**Chemistry IA – Periodic Trends**

**- Classification Of The Elements:**

 - Dmitri Mendeleev—organized the elements in the first periodic

 table

- arranged according to ATOMIC MASS

- Henry Mosely—organized the elements according to ATOMIC

 NUMBER

- The ELECTRON is the most important subatomic particle for

 determining chemical and physical properties

- PERIODIC LAW—the chemical and physical properties of the

 elements are periodic functions of their atomic number

**- Periodic Trends:**

 **- Atomic Radius:**

 - atomic radius—half the distance between the nuclei of 2

 IDENTICAL bonded atoms



 - atomic radius INCREASES down a group because the atoms

 have electrons in higher energy levels (farther away from the

 nucleus)

 - atomic radius DECREASES across a period because outer

 electrons are in same energy level but pulled closer to

 the nucleus by more protons



 **- Ionization Energy:**

 - ionization energy—the energy required to remove an electron

 from an atom in the gas phase

 A 🡪 A+ + 1 e-

 - CATION—a (+) charged ion

 - IE always forms a cation(removing e-)

- always INCREASES as you go from 1st IE to 2nd IE to 3rd IE

 - IE DECREASES down a group because it is easier to pull

 electrons from the atom when they are farther from the

 nucleus

 - IE INCREASES across a period because of a greater pull

 towards the nucleus due to more protons



 **- Electron Affinity:**

 - electron affinity—the energy required to add an electron to a

 neutral atom in the gas phase

 A + 1 e- 🡪 A-

 - ANION—a (-) charged ion

 - EA always forms anions

 - EA DECREASES down a group because electrons are not as

 attracted to the nucleus when they are farther away

 - EA INCREASES across a period because the electrons are

 pulled closer to the nucleus by more protons





 **- Ionic Radius:**

 - metal atoms tend to form cations

 - nonmetal atoms tend to form anions

- forming a cation DECREASES the radius (losing e-)



 - forming an anion INCREASES the radius (gaining e-)



 - IR INCREASES as you go down a group because the valence

 electrons are in a higher energy level (farther from the

 nucleus)

- IR in a period has NO CLEAR TREND



 **- Electronegativity:**

 - electronegativity—the tendency for an atom to attract

 electrons when it is bonded to another atom

 - scale of electronegativities by Linus Pauling

 - 0.7 (Fr)—lowest

 - 4.0 (F)—highest

 

 - Group 18 (Nobel gases) do NOT have any EN values because

 they do NOT form compounds!

 - EN difference is used to predict BOND CHARACTER

 - EN DECREASES as you go down a group because the

 valence electrons that are further away from the nucleus are

 less attracted to it

- EN INCREASES as you go across a period because the

 electrons are closer to the nucleus and are attracted more to it



***Ionization Energy, Electron Affinity and Electronegativity are***

 ***ALL OPPOSITE OF ATOMIC RADIUS!!!!!***

