

## Study Questions for Bio. Sci. 10 from the Text

### Chapter 6

1. What are potential and kinetic energy? What is an example of mechanical energy? What is an example of chemical energy?
2. What is the "First Law of Thermodynamics?" What is the "Second Law of Thermodynamics?" What is entropy? How do "order" and "disorder" relate to the Second Law of Thermodynamics?
3. Define exergonic and endergonic reactions. What is a coupled reaction?
4. What is the name of the "energy currency molecule?" Use 3 letters for its name. How is ADP produced? How does ATP function? Can you describe Fig. 6.6 in your own words?
5. What kind of chemical are enzymes? How do they function?
6. What is a substrate? How can you define a "metabolic pathway?"
7. How are enzymes related to the "activation energy" of a chemical reaction?
8. What is the general word covering enzymes and other substances that act in the same way?
9. What is an "active site?" Many vitamins are transformed into what in an enzymatic reaction?
10. Can you say in your own words how chymotrypsin works? See Fig. 6.10.
11. Regulation of enzymatic activity can occur in several ways: name 2 in addition to allosteric regulation. What is "allosteric regulation?"

### Chapter 7

1. Can you put into your own words the paragraph 7.1?
2. In the account of electrons "falling down" the energy hill, what does the "uphill" part accomplish? What is the role of oxygen in this activity?
3. Why isn't there just one step in the transfer of energy from food to ATP?
4. With regards to electrons, how are oxidation and reduction defined?
5. What are electron carriers? What are the first-letter initials of the most important electron carrier? What does it mean to refer to it as "empty" or as "loaded?" How does the electron carrier get "unloaded?"
6. What are the 3 stages of cellular respiration? Is this kind of "respiration" the same as breathing? Which one of the 3 yields the most ATP?
7. Overall, how much ATP does the breakdown of 1 molecule of glucose yield?
8. How are the stages of cellular respiration related? That is, which is first, second, and third?
9. Why is glycolysis probably a more ancient form of energy harvesting?
10. What 3 things does glycolysis accomplish in energy harvesting? What does USING some ATP at the start of glycolysis accomplish?
11. How is energy harvesting ending at glycolysis put to use by humans?
12. Where in a cell does glycolysis take place? Where in a cell does the Krebs Cycle take place?

13. Between glycolysis and the Krebs Cycle there is a step, what are the 3 products of this step?
14. Why is the Krebs Cycle called a "cycle?" What are the 3 energy rich molecules that come from the Cycle?
15. Where is the electron transport chain located? Electron transfer from carrier to carrier pumps hydrogen ions, from where to where? Is this with or against the hydrogen ion concentration? Then what happens to the hydrogen ions? What is ATP synthase?
16. Can a human depend on glycolysis alone for adequate ATP formation?
17. How many ATP molecules can one NADH molecule produce? How many NADH molecules come from one molecule of glucose? How many FADH<sub>2</sub> molecules can come from one molecule of glucose?
18. At the end of the ETC, what is oxygen's role? What does it produce?
19. Can molecules other than glucose be utilized for energy? How?

END.