Biology Ch 9 Cellular Respiration & Fermentation (9.1-9.2)

For Questions 1–10, complete each statement by writing the correct word or words.

1. A calorie is a unit of __________.
2. The Calorie used on food labels is equal to __________ calories.
3. A Calorie is also referred to as a __________.
4. Cells use the energy stored in chemical bonds of foods to produce compounds that directly power the cell’s activities, such as __________.
5. The equation that summarizes cellular respiration, using chemical formulas, is __________ ________
6. If cellular respiration took place in just one step, most of the __________ would be lost in the form of light and __________.
7. Cellular respiration begins with a pathway called __________, which takes place in the __________ of the cell.
8. At the end of glycolysis, about __________ percent of the chemical energy is locked in the bonds of the __________ molecule.
9. Cellular respiration continues in the __________ of the cell with the __________ and electron transport chain.
10. The pathways of cellular respiration that require oxygen are said to be __________. Pathways that do not require oxygen are said to be __________.
11. Complete the illustration by adding labels for the three main stages of cellular respiration.
For Questions 12–15, write True if the statement is true. If the statement is false, change the underlined word or words to make the statement true.

12. The energy flow in photosynthesis and cellular respiration occurs in the same direction.

13. Photosynthesis deposits energy in Earth’s “savings account” for living organisms.

14. Cellular respiration removes carbon dioxide from the air.

15. Photosynthesis takes place in nearly all life.

16. Complete the table comparing photosynthesis and cellular respiration.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Photosynthesis</th>
<th>Cellular Respiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of reactions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reactants</td>
<td></td>
<td></td>
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<tr>
<td>Products</td>
<td></td>
<td></td>
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</tbody>
</table>

17. How does an understanding of the process of cellular respiration support the theory that the cell is the basic functional unit of life?

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
18. Complete the diagram by writing on the lines provided the names and numbers of molecules used and produced during glycolysis.

\[ \text{Glucose} \rightarrow \text{ATP} \rightarrow \text{NAD}^+ \rightarrow \text{Pyruvic acid} \]

19. Why is it an investment for the cell to use two ATP at the beginning of glycolysis?

20. What are two advantages of glycolysis?

For Questions 21–24, write True if the statement is true. If the statement is false, change the underlined word or words to make the statement true.

21. The pyruvic acid produced in glycolysis enters the chloroplasts if oxygen is present in a cell.

22. In the matrix, pyruvic acid is converted to lactic acid before the Krebs cycle begins.

23. The compound that joins with a 4-carbon molecule in the Krebs cycle is called acetyl-CoA.

24. Carbon dioxide is the only product of the Krebs cycle that is not re-used or used in other stages of cellular respiration.
25. Complete the flow chart to show which of the Krebs cycle’s many products go on to the third stage of cellular respiration.

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Krebs Cycle  →  Electron Transport Chain
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For Questions 26–31, complete each statement by writing the correct word or words.

26. In eukaryotes, the electron transport chain is composed of a series of electron carriers located in the __________ of the mitochondrion.

27. In prokaryotes, the electron transport chain is in the __________.

28. __________ serves as the final electron acceptor of the electron transport chain.

29. __________ and __________ pass high-energy electrons to the electron transport chain.

30. The transfer of high-energy electrons down the electron transport chain causes __________ to be transported across the mitochondrial membrane.

31. ATP synthases produce the force needed to add one __________ to each ADP molecule by spinning when hydrogen ions flow through them.

32. How many ATP molecules per glucose molecule does a cell gain from each of the three stages of cellular respiration?

33. Besides glucose, what other kinds of molecules can be used to produce ATP in cellular respiration?

34. Why is cellular respiration considered an efficient process?

35. Where does the heat that warms your body come from? Explain your answer.
For Questions 1–6, write True if the statement is true. If the statement is false, change the underlined word or words to make the statement true.

1. Glycolysis provides the pyruvic acid molecules used in fermentation.

2. Fermentation allows glycolysis to continue by providing the NADPH needed to accept high-energy electrons.

3. Fermentation is an aerobic process.

4. Fermentation occurs in the mitochondria of cells.

5. Alcoholic fermentation gives off carbon dioxide and is used in making bread.

6. Most organisms perform fermentation using a chemical reaction that converts pyruvic acid to lactic acid.

7. Compare and contrast fermentation and cellular respiration by completing the compare/contrast table. Write your answers in the empty table cells.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Fermentation</th>
<th>Cellular Respiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reactants</td>
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<tr>
<td>Products</td>
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</tbody>
</table>

8. Compare and contrast alcoholic fermentation and lactic acid fermentation by completing the compare/contrast table. Write your answers in the empty table cells.

<table>
<thead>
<tr>
<th>Type of Fermentation</th>
<th>Summary Equation</th>
<th>Use in Industry</th>
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<tbody>
<tr>
<td>Alcoholic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactic acid</td>
<td></td>
<td></td>
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</tbody>
</table>
9. What causes humans to become lactic acid fermenters?

10. What are three main sources of ATP available for human muscle cells?

11. During a race, how do your muscle cells produce ATP after the store of ATP in muscles is used?

12. Why does a sprinter have an oxygen debt to repay after the race is over?

13. A runner needs more energy for a longer race. How does the body generate the necessary ATP?

14. Why are aerobic forms of exercise so beneficial for weight control?

15. Compare and contrast the role of fermentation and cellular respiration in the actual production of ATP. In your response, consider which process produces ATP and which process contributes to its production.