VSEPR THEORY

Valence Shell Electron Repulsion

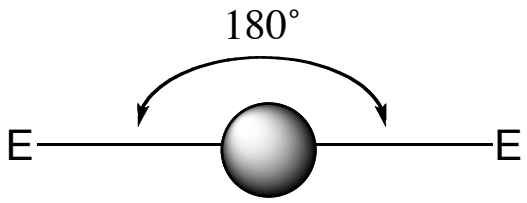
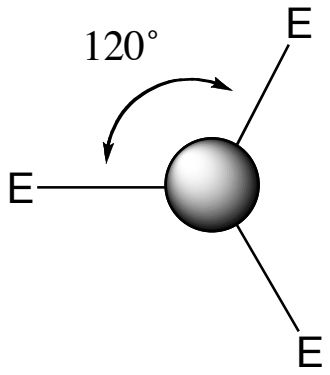
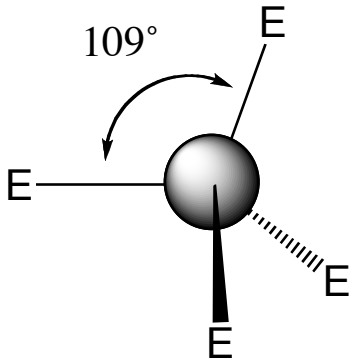
VSEPR is a useful theory for estimating the shape of molecules. The idea is that all electrons, whether non-bonding loan pairs or electrons that form bonds, will repel each other and try to move as far apart as possible.

Step 1: Create Lewis Dot Structure

Draw the Lewis dot structure. This will tell you how many bonded atoms and lone pairs are around each atom.

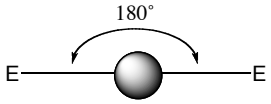
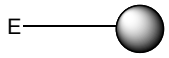
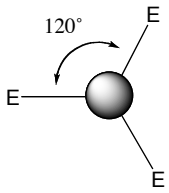
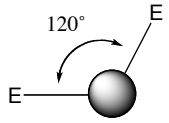
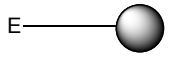
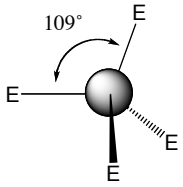
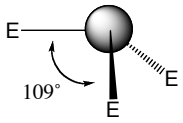
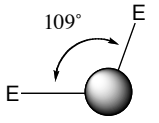
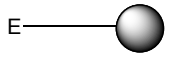
Step 2: Find Electron Geometry

Look at how many sets of electrons you have around each atom. Each lone pair and each bonded atom counts as one electron set. This will tell you the electronic shape.

# of bonded atoms and lone pairs	Electronic Shape Name	Electronic Shape Name
1 or 2		Linear
3		Trigonal Planar
4		Tetrahedral

Step 3: Find Molecular Geometry

Start with the electronic shape and ignore the electrons that are not used in bonds. What's left over will be the shape the atoms form in the structure.

Electronic Shape	# of lone pairs to ignore	Molecular Shape	Molecular Shape Name
Linear	0		Linear
Linear	1		Linear
Trigonal Planar	0		Trigonal Planar
Trigonal Planar	1		Bent
Trigonal Planar	2		Linear
Tetrahedral	0		Tetrahedral
Tetrahedral	1		Trigonal Pyramidal
Tetrahedral	2		Bent
Tetrahedral	3		Linear