

INTRODUCTION to chemistry

Definitions:

- Scientific Method: statements made with 5 senses
- Chemical Change => internal change
- Physical Change => external change
- Pure Substance: one kind of matter
- Mixture: different kinds of matter
- Elements: a pure substance that can't be broken down
- Compounds: a chemical combination of 2+ elements joined in properties

How to Do:

- Sig Figs:
 - ❖ last number is always the guess digit
 - ❖ sig fig rules determine which zeroes count
- Decimal Hopping:
 - ❖ start with the unit you know
 - ❖ hop to the unit you want to know

Formulas:

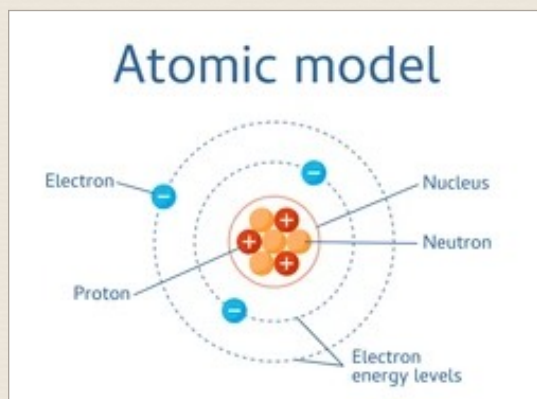
Percent Error:

$$\left(\frac{\text{Experimental} - \text{Actual}}{\text{Actual}}\right) \times 100\%$$

Density:

Mass/Volume

THE ATOM



- ❖ Protons (+1): in nucleus
- ❖ Electrons (-1): in electron clouds
- ❖ Neutrons (0): in nucleus
- ❖ Nucleus (# of protons): center of atom

Definitions:

- Isotope: substances with same protons but different neutrons
- Nuclear Decay: radioactive, fission, fusion
- Alpha Decay: least harm, helium nucleus
- Beta Decay: energy electron w/ -1 charge
- Gamma Decay: most harm, electromagnetic wave

How to Do:

- Atomic Mass: takes the weighted average of isotopes
- High e, high f, short wavelength

INTRODUCTION to periodic table

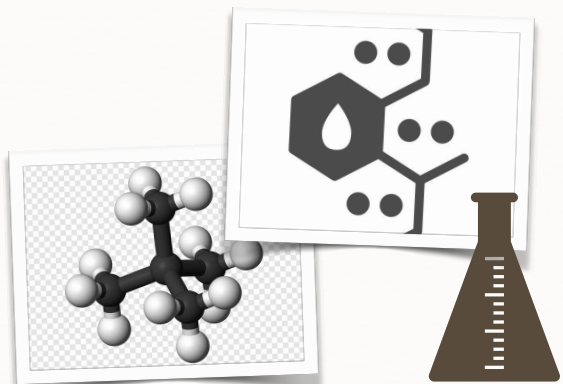
The image shows a standard periodic table of elements. It is organized into groups and periods. Elements are color-coded by groups: Alkali Metals (red), Alkaline Earths (orange), Transition Metals (yellow), Nonmetals (green), Halogens (blue), Noble Gases (purple), Lanthanides (pink), and Actinides (grey). The table includes element symbols, atomic numbers, and names. A legend in the top center defines the symbols: "Number" (atomic number), "Symbol", "Name", and "Mass" (atomic mass).

- ❖ Families=vertical, periods=horizontal
- ❖ Mendeleev arranges elements by increasing atomic mass and similar properties

Definitions:

- Triads: 3 elements w/ similar properties
- Metals: shiny, malleable, ductile
 - valence electrons loose
- Nonmetals: dull, brittle, no conducting
 - valence electrons tight
- Metalloids: Shiny, conduct, but shatters
- Octet Rule: atoms gain, lose, or share electrons to have full outer energy level
- Duet Rule: Metals lose electrons => +
Nonmetals gain electrons => -
- Trends on Periodic Table:
 - Atomic radius
 - Ionization energy
 - Electronegativity

IONIC AND COVALENT BONDING



hydrocarbons: organic compounds that involve hydrogen and carbon

alkanes: a hydrocarbon where all the carbons are connected by single bonds

Prefixes (# of atoms):

1 mono

2 di

3 tri

4 tetra

5 penta

6 hexa

7 hepta

8 octa

9 nona

Ionic Compounds:

- high melting point, conduct electricity, solids at room temperature

Covalent Compounds:

- low melting point, don't conduct electricity, often liquids/gases at room temperature

IONIC COMPOUND FORMULA

Ionic Compounds:

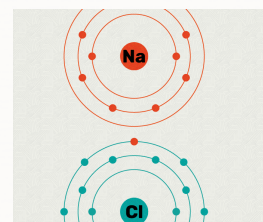
- Formula represents the lowest whole number ratio of ions in the compound

- Ends in ide

1. Break into ions

2. Criss Cross

3. Find lowest whole # ratio

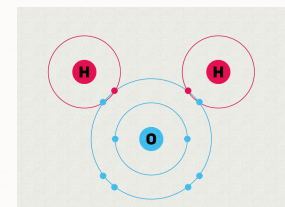
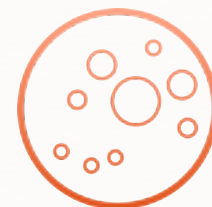


COVALENT COMPOUND FORMULA

- Different than ionic

- Nonmetals can come together in various ways

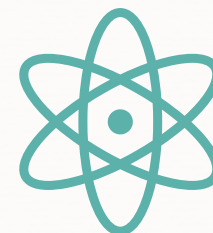
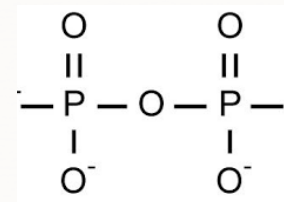
- Binary and polyatomic



POLYATOMIC ION

- ♦ Sometimes atoms covalently bond and in the process the molecule picks up or loses electrons, giving the molecule a charge

- ♦ Ends in ate or ite





Works Cited:

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