Name _____

AP Biology Chapter 8 - An Introduction to Metabolism

Guided Reading Assignment Campbell's 10th Edition

Essential Content

2.A.1 All living systems require constant input of free energy 4.B.1 Interactions between molecules affect their structure and function

LO 2.1 The student is able to explain how biological systems use free energy based on empirical data that all organisms require constant energy input to maintain organization, to grow, and to reproduce. LO 2.2 The student is able to justify a scientific claim that free energy is required for living systems to maintain organization, to grow, or to reproduce, but that multiple strategies for obtaining and using energy exist in different living systems.

- 1. Contrast the catabolic and anabolic pathways.
- Define the following terms: these terms and concepts are critical a. Energy
 - b. Kinetic energy
 - c. Heat/thermal energy
 - d. Chemical energy
 - e. Thermodynamics
 - f. First Law of Thermodynamics
 - g. Second Law of Thermodynamics
 - h. Free Energy
- 3. Contrast exergonic and endergonic reactions in terms of: free energy, stability, capacity to do work.

Free energy stability capacity to do work exergonic

endergonic

- 4. How do you know if a reaction is spontaneous?
- 5. Can a closed system at equilibrium do work? Why or why not?
- 6. List and give an example of the three main kinds of cellular work done by ATP.



- 9. In your own works, explained the concept of coupled reactions and ATP doing work.
- 10. What is the relationship between exergonic reactions, endergonic reactions and the use and regeneration of ATP?
- 11. What is activation energy?



12. Label the diagrams below including the change in free energy.

- 13. Define the following terms:
 - a. Substrate
 - b. Enzyme substrate complex
 - c. Active site
 - d. Induced fit
- 14. Label the diagram:
- 15. How do temperate and pH (specifically) affect enzyme activity?
- 16. Compare and contrast competitive and noncompetitive inhibitors.
- 17. What is allosteric regulation and how does assist in the regulation of metabolism?
- 18. What is cooperativity?
- 19. How does feedback inhibition work?

