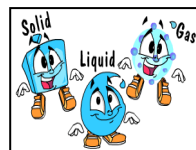


Knowledge Organiser - Year 4 - Science: States of Matter



States of Matter - The state that a material is in depends upon its temperature.

Key Vocabulary

Celsius	A scale of temperature - water freezes at 0° Celsius (°C) and boils at 100° Celsius (°C) under standard conditions.
Condensation	Changing vapour or gas to a liquid by cooling it down.
Energy	Energy is defined as the ability to do work. Energy can be found in many things and can take different forms.
Evaporation	The process of turning liquid to a vapour (gas).
Freezing	When a substance changes from a liquid to a solid.
Gas	A state of matter with no fixed shape or volume which expands freely to fill the space available.
Liquid	A substance that flows freely but can be measured by volume e.g. water or oil.
Melting	When a substance changes from a solid to a liquid.
Molecules	A small particle inside a solid liquid or gas.
Particles	A very small amount of something, sometimes too small to see.
Plasma	A state of matter that is similar to a gas, but the particles are moving more freely. Plasma has been called the fourth state of matter.
Precipitation	Another word for rain, snow, sleet, or hail that falls to, or condenses on the ground.
Reversible	Able to be reversed back to its original state e.g. Ice to water. A physical change – melt, freeze.
Solid	Firm and stable in shape, not a liquid or fluid.
State	A state of matter is one of the forms in which a substance can exist. Four states of matter are observable in everyday life: solid, liquid, gas, and plasma, but the first three are the most common.
Temperature	Temperature is a measurement of how hot or cold an object is. It can be measured with a thermometer.
Thermometer	An instrument for measuring temperature; usually a narrow, glass tube marked with a scale and containing mercury or alcohol, which extends along the tube as it gets hot. They can also be digital.
Water Cycle	This describes the continuous movement of water as it makes a circuit from the oceans to the atmosphere and then to the Earth and on again.

Working Scientifically

Pupils should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; help to decide how to set it up; talk about criteria for grouping, sorting and classifying. They should decide what data to collect to identify them. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. They should learn how to use new equipment. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. Pupils should use relevant scientific language to discuss their ideas and communicate their findings.

Key Question: How can this material be changed?

Solids

- Keep a fixed shape and volume
Rigid particles locked into place
- Can't be compressed easily
Little space between particles
- Do not flow easily
Particles cannot slide past one another



Liquids

- Take the shape of the part of the container they are in
Particles can move/slide past one another
- Can't be compressed easily
Little space between particles
- Flow easily
Particles can move/slide past one another



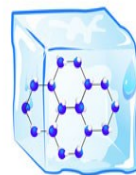
Gases

- Take the shape and volume their container
Particles can move past one another
- Can be easily compressed
Lots of space between particles
- Flow easily
Particles can move past one another

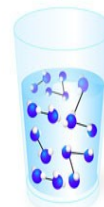


These are the three main states of matter, which means that nearly anything on Earth can be classified as a solid, a liquid or a gas. These states change when temperature changes, but usually we describe a state as something we see at room temperature, so water exists as a liquid. If you heat it to its boiling point, it becomes a gas and if you cool it to its freezing point, it will become a solid. The three states behave in different ways and this is caused by how the little particles inside the material are behaving. Particles inside a gas are moving very quickly, but particles inside a solid hardly move at all, they just vibrate a little!

Solid



Liquid

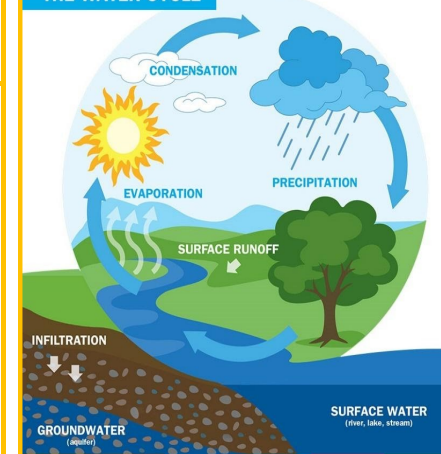


Gas



Pour yourself a glass of water and take a sip. Did you know that the water you've just swallowed is the same water that woolly mammoths, King Tutankhamun and the first humans drank? That's because Earth has been recycling water for over four billion years!

THE WATER CYCLE



The water cycle describes the continuous movement of water as it makes a circuit from the oceans to the atmosphere and then back to the Earth. As the sun heats the Earth's surface, water from rivers, lakes and the oceans evaporates into the atmosphere. In the sky it is cooler and so the water vapour condenses, forms clouds and then falls back to Earth as precipitation. The trees also play a part by taking in water and then releasing water vapour from their leaves (this is called transpiration). The ability of water to exist in three states is the reason this cycle can take place.