Manor Primary School Knowledge Organiser –UKS2 Science

Topic: Materials	Phase: UKS2	Strand: Physics

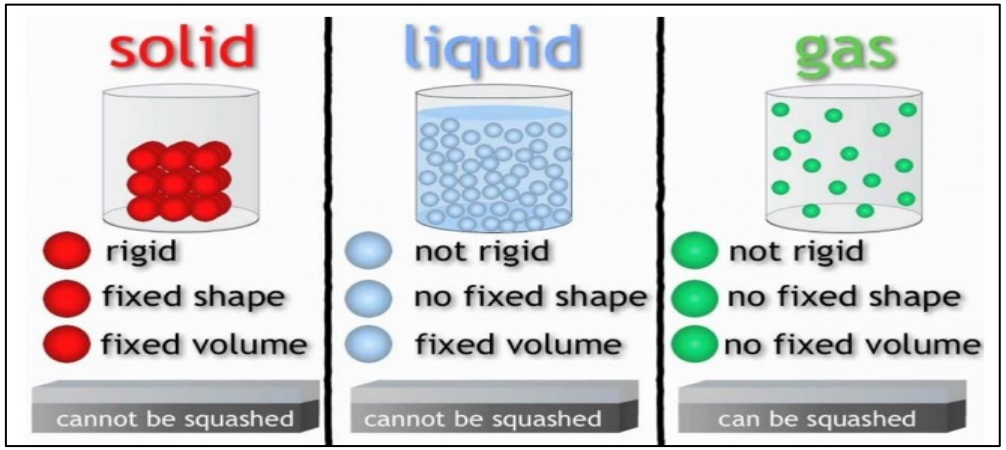
What should I already know?

- That I can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- Identify and compare the suitability of different materials discussing their properties and uses
- How to change the shapes of materials by squashing, twisting, bending, heating and cooling.

At the end of the unit, I will be able to:

- Compare and group materials based on their properties including hardness, solubility, transparency, conductivity 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
- Decide how mixtures might be separated, including through filtering, sieving and evaporating
- Give reasons 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

States of Matter

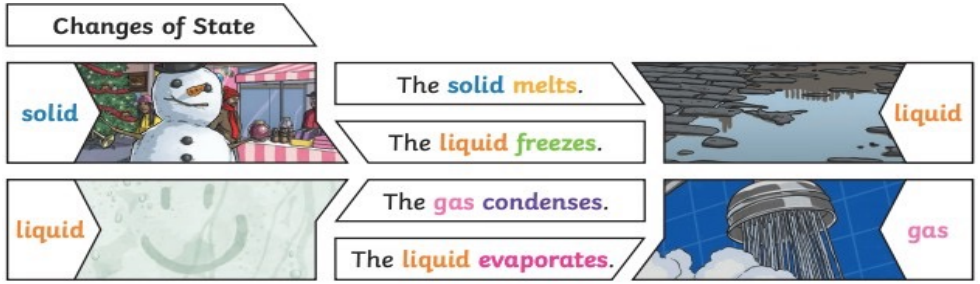


All materials can be put into one of three categories or states:
1.Solids – the shape of a solid does not change on its own – it is rigid. They also have a fixed volume.
2. Liquids – the shape of a liquid does change, it is not rigid. It fits the shape of the container it is put in. Liquids flow. They also have a fixed volume.
3. Gases – gases do not have a shape; they completely fill any container they are put into. They do not have a fixed volume but the same volume as the container.

We are MANOR! As Scientists we will...

Manners	Develop a respect and understanding for the natural world, its people, animals and plants. Share ideas, celebrate good work, value others' contributions, or discussions and debates.
Aspiration	Learn by being challenged in a series of well-designed scientific enquiry and investigation tasks linked to meaningful contexts and develop a knowledge of scientists and careers to broaden our horizons. Be aspirational in developing scientific knowledge and conceptual understanding through biology, chemistry and physics.
Nurture	To recognise that we live in a wonderful world made up of many different people and living things. We will develop an appreciation and respect for the diverse world and environment in which we live, showing care and compassion for the environment around us.
Open-Mindedness	We will be open-minded so that we can conduct experiments or observe what is happening in order to see patterns that might emerge or to gain new knowledge. We will use our curiosity and learn to wonder why something behaves a certain way.
Resilience	Engage confidently with the science curriculum and learn that anything is possible and failure is not something to fear but to learn from. We will develop our scientific enquiry and investigation skills with patience and care, repeating investigations to check the accuracy of results.

Key Knowledge



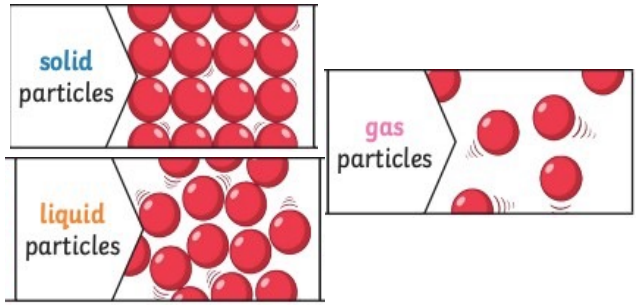
Reversible changes

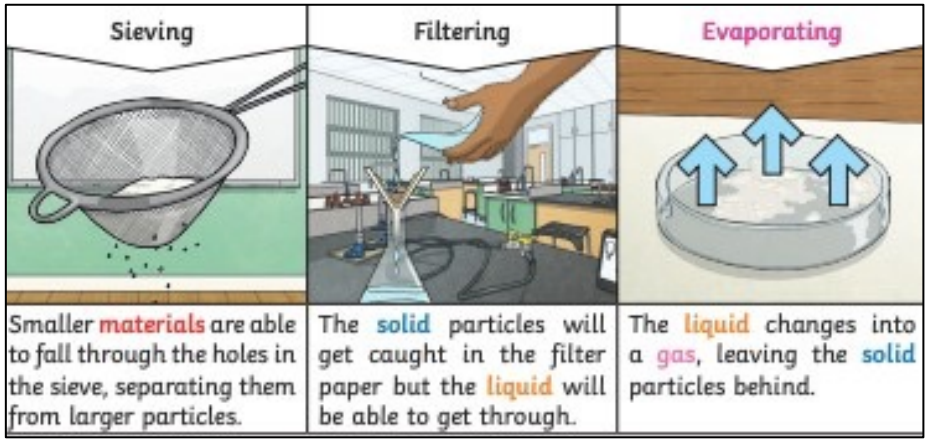
When mixing or dissolving solids and liquids together you can use sieving, filtering or evaporating to reverse the changes and have two or more separate materials again.

Irreversible changes

When burning materials or mixing certain materials it is not possible to get them back to the original materials e.g. if you burn a piece of bread and it becomes toast, there is no way to return this to its original state.

When some materials meet they create a chemical or thermal reaction which means it can not be reversed .





Comparing and grouping -

materials can be compared and grouped together on the basis of their properties including:

- Hardness – how hard or soft a material is
- Solubility-whether a material can dissolve
- Transparency whether it allows light to pass through
- Conductivity - whether it allows electricity or heat through it
- Response to magnets - whether it is magnetic

Vocabulary

Materials	The substance that something is made out of e.g. wood, metal, plastic
Solids	One of the three states of matter. The particles in a solid are packed very closely together and hold their shape e.g. wood and metal
Liquids	This state of matter can flow and take the shape of a container as the particles are loosely packed and the particles can move around. Examples include water and milk
Gases	The third state of matter is gas. gas particles are further apart than a solif and liquid and are free to move around. They fill the shape and volume of a container. Gases include oxygen and helium
Melting	The process of heating a solid so it turns into a liquid
Freezing	When a liquid cools into a solid
Evaporating	When a liquid turns into a gas or vapour
Condensing	When a gas turns into a liquid when it cools down
Conductor	A conductor is a material that heat or electricity can pass easily through most metals are thermal and electric conductors
Insulator	An insulator is a material that does not let electricity or heat travel through it wood and plastic are insulators
Transparency	A transparent object lets light through so the object can be looked through for example glass or some plastics – clean water is also transparent

Materials Quiz

Use the Knowledge Organiser and research to answer these questions.

	Question	Answer
1	Name three ways we can reverse changes made from dissolving and mixing	
2	Give 2 facts about each of the three states of matter	
3	What is it called when a liquid cools and becomes solid?	
4	Name a type of irreversible change	
5	How can we group or compare materials? Give 3 ways	