



**What I should know by the end of this unit:**

- compare and group everyday materials according to 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 evidential reasons, 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.

**COMPARING AND GROUPING –**

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

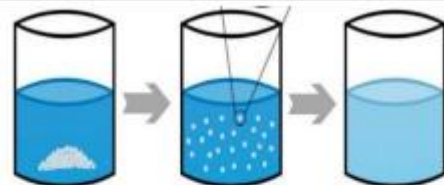
- **Hardness** – how hard or soft a material is
- **Solubility** – whether a material can dissolve
- **Transparency** – whether it allows light to pass through
- **Conductivity** (electrical or thermal) – whether it allows heat or electricity to carry through
- **Response to magnets** – whether it is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

**DISSOLVING -**

- Sometimes when a solid (solute) is mixed with a liquid (solvent) it will dissolve to form a solution e.g. dissolving sugar in hot tea.

The solid seems to disappear in the solution but it is still there it has just become part of the liquid.

A soluble material can dissolve however an insoluble material cannot dissolve.



Tiny sugar cubes in still water

Sugar cubes being distributed throughout the solution

A "Sugary" solution

**PARTICLE ARRANGEMENT**

**Solid** – particles packed closely together



**Liquid** – particles have some space to move.

to move

**Gas**– particles are free



**REVERSIBLE AND IRREVERSIBLE CHANGES**

| REVERSIBLE                | IRREVERSIBLE   |
|---------------------------|----------------|
| Dissolving sugar in water | Toasting bread |
| Freezing water            | Cooking a cake |
| Melting chocolate         | Boil an egg    |

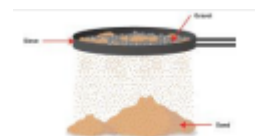


Key Vocabulary

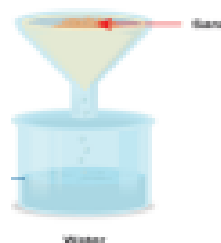
| Spelling                    | Definition  |
|-----------------------------|---|
| <b>Soluble</b>              | -able to be dissolved, especially in water                                |
| <b>Insoluble –</b>          | – cannot be dissolved, especially in water                                |
| <b>Dissolve</b>             | – when something solid mixes with a liquid and becomes part of the liquid |
| <b>Solution</b>             | – is made when one substance dissolves into another                       |
| <b>Reversible change</b>    | -can be reversed back to its original state                               |
| <b>Irreversible change</b>  | – cannot be reversed back to its original state                           |
| <b>Transparent</b>          | – allows light to pass through  |
| <b>Thermal conductor</b>    | - a material or device which allows heat to carry through                 |
| <b>Magnetic</b>             | – capable of being magnetised or attracted by a magnet                    |
| <b>Electrical conductor</b> | – a material or device with allows electricity to carry through           |

SEPARATING MIXTURES

**SIEVING** – a mixture of different sized solid particles can be separated with a sieve.



**FILTERING** – an insoluble solid can be separated from a liquid when passed through a filter. The liquid passes through the filter. The solid particles are trapped on the filter.



**EVAPORATING** – if a solution is boiled (heated) the water will evaporate into gas and the solid will be left behind.



| Write the meanings of these properties of materials.... | Start of unit | End of unit |
|---|---------------|-------------|
| Flexible  |               |             |
| Permeable   |               |             |
| Absorbent   |               |             |

| Name two properties of each of these materials which make them good for these jobs: | Start of unit | End of unit |
|---|---------------|-------------|
| Nylon fabric used for an umbrella:  |               |             |
| Glass used for a greenhouse:  |               |             |
| Plastic used for making electrical plugs  |               |             |

| Tick all the materials that will dissolve in water | Tick | Start of unit | End of unit |
|--|------|---------------|-------------|
| Salt   |      |               |             |
| Pepper   |      |               |             |
| Sugar  |      |               |             |
| Cooking oil  |      |               |             |
| Tea leaves   |      |               |             |
| Jelly crystals                                     |      |               |             |

|                |  |  |  |
|----------------|--|--|--|
| Instant coffee |  |  |  |
| Sand           |  |  |  |

| What is the correct scientific word for                  | Start of unit | End of unit |
|--|---------------|-------------|
| Describing something that does not dissolve in water?    |               |             |
| Water or another liquid with something dissolved into it |               |             |

| Tick all the changes below that are irreversible: | Tick | Start of unit | End of unit |
|---|------|---------------|-------------|
| Frying an egg                                     |      |               |             |
| Melting chocolate                                 |      |               |             |
| Dissolving salt in water                          |      |               |             |
| Dissolving salt in water                          |      |               |             |
| Freezing water to make ice                        |      |               |             |
| Mixing vinegar and bicarbonate of soda            |      |               |             |
| Burning wood                                      |      |               |             |