

Introductory Topics | General Chemistry Review Learning Objectives

As you go through the introductory chapter in your OChem text, you should learn...

- 1) how to use the periodic table to determine:
 - A) which elements are more electronegative than others.
 - B) which elements are larger than others.
 - C) which elements are more polarizable than others.
 - D) which atoms are better off with negative charges than others.
 - E) which atoms are better off with positive charges than others.
 - F) how many valence shell electrons an atom has.
 - G) whether a bond is polar, nonpolar or somewhere in between.

Note: you will need to use these determinations to explain chemical phenomena such as bond length, bond strength, etc.
- 2) how to draw orbital energy diagrams for pure elements, hypothetical hybridized atoms, and molecules.
- 3) how to place electrons into any set of orbitals (atomic, hybridized, or molecular) in any energy diagram.
- 4) how to quickly draw Lewis structures of any molecule or molecular ion.
- 5) whether a Lewis structure possesses any resonance structures, regardless of how unstable it is.
- 6) how to judge whether a resonance structure is relevant or not to a particular question or situation.
- 7) how to determine the relative stability of any set of resonance structures.
- 8) how to determine the charge of any given atom in a molecule or ion.
- 9) the common organic chemistry exceptions to the octet rule (B, Al, P, S).
- 10) how to instantly visualize or draw the functional groups we covered in class.
- 11) how to determine the hybridization of any given atom in a molecule or ion.
- 12) how to draw the orbital picture around any given atom in a molecule or ion such that:
 - A) you know the overall shape of a molecule (or at least can draw it accurately).
 - B) you know what orbitals (hybrid or otherwise) make up each bond.
 - C) you know the orbitals in which nonbonded electrons reside.
 - D) you can determine whether a molecule is overall polar or nonpolar.
 - E) you know whether bond angles are deformed from ideality.
- 13) which charges attract and lead to (mostly) stable situations.
- 14) which charges repel and lead to (mostly) unstable situations.
- 15) what nodes are and what they mean when referring to orbitals.
- 16) the significance of phase when discussing orbitals by understanding which phases attract and which phases repel in orbital interactions.
- 17) how to use arrows to show electron movement.
- 18) the different ways to describe a bond (e.g. as a graphic, as converging energy levels via MO theory, etc).
- 19) how VSEPR theory can be used to determine the optimal geometry about an atom.
- 20) how VSEPR theory can be violated because of other energetically favorable situations.
- 21) how bonds and bond rotations can affect the geometry of a molecule.