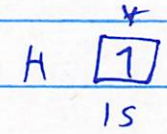
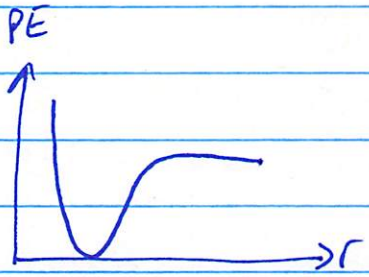
12/5/18

from last time:

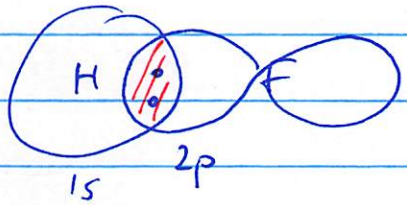
VB : bond = overlap of 2 orbs w/ 2 e^- (1 e^- in each!)

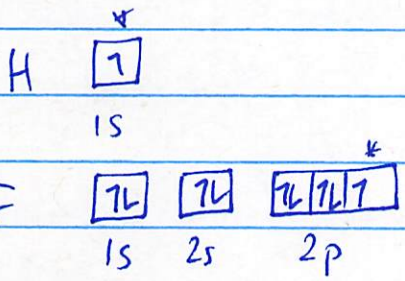
ex: H_2





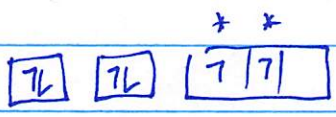
ex: HF



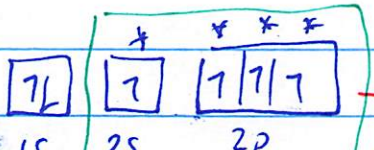


CH_4 → 109.5°

H: 

C: 

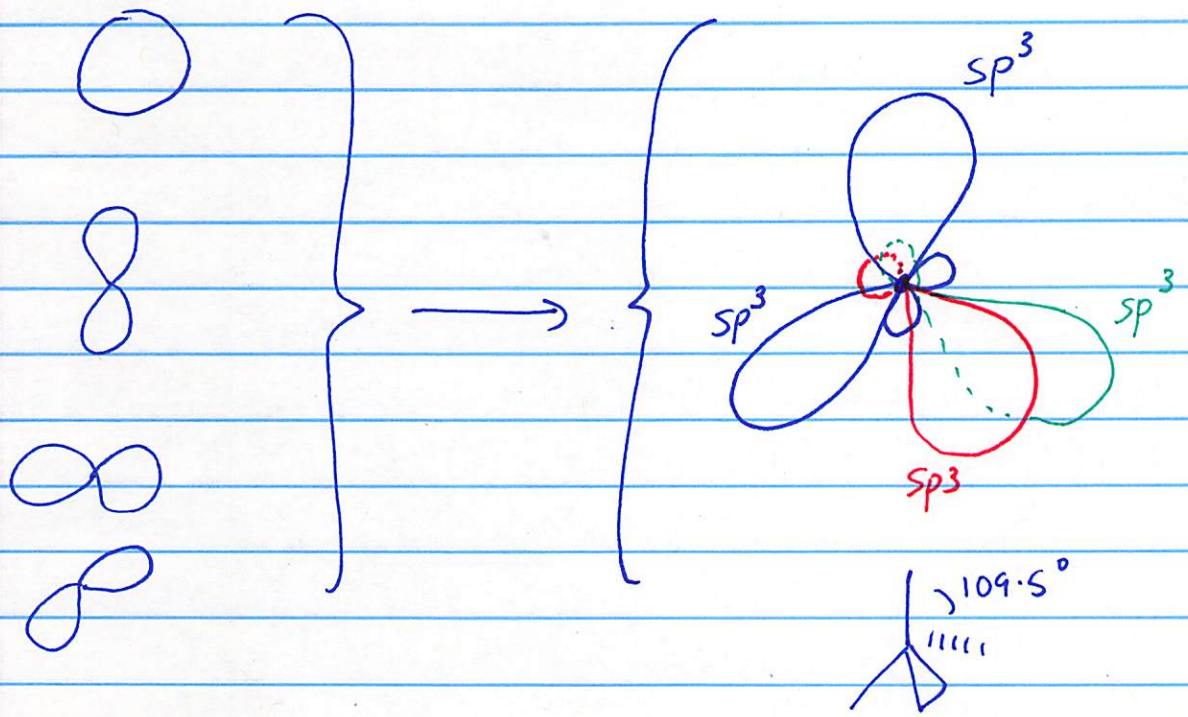
1. Promotion



@90°

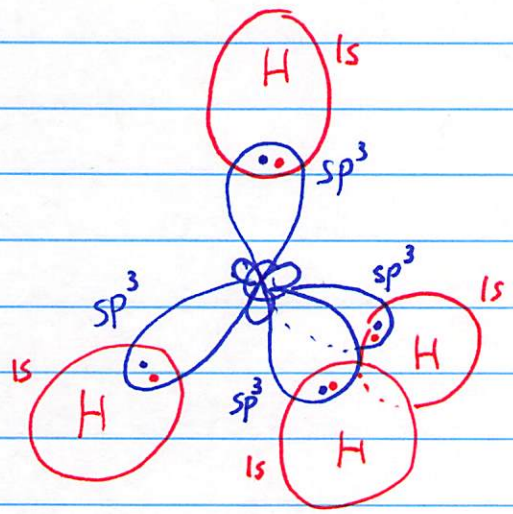
2. Hybridize.
one × 2s
three × 2p

@109.5°

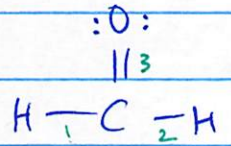


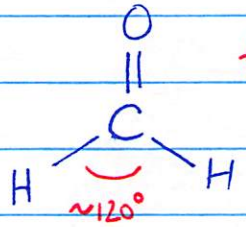
CH_4.

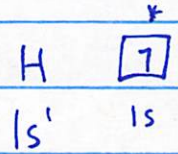
H: $\overset{*}{\boxed{1}}$ 1s

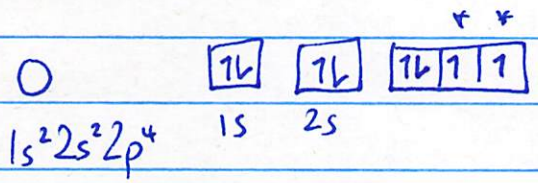


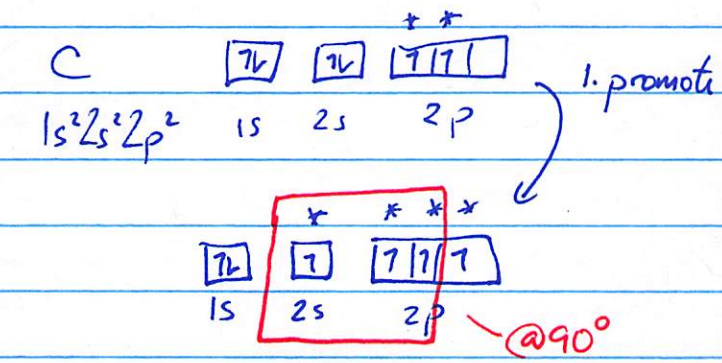
What about VB explanation for CH_2O?

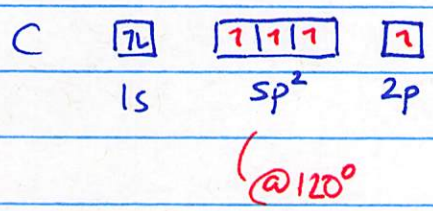
Lewis: 

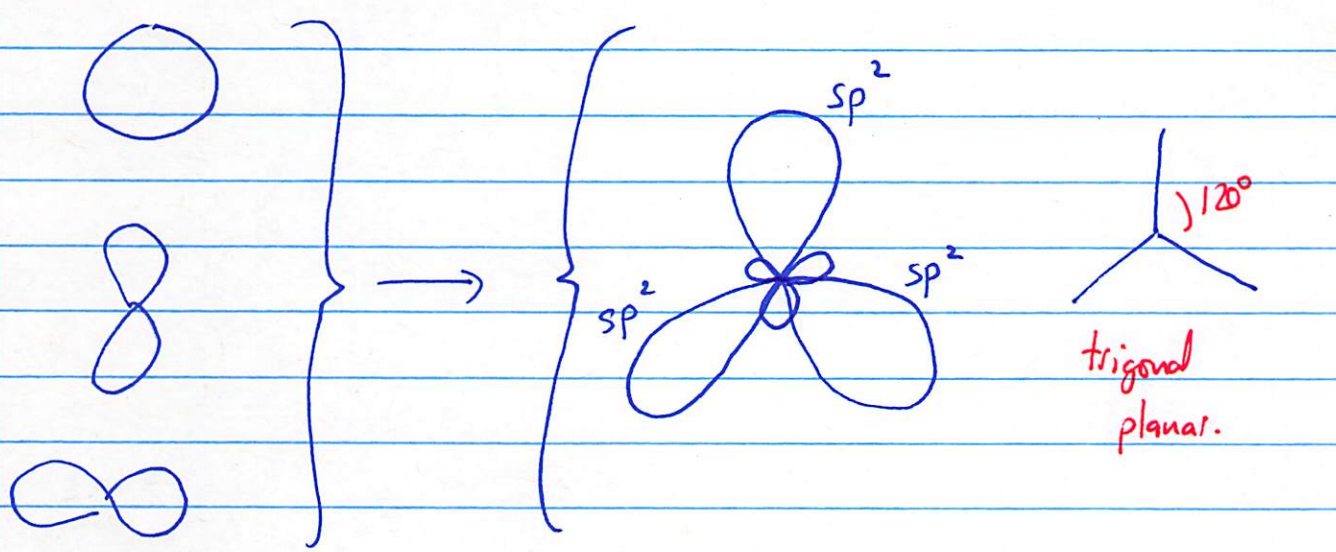
VSEPR:  trigonal planar.





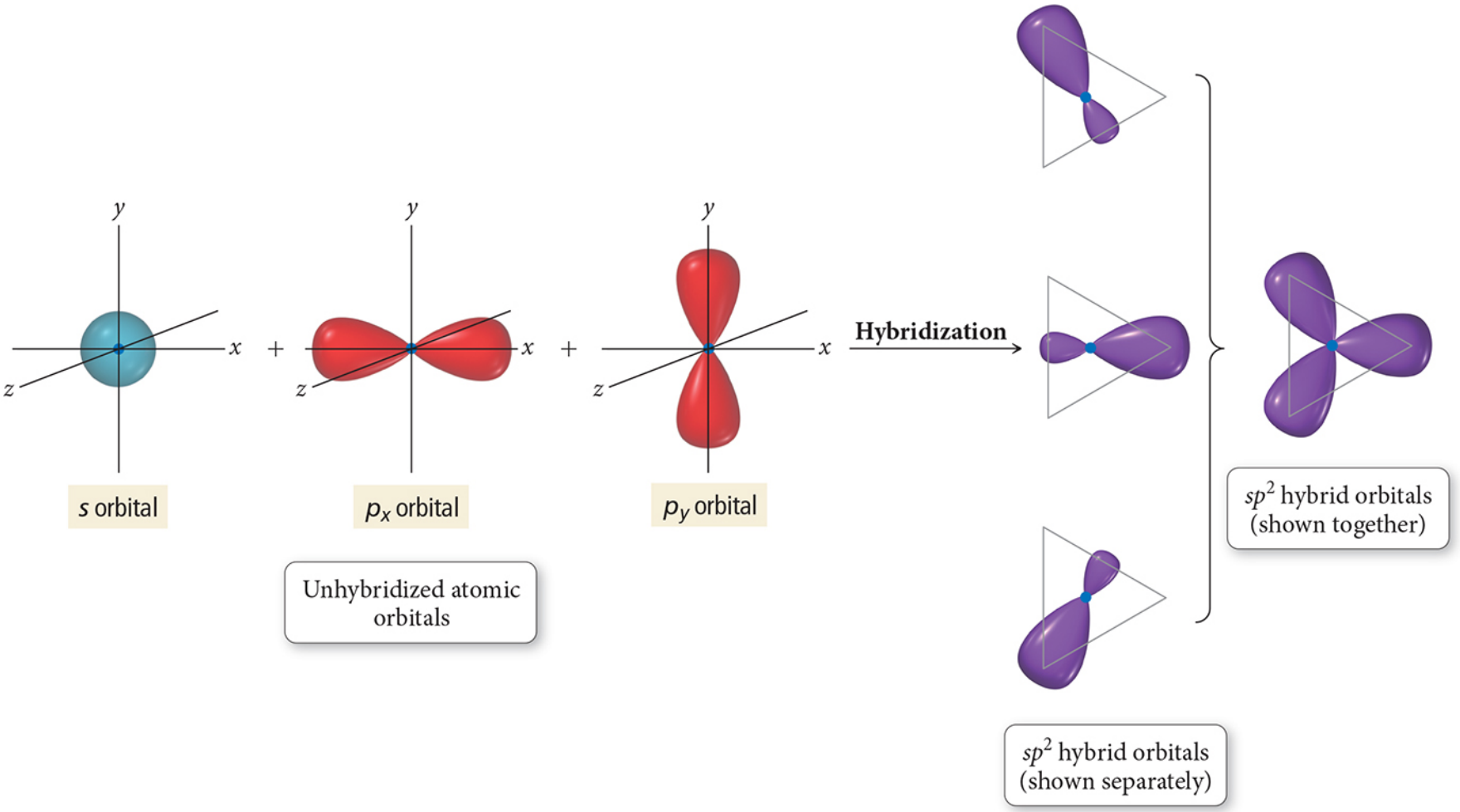


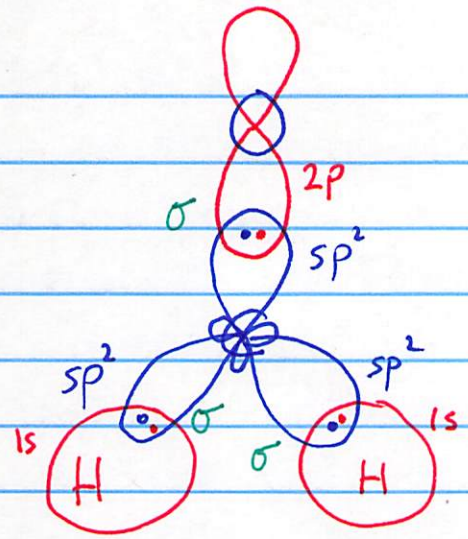


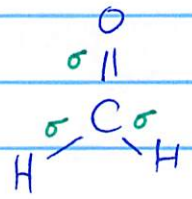


Formation of sp^2 Hybrid Orbitals

One *s* orbital and two *p* orbitals combine to form three sp^2 orbitals.

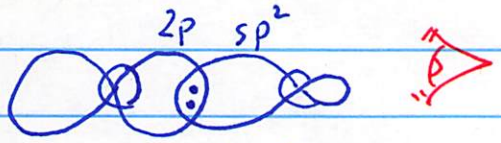


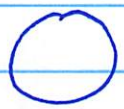




1st bond between atoms is ALWAYS σ

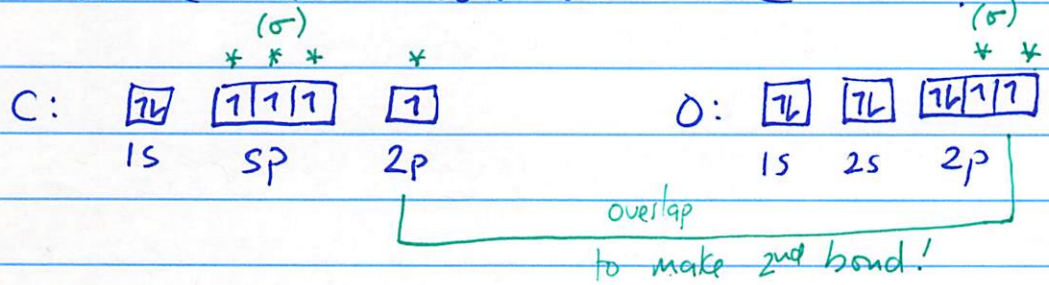
Best bonds are when we have head-on overlaps.

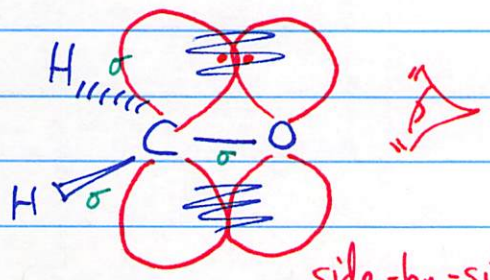


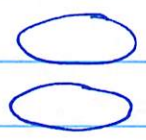
head-on overlap. : side-on view 

called a σ (sigma) bond.

let's look @ second bond between C + O

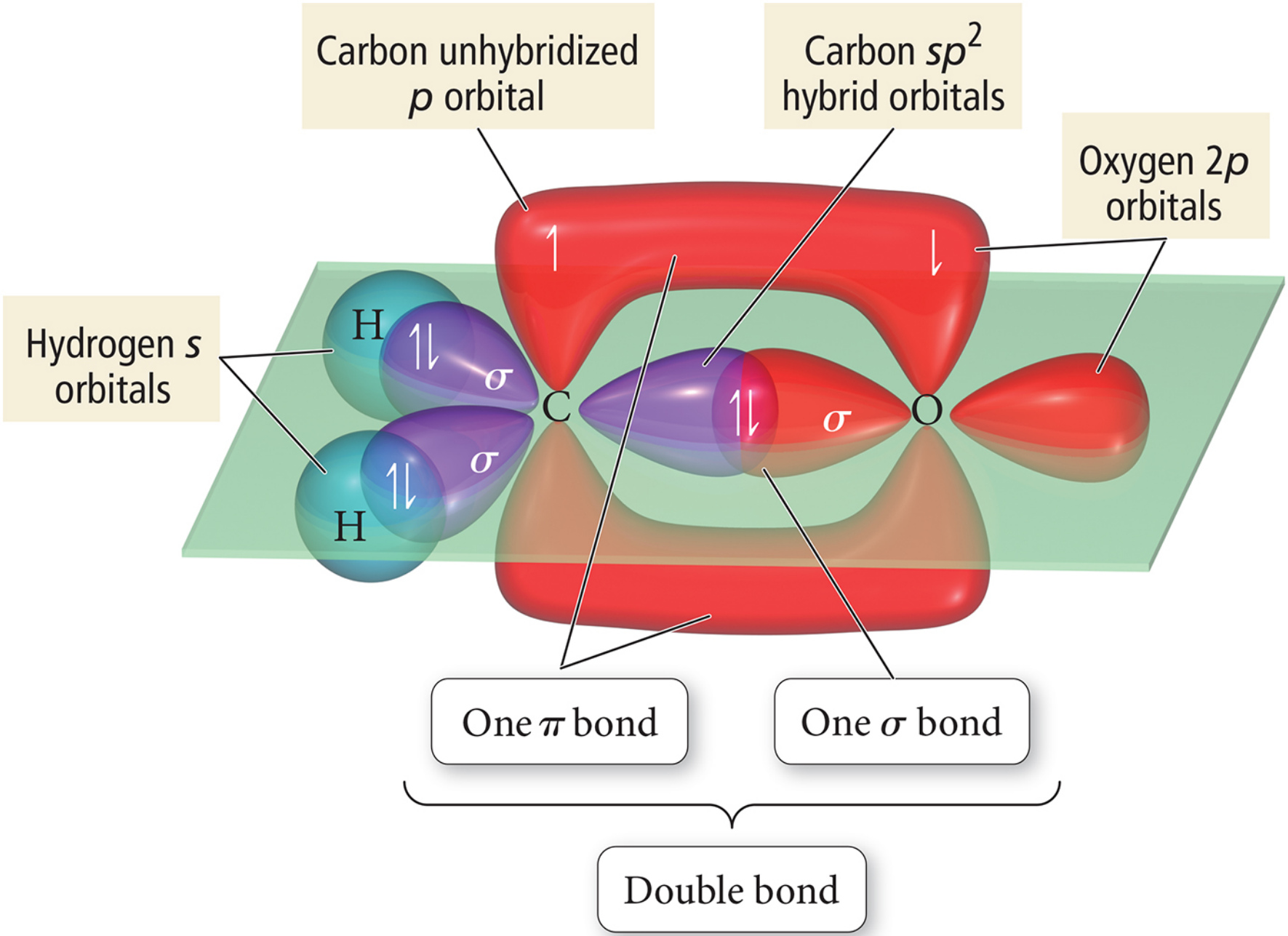


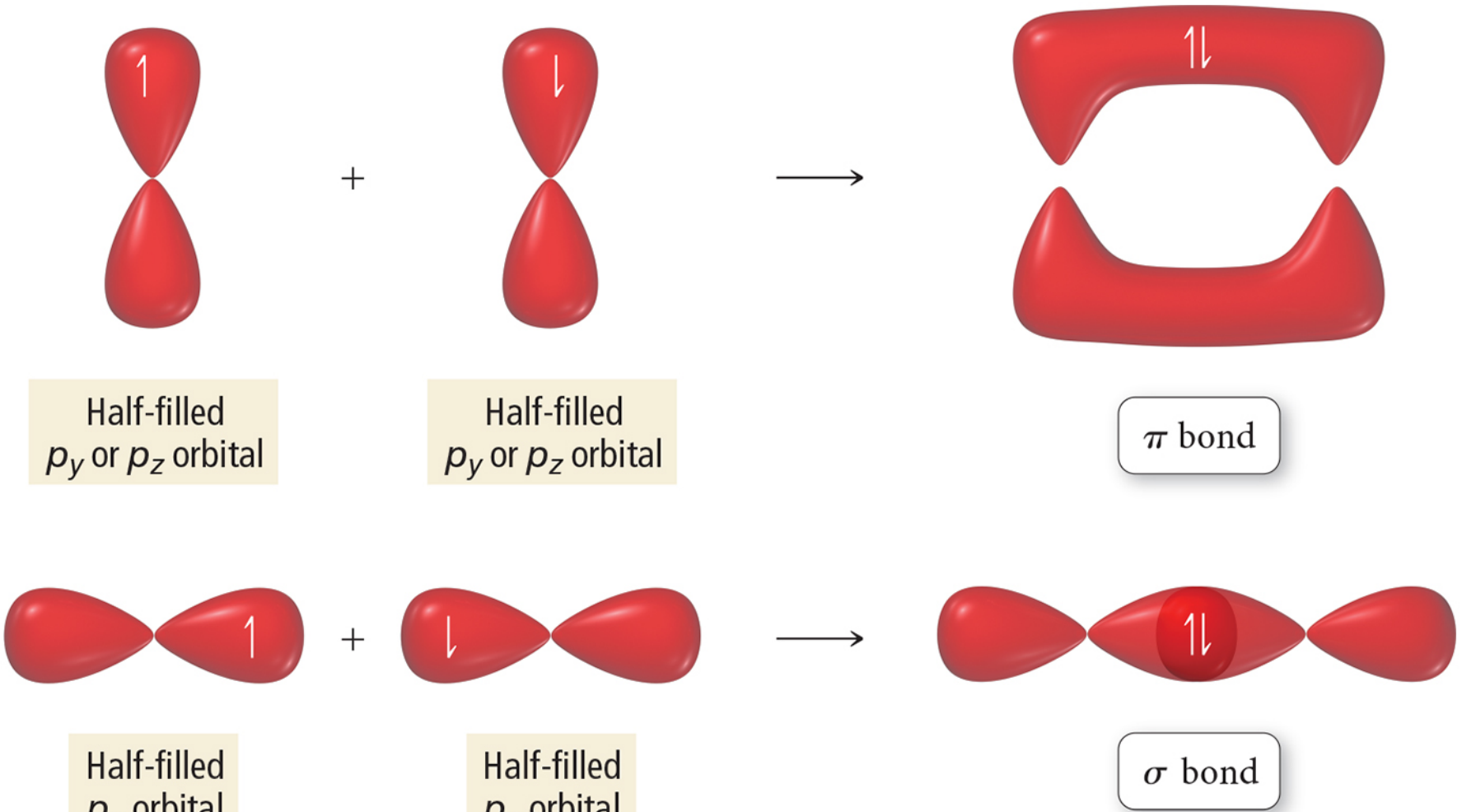


side-on view  - called a ππ(pi) bond.

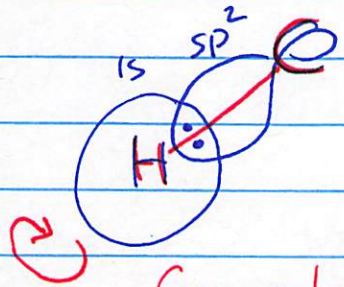
side-by-side overlap

□ 2nd + 3rd bonds between atoms = π





sigma-bonds.



- free rotation about σ

pi-bonds.

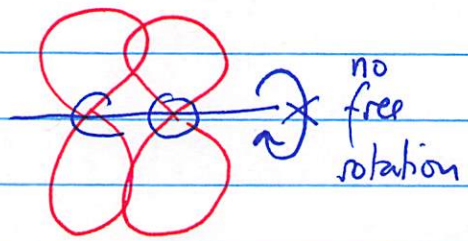
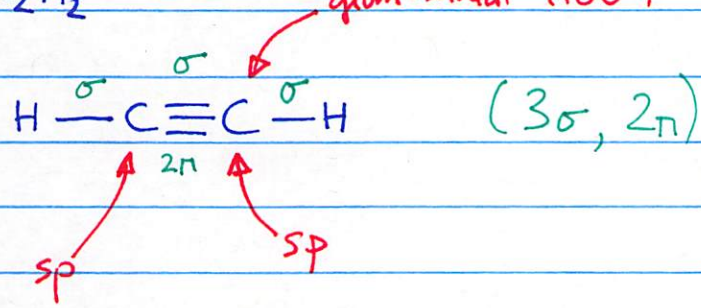


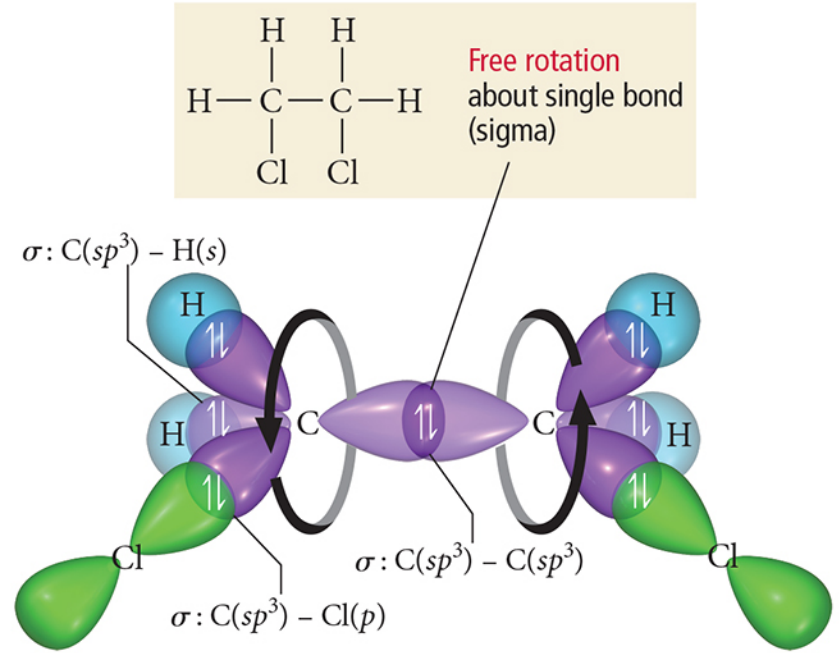
table of geometries + hybridizations

# repulsions	VSEPR geometry	hybrid orbitals
6	octahedral	sp^3d^2
5	trigonal bipyramidal	sp^3d
4	tetrahedral	sp^3
3	trigonal planar	sp^2
2	linear	sp

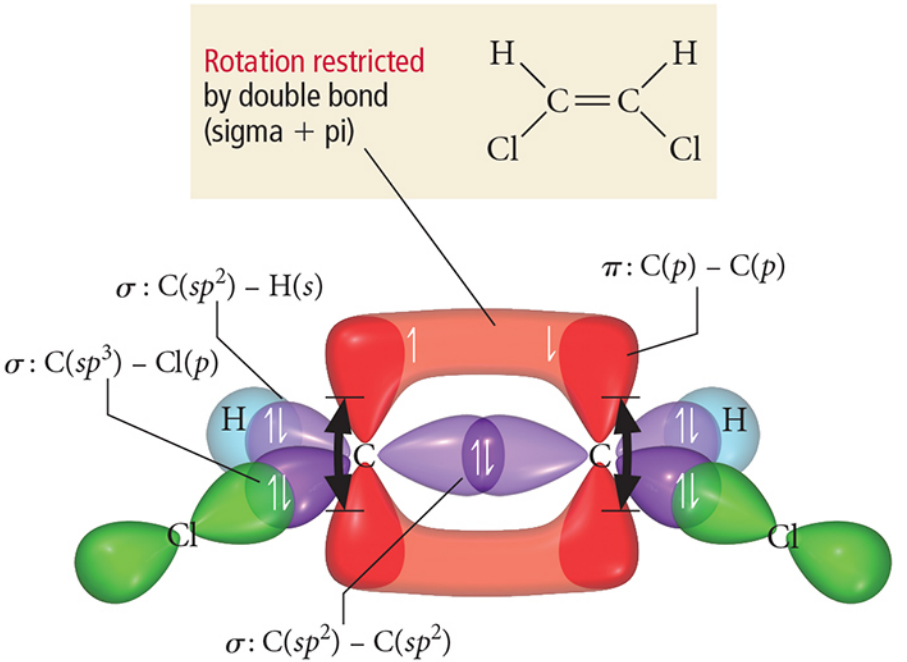
example: C_2H_2



Lewis:



1,2-Dichloroethane



1,2-Dichloroethene