



Key Vocabulary	
materials	the matter or substance that objects are made of.
reversible changes	a change that can be changed back again. Melting and heating are examples of reversible changes.
irreversible changes	a change that cannot be changed back again. Burning or mixing a liquid with bicarbonate of soda are examples of irreversible changes.
soluble	able to be dissolved.
insoluble	impossible to dissolve, esp. in a given liquid.
solution	a mixture that contains two or more substances combined evenly.
dissolve	when a substance is mixed with a liquid and the substance disappears.
evaporate	to turn from liquid into gas; pass away in the form of vapour.
conductor	the ability of a material to conduct either heat or electricity.
insulator	a non-conductor of electricity or heat.
permeable	a substance that a gas or liquid can pass through.
thermal	relating to or caused by heat or by changes in temperature.
transparent	an object you can see through

Thermal and Electrical Conductor and Insulator

An **electrical conductor** lets electricity pass through it, e.g. water, carbon, iron, copper and gold. An insulator doesn't let electricity pass through it, e.g. wood, leather, plastic. Materials which are good **thermal conductors** allow heat to move through them easily. Thermal insulators do not let heat travel through them easily. E.g. flasks or woollen.

Comparing and Grouping Materials

Materials can be compared and grouped together on the basis of their properties including:

- Hardness – how hard or soft a material is
- Solubility – whether a material can dissolve
- Transparency – whether it allows light to pass through
- Conductivity (electrical or thermal) – whether it allows heat or electricity to carry through
- Response to magnets – whether it is magnetic

Magnetic 	Transparent 	Permeable 
Soluble 	Insoluble 	Impermeable 
		Flexible 

Reversible and Irreversible Changes

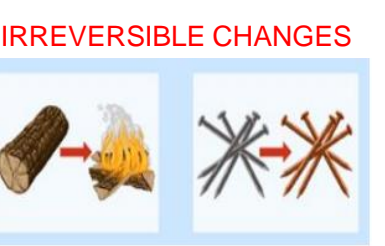
There are many ways in which materials can be changed, for example through heating, cooling, or mixing with other substances.

-Some changes can be reversed (e.g. the material can be returned to its previous form). These are known as reversible changes. An example of this is the freezing of water into ice – it can be melted to become water again.



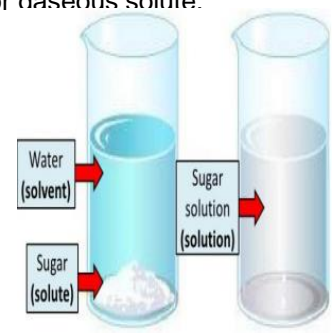
Other changes are irreversible. This means that that the changes cannot be 'undone.' Examples of this include cooking, baking, frying and burning materials.

For example, you can fry a raw egg to cook it. You can't return it back to a raw egg again. - Changes that involve the formation of new materials (e.g. mixing cement) are not normally reversible.



Solutions and Separation

A **solvent** is a substance that dissolves a solid, liquid, or gaseous solute. A **solute** is the substance dissolved in the solvent. When it dissolves, it looks as though it has disappeared, but in fact it has been broken down to become a part of the liquid. For example, salt water. You cannot see the salt, and the **solution** will remain if left alone. Some mixtures and solutions can be separated, e.g. through processes such as **sieving, filtering & evaporating**. Salt and water can be separated by Evaporation.



Focused Scientist – Ruth Benerito (1916 – 2013)

Ruth Benerito was an American chemist. She is best known for developing wrinkle-free cotton fabric. She also invented a fat mixture that could provide nutrients through the veins of patients who could not eat.



Ahmed Zewali – (1946 – 2016)

He was known as the father of femtochemistry which is the study of chemical reactions over very short periods. He was the first Egyptian scientist to win a Nobel prize.

