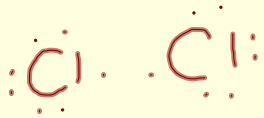
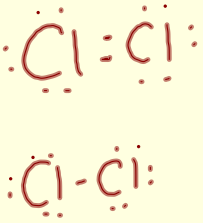
Warm Up

Draw the electron dot structure and structural diagram for SO_4^{2-}.

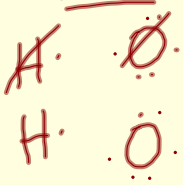
p. 225 #7-12

7.a) Cl_2

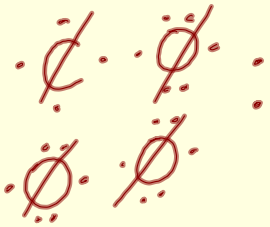


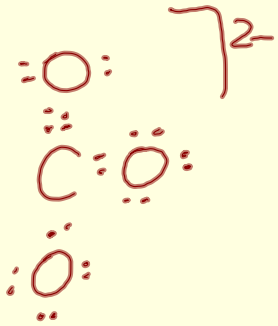


8. H_2O_2

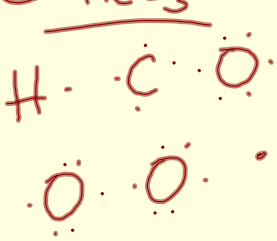


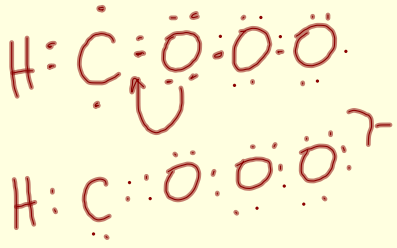
11. CO_3^{2-}

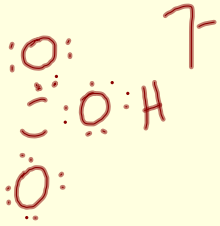




12. HCO_3^-





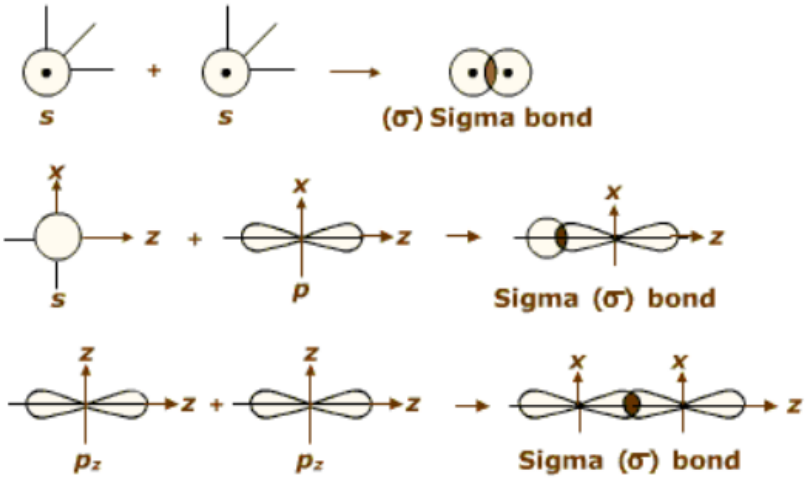


Molecular Orbitals

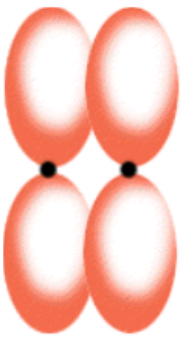
When two atoms share electrons to form a molecule, their atomic orbitals combine to produce molecular orbitals.

When the orbital is filled with two electrons, it is called a **bonding orbital**.

Sigma bond
Bond that forms when two atomic orbitals overlap head-on.
-strong bond



Pi bond
Bond that forms when two atomic orbitals overlap side-by-side.
-orbitals overlap less than in sigma bonds, thus the bonds are weaker than sigma bonds.



A.O + A.O → M.O.

1s + 1s

1s ⇅

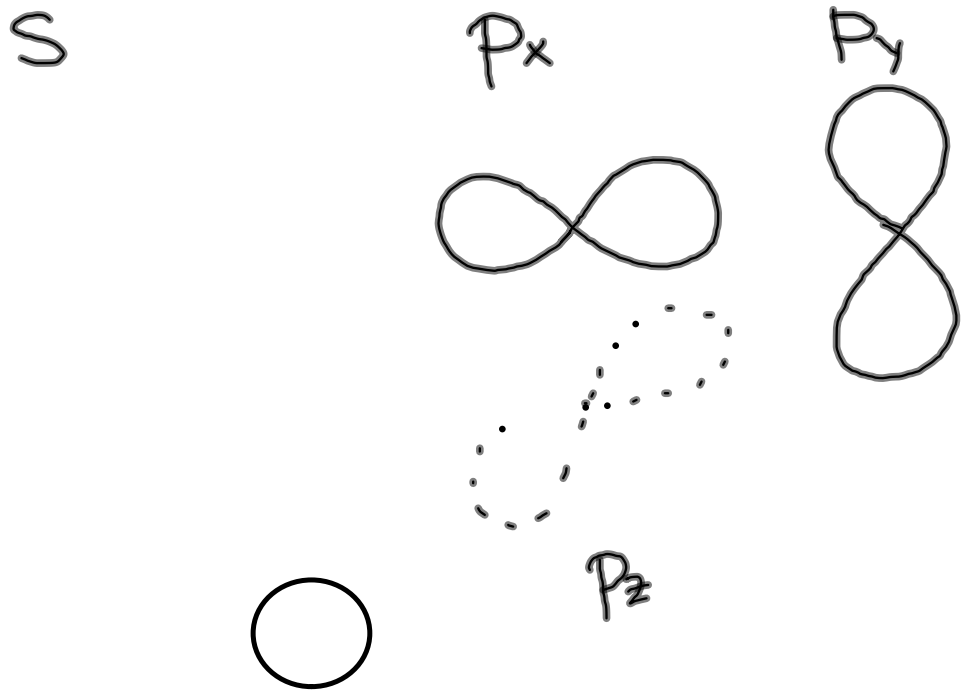
H

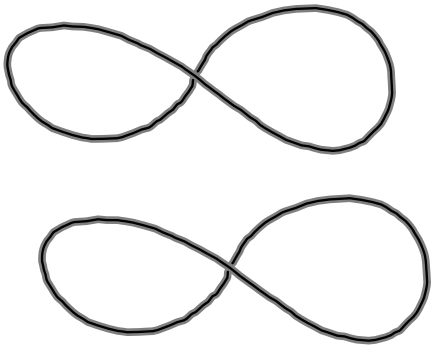
H·

Hs

·H

H : H


S
Px
Py
Pz

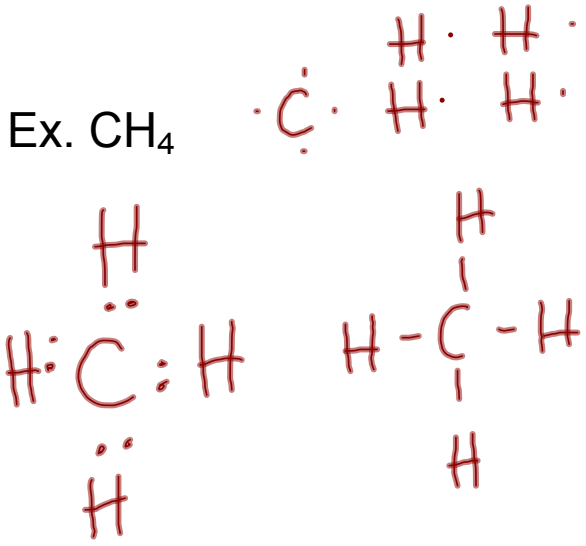


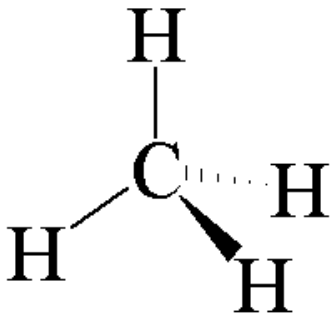
http://www.mhhe.com/physsci/chemistry/animations/chang_7e_esp/bom5s2_6.swf

VSEPR Theory

Valence-Shell Electron-Pair Repulsion Theory
Repulsion between electron pairs causes molecular shapes to adjust so that the valence-electron pairs are as far apart as possible.

Ex. CH_4





tetrahedral angle (109.5°)

Ex. NH_3

Lone pairs (unshared pairs) also affect the shapes of molecules.