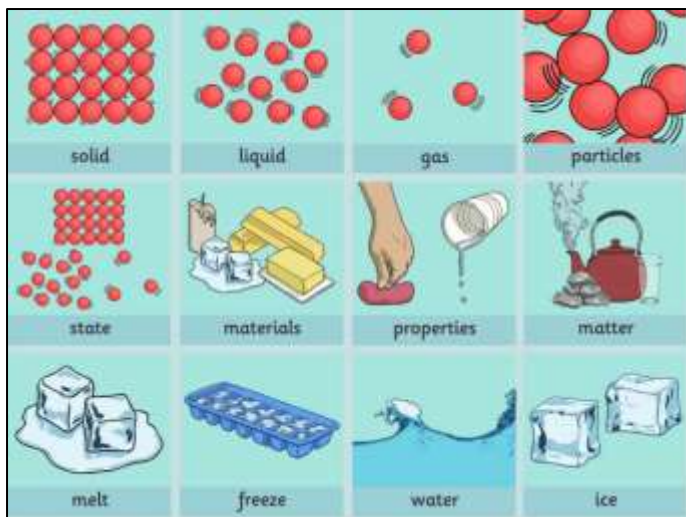


Year 3 & 4 Knowledge Organiser- Science



Assessment of Key Skills:

I can sort and describe materials.
 I can investigate gases and explain their properties.
 I can investigate materials as they change state.
 I can explore how water changes state.
 I can investigate how water evaporates.
 I can identify and describe the different stages of the water cycle.

Key Concepts/Strands

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

My skills and knowledge that I may use from other subjects

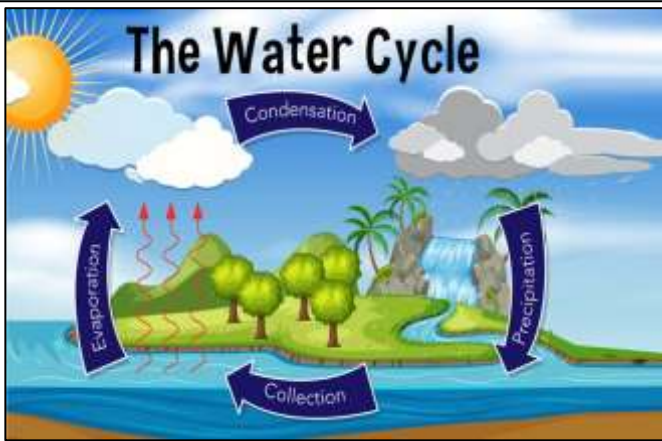
Literacy- I can use my literacy knowledge to write about my findings

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

By the end of this unit all children should be able to:

- Sort materials into solids, liquids and gases and describe their properties.
- Explain that melting and freezing are opposite processes that change the state of a material.
- Identify the melting and freezing point of water and other materials.
- Explain that heating causes evaporation and cooling causes condensation using practical examples.
- Describe the effect of temperature on evaporation referring to their investigation.
- Explain what happens to water at the different stages of the water cycle.
- Predict what will happen in an investigation.
- Be able to answer questions based on their learning.
- Make observations and conclusions



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)

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

Focus Scientists — Robert Boyle

Robert Boyle (1627-1691) studied the behaviour of gases, thought all materials were made of particles and linked states of matter with the movement of particles.



Dorothy Hodgkin Dorothy Hodgkin (1910-1994) is the only British woman to have won the Noble Prize for Chemistry. It was for her work on the structure




Key Knowledge Facts

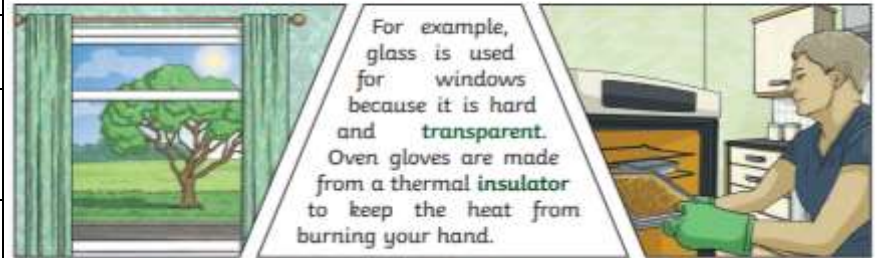
- Particles are what materials are made from.
- Solids always take up the same amount of space
- Liquid particles can move over each other.
- Gases have particles which are spread out and move in all directions
- A 'mixture' is something that is physically joined together but can be separated again.
- Mixtures can be separated in so many ways – such as evaporation, distillation, filtering and absorption.

Materials Knowledge Organiser

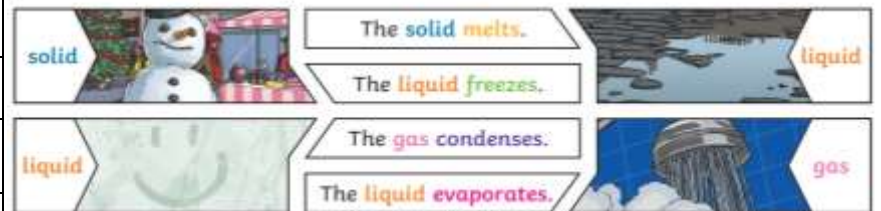
material	The matter from which an object is made. For example, wood, plastic or metal.
solid	One of the three states of matter. Solid particles are very close together, meaning solids, such as wood and glass, hold their shape.
liquid	This state of matter can flow and take the shape of the container because the particles are more loosely packed than solids and can move around each other.
gas	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.
particles	Tiny pieces of matter that make up solids, liquids and gases. They are so small we are not able to see them.
filter	To separate all solid particles from liquid particles.
sieve	To separate smaller particles from larger particles.
evaporate	When a liquid turns into a gas or vapour
reversible	When individual materials can be brought back to their original form after changing.
irreversible	When the state of materials is changed forever.
soluble	Materials are described as soluble when they can be dissolved in a liquid. Sugar is soluble. A solution is made when solid particles mix with liquid particles.
insoluble	Materials are described as insoluble when they cannot be dissolved. Sand is insoluble.
melting	The process of heating a solid until it changes into a liquid.
freezing	The process of a liquid cooling down and turning into a solid.
condense	When a gas, such as water vapour, cools and turns into a liquid.
transparency	A transparent object lets light through so the object can be looked through, for example glass or some plastics.
conductivity	A measure of how easily heat and/ or electricity can travel through a material. 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.

Properties and changes of materials

Different **materials** are used for particular jobs based on their properties: electrical **conductivity**, flexibility, hardness, insulators, magnetism, solubility, thermal **conductivity**, **transparency**.



Changes of State



Reversible Changes



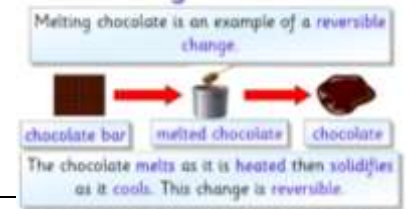
Cooking Eggs



Irreversible Changes



Melting Chocolate



Key Knowledge

Learn these key facts—key points in red

Solids, Liquids and Gases

What is a solid?

When materials hold their shape. Their particles are closely packed and form a regular pattern. Their shape is fixed and they will always take up the same amount of space. Examples: Ice, Wood, Glass, Diamond.



What is a liquid?

When materials hold the shape of the containers they are in and so can change shape. Their particles are close together but can move over each other. Liquids can be poured. Examples: Water, Milk, washing-up liquid.



What is a gas?

Gases can escape from open containers. They often cannot be seen. They have particles which can spread out and move in all directions.

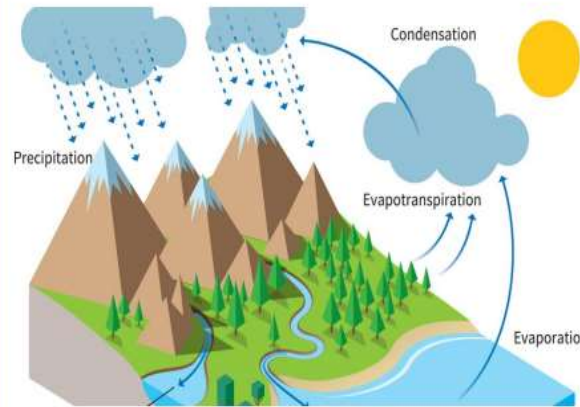


Examples: Steam, Hydrogen, Oxygen, Carbon Dioxide.

The Water Cycle

Water continually moves around the Earth in the water cycle. The Sun evaporates water into water vapour.

When the water vapour cools down it turns into liquid water and it rains. In very cold places the water freezes into snow or ice. Snow and ice, when warmed



Changes of State (heating and cooling)

Warming solid ice makes it melt into liquid water. Adding more heat makes it evaporate, at 100°C, into steam (a gas). When it is cooled it condenses back into liquid water. If it is cooled to 0°C it freezes and forms

