

LKS2 – Science A2

Cycle B	Ask Questions	Plan	Make Observations	Take Measurements	Gather, record and classify data	Present findings	Answer questions and make conclusions
Year 3	Ask questions and understand there are different enquiry types they could use to answer them	Make relevant predictions. Identify what they will change, observe and keep the same. With support, set up simple practical enquiries.	Begin to use scientific equipment to make observations	Carry out tests and simple experiments and take measurements using standard units.	Gather and record data in different ways to help answer questions. Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.	Report on findings from enquiries, including oral and written explanations.	Make simple conclusions. Use results, findings or observations to answer questions. Suggest questions for further investigation.
Year 4	Ask relevant questions and use different types of scientific enquiry to answer them.	Make predictions based on simple scientific knowledge. Identify what they will change, observe or measure and keep the same. Set up simple practical enquiries, comparative and fair tests.	Make systematic and careful observations.	Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.	Gather, record and classify data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	Use straight forward scientific evidence to answer questions or to support their findings. Use results to draw simple conclusions. Begin to identify differences, similarities or changes related to simple ideas or processes. Begin to make predictions for new values, suggest improvements and raise further questions.

Curriculum Links

States of Matter:

- 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

Key Knowledge Goals for the Topic

What is a Solid, liquid and Gas.
 How materials can change state.
 Investigate how the temperature affects the time to melt.
 What is the water cycle.
 Investigate how the temperature affects the rate of evaporation.

Vocabulary

Sold, Liquid, Gas
 Volume
 Flow
 Freezing
 Melting
 Condensation
 Water cycle
 Precipitation
 Evaporation

Week	Knowledge (Subject Leader)	Skills (Subject Leader)	Lesson Content
1	Step 1 and 2 Properties of solids, liquids and gases	To know that solids have a defined shape and volume. A solid keeps its shape. Liquids have no fixed shape and will take the shape of any container. Gases have no fixed shape and no fixed volume. They will spread out and fill any space.	Look at the properties of solids, liquids, and gases. Show particle pictures to explain the movement into different containers. Explain what items are solids, liquids and gases. Look at ooblek, when a force is applied, it acts as a solid, when no force is applied, it acts as a liquid.
2	Step 3 Changing States	Introduce the vocabulary evaporation and condensation. Temperature changes can cause changes in state. Discuss melting and freezing through changing of state.	Practical lesson – observing the changes of state through heating/ freezing. Melt different materials. (chocolate, ice, butter) Show how a solid can change state through applying heat. Boil a kettle. Observe the evaporation of the water coming out of the top of the kettle. Put a glass bowl above the kettle to create

			condensation from the evaporated water cooling and changing back to liquid again.
3	Step 4 and 5 Plan melting experiment	<p>Plan fair test to investigate whether the temperature of the water affect the time it takes for ice to melt.</p> <p>Discuss what the variables will be and what makes it a fair test.</p> <p>Keep water under 50C</p>	<p>Plan – How does the temperature of the water affect the time it takes for ice to melt?</p> <p>Variables – What will change? – The temperature of water What will be measured? – The time it takes for ice to melt. What will stay the same? – The volume of the water in the containers.</p> <p>Equipment needed: Beakers, thermometer, stopwatch, hot water, cold water, ice cubes.</p> <p>Write predictions – I predict that... I think this will happen because... We are changing the... We are measuring the... We are keeping _____ the same.</p> <p>Method: 2 beakers A and B. Hot water in one and cold in the other. Measure starting temperature in both beakers and record in results table. Add ice to both beakers at the same time and start the stopwatch. Observe closely how long it takes the ice to melt. Record both times.</p>
4	Step 6 Investigate melting experiment	<p>Carry out experiment, talking through the process, referring to method from last lesson.</p> <p>Write evaluation.</p>	<p>Experiment</p> <p>Children record results in result table showing the temperature of the water and the time of melted ice in each beaker.</p> <p>Write evaluations explaining which beaker melted the ice faster and why.</p> <p>My prediction was correct/ incorrect because...</p>
5	Step 7 The water cycle	<p>Introduce the water cycle</p> <p>Evaporation is one stage of the water cycle where liquid changes to gas.</p> <p>Condensation is when the gas changes to the liquid (clouds)</p> <p>Precipitation – liquid or frozen water that falls back to earth. (rain, sleet, snow, hail)</p>	<p>Do this prior to the lesson to show the result to the class – video or take photos to show children. – maybe at the start of lunch for an afternoon lesson.</p> <p>Put a small cup into a glass bowl. Pour warm water in the bowl until it is two-thirds the way up the cup and cover the bowl with cling film. Tighten with elastic band.</p> <p>See the water that has evaporated and formed condensation on the plastic. Then “rain” into the cup.</p> <p>Another idea is to grow cress via the water cycle. – see twinkl. Cress seeds in soil and water (in a plastic cup) Put cling film around the top of the cups. Observe over the next couple of weeks that the water cycle “rains” on the seeds and the seeds grow into cress.</p> <p>Show the water cycle – Twinkl 3D model.</p>
6	Step 9 Plan evaporation experiment	<p>Plan experiment – How does the temperature affect the time it takes for water to evaporate?</p> <p>Discuss what the variables will be and what makes it a fair test.</p>	<p>Put the same volume of water in shallow dishes in three different locations. (on top/ near a radiator, fridge and classroom)</p> <p>Plan – How does the temperature of the water affect the time it takes for ice to melt?</p> <p>Variables – What will change? – The temperature of the different locations. What will be measured? – The time it takes for water to evaporate. What will stay the same? – The volume of the water in the containers.</p> <p>Equipment needed: Shallow dishes, water, measuring cylinder, thermometer.</p>

			<p>Write predictions – I predict that... I think this will happen because... We are changing the... We are measuring the... We are keeping _____ the same.</p> <p>Method Measure the same volume of water in the cylinder for each dish, Place dishes in chosen areas. Measure starting temperature in each area. Record temperatures every hour/ am & pm. Observe which area has the quickest rate of evaporation.</p> <p>(You could do a larger volume of water and observe the changes over a week if easier).</p>																																						
7	Investigate and evaluate evaporation experiment	<p>Fill out the table of results</p> <p>Write conclusion And evaluation</p> <p>Assessment quiz.</p>	<p>Record data in a table throughout the days/ am & pm instead of hours if choosing to.</p> <table border="1" data-bbox="807 663 1426 891"> <thead> <tr> <th rowspan="2">Time (hours)</th> <th colspan="3">Location</th> </tr> <tr> <th>Classroom</th> <th>Radiator</th> <th>Fridge</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table border="1" data-bbox="802 913 1422 1142"> <thead> <tr> <th colspan="3">Location: Fridge</th> </tr> <tr> <th>Time in hours</th> <th>Temperature (°C)</th> <th>Has the water evaporated?</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4</td> <td>No</td> </tr> <tr> <td>2</td> <td>4</td> <td>No</td> </tr> <tr> <td>3</td> <td>4</td> <td>No</td> </tr> </tbody> </table> <p>Evaluate – Write conclusions to conclude what they have observed over time.</p> <p>From looking at the results we can see that... This happened because...</p> <p>I predicted that... My prediction was correct/ incorrect because...</p>	Time (hours)	Location			Classroom	Radiator	Fridge	1				2				3				4				Location: Fridge			Time in hours	Temperature (°C)	Has the water evaporated?	1	4	No	2	4	No	3	4	No
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