Quantum Numbers and Symbols

Every atom has 4 quantum numbers. These describe the makeup of the atom to us. They also relate to terms that have been previously covered

Quantum Number	Previous Term	Symbol	Values
Principle Quantum #	Energy Level	n	n= 1, 2, 3...
Angular Quantum #	Orbital	l	l = 0, 1, 2, 3 s, p, d, f
Magnetic Quantum #	Sublevel	Ml	...-3, -2, 1, 0, 1, 2, 3 starts ^ here (0)
Spin Quantum #	Spin	Ms	+1/2 or -1/2

Electron Configuration

There are a few different ways to diagram electrons within an atom.

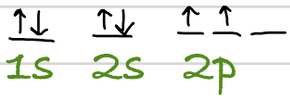
Electron Configuration Notation:

Ex. Carbon
1s2 2s2 2p2

The coefficient is the energy level, the letter (s, p, d, or f) is the orbital, and the raised number is the amount of electrons in that orbital.
*Note. Each sublevel can hold only a certain amount of electrons:
S = 2 e-
P = 6 e-
D = 10 e-
F = 14 e-

Orbital Notation:
This notation is used to represent the electrons in each orbital and the spins they have.

Ex. Carbon

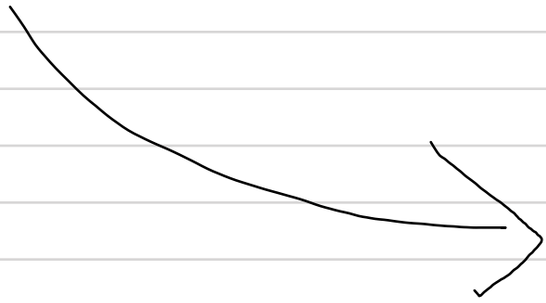


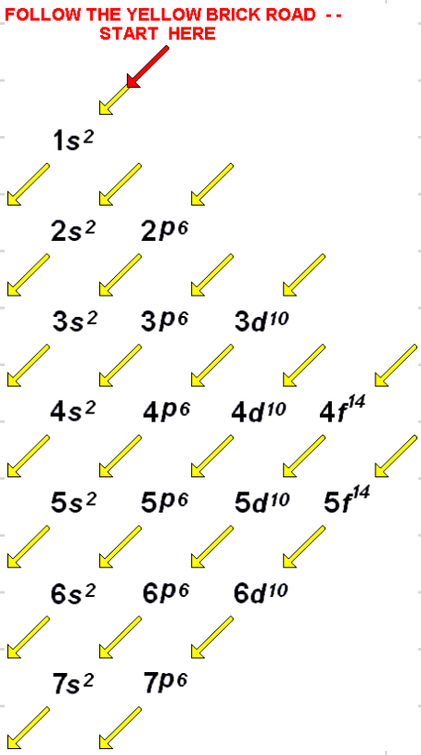
Shorthand Configuration

This method is exactly like Electron Configuration, however you start with the noble gas before the element you are configuring and start the configuration from there.
Ex. Carbon
[He] 2s2 2p2

Principles for Electrons

Aufbau Principle – electrons must occupy the lowest energy level available before they can begin to occupy the any higher energy levels





Pauli Exclusion Principle- No two electrons can have the same 4 quantum numbers. (Basically, electrons in the same sublevel and orbital cannot have the same spin).

Hund's Rule – Electrons must singularly occupy all equal energy orbitals before any of those orbitals can receive a second electron.

Terms and Trends

Paramagnetic - the property of a substance that has a weak attraction to a magnetic field as a result of unpaired electrons

Diamagnetic - The property of a substance that has no attraction to a magnetic field as a result of having only paired electrons.

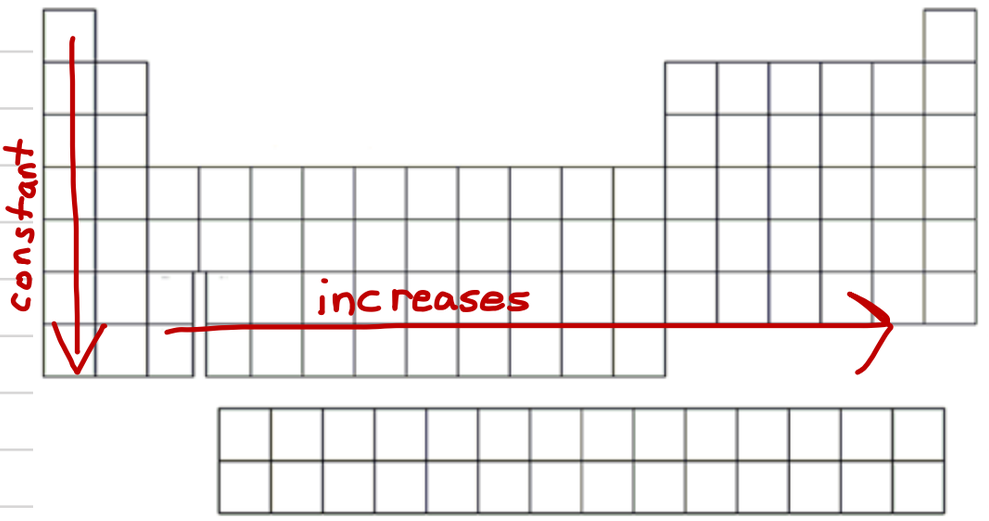
Effective Nuclear Charge (ENC)- The packing of more p+ into the nucleus to increase the positive charge (strength of pull of nucleus)

Ionization Energy - How much energy is required to take 1 electron.

Periodic Trends

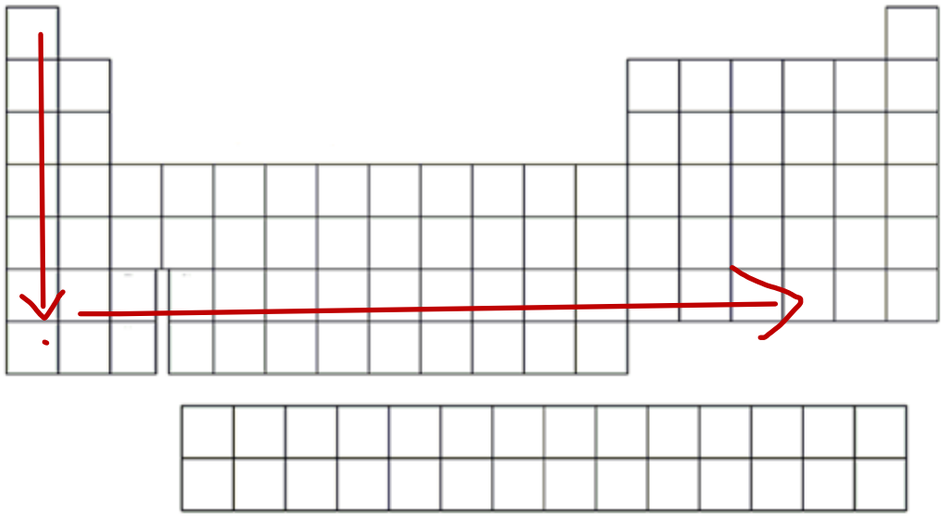
Atomic Radius

Effective Nuclear Charge



Periodic Trends Continued

Ionic Radius



Ionization Energy