



States of matter



Year 4

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.
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

What will I know by the end of this unit?

What is a solid?

Solids hold their shape; their particles are closely packed and form a regular pattern. Their shape is fixed, and they will always take up the same amount of space. Examples: ice, wood, glass, brick.

What is a liquid?

Liquids hold the shape of the containers they are in and so can change shape. Their particles are close together but can move over each other. Liquids can be poured. Examples: milk, washing-up liquid, water.

What is a gas?

Gases can escape from open containers. They often cannot be seen. They have particles which can spread out and move in all different directions. Examples:

Vocabulary

materials: The substance that something is made out of, e.g. wood, plastic, metal.

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.

solid: a state of matter that is firm and stable.

liquid: a state of matter that flows freely but keeps the same volume, e.g. water or oil.

gas: a state of matter that have no defined shape or volume.

water vapour: Water that takes of a gas. When water is boiled, it evaporates into a water vapour.

melting: The process of heating a solid until it changes into a liquid.

freezing: When a liquid cools and turns into a solid.

evaporation: When a liquid turns into a gas or vapour. A process used for separating a soluble solid and a liquid.

condensation: When water vapour cools and turns back into water.

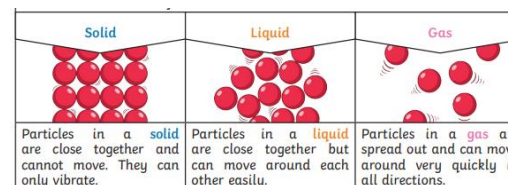
precipitation: liquid or solid particles that fall from a cloud as rain, sleet, hail or snow.

temperature: how hot or cold something is.

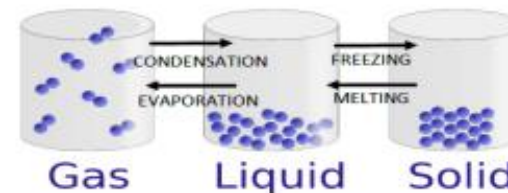
thermometer: an instrument use for measuring temperature.

Diagrams

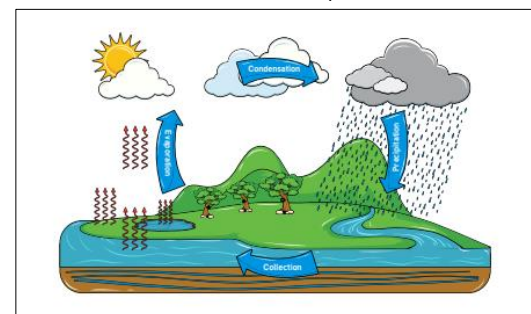
States of Matter



Heating and Cooling



The Water Cycle



Learning Journey Assessment

- 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.

Famous Scientists/Inventors

- Antoine Lavoisier and Joseph Priestley - two scientists responsible for the discovery of oxygen.
- Washington Sheffield - invented toothpaste.
- Garrett Morgan - invented the first modern gas mask.
- Robert Boyle - studied the behaviour of gases and linked states of matter with the movement of particles.

Oxygen, Hydrogen, steam, carbon dioxide. <u>Changes of state (heating & cooling)</u> Warming solid ice makes it melt into liquid water. Adding more heat makes it evaporate (at 100 C) into steam (gas). The particles move faster and faster until they are able to move over and around each other. When it is cooled it condenses back into liquid water. The particles in the liquid begin to slow down as they get colder and colder. If it is cooled to 0 C it freezes and forms ice. The particles can only move gently on the spot, giving them a solid structure. <u>The Water Cycle</u> Water continually moves around the Earth in the water cycle. The sun evaporates water into water vapour. When the water vapour cools down it turns into liquid water and it rains. In very cold places the water freezes into snow or ice. Snow and ice, when warmed melts into					