Reffley ACADEMY

Knowledge Organiser

Year: 5 Subject: Science Unit: Properties and changes of materials

Overview:

During this sequence of learning, pupils will compare and group together everyday materials, know that some materials will dissolve to form a solution and understand how mixtures can be separated. Pupils will also be able to demonstrate that dissolving, mixing and changes of states are reversible changes and explain that some changes result in the formation of new materials.

What should I already know?

- An object is made from/of a material.
- Materials can have useful properties for a given job e.g. being waterproof.
- Metals are good electrical conductors.
- Many types of plastic are waterproof, that steel (a type of metal) is strong, that rock is hard, that cotton wool is soft, that rubber is flexible, that rock is rigid, that polystyrene (a type of plastic) is light and that iron (a type of metal) is heavy,
- Things are composed of a material in one of three states of matter: solid, liquid or gas.
- Materials can change state when temperature changes.
- When solids turn into liquids, this is called melting and that the reverse process is called freezing.
- When liquids turn into gases, this is called evaporation and that the reverse process is called condensation.
- When a solid turns into a gas without passing through the liquid state, this is called sublimation.
- The melting point of water is 0° C and that the boiling point of water is 100° C.
- Some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic. Not all metals are magnetic.

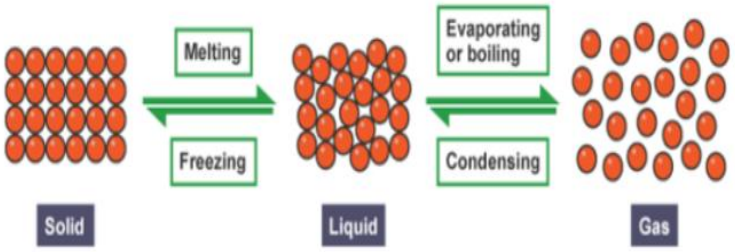
What will I know by the end of the unit?

- Materials can be sorted in a variety of ways based on their properties.
- In some solid materials the bonds between particles break when surrounded by a liquid; this allows the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution.
- When a solid dissolves in a liquid it is described as being soluble in that solvent (e.g. sugar in water); when it cannot it is insoluble (e.g. sand in water).
- A given amount of solvent can only absorb a certain amount of solid before no more will dissolve; when this happens the liquid is said to be saturated.

Vocabulary:

irreversible	Cannot be reversed back to its original state.
dissolve	When something solid mixes with a liquid and becomes part of the liquid.
soluble	Able to be dissolved, especially in water.
insoluble	Not able to be dissolved in water.
solvent	A substance that breaks down or dissolves another substance e.g. if sugar was dissolved in hot water, the water is the solvent.
solute	A solute is a substance that can be dissolved by a solvent to create a solution.
solution	A mixture of two or more substances made up of a solute and a solvent.

- When a solvent is evaporated from a solution, the original solute is left behind; the remaining solid will often form crystals – the slower the solvent evaporates, the larger the crystals that will be formed.
- Children will know how to dissolve a solute in a solvent and then how to evaporate the solvent to recover the solute.
- A reversible change is one that can be reversed and that examples of this are mixing, dissolving and changes of state where no chemical reaction takes place.
- An irreversible change is one that cannot be reversed and examples of this often involve a chemical change where a new material is made, often a gas (e.g. burning, boiling an egg).



- Filtering allows solids and liquids to be separated and sieving allows solids made up of different sizes parts to be separated.
- Children will know how to separate a mixture of sand, salt and small stones by sieving (to remove the small stones), followed by dissolving in water (so the salt is absorbed), followed by filtering to remove the sand from the mixture, followed finally by evaporation of the water to recover the salt.
- Materials' different properties can be tested through acting upon them, including testing to find whether materials are magnetic, thermally conductive and electrically conductive.
- The various properties of different materials make them suitable for a given function.
- How to explain orally and in writing the reasons why various materials are suited or unsuited to a function.

filter	A porous substance through which a liquid or gas is passed through in order to separate it.
sieve	A utensil for separating the finer and coarser parts of a substance.
saturation	A solution that is unable to absorb or dissolve any more solute.
crystallization	The process by which a solid forms (as crystals) when a solvent is evaporated.
thermal	Related to heat.
chemistry	A branch of science that deals with the composition and properties of substances and the changes they undergo.