

Pure substances and mixtures

Printable revision sheet — Galaxscia

LEVEL 1

Pure substances and mixtures

The matter around us belongs to one of two big families:

A pure substance: it is made of a single chemical species.

A mixture: it contains several different chemical species.

Example of a pure substance :

Salt, sugar, copper or graphite (pencil lead) are solid pure substances.

Demineralised water and some oils are liquid pure substances.

Examples of mixtures:

Tap water contains water and dissolved minerals.

A fruit juice contains water, sugars, flavourings, vitamins...

Key points — revision questions

What is the difference between a pure substance and a mixture?

Name three examples of solid pure substances and two examples of liquid pure substances.

Why is tap water considered to be a mixture?

Are the drinks we consume pure substances or mixtures?

LEVEL 2

Homogeneous mixtures

In a **homogeneous mixture**, the components cannot be told apart with the naked eye.

Example :

Water + mint syrup

Water + dissolved salt

Heterogeneous mixtures

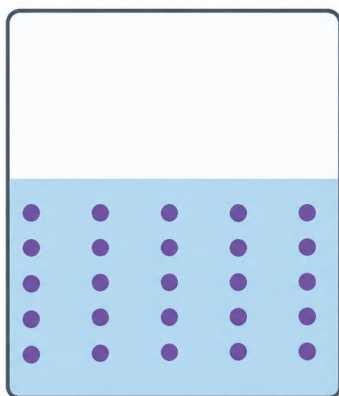
In a **heterogeneous mixture**, the components can be told apart with the naked eye.

Example :

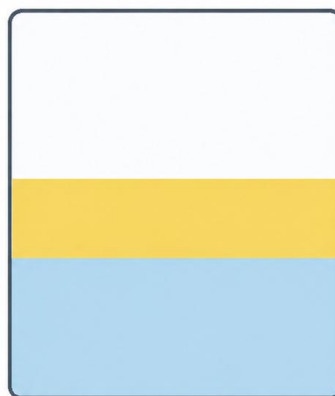
Water + oil

Water + pieces of plastic

Homogeneous or heterogeneous mixture?



Homogeneous



Heterogeneous

Key points — revision questions

What is the difference between a homogeneous mixture and a heterogeneous mixture?

Give two examples of homogeneous mixtures and two examples of heterogeneous mixtures.

LEVEL 3

Filtration

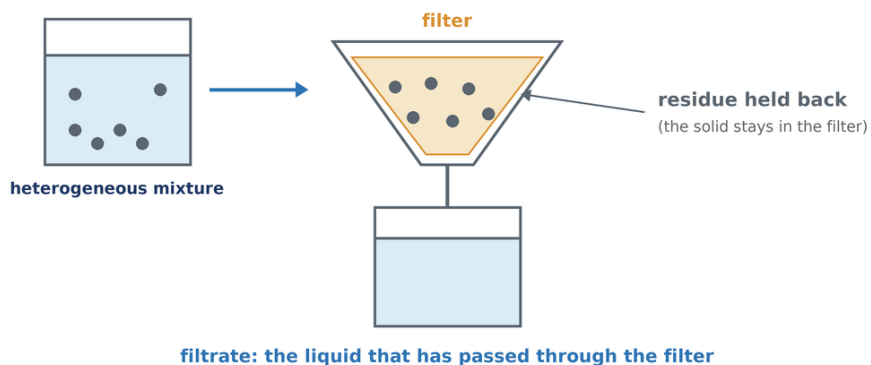
Filtration separates a **heterogeneous solid-liquid** mixture. The mixture passes through a filter:

The larger solid particles are held back.

The liquid (and the very fine particles) passes through.

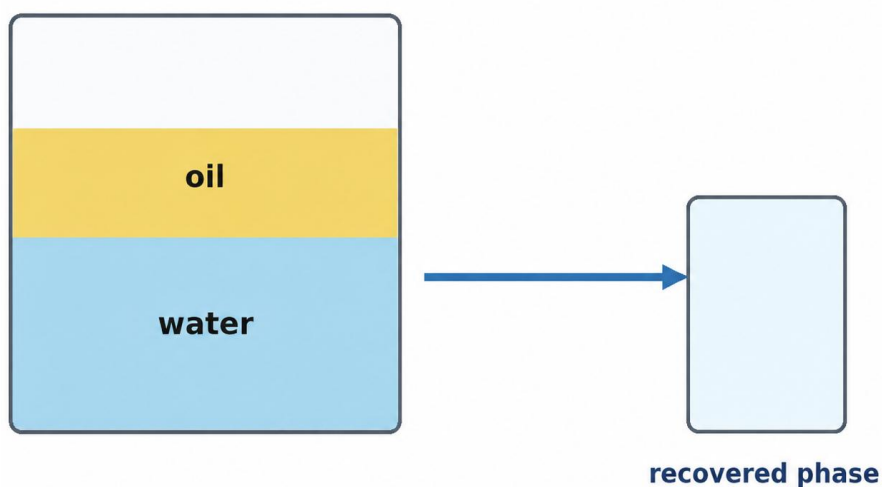
Example : Filtering a sand + water mixture. The sand stays in the filter, the water passes through.

Filtration



Settling (decantation)

Decantation



Settling makes use of the **difference in density** between two substances.

The denser one sinks to the bottom.

The less dense one stays on top.

Example : In a water + oil mixture, the oil (less dense) stays on top and the water stays underneath.

Towards purification

These techniques separate the components of a mixture in order to obtain purer substances.

Key points — revision questions

What principle is filtration based on?

Why does filtration not work with salty water?

How does settling work and which property does it use?

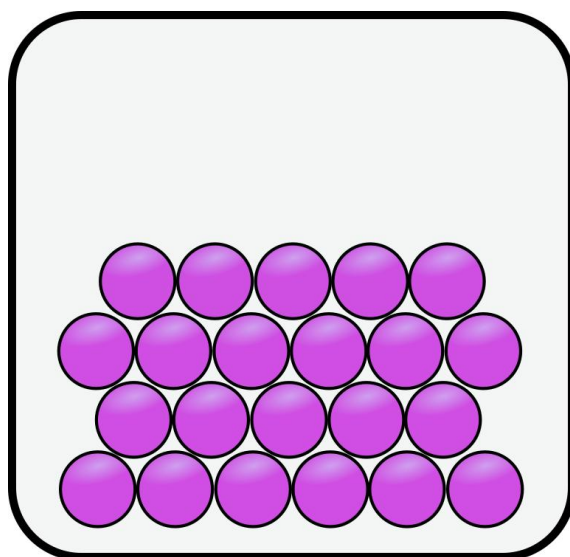
Which types of mixture can be separated by settling?

LEVEL 4

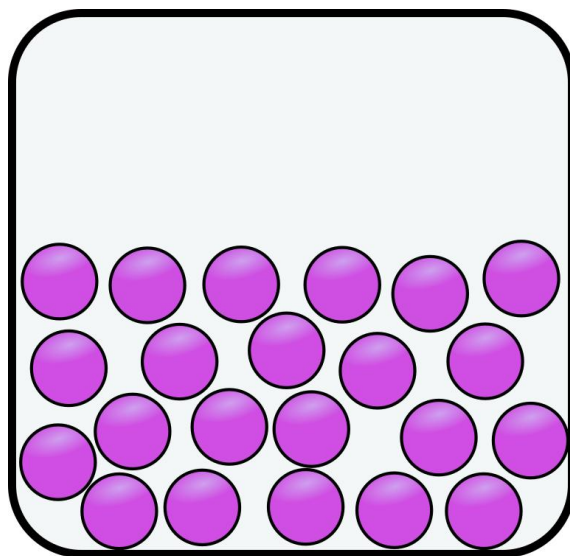
The pure substance

A pure substance contains a single type of molecule.

In a **solid**, these identical molecules are often arranged in an orderly way (crystals).



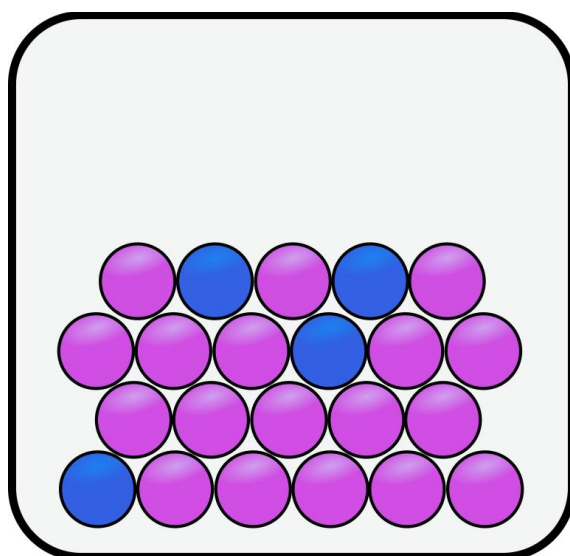
In a **liquid**, they move freely but they all stay identical.



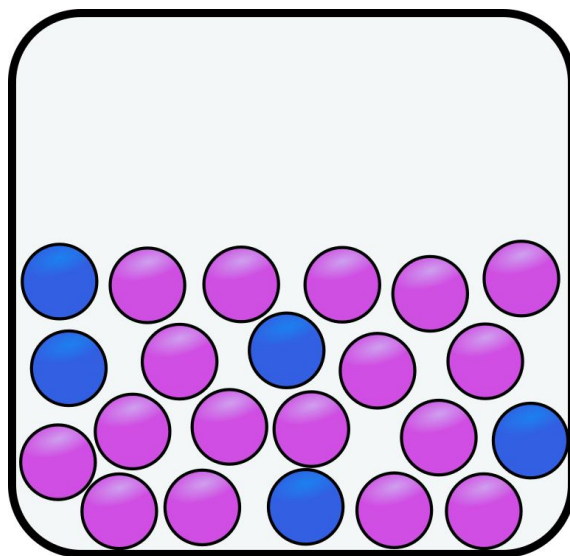
The mixture

A mixture contains several types of molecule.

In a **solid mixture**, particles of different kinds sit side by side.



In a **liquid mixture**, different molecules move around together.



Example : - A bag filled only with red marbles = a pure substance. - A bag filled with red, green and yellow marbles = a mixture.

Key points — revision questions

What does a pure substance look like at the molecular level?

What is the fundamental difference between a pure substance and a mixture on the microscopic scale?

How are the molecules arranged in a solid pure substance? And in a liquid pure substance?

What does the microscopic view reveal about the nature of mixtures?