

Knowledge Organiser Properties and Changes of Materials Year 5/6

What I have already learnt

- I have learnt to compare and group materials together, according to whether they are solids, liquids or gases
- I have learnt that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- I have learnt what part evaporation and condensation play in the water cycle and associate the rate of evaporation with temperature

Key skills I will learn/use

- Notice-** I will be able to ask relevant questions and using different types of scientific enquiries to answer them
- Observe-** I will be able to set up simple practical enquiries, comparative and fair tests
I will be able to make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Record-** I will be able to gather, record, classify and present data in a variety of ways to help in answering questions
I will be able to record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Report-** I will be able to report findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
I will be able to using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identify-** I will be able to identify differences, similarities or changes related to simple scientific ideas and processes
- Evidence-** I will be able to use straightforward scientific evidence to answer questions or to support their findings.

What I will have learnt by the end of this unit

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

Recall and Remember

Can you answer these 6 questions in 6 minutes?

1. Can you define reversible change?
2. Give me an example of reversible change.
3. How would you separate rice and water?
4. What is the scientific name of turning water vapour into water?
5. Can you name 3 heat insulators?
6. Can you name 2 materials that will dissolve?

Key Concepts/Strands

- Biology
- Chemistry
- Physics
- Scientific Enquiry
- Science for the future
- Vocabulary

My skills and knowledge that I may use from other subjects

- Literacy-** I can use my literacy knowledge to write about my findings
- Mathematics-** I can use my measuring skills to carry out simple tests and record my findings using diagrams and graphs
- DT-** I can use my skills learnt during DT lessons such as techniques to attach different materials to each other and evaluate which materials are best for a given purpose

Opportunities for teaching Diversity, Equality (including protected characteristics) and expanding Cultural Capital

Recycling Opportunities

Get involved in local opportunities to explore recycling activities

How to save the planet!

How to save the planet: a guide for kids! - National Geographic Kids (natgeokids.com)

Get to meet a scientist! Explore people who use science in their jobs.

- I'm a Scientist, Get me out of here! - A super-curricular science outreach education & engagement activity (imascientist.org.uk)
- Science for Everyone (science4everyone.org)

What I will have learnt by the end of my Key Stage

- I will 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
- I will know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- I will use my knowledge of solids, liquids and gases to separate mixtures through filtering, sieving and evaporating
- I will give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- I will understand that dissolving, mixing and changes of state are reversible changes
- I know and understand 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

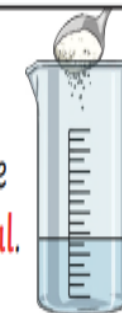
Key Knowledge

- Objects have different **names** and can be made of different **materials** such as wood, plastic, glass, metal, water, and rock
- Different materials are used for particular jobs based on their properties: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency.
- Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by sieving, filtering, evaporating

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.



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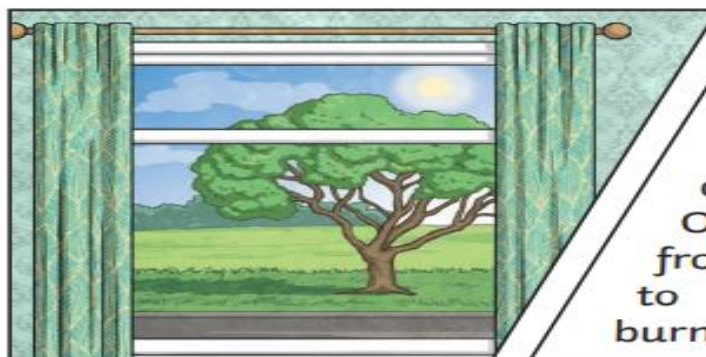
Key Vocabulary

Key Vocabulary	
materials	The substance that something is made out of, e.g. wood, plastic, metal.
solids	One of the three states of matter. Solid particles are very close together, meaning solids , such as wood and glass, hold their shape.
liquids	This state of matter can flow and take the shape of the container because the particles are more loosely packed than solids and can move around each other. Examples of liquids include water and milk.
gases	One of the three states of matter. Gas particles are further apart than solid or liquid particles and they are free to move around. A gas fills its container, taking both the shape and the volume of the container. Examples of gases are oxygen and helium.
melting	The process of heating a solid until it changes into a liquid .
freezing	When a liquid cools and turns into a solid .
evaporating	When a liquid turns into a gas or vapour.
condensing	When a gas , such as water vapour, cools and turns into a liquid .

Key Vocabulary

conductor	A conductor is a material that heat or electricity can easily travel through. Most metals are both thermal conductors (they conduct heat) and electrical conductors (they conduct electricity).
insulator	An insulator is a material that does not let heat or electricity travel through them. Wood and plastic are both thermal and electrical insulators .
transparency	A transparent object lets light through so the object can be looked through, for example glass or some plastics.

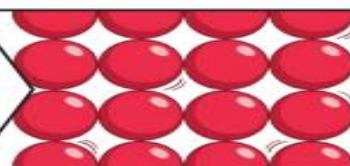
Key Knowledge



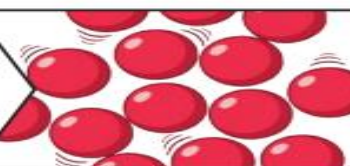
For example, glass is used for windows because it is hard and **transparent**. Oven gloves are made from a thermal **insulator** to keep the heat from burning your hand.



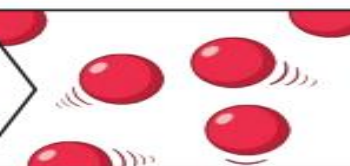
solid particles



liquid particles



gas particles



Changes of State

solid



The **solid** melts.

The **liquid** freezes.

liquid



liquid



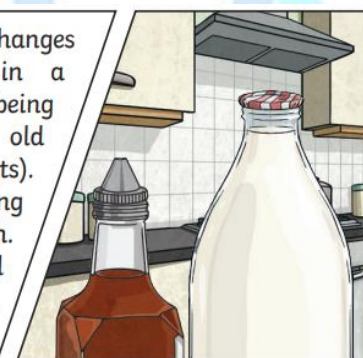
The **gas** condenses.

The **liquid** evaporates.

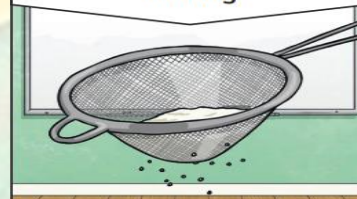
gas



Irreversible changes often result in a new product being made from the old **materials** (reactants). For example, burning wood produces ash. Mixing vinegar and milk produces casein plastic.



Sieving



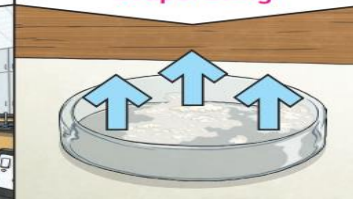
Smaller **materials** are able to fall through the holes in the sieve, separating them from larger particles.

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.



MATERIALS

