## Prior Knowledge

**What you should know.**

Materials exist as solids, liquids or gases.

Materials have different **properties** that make them suitable for different uses, e.g. **flexible** or **rigid**.

Some materials are **magnetic**.

Some materials are good **conductors** of sound, heat or electricity.

Some materials are good **insulators** of sound, heat or electricity.

Materials are made of atoms. Atoms are extremely small and cannot be seen with the naked eye.

## Key Vocabulary

| | |
|---|---|
| **condense** | change or cause to change from a gas or vapour to a liquid |
| **decant** | separate liquid from solid by pouring off the liquid leaving the sediment behind |
| **dissolve** | become incorporated into a liquid to form a solution |
| **distil** | cooling and condensing vapour and collecting the resulting liquid |
| **emulsion** | a fine distribution of minute droplets of one liquid in another |
| **evaporate** | turn from liquid into vapour |
| **filter** | a device/process to separate insoluble solids from a liquid |
| **insoluble** | a solid that does not dissolve in a liquid |
| **mixture** | a material made of two or more different substances which are combined |
| **oxidise** | a material combines with oxygen to form another substance – iron oxidises to form rust |
| **soluble** | a solid that dissolves in a liquid |
| **solute** | the substance dissolved by a solvent to create a solution |
| **solution** | a liquid mixture in which the solute is dissolved within the solvent |
| **solvent** | a liquid in which other substances can be dissolved |
| **suspension** | a liquid mixture that contains insoluble solid particles |

**OAK CLASS**

# Material Changes

**Science**

## Physical and Chemical Changes

**Physical changes** are **reversible**.
For example, water can be frozen to form ice. When heated, the ice will melt and the water will change from solid to liquid.
Water can also be boiled and form a gas - steam. If cooled, the steam will change back to liquid water.

**Chemical changes** are **irreversible**.
Chemical changes occur when there is a chemical reaction and a new material or materials are formed.
Burning is an example of a chemical change. For example, toasting a slice of bread burns the surface of the bread and gas is produced – creating the distinctive smell of toast.

## Separating

Materials can be separated using different methods.

### Filtration

Filtration separates insoluble solids from liquids using a filter (or series of filters) through which only the liquid can pass.



### Decanting

Decantation is the separation of a liquid and a insoluble solid and a liquid (suspension). It can be used if the solid settles at the bottom of the liquid – this solid is called sediment.

### Evaporation

Evaporation is the process of a liquid turning into a gas. It can be used to separate soluble solids from liquids.



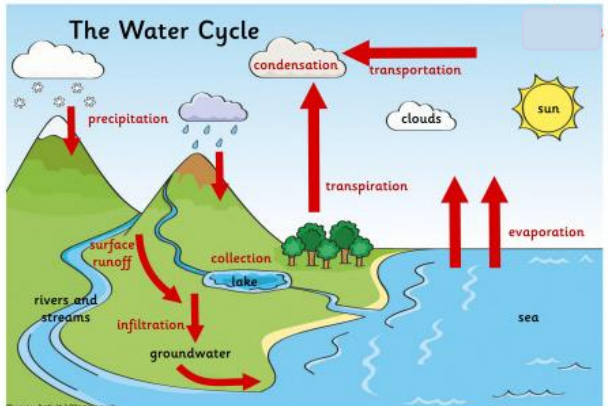
### Distillation

Distillation is used to reclaim evaporated liquid. Vapour is condensed and captured as it turns back to liquid.



## The Water Cycle

Water on Earth is constantly moving, changing state (from liquid, to gas, to solid) and being recycled. The water cycle describes this journey. There are four main stages in the water cycle: evaporation, condensation, precipitation and collection.




## Mixing

When materials are combined (mixed together) they can form:

**Mixture –** a solid in a solid – for example muesli



A gas in a solid – e.g. pumice stone



Solid in a gas – e.g. smoke from a fire



Gas in a gas – e.g. air which is not **a** gas but a number of gases (mostly oxygen and nitrogen)

Gas in a liquid – e.g. carbon dioxide in fizzy drink



**Emulsion –** liquid in a liquid – for example milk



**Suspension** – an **insoluble** solid in a liquid – e.g. muddy water



**Solution** – a **soluble** solid in water – e.g. salty water

