An Introduction to Metabolism
Chapter 8

1. Define the terms metabolic, catabolic, and anabolic.
2. Use the second law of thermodynamics to explain the diffusion of a molecule across a membrane.
3. Although cells might seem to violate the second law of thermodynamics, explain how, in reality, they don't.
4. What is free energy?
5. What makes a process spontaneous?
6. Explain exergonic and endergonic reactions in terms of free energy.
7. Why do cells try to avoid metabolic equilibrium?
8. Describe the structure of ATP.
9. How is ATP used by cells to do work?
10. What is energy coupling? Provide an example.
11. What about the structure of ATP makes it useful as an energy currency?
12. How is ATP regenerated?
13. Draw a graph which shows both the change in free energy as a non-catalyzed reaction proceeds as well as that for an enzyme-catalyzed reaction.
14. At first, the rate of an enzyme-catalyzed reaction increases with increasing substrate concentration but, eventually, the reaction rate no longer increases. Explain.
15. Why do enzymes act only on specific substrates?
16. What is energy of activation and what does it have to do with chemical reactions?
17. Give a couple of ways enzymes lower the activation energy of a reaction.
18. Briefly explain the effect of both temperature and pH on enzyme activity.
19. What is the difference between competitive and noncompetitive inhibition?
20. Describe allosteric regulation, cooperativity, and feedback inhibition.