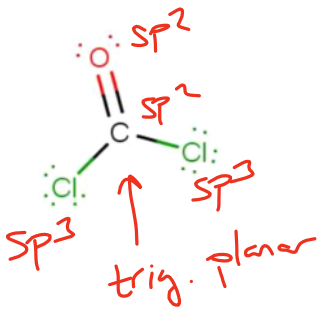
HybridizationandBondingKey

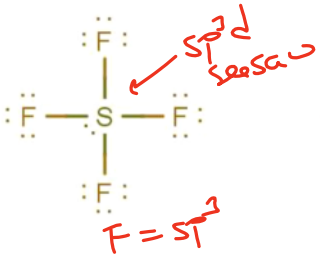
Wednesday, February 15, 2017 7:50 AM

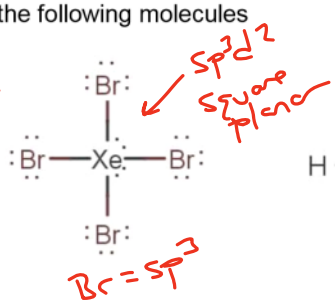
Hybridization and bonding

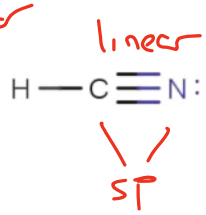
Consider each of the following compounds.

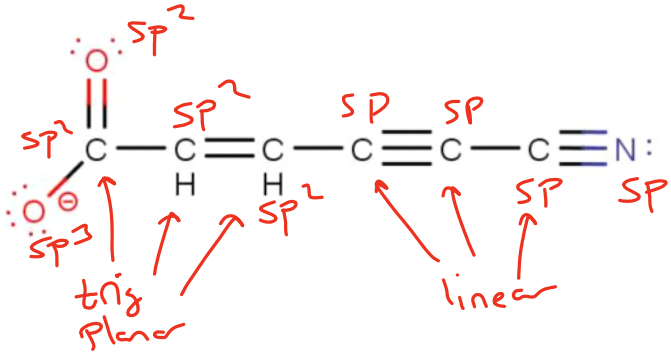
- Determine the molecular geometry of each central atom.
- Assign hybridization to **every** non-hydrogen atom in the following molecules

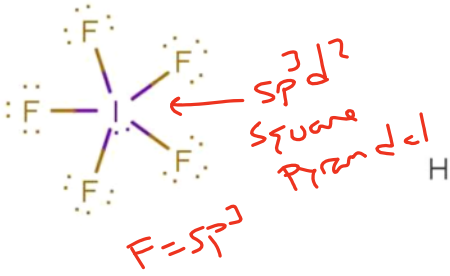


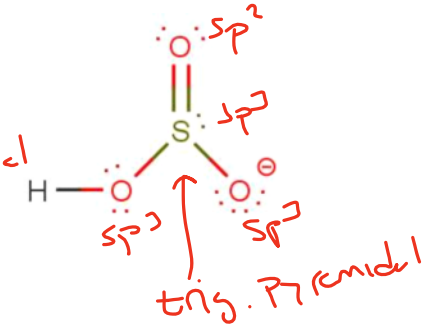


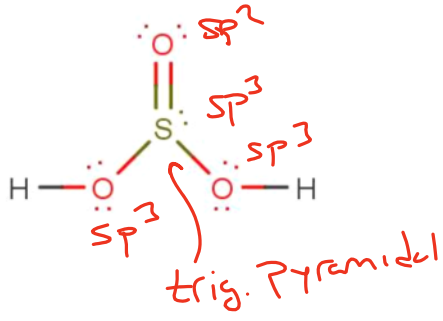












- To help you prepare for the next problem, determine the electron geometry on each atom in the first two compounds. Compare the hybridization and the electron geometry. Do you notice anything interesting?

C = trig planar (sp^2)
Cl = tetrahedral (sp^3)
O = trig. planar (sp^2)

F = tetrahedral (sp^3)
S = trig. bipyramidal (sp^3d)

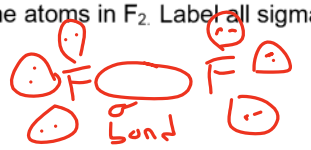
Determine the electron geometry for each of the following hybridizations:

sp	sp^2	sp^3	sp^3d	sp^3d^2
linear	trig. planar	tetrahedral	trig. bipyramidal	octahedral

How many sigma bonds and how many pi bonds exist in each of the following:

Bond Order	Sigma bonds	Pi bonds
1 (single bond)	1	0
2 (double bond)	1	1
3 (triple bond)	1	2

Sketch the bond that forms between the two fluorine atoms in F_2. Label all sigma and pi bonds.

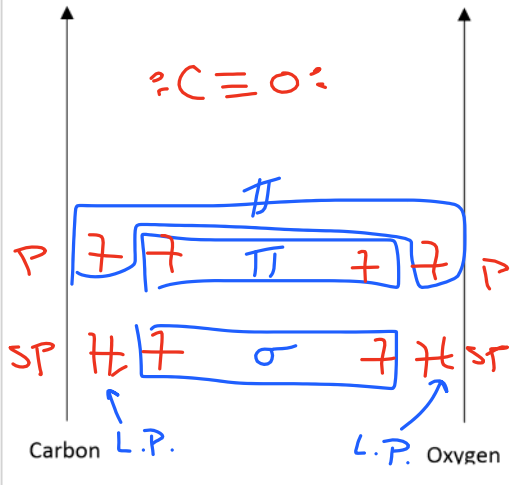


← lobes are shaped tetrahedral

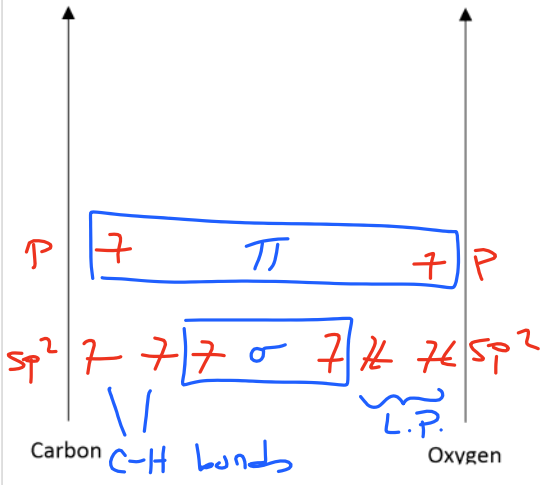
Sketch the bond that forms between the two oxygen atoms in O_2. Label all sigma and pi bonds. (e⁻ geometry)

Using hybridization theory, sketch an energy diagram for the bond that forms between carbon and oxygen atoms in:

CO



H_2CO



Now try it all with no guidance. Consider CH_2NH.

- Draw a Lewis structure showing the correct geometry around each central atom.
- Determine the hybridization of each central atom.
- Sketch the bond between the C an N
- Draw an energy diagram showing the bond between C and N. Make sure to account for all electrons you see in your Lewis structure.