

Unit 2 Study Guide, BIOL 180, Fall 2015

Use this as a **study aid only**. This is intended to get you thinking about the major lecture topics. Do not assume exam questions will be limited to the material seen here.

1. What is energy? Why is energy important for organisms? Differentiate between kinetic energy and potential energy. Be able to give examples of kinetic and potential energy. What is the First Law of Thermodynamics?
2. What is entropy? What is the Second Law of Thermodynamics? Explain the highly-ordered structure of an organism with respect to the Second Law of Thermodynamics.
3. Differentiate between an exergonic reaction and an endergonic reaction. Relate this to the laws of thermodynamics, and be able to give examples of exergonic and endergonic reactions.
4. What is the major form of energy used in a cell?
5. Why is transport important in organisms? Differentiate between active and passive forms of transport. Know: diffusion, facilitated diffusion, osmosis, membrane pumps, exocytosis, and endocytosis. Is each active or passive transport? Also know: concentration gradient, vesicles.
6. Define the terms isotonic, hypertonic, and hypotonic. Explain the net movement of water into or out of a cell placed into a solution of each of these. Explain how a cell wall can be important with respect to water movement. Also know: semipermeable membrane, osmoregulation.
7. What is an enzyme? Why are enzymes important? Explain how enzymes alter the process of a biological reaction. Are energetics changed? Also know: energy of activation, substrate, and active site.
8. What is respiration? What are the purposes of respiration?
9. What is energy? Describe some of the major energy measures used in dietetics. What is a calorie? How does it differ from a Calorie?
10. What is the role of ATP and NADH in respiration?
11. What are the three major phases of respiration? Where in the cell does each occur? Understand the structure of a mitochondrion and how this structure relates to aerobic respiration.
12. What is glycolysis? Where does it occur in the cell? What are the necessary inputs for glycolysis? What is produced by glycolysis? Is oxygen required for glycolysis?

13. What is the citric acid cycle (Krebs cycle)? Where does it occur in the cell? What are the necessary inputs for the citric acid cycle? What is produced by the citric acid cycle? Is oxygen required for the citric acid cycle?
14. What is oxidative phosphorylation? Where does it occur in the cell? What are the necessary inputs for oxidative phosphorylation? What is produced by oxidative phosphorylation? Is oxygen required for oxidative phosphorylation?
15. What happens to respiration in the absence of oxygen? Which of the above phases are affected? Understand the energetics involved with aerobic metabolism and how it compares to anaerobic metabolism.
16. What is fermentation? What is the purpose of fermentation? Where does it occur in the cell? What are the necessary inputs for fermentation? What is produced by lactic acid fermentation? What is produced by ethanol fermentation?
17. What is photosynthesis? Where does photosynthesis occur in cells? Why is photosynthesis important? Know: autotroph and heterotroph. Know that photosynthesis is divided into two major phases. What are they?
18. Understand the structure of a chloroplast, and be able to draw a diagram and label the parts. Know: inner and outer membranes, stroma, thylakoid, granum. Where in the chloroplast do the various parts of photosynthesis occur?
19. What is the role of ATP and NADPH in photosynthesis?
20. What are pigments? What is their role in photosynthesis? What types of pigments are involved in photosynthesis in plants?
21. What are stomates? What is their role in plant function? How are they related to photosynthesis?
22. Understand the basic nature of light. What are its wave properties? Is higher energy associated with shorter or longer wavelengths? What wavelengths of light are useful for driving photosynthesis? What is a "particle" of light called?
23. What are the inputs and outputs from the light reactions? Where in the chloroplast do the light reactions occur? What is produced by the light reactions? What are photosystems? What is photolysis? What is photophosphorylation?
24. What are the inputs and outputs from the Calvin Cycle (the carbon reactions)? Where in the chloroplast does the Calvin Cycle occur? What is RuBP? What is rubisco? What is 3-PGA? What is G3P?