.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |