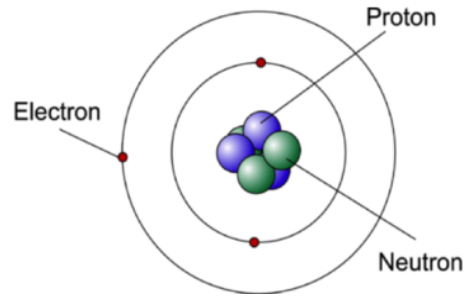
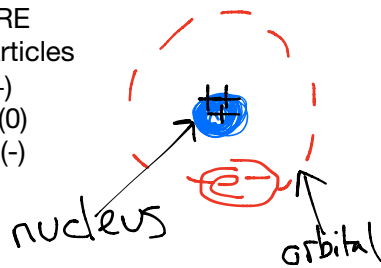


## I. ATOMIC STRUCTURE

### a) Subatomic Particles

- 1) Proton (+)
- 2) Neutron (0)
- 3) Electron (-)



Bohr Model

## II. Atomic Properties

### a) Number of protons - determines what element

Hydrogen - 1 proton

Carbon - 6 protons

Oxygen - 8 protons

### b) Atomic Number - # of protons, tells you element

### c) Electrically Neutral - elements must have the same number of protons and electrons

### d) Atomic Mass - sum of protons and neutrons

Example Question - Atomic Number of 20, with 20 neutrons...atomic mass?

## III. Electron Organization

### a) Electrons orbit the nucleus in "shells" or energy levels

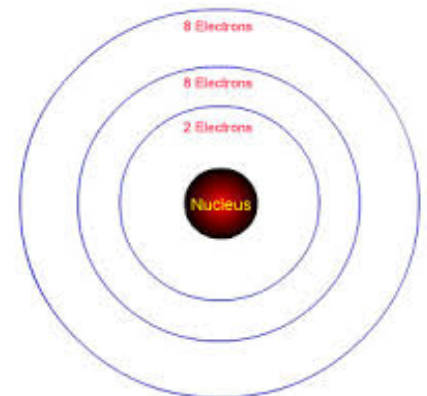
### b) Focus on the first three shells

first shell - 2 electrons

second shell - 8 electrons

third shell - 8 electrons

### c) Each shell must be filled before moving on to the next



Shell diagram of a neutral atom. The positively charged nucleus is surrounded by clouds of negatively charged electrons, arranged in successive shells. The first (inner) shell holds a maximum of 2 electrons; the second and third shells can hold 8 outer electrons each.

## IV. Chemical Reactivity

### a) Based on the number of electrons

### b) Number of valence electrons (electrons in the outer shell)

### c) 2-8-8 (Filled outer shells are chemically non-reactive) /

Atoms are most happy with a full valence shell

### d) Atoms will give up or gain electrons if possible, resulting in charged ions

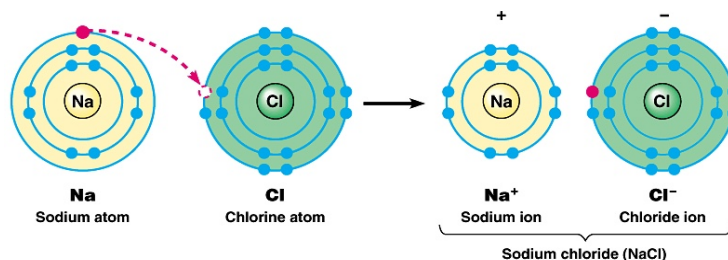
ANION - a negative ion

CATION - A positive ion

### e) Electronegativity - an atom's attraction to electrons

Chlorine has a stronger affinity to electrons, so it is more electronegative than Sodium.

This results in chlorine taking sodium's lone valence electron



f) The resulting charged ions, because of opposite charges, attract to each other forming a bond based on charge between the two ions. We call this bond an:

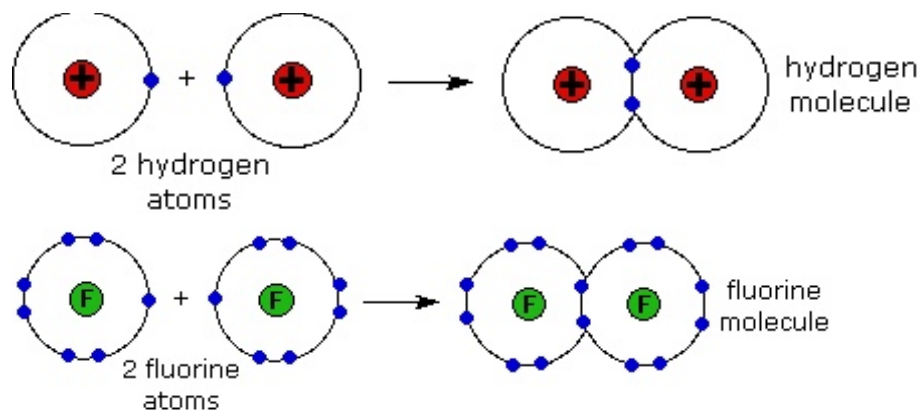
## IONIC BOND

g) This is the first step towards seeing the formation of bigger compounds that have unique, EMERGENT properties, as a result of the combination of atoms

h) As all compounds that result from Ionic Bonds form salt crystals, all SALTS are ionic compounds and the term SALT and IONIC COMPOUND are interchangeable.

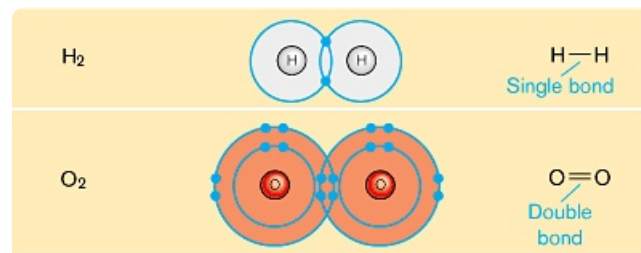
i) Atoms can also fill valence shells by sharing electrons and forming:

## COVALENT BONDS



j) Since shared electrons are traveling around both atoms, this produces a stronger bond compared to the ionic bond.

k) Since more than one electron can be shared, covalent bonds can exist as single, double, or even triple bonds



l) We refer to resulting combination of atoms from Covalent Bonds as **MOLECULES**

m) Molecules can form large combinations of atoms, which helps to understand the deeper complexity of living things.

n) Molecules made of the same atoms can be arranged in different ways (**ISOMERS**)