

Sithney C.P. School Knowledge Organisers

Science. Chemistry: Properties and Changes of Materials



What you should already know:

- 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 ($^{\circ}\text{C}$).
- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.

Key learning:

- 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.

Key Vocabulary:

Absorbent: the ability of a fabric to take in moisture

Conductor: a material which allows electricity, heat, or sound to travel through it.

Dissolve: When a material mixes with a liquid and it looks like it has disappeared – it has become part of the liquid.

Gases: gases do not have a shape; they completely fill any container they are put into. They do not have a fixed volume but the same volume as the container.

Insoluble: describes a material which cannot dissolve into a liquid

Insulator: a material that does not allow electricity, heat, or sound travelling through it.

Irreversible: cannot be change back to its original state

Liquids: the shape of a liquid does change, it is not rigid. It fits the shape of the container it is put in. Liquids flow. They also have a fixed volume.

Material: Any substance that has a name. (Plastic, wood, water)

Matter: Everything around us is made of matter, from the air we breathe to the water we drink, and even our own bodies.

Properties: something about a material that we can measure, see or feel – it helps us decide whether or not it is the best material.

Reversible: – can be change back to its original state

Solid: the shape of a solid does not change on its own – it is rigid. They also have a fixed volume.



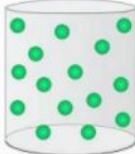
Soluble: describes a material that can dissolve into a liquid.

Solution: Created when a material dissolves into a liquid

Solute: the material which dissolves in a liquid to make a solution

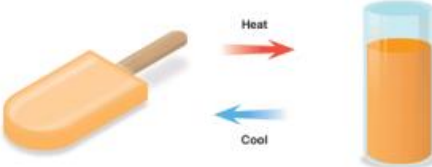

Solvent: The liquid that dissolves the material (solute) to make a solution

Transparent: A material allows light to pass through so that objects behind can be seen.

solid	liquid	gas
		
● rigid	● not rigid	● not rigid
● fixed shape	● no fixed shape	● no fixed shape
● fixed volume	● fixed volume	● no fixed volume
cannot be squashed	cannot be squashed	can be squashed

Changes of State

solid	The solid melts .	liquid
liquid	The liquid freezes .	gas
liquid	The gas condenses .	gas
liquid	The liquid evaporates .	gas

	Reversible changes Reversible changes such as mixing and dissolving can be reversed.
	Irreversible changes Irreversible changes often result in a new product being made from the old materials (reactants). For example, burning wood produces ash and this cannot be turned back into wood.

Mohs Hardness Scale

Mineral Name	Scale Number	Common Object
Diamond	10	
Corundum	9	Masonry Drill Bit (8.5)
Topaz	8	
Quartz	7	Steel Nail (6.5)
Orthoclase	6	Knife/Glass Plate (5.5)
Apatite	5	
Fluorite	4	Copper Penny (3.5)
Calcite	3	
Gypsum	2	Fingernail (2.5)
Talc	1	

↑ Increasing Hardness

SEPARATING MIXTURES

SIEVING – a mixture of different sized solid particles can be separated with a sieve.

FILTERING – an insoluble solid can be separated from a liquid when passed through a filter. The liquid passes through the solid particles are trapped on the filter.

EVAPORATING – if a solution is boiled (heated) the water will evaporate into gas and the solid will be left behind.