Bonding Notes

Valence Electrons- an electron in the outer most energy levels of an atom, where it can participate in bonding

Octet Rule- the tendency for main group elements to gain, lose, or share electrons so that their s and p orbitals are full with 8 electrons

Main Group Elements	Group 1	Group 2	Group 13	Group 14	Group 15	Group 16	Group 17	Group18
Electron Ending	s^1	s^2	s^2p^1	s^2p^2	s^2p^3	s^2p^4	s^2p^5	s^2p^6
Valence Electrons	1	2	3	4	5	6	7	8

Ionic Compounds (salts)- compounds that form due to the transfer of electrons, usually bonding a **metal to a non-metal**, smallest unit is called a formula unit.

Covalent (Molecular) Compounds- compounds that form due to the sharing of electrons between elements, usually bonding **non-metals to non-metals**, smallest unit is called a molecule.

Polar Bond- a polar covalent bond arises from the uneven sharing of electrons (bonded atoms that have different electronegativities)

Non-Polar- a non-polar bond has even sharing of electrons in a covalent bond (bonded atoms are the same element or have the same electronegativities)

Polar Molecule- molecules with a slightly positive end and a slightly negative end.

Non-Polar Molecules- molecules with no net charge.

All of the symmetrical molecular shapes (linear, trigonal planar, tetrahedral) yield non-polar molecules as long as all of the outer atoms are identical.

If the outer atoms are different the molecules are usually polar.

The presence of non-bonding electron pairs on the central atom usually lowers the symmetry enough so that a polar molecule results.

Polar molecules mixes with Polar molecules and Non-Polar molecules mixes with Non-Polar molecules.

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Intermolecular Forces- the attraction between molecules. The strength of a molecules' intermolecular forces can affect melting point and boiling point.

London Dispersion Forces (LDF, "Big molecule force")
-A weak intermolecular force due to a temporary dipole that is induced by the uneven movement of electrons.
-"The bigger the molecule the stronger the attraction"
-LDF are the only intermolecular forces that can be exhibited on non-polar molecules.

Dipole-Dipole attractions- The attraction of polar molecules to each other due to partial opposite charges.

Hydrogen Bonds- not a true **intramolecular "**bond". A very strong dipole-dipole attraction that occurs between hydrogen of one molecule and a very electronegative atom (ex. N, O, F) of another molecule.

Relative Strength of Intermolecular Forces **for similar sized molecules-**

LDF <<<<<<<<<< Dipole-Dipole <<<<<<<<<< Hydrogen Bonds

Polar Molecules

If molecule has:

-one type of atom it is **non-polar.**

-two types of atoms and no unshared pairs of electrons around the central atom, it is **non polar.**

-two types of atoms and has unshared pairs of electrons around the central atom , it is **polar.**

-three types of atoms it is **polar.**