

Module 02: Chemistry of Life — Keys to Success

Key Learning Objectives

1. Atomic Structure and Elements

- Describe the structure of an atom (protons, neutrons, electrons)
- Identify biologically important elements (C, H, O, N, P, S)
- Explain the significance of atomic number and mass number
- Define isotopes and their biological applications

2. Chemical Bonding

- Differentiate between ionic, covalent, and hydrogen bonds
- Explain how electronegativity influences bond formation
- Describe polar vs. nonpolar covalent bonds
- Understand the importance of weak bonds in biological systems

3. Properties of Water

- Explain water's unique properties (cohesion, adhesion, high specific heat, solvent properties, density of ice)
- Describe how hydrogen bonding creates these properties
- Explain why water is essential for life

4. Acids, Bases, and pH

- Define acids, bases, and the pH scale
- Explain how buffers maintain pH stability
- Describe the importance of pH in biological systems

5. Organic Chemistry Basics

- Distinguish between organic and inorganic compounds

- Identify the role of carbon in forming diverse molecules
 - Understand functional groups and their properties (hydroxyl, carboxyl, amino, phosphate)
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Study Tips

1. **Draw atomic models** to visualize electron arrangements
2. **Create diagrams** showing different types of chemical bonds
3. **Conduct simple experiments** to observe water's properties
4. **Practice pH calculations** and buffer problems
5. **Use molecular models** to understand 3D structures