(8) **Today**

3.2 VSEPR

3.3 Molecular Polarity

Next Class (9)

4.1 Symmetry elements and Operations

4.2 Point Groups

(10) **Second Class from Today**

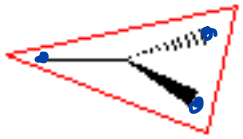
4.1 Symmetry elements and Operations

4.2 Point Groups

Third Class from Today (11)

4.3 Properties and Representations of Groups

4.4 Uses of Character Tables



trigonal planar

V-shape ← these shapes are based on where the atoms are

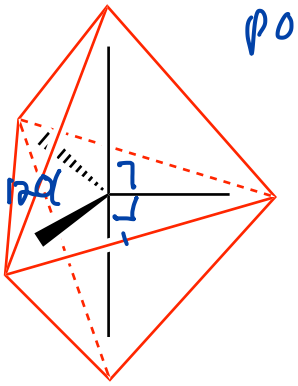
tetrahedral

pyramidal

bent

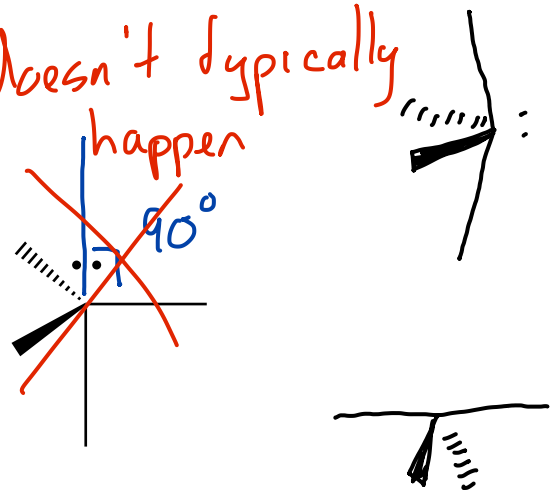
90° between axial + equitorial positions

120° between equitorial positions

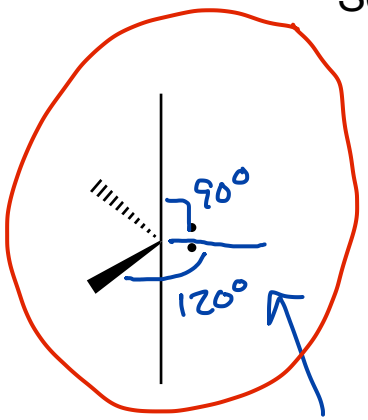


trigonal bipyramidal

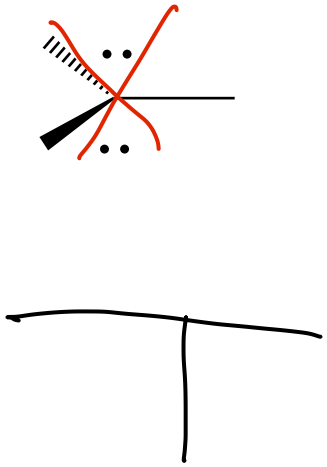
doesn't typically happen



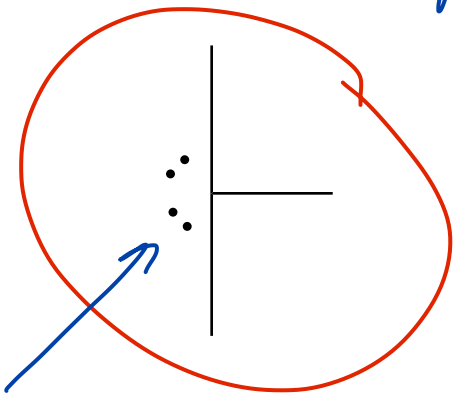
See-saw



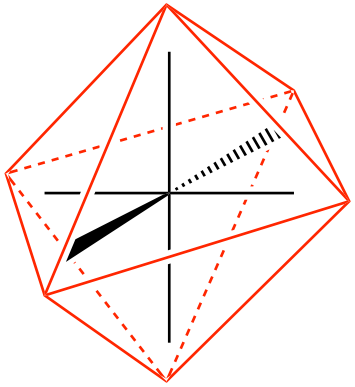
more room for lp e⁻

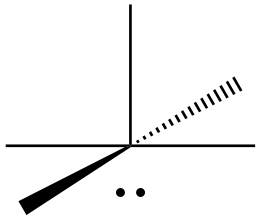


T-shaped



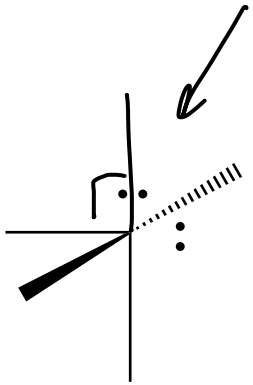
more room

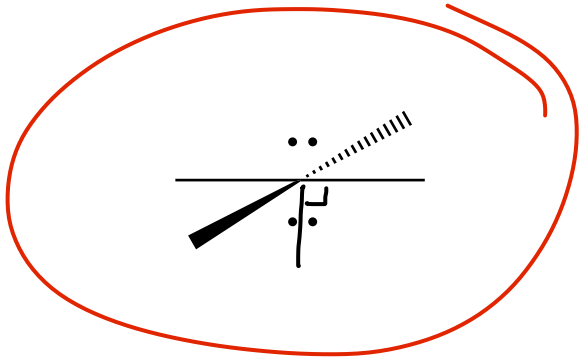




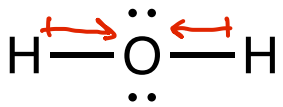
square pyramidal

90° from bp, bp, bp, lp



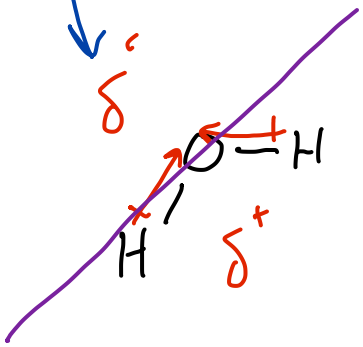


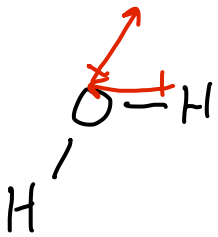
90° from bp, bp, bp, bp

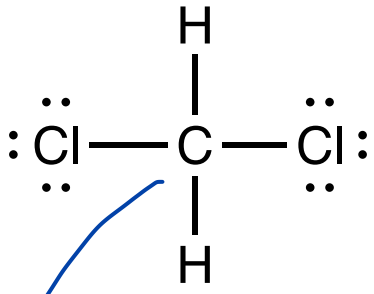


VSEPR

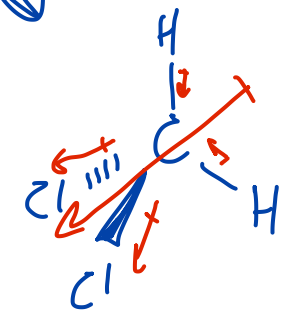
polar
1.85 D

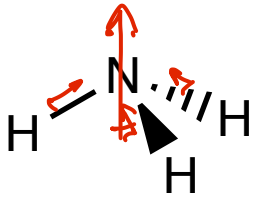






polar
1.6 D



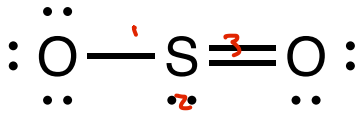


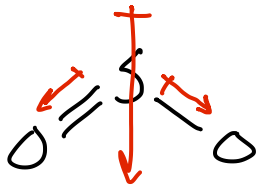
polar
1.47 D

Draw Lewis Structure

Predict Shape

Find polar bonds



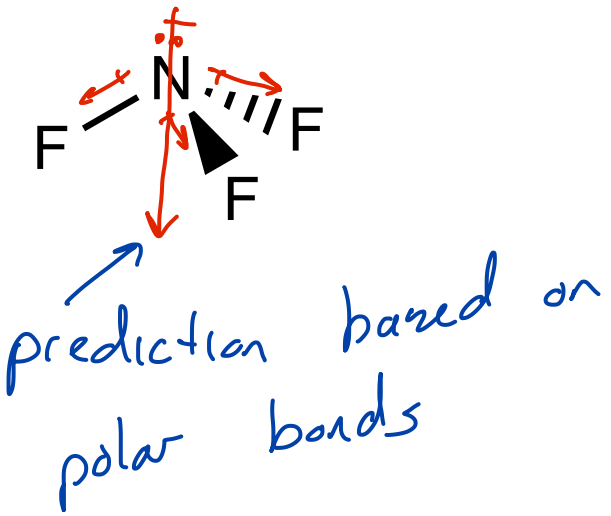


prediction based on polar bonds

Draw Lewis Structure

Predict Shape

Find polar bonds



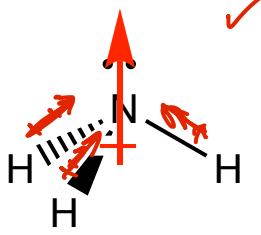
Draw Lewis Structure

Predict Shape

Find polar bonds

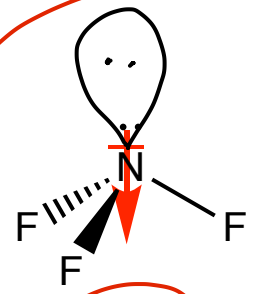
Does prediction based on polar bonds match the position of the lone-pair e⁻ ?

polar bonds + lp e⁻ reinforce each other



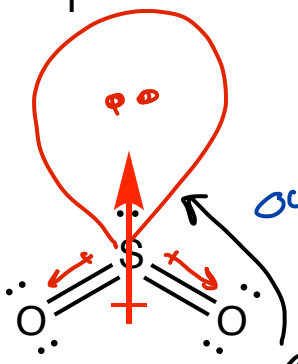
1.47 D

safely predict polarity when polar bonds are reinforced by lp e⁻



0.23 D

cannot safely predict when polar bonds + lp e⁻'s do not coincide



1.63 D

our prediction was wrong

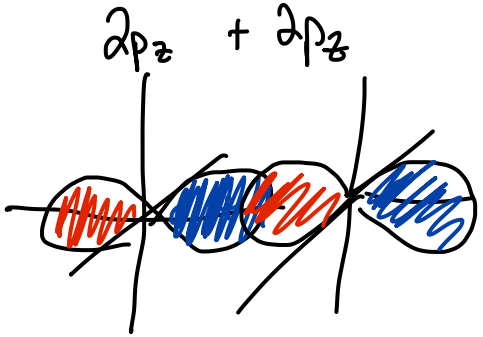
lp e⁻'s stick so far out they cause the S side to be the δ⁻ side

Symmetry is important for a variety of reasons

* Chirality
* IR + Raman Spectroscopy

Shine IR light on a molecule & the molecule absorbs some infrared... symmetry of the vibration determines whether the vibration is IR or Raman active

* Atomic orbitals combine to form Molecular orbitals



the symmetry determines how the AO's combine to form MO's