CHAPTER 8
AN INTRODUCTION TO METABOLISM

Learning objectives:

Metabolism, Energy, and Life

1. Explain the role of catabolic and anabolic pathways in cellular metabolism.
2. Distinguish between kinetic and potential energy.
3. Distinguish between exergonic and endergonic reactions in terms of available energy change.
4. List the three main kinds of cellular work and provide examples of each. Explain in general terms how cells obtain the energy to do cellular work.
5. Describe the structure of ATP and identify the major class of macromolecules to which ATP belongs.
6. Explain how ATP performs cellular work.

Protein Enzymes Regulate Metabolic Pathways

7. Describe the function of enzymes in biological systems.
8. Explain how enzyme structure determines enzyme specificity.
9. Explain the induced-fit model of enzyme function.
10. Describe the mechanisms by which enzymes lower activation energy.
11. Explain how substrate concentration affects the rate of an enzyme-catalyzed reaction.
12. Explain how temperature, pH, cofactors, and enzyme inhibitors can affect enzyme activity.
13. Distinguish between a competitive and noncompetitive inhibitor.

The Control of Metabolism

14. Describe how allosteric regulators may inhibit or stimulate the activity of an enzyme.
15. Explain how the binding of oxygen to hemoglobin illustrates cooperativity.
16. Explain how feedback inhibition prevents a cell from wasting chemical resources.
17. Describe how localization of enzymes within a cell may help order metabolism.