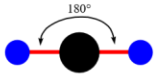
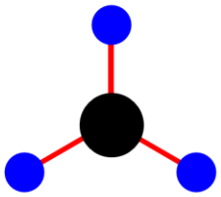
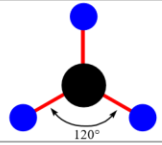
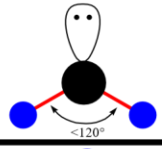
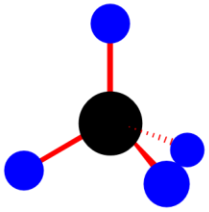
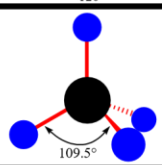
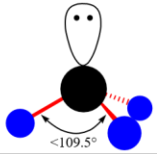
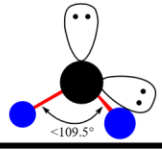
Using VSEPR to Predict the Shapes of Molecules

Electron Groups on central atom[1]	Electron-Group Shape	Bonds[2]	Lone Pairs	AX_mE_n[3]	Molecular Shape	Bond angles	Polarity	Hybrid -ization	Appearance
2	 Linear	2	0	AX_2	linear	180°		sp	
3	 Trigonal Planar	3	0	AX_3	trigonal planar			sp^2	
		2	1	AX_2E	bent			sp^2	
4	 Tetrahedral	4	0	AX_4	tetrahedral	109.5°		sp^3	
		3	1	AX_3E	trigonal pyramidal			sp^3	
		2	2	AX_2E_2	bent			sp^3	

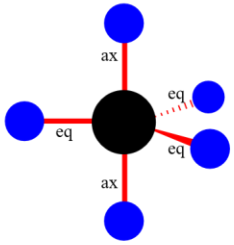
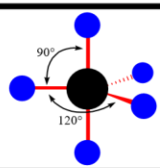
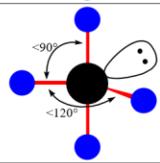
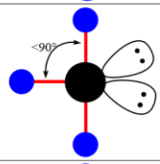
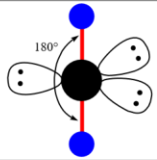
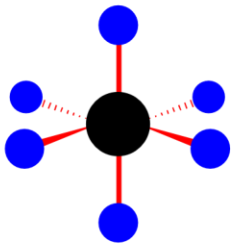
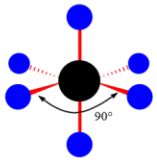
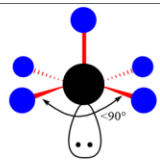
[1] "Electron groups or clouds" include bonds, lone pairs, and odd (unpaired) electrons. A multiple bond (double bond or triple bond) counts as one electron group.

[2] A multiple bond (double bond or triple bond) counts as one bond in the VSEPR model.

[3] A = central atom, X = surrounding atoms, E = lone pairs

[4] You must consider BOTH the change in electronegativity and the molecular symmetry when deterring the polarity of a molecule.

[5] Electrons in lone pairs take up more room than bonded electrons, when lone pairs are present the bond angles are decreased slightly due to electron repulsion compared to the basic structure without lone pairs.

Electron Groups on central atom[1]	Electron-Group Shape	Bonds[2]	Lone Pairs	AX_mE_n[3]	Molecular Shape	Bond angles	Polarity	Hybrid-ization	Appearance
5	 eq = equatorial ax = axial Trigonal Bipyramidal	5	0	AX_5	trigonal bipyramidal	120° eq 90° ax		sp^3d	
		4	1	AX_4E	seesaw	<120° eq <90° ax		sp^3d	
		3	2	AX_3E_2	T-shaped	<90°		sp^3d	
		2	3	AX_2E_3	linear	180°		sp^3d	
6	 Octahedral	6	0	AX_6	octahedral	90°		sp^3d^2	
		5	1	AX_5E	square pyramidal	<90°		sp^3d^2	
		4	2	AX_4E_2	square planar	90°		sp^3d^2