Determining Bond & Molecular Polarity:

ΔEN 0 – 0.4 = Non-Polar Covalent ΔEN 0.5 – 1.7 = Polar Covalent ΔEN >1.7 = Ionic

1. Complete the chart below (except the last column)
   Use Phet Molecule Shapes & http://bit.ly/2Za8zLb chart to help with shape names and determining symmetry.

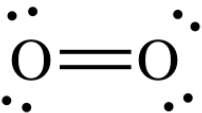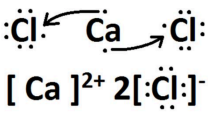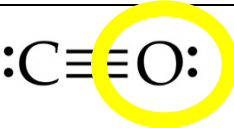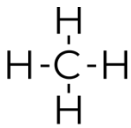| Compound	Atom with greater EN	EN Difference	Type of Bond(s)	Shape	Molecule Symmetry (Y/N)	Polar or Non-Polar Molecule?
HCl	Cl	3-2.1 = 0.9	POLAR COVALENT	LINEAR	NO	POLAR
H_2S	S	2.5 – 2.1 = 0.4	NON-POLAR COVALENT	BENT	NO	POLAR
CaO	O	3.5 – 1 = 2.5	IONIC	NO SHAPE	NONE	IONIC
PCl_3	Cl	3-2.1 = 0.9	POLAR COVALENT	TRIGONAL PYRAMID	NO	POLAR
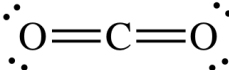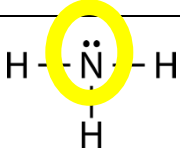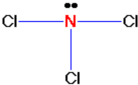
Molecule Polarity Determined by:

a) If <u>all of the bonds</u> are all ionic the polarity is just "**Ionic**"
b) If <u>all of the bonds</u> are non-polar covalent then the molecule is **"Non-Polar"**
     i. *** Unless there are unbound electrons ***
c) If the <u>only bond is polar</u> then the molecule is **"Polar"**
d) If <u>one or more of the bonds are polar</u> then look at symmetry:
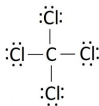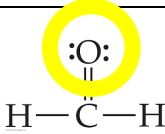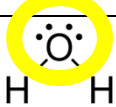   • If the polar covalent bonds are arranged in a way that causes them to cancel each other out (ie. linear, tetrahedron, or trigonal planar and all bonds are the same) then the molecules is **"Non-Polar"** due to symmetry
   • If the polar covalent bonds do not cancel each other out (ie. pyramid, linear, or bent) then the molecule is **"Polar"**

2. Label the last column in the chart above "Polar or Non-Polar?" and complete the chart.

3. Complete the chart below. If a molecule is **POLAR**, highlight the polar region.

Compound	Molecule Diagram	Type of Bond(s)	Shape	Molecule Symmetry	Polar or Non-Polar Molecule?
H_2	H—H	H-H NPC	LINEAR	YES	NON-POLAR MOLECULE
N_2	:N≡N:	N-N NPC	LINEAR	YES	NON-POLAR MOLECULE

Compound	Molecule Dot Diagram	Type of Bond(s)	Shape	Molecule Symmetry	Polar or Non-Polar Molecule?
O_2		O-O NPC	LINEAR	YES	NON-POLAR MOLECULE
$CaCl_2$	[Ca]²⁺ 2[:Cl:]⁻	Ionic	NO SHAPE	NONE	IONIC
CO		C-O PC	LINEAR	NO	POLAR MOLECULE
CH_4		C-H NPC	TETRAHEDRAL	YES	NON-POLAR MOLECULE
CO_2		C-O PC	LINEAR	YES	NON-POLAR MOLECULE
NH_3		N-H PC	PYRAMID	NO	POLAR MOLECULE
NCl_3		N-Cl NPC	PYRAMID	NO	POLAR MOLECULE
CF_4		C-F PC	TETRAHEDRAL	YES	NON-POLAR MOLECULE
CCl_4		C-Cl NPC	TETRAHEDRAL	YES	NON-POLAR MOLECULE
H_2CO		H-C NPC C-O. PC	TRIGONAL PLANAR	NO	POLAR MOLECULE
H_2O		O-H PC	BENT	NO	POLAR MOLECULE