1: Electronic Structure and Covalent Bonding

- 1.1: The Structure of an Atom
- 1.2: How Electrons in an Atom are Distributed
- 1.3: Ionic and Covalent Bonds
- 1.4: How the Structure of a Compound is Represented
- 1.5: Atomic Orbitals
- 1.6: How atoms form Covalent Bonds
- 1.7: How Single Bonds Are Formed in Organic Compounds
- 1.8: How a Double Bond is Formed- The Bonds in Ethene
- 1.9: How a Triple Bond is Formed- The Bonds in Ethyne
- 1.10: Bonding in the Methyl Cation, the Methyl Radical, and the Methyl Anion
- 1.11: The Bonds in Water
- 1.12: The Bonds in Ammonia and in the Ammonium Ion
- 1.13: The Bond in a Hydrogen Halide
- 1.14: Summary- Hybridization, Bond Lengths, Bond Strengths, and Bond Angles
- 1.15: The Dipole Moments of Molecules
- 1.16: An Introduction to Acids and Bases
- 1.17: pka and pH
- 1.18: 1.18 Organic Acids and Bases
- 1.19: How to Predict the Outcome of an Acid-Base Reaction
- 1.20: How to Determine the Position of Equilibrium
- 1.21: How the Structure of an Acid Affects its pka Value
- 1.22: How Substituents Affect the Strength of an Acid
- 1.23: An Introduction to Delocalized Electrons
- 1.24: A Summary of the Factors that Determine Acid Strength
- 1.25: How pH Affects the Structure of an Organic Compound
- 1.26: Buffer Solutions
1.27: Lewis Acids and Bases

2: Acids and Bases
- 2.1: An Introduction to Acids and Bases
- 2.2: pK_a and pH
- 2.3: Organic Acids and Bases
- 2.4: How to Predict the Outcome of an Acid-Base Reaction
- 2.5: How to Determine the Position of Equilibrium
- 2.6: How the Structure of an Acid Affects its pK_a Value
- 2.7: How pH Affects the Structure of an Organic Compound
- 2.8: Buffer Solutions
- 2.9: Lewis Acids and Bases

3: An Introduction to Organic Compounds- Nomenclature, Physical Properties, and Representation of Structure
- 3.1: How Alkyl Substituents Are Named
- 3.2: The Nomenclature of Alkanes
- 3.3: The Nomenclature of Cycloalkanes • Skeletal Structures
- 3.4: The Nomenclature of Alkyl Halides
- 3.5: The Structures of Alkyl Halides, Alcohols, Ethers, and Amines
- 3.6: The Physical Properties of Alkanes, Alkyl Halides, Alcohols, Ethers, and Amines
- 3.7: Rotation Occurs About Carbon-Carbon Single Bonds
- 3.8: Some Cycloalkanes Have Angle Strain
- 3.9: Conformers of Cyclohexane
- 3.10: Conformers of Monosubstituted Cyclohexanes
- 3.11: Conformers of Disubstituted Cyclohexanes
- 3.12: Fused Cyclohexane Rings

4: Alkenes- Structure, Nomenclature, and an Introduction to Reactivity
- 4.1: Molecular Formulas and the Degree of Unsaturation
- 4.2: The Nomenclature of Alkenes
- 4.3: The Structures of Alkenes
- 4.4: Alkenes Can Have Cis and Trans Isomers
4.5: Naming Alkenes Using the E,Z System
4.6: How Alkenes React (Curved Arrows Show the Flow of Electrons)
4.7: A Reaction Coordinate Diagram Describes the Energy Changes That Take Place During a Reaction

5: The Reactions of Alkenes and Alkynes- An Introduction to Multistep Synthesis

5.1: The Addition of a Hydrogen Halide to an Alkene
5.2: Carbocation Stability Depends on the Number of Alkyl Groups Attached to the Positively Charged Carbon
5.3: Electrophilic Addition Reactions Are Regioselective
5.4: The Addition of Water to an Alkene
5.5: The Addition of an Alcohol to an Alkene
5.6: The Nomenclature of Alkynes
5.7: The Structure of Alkynes
5.8: The Physical Properties of Unsaturated Hydrocarbons
5.9: The Addition of Hydrogen Halides and Addition of Halogens to an Alkyne
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5.11: A Hydrogen Bonded to an sp Carbon is “Acidic”
5.12: Synthesis Using Acetylide Ions
5.13: An Introduction to Multistep Synthesis

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6.2: A Chiral Object Has a Nonsuperimposable Mirror Image
6.3: An Asymmetric Center Is a Cause of Chirality in a Molecule
6.4: Isomers with One Asymmetric Center
6.5: Asymmetric Centers and Stereocenters
6.6: How to Draw Enantiomers
6.7: Naming Enantiomers by the R,S System
6.8: Chiral Compounds Are Optically Active
6.9: How Specific Rotation is Measured
6.10: Enantiomeric Excess
6.11: Isomers with More than One Asymmetric Center
6.12: Meso Compounds Have Asymmetric Centers but Are Optically Inactive
6.13: How to Name Isomers with More than One Asymmetric Center
6.14: Reactions of Compounds that Contain an Asymmetric Center

- 6.15: Using Reactions that Do Not Break Bonds to an Asymmetric Center to Determine Relative Configurations
- 6.16: How Enantiomers Can Be Separated
- 6.17: Nitrogen and Phosphorus Atoms Can Be Asymmetric Centers
- 6.18: Stereochemistry of Reactions- Regioselective, Stereoselective, and Stereospecific Reactions
- 6.19: The Stereochemistry of Electrophilic addition Reactions of Alkenes
- 6.20: The Stereochemistry of Enzyme-Catalyzed Reactions
- 6.21: Enantiomers Can Be Distinguished by Biological Molecules

- 7: Delocalized Electrons and Their Effect on Stability, Reactivity, and pKa (Ultraviolet and Visible Spectroscopy)
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  - 7.1: Delocalized Electrons Explain Benzene’s Structure
  - 7.2: The Bonding in Benzene
  - 7.3: Resonance Contributors and the Resonance Hybrid
  - 7.4: How to Draw Resonance Contributors
  - 7.5: The Predicted Stabilities of Resonance Contributors
  - 7.6: Delocalized Energy Is the Additional Stability Delocalized Electrons Give to a Compound
  - 7.7: Examples That Show How Delocalized Electrons Affect Stability
  - 7.8: A Molecular Orbital Description of Stability
  - 7.9: How Delocalized Electrons Affect pKa Values
  - 7.10: Delocalized Electrons Can Affect the Product of a Reaction
  - 7.11: Thermodynamic Versus Kinetic Control of Reactions
  - 7.12: The Diels-Adler Reaction Is a 1,4-Addition Reaction

- 8: Aromaticity- Reactions of Benzene and Substituted Benzenes
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  - 8.1: The Two Criteria for Aromaticity
  - 8.2: Applying the Criteria for Aromaticity
  - 8.3: Aromatic Heterocyclic Compounds
  - 8.4: The Nomenclature of Monosubstituted Benzenes
  - 8.5: How Benzene Reacts
  - 8.6: The General Mechanism for Electrophilic Aromatic Substitution Reactions
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- 9: Substitution and Elimination Reactions of Alkyl Halides
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  - 9.3: Factors That Affect \( S_N2 \) Reactions
  - 9.4: The Mechanism for an \( S_N1 \) Reaction
  - 9.5: Factors That Affect \( S_N1 \) Reactions
  - 9.6: Comparing the \( S_N2 \) and \( S_N1 \) Reactions of Alkyl Halides
  - 9.7: Elimination Reaction of Alkyl Halides
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  - 9.9: Comparing the E2 and E1 Reactions of Alkyl Halides
  - 9.10: Does an Alkyl Halide Undergo SN2, E2 Reactions or SN1 Reactions?
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- 10: The Chemistry of Nucleic Acids
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  - 10.2: Nucleic Acids Are Composed of Nucleotide Subunits
  - 10.3: Why DNA Does Not Have A 2'-OH Group
  - 10.4: The Biosynthesis of DNA is Called Replication
  - 10.5: DNA and Heredity
  - 10.6: The Biosynthesis of RNA is Called Transcription
  - 10.7: There Are Three Kinds of RNA
  - 10.8: The Biosynthesis of Proteins Is Called Translation
  - 10.9: Why DNA Contains Thymine Instead of Uracil
10.10: How the Base Sequence of DNA Is Determined
10.11: The Polymerase Chain Reaction (PCR)
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11: The Organic Chemistry of Drugs- Discovery and Design
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11.3: Molecular Modification
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11.9: Antiviral Drugs
11.10: Economics of Drugs (Governmental Regulations)