Knowledge Organiser

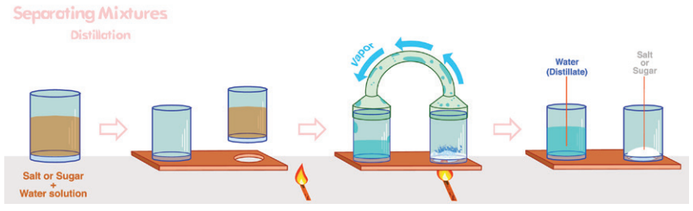
Properties and Changes of Materials

Key Vocabulary		
1	**materials**	the substances from which objects are made
2	**property**	a characteristic of a material that makes it suitable for a particular purpose
3	**classify**	to sort into groups
4	**natural**	occurring in nature
5	**man-made**	created by people
6	**conductivity**	the ability of a material to allow heat or electricity to pass through it
7	**magnetism**	a pushing and pulling non-contact force, which can attract magnetic materials
8	**solution**	a mixture of a solvent and solute
9	**dissolving**	the process of mixing a solute in a solvent to form a solution
10	**saturated**	when a solution contains the maximum possible amount of solute
11	**mixture**	a substance comprised of more than one material, where those materials are not chemically joined
12	**separation**	a process of obtaining the constituent parts of a mixture
13	**filtration**	the process of separating a solid from a filtrate by using a filter
14	**sieving**	the process of separating different sized solids by using a sieve
15	**distillation**	the process of purifying a liquid through evaporation and condensation
16	**combustion**	the scientific term for burning, an irreversible change producing carbon dioxide and water
17	**acid**	a substance containing numerous hydrogen ions, which have a positive charge
18	**base**	a substance containing numerous hydroxide ions, which have a negative charge
19	**alkali**	a base that is soluble in water
20	**neutralisation**	a chemical reaction which occurs when an acid mixes with a base

Where we combine more than one material, but those materials are not chemically joined, we call it a mixture. Mixtures can be separated using a variety of processes.

Distillation

If we have a solution of water and a solute, we can evaporate the water, leaving the solute behind, and then use condensation to recover the water. This can also be used to separate water and insoluble substances.



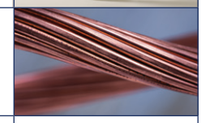
Materials can be classified based on their properties. Examples include:

Hardness – how resistant it is to a permanent change in shape resulting from a force.

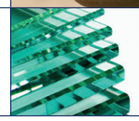
Buoyancy – whether or not it floats.

Strength – how likely it is to fracture under force.

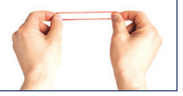
Conductivity – how easily it allows heat or electricity to pass through it.



Transparency – whether or not it allows light to pass through it.



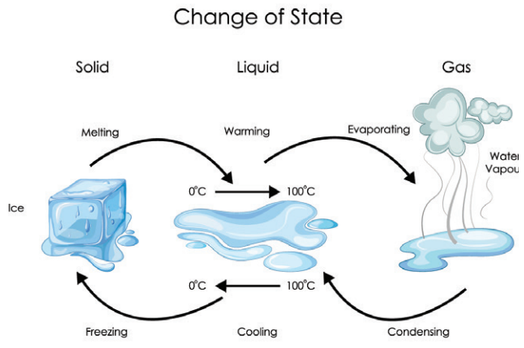
Elasticity – how able it is to stretch and return to its original shape.



Reversible changes

There are some changes where we can recover the original material. We call these reversible changes.

Examples include changes between states of matter. If we apply heat to a solid, we can melt it and form a liquid. If we apply heat to a liquid, we can evaporate it and form a gas. In reverse, if we cool a gas, condensation will form a liquid, and if we cool a liquid we can freeze it to form a solid.



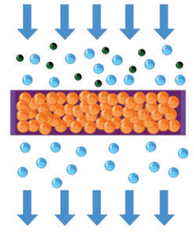
Irreversible changes

With some changes, we cannot recover the original material. There has been a chemical reaction, creating new materials.

One example is combustion, where a material, when heat is applied, combines with oxygen to form the new materials carbon dioxide and water.

Filtration

If we have a mixture of a solid and liquid, we can pass this through a filter to separate them.



Sieving

If we have a mixture of different-sized solids, we can pass this through a sieve to separate them.