The Periodic Table NOTES

A. HISTORY –

1. Dmitri Mendeleev- scientist who designed 1st periodic table by *atomic mass*. While putting the elements in order by *atomic masses*, the following number trend was discovered:
2.

Trend -	1	2	3	4	3	2	1
	Li	Be	B	C	N	O	F

*The # represents the # of valence electrons that can be gained, lost, or shared.

2. Henry Moseley- British scientist who discovered the *atomic numbers* of elements. He rearranged Mendeleev's periodic table, by atomic numbers, & we use this today.

B. **METALS**:**LEFT** side of the Periodic Table

1. Physical Properties
   a. Luster- shininess.
   b. Good conductor of electricity & heat.
   c. Ductile- can be drawn into wires
   d. Malleable- can be hammered into thin sheets.
   e. Most are solids at room temperature.
   (except- Hg, Ga, Fr, Cs)

2. Chemical Properties(depends on the electron arrangement)
   a. LOSE electrons when combine.
   b. Combines easily with water & other elements in the air. (causes *corrosion*)

C. **NON-METALS** – Right side of the Periodic Table

1. Physical Properties- just the opposite of metals.

2. Chemical Properties
   a. GAIN electrons when combine.

***NOTE**- Metals & non-metals combine easily because of the number of valence electrons.

D. **METALLOIDS** – have the properties of both metals & non-metals.

1. Si= most common.
2. All are solids.
3. B, Si, As, Te, At, Ge, Sb, Po

E. **ALKALI METALS** – Group 1 elements
1. Have 1 valence electron
2. Soft, white, shiny metals
3. Highly reactive- gives up their 1 electron to combine easily.
4. Never found in their pure form in nature.
*Stored in oil in lab to keep from reacting (explosive).

F. **ALKALINE EARTH METALS** – Group 2 elements
1. Have 2 valence electrons.
2. Not as reactive as the alkali metals, but will lose 2 electrons when combined.
3. Never found in their pure form in nature.

G. **TRANSITION METALS** – in middle
1. Don't fit with any family – they have properties of metals & their own.
2. Physical Properties-
    a. Good conductors
    b. Brightly colored
    c. Hg (Mercury) is the only one that is not a solid at room temperature.

3. Chemical Properties-
    a. Have varying numbers of valence electrons- may lose or share electrons.
    b. Form many different compounds.

H. **BORON FAMILY** – Group 3 or 13 *Have 3 valence electrons.

I. **CARBON FAMILY** – Group 4 or 14 *Have 4 valence electrons.

J. **NITROGEN FAMILY** – Group 5 or 15 *Have 5 valence electrons.

K. **OXYGEN FAMILY** – Group 6 or 16 *Have 6 valence electrons.

L. **HALOGENS** – Group 7 or 17
1. Have 7 valence electrons.
2. Most active non-metals (only need to gain 1 electron for an octet)
3. Never found in pure form in nature.
4. All dissolve in water.
5. Solids (At, I) , Liquid (Br), Gases (Cl, F)

M. **NOBLE GASES (The Inert Gases)** – Group 8 or 18
1. Have a complete octet so they are normally unreactive.
2. All gases. (He, Ar, Ne, Kr, Xe, Rn)
3. All are found in small amounts in the Earth's atmosphere.

N. **RARE EARTH ELEMENTS –** bottom of Periodic Table
1. Lanthanide Series – soft, malleable metals, luster, conductivity. (Atomic numbers 58 – 71)
2. Actinide Series – radioactive (Atomic numbers 90 →)