

# Chemistry 1 Knowledge Map - Mixing, Dissolving and Separating

## Elements, Compounds and Mixtures

An element is made up of only one type of atom. These can be found on the periodic table of elements. Examples are oxygen and carbon.

Molecules are made up of more than one atom and are chemically joined together. These atoms can be from the same element or different elements. You can have molecules of compounds or elements. You cannot have molecules of a mixture because the elements are not chemically joined in a mixture!

Compounds are two or more elements chemically joined together by bonds. They cannot be easily separated. Examples are carbon dioxide, pure water and ammonia.

Mixtures are two or more elements mixed together but not chemically bonded. They are usually easy to separate. Examples are sea water and crude oil.

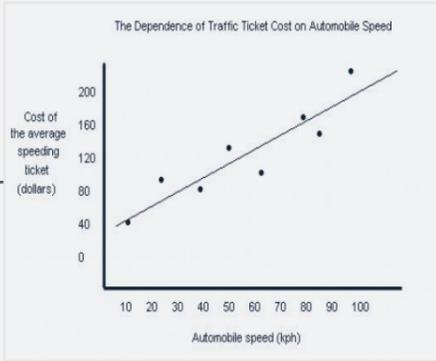
## Dissolving and Evaporating

Substances that dissolve are called soluble. For example, sugar is soluble. It can dissolve in water. The water is the solvent, the mixture of sugar and water is called a solution and the sugar is the solute. Another example would be dissolving salt in water. The salt is the solute, the water is the solvent and the salt water is the solution.

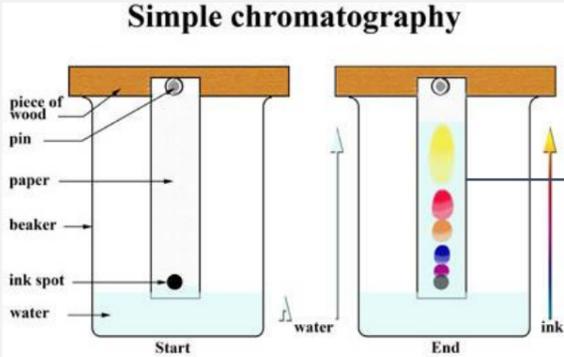
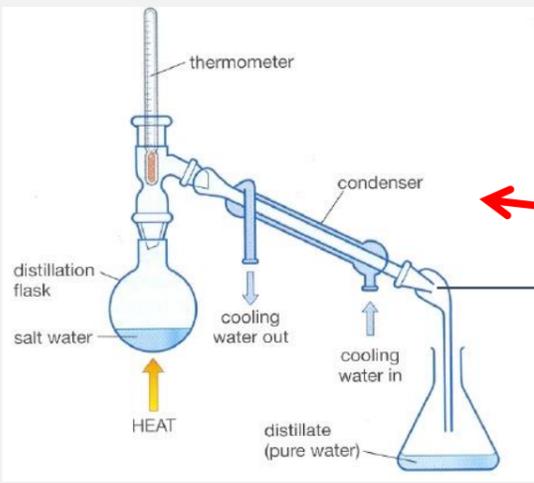
Different types of sugar will dissolve in water at different speeds. This is due to their particle size and composition. We can change the rate of dissolving by changing the temperature.

Evaporation is when a liquid is converted into a gas. For example, we can separate salt from water by heating the solution. This will allow the water to evaporate, leaving behind salt crystals. This is called crystallisation.

## Graph Skills



When drawing graphs, you must include the following:  
 Heading for graph, underlined.  
 Title and units for each axis.  
 A sensible scale on each axis.  
 Points plotted accurately.  
 Line of best fit drawn with a ruler representing as many points as possible.



## Separating Mixtures

Different apparatus can be used to separate mixtures by size. For example, a sieve can be used to remove rocks from sand. Filter paper can be used to separate sand from water.

The properties of the components of the mixture can also be used to separate them. For example, if there is a metal in the mixture, a magnet could be used to separate the metal from the mixture.

**Rules for Mixtures:**  
 Mixtures can be separated by physical method.  
 Mixtures only have the properties of the substances in the mixture.  
 No chemical change occurs when making mixtures.

Distillation can be used to separate a liquid from a liquid. Different liquids evaporate at different temperatures. The liquid is heated until the liquid evaporates, then is cooled so it condenses back into water. The different liquids in the mixture will do this at different temperatures, so the liquids will be separated and collected.

The apparatus for distillation is shown on the left.

Chromatography can be used to separate inks or dyes into colours. Black ink is actually a mixture of colours. Chromatography can separate these colours. Chromatography is commonly used to identify dyes, inks and paints by seeing what it is a mixture of!

An example of pen ink separated by chromatography is shown below.

## Equations

A word equation shows reactants and products. An arrow is used to represent the reactants converting into the products, or the reaction happening.

For example;  
 sodium + chlorine → Sodium Chloride  
 The reactants are shown before the arrow. In this case, the reactants are sodium and chlorine.  
 The products are shown after the arrow. In this case the product is sodium chloride.

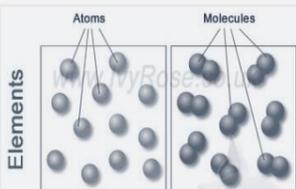
The copper oxide is then heated with 'coke', which is a form of carbon, to displace the copper.  
 The word equation for this reaction is;  
 Copper oxide + carbon → Copper + Carbon dioxide.

The copper will still contain impurities. A process known as electrolysis will be used to purify the copper.

## Particle Model and Forces

Particle models show the different atoms in a substance and how they are arranged.

Intermolecular forces are forces between atoms. In solids, these forces are strong. In liquids, these are moderately strong and in gases these are very weak.



Compounds



Mixture of Elements



Mixture of Compounds

