Making Measurements

Measurements have some degree of uncertainty.

**Sig Figs**

Represent precision of measurements

Rules with zeros can be tricky

Leading zeros (0.0015) = 2 sig figs

Captive Zeros (101) = 3 sig figs

Trailing Zeros (150 – 150. -150.0)

Exact Numbers (not measurements)

Multiplication and division - Take lowest number of sig figs

Addition and subtraction – Same # decimal places as least precise

**Units**

The scale of which a measurement is made

All measurements should have a unit

Can direct how a problem should go

SI Units: Mass - Kilogram

Length - meter

Time - second

Temperature - Kelvin

Electrical Charge – Coulomb

Pressure – Pascal

**Atoms, Molecules, Compounds**

Substance- matter with uniform properties

Atom- fundamental unit of a substance

Molecule- two or more atoms held in specific shape by attractive forces

Elementary substance- substance with only atoms of the same atomic number

Compound substance- substance with more than one type of atom

Chemical formula- elements listed with number of atoms as subscript

**Classification of matter**

Matter- anything taking up space and having mass

3 Phases- Solid, Liquid, Gas

**Properties**

-Specific characteristics that can distinguish substances

Physical properties- observed without change in composition of substance

Chemical properties- only evident if substance goes through chemical change

Chemical change- requires new substance before and after

**Mixtures**

Heterogeneous- distinguishable parts

Homogenous- indistinguishable parts

**Pure Substance**

Cannot be separated by any physical means

Distillation- separation of saltwater

Water is a pure substance

**Atomic Theory**

Several key observations lead to theory of atoms

Law of the conservation of Matter- mass is neither created or destroyed in chemical process

* It is just moved around
* Limits possibilities of chemical reactions
* Leads directly to law of multiple proportions

Law of multiple proportions- when two elements form a series of compounds, the ratio of the masses of each elements can alwas be reduced to a whole number

**Atomic Theory**

Nature only allows certain combinations of masses (Combintion of atoms

Oxygen and hydrogen mostly react with the ratio: 8g oxygen / 1g hydrogen

**What is an atom made up of?**

Protons (p+)

Electrons (e-)

Neutrons (n0)