



Cellular Respiration

Science Literacy Article Questions

ANSWER KEY

Short Answer

1. What four cell processes do all living cells need energy for? Breaking down food, cell reproduction, synthesizing organic molecules, actively transporting materials in and out of cell.
2. What is ATP and what does it provide? ATP is adenosine triphosphate and it provides energy in a form cells can use.
3. Describe the process of cellular respiration. Cellular respiration is the process where organisms use oxygen to break down the glucose in food to produce ATP energy, carbon dioxide, and water. Energy from organic molecules is converted to ATP energy.
4. Describe the process of glycolysis. Glycolysis breaks down glucose into 2 molecules of pyruvic acid, NADH, and 2 molecules of ATP.
5. What are two advantages of glycolysis? It is very fast at supplying ATP energy to cells and does not require oxygen.
6. What process occurs after glycolysis if oxygen is available for cellular respiration? Krebs Cycle
7. Describe what occurs during the Krebs Cycle. The products of pyruvic acid and NADH of glycolysis are converted to carbon dioxide, 2 molecules of ATP, and electron carriers.
8. What is the purpose of the electron transport chain? The electron transport chain transports high-energy electrons supplied by the Krebs Cycle to carrier molecules to convert ADP to ATP molecules.
9. If 10 glucose molecules enter the Krebs Cycle, how many possible molecules of ATP can be produced? Show your work. $10 \times 36 = 360$ molecules of ATP
10. What is the difference between aerobic respiration and anaerobic respiration? Which process creates the most ATP? Aerobic respiration takes place in the presence of oxygen, while anaerobic respiration takes place without oxygen present. Aerobic respiration produces the most ATP.
11. Summarize the process of lactic acid fermentation. The pyruvic acid produced during glycolysis is converted to alcohol, carbon dioxide, and NAD⁺. No carbon dioxide is produced.
12. What foods are made with lactic acid produced by prokaryotic bacteria? Yogurt, cheeses, buttermilk, sour cream, and pickles.
13. Why do you feel a sore burning sensation in your muscles when you exercise strenuously? The lactic acid byproduct of lactic acid fermentation builds up in muscle cells and causes this sensation.
14. Summarize the process of alcoholic fermentation. Pyruvic acid produced during glycolysis is converted to alcohol, carbon dioxide, and NAD⁺
15. What is yeast and why is it used for making bread? Yeast undergoes alcoholic fermentation when no oxygen is available. When used in breads, the yeast breaks down the sugar anaerobically and release carbon dioxide and alcohol. The carbon dioxide released in gas bubbles is what give bread its airy texture and the alcohol evaporates.

True or False

If the answer is true, write "T" for True on the line provided. If the answer is False, write the correct word that should go in the **bolded** section of the statement to make it True on the line provided.

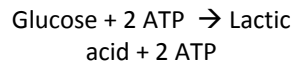
16. Without **carbon dioxide** and food, cells cannot create ATP to power life processes. _____ Oxygen _____
17. Yogurt, cheese, and other foods are produced through **alcoholic** fermentation. _____ Lactic acid _____
18. The majority of cellular respiration takes place in the **nucleus** of cells. _____ Mitochondria _____
19. Yeast is a type of **bacteria**. _____ Fungi _____
20. Anaerobic respiration creates **less** ATP energy than aerobic respiration. _____ True _____
21. **Fermentation** is always the first phase in cellular respiration. _____ Glycolysis _____
22. The Krebs Cycle and electron transport chain both take place in the **mitochondria**. _____ True _____
23. In the Krebs Cycle, pyruvic acid from glycolysis is used to make **oxygen**. _____ Carbon dioxide _____
24. Glycolysis takes place in the **mitochondria** of the cell. _____ Cytoplasm _____
25. Fermentation is a type of **anaerobic** respiration. _____ True _____
26. The gas released during **lactic acid** fermentation is carbon dioxide. _____ Alcoholic _____
27. If oxygen is not present, glycolysis is followed by **fermentation**. _____ True _____

Equations

28. Write the chemical equation for aerobic respiration below.



29. Write the chemical equation for lactic acid fermentation below.



30. Write the chemical equation for alcoholic fermentation below.

