

Background: Molecular orbitals come from a linear combination of atomic orbitals, which are conserved in any covalent bonds. Write that down and remember it, kids. That little phrase has saved my behind more times than I care to mention.

Based on the number of electrons that individual atoms have, they are able to form bonds with other atoms. They do it in an effort to conserve energy. That is, two atoms bound together should be less energetic than they were separately. When they share electrons, they often do so in a way that fills out their orbitals, and makes them more stable.

The molecules we will look at have an easy time doing this, on paper, but we need to remember that they do this in space as well. That is, these molecules are three dimensional and occupy space in a certain way. So we will start to use molecular models to describe their shape.

Finally, we will look at the shape of the molecule and try to determine some of its properties. For example, is the molecule polar because parts of it are not sharing their electrons equally? Will that molecule mix with water because it is polar or non-polar? What is the effect on the boiling point of those molecules based on their polarity? So many questions. So much excitement. Stay tuned, kids!

Objectives:

1. Identify the number of valence electrons in an atom.
2. Make a Lewis diagram of a molecule.
3. Make a space filling diagram of a molecule.
4. Name the geometry of a molecule based on its Lewis structure.
5. Determine the physical properties of a molecule based on its structure.

Reading: Zumdahl Chapter 11