

Investigating Materials– States of Matter

What you've learnt already

To distinguish between objects and materials.
About the suitability of materials and changing the shape of solids.
Understand how rocks and soil are formed .
The changes of state for water: ice, water, steam

Choices

Choose methods and resources for their investigation and how to measure their findings.
Decisions on how to create the final outcome within groups.

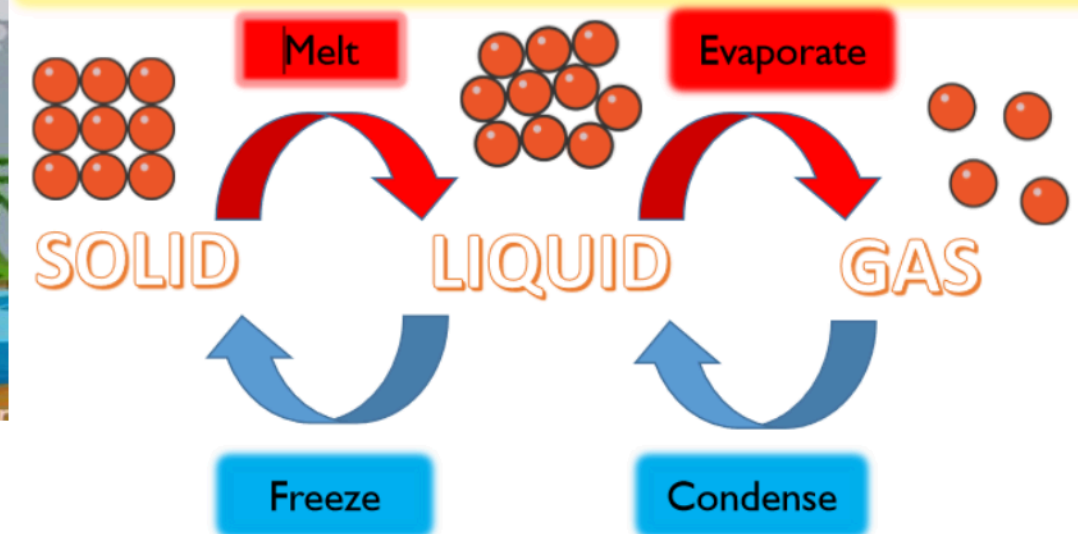
Key Vocabulary

Condensation	The process of gas (water vapour) cooling and changing into a liquid.
Evaporation	The process of a liquid heating and changing into a gas.
Expand	An increase in volume, usually due to heating
Freezing	The process of a liquid cooling and changing into a solid.
Melting	The process of a solid heating and changing into a liquid.
Particle	A tiny amount of something– cannot be seen with eyes.
Solidify	Change of state liquid to solid at warmer temperatures
Temperature	How hot or cold something is– measured in degrees Celsius.
Variable	Anything that can be changed or measured
Independent variable	The variable being changed
Dependent variable	The variable being measured/observed
Water Vapour	When water takes the form of a gas after reaching boiling point.



Diagrams

CHANGING STATES OF MATERIALS



Lesson Sequence

L1	WALT identify properties of solids and liquids
L2	WALT understand how temperature is measured
L3	WALT plan and carry out a fair test on melting points
L4	WALT investigate melting, and freezing
L5	WALT investigate whether spaces are really empty
L6	WALT understand evaporation
L7	WALT understand condensation
L8	WALT understand the water cycle.

Key Knowledge

Solids, liquids and gases can be identified by their observable properties.
Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action).
Liquids can pour and take the shape of the container in which they are put.
Liquids form a pool not a pile.
Solids in the form of powders can pour as if they were liquids but make a pile not a pool.
Gases fill the container in which they are put.
Gases escape from an unsealed container.
Gases can be made smaller by squeezing/pressure.
Liquids and gases can flow.
Changes of state in processes melting, freezing, evaporating, condensing (as in diagram above)

Key Working Scientifically Skills

Observing over time, pattern seeking and classifying materials and changes of state.
Set up simple, practical enquiries and comparative and fair tests.
Take measurements using thermometers .

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Name one property of a gas	Name one property of a solid.	Name one property of a liquid	What is the name of water in it's 3 states?
What is the process called when matter changes from a solid to a liquid?	What is the process called when matter changes from a liquid to a gas?	What is the process called when matter changes from a gas to a liquid?	What is the process called when matter changes from a liquid to a solid?
What is condensation?	At what temperature does water change to a solid?	At what temperature does water change to a gas?	Explain what evaporation is.
Where do gases come from?	Does everything in the world melt at the same temperature? Give examples.	Explain the water cycle.	Which state of matter takes the shape of its container?

One Point

Two Points

Three Points

Four Points

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<p>Name one property of a gas</p> <p>Does not have a fixed shape, changes volume -spreads out to fill the space, often invisible.</p>	<p>Name one property of a solid.</p> <p>Keeps its shape and volume. Cannot flow.</p>	<p>Name one property of a liquid</p> <p>Take the shape of the container, can flow, don't change volume.</p>	<p>What is the name of water in it's 3 states?</p> <p>Ice, water, water vapour</p>
<p>What is the process called when matter changes from a solid to a liquid?</p> <p>Melting</p>	<p>What is the process called when matter changes from a liquid to a gas?</p> <p>Evaporation</p>	<p>What is the process called when matter changes from a gas to a liquid?</p> <p>Condensation</p>	<p>What is the process called when matter changes from a liquid to a solid?</p> <p>Freezing</p>
<p>What is condensation?</p> <p>When a gas cools and changes to a liquid e.g. water vapour condenses on a bathroom mirror.</p>	<p>At what temperature does water change to a solid?</p> <p>0°C</p>	<p>At what temperature does water change to a gas?</p> <p>100°C</p>	<p>Explain what evaporation is.</p> <p>When a liquid is heated and changes to a gas e.g. water in a kettle becomes water vapour.</p>
<p>Where do gases come from?</p> <p>Gases exist naturally in air but the balance is changed. Oxygen is excreted by trees, carbon dioxide by humans. Methane is created by animals and car exhausts.</p>	<p>Does everything in the world melt at the same temperature? Give examples.</p> <p>Different temperatures e.g. ice melts at 0°C but iron melts at 1538°C</p>	<p>Explain the water cycle.</p> <p>Water evaporates as it is heated by the sun. In the colder air at higher altitudes, it condenses into water droplets. As these get larger and heavier, they fall (precipitation)</p>	<p>Which state of matter takes the shape of its container?</p> <p>Liquid (and gas if it is a closed container)</p>

One Point

Two Points

Three Points

Four Points