Reading guide and suggested problems for Chapter 3

Chapter 3: Simple Bonding Theory. This chapter is largely a review of material that has been covered in general chemistry including Lewis dot structures and VSEPR. Lewis dot structures and VSEPR provide a simple, straightforward approach to predicting molecular structure. These will serve as our foundation for thinking about bonding in molecules from a molecular orbital perspective (Ch 5).

Learning goals:
1) Derive Lewis dot structures, taking into account resonance, formal charge, and in some cases, expanded octets.
2) Predict the geometry of molecules based on their Lewis dot structures, taking into account the optimal positioning of lone pairs and bonding pairs (single and multiple bonds) of electrons.
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Suggested reading

3.1, 3.1.1, 3.1.2, 3.1.3: Lewis dot structures. These structures help us build our understanding of what molecules look like, though this treatment is less rigorous than a molecular orbital-based approach (covered in Chapter 5). The ability to quickly determine Lewis dot structures for a given molecule will be helpful in this course and should be review from your general chemistry course. Knowledge of resonance and formal charge and their contributions to these structures is expected.

3.2, 3.2.1, 3.2.2: Valence Shell Electron Pair Repulsion Theory. This theory helps us predict the shapes of molecules. You are responsible to know the different geometries expected for different steric numbers and know the bond angles for steric number 2-6. You should be able to predict to positioning of lone pairs and multiple bonds in these geometries and know qualitatively the effects of lone pairs and multiple bonds on bond angles in these.
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Suggested homework problems:
3.2, 3.3, 3.4, 3.5, 3.6, 3.13, 3.16, 3.17, 3.20: practice with Lewis structures

***3.8, 3.9, 3.10, 3.41, 3.42: Lewis structures and VSEPR shapes. Important to be able to properly draw the shapes! One exam question is guaranteed to be similar to these questions.