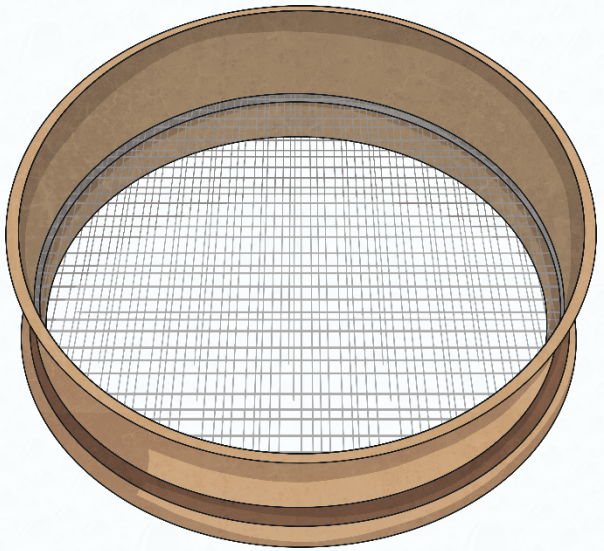
Separating Solutions Investigation

Processes to Separate Mixtures

When some materials are mixed together, it is possible to separate the mixture and get the original materials back again.



There are several different ways of separating mixtures. The best process to use depends on the type of mixture you are separating.

Evaporation and Condensation

Magnetism

Filtering

Sieving

Decanting

Evaporation and Condensation

1 This process is best used to separate solutions - mixtures in which a solid has dissolved in a liquid.

2 As the solid has dissolved in the liquid, filtering would not separate the two materials. The solid particles would go through the filter paper along with the liquid.

3 When the solution is evaporated, either through boiling or by being left in a warm place, the liquid will turn into gas and leave the solid behind.

4 If the gas is then condensed on a cool surface, the liquid can be recovered and collected too. Examples of mixtures to separate with this process include salt and water or sugar and water

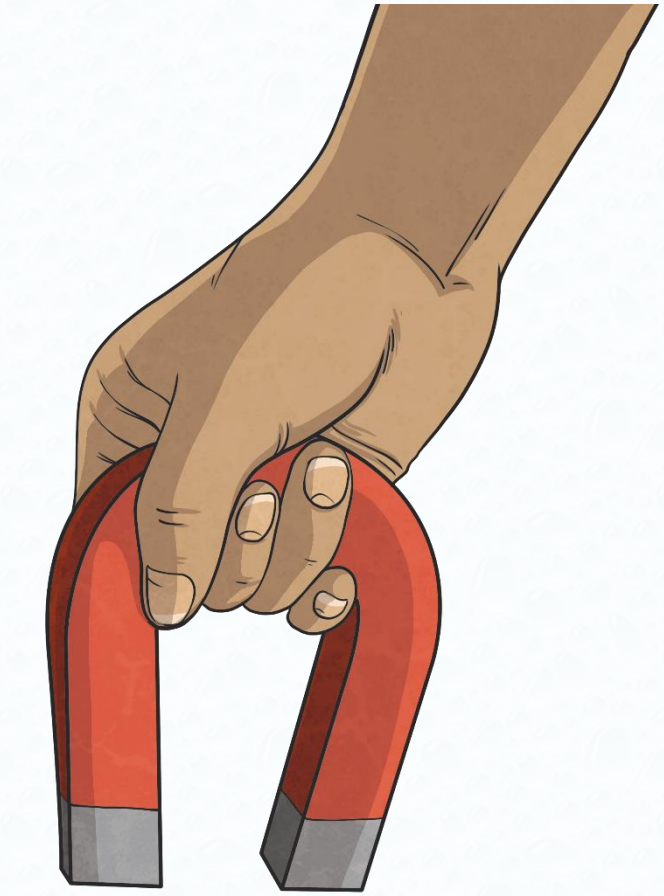
Processes

Magnetism

Use this process to separate magnetic materials from non-magnetic materials.

A magnet is used to attract any magnetic materials and remove them from the mixture.

You could separate a mixture of copper nails and iron nails using this process.



Processes

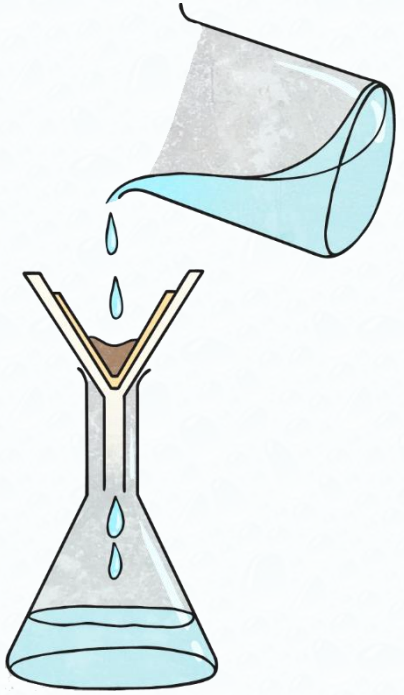
Filtering

This process should be used to separate a mixture of an insoluble solid and a liquid.
A funnel is lined with filter paper and placed over a beaker.
The mixture is poured slowly into the filter paper.

Insoluble solids will not have dissolved in the liquid. The solid particles will not be able to get through the tiny holes in the filter paper, and will be caught in it.

The liquid particles will go through the filter paper into the beaker below.

This process could be used to separate a mixture of sand and water.



Processes

Sieving

Use this process to separate a mixture of different sized solids.

The mixture is poured into a sieve held over a bowl.

The smaller particles will get through it into the bowl and the larger particles will be caught in the sieve.

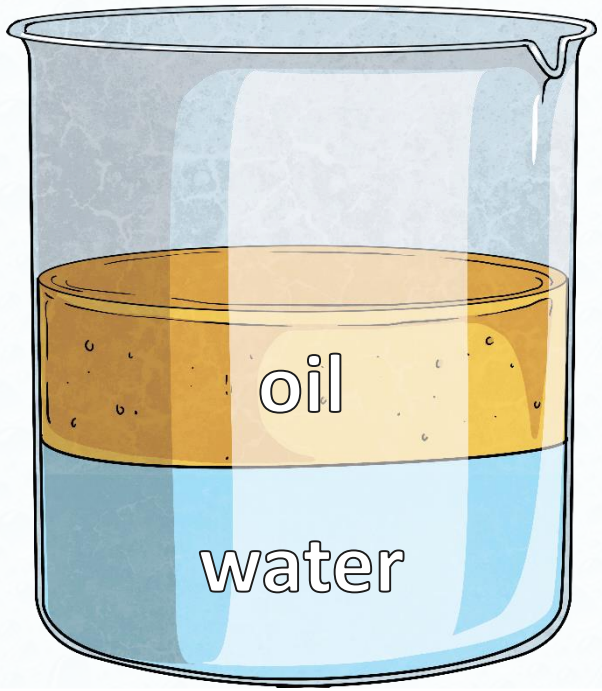
Mixtures you could separate using this process include raisins and flour, or rice and pasta.

Processes

Decanting

This process can be used to separate two liquids that have different densities.

The mixture of liquids is left to settle, so the two liquids are visible as two different layers.



The less dense liquid will be the top layer, and this can be decanted, or slowly poured off.

This process could be used to separate a mixture of oil and water.

Investigation into Separating Solutions

Click here to watch a video about separating solutions.

How would you separate the following?

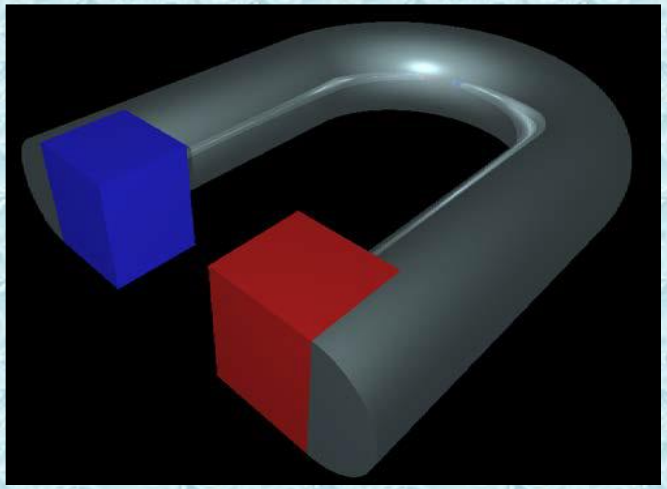
Solutions to separate:

- Salty water
- Flour, rice and pasta
- Filter coffee in water
- Iron & brass paper clips

How would you separate the following?

Equipment to use:

- Sieves
- Filters – cotton wool, muslin, filter paper
- Magnets
- Hairdryer/candles
- Water



TASK: Match the process with its correct description.

Evaporating and Condensing	Separates insoluble solids from liquids
Decanting	Separates two liquids which have different weights
Magnetism	Separates different sized solids
Filtering	Separates soluble solids from liquids
Sieving	Separates iron and steel from non magnetic materials

TASK: Write in the process used to separate each material.

Mixture	Process
Salt + water	
Sugar + water	
Rice + pasta shapes	
Sand + water	
Flour + rice	
Paperclips + sawdust	

Investigation prompt questions

Sieving

- Think about the three solids - how many sieves and grades of sieve might you need?
- What order will you sieve the mixture in?

Using magnets

- How will a magnet separate two materials that are both metallic?
- Which metals attracted to magnets?

Filtering

- How many different types of filter could you use? (e.g. cotton wool, piece of muslin, filter paper)
- Which filter works the best (which water is the clearest)?

Evaporation

- Can you find a way to separate the salt from the water so the salt is in solid form again?
- Where could you leave liquids (it will need to be a warm place!) to create the best conditions for evaporation without using a hairdryer or candle?