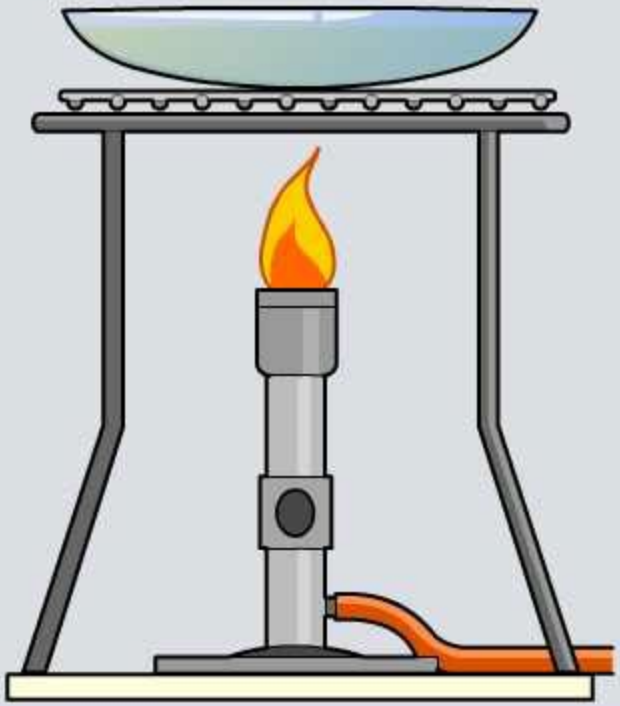
Separating Mixtures



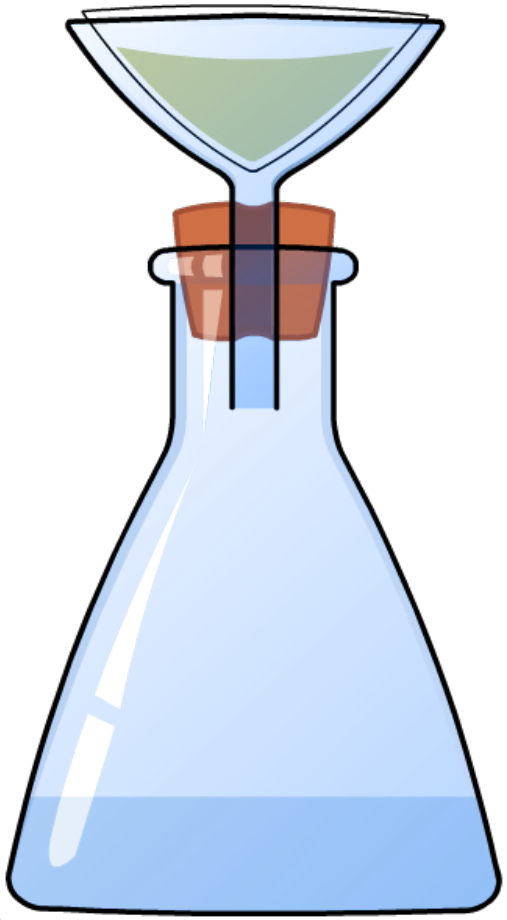
How could you separate these mixtures?

Suggest some methods by which you could separate out these mixtures:

- chocolate chips and raisins
- different colored candies
- pebbles and sand
- salt and sand
- mud and water
- oil and water
- gold and iron.

Separating an insoluble solid

How could you separate an insoluble solid like sand from a mixture of sand and water?



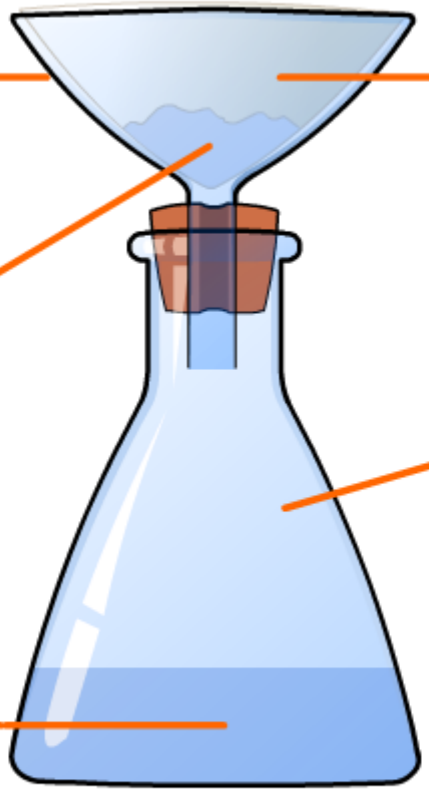
It is easy to separate an insoluble solid by **filtering** the mixture.

The insoluble solid cannot pass through the filter paper but the water can.

The sand that is trapped by the filter paper is called the **residue**. The water that passes through the filter paper is called the **filtrate**.

Filtering apparatus

What apparatus is used for filtering substances?



? ?

? ?

? filter paper

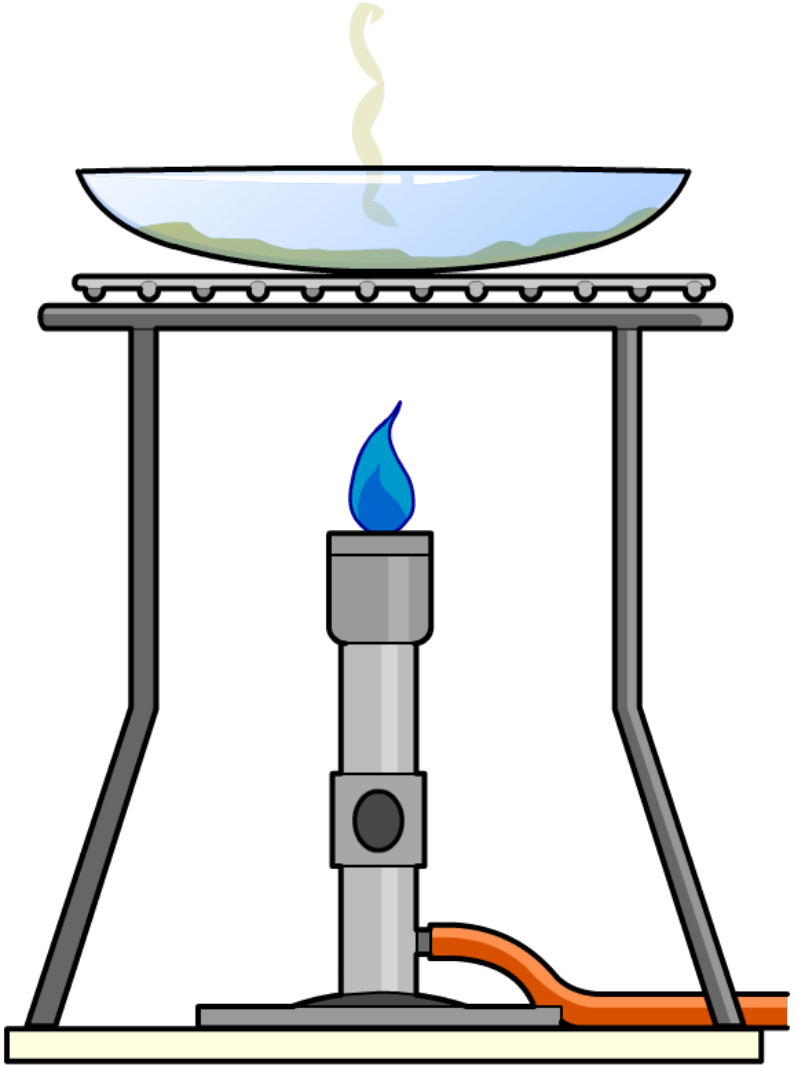
solve

Separating a soluble solid

How could you separate a soluble solid, like salt, from a seawater solution?

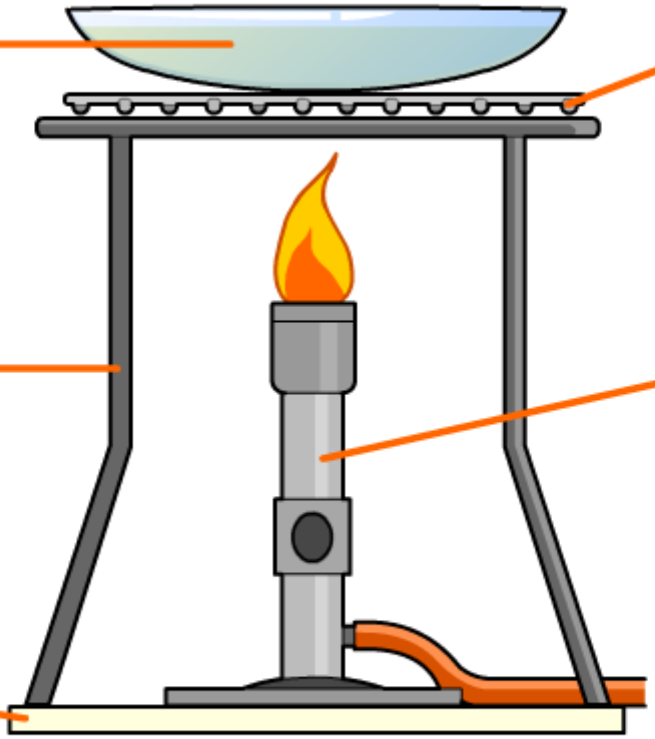
To separate a soluble solid from a solution, **evaporation** can be used.

The solution is heated so that the water evaporates and leaves the dissolved solid behind.



Evaporation apparatus

What apparatus is used for evaporating substances?



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?

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?

?

Bunsen burner

solve

Salty water

Where does the salt around the Dead Sea come from?

Separating salt from seawater

The Dead Sea is a salty lake located between Jordan and Israel.

The Dead Sea contains some of the saltiest water in the world.

The Dead Sea is almost six times saltier than the ocean, so nothing is able to live in it, which is why it is called ‘dead.’

The heat of the Sun evaporates the water from the Dead Sea, and the salt that is left behind is collected in salt beds.

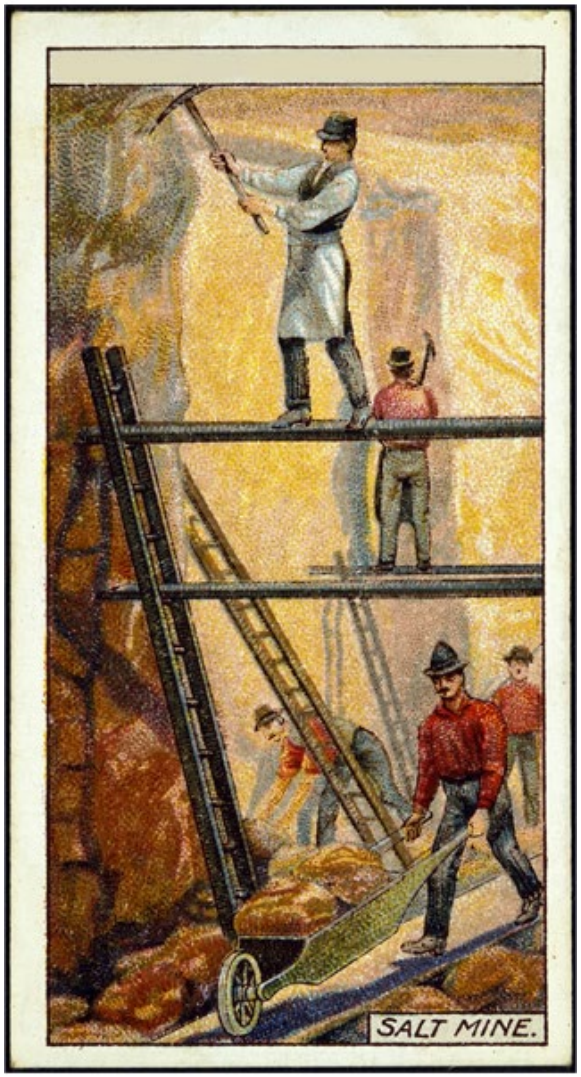
Separating salt from rock salt

We also get salt from rocks called ‘rock salt.’ Rock salt is a mixture of salt, sand and bits of rock.

Rock salt was traditionally extracted by hand from underground mines - a very dangerous process.

Today, rock salt is mined using earth-moving equipment before being purified.

How could you use dissolving, filtering and evaporation to separate the salt from rock salt?

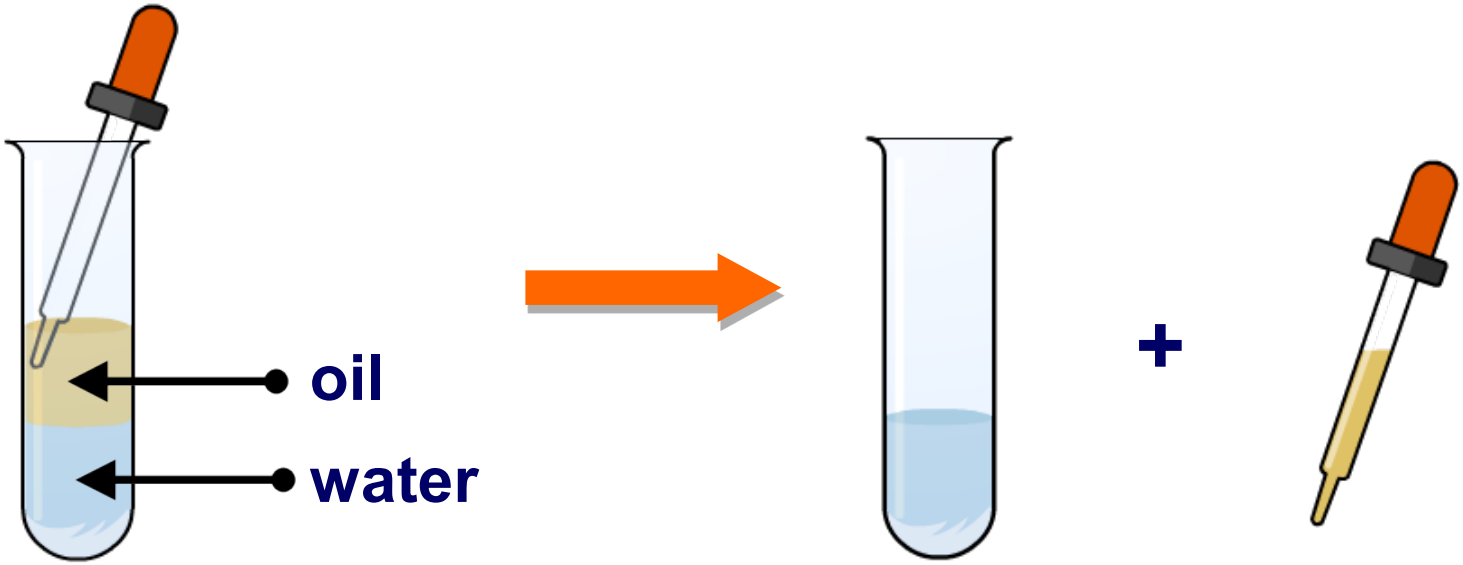


Separating immiscible liquids

Liquids that do not mix together are described as **immiscible**.

Can you think of any examples of immiscible liquids?

On a small scale, immiscible liquids can be separated by simply removing the top layer using a pipette.



In laboratories, chemists use a separating funnel to separate immiscible layers.

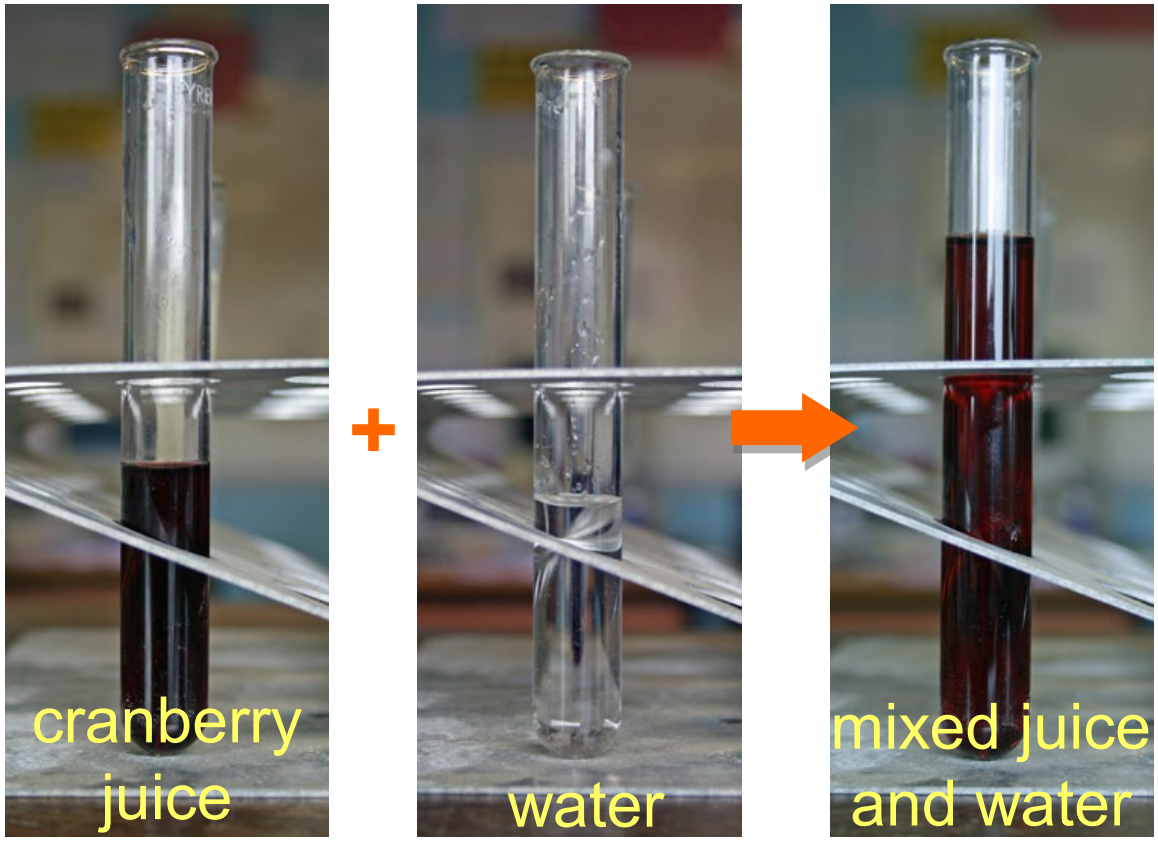
Separating miscible liquids

Liquids that do mix together are described as **miscible**.

An example of this is water and fruit juice – these two liquids mix together easily.

Can you think of any more examples of miscible liquids?

How could you separate a mixture of miscible liquids?



Distillation

The technique used to separate a liquid from a mixture is called **distillation**.

Distillation has three steps:

1. evaporation
2. condensation
3. collection.

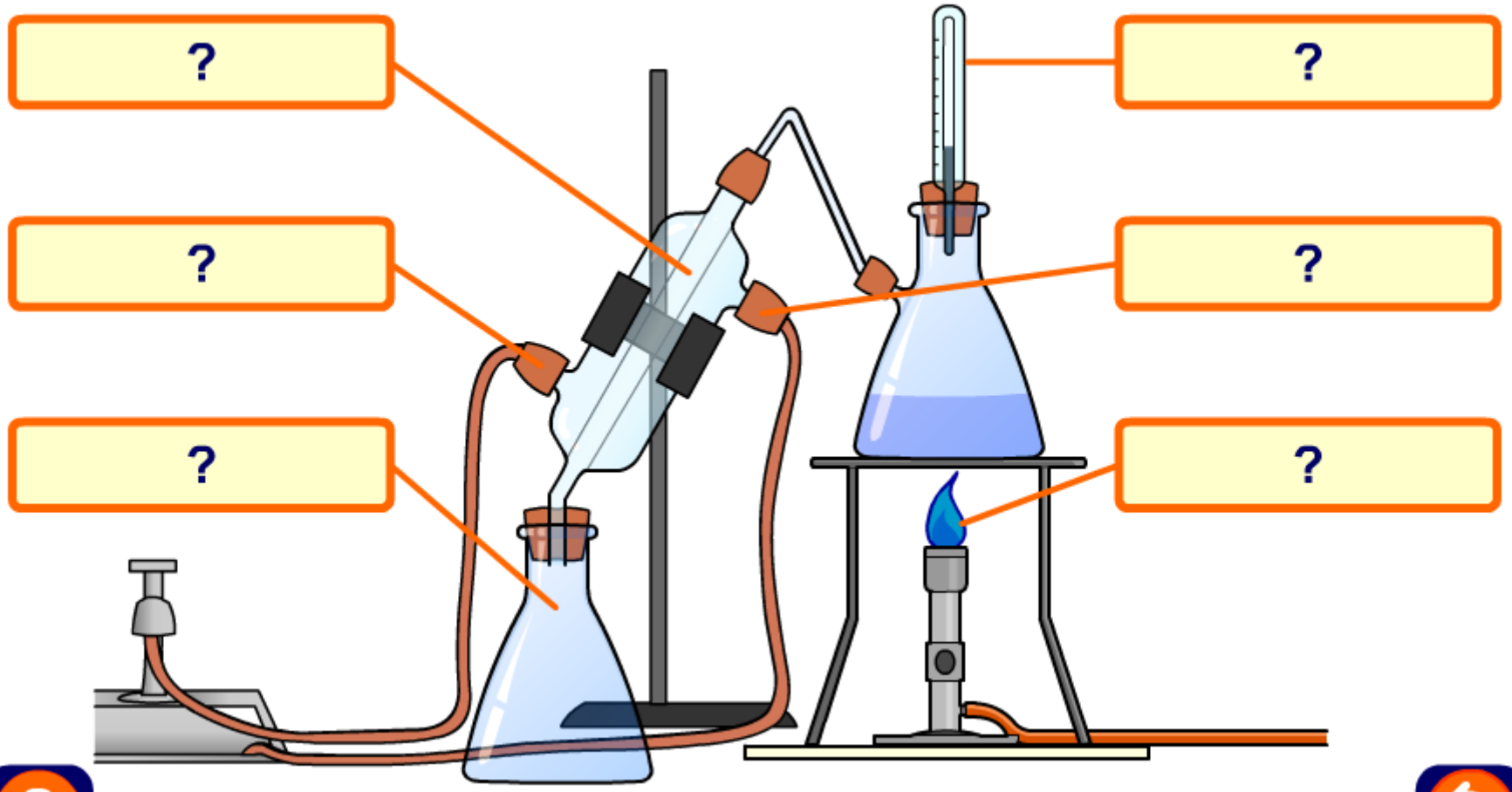
The solution is heated so that the liquid evaporates and is turned into a gas. Everything else is left behind.

The gas cools in the condenser and turns back into a liquid, which can then be collected.

Could distillation be used to make seawater safe to drink?

Distillation

What apparatus is used for distillation?



Which separation technique?

Match each technique to the substances it is used to separate

sieving	separating solids of different sizes
filtering	separating a mixture of two liquids
distillation	separating a soluble solid from a liquid
evaporation	separating an insoluble solid from a liquid

?

solve

Separating mixtures

Which method could be used to separate each mixture?

Mixture	Substance to collect	Method
glass and water	glass	1
sea water	salt	2
sea water	water	3
cooking oil and water	cooking oil	4
alcohol and water	alcohol	5

distil

solve