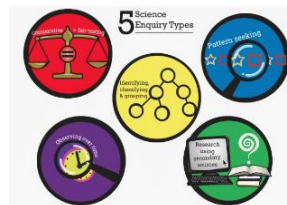


Year 5 Spring Term

Properties and changing of materials

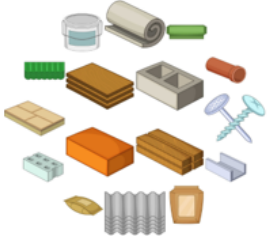


Prior knowledge learned in year 1 - distinguish between an object and the material from which it is made, identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock, describe the simple physical properties of a variety of everyday materials, compare and group together a variety of everyday materials on the basis of their simple physical properties **year 2** - identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses, find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching **year 4** compare and group materials together, according to whether they are solids, liquids or gases, 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 ($^{\circ}\text{C}$), identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

National Curriculum for year 5 - 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 - know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution - use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating - give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic - demonstrate that dissolving, mixing and changes of state are reversible changes - 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.

PROPERTIES AND CHANGES OF MATERIALS KNOWLEDGE ORGANISER


What you should already know...



- Materials are the substances that things are made from.
- The **properties** of materials make them useful for different purposes.
- Materials have **more than one property** and can be **natural or man-made**. Properties can include the hardness, whether it conducts electricity, the shininess, or whether it is magnetic.
- There are **three main states of matter** - solids, liquids, and gases.
- The state of matter of materials can **change**, through processes such as freezing and melting.

Solutions and Separation

A solution is a specific type of mixture where one substance is dissolved into another.




- 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.
- One example of a solution is 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.

Grouping Materials by Properties		
PROPERTY	YES	NO
ELECTRICAL CONDUCTOR	Copper, aluminum, gold, silver, steel, sea water	Glass, air, plastic, rubber, wood, oil, diamond
MAGNETIC	Steel, nickel, cobalt, iron, uranium, platinum	Paper, glass, plastic, rubber, wood, wool
TRANSPARENT	Glass, water, clear plastic	Wood, rubber, oil, steel, copper, iron, silver
WATERPROOF	Plastic, rubber, metal, glass	Tissue, sponge, fabric


Reversible and Irreversible Changes

REVERSIBLE 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.

IRREVERSIBLE CHANGES



- Other changes are irreversible. This means 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.

Key vocabulary

Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Dissolving, Mixing Evaporation,

Suggested texts

(Foxton) Properties and changes of materials

Scientists

Sir Humphrey Davy- Separating gases, Jamie Garcia (BP website)- Invention of a new plastic, Becky Schroeder - fluorescence material, Spencer Silver, Arthur Fry and Alan Amron - Post-It Notes, Ruth Benerito - Wrinkle-Free Cotton

Reversible Changes

Dissolving

Mixing



Changes of State

Burning



Rusting

Irreversible Changes

Decaying

In what ways can materials be categorised?

How would you recover a substance from a solution?

What is a reversible/ irreversible change?

What is meant by conductivity?