Jeavons Wood Primary School – Science Knowledge Organiser

Topic: States of Matter	Year: 4	Strand: Chemistry

Big Question: *How does water exist in all 3 states of matter?*

What should I already know?

*Distinguish between an object and the material from which it is made.
*Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.
*Describe the simple physical properties of a variety of everyday materials.
*Compare and group together a variety of everyday materials on the basis of their simple physical properties.
*Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
*Understanding squashing, bending, twisting and stretching solids.

What will I know by the end of the unit?

Types of Material

Solids	*Stay in one place and can be held *Most keep their shape and do not flow like liquids. Some like sand and salt can be poured as they are made up of lots of solid particles. *Always take up the same amount of space (fixed volume)
Liquids	*Can flow or be poured easily and are not easy to hold. *Change shape depending on the container they are in but have a fixed volume.
Gases	*Often invisible *Do not keep their shape – changing this and their volume to fill up whatever container they are in.

Changes of State

When a material changes from one material type to another, we refer to it as **'having changed state of matter'**.

What are the changes of state?

What	Explanation	Name of process	Example
Solid to Liquid	When a solid **melts** it changes to a liquid.	Melting	When an ice cube melts.
Liquid to Gas	A liquid **evaporates** into a gas when it is heated.	Evaporation	When water on a roof is warmed up and turns to steam.
Gas to Liquid	When a gas it cooled it **condenses** into a liquid.	Condensation	When steam from the shower cools on the mirror it turns to water.
Liquid to Solid	When a liquid **freezes** it turns into a solid.	Freezing	When the water in a pond freezes, it turns to ice.

Temperatures for changes of state

Boiling	• Water boils at exactly 100°C (A hot bath is about 40°C)
Melting	Different solids melt at different temperatures: • Ice melts at 0 degrees Celcius (0°C). • (Chocolate melts at about 35°C)
Freezing	Water freezes at 0 degrees Celcius (0°C).
Evaporation and Condensation	• Water can evaporate and condense at any temperature. But, the warmer it is the faster the evaporation takes place.

The Water Cycle

Water on the earth is constantly moving. It is recycled over and over again. This recycling process is called the **water cycle**.

a. Water evaporates into the air
The sun heats up water on land, and in rivers, lakes and seas and turns it into water vapour. The water vapour rises into the air.

b. Water vapour condenses into clouds
Water vapour in the air cools down and changes back into tiny drops of liquid water, forming clouds.

c. Water falls as rain
The clouds get heavy and water falls back to the earth in the form of rain or snow.

d. Water returns to the sea
Rain water runs over the land and collects in lakes or rivers, which take it back to the sea. The cycle starts all over again.

Vocabulary

Temperature	The measure of warmth or coldness of an object.
Celsius	The common scale in the UK for measuring temperature.
Boils	To become so hot (100°C) that water bubbles and then turns into a gas.
Container	Something which holds things inside, like a box, jar or tub.
Evaporation	The process of turning from a liquid into a gas.
Condensation	The process of turning from a gas into a liquid.
Melting	The process of turning from a solid into a liquid.
Freezing	The process from turning from a liquid into a solid.
Precipitation	Water falling back to the earth in the form of rain/snow/hail.
Run off	Water running over land back to lakes, rivers and the sea.
Water vapour	Water in it's gas state.
Particles	A minute portion of matter that all things are made of.

Where will my learning go next?

In Year 5: Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Demonstrate that dissolving, mixing and changes of state are reversible changes. explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

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Q1: Tick the States of Matter;	**Start of unit**	**End of unit**
Solid		
Air		
Liquid		
Water		
Gas		

Q2: Tick the process involved in the Water Cycle;	**Start of unit**	**End of unit**
Precipitation		
Evaporation		
Dissolving		
Condensation		
Melting		
Freezing		
Collection		

Q3: What is the process called when a gas turns into a liquid?	**Start of unit**	**End of unit**
Evaporation		
Condensating		
Melting		
Freezing		

Q4: Which state of matter does not have a fixed volume?	**Start of unit**	**End of unit**
Solid		
Liquid		
Air		
Gas		

Q5: At what temperature does each happen?	**Start of unit**	**End of unit**
Boiling water to change to water vapour		
Melting ice to become water		
Freezing water to become ice		
Evaporation and Condensation		