Test-Taking Tip

When a paragraph and some related questions accompany a diagram, read the paragraph and all of the labels carefully. For example, in questions 7–9, the paragraph tells you that the drops of pigment were placed at the bottom of the strip. This information helps you interpret the events represented by the diagram.

Directions: Choose the letter that best answers the question or completes the statement.

1. The principal pigment in plants is
(A) chlorophyll. (D) ATP.
(B) oxygen. (E) NADPH.
(C) ADP.

2. Which of the following is NOT produced in the light-dependent reactions of photosynthesis?
(A) NADPH (D) ATP
(B) sugars (E) oxygen
(C) hydrogen ions

3. Which equation best summarizes the process of photosynthesis?
(A) water + carbon dioxide $\xrightarrow{\text{light}}$ sugars + oxygen
(B) sugars + oxygen $\xrightarrow{\text{light}}$ water + carbon
(C) water + oxygen $\xrightarrow{\text{light}}$ sugars + carbon dioxide
(D) oxygen + carbon dioxide $\xrightarrow{\text{light}}$ sugars + oxygen
(E) sugars + carbon dioxide $\xrightarrow{\text{light}}$ water + oxygen

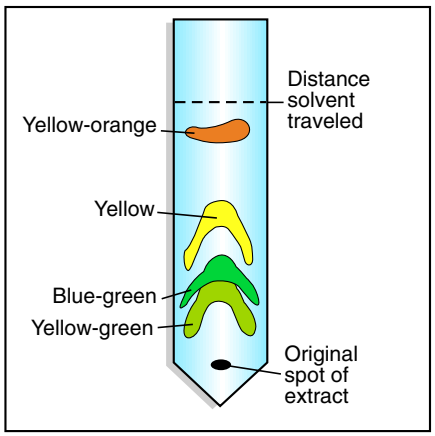
4. The color of light that is LEAST useful to a plant during photosynthesis is
(A) red. (D) orange.
(B) blue. (E) violet.
(C) green.

5. The first step in photosynthesis is the
(A) synthesis of water.
(B) production of oxygen.
(C) formation of ATP.
(D) breakdown of carbon dioxide.
(E) absorption of light energy.

6. In a typical plant, all of the following factors are necessary for photosynthesis EXCEPT
(A) chlorophyll.
(B) light.
(C) oxygen.
(D) carbon dioxide.
(E) water.

Questions 7–9

Several drops of concentrated pigment were extracted from spinach leaves. These drops were placed at the bottom of a strip of highly absorbent paper. After the extract dried, the paper was suspended in a test tube containing alcohol so that only the tip of the paper was in the alcohol. As the alcohol was absorbed and moved up the paper, the various pigments contained in the extract separated as shown in the diagram below.



7. Which pigment traveled the shortest distance?
(A) yellow-orange
(B) yellow
(C) blue-green
(D) yellow-green
(E) black

8. A valid conclusion that can be drawn from this information is that spinach leaves
(A) use only chlorophyll during photosynthesis.
(B) contain several pigments.
(C) contain more orange pigment than yellow pigment.
(D) are yellow-orange rather than green.
(E) have only one color of pigment.

9. In which organelles would most of these pigments be found?
(A) vacuoles
(B) centrioles
(C) mitochondria
(D) chloroplasts
(E) ATP

Standardized Test Prep

1. A	**4.** C	**7.** D
2. B	**5.** E	**8.** B
3. A	**6.** C	**9.** D

Writing in Science

Stories and illustrations will vary, but all students should include the basic events of photosynthesis. Students should recognize that both the oxygen atom and the hydrogen atoms enter a chloroplast together as a molecule of water: H_2O. The writer, as the oxygen atom, will split from the friends, the hydrogen atoms, in the first stage of photosynthesis and leave the plant as oxygen gas. The hydrogen atoms will become involved in the formation of NADPH, the production of ATP, and the production of high-energy sugars in the Calvin cycle.

Performance-Based Assessment

Students may use modeling compound, toothpicks, pipe cleaners, or similar materials to construct a three-dimensional model of ATP, or they may simply use pencil and paper to make a two-dimensional model. The model of ATP should be similar to the depictions of ATP shown in Figure 8–2 and Figure 8–3. When ATP is broken down into ADP, the ADP compound has only two phosphate groups rather than the three of ATP. Students' models of ADP should be similar to that shown in Figure 8–3. Students should infer that AMP is an abbreviation for adenosine monophosphate. A model of AMP, then, should show only one phosphate group.