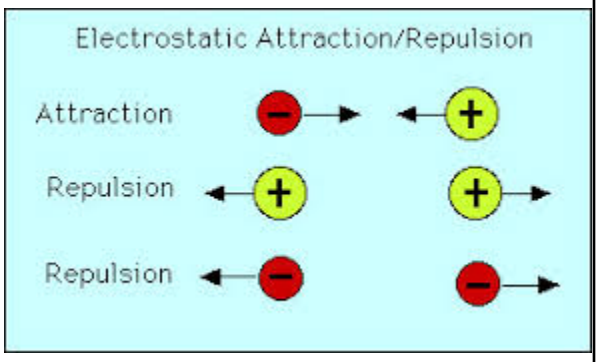
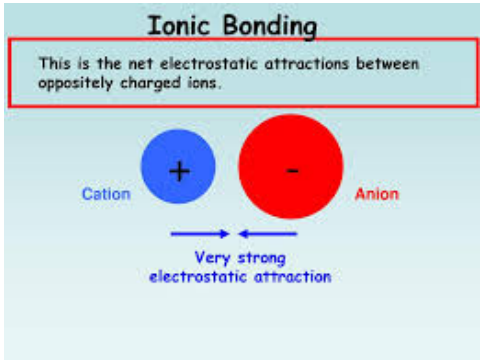
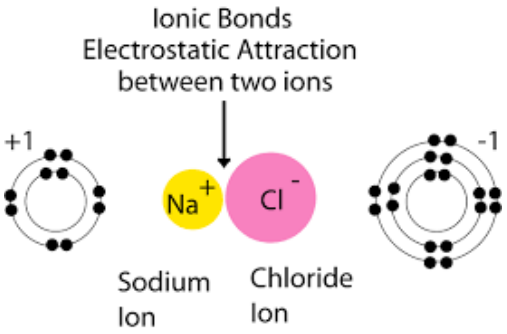
Video Tutorials	Check out these video tutorials for extra support on each topic: Ionic vs. Covalent bonding Lewis Structures- Covalent bonding VSEPR shapes Polar and Nonpolar Molecules Polarity and properties

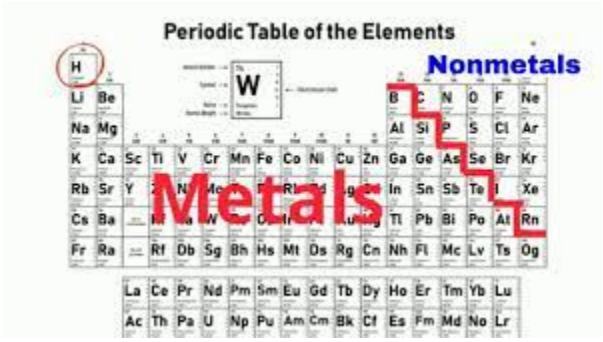
Key Terms, Definitions & Concepts	
Electrostatic forces of attraction: Opposite charges attract and like charges repel	
Ionic vs. Covalent Bonding **Ionic bonding- A bond between a metal and a nonmetal** **Electrons are transferred** from the metal to the nonmetal and + and - ions form. Ionic bonds form because the electronegativity difference between the metal and nonmetal are so great that nonmetal takes the electrons. Since **ionic compounds form + and - ions, these are the strongest forces of attraction** holding compounds together and also when they interact with other ionic or polar covalent substances, such as water. **Covalent bonding- A bond between 2 or more nonmetals** **Electrons are shared** between two atoms	 

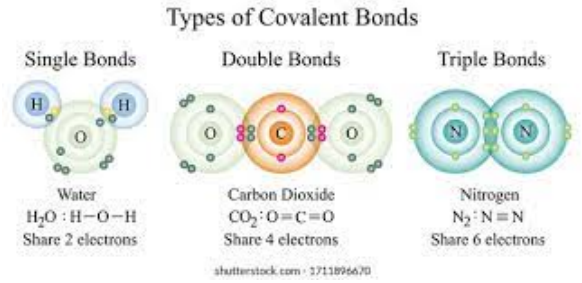
A covalent bond is considered polar, when there is a greater difference between the electronegativity values between both nonmetal atoms in the bond. However, it's not as great as ionic.

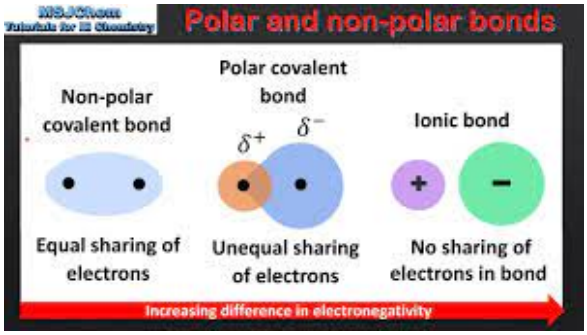
Polar covalent molecules= Unequal sharing of electrons in bonds creating an overall dipole. This means that the electrons prefer to spend more time around the more electronegative atom, thus creating a partial negative charge and the atom where they spend less time has a partial positive charge.

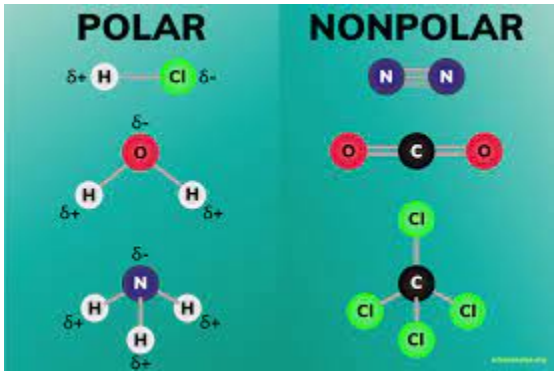
Nonpolar covalent molecules= electrons are equally shared in the bond, thus creating no partial charges or dipoles OR polar bonds are symmetrical and cancel out

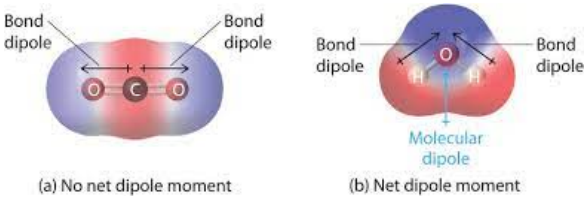
Nonpolar covalent bonds have the weakest forces of attraction holding the molecule together and don't attract well to ionic or polar substances such as water.









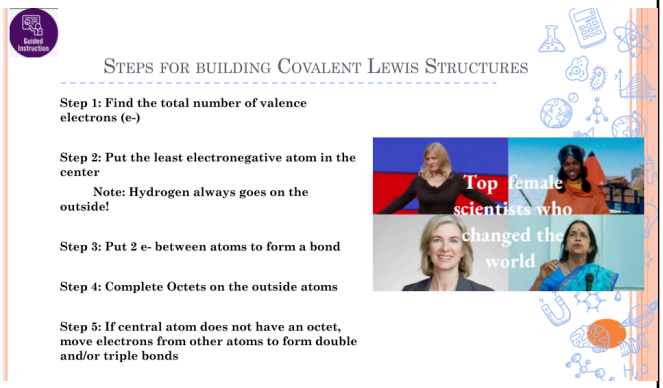


Covalently Bonded Molecules (Lewis Structures)

THERE ARE 5 STEPS TO COVALENTLY BOND MOLECULES- REMEMBER ATOMS SHARE ELECTRONS SO THAT EVERY ATOM FULFILLS THEIR OCTET.

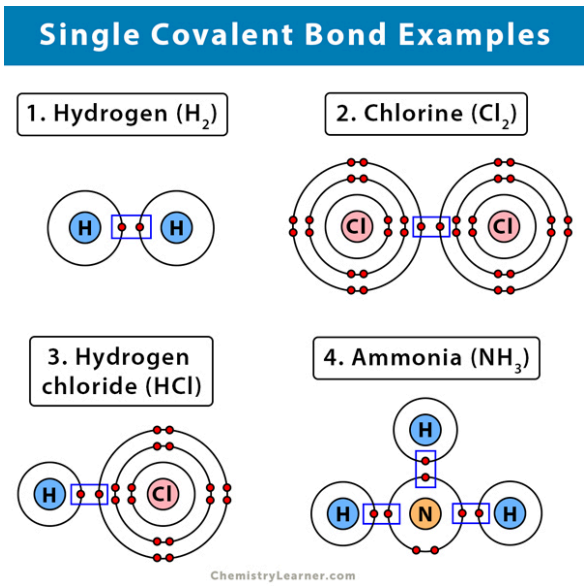
Video going through steps of bonding

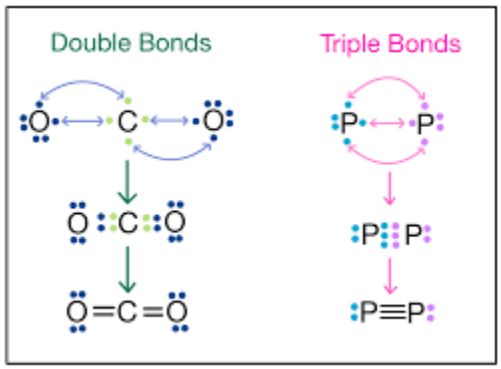
H- only needs 2 valence electrons
B- only needs 6 valence electrons
All other atoms need 8 valence electrons

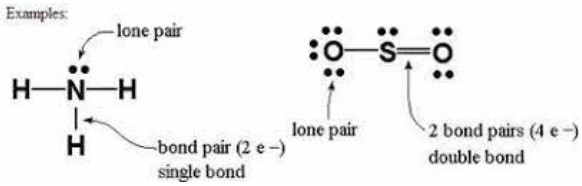


Lone Pairs- Electrons in the shells of only 1 atom

Bonded or Shared Pairs- Electrons that are shared between 2 atoms in a bond







VSEPR Theory and Molecular Shapes

VSEPR- Valence Shell Electron Pair Repulsion

Since electrons repel each other, the shape of molecules are based on **lone pairs and bonded electrons being as far apart from each other as possible.**

The shape of a molecule depends on the lone

l.p.	b.a.	Parent Shape	Molecular Shape	Picture	Angles
0	2	Linear	Linear	X—E—X	180°
0	3	Trigonal Planar	Trigonal Planar		120°
1	2		Bent		< 120°
0	4	Tetrahedral	Tetrahedral		109.5°
1	3		Trigonal Pyramidal		107°
2	2		Bent		104°

LP= lone pairs around central atom

pairs and bonded atoms attached to the central atom only. Lone pairs on side or terminal atoms do not affect molecular shapes.

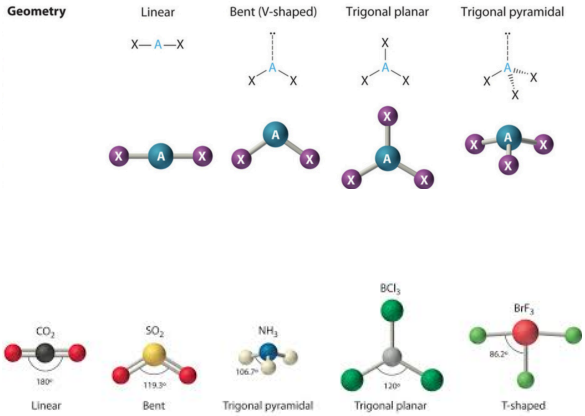
The VSEPR chart shows the main types of molecular shapes.

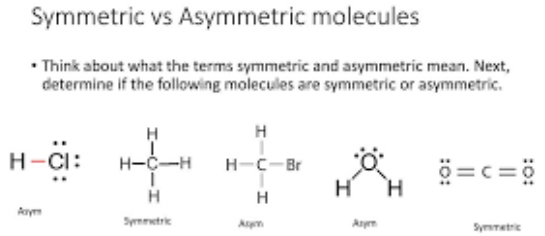
After you go through the 5 steps above for covalent bonding, you use the chart to determine the molecular shape.

Polar molecules tend to have lone pairs and are **asymmetrical** in shape

Nonpolar molecules are **symmetrica**l in shape

BA= atoms attached to the central atom





Polarity, Structure and Properties:

The shape and polarity of a molecule determines observable properties

Water is very polar and has strong attractive forces with itself. The partial negative oxygen from 1 water molecule attracts the partial positive hydrogens of another molecule.

Solubility or the ability to dissolve, depends on polarity. Polar substances dissolve or are soluble in each other. Nonpolar substances dissolve or are soluble in each other. Polar and nonpolar substances are insoluble with each other.

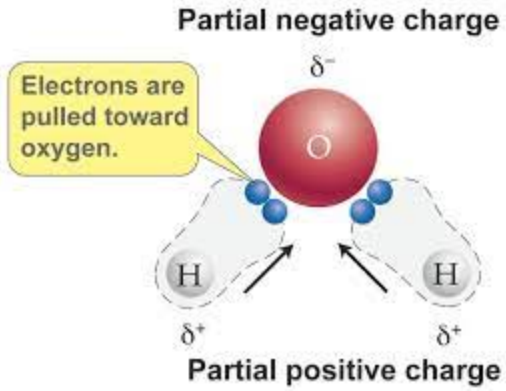
The melting and boiling point of molecules is based on how strongly attracted molecules are to each other. In order to melt or boil, molecules have to break apart these forces of attraction.

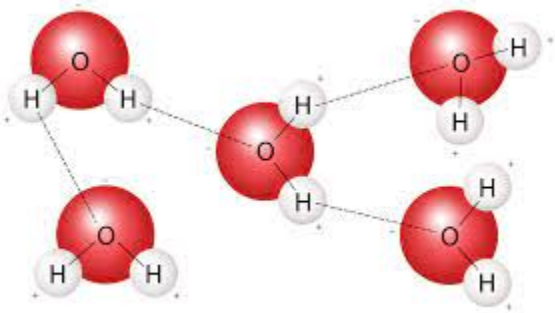
Ionic compounds will have the highest boiling and melting points because they have the strongest forces of attraction holding them together, Polar is next followed by nonpolar molecules which have the weakest forces of attraction and lowest boiling and melting points.

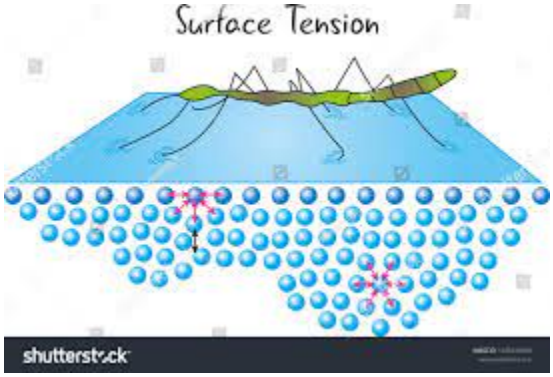
Ionic substances will conduct electricity through a wire because the positive and negatively charged ions move through a wire similar to how electrons move through a wire to create a current.

Covalently bonded substances don't conduct electricity because they do not form positive or negatively charged ions since they share electrons in bonds.

Chromatography- The process of separating components based on attractions or solubility of the component (solutes) with the solvent (dissolving medium)







Mobile phase- solvent (i.e water or other liquid)

Stationary phase- medium that stays put (i.e. paper)

The ability of the solvent to attract to the solute is based on polarity.

More polar solvents such as water will attract more strongly to polar solutes. Therefore, the farther the solute travels, the more polar it is.

Nonpolar solvents will dissolve nonpolar solutes better, and therefore the most nonpolar solute will travel furthest.