**BI-102 Learning Objectives – Chapter 7: Energy Harvest**

**Fall '08**

1. Be able to explain why photosynthesis is so important to essentially **all** life on earth.
2. Be able to define the terms autotroph and heterotrph and give an example of each.
3. Be able to recognize and compare and contrast the processes of aerobic and anaerobic respiration.
4. Be able to describe the role of NAD+/NADH in cellular respiration.
5. Be able to explain what the electron transport chain and catabolic reactions in general tend to occur in multiple small steps and as opposed to single large ones.
6. Be able to write the overall chemical reaction (including the number of ATP’s typically produced) for aerobic respiration.
7. Be able to name or describe two general ways in which cells produce ATP from the catabolism of organic molecules.
8. Be able to explain in some detail why ATP is often called the energy currency of cells.
9. Be able to describe the two major steps in glucose catabolism and where each occurs in typical eukaryotic cells. In this case, I count pyruvate oxidation, the Krebs cycle and electron transport as a single step.
10. Be able to explain why NAD+ must be regenerated in order for glycolysis to continue.
11. Be able to briefly describe the processes of pyruvate oxidation with emphasis on their inputs and outputs.
12. Be able to explain in some detail the importance of acetyl-CoA in metabolism.
13. Be able to describe the Krebs cycle in terms of what enters it and what it produces.
14. Be able to state specifically where the Krebs cycle reactions occur.
15. Be able to name two important “electron carriers” in cells.
16. Be able to describe the operation of the electron transport chain with emphasis on its inputs and outputs.
17. Be able to describe (probably using a sketch) the so called chemiosmotic process of ATP generation. Be sure to include the role of the pH (hydrogen ion) gradient.
18. Be able to explain how and why the chemical reactions of aerobic metabolism are controlled.
19. Be able to describe the circumstances under which cells use fermentation and why they need to use it.
20. Be able to name 2 possible inorganic anaerobic respiration electron acceptors.

1. Be able to name two common organic products of fermentation.
2. Be able to state weather or not molecules other than glucose can enter the catabolic pathways.
3. Be able to state what happens to the nitrogen in excess protein.
4. Be able to state what type of molecule the term β-oxidation applies to.
5. Be able to state what produces more ATP, the catabolism of a gram of fat or a gram of glucose.
6. Be able to speculate regarding why all cells can use glycolysis.
7. Be able to name or describe 3 of the 6 major metabolic innovations discussed in your textbook.