

# Properties and Changes of Materials Knowledge Organiser

Solids, liquids and gases are known as the three states of matter. Every material must be one of the three states.

Solids stay in one place and can be held. They can be cut and shaped. Some solids like sugar or salt may seem different, but each particle remains the same shape.

Liquids can flow or be poured - they take the shape of the container they are placed in. However, they always take up the same amount of space and do not increase in volume.

Gases are often invisible and do not take on a fixed shape - they spread out and change their shape and volume to fill the container they are in. Gases can be squashed into a smaller volume.

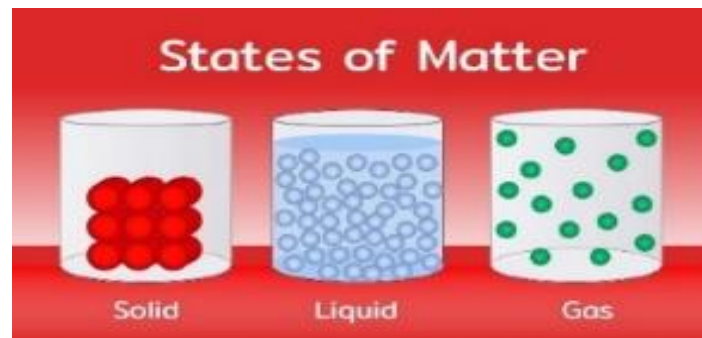
Some mixtures of solids are easily separated. For example, solids with larger particles can be separated from those with smaller particles by sieving.

Some metals can be separated from non-metals by using a magnet. This means the creation of the mixture is a reversible change.

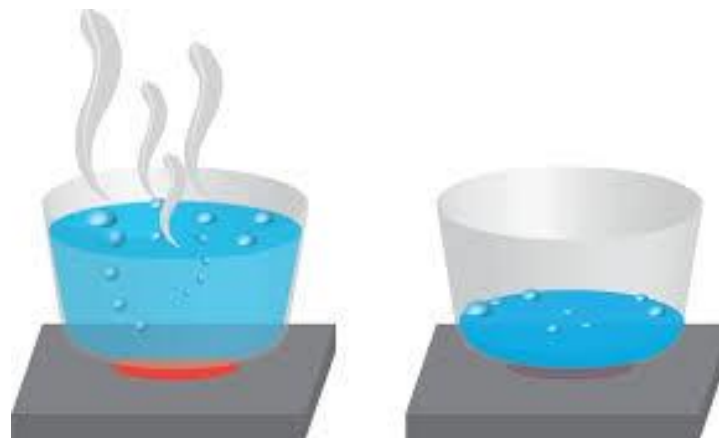
Some solids dissolve in liquids such as water. When they are mixed into a water, it looks like they have disappeared but they have actually mixed with the water to make a transparent liquid called a solution.

A substance that can be dissolved is called a solute - these are soluble. Materials which will not dissolved are called insoluble. Some solid will dissolve more easily than others.

When we create a mixture of a liquid and a solid (for example, water and sand) we can separate them using filter paper as the water can pass through the filter, but the particles of sand are too big to. This means the creation of the mixture is a reversible change.



Some water-based solutions can be separated by adding heat. The heat turns the water into water vapour (a gas) and leaves the solid behind. This is known as evaporation. This means the creation of the solution is a reversible change.



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## Key Vocabulary

**Gas:** A state of matter with no fixed shape or volume like oxygen.

**Liquid:** A state of matter that can flow and take on the shape of a container. They do, however, have a fixed volume.

**Solid:** A state of matter that does not flow or does take on the shape of a container.

**Dissolve:** To mix a solid completely into a liquid so the tiny pieces too small to be seen.

**Evaporate:** To turn a liquid into a gas by adding heat.

**Condensation:** To turn a gas into a liquid by cooling it down.

**Freezing:** To turn a liquid into a solid by cooling it down.

**Reversible:** A change that can be undone or reversed.

**Irreversible:** A change that cannot be undone or reversed.

**Soluble:** A solid that will dissolve in a liquid.

**Insoluble:** A solid that will not dissolve in a liquid.