Name _____

AP Biology
Chapter 9 - Cellular Respiration and Fermentation

Guided Reading Assignment Campbell's 10th Edition

Essential Knowledge
2.A.1 All living systems require constant input of free energy
2.A.2 Organisms capture and store free energy for use in biological processes

LO 2.4 The student is able to use representations to pose scientific questions about what mechanisms and structural features allow organisms to capture, store and use free energy
LO 2.5 The student is able to construct explanations of the mechanisms and structural features of cells that allow organisms to capture, store or use free energy.
LO 2.41 The student is able to evaluate data to show the relationship between photosynthesis and respiration in the flow of free energy through a system.

1. Define the two catabolic pathways:
   a. Fermentation

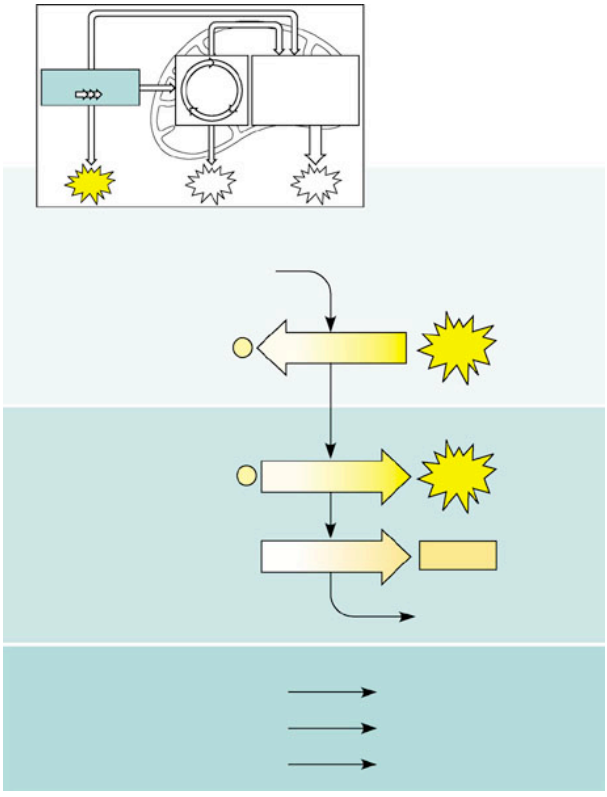
   b. Cellular respiration

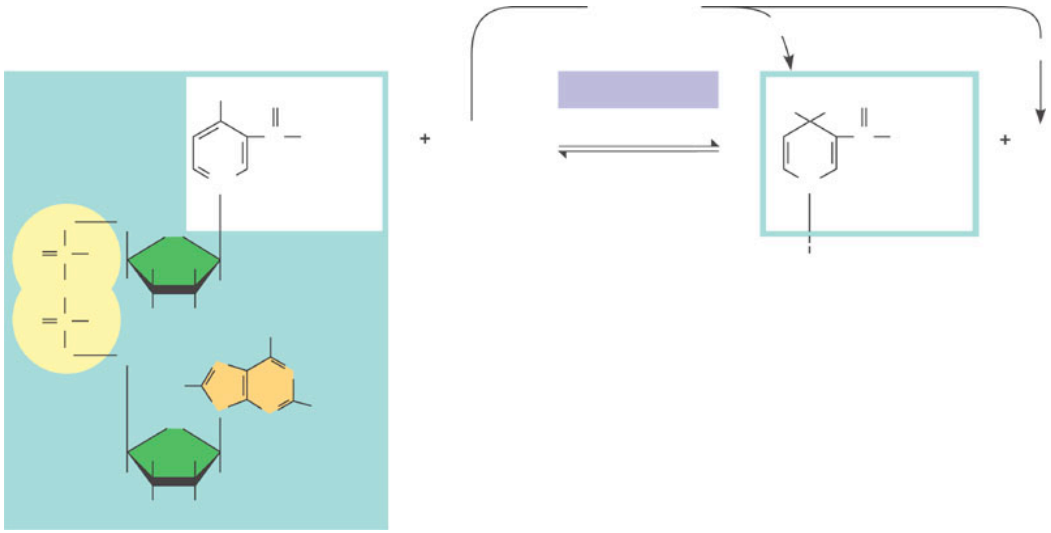
2. Use the following terms correctly in a sentence: redox reactions, oxidation, reduction, reducing agent and oxidizing agent.

3. Why is being "reduced" equivalent to having a greater potential energy?

4. In cellular respiration, what is being oxidized and what is being reduced?

5. Label the diagram of the electron movement with regard to the coenzyme NAD+.





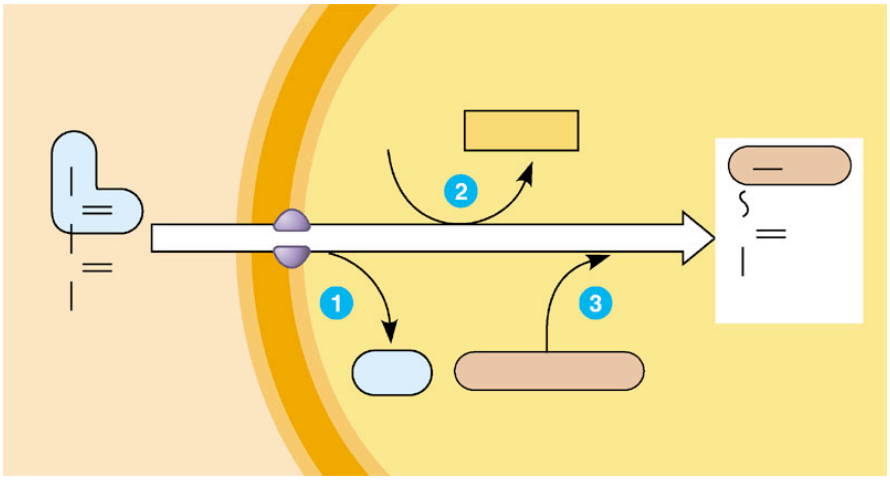
6. Why are electron transport chains an advantage to living systems?

7. What are the three stages of aerobic cellular respiration?

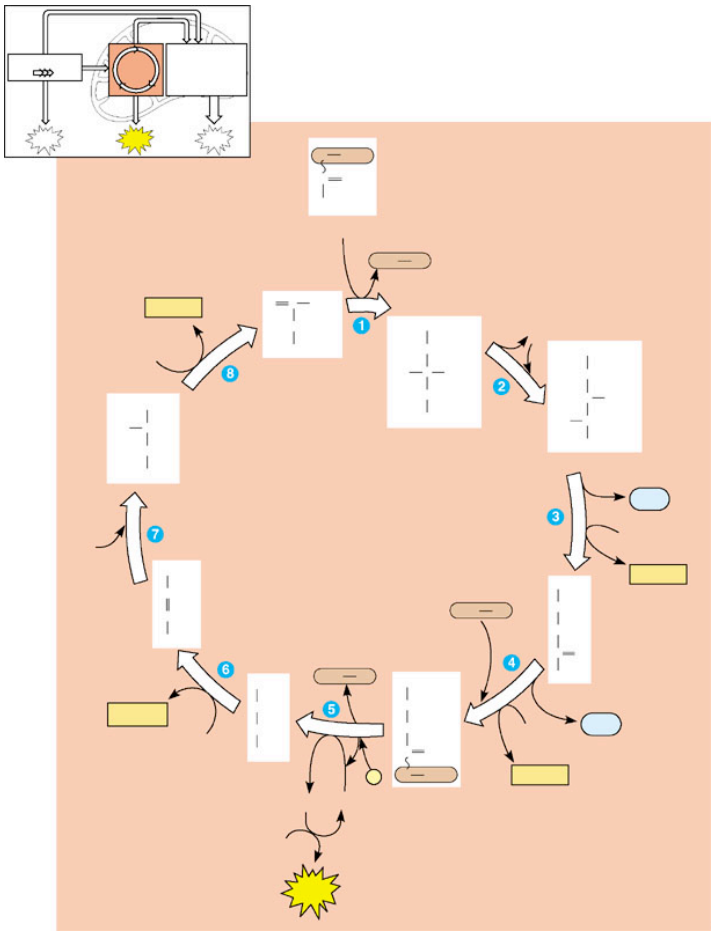
8. What is substrate-level phosphorylation?

9. Complete the chart re: glycolysis

10. Label the transition reaction converting pyruvate to acetyl coA:



11. Label the citric acid cycle:



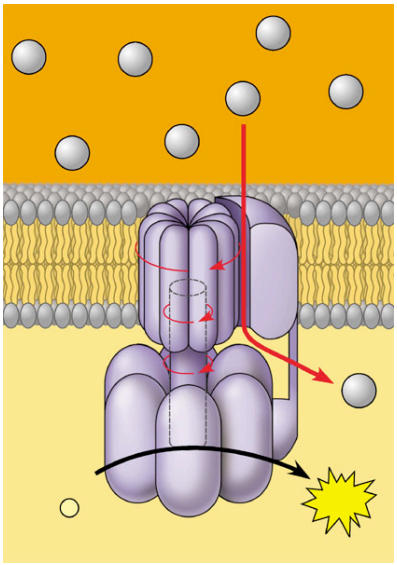
a. Where does the C “go” that is removed?

b. What is happening when NAD+ → NADH + H+?

c. Where is substrate level phosphorylation happening?

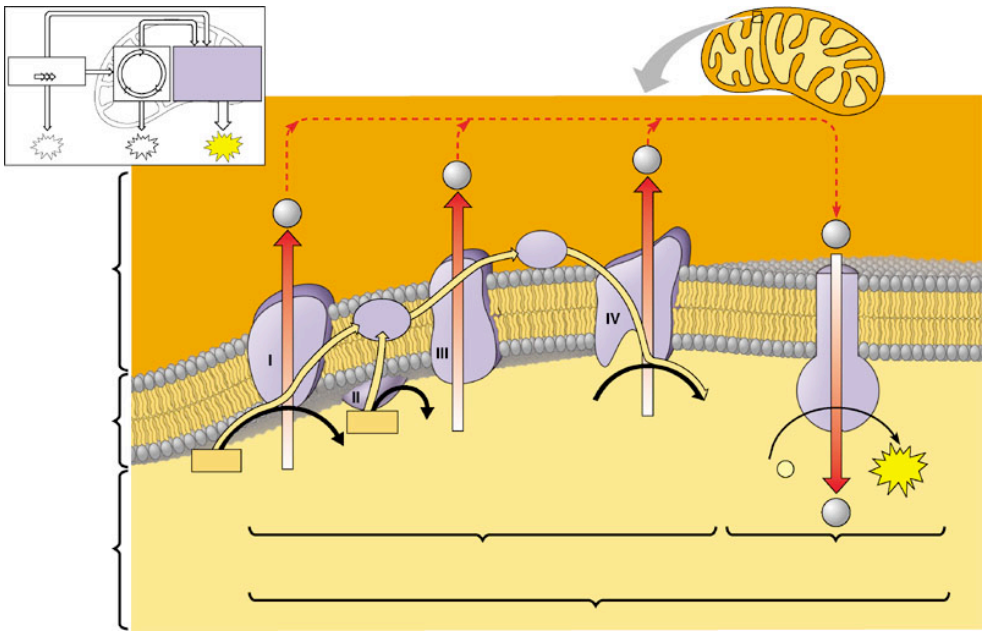
12. What is oxidative phosphorylation?

13. What are cytochromes?

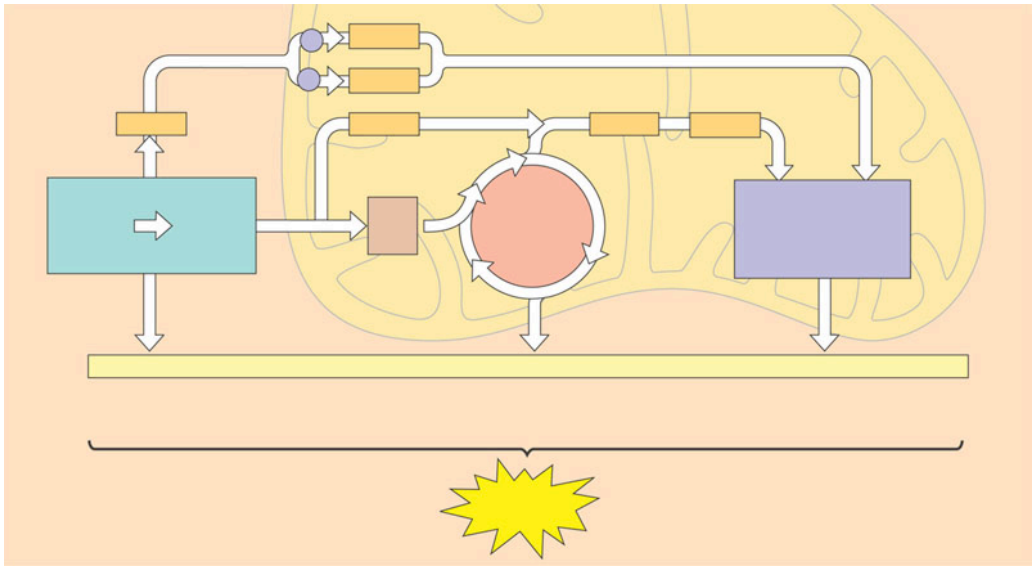


14. Define chemiosmosis and label the diagram:

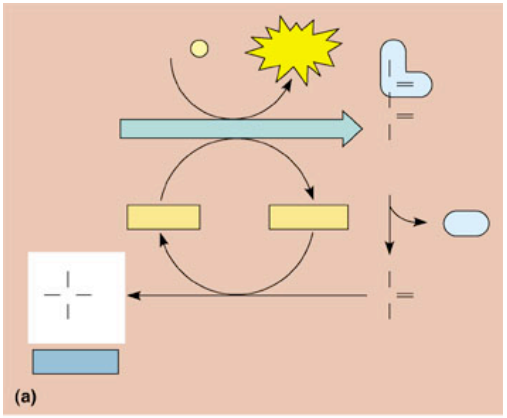
15. Label the diagram below of the activities occurring on the ECT.

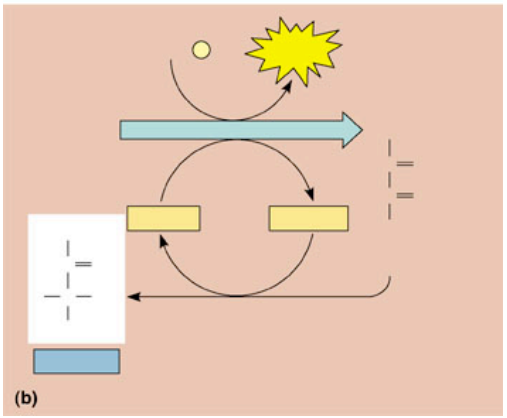


16. Complete the summary diagram of cellular respiration. You are responsible for these #'s and locations!



17. Label the diagram of fermentation:





18. Does aerobic cellular respiration happen in prokaryotic organisms – if yes – where?

19. What is the overall purpose of fermentation? Why does it have to occur?

20. What is a facultative anaerobe?

21. What is the evolutionary significance of glycolysis?

22. Why do fats provide a little more than twice as many calories per gram as compared to carbohydrates or proteins? Hint: Think of the output of the Citric Acid Cycle.

23. Why would AMP stimulate cellular respiration and ATP inhibit it?

24. Why would phosphofructokinase being allosteric in character be an advantage to the control of cellular respiration?