

NOTES FOR THE PERIODIC ATOMOFFE

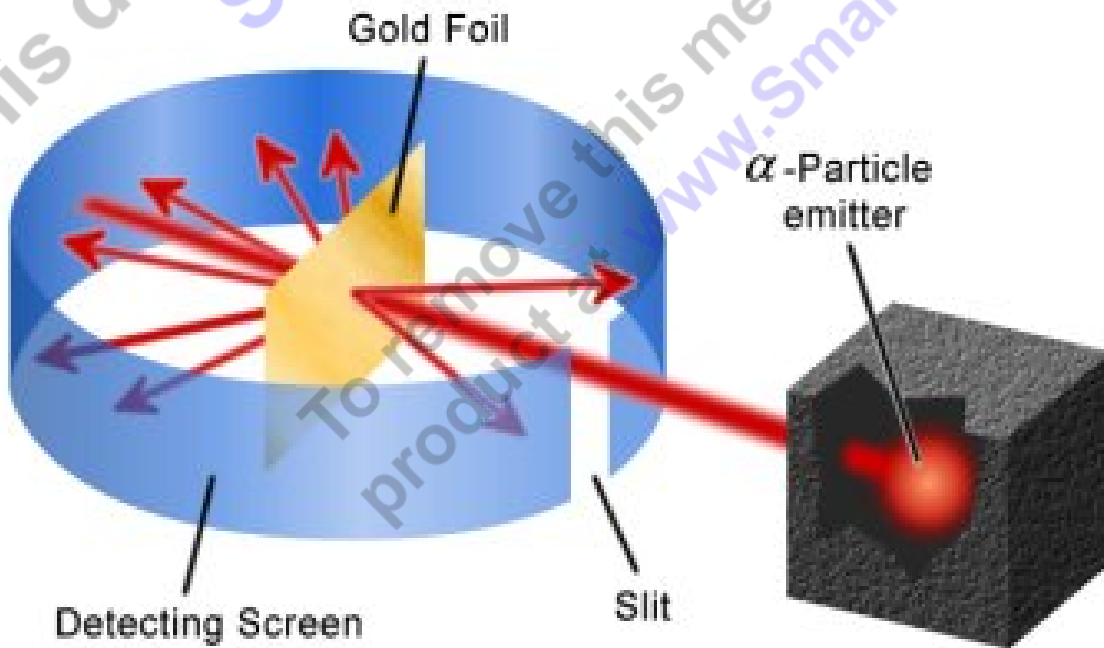
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Name: _____

- Atomic Force Microscope - Let's us see some atoms



- Rutherford's gold foil experiment

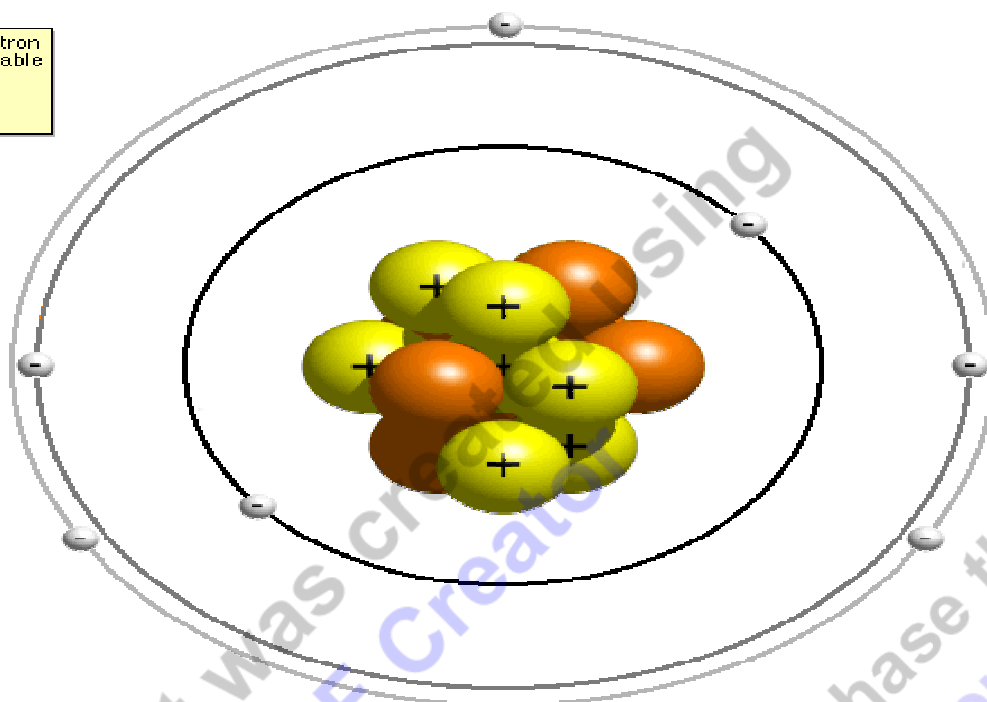


- An Atom is the smallest part of an element which can take part in a chemical reaction



- The atom consists of three fundamental particles
 - -Proton + (positive charge)
 - -Neutron 0 (neutral charge / no charge)
 - -Electron - (negative charge)
- Nucleus - The positively charged dense center of an atom

Nitrogen's Electron Configuration Table
 $1s^2$
 $2s^2 2p^3$



- Atoms always have the same number of protons and electrons, this called the atomic number.

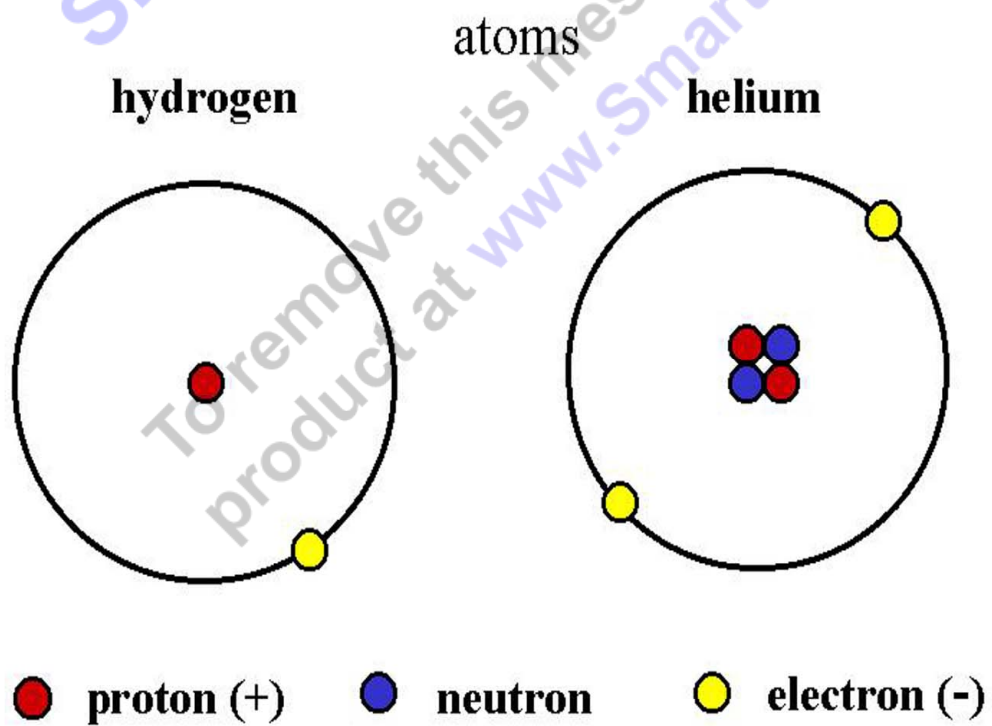
Atomic Number → 47

Ag

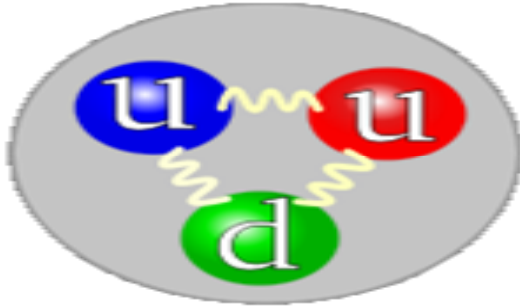
Silver

107.8682

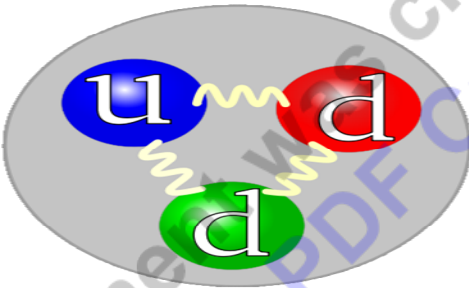
- The Nucleus has almost all the mass of the atom. It is made up of protons (+) and neutrons (o).



- Isotope: atom with same number of protons and electrons but different numbers of neutrons.
 - To find the number of neutrons: Subtract the atomic number from the atomic mass.
 - Most of an atom is empty space, electrons orbit far away from nucleus
 - 1800 Electrons = Mass of 1 proton
 - 1 Neutron = little bit more mass than proton
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- Physicists have discovered that protons and neutrons are composed of even smaller particles called **quarks**. Just bigger than an electron.
 - Proton is composed of two up quarks, one down.



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- A neutron is composed of two down quarks and one up quark.

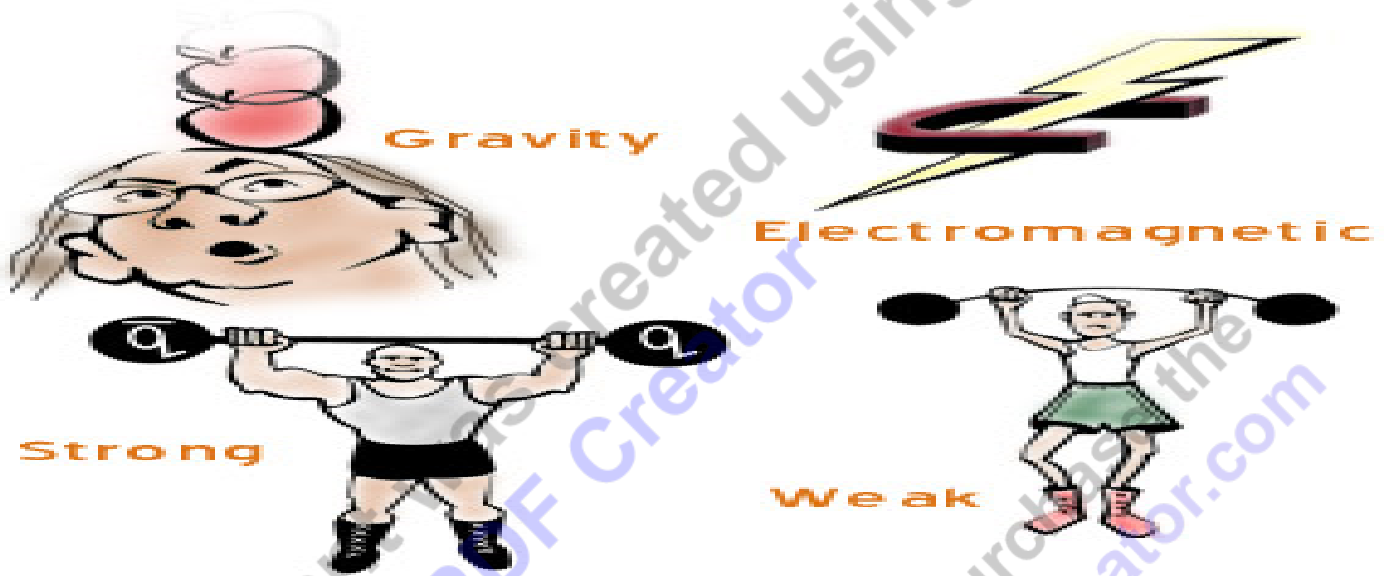


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- The 6 Leptons
 - Electron
 - Muon
 - Tau
 - 3 types of Neutrinos



- Everything is made of...
 - 6 quarks that make Protons and Neutrons
 - 6 leptons. The best-known lepton is the electron.

- Force carrier particles
- The four force carrier particles



Dalton's Atomic Theory

- 1.) All matter is made up of tiny particles called atoms.
- 2.) All atoms of a given element are alike, but are different from the atoms of any other element.
- 3.) Compounds are formed when atoms of different elements combine in fixed proportions.
- 4.) A chemical reaction involves a rearrangement of atoms, not a change in the atoms themselves.

- Each Element is made up of one kind of atom. The number of Protons and Electrons.

- Atoms are arranged on the periodic table of elements.

The diagram shows a rectangular box representing an element's entry on the periodic table. Inside the box, the word "Hydrogen" is at the top, followed by the atomic weight "1.0080", the chemical symbol "H" in a large font, and the atomic number "1" in a smaller font at the bottom left. Four lines with labels point to these specific parts of the box: "Name of element" points to "Hydrogen", "Atomic weight" points to "1.0080", "Symbol for hydrogen" points to "H", and "Atomic number" points to "1".

- Atomic Mass = AMU Atomic Mass Units, The number of protons, neutrons, and electrons.
- To find # of protons and electrons
 - It is the atomic number
- To find # of neutrons
- Subtract the atomic number from the atomic mass to determine the difference.

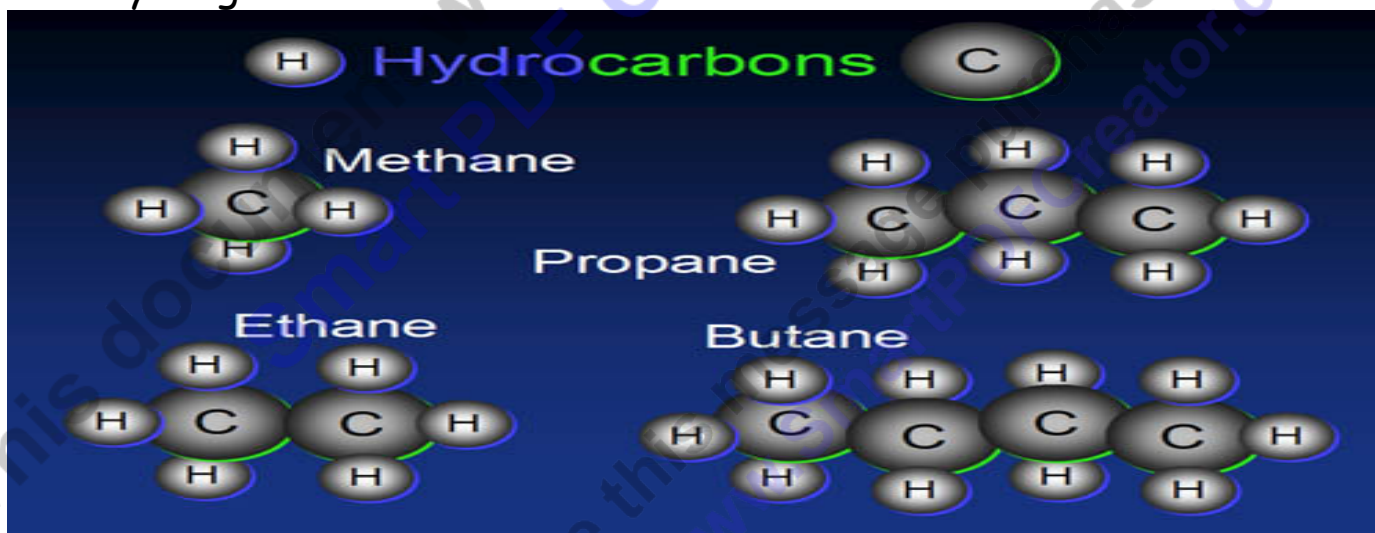
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- The number of valence electrons determines the group placement of an element on the periodic table

1A		2A		3A		4A		5A		6A		7A	8A
Li ·	·Be ·	·B ·	·C ·	·N :	·O :	·F :	·Ne :	Hydrogen	Helium				
Lithium	Beryllium	Boron	Carbon	Nitrogen	Oxygen	Fluorine	Neon						
Na ·	·Mg ·	·Al ·	·Si ·	·P :	·S :	·Cl :	·Ar :	Aluminum	Silicon	Phosphorus	Sulfur	Chlorine	Argon
Sodium	Magnesium	Aluminum	Silicon	Phosphorus	Sulfur	Chlorine	Argon						

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- The rules for the first 18 elements are as follows...SPONCH included
 - 2 electrons max in the 1st shell.
 - 8 electrons max in the 2nd shell.
 - 8 electrons max in the 3rd shell.
 - 18
 - 32
 - 32
 - 18
 - 2

- S-Sulfur
 - P-Phosphorus
 - O-Oxygen
 - N-Nitrogen
 - C-Carbon
 - H-Hydrogen
- is an organic compound consisting entirely of hydrogen and carbon.



- Alcohol - Mostly carbon and hydrogen with a OH group

Protein: Group of nitrogenous organic compounds that are a essential part of living cells. ONCH

NEW AREA OF FOCUS - PERIODIC TABLE OF THE ELEMENTS

- The periodic table of the elements is a...

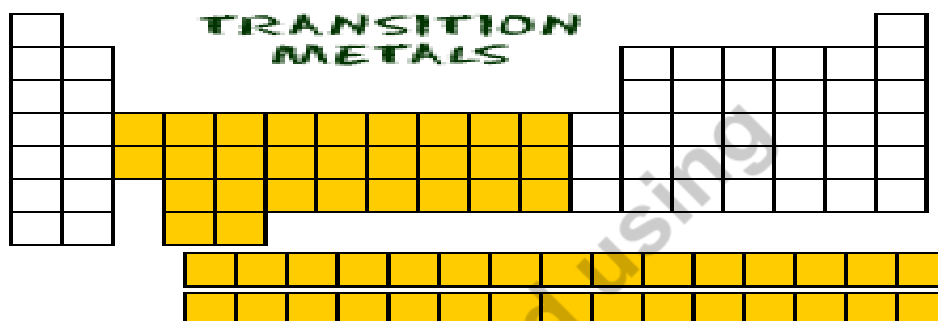
- A chart of all the known elements.
- Is in order of increasing atomic number and mass.
- The table puts elements into groups with similar characteristics.
- Allows us to recognize trends over the whole array of elements.

- Period is horizontal
- Group/Family vertical

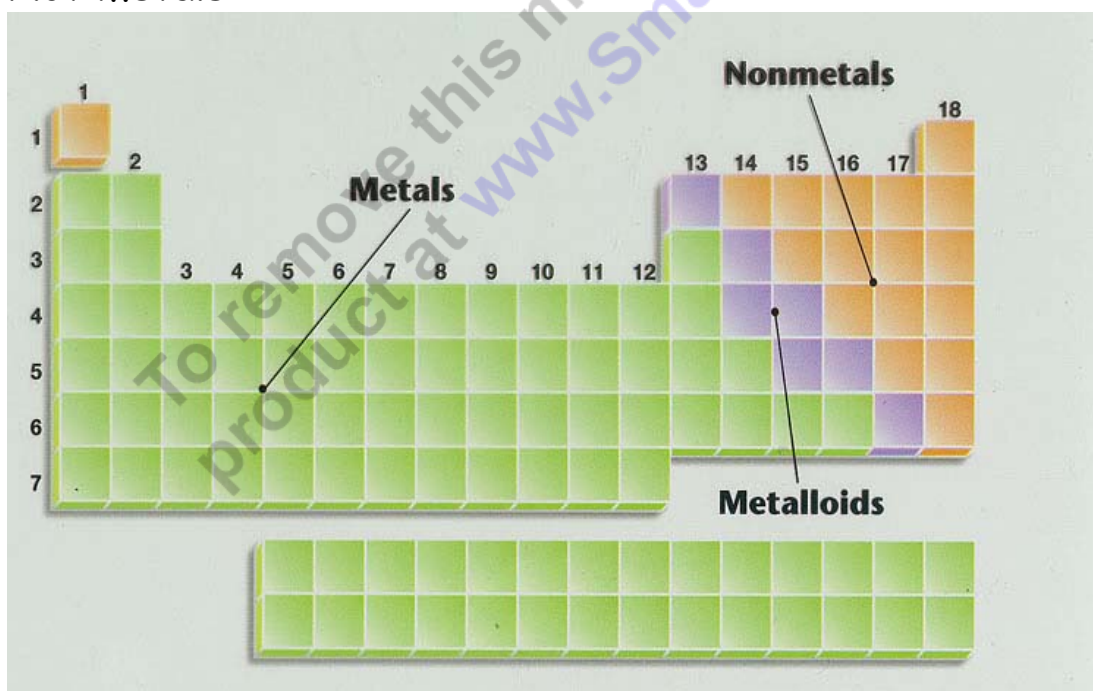
Periodic Table of the Elements

1	IA 1 H																	2 He	
2	3 Li	4 Be																	10 Ne
3	11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar											
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr	
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe	
6	55 Cs	56 Ba	57 *La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn	
7	87 Fr	88 Ra	89 +Ac	104 Rf	105 Ha	106 Sg	107 Ns	108 Hs	109 Mt	110	111	112	113						
* Lanthanide Series			58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu			
+ Actinide Series			90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr			

- AMU increases from left to right and top to bottom.
- Electron negativity increases from lower left to upper right.
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- Transition Metals, found in middle
 - Metal's that are malleable and ductile



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- Ductile- Made into wire
- Malleable - Made into sheets
- Metals are also...
 - Good conductors of electricity.
 - Have a high luster (shine).
 - Mostly solid (Hg is a liquid).
 - Most have a high density.
- Non-Metals
 - Not metals



- H and He are non-metals
- They are poor conductors.
- They are brittle, not ductile
- They show no metallic luster
- They may be transparent or translucent
- They have low density
- bonded.

Metals

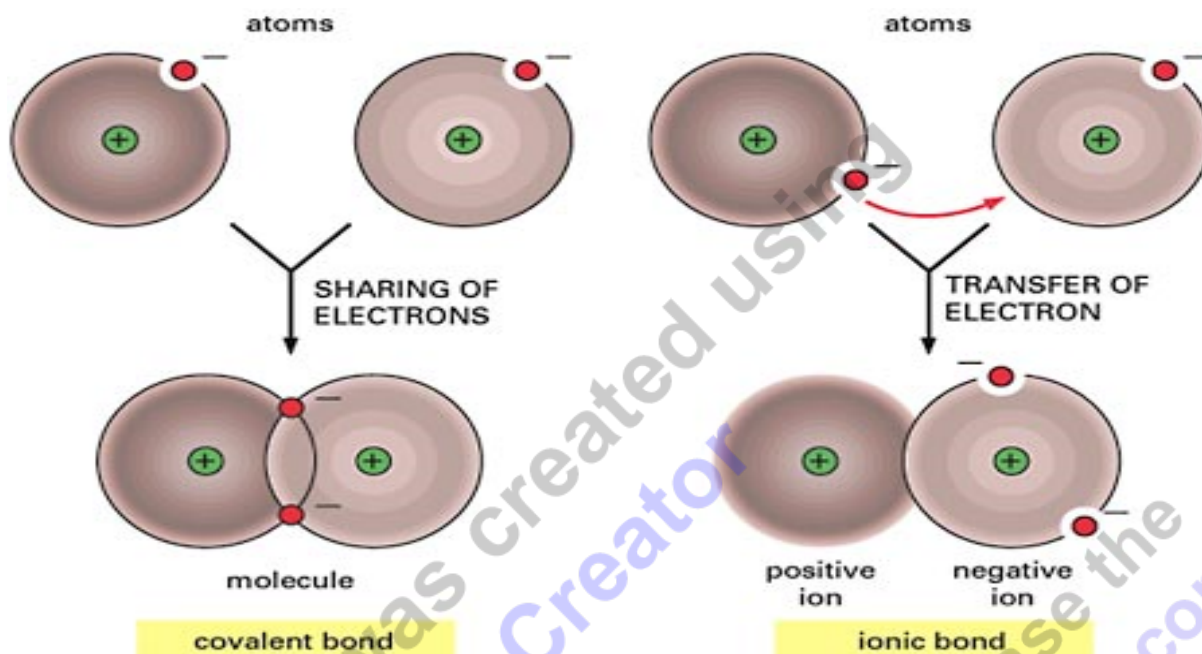
- **Conduction:** Metals are good at conducting electricity.
- **Reactivity:** Metals are very reactive (Alkali Metals)
- **Alloys:** Metals are easily combined

Metalloids

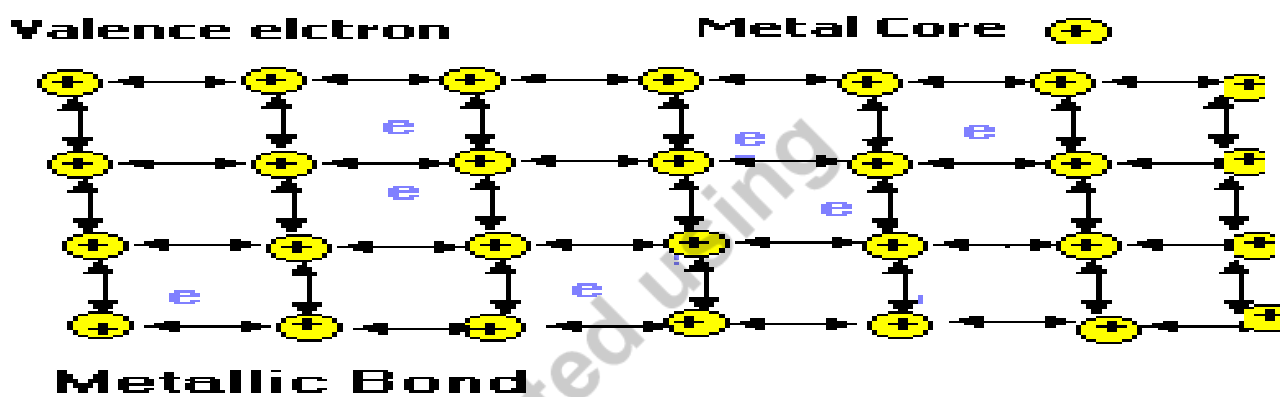
- Properties of metals and non-metals
- Semi-conductors
- Brittle
- Can have luster

Atomic Bonds

- Chemical Bonding - The attraction that holds atoms close to each other.
- Ionic, Covalent, Metallic
 - Ionic - Gain or lose electrons
 - Covalent - Share electrons
 - Metallic- Many free electrons
- Covalent bonding occurs by a sharing of valence electrons (Strongest) (SPONCH)



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- Ionic bonding (+/-) Bonds created by the attraction of opposite charges.
 - Ionic - Forms crystal lattice
 - Ion - A charged atom
 - When strips electron, now one atom has 1+ (cation), and the other has 1 - (anion),
- Ionization: The process of removing electrons from an atom to form ions.
- bonding is the bonding between atoms within metals. The sharing of many free electrons.



5 Paul

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