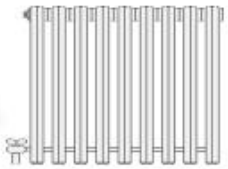
Year 5 Knowledge Organiser Science – Changes of Materials

MATERIALS

KEEPING COOL

Thermal Insulators – Do not let heat travel through easily such as fabrics, wood and plastics. Can keep heat in or out.


Thermal Conductors - Lets heat travel easily through such as metals.

When things get hot, atoms start to vibrate. Heat produces energy. This could cause them to change state!

Reversible and Irreversible Changes

The following cycle is one which is reversible. (They can be changed back or reversed by adding heat or by cooling down.)

Ice (melts into water) > Water (evaporates into steam) >
Steam (condenses into water) > Water (freezes into ice) >

The following examples are ones which are irreversible. (They can NOT be changed or reversed by adding heat or cooling down).

cooking an egg 

burning wood 

An electrical conductor lets electricity pass through. They are often metals but it also includes water.

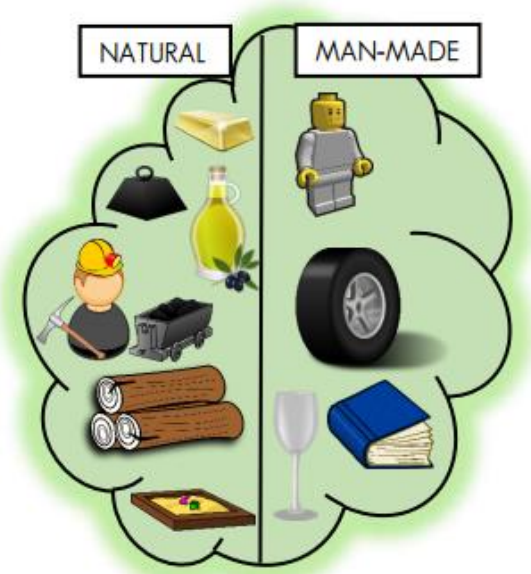
An electrical insulator does not let electricity pass through.

Three states of matter:

SOLID: particles close together / vibrate around a fixed position
LIQUID: particles close but randomly arranged / move around
GAS: particles far apart and randomly arranged / move around

Separating Materials

SIEVING – A way to separate two solids of different sizes (e.g. flour and raisins).
FILTRATION – A mixture of liquids and solids which haven't dissolved can be filtered using paper with tiny holes (e.g. sand and water).
EVAPORATION – A solid dissolved in a liquid (solution) can be heated. Liquid evaporates and leaves behind the solid (e.g. salt and water solution).
MAGNETISM – Metal attracts to the magnet, leaving behind the other solid (e.g. paper clips and matchsticks).



DISSOLVING

Dissolving is when the particles of solids mix with particles of liquids, often appearing like it has disappeared but it has dissolved in the liquid to make a transparent solution (e.g. mixing sugar into water). It does not always need heat to occur. If a material does not dissolve, it is insoluble. If it does, it is soluble.

MELTING

Involves only solids which change into a liquid due to heat. They stay as the same material (e.g. ice to water).

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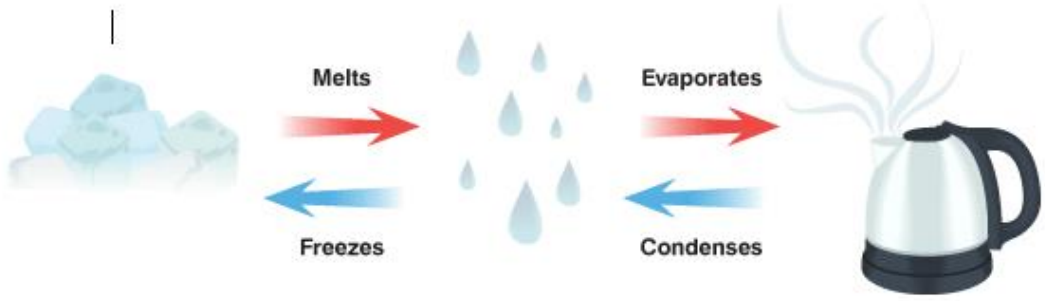

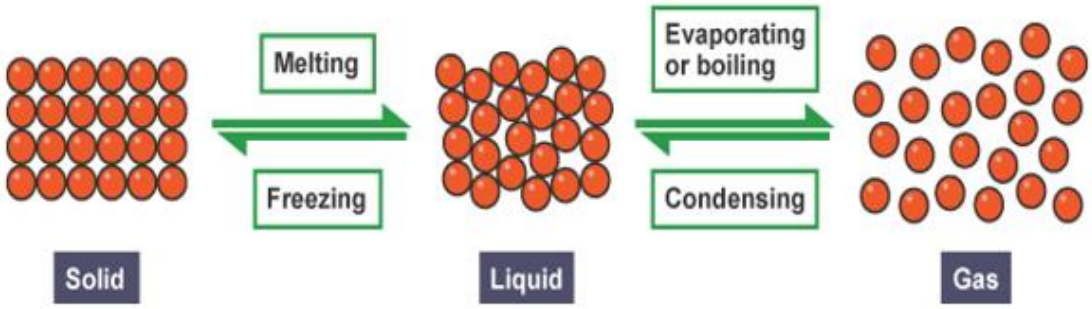

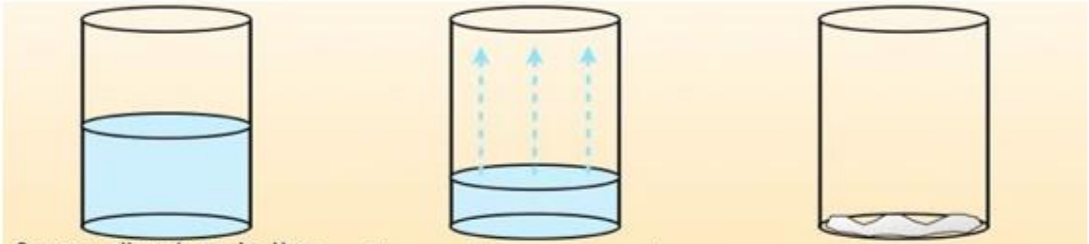

Sugar dissolves in the water making a sugar solution. You cannot see the sugar but it is still there in tiny particles.

The water evaporates. This means that it becomes water vapour. The process will be quicker if the water is heated.

Once all the water has evaporated, the sugar is left at the bottom of the beaker. This is because sugar cannot evaporate.

Key Vocabulary

Conductor – A material or device which allows heat or electricity to carry through

Dissolve – When something solid mixes with a liquid and becomes part of the liquid

Evaporation – The process of turning from liquid to vapour

Flexible – Capable of bending easily without breaking

Gas – An air-like fluid substance which expands freely to fill any space available

Insulator – A substance which does not readily allow the passage of heat or sound

Irreversible – Cannot be reversed back to its original state

Liquid – A substance that flows freely but can be measured by volume e.g. water or oil

Magnetic – Capabale of being magnetised or attracted by a magnet

Material – The matter from which a thing is or can be made from

Opaque – Not able to be seen through, not transparent

Reversible – Able to be reversed back to its original state

Solid – Firm and stable in shape, not a liquid or fluid

Soluble – Able to be dissolved, especially in water

Thermal – Relating to heat

Transparent – Allows light to pass through so that objects behind can be seen