

Ms. Deng - Chemistry Regs Final Review

Subsection: Intro to chemistry

Chemistry - The study of matter

Matter - anything that occupies space (volume) and has mass

Observations vs Assumptions

- Statement made with 5 senses (see, hear, smell, taste, feel/touch) and it has to be objective (no judgement, no opinion, no guess, not drawing a conclusion.)

Qualitative vs Quantitative

Qualitative: results in non-numerical form using the 5 senses (touch, sight, hearing, smell and taste)

Quantitative: results in numerical form with **UNITS** (ex 50cm, 30ml)

Scientific Notation

Helps to write numbers easily without putting too many zeros

(ex 300,000,000 m/s = 3.0×10^8 m/s)

Percentage of ERROR

$\% \text{ Error} = \frac{|\text{Experimental} - \text{Actual}|}{\text{Actual}} \times 100\%$

Significant Figures

A way to express the unavoidable error due to uncertainty of the measuring tools.

How to Convert Units

Step 1) write the given # and unit

Step 2) put in conversion factor with units()

Step 3) Put the # with the smaller unit.

Step 4) multiply #s on top, divide # on bottom

Density = mass per volume = mass/volume

Physical change = physical image becoming distorted

Chemical change = changing the chemical properties

Elements - a pure substance that can't be broken

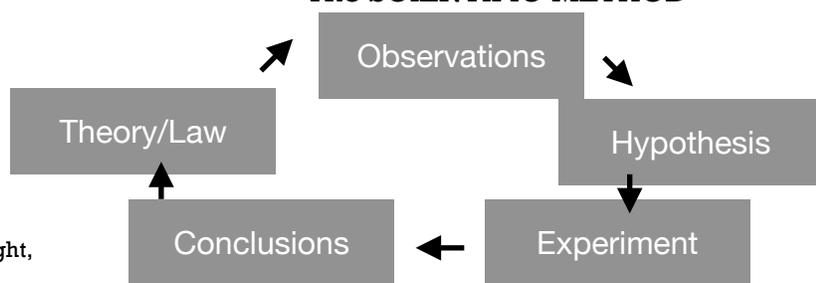
Compounds - a chemical combination of 2 or more elements

Mixture - made of different kinds of matter

Homogenous - same throughout ex. Tea or air

Heterogeneous - varies throughout dirt and concrete

The SCIENTIFIC METHOD



Data qualification

High Accuracy
High Precision



Low Accuracy
High Precision



High Accuracy
Low Precision



Low Accuracy
Low



Subsection: The Atom

Makeup of the atom

90% of the atom is empty space

10% is the actual atom

Isotopes - substances that are chemical alike but have different numbers of neutrons

Nuclear reactions

-When an atom's nucleus change.

-involves protons and neutrons.

-unlike chemical reactions which involves electrons.

3 types of nuclear decay

-radioactive decay

-fission reaction

-fusion reaction

Alpha decay

-constant stream of alpha particles

Beta decay

-Beta particles are lighter and smaller the alpha particles

Gamma Decay

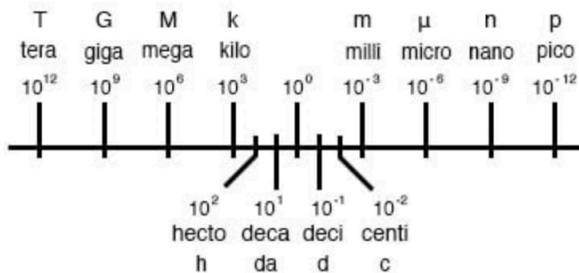
High energy electromagnetic wave

Electromagnetic spectrum shows all the colors and their frequencies

Hands rule - Buss rule

Unit Conversions

METRIC PREFIX SCALE



<https://www.allaboutcircuits.com/textbook/direct-current/chpt-4/metric-notation/>

Subsection: The Periodic Table

Modern Periodic Table

-arrange by increasing atomic number (# of p+)

-arrange to show similarities in physical and chemical properties

Metals

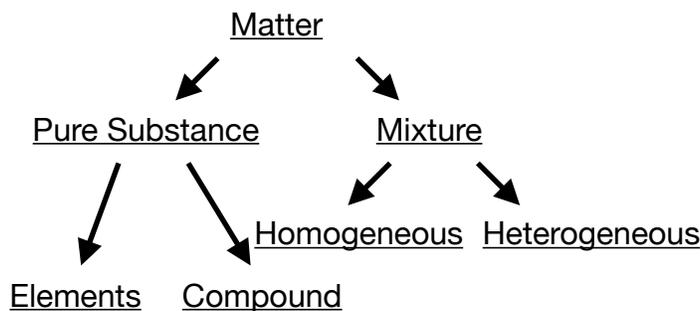
Substances that tend to:

-be shiny

-be malleable (bendable)

-ductile (can be pulled into a wire)

-conduct electricity well



Subsection: The Periodic Table Continued

Duet Rule

Non - Metals

Substances that tend to:

- be dull (not shiny)
- be brittle (shatter easily)
- don't conduct electricity well

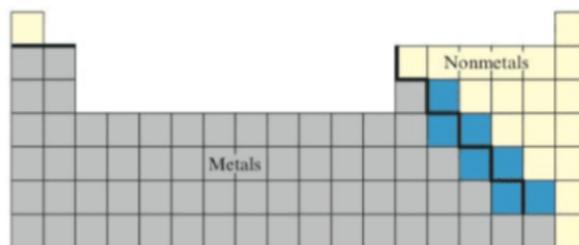
Metalloids

Substances that can sometimes act like a metal and sometimes act like a nonmetal.

H and He only needs 2 e⁻ for a full outer shell

Metals lose electrons to become **Cat-Ions**

Non metals gain electrons to become **An-Ions**



<https://oneclass.com/homework-help/chemistry/6927527-staircase-in-periodic-table.en.html>

1A	2A	3A	4A	5A	6A	7A	8A
loses 1 electron easily	loses 2 electron easily	loses 3e ⁻	needs 4 e ⁻ to have a full outer energy level usually does this by sharing. ex. carbon loves to share o.chem	tends to gain 3 electrons but it also shares	gains 2e ⁻	easily gains 1 e ⁻	Already have a full outer energy level. No need to lose or gain e ⁻ . They don't react "inert"
Alkali Metals	Alkaline Earth Metals					Halogen	Noble Gas

Electron Configurations for Ions

Configuration of an element with each energy levels predicted

(ex. K⁺ 1s² 2s² 2p⁶ 3s² 3p⁶)

Short hand is the natural gas base and the extra energy levels

(ex. K⁺ [Ar])

Strength of the Nucleus - energy pulled in

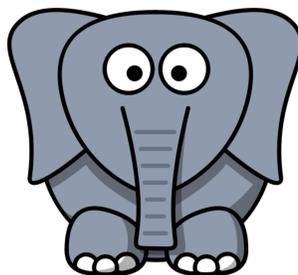
Shielding - blocking the electrons from coming into the atom

Subsection: Chemical Bonding

Bonding : Two types - Ionic Covalent

Ionic = (transfer atoms transfer electrons)

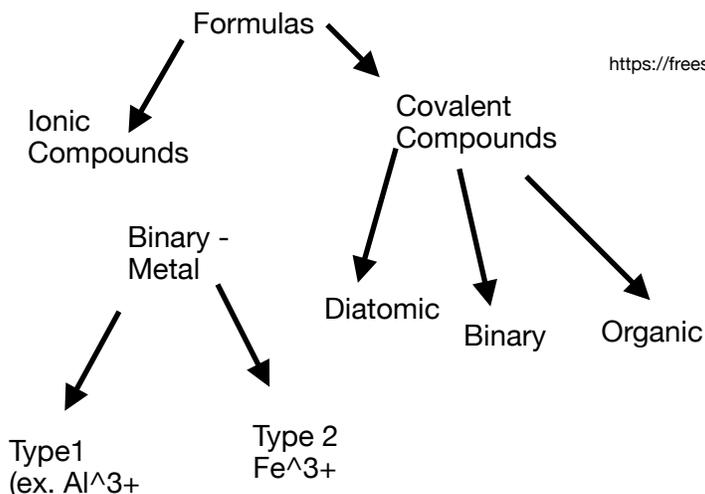
Eg - NaCl



<https://freesvg.org/vector-drawing-of-funny-kid-cartoon-elephant>

Organic Compounds: Hydrocarbons - A

My - Methane
Elephant - Ethane
Poops - Propane
Big - Butane
Poop - Pentane



Ionic	Covalent
Conducts electricity	Doesn't conduct electricity
High melting point	Low melting point
Generally solid in room temperature	Generally liquid or gas