

# Knowledge Organiser Focus:

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	The 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. Examples of gases are oxygen and helium.
melting	The process of heating a solid until it changes into 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.
transparency	A transparent objects lets light through so the object can be looked through, for example glass or some plastics.
Soluble	When a substance is able to be dissolved (especially in water).
Reversible	A process that can be changed back to the previous state.
Dissolve	To become part of a liquid to form a solution.
Volume	A space occupied by a solid, liquid or gas.
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.

# Properties and changes of materials

solid	liquid	gas
melt	freeze	evaporate
condensation	sieve	filter
dissolve	separate	reversible
irreversible	soluble	insoluble

- ### I will learn
- I can compare and group together everyday materials on the basis of their properties, including their hardness, transparency, and conductivity (electrical and thermal).
  - I will know that thermal insulation prevents the movement of heat energy identifying which materials allow thermal energy to pass through them easily called thermal conductors.
  - I will know that electrical conductors are materials or devices that allow electricity to carry through.

### I should already know

I can compare and group materials together, according to whether they are solids, liquids or gases.

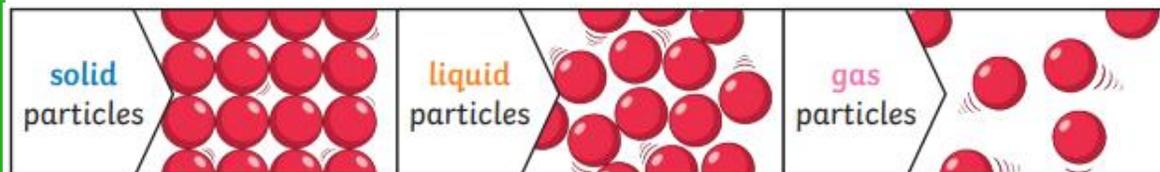
### Thinking Deeper Challenge

Explain why these objects are made from these materials.

- Wellingtons are made from rubber
- Roofs are made from slates
- Windows are made from glass
- Electrical wires are covered in plastic

## Science (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 and transparency.



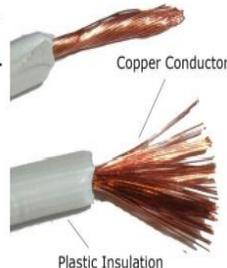
## What are thermal insulators and conductors?

- Materials which are good **thermal conductors** allow heat to move through them easily
- Thermal conductors are used to make items that require heat to travel through them easily e.g., a saucepan requires heat to travel through to cook food
- **Thermal insulators** do not allow heat to travel through them easily e.g., woolen clothes and flasks for hot drinks



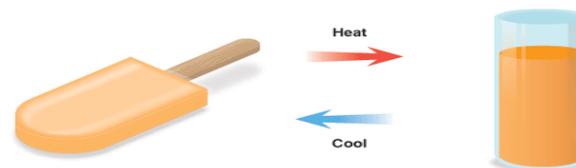
## What are thermal insulators and conductors?

- **Electrical conductors** allow electricity to pass through them easily while electrical insulators do not.
- **Electrical insulators** have a high resistance which means that it is hard for electricity to pass through these objects.



## Reversible changes

Reversible changes such as mixing and dissolving can be reversed.



## Irreversible changes

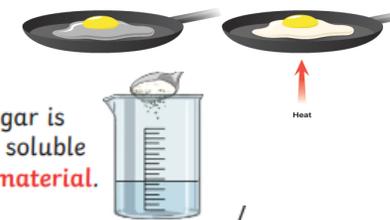
Irreversible changes often result in a new product being made from the old materials (reactants). For example, burning wood produces ash and this cannot be turned back into wood.

## 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.



Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by:

Sieving	Filtering	Evaporating
Smaller <b>materials</b> are able to fall through the holes in the sieve, separating them from larger particles.	The <b>solid</b> particles will get caught in the filter paper but the <b>liquid</b> will be able to get through.	The <b>liquid</b> changes into a <b>gas</b> , leaving the <b>solid</b> particles behind.

