Chapter 10 Chemical Bonding II:

Molecular Shapes, Valence Bond Theory, and Molecular Orbital Theory

10.1 Artificial Sweeteners: Fooled by Molecular Shape

10.2 VSEPR Theory: The Five Basic Shapes

 Two Electron Groups: Linear Geometry

 Three Electron Groups: Trigonal Planar Geometry

 Four Electron Groups: Tetrahedral Geometry

 Five Electron Groups: Trigonal Bipyramidal Geometry

 Six Electron Groups: Octahedral Geometry

10.3 VSEPR Theory: The Effect of Lone Pairs

 Four Electron Groups with Lone Pairs

 Five Electron Groups with Lone Pairs

 Six Electron Groups with Lone Pairs

10.4 VSEPR Theory: Predicting Molecular Geometries

 Representing Molecular Geometries on Paper

 Predicting the Shapes of Larger Molecules

10.5 Molecular Shape and Polarity

 Vector Addition

 Chemistry in Your Day: How Soap Works

10.6 Valence Bond Theory: Orbital Overlap as a Chemical Bond

10.7 Valence Bond Theory: Hybridization of Atomic Orbitals

 sp[Sup(3)] Hybridization

 sp[Sup(2)] Hybridization and Double Bonds

 Chemistry in Your Day: The Chemistry of Vision

 sp Hybridization and Triple Bonds

 sp[Sup(3)]d and sp[Sup(3)]d[Sup(2)] Hybridization

 Writing Hybridization and Bonding Schemes

10.8 Molecular Orbital Theory: Electron Delocalization

 Linear Combination of Atomic Orbitals (LCAOs)

 Period Two Homonuclear Diatomic Molecules

 Second-Period Heteronuclear Diatomic Molecules

 Polyatomic Molecules

CHAPTER IN REVIEW: Self-Assessment Quiz

 Key Terms

 Key Concepts

 Key Equations and Relationships

 Key Learning Outcomes

 EXERCISES: Review Questions

 Problems by Topic

 Cumulative Problems

 Challenge Problems

 Conceptual Problems

 Questions for Group Work

 Data Interpretation and Analysis

 Answers to Conceptual Connections