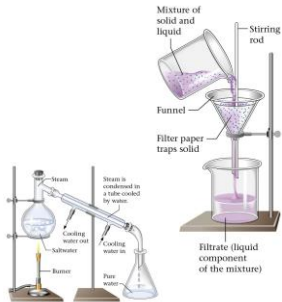
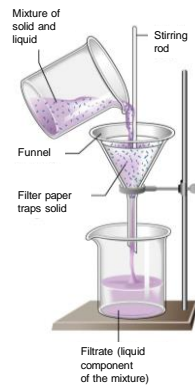


Methods of Separating Mixtures

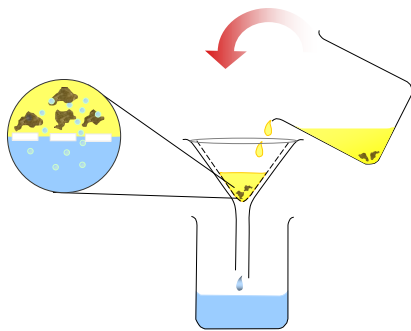
- Magnet
- Filter
- Decant
- Evaporation
- Centrifuge
- Chromatography
- Distillation



Filtration separates a liquid from a solid



Zumdahl, Zumdahl, DeCoste, World of Chemistry 2002, page 40

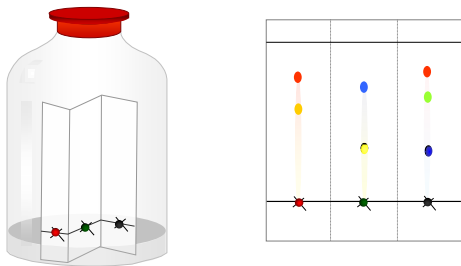


Chromatography

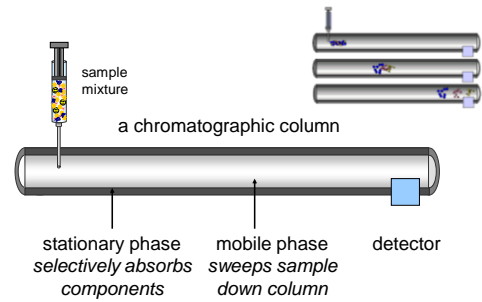
- Tie-dye t-shirt
- Black pen ink
- DNA testing
 - Tomb of Unknown Soldiers
 - Crime scene
 - Paternity testing



Paper Chromatography

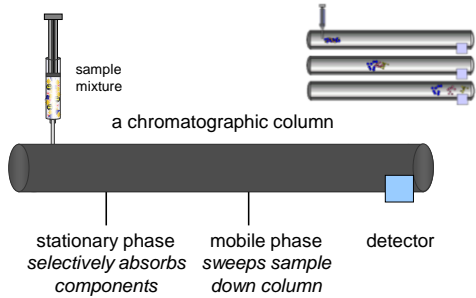


Separation by Chromatography



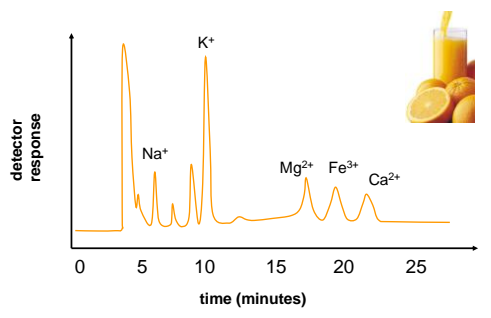
<http://terrace.frostburg.edu/~chem/science/101/matter/ideas/58006.htm>

Separation by Chromatography

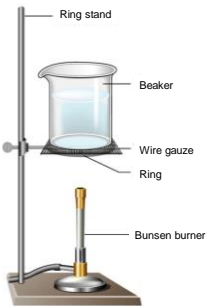


<http://webhome.crk.edu/~henry/courses/1101/master/04/lec/040006.htm>

Ion chromatogram of orange juice



Setup to heat a solution



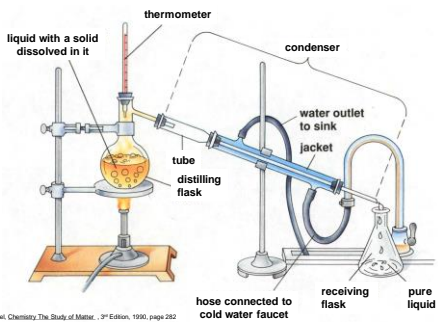
Zumdahl, Zumdahl, DeCoste, World of Chemistry, 2002, page 42

A Hero's Fountain



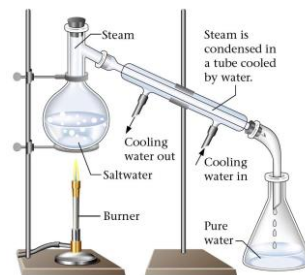
Eyewitness Science "Chemistry", Dr. Ann Newman, DK Publishing, Inc., 1995, pg 13

A Distillation Apparatus



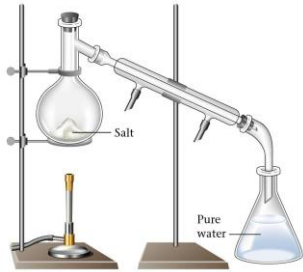
Davis, Deming, Galati, Chemistry: The Study of Matter, 3rd Edition, 1990, page 282

The solution is boiled and steam is driven off.



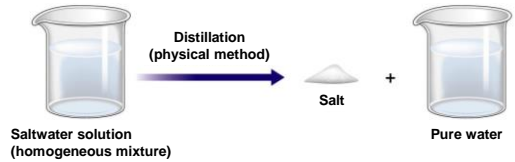
Zumdahl, Zumdahl, DeCoste, World of Chemistry 2002, page 59

Salt remains after all water is boiled off.



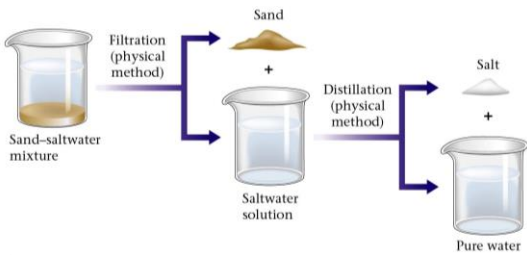
Zumdahl, Zumdahl, DeCoste, World of Chemistry, 2002, page 39

No chemical change occurs when salt water is distilled.



Zumdahl, Zumdahl, DeCoste, World of Chemistry, 2002, page 40

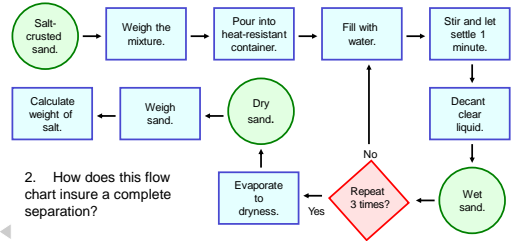
Separation of a sand-saltwater mixture.



Zumdahl, Zumdahl, DeCoste, World of Chemistry, 2002, page 40

Separation of Sand from Salt

- Gently break up your salt-crusted sand with a plastic spoon. Follow this flowchart to make a complete separation.

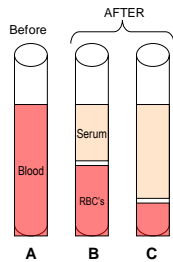


- How does this flow chart insure a complete separation?



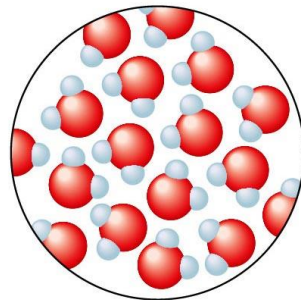
Centrifugation

- Spin sample very rapidly: denser materials go to bottom (outside)
- Separate blood into serum and plasma
 - Serum (clear)
 - Plasma (contains red blood cells 'RBC's')
 - Check for anemia (lack of iron)



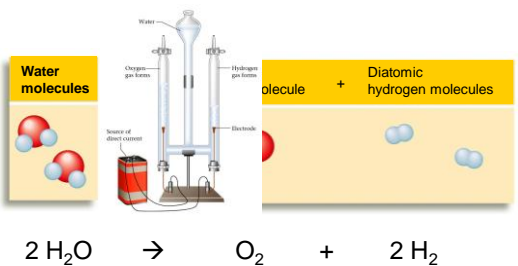
Zumdahl, Zumdahl, DeCoste, World of Chemistry, 2002, page 6

Water Molecules



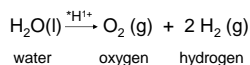
Zumdahl, Zumdahl, DeCoste, World of Chemistry, 2002, page 6

The decomposition of two water molecules.

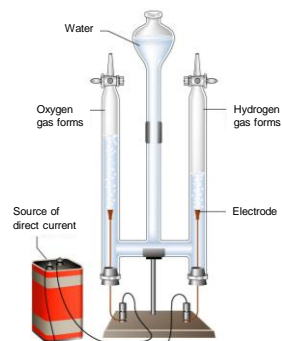


Electrolysis

"electro" = electricity
"lysis" = to split

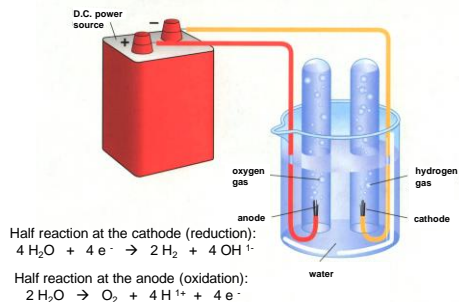


*Must add acid catalyst to conduct electricity



Zumdahl, Zumdahl, DeCoste, World of Chemistry 2002, page 52

Electrolysis of Water




Reviewing Concepts

Physical Properties

- List seven examples of physical properties.
- Describe three uses of physical properties.
- Name two processes that are used to separate mixtures.
- When you describe a liquid as thick, are you saying that it has a high or low viscosity?

Reviewing Concepts

Physical Properties

- Explain why sharpening a pencil is an example of a physical change. 
- What allows a mixture to be separated by distillation?

Reviewing Concepts

Chemical Properties

- Under what conditions can chemical properties be observed?
- List three common types of evidence for a chemical change.
- How do chemical changes differ from physical changes?

Reviewing Concepts

Chemical Properties

- Explain why the rusting of an iron bar decreases the strength of the bar.



- A pat of butter melts and then burns in a hot frying pan. Which of these changes is physical and which is chemical?

