

LO: Students will be able to draw, label, and discuss polarity of molecular geometries.

DOL: Students will be able to correctly identify at least 4/5 molecular geometries.

### An exception to the octet rule:

-Expanded Octet

-only elements with a minimum of  $n=3$  can have expanded octets

Example:  $\text{SF}_6$  (sulfur hexafluoride)

## VSEPR Theory

### Valence Shell Electron Pair Repulsion Theory

This is the theory that gives us molecular geometry. The general idea is atoms want to be as far from each other as they can, but lone electron pairs have a stronger repulsion than bonded atoms.

Oct 31-12:23 PM

In order to determine the VSEPR, you must first draw the proper Lewis Structure.

The molecular geometry (shape) depends on how many "things" are around the central atom.

Draw the Lewis Structure for carbon dioxide:

How many "things" are around the central atom?

Let's look at the Lab software...

Draw the Lewis Structure for carbonate.

How many things are around the central atom?

Let's look at the Lab software...

Draw the Lewis Structure for carbon tetrahydride.

How many things are around the central atom?

Let's look at the Lab software...

Draw the Lewis Structure for  $\text{PCl}_5$

How many things are around the central atom?

Let's look at the Lab software...

Draw the Lewis structure for sulfur hexafluoride

How many things are around the central atom?

Let's look at the Lab software...

## Electron Geometry vs Molecular Geometry

-electron geometry is how many "things" are around the central atom

-molecular geometry is the actual shape

If the only "things" on the central atom are other atoms, then these two geometries are the same.

## Electron and Molecular Geometries with no unbonded electrons on the central atom:

2 = linear ( $180^\circ$ )

3 = trigonal planar ( $120^\circ$ )

4 = tetrahedral ( $109.5^\circ$ )

5 = trigonal bipyramidal ( $120^\circ$  and  $90^\circ$ )

6 = octahedral ( $90^\circ$ )