

Year 4 Science Curriculum

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States of Matter

What's the big picture? Recap knowledge from year 2 (use of everyday materials) and children to generate own questions to investigate - *"I know how to ask simple scientific questions"*

Prior learning:

Distinguish between an object and the material from which it is made. (Y1 - Everyday materials)

Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials)

Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials)

Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)

Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)

Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)

National Curriculum Principles	Objectives	Knowledge and key Vocabulary	Reading opportunities	Technology
Pupils should be taught to compare and group materials together according to whether they are solids, liquids, gases	To group materials based on their state of matter (solid, liquid, gas)	Give children a selection of solids and liquids to classify according to physical characteristics . Introduce children to the terms solid, liquid, and gas . A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Children to create a double page spread	Once Upon a Raindrop: The Story of Water (James Carter) Sticks (Diane Alber) Charlie and the Chocolate factory (Ronald Dahl)	
Observe that some	I know how some	Melting is a state change from solid to liquid. Freezing is a state	Bartholomew	

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<p>materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees celsius</p>	<p>materials can change state</p> <p>I can explore how materials change state</p> <p>I can measure the temperature at which materials change state</p>	<p>change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Boiling point of water is 100oC.</p> <p>Explore a range of materials melting.</p> <p>Explore freezing different liquids.</p> <p>Children to explore the properties of ice - what is ice? How does it look? How does it feel, smell etc... What happens to ice at room temperature? Children to measure temperature of melting ice over time using a thermometer/data logger.</p> <p>Children to investigate how best to speed up the melting of ice eg hairdryer, salt, hot water - complete comparative testing and predictions. Present results (table, bar chart and report findings)</p> <p>Children to observe what happens when water is boiled - boiling point, steam. Use thermometer/data loggers to measure temperature of boiling water (teacher led). Children to investigate which materials will and will not melt, eg chocolate, butter, apple - comparative testing</p>	<p>and the Oobleck (Dr Seuss)</p> <p>Itch (Simon Mayo)</p> <p>Stormbreaker (Anthony Horowitz)</p>	
<p>Identify the part played by evaporation and condensation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>I know about the water cycle</p> <p>I know the part played by evaporation and condensation in the water cycle</p>	<p>Demonstrate the water cycle to children using bowl, hot water, ice and cling film. Introduce children to the terms evaporation, condensation, precipitation.</p> <p>Set up a water cycles in plastic wallets - make observations.</p> <p>Children to label and describe a diagram of the water cycle.</p> <p>Children to investigate rates of evaporation (black sugar paper and wet sponge) How to make a damp towel dry more quickly. - comparative test, how to improve, gather and record data</p>		

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		Use secondary sources to find out about the after cycle.		
		Children create a double page spread		

Famous scientists

Joseph Priestly - gases

Lord Kelvin - discovered absolute zero

Common misconceptions

Some children may think:

- 'solid' is another word for hard or opaque
- solids are hard and cannot break or change shape easily and are often in one piece
- substances made of very small particles like sugar or sand cannot be solids
- particles in liquids are further apart than in solids and they take up more space
- when air is pumped into balloons, they become lighter
- water in different forms - steam, water, ice - are all different substances
- all liquids boil at the same temperature as water (100 degrees)
- melting, as a change of state, is the same as dissolving
- steam is visible water vapour (only the condensing water droplets can be seen)

Enquiry ideas

<u>Comparative tests</u>	<u>Identify and classify</u>	<u>Observations over time</u>	<u>Pattern seeking</u>	<u>Research</u>
Which material is best for keeping our hot chocolate warm?	Group materials according to whether they are solids liquids or gases?	How does the level of water in a glass change when it is left on the windowsill?		What are hurricanes and why do they happen?
		What happens to the temperature and state of an ice cube over time?		