

Name _____

Period _____

AP Biology

Date _____

RAVEN CHAPTER 9 GUIDED NOTES: HOW CELLS HARVEST ENERGY

1. Define the following terms

a. autotrophs _____

b. heterotrophs _____

c. digestion _____

d. catabolism _____

e. aerobic respiration _____

f. anaerobic respiration _____

g. fermentation _____

2. In what bonds is the chemical energy stored in fats and in carbohydrates?

3. How is energy stored in chemical bonds?

4. Identify some activities the cell uses ATP for.

5. Explain why ATP is such a “high energy” molecule.

6. How does ATP drive endergonic reactions? How does ATP function in “coupled reactions”?

7. Explain how ATP synthase produces ATP.

8. Briefly distinguish between the two methods of producing ATP in respiration:

a. substrate-level phosphorylation _____

b. aerobic respiration _____

9. List the four stages of cellular respiration:

a. _____

b. _____

c. _____

d. _____

10. List two classes of prokaryotes that utilize anaerobic respiration and explain what molecules they use as electron acceptors (instead of oxygen).

a. _____

b. _____

11. **STAGE 1: Glycolysis**

- a. occurs where? _____
- b. starts with? _____
- c. produces? _____
- d. yields how much ATP? _____
- e. produces ATP through what process? _____

12. Why is glycolysis thought to be one of the earliest of all biochemical processes to have evolved?

13. **STAGE 2: Oxidation of Pyruvate**

- a. occurs where? _____
- b. starts with? _____
- c. produces? _____
- d. yields how much ATP? _____

14. If the body has enough ATP, what is the fate of acetyl-CoA?

15. **STAGE 3: The Krebs Cycle**

- a. occurs where? _____
- b. starts with? _____
- c. produces? _____
- d. yields how much ATP? _____
- e. produces ATP through what process? _____

16. What is the major function of the Krebs cycle?

17. Define each of the following:

a. oxidation _____

b. reduction _____

18. What are the roles of NAD^+ & FAD^{+2} in respiration?

19. **STAGE 4: The Electron Transport Chain**

a. occurs where? _____

b. starts with? _____

c. produces? _____

d. yields how much ATP? _____

e. produces ATP through what process? _____

20. What is the final electron acceptor in the Electron Transport Chain?

21. Describe the role of the Electron Transport Chain. What happens to the electrons and H^+ ?

22. What is chemiosmosis and how is it generated?

23. Explain why respiration is considered exergonic.

24. What is the main reason energy is harvested in stages in respiration

25. What happens to most of the energy released during cell respiration?

26. What is the theoretical ATP yield of aerobic respiration? ...the actual yield? Explain why they differ.

27. Identify examples of each of the following feedback mechanisms in aerobic respiration:

- a. negative feedback _____
- b. positive feedback _____

28. Write the summary equation for cellular respiration:

- a. Where did the glucose come from? Where did it go? _____
- b. Where did the O₂ come from? Where did it go? _____
- c. Where did the CO₂ come from? Where did it go? _____
- d. Where did the H₂O come from? _____
- e. Where did the ATP come from? _____
- f. What else is produced that is not listed in this equation? _____

31. **Fermentation**

a. Alcoholic fermentation converts glucose to _____

b. Alcoholic fermentation is utilized by what organisms? _____

c. Lactic acid fermentation converts glucose to _____

d. Lactic acid fermentation is utilized by what organisms? _____

32. **Big Picture Thought Questions**

a. Why do we eat? _____

b. Why do we breathe? _____
