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

Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2) •Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2)• 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. (Y3) • Compare and group materials together, according to whether they are solids, liquids or gases. (Y4) • 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). (Y4)• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4)

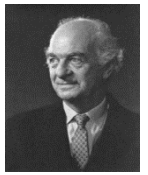
Key Knowledge:

- Different materials are used for particular jobs based on their properties: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency.
- 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. Signs that a chemical change is taking place include colour changes, temperature changes, bubbles of gas, a flame or an explosion.
- **Physical changes**, such as melting and boiling, are known as **reversible** changes. When a physical change occurs, materials may mix together or appear in a different state, but their chemical properties have not changed in any way.
- 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.

Key Vocabulary

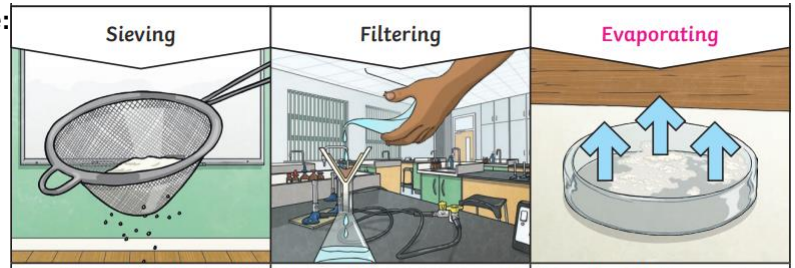
Change of state: Describes the process of one state of matter (solid, liquid or gas) changing to another. Eg. Ice melting
Chemical reaction: A process in which two or more substances react together to produce a new substance.
Compound: A substance consisting of atoms of more than one element, chemically bonded as molecules. Forms when two or more elements join together in a chemical reaction. Water, table salt and vinegar are all examples of compounds.
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.
Mixture: A mixture forms when two or more materials are combined together but do not undergo a chemical change.
Particle: A general term used for atoms and molecules. It may also be used to mean a very small, single piece of a material.
Rusting: A form of corrosion. It is caused by a chemical reaction that affects masses of iron and steel.
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

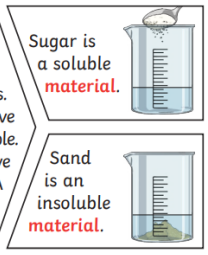


Key Knowledge:

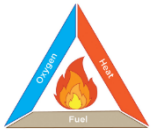
Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by:



Dissolving
A solution is made when solid particles are mixed with liquid particles. Materials that will dissolve are known as soluble. Materials that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve.



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**.



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.