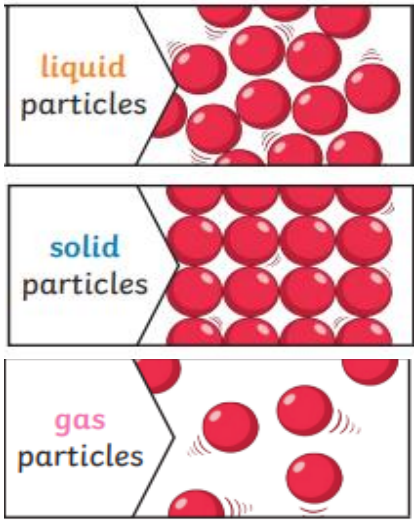
Knowledge is Power...

Ivington C of E Primary and Preschool

Reaching together... stand firm in your faith, be courageous and strong - 1 Corinthians 16:13

Properties and Changes in Materials

Year 4/5 – Autumn 2023	
Key Vocabulary	
Conductor	A material that allows electricity or heat to pass through it easily.
Dissolve	When a solid is mixed into an absorbed into a liquid.
Elasticity	The ability of a material to return to its original form after being compressed or stretched.
Electrical	Relating to electricity.
Insoluble	Not being able to be dissolved into a liquid.
Insulator	A material that does not allow electricity or heat to pass through it easily.
Magnetic	Attracted to magnets.
Material	The substance in which an object is made from.
Melting	The process of heating a solid until it changes into liquid.
Mixture	A substance made from a combination of different materials
Opaque	Does not allow light to pass through it.
Perforate	To pierce or puncture something.
Properties	A quality of something.
Reversible	A process that can be changed back to the previous state.
Soluble	Able to be dissolved into liquid.
Solute	A liquid into which a solid has been mixed and dissolved.
Thermal	Relating to heat (energy)
Translucent	Allows some light to pass through it.
Transparent	Allows light to pass through it easily.



Aims (in line with the National Curriculum)

Content

- Compare and group together everyday materials on the basis of their properties, including their hardness, transparency, and conductivity (electrical and thermal).
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood, and plastic.

Working scientifically

- Planning different types of scientific enquiries to answer questions, including recognising, and controlling variables where necessary.
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar, and line graphs.
- Using test results to make predictions to set up further comparative and fair tests.
- Reporting and presenting findings from enquiries, including conclusions, causal relationships, and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
- Identifying scientific evidence that has been used to support or refute ideas or arguments

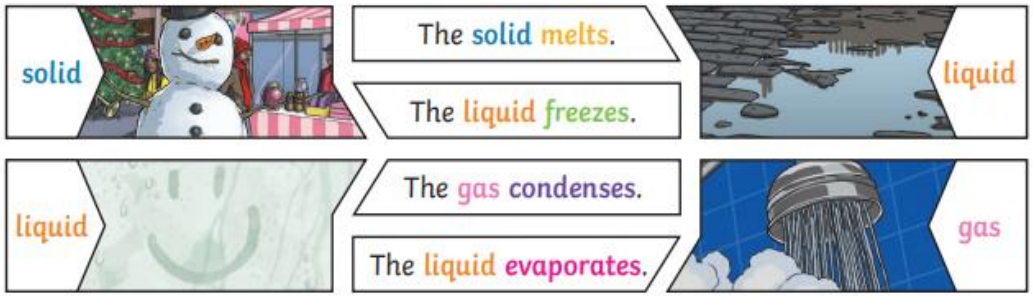
Prior knowledge

- A variety of everyday materials including wood, plastic, glass, metal, water, and rock.
- The physical properties of a variety of everyday materials (including those that are transparent) and to compare and group materials on the basis of these properties.
- How materials are suitably used based on their properties.
- How magnets and electrical circuits work.
- Some materials which are magnetic.
- How shapes of solid objects can be changed by squashing, bending, twisting, and stretching.
- Materials that are solids, liquids and gases and their particle structure.
- Some materials change state when they are heated or cooled and the temperature at which this happens.
- The roles of melting, evaporation and condensation in the water cycle and the role temperature has on the rate of evaporation.
- Some rocks are permeable.

Subject Specific Knowledge - Pupils will learn:

- How to group materials based on their properties using more complex vocabulary such as magnetic, transparent, elasticity, permeable, soluble, and insoluble.
- Materials which are good thermal conductors allow heat to move through them easily.
- Thermal conductors are used to make items that require heat to travel through them easily, such as a saucepan which requires heat to travel through to cook food.
- Thermal insulators do not let heat travel through them easily.
- Examples of thermal insulators include woollen clothes and flasks for hot drinks.
- Electrical conductors allow electricity to pass through them easily while electrical insulators do not.
- Electrical insulators have a high resistance which means that it is hard for electricity to pass through these objects.
- When the particles of a solid mix with the particles of a liquid, this is called dissolving. The result is a solution.
- Materials that dissolve are soluble.
- Materials that do not dissolve are insoluble.
- Some materials can be separated after they have been mixed based on their properties this is called a reversible change.
- Some methods of separation include the use of a magnet, a filter (for insoluble materials), a sieve (based on the size of the solids) and evaporation.
- When a mixture cannot be separated back into the original components, this is called an irreversible change.
- Examples of this include when materials burn or mixing bicarbonate of soda with vinegar.

Changes of State



Dissolving

A solution is made when **solid** particles are mixed with **liquid** particles. **Materials** that will dissolve are known as soluble. **Materials** that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve.

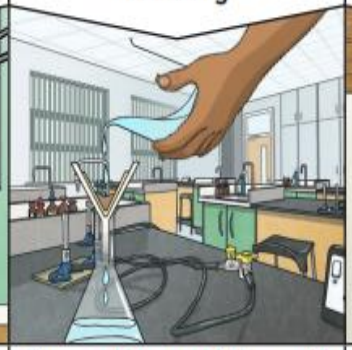
Sugar is a soluble **material**.

Sand is an insoluble **material**.

Sieving

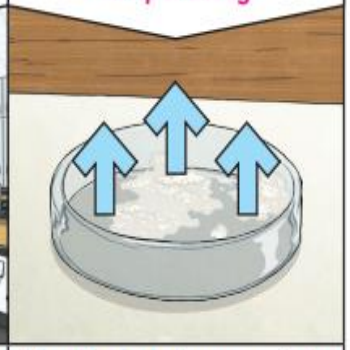
Smaller **materials** are able to fall through the holes in the sieve, separating them from larger particles.

Filtering

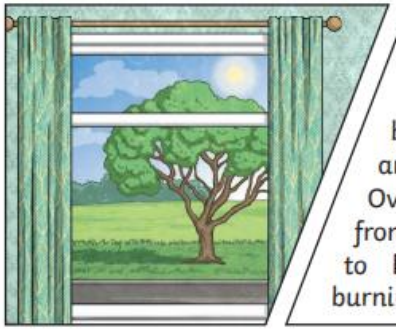


The **solid** particles will get caught in the filter paper but the **liquid** will be able to get through.

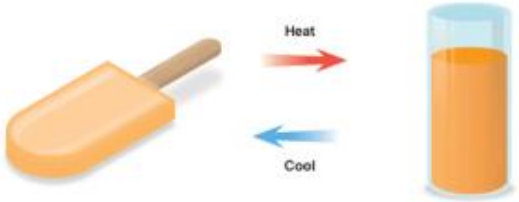
Evaporating



The **liquid** changes into a **gas**, leaving the **solid** particles behind.



For example, glass is used for windows because it is hard and **transparent**. Oven gloves are made from a thermal **insulator** to keep the heat from burning your hand.



Reversible changes

Reversible changes such as mixing and dissolving can be reversed.

Irreversible changes

Irreversible changes often result in a new product being made from the old materials (reactants). For example, burning wood produces ash and this cannot be turned back into wood.