IONIC BONDING

Bonds:

- Definition: Forces that hold groups of atoms together and make them function as a unit.
- Ionic bonds is the transfer of electrons.
- Covalent bonds is the sharing of electrons.

The Octet Rule – Ionic Compounds:

- Ionic compounds form so that each atom, by gaining or losing electrons, has an octet of electrons in its highest occupied energy level.
- Metals lose electrons to forms positively-charged cations.
- Nonmetals gains electrons to form negatively-charged anions.

Ionic Bonding: The Formation of Sodium Chloride:

- Sodium has 1 valence electron
- Chlorine has 7 valence electrons
- An electron transferred gives each an octet

Examples of Ionic Compounds:

- $Mg^{2}+Cl\text{-}_{2}$: Magnesium chloride: Magnesium loses two electrons and each chlorine gains one electron.
- $Na^{+}{}_{2}O^{2-}$: Sodium oxide: Each sodium loses one electron and the oxygen gains two electrons.
- $Al^{3}+{}_{2}S^{2}\text{-}_{3}$: Aluminum Sulfide: Each Aluminum loses two electrons (six total) and each sulfur gains two electrons (six total).

Metal	**Monatomic Cations**	**Ion Name**
Lithium	Li^{+}	Lithium
Sodium	Na^{+}	Sodium
Potassium	K^{+}	Potassium
Magnesium	Mg^{2+}	Magnesium
Calcium	Ca^{2+}	Calcium
Barium	Ba^{2+}	Barium
Aluminum	Al^{2+}	Aluminum

Nonmetal	**Monatomic Anions**	Ion Name
Fluorine	F^{-}	Fluorine
Chlorine	Cl^{-}	Chlorine
Bromine	Br^{-}	Bromine
Iodine	I^{-}	Iodine
Oxygen	O^{2-}	Oxygen
Sulfur	S^{2-}	Sulfur
Nitrogen	N^{3-}	Nitrogen
Phosphorus	P^{3-}	Phosphorus

Sodium Chloride Crystal Lattice:

- Ionic compounds form solid crystals at ordinary temperatures.
- Ionic compounds organize in a characteristic crystal lattice of alternating positive and negative ions.
- All salts are iconic compounds and for crystals.

Structure:	Crystalline solids
Melting Point:	Generally high
Boiling Point:	Generally high
Electrical Conductivity	Excellent conductors, molten and aqueous
Solubility in water:	Generally soluble