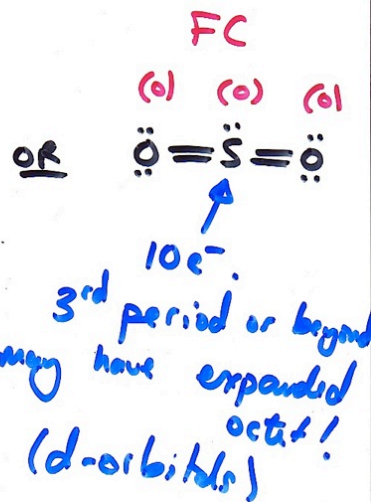
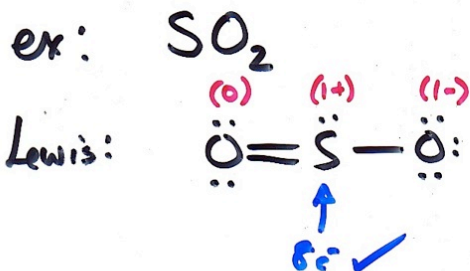


## Molecules w/ 1 or more lone-pairs

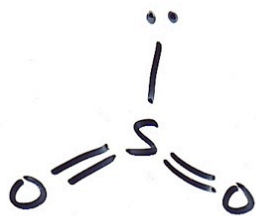


Shape?



e<sup>-</sup> geometry

trigonal planar



molecular geometry

-where atoms are!

**Bent**

b.p.



small

l.p.



LARGE



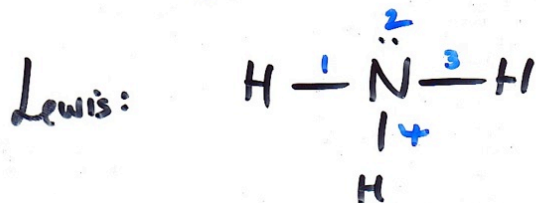
$< 109.5^\circ$

$= 107^\circ$  (do not memorize!)

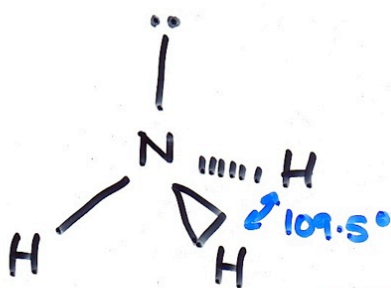
4 e<sup>-</sup> pairs

3 bp, 1 lp.

ex: NH<sub>3</sub>



VSEPR:



e<sup>-</sup> geom  
tetrahedral  
molecular geom

TRIGONAL  
PYRAMIDAL



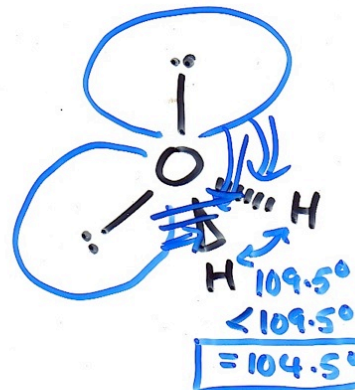
4 e<sup>-</sup> pairs

2 bp, 2 lp

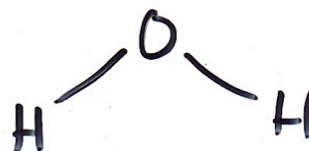
ex: H<sub>2</sub>O



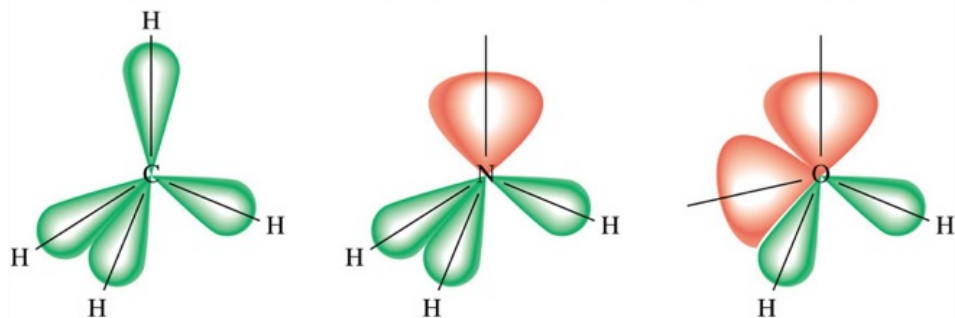
VSEPR:



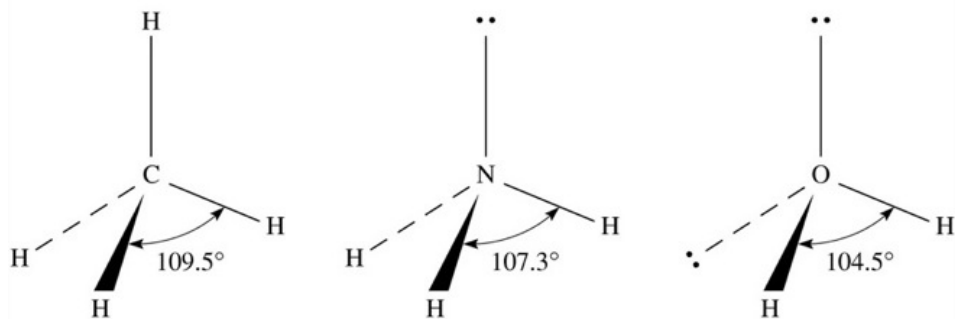
e<sup>-</sup> geom  
tetrahedral  
mol. geom  
Bent



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(a)

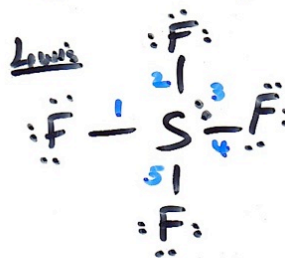


(b)

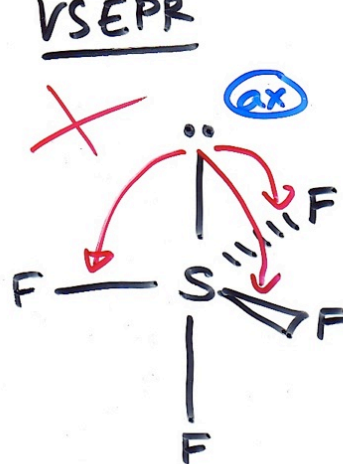
5 e<sup>-</sup> pairs

4 b.p. , 1 l.p.

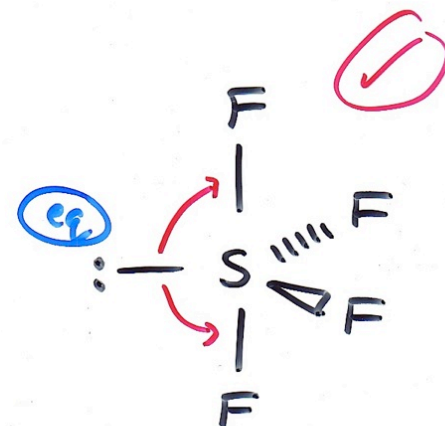
ex: SF<sub>4</sub>



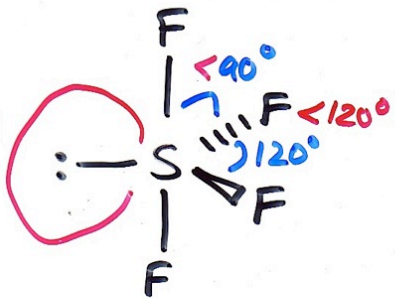
VSEPR



3 l.p.-b.p.  
repulsions @ 90°  
☹️

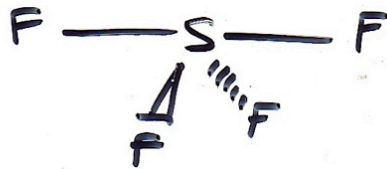


2 l.p.-b.p.  
repulsions @ 90°  
😊



~~$e^-$  geom  
trigonal bipyramidal.~~

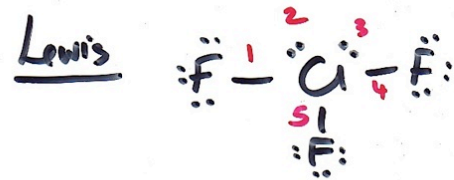
mol. geom  
see-saw.



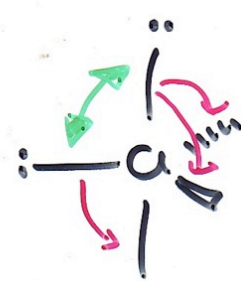
5  $e^-$  pairs

3 b.p. , 2 l.p.

$ClF_3$



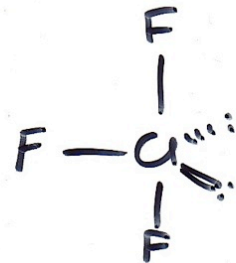
6 l.p.-b.p. @  $90^\circ$



3 l.p.-b.p. @  $90^\circ$   
l.p.-l.p. @  $90^\circ$



4 l.p.-bp @  $90^\circ$



T-shaped

**Table 10.2** Geometry of Simple Molecules and Ions in Which the Central Atom Has One or More Lone Pairs

Class of molecule	Total number of electron pairs	Number of bonding pairs	Number of lone pairs	Arrangement of electron pairs*	Geometry	Examples
AB <sub>2</sub> E	3	2	1		Bent	 SO <sub>2</sub>
AB <sub>3</sub> E	4	3	1		Trigonal pyramidal	 NH <sub>3</sub>
AB <sub>2</sub> E <sub>2</sub>	4	2	2		Bent	 H <sub>2</sub> O
AB <sub>4</sub> E	5	4	1		Distorted tetrahedron (or seesaw)	 SF <sub>4</sub>
AB <sub>3</sub> E <sub>2</sub>	5	3	2		T-shaped	 ClF <sub>3</sub>
AB <sub>2</sub> E <sub>3</sub>	5	2	3		Linear	 I <sub>3</sub>
AB <sub>5</sub> E	6	5	1		Square pyramidal	 BrF <sub>5</sub>
AB <sub>4</sub> E <sub>2</sub>	6	4	2		Square planar	 XeF <sub>4</sub>

\*The colored lines are used to show the overall shape, not bonds.

Most molecules have >1 central atom.

