Warm Up

Draw an electron dot structure and structural diagram for the following:

C_3H_4O

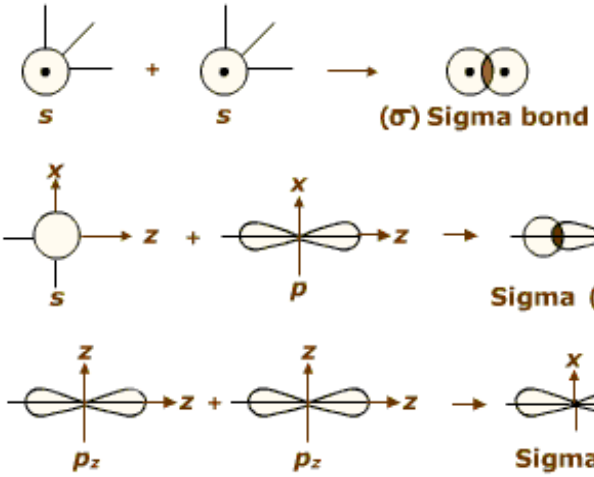
Molecular Orbitals

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**.

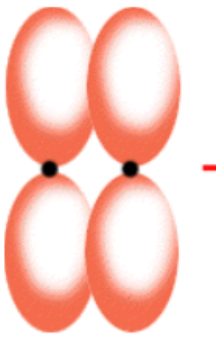
Sigma bond

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



Pi bond

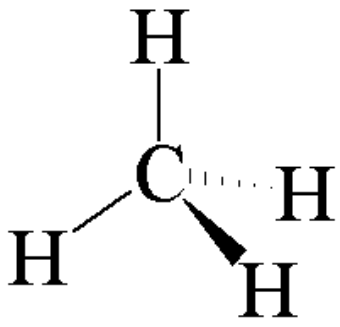
Bond that forms when two atomic orbitals overlap side-by-side.
-orbitals overlap less than in sigma bonds, thus the bonds are weaker than sigma bonds.



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.

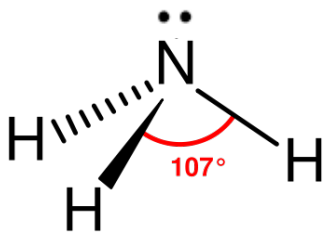
Ex. CH_4



tetrahedral angle (109.5°)

Ex. NH_3

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



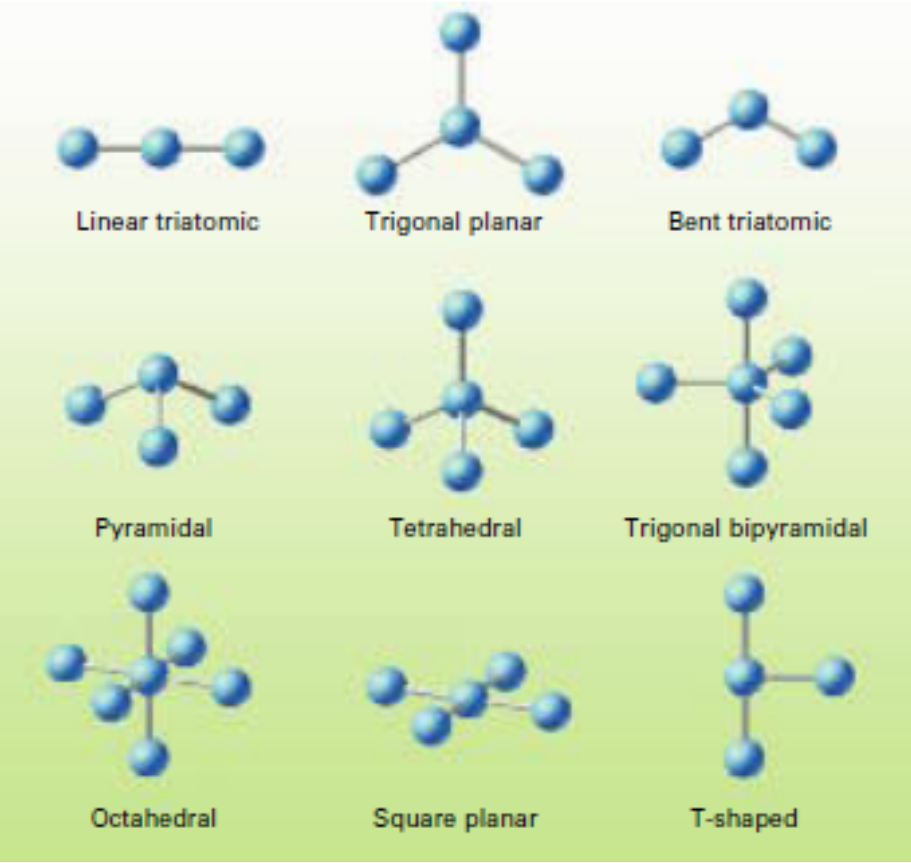
Homework

Ex. CO_2

When predicting molecular shapes, double and triple bonds are treated as single bonds.

Ex. CH_2O

trigonal planar (120°)


Linear triatomic
Trigonal planar
Bent triatomic
Pyramidal
Tetrahedral
Trigonal bipyramidal
Octahedral
Square planar
T-shaped