



Subject	Term	Unit
Science - Year 4	Summer 2	States of matter

Intent

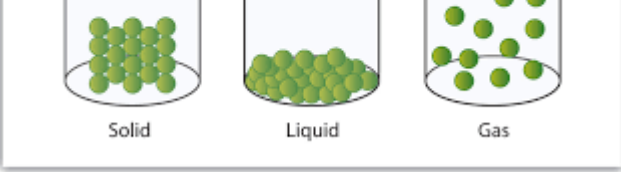
At Hurst Hill, we nurture young scientists by fostering curiosity and developing strong scientific knowledge and enquiry skills. Children learn to investigate, observe and evaluate confidently, understanding how science shapes the past, present and future while building firm foundations for lifelong scientific learning.

Prior knowledge	National Curriculum
<ul style="list-style-type: none"> • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching 	<ul style="list-style-type: none"> • 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

What?	To take a more in depth look at materials and their properties. To understand the differences between solids, liquids and gases and how these changes occur.
Why?	This will link closely to Year 5's work on materials and their properties.
How?	Through observation of materials and by measuring temperatures and changes. Through discussion and collection of information.

Vocabulary

Condensation	Small drops of water which form when water vapour or steam touches a cold surface, such as a window.
Cooling	Lowering the temperature of something.
Evaporation	To turn from a liquid to a gas and pass away in the form of vapour.
Freezing	When a liquid , or substance containing a liquid, becomes solid because of low temperatures .
Freezing point	The temperature at which a substance freezes. The freezing point of water is 0°C.
Gas	A form of matter that is neither solid nor liquid . A gas rapidly spreads out when it is warmed and contracts when it is cooled.
Heating	Raising the temperature of something.
Liquid	In a form that flows easily and is neither a solid nor a gas .
Melting	To change from a solid to a liquid through heating or pressure.
Melting Point	The temperature at which a substance melts.
Particles	A tiny amount or a small piece of something.
Precipitation	Rain, snow, sleet, dew, etc. formed by condensation of water vapour in the atmosphere.
Process	A series of actions used to produce something or reach a goal.
Properties	The ways in which an object or substance behaves.
Solid	Having a firm shape or form that can be measured in length, width and height and being neither a liquid nor a gas .
Temperature	A measure of how hot or cold something is.
Vibrations	Small, quick, repeated movements caused by an object or substance shaking.
Water cycle	The process by which water on the Earth evaporates, condenses in the atmosphere and returns to the ground in the form of precipitation .
Water vapour	Water in its gaseous state, particularly caused by evaporation at a temperature lower than boiling point.

Objective	Learning
<p>Can I group materials into solids, liquids and gases?</p>	<p style="text-align: center;">Pattern Seeking Identifying and Classifying</p> <p>The properties of a substance depend on what its particles are like, how they move and how they are arranged. Particles are what materials are made from and they are so small that we cannot see them with our eyes. They behave differently in solids, liquids and gases:</p> <ul style="list-style-type: none"> • Solids always take up the same amount of space. They have vibrating particles which are closely packed in and form a regular pattern, which means they have a fixed shape and cannot be poured. • Liquids can change shape depending on the shape of the container they are in because they can be poured. Liquid particles are spaced out randomly and close together, which allows them to move over each other. • The particles in a gas can escape from any container they are placed in. This is because they are spread out and can move in any direction. <p>Ask the children to look at the range of materials and sort them physically into solids, liquids and gases. Begin to think and to label the properties of each material- solid, liquid and gas. What do they have in common?</p>
<p>Can I explain the properties of solids, liquids and gases?</p>	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>Identifying and classifying</p> <p>Ask the children to look at the range of materials and sort them physically into solids, liquids and gases so they can describe this to the properties listed above. Begin to think and to label the properties of each material- solid, liquid and gas. What do they have in common?</p> </div> </div>

Can I describe what happens to a substance when it is heated?

Pattern seeking

Look at an ice cube. What happens when it heats up by being held in our hand?
 Look at water being boiled (kettle or on a video). What happens when the water gets to boiling point? What temperature does this happen at?
 Go back to the class representation of solids, liquids and gases- ask the children to get more energy and ask them to change state as they start to move. What happens to them?
 Children draw and explain what happens when we heat water?
 Ask the children to reverse the process and show water being cooled.
 (Could use other examples too- metal, chocolate etc).



Can introduce the terms, evaporation, condensation, melting and freezing.

Can I investigate how the level of water in a container change when left on the windowsill?

2 lessons- one to set up and one to record and explain.

Observing Over Time

Consider the variables involved in investigating this question – how would fair testing be ensured? Could the windowsill used create any potential problems (e.g.: radiator near the window, season of the year)? What can be measured? What can't be controlled (e.g.: temperature caused by sunlight, position of the Sun throughout the day)? What observations would you expect to find? Why?
 Fair test experiment set up for the children to test what happens to the level of water over one week. Leave in different areas- fridge, window sill to link to temperature. Record observations in the next lesson. Why has this happened?

Research

Can I explain the changes happening in the water cycle?

When a liquid such as water is heated, the particles start to move faster and faster until they have enough energy to move around more freely. The water has evaporated into water vapour, which is a gas. As water vapour starts to cool, the particles start to slow down and move closer together again, eventually returning to a liquid state.

The water cycle is a natural process that uses evaporation and condensation to continually recycle the Earth's water. Water in lakes, oceans and rivers is heated by the sun and evaporates into the atmosphere, where it cools and condenses into clouds. The clouds then release water as precipitation, which lands on the Earth and finds its way back to the lakes, oceans and rivers to repeat the process again.



Students could make a model of the water cycle or draw to explain the processes that are shown.

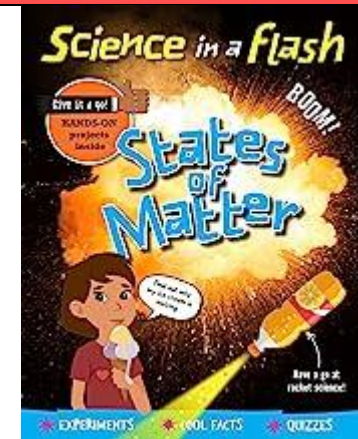
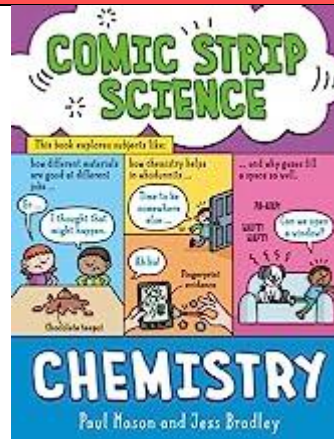
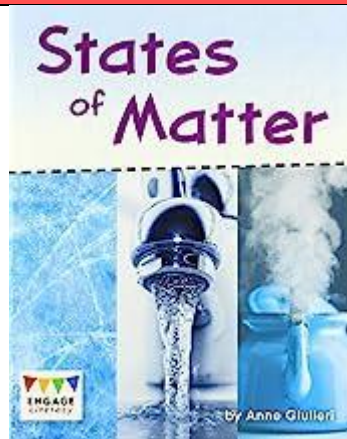
Websites

<https://www.bbc.co.uk/bitesize/topics/z9r4jxs/articles/zqpv/p3>

<https://www.schoolsofkingedwardvi.co.uk/ks2-science-year-4-3-states-matter-solids-liquids-gases/>

<https://www.stem.org.uk/resources/community/collection/12345/year-4-states-matter>

Recommended Reads



Golden Thread

Materials and their properties

