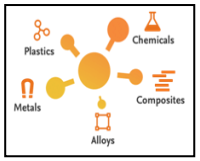
Knowledge Organiser - Year 5 - Science: Properties and Changes of Materials



Materials are the matter from which a thing is made from. Usually split into four categories: Metals, ceramics, polymers and composites.

Key Vocabulary

Absorbent	Able to soak up liquid easily.
Condensation	Changing vapour or gas to a liquid by cooling it down.
Conductor	A material or device which allows heat or electricity to pass through it.
Dissolve	When something solid mixes with a liquid and becomes part of the liquid.
Distillation	The process of making a liquid purer by heating it until it changes to a gas and then cooling it so that it changes back into a liquid.
Evaporation	The process of turning from liquid to vapour.
Flammable	Capable of being easily set on fire and of burning quickly.
Flexible	Capable of bending easily without breaking.
Gas	A state of matter with no fixed shape or volume which expands freely to fill the space available.
Insulator	A substance which does not easily allow heat, sound or electricity to pass through it.
Irreversible	Cannot be reversed back to its original state. Usually a chemical change e.g. Cook, burn, rust.
Liquid	A substance that flows freely but can be measured by volume e.g. water or oil
Magnetic	Capable of being magnetised or attracted by a magnet.
Opaque	Not able to be seen through, not transparent.
Permeable	A material that allows liquids or gases to pass through it.
Reflective	A surface that reflects light or sound (bounces it back) due to its smooth nature.
Reversible	Able to be reversed back to its original state e.g. Ice to water. A physical change – melt, freeze.
Solid	Firm and stable in shape, not a liquid or fluid.
Soluble	Able to be dissolved, especially in water. This forms a solution.
Thermal	Relating to heat.
Translucent	Allows some light to pass through, but objects can't be seen clearly through it.
Transparent	Allows light to pass through so that objects behind can be seen.

Working Scientifically

Explore ideas, select, plan and recognise how to set up comparative tests. They should use information to identify materials, and identify patterns that might be found in the natural environment. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use relevant scientific language and resources to discuss, research, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.

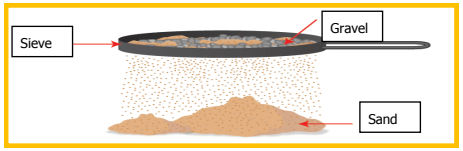
Key Question: Can we investigate the properties of materials?

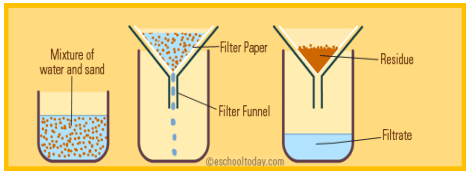
Helping solubility: Certain solids can dissolve in liquids. These solids are soluble. You can help a solid to dissolve by heating the liquid or by stirring the solid. The other way you can help, is to make the particles of the solid as small as possible before it enters the liquid so that the liquid can surround each particle fully.

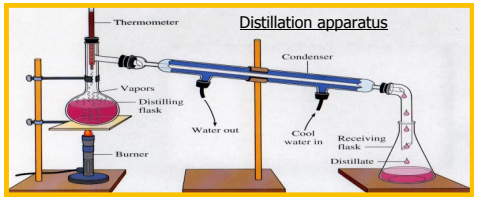
Thermal Insulation: How can you keep something warm for as long as possible and at the highest temperature you can?
What can you use to insulate the object in question? Does the type of material make a difference? Does it have to have layers that trap air? Good insulating materials are used in your loft and walls and also in a thermos flask. What is your winter coat made from?

Reversible and Irreversible change: Some substances can move between the three states of solid, liquid and gas and then be changed back, this is a physical or reversible change. Irreversible change occurs when you cook, burn or chemically mix substances and these can not be returned to their former state (A chemical change).

Methods of separation: If you have a mixture of solids like gravel, sand and salt, you are going to need three methods to separate them. Firstly, sieve the mixture to remove the larger particles of gravel. Then add water to dissolve the salt and filter to remove the sand. To get the salt back you could evaporate the water or use distillation apparatus.







Properties of materials and their uses: Materials have many different properties. Are they hard, flexible or transparent? Do they conduct electricity or heat? Do they have good grip or keep you warm? You would choose a material that would have the best properties for the task. For example, if you wanted to clear up a spillage of liquid, you would not use plastic as this is waterproof and non-absorbent.

When performing a test you should think about variables: In a fair test there are three different types of **variable.** **Independent variable:** The one thing that you change. **Controlled variables:** All of the things that you keep the same. **Dependent variable:** The thing that you measure.