

# Separating Mixtures

## Atoms, Elements, Compounds and Mixtures

Definitions you need to know.

An atom is

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An Element is

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A compound (molecule) is

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## Separating Mixtures

*Complete the following sentences.*

The smallest part of an element is called an \_\_\_\_\_. All the \_\_\_\_\_ in an element are the same. Atoms can't be broken down into \_\_\_\_\_ substances.

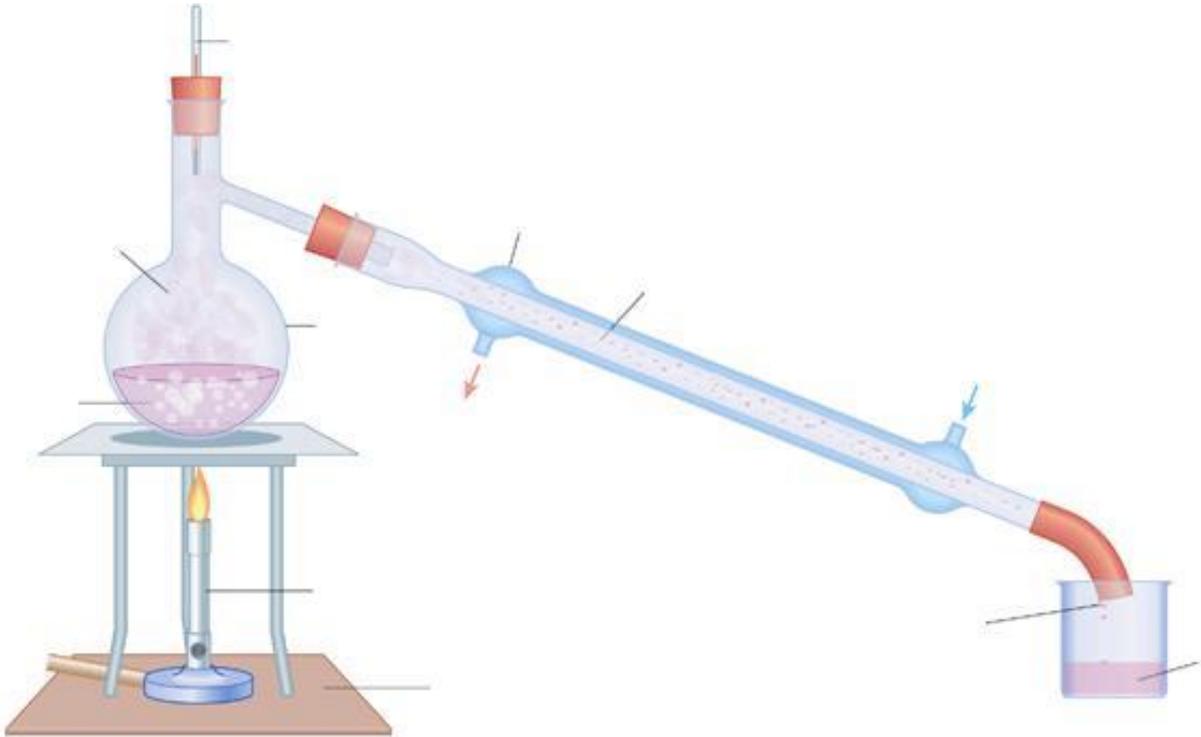
Atoms joined, or bonded, together chemically are called \_\_\_\_\_.

In a \_\_\_\_\_ change, new substances are formed. However, no new substances are made in a \_\_\_\_\_ change.

## Separating Mixtures

Label the diagram using the key words:

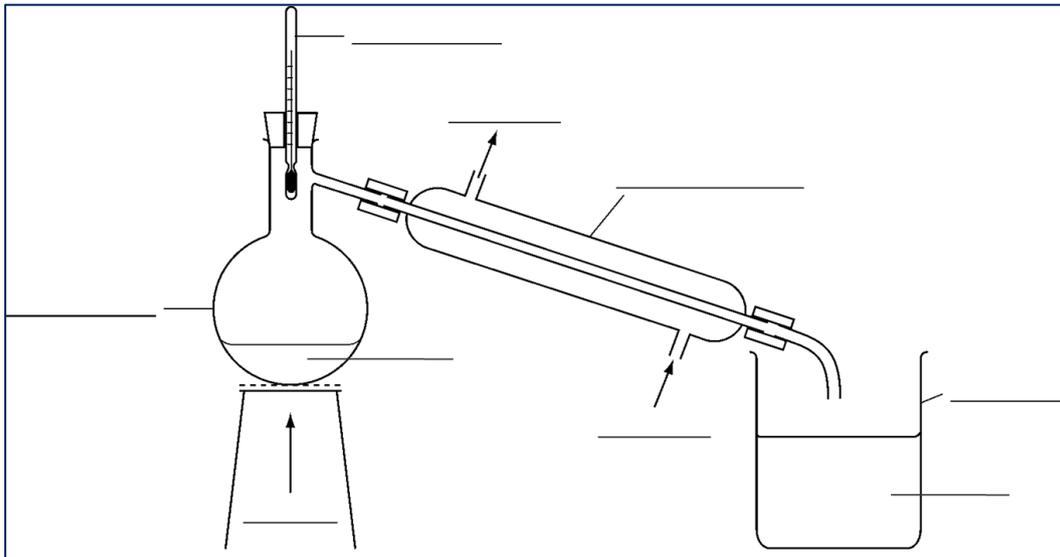
Condenser, round bottom flask, thermometer, water in, water out, collection flask



On your diagram show where the evaporation of a liquid happens and where the condensation of a liquid happens.

# Separating Mixtures

## Distillation



Label the pieces of equipment with the following keywords:

Heat	Flask	Water in	Water out
thermometer	Beaker	Solution	Distillate
Liebig condenser		Beaker	

What is meant by the term condensing?

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How is the water going in to the condenser different to the water which comes out?

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How does distillation separate a mixture of different liquids?

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Why does distillation produce pure water but filtration does not?

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# Separating Mixtures

## Separating Substances

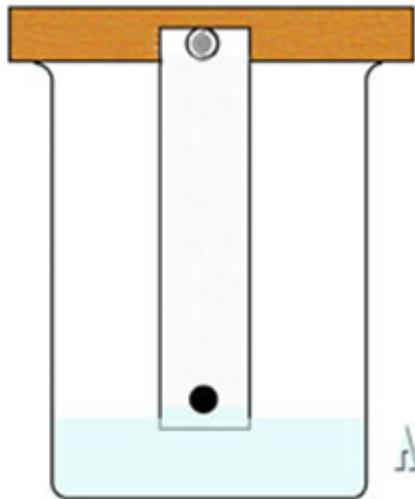
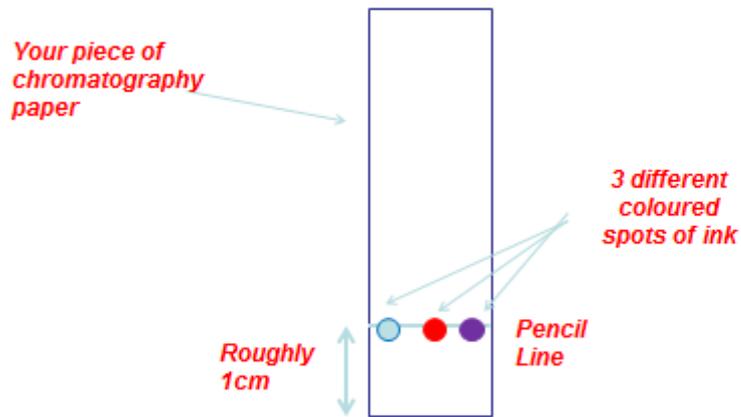
*Match the definition to the word.*

Atom	Two or more substances which can be physically separated.
Element	The smallest particle used to make everything else.
Compound	Contains only one type of atom.
Mixture	Two or more atoms chemically joined together

# Separating Mixtures

## Technique 1 : Chromatography

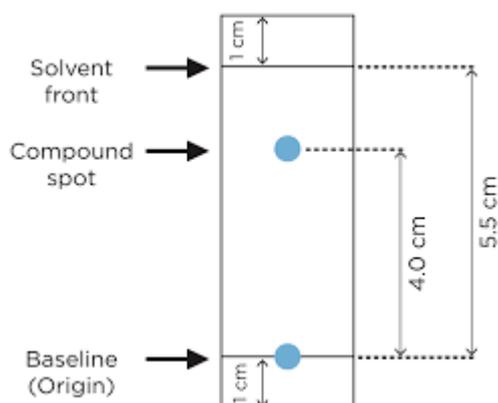
### Chromatography - How we're going to do it...



1. Put about 1cm of water into the bottom of your beaker
2. Fold the top of your paper over the top of a splint and place the splint on top of the beaker
3. Ensure the water is not touching your ink spot

# Separating Mixtures

## Calculating R<sub>f</sub>



How does this technique separate a mixture?

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*Use the following sentences to help you describe how chromatography separates a mixture*

A mixture is two or more substances jumbled up together.

Some substances are more soluble in water than others.

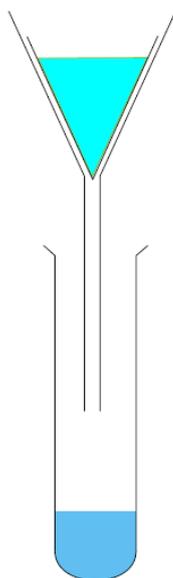
Coloured pens are made up of different dyes mixed together.

Substance that are more soluble in water move quickly up the paper and separate from the rest of the substances.

## Separating Mixtures

### Technique 2: Filtration

Set up your apparatus as shown in the diagram:



Use the key words to label your diagram:

Filter paper, funnel, collection flask, filtrate, residue.

How does this technique separate a mixture?

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## Separating Mixtures

Match the words to their definitions-

Mixture	A solid that dissolves
Solute	Method used to separate a soluble solid from a liquid
Solvent	If a solute doesn't dissolve in a solvent then it is...
Solution	Two or more substances 'jumbled up' together
Soluble	When a liquid changes into a gas
Insoluble	A liquid that does the dissolving
Distillation	If a solute dissolves in a solvent then it is...
Evaporation	When a gas changes into a liquid
Condensation	Formed when a solute completely dissolves in a solvent

### Separation methods

Use the word bank in the box to fill in the gaps.

**Distillation** can be used to separate two or more liquids. The mixture is boiled and the gas with the lowest \_\_\_\_\_ goes into the \_\_\_\_\_ first. It \_\_\_\_\_ into a liquid and is collected. The other liquid is left behind.

**Filtration** is used to separate a solid from a liquid using a filter. The solid cannot \_\_\_\_\_ in the liquid and it also cannot pass through the holes in the \_\_\_\_\_, but the liquid can.

**Evaporation** is used to separate a solid that is dissolved in a \_\_\_\_\_. As the liquid \_\_\_\_\_ into a gas, it leaves the solid behind, often as crystals.

**Chromatography** is used to separate more than one \_\_\_\_\_ which are soluble in one \_\_\_\_\_. A small amount of substances is spotted on some \_\_\_\_\_ and the solvent runs up this separating the mixture

evaporates	filter paper	dissolve	filter	solvent
condenser	condenses	boiling point	liquid	solute

## Separating Mixtures

Using the information above, explain whether you would use filtration, evaporation or distillation in each of these cases:

1. Greg lives by the sea and wants to make his own sea-salt for cooking. He gets it from seawater.
2. Eric has made some brandy at home. He wants it to be stronger by removing some of the water.
3. Boris accidentally drops 1kg of sugar in a bucket of hot water. It dissolves, but he wants to get the solid sugar back.
4. Lily is shipwrecked on an island. She needs clean water, but there isn't any - just a swamp with muddy water.
5. Angus has a bottle of alcohol mixed with water. He wants to remove the alcohol from the water to use as a fuel.