MORDA CE PRIMARY SCHOOL

Science – Properties of materials Knowledge Organiser: ROSES Year 4/5 Spring 1st half 2023

Key Skills	Key enquiry questions
Year 4 Use knowledge and understanding of materials to sort and group materials. Identify and describe the features of sub-groups within a material with the same properties, e.g. oak, beech, birch etc. Describe why materials are used for different purposes, e.g. glass for windows. Compare and group materials together, according to whether they are solids, liquids or gases. **Year 5** Identify and give reasons why materials are used for a specific task or purpose. Compare and group everyday materials based on evidence from comparative and fair tests, based on hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets.	What is a solid? What is a liquid? What is a gas? What are the properties of each? What is a particle? What are the particles like in a solid? Liquid? Gas? What makes fizzy drinks fizzy? Do gases weigh anything? How do materials change state? What happens when a material is heated? What happens when a material is cooled? How do the particles change when they are heated or cooled? How does water change between the three states? How do wet clothes dry? What is the water cycle?

Science National Curriculum	
Pupils should be taught to: • 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 Vocabulary	
states of matter	Materials can be one of three states: solids, liquids or gases. Some materials can change from one state to another and back again.
solids	These are materials that keep their shape unless a force is applied to them. They can be hard, soft or even squashy. Solids take up the same amount of space no matter what has happened to them.
liquids	Liquids take the shape of their container. They can change shape but do not change the amount of space they take up. They can flow or be poured.
gases	Gases can spread out to completely fill the container or room they are in. They do not have any fixed shape but they do have a mass.
water vapour	This is water that takes the form of a gas. When water is boiled, it evaporates into a water vapour.

Key Vocabulary	
melt	This is when a solid changes to a liquid.
freeze	Liquid turns to a solid during the freezing process.
evaporate	Turn a liquid into a gas.
condense	Turn a gas into a liquid.
precipitation	Liquid or solid particles that fall from a cloud as rain, sleet, hail or snow.

Properties of materials

What are the three states of matter?

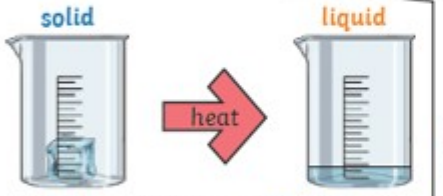
Key Knowledge

There are three states of matter.

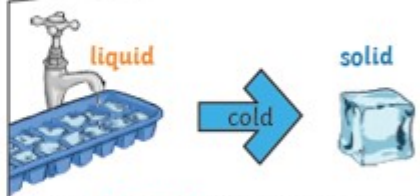
Solid	Liquid	Gas
Particles in a **solid** are close together and cannot move. They can only vibrate.	Particles in a **liquid** are close together but can move around each other easily.	Particles in a **gas** are spread out and can move around very quickly in all directions.

How does temperature affect liquids?

When water and other **liquids** reach a certain temperature, they change state into a **solid** or a **gas**. The temperatures that these changes happen at are called the boiling, **melting** or **freezing** point.



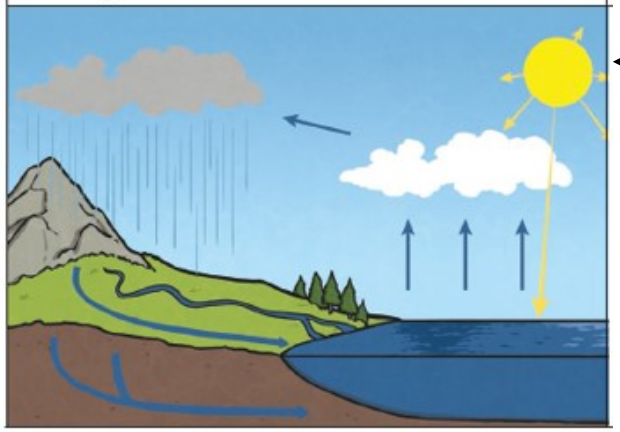
If a **solid** is heated to its **melting** point, it **melts** and changes to a **liquid**. This is because the particles start to move faster and faster until they are able to move over and around each other.



When **freezing** occurs, the particles in the **liquid** begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a **solid** structure.

What is the water cycle?

Condensation and **evaporation** occur within the water cycle.



1. Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into **water vapour**.
2. This **water vapour** rises, then cools down to form water droplets in clouds (**condensation**).
3. When the droplets get too heavy, they fall back to the earth as rain, sleet, hail or snow (**precipitation**).

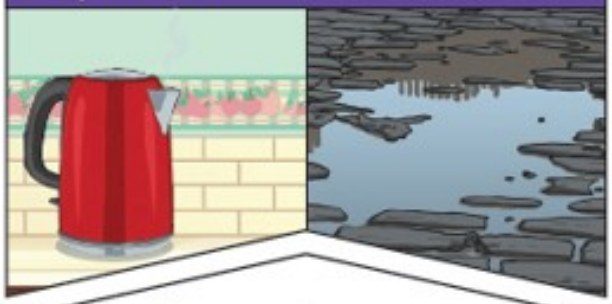
What is condensation?

Condensation

Condensation is when **water vapour** is cooled down and turns into water. You can see this when droplets of water form on a window. The **water vapour** in the air cools when it touches the cold surface.

What is evaporation?

Evaporation



Evaporation occurs when water turns into **water vapour**. This happens very quickly when the water is hot, like in a kettle, but it can also happen slowly, like a puddle **evaporating** in the warm air.