Elements, Compounds, and Mixtures

Elements - Is the simplest form of matter that has a unique set of properties. It cannot be broken down (only one kind of atom)

Compounds - Two or more elements that are chemically combined in a fixed proportion. It can be broken down (two or more types of atoms)

NOTE: A compound can be broken down into simpler substances by chemical means.

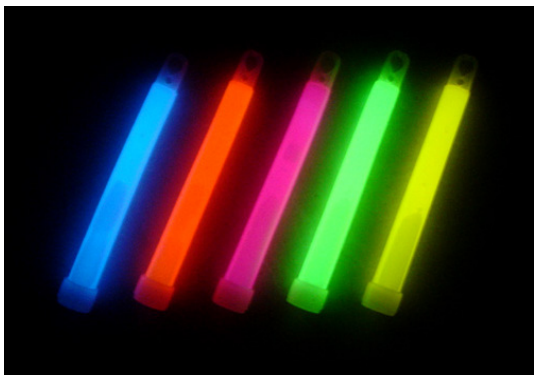
To break down compounds, a chemical change must occur.

Separating Water

A chemical change is a change that produces matter with a new composition. Something new is formed.

Recognizing Chemical Change (Evidence)

- colour change
- odour change
- temperature change
- formation of precipitate (ppt)
- light given off
- difficult to reverse (cannot get original material back)
- bubbles (formation of a gas)



A mixture is a physical blend between two or more substances. Therefor it can be separated physically.

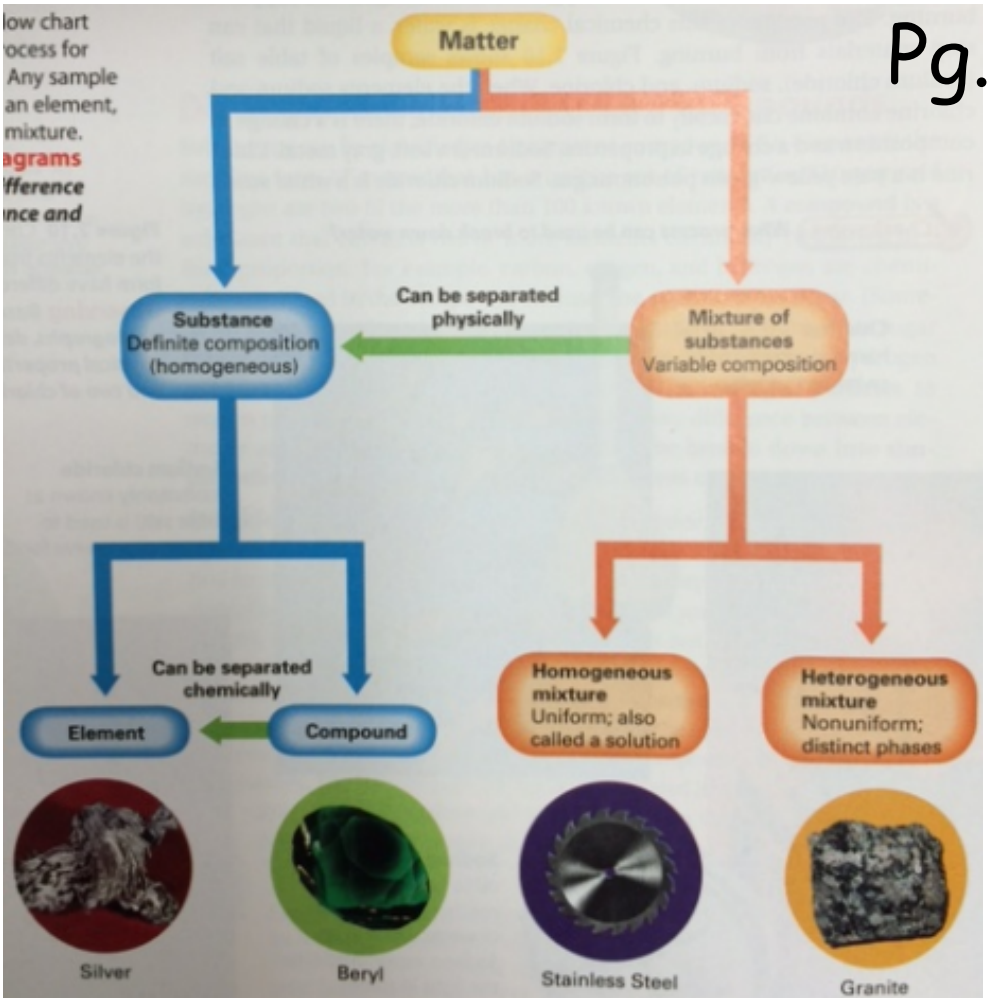
Solutions - homogeneous mixture "seems as one" It only has one visible phase. (Ex. 

)

Heterogeneous Mixture - You see two or more phases or visible parts. (Ex. )

Pg. 50

low chart
ocess for
Any sample
an element,
mixture.
agrams
fference
nce and



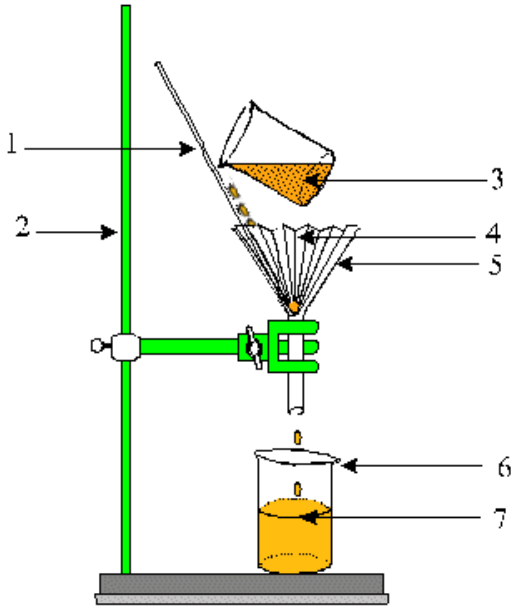
Separating Mixtures

Differences in physical properties can be used to separate mixtures.

Processes such as filtration and distillation are examples of separating mixtures. Others would include mechanical separation, settling, and extraction.

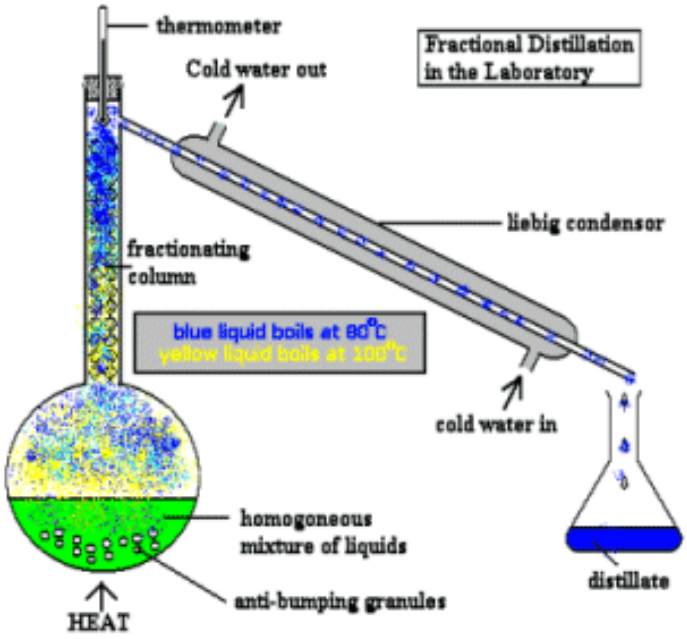
Filtration

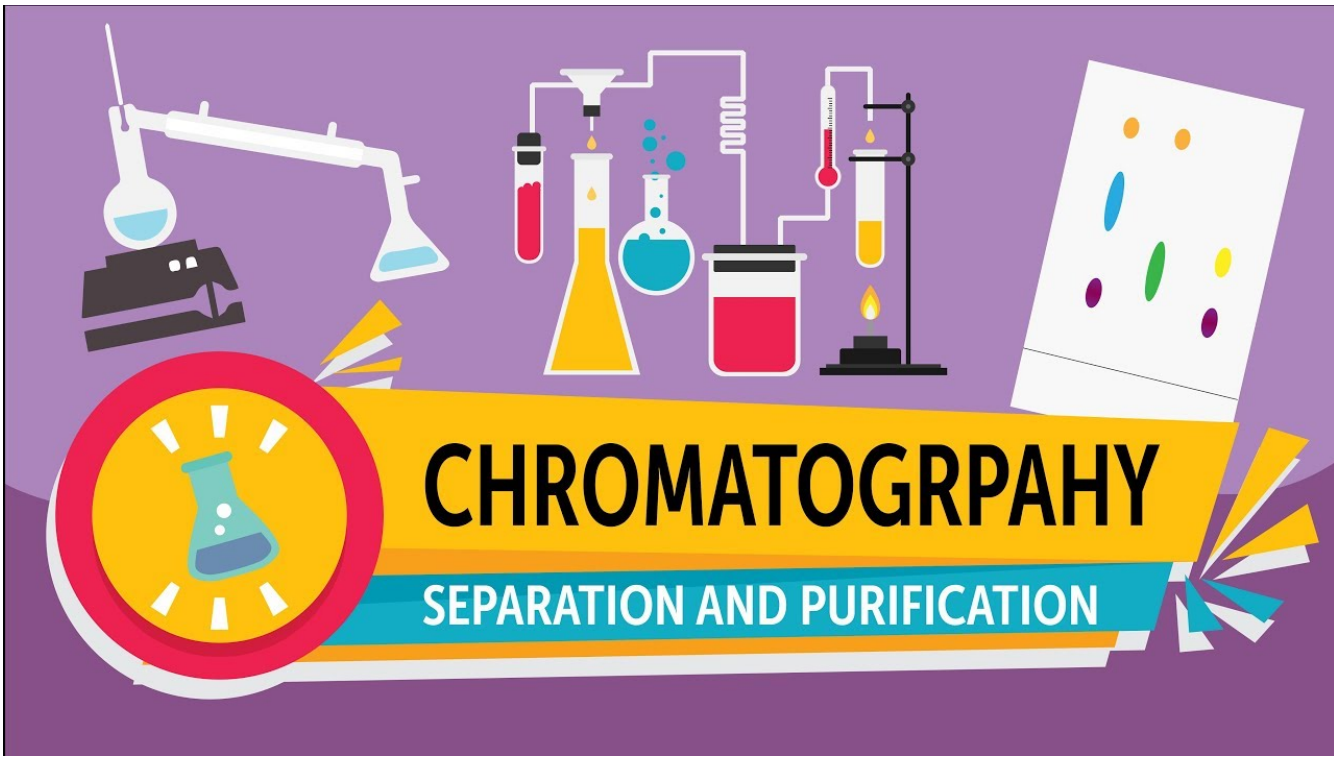
Remove a solid phase from a liquid phase.



Distillation

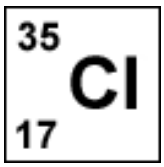
Separating liquids based on their boiling points.





The separation of a mixture by passing it through a solution where the components move at different rates.

Symbols



Each element is given a symbol. Most have two letters (First always upper case, second always lower case)

These symbols provide a shorthand way to write chemical formulas.

For instance, water is H_2O and table sugar (sucrose) is $C_{12}H_{22}O_{11}$

The small numbers are subscripts and indicate how much of a given element is present.

A chemical formula is an abbreviation for the name of a compound

H_2O = water

Al_2SO_4 = aluminum sulfate

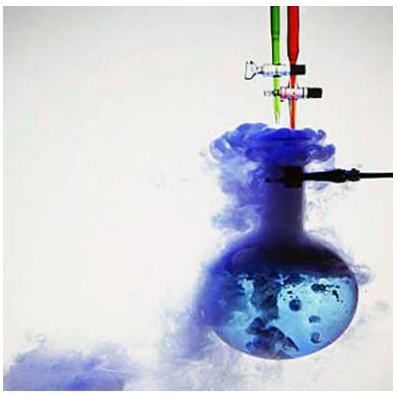
SO_3 = sulfur trioxide

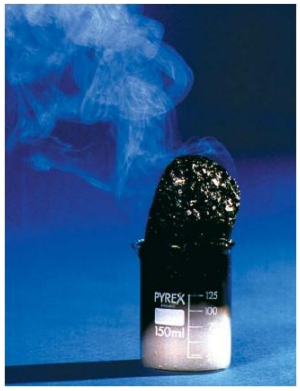
A chemical <u>equation</u> is an abbreviation that represents a chemical reaction

$$6KNO_3 + Al_2(SO_4)_3 \rightarrow 3K_2SO_4 + 2Al(NO_3)_3$$

Chemical Reaction

A chemical reaction occurs when one or more substances change into one or more new substances





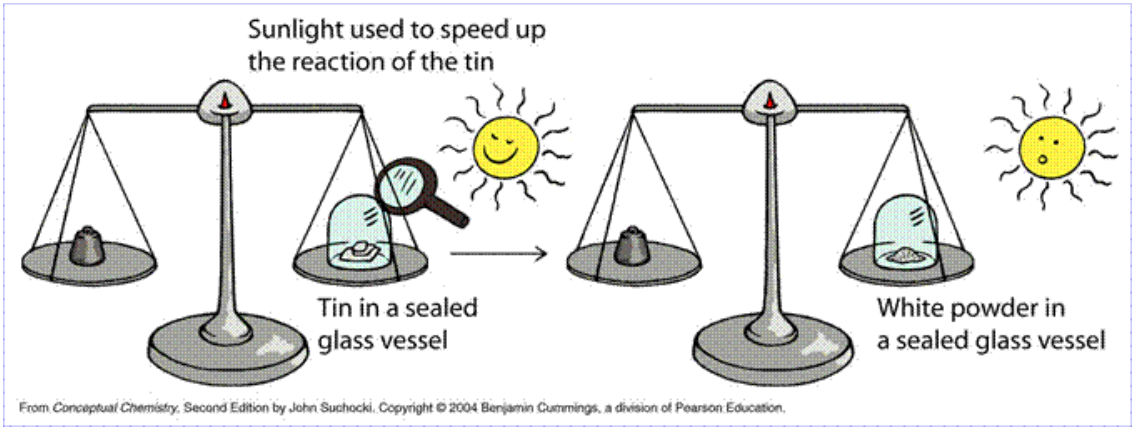
The substance(s) before the reaction takes placed is called the reactant(s)

The substance(s) after the reaction takes placed is called the product(s)

Precipitate - a solid forms and settles out of a liquid mixture.

The Conservation of Mass

During any chemical reaction, the mass of the products is always equal to the mass of the reactants.



The law of conservation of mass states that in any physical change or chemical reaction, mass is always conserved. Mass is neither created or destroyed.

Try the following questions

Pg. 47 #11-17

Pg. 52 #20-27

Pg. 55 #28-34