Ionic and Covalent Bonding

Ionic Bonding

lonic bonding occurs when a metal *transfers* one or more valence electrons to a nonmetal in an effort to attain a stable octet or valence electrons. We can show this transfer of electrons by drawing the Lewis Dot Diagrams of the elements involved and showing the transfer of electrons with an arrow.

STEPS:

- 1. Draw the Lewis Dot Diagrams of the involved elements.
- 2. Determine which element wants to give electrons away (and become a + cation).
- 3. Determine which element wants to gain electrons (and become a anion).
- 4. Show the transfer of electrons with arrows. Make sure every element gets a full shell either by gaining or losing electrons in the transfer. If you have extra to transfer, you can draw more atoms that will accept the electrons. If you need more electrons to get an octet, you need more atoms willing to lose electrons.
- 5. Write the formula (metal first, then nonmetal second) including subscripts for the number of each type of atom involved.

Examples:

EX1: Sodium & Chlorine.

EX2: Calcium & Chlorine.

	Lewis Dot Diagrams	Show the Transfer of Electrons	Formula
1.	Potassium & Fluorine		
2.	Magnesium & Iodine		
3.	Beryllium & Sulfur		
4.	Sodium & Oxygen		
5.	Aluminum & Bromine		
6.	Aluminum & Oxygen		

Covalent Bonding

Covalent Bonding occurs when two or more nonmetals *share* electrons, attempting to attain a stable octet of electrons. Atoms may share up to three pairs of bonded electrons.

STEPS:

- 1. Draw the Lewis Dot Diagrams of the involved elements.
- 2. Determine a way that elements can share electrons to have a full valence shell.
- 3. Show the sharing of electrons and carefully draw a circle around the octet of each atom.
- 4. Write the formula including subscripts for the number of each type of atom involved.

Examples:

EX1: Hydrogen & Chlorine (HCl)

EX2: Carbon, Chlorine, & Nitrogen

	Lewis Dot Diagrams	Show the Sharing of Electrons	Formula
1.	Hydrogen & Hydrogen		
2.	Fluorine & Fluorine		
3.	Oxygen & Oxygen (double bond)		
4.	Nitrogen & Nitrogen (triple bond)		
5.	Carbon & Oxygen (CO ₂)		
6.	Hydrogen & Oxygen (H ₂ O)		