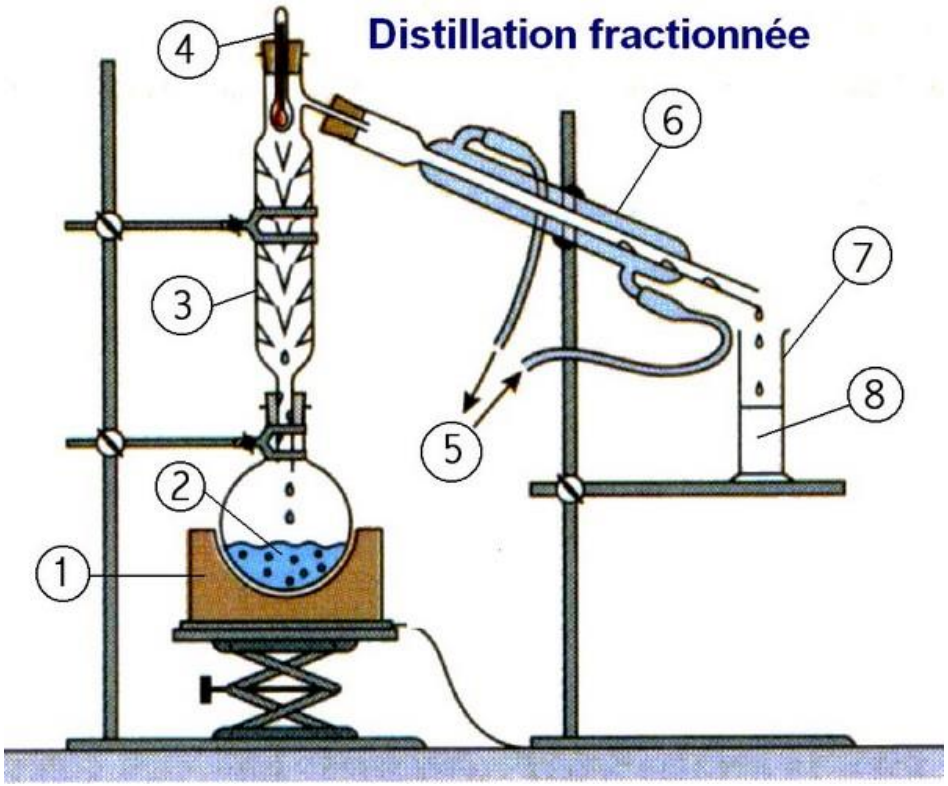
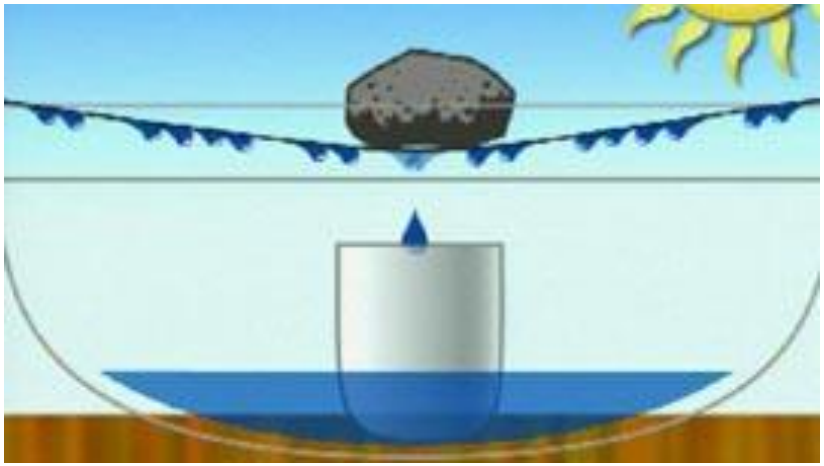
Various Methods for Separating the Components of a Mixture



Distillation: Separation through vaporization of a liquid from a solid, or another liquid, followed by vapor condensation.

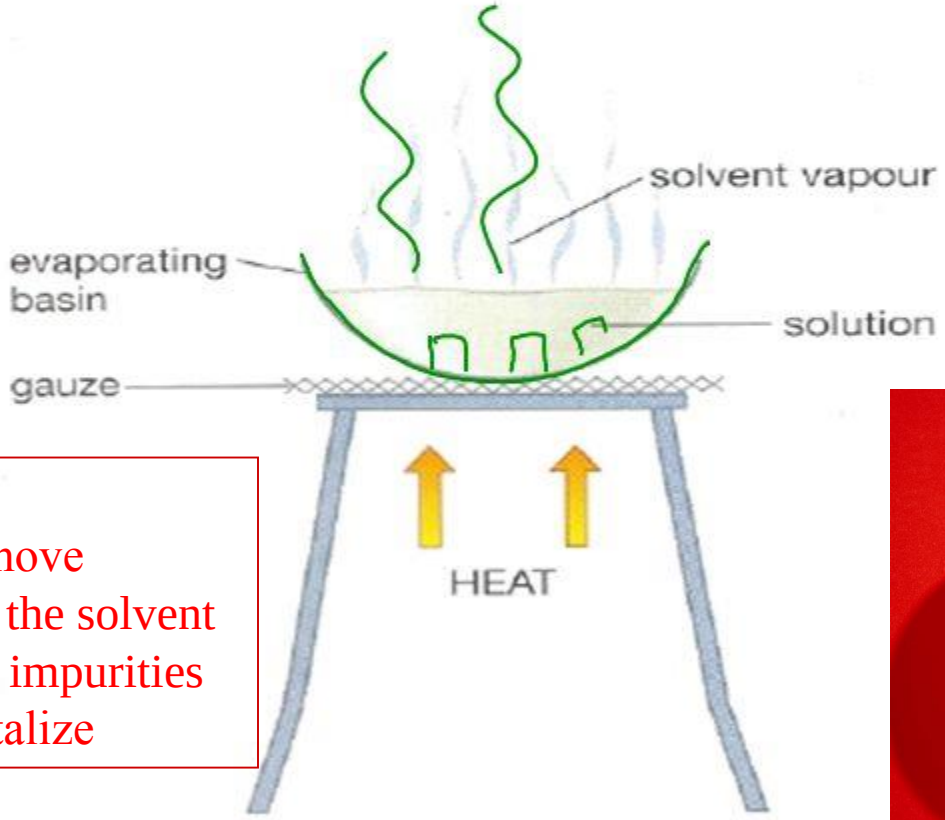
Distillation is used in many different industries including **chemical, brewery and pharmaceutical.**

Distilling Salt Water



Evaporation

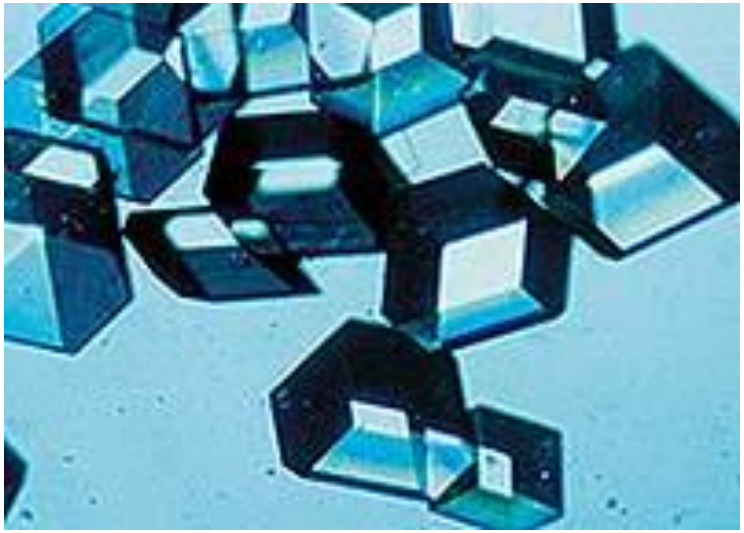
- Solution is put in an evaporation disk and heat is applied until all of the solvent has evaporated and only the solid remains.



Add to notes

Caution
You'll want to remove crystals before all the solvent evaporates so that impurities don't start to crystalize

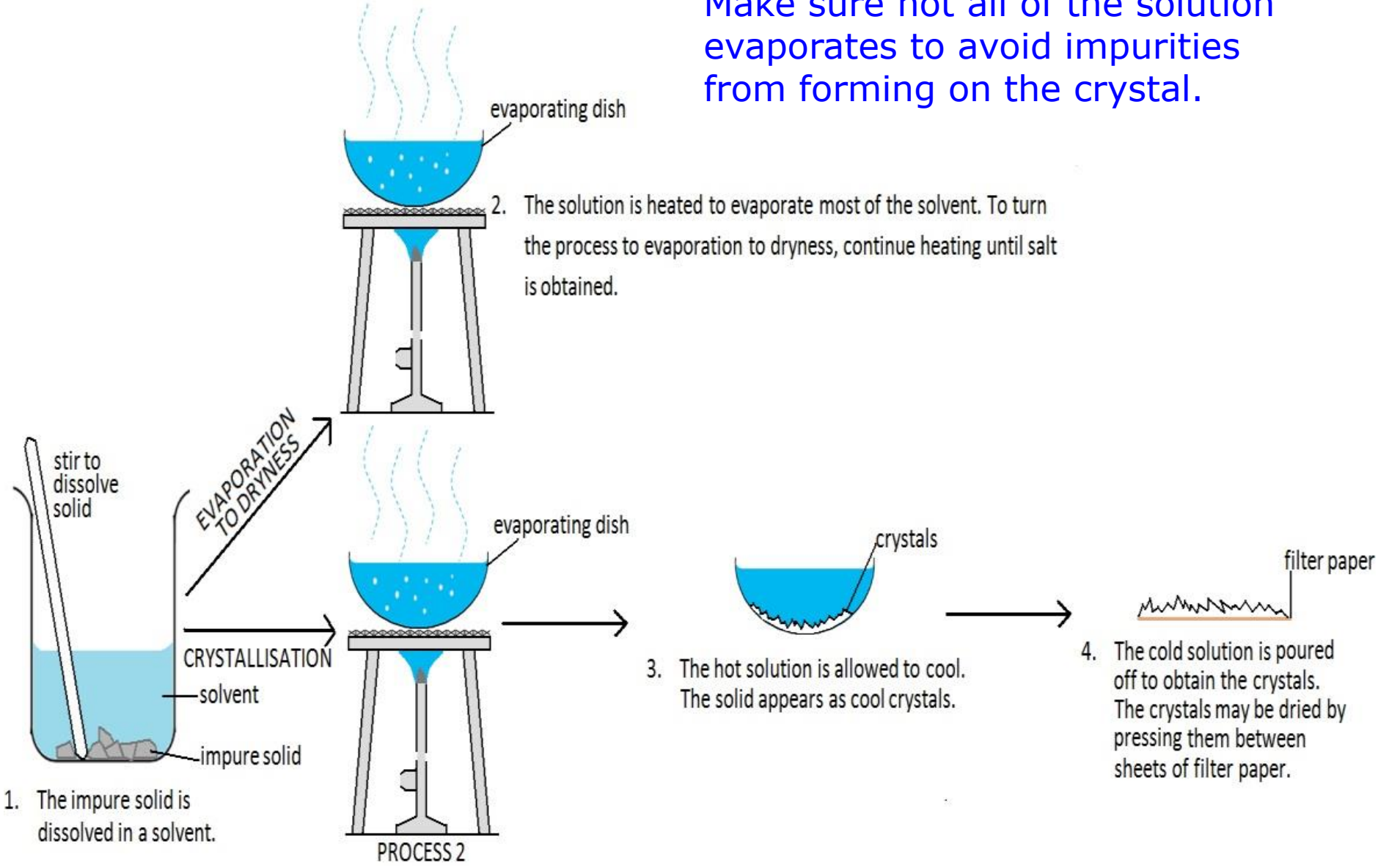
Crystallization: forming a crystalline solid by decreasing its solubility as a result of cooling the solution, evaporating the solvent, or adding a solvent in which the solid is less soluble such that solid crystals form.



Crystals of insulin grown in space let scientists determine the vital enzyme's structure and linkages with much higher resolution than Earth-grown crystals.

Rock candy

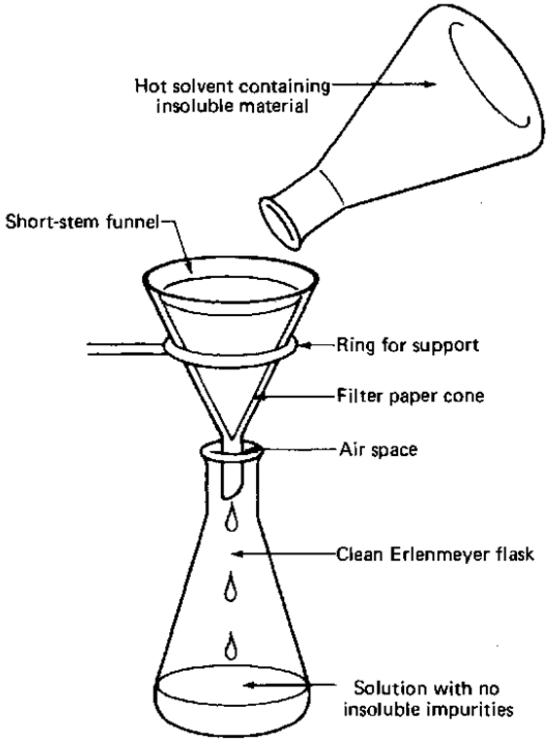
Make sure not all of the solution evaporates to avoid impurities from forming on the crystal.



Filtration: removing a solid substance from a liquid by passing the suspension through a filter.

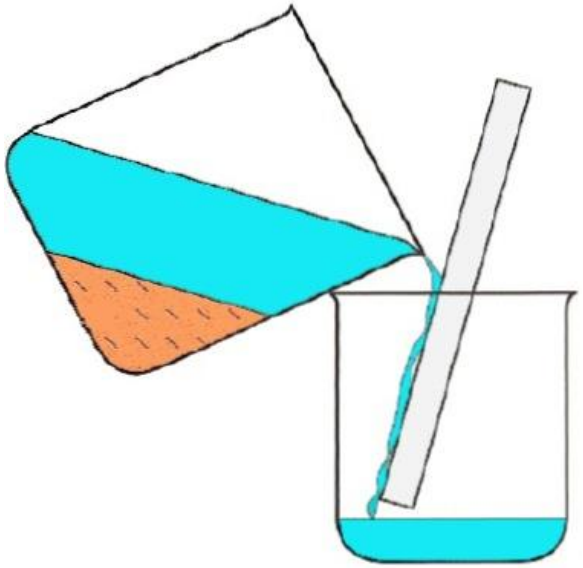
Gravity Filtration

Crude oil filtration (vacuum filtration)



Decantation: a process for separating the liquid component of a solid—liquid mixture from the solid by pouring.

Decanting whey from the curds in cheese making.



Decanting a solvent from a solute.

Decanting Wine to remove sediment.

Two liquids are miscible if they are mutually soluble in each other in all proportions.

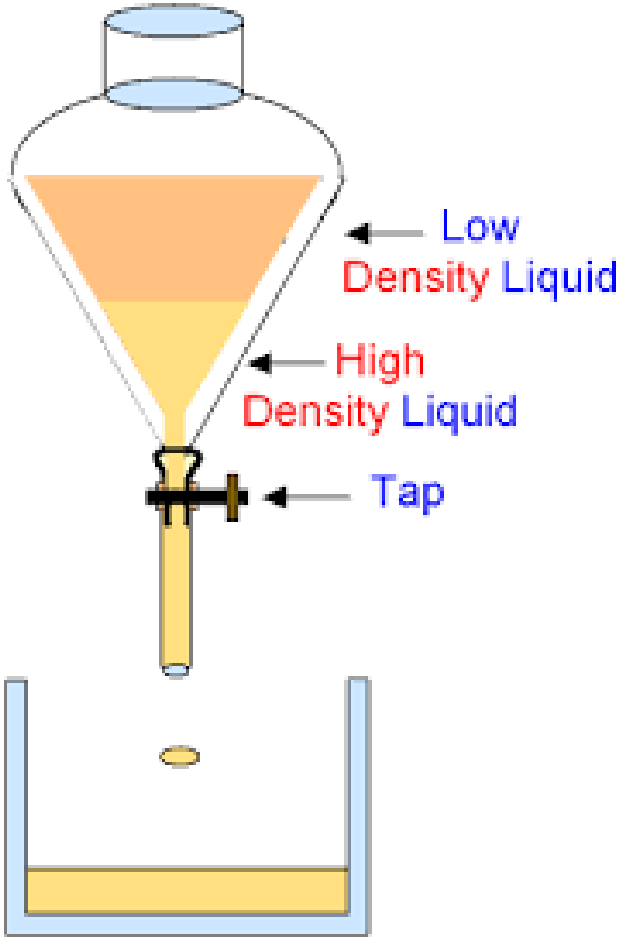
Ex. Water and alcohol dissolve each other in all proportions and thus are miscible.

Two liquids are immiscible if they are insoluble in each other.

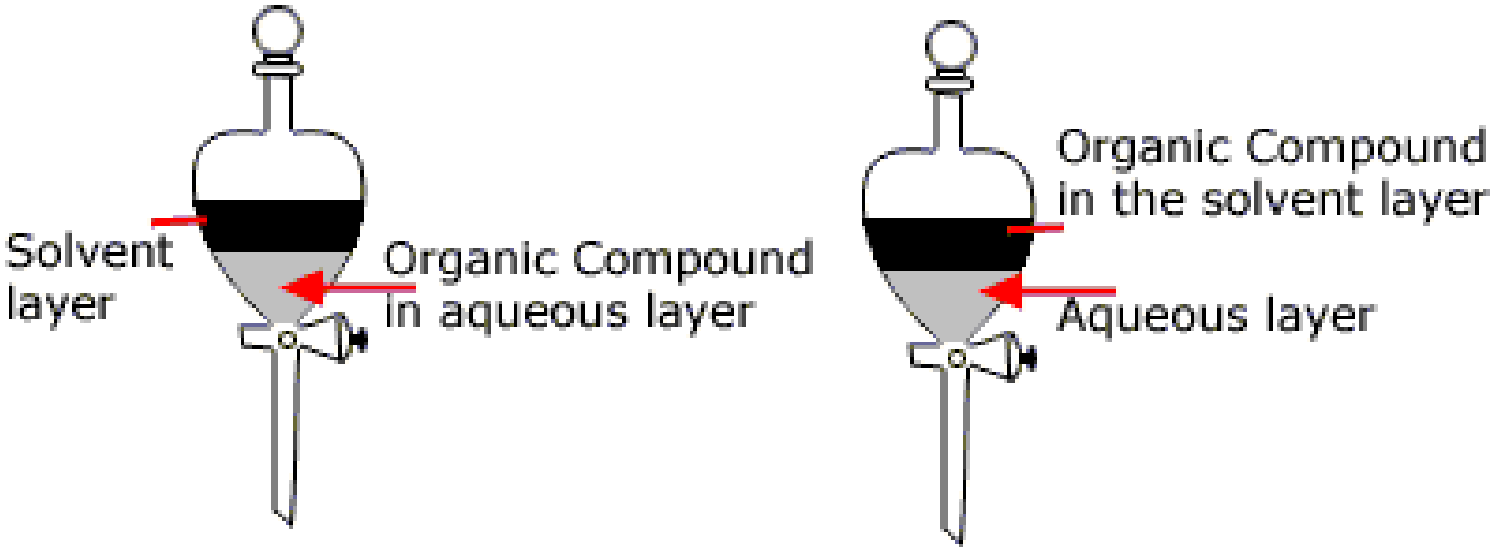
Ex. Water and vegetable oil do not mix with each other and are immiscible.

Separatory funnel

Separate by using the densities. The more dense material will be at the bottom and can be separated from the less dense material on the top.



Solvent Extraction: removing a substance from a solid or liquid mixture by adding a solvent in which the substance is more soluble. Dissolve one of the substances and then use a separatory funnel or filter to separate the substance.

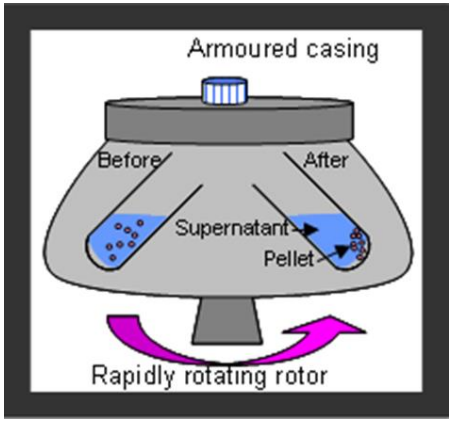


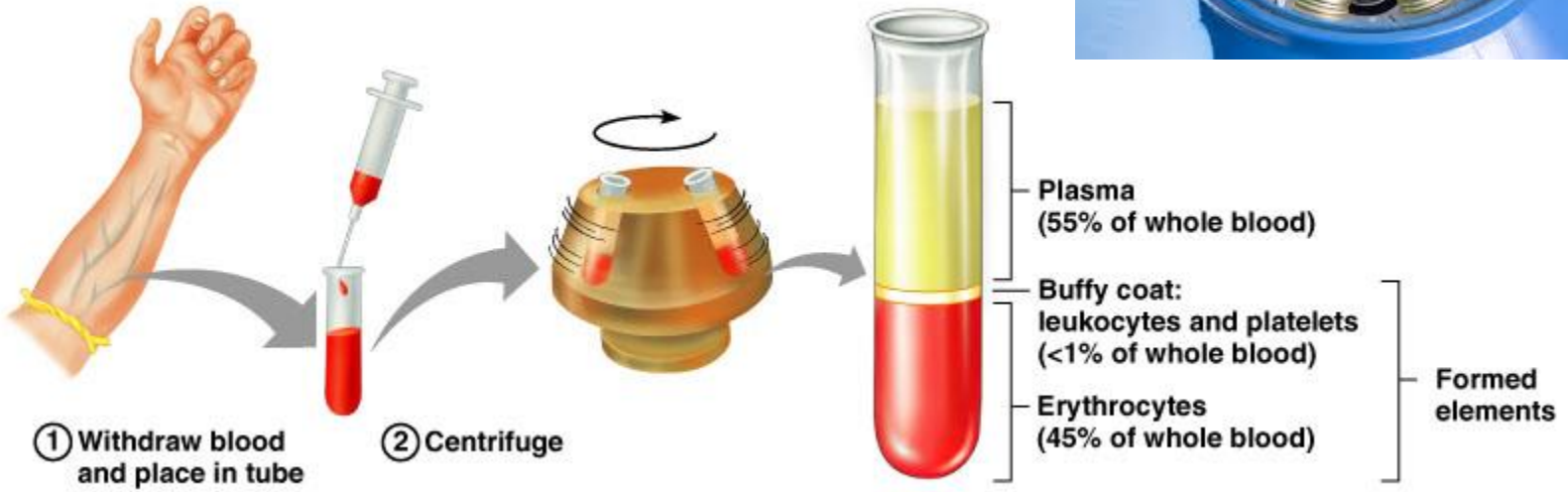
Example: To remove salt from oil add water to dissolve the salt then let mixture separate due to densities. The salt will remain in the water and the oil will separate.

Gravity separation

Shaking or agitating a mixture will make the more dense particle sink to the bottom and less dense particles rise to the top.

Centrifugation: (Gravity separation) removing a substance from a solution by means of a centrifuge. Spin the solution and gravity pulls the more dense material to the bottom.





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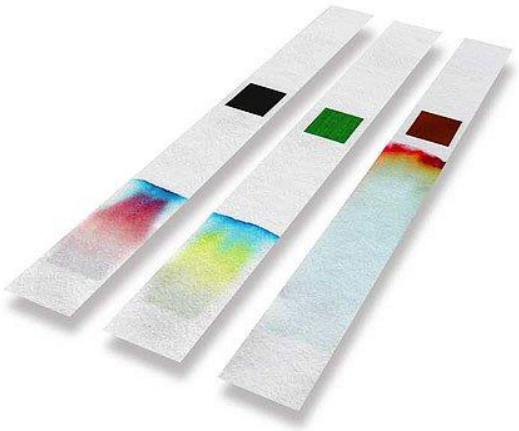
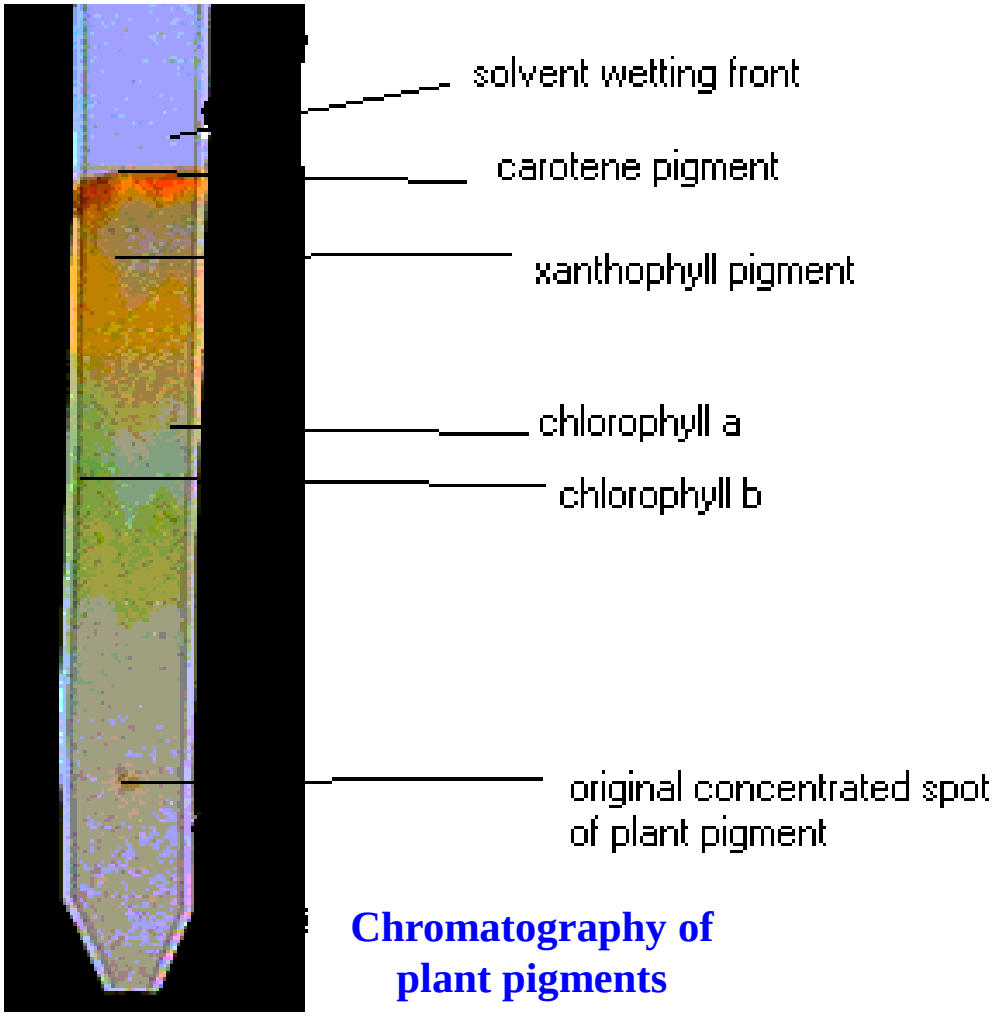
Chromatography:
separating components of a mixture that have differing adsorptive tendencies on a stationary phase as the mixture is passed over or through the stationary phase .





Chromatography of plant pigments

HAND SEPERATION

- A mechanical mixture can be separated by hands, a magnet or a sieve.