

Phase: 5/6

Subject: Science

Focus: Properties and changes of materials

Term: Autumn

What I should already know?


The suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. How shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. 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.

Vocabulary

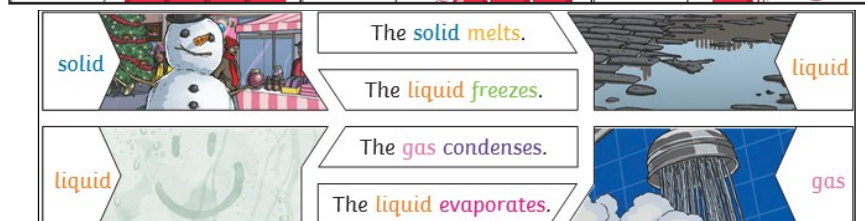
Materials	The substance that something is made out of.
Solids	A state of matter where the particles are close together. Solids hold their shape.
Liquids	A state of matter that can flow and take the shape of the container. The particles are more loosely packed than solids and move around each other more easily.
Gases	One of the three states of matter. Gas particles are further apart than solid or liquid particles and they are free to move around.
Melting	The process of heating a solid until it becomes a liquid.
Freezing	When a liquid cools and becomes a solid.
Evaporating	When a liquid turns into a gas or vapour.
Condensing	When a gas, such as water vapour, cools and turns into a liquid.
Conductor	A conductor is a material that heat or electricity can easily travel through. Most metals are both thermal conductors (they conduct heat) and electrical conductors (they conduct electricity).
Insulator	An insulator is a material that does not let heat or electricity travel through them. Wood and plastic are both thermal and electrical insulators.
Transparency	A transparent object lets light through so the object can be looked through, for example glass or some plastics.

Knowledge

- Materials have different uses depending on their properties and state (liquid, solid, gas).
- Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets.
- Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.
- Mixtures can be separated by filtering, sieving and evaporation.
- Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.



The diagram illustrates the three states of matter using red spheres representing particles. In the solid state, particles are packed closely together in a regular pattern. In the liquid state, particles are more loosely packed and can move past each other. In the gas state, particles are widely spaced and move rapidly in all directions.



The diagram shows four state changes with corresponding illustrations:

- Solid to Liquid:** A snowman melting. Text: "The solid melts."
- Liquid to Solid:** Water freezing into ice. Text: "The liquid freezes."
- Liquid to Gas:** Water evaporating from a shower. Text: "The liquid evaporates."
- Gas to Liquid:** Water vapor condensing on a mirror. Text: "The gas condenses."

By the end of the unit I should know..

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.
- 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.
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
- 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.



Irreversible changes often result in a new product being made from the old materials (reactants). For example, burning wood produces ash. Mixing vinegar and milk produces casein plastic.

For example, glass is used for windows because it is hard and transparent. Oven gloves are made from a thermal insulator to keep the heat from burning your hand.

<u>Question 1 - What are the properties of a solid? (Tick all that apply)</u>	<u>Start of Unit</u>	<u>End of Unit</u>
It is hard		
It doesn't take the shape of the container		
The particles are close together		
It holds its shape		

<u>Question 2 - What does transparency mean?</u>	<u>Start of Unit</u>	<u>End of Unit</u>
It is see through		
It is partly see through		
It is not see through		

<u>Question 3 - When a liquid is turned into a gas it is called...</u>	<u>Start of Unit</u>	<u>End of Unit</u>
Condensation		
Evaporation		
Melting		

<u>Question 4— What is an example of a thermal or electrical insulator?</u>	<u>Start of Unit</u>	<u>End of Unit</u>
Tin foil		
Plastic		
Copper		
Don't know		

<u>Question 5— What is a way you can separate mixtures? (Tick all that apply)</u>	<u>Start of Unit</u>	<u>End of Unit</u>
Sieving		
Evaporation		
Filtering		
Don't know		

<u>Question 6— What does irreversible mean?</u>	<u>Start of Unit</u>	<u>End of Unit</u>
A new material has not been formed		
It can go back to what it was		
A new material has been formed		