



Year 5 Science Knowledge Organiser: (Properties and Changes in Materials)



Subject Specific Skills

- I can 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
- I know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- I can use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- I can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- I can demonstrate that dissolving, mixing and changes of state are reversible changes
- I can 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.

Prior Learning

- 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.

Key Knowledge:

- Respiration is a chemical change that takes place inside every cell of our bodies, providing us with energy. Cooking food causes chemical changes, as does burning fuel in the engine of a car. Some chemical changes create products that are useful, such as plastics or fertilisers, while other chemical changes can create problems, such as when iron or steel rusts and corrodes.
- A chemical change is a process in which two or more substances react together to produce a new substance.
- **Chemical changes** cannot be reversed without a further chemical reaction, and in some cases cannot be reversed at all. Chemical changes are known as irreversible changes.
- **Physical changes**, such as melting and boiling, are known as reversible changes.

Key Vocabulary

Chemical reaction: A process in which two or more substances react together to produce a new substance.

Compound: A substance consisting of atoms of more than one element, chemically bonded as molecules. Water, table salt and vinegar are all examples of compounds.

Mixture: A combination of two or more materials that do not chemically react with one another.

Particle: A general term used for atoms and molecules. It may also be used to mean a very small, single piece of a material.

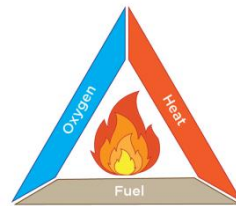
Element: A pure chemical substance made up of a single type of atom. Examples of elements include gold, copper, oxygen and hydrogen.

Key Individual: Linus Pauling



Key Knowledge:

- In some reactions, the reacting substances get hot and give off heat. These are known as exothermic reactions. In other reactions, the reacting substances might get colder and absorb heat. These are known as endothermic reactions.
- Other signs that a reaction is taking place include the production of light or a change in colour. A reaction could also produce a flame, or some bubbles of gas.
- At this teaching stage it is acceptable for the children to consider all chemical changes as irreversible (or non-reversible).
- A **mixture** forms when two or more materials are combined together but do not undergo a chemical change.
- A **compound** forms when two or more elements join together in a chemical reaction.
- The properties of a compound are often very different from those of its constituent elements. For example: oxygen and hydrogen are flammable gases, but when they react and combine they form water (H₂O), which is a non-flammable liquid.
- Firework displays involve many exciting and colourful chemical reactions. When the solid chemicals react together, they produce lots of hot gas. This causes a build up of pressure inside the firework, which eventually causes the firework to explode.
- Burning is a chemical reaction that needs three things to make it happen: a material to burn, called the fuel; a supply of oxygen; and a source of heat to set fire to, or ignite, the fuel.



- To better understand dissolving, it is important to remember that liquids are made of particles, and that these particles move freely. Any liquid that dissolves a substance is called a **solvent**. The substance that dissolves is called the **solute**.