CHAPTER 7 ACTIVE READING GUIDE

CELLULAR RESPIRATION

Section 7-1: Glycolysis and Fermentation

Read the passage below, which is reproduced from page 128 of your textbook. Answer the questions that follow.

Glycolysis is a pathway in which one six-carbon molecule of glucose is oxidized to produce two three-carbon molecules of pyruvic acid. The pathway can be condensed into the following four main steps.

Step 1. Two phosphate groups are attached to glucose, forming a new six-carbon compound. The phosphate groups are supplied by two molecules of ATP, which are converted into two molecules of ADP in the process.

Step 2. The six-carbon compound formed in Step 1 is split into two three-carbon molecules of PGAL.

Step 3. The two PGAL molecules are oxidized, and each receives a phosphate group. The product of this step is two molecules of a new three-carbon compound. The oxidation of PGAL is accompanied by the reduction of two molecules of NAD\(^+\) to NADH. Like NADP\(^+\), NAD\(^+\) is an organic molecule that accepts electrons during redox reactions.

Step 4. The phosphate groups added in Step 1 and Step 3 are removed from the three-carbon compounds formed in Step 3. This reaction produces two molecules of pyruvic acid. Each phosphate group is combined with a molecule of ADP to make a molecule of ATP. Because a total of four phosphate groups were added in Step 1 and Step 3, four molecules of ATP are produced.

Read each question and write your answer in the space provided.

**SKILL:** Recognizing Text Structure

A writer will use different types of text structure to present organized ideas or events. The ability to understand how ideas are organized will help you understand a text. Some of the patterns of text structure you may have seen in earlier sections are compare and contrast (similarities and differences), cause and effect, and sequencing information.

1. What text structure is used to present this information to the reader?
2. What is the final product of glycolysis?

3. Insert the following labels on the diagram to show the steps of glycolysis: "4 ATP," "2 ATP," "2 molecules of 3-carbon compound," "Glucose," "2 molecules of pyruvic acid," "6-carbon compound," and "2 molecules of PGAL."

Step 1

a. __________________________

b. __________

2 ADP

Step 2

c. __________________________

d. __________________________

Step 3

e. __________________________

2 NAD+

2 NADH + 2H⁺

2 phosphate

Step 4

f. __________________________

g. __________________________

4 ADP

Circle the letter of the phrase that best completes the statement.

4. NADP⁺ and NAD⁺ are similar in that both

a. accept molecules during redox reactions.
b. are types of organic molecules.
c. are forms of pyruvic acid.
d. Both (a) and (b)