Answer Key

Photosynthesis Practice Questions

1. Scientists studying ocean organisms are discovering new and unusual species. Which observation could be used to determine that an ocean organism carries out autotrophic nutrition?

makes its own food

(1) Chloroplasts are visible inside the cells.
2) Digestive organs are visible upon dissection.
3) The organism lives close to the surface.
4) The organism synthesizes enzymes to digest food.

2. The interaction between guard cells and a leaf opening would *not* be involved in

1) diffusion of carbon dioxide
2) *maintaining homeostasis*
(3) heterotrophic nutrition
4) feedback mechanisms

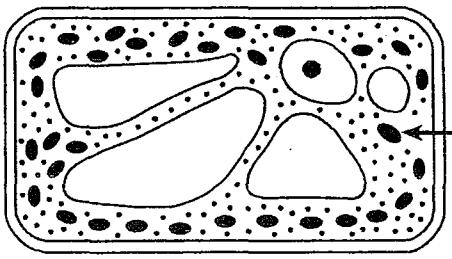
3. Which statement best describes the starch content of two leaves taken from the same plant shown in the chart below?

Leaf A	taken from plant in the dark for 48 hours
Leaf B	taken from plant in bright light for 48 hours

← more light more photosynthesis

1) Neither leaf contains starch.
2) Both leaves contain the same amount of starch.
3) Leaf *A* contains more starch than leaf *B*.
(4) Leaf *B* contains more starch than leaf *A*.

4. The diagram below represents an autotrophic cell.



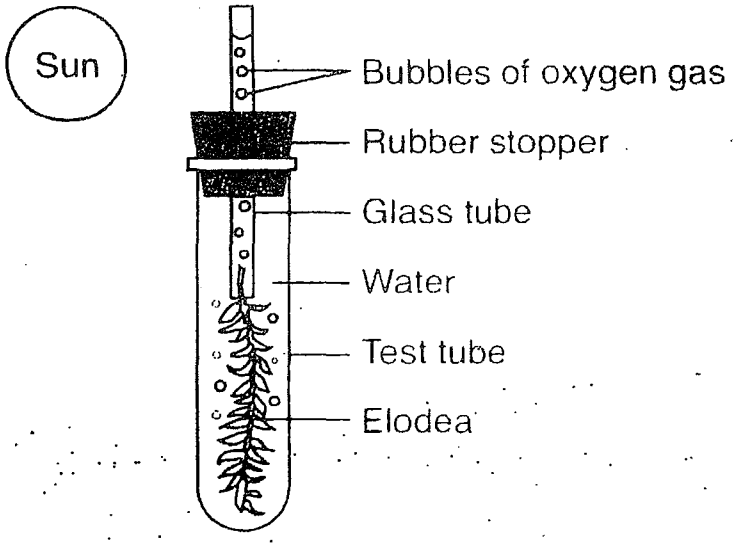
A chloroplast

For the process of autotrophic nutrition, the arrow labeled A would most likely represent the direction of movement of

(1) carbon dioxide, water, and solar energy — sunlight
2) oxygen, glucose, and solar energy
3) carbon dioxide, oxygen, and heat energy
4) glucose, water, and heat energy

Base your answers to questions **5** and **6** on the information and diagram below and on your knowledge of biology.

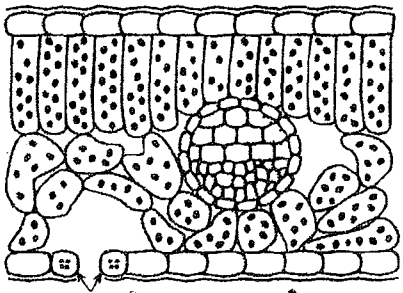
A small water plant (elodea) was placed in bright sunlight for five hours as indicated below. Bubbles of oxygen gas were observed being released from the plant.



5. What substance did the plant most likely absorb from the water for the process that produces the oxygen gas?
   1) dissolved nitrogen (2) carbon dioxide 3) an enzyme 4) a hormone

6. Since oxygen gas is being released, it can be inferred that the plant is
   (1) producing glucose
   2) making protein
   3) releasing energy from water
   4) carrying on active transport

7. The diagram below represents a cross section of part of a leaf.



Guard cells

Which life functions are directly regulated through feedback mechanisms associated with the actions of the structures labeled X?
   1) excretion and immunity
   2) digestion and coordination
   3) circulation and reproduction
   (4) respiration and photosynthesis

Regulate gas exchange

8. An enzyme known as rubisco enables plants use large amounts of carbon dioxide. This enzyme is most likely active in the
   1) nucleus 3) mitochondria
   2) vacuoles (4) chloroplasts

Chloroplasts use CO_2 for photosynthesis

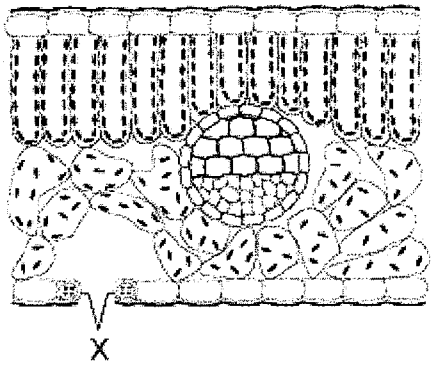
Respiration/Photosynthesis Practice

1. In some land plants, guard cells are found only on the lower surfaces of the leaves. In some water plants, guard cells are found only on the upper surfaces of the leaves. Explain how guard cells in both land and water plants help maintain homeostasis. In your answer be sure to:

   • identify one function regulated by the guard cells in leaves
   • explain how guard cells carry out this function
   • give one possible evolutionary advantage of the position of the guard cells on the leaves of land plants

   Gas exchange/water loss
   opening/closing stomates
   less chance of losing too much water on a hot, sunny day.

2. The diagram below represents a cross section of a leaf.

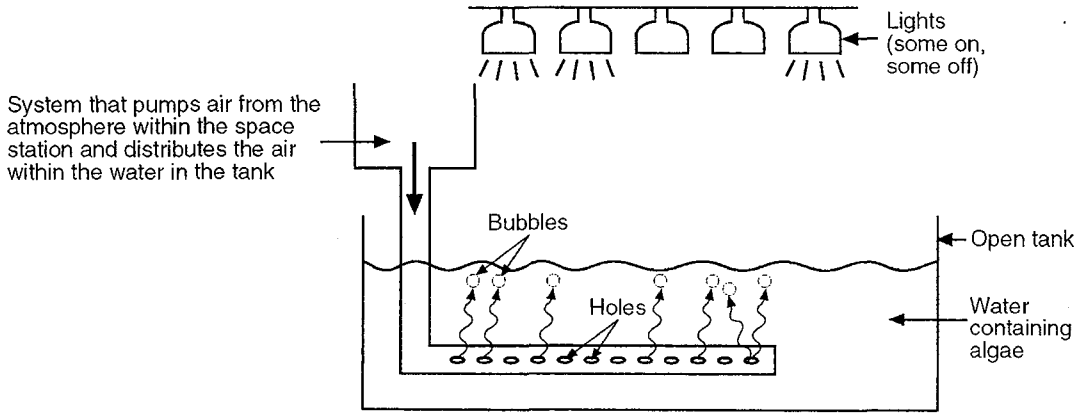


   Explain how the structures labeled X function to maintain homeostasis in a plant.

   Regulates gas exchange

Base your answers to questions **3** through **5** on the information and diagram below.

The diagram represents a system in a space station that includes a tank containing algae. An astronaut from a spaceship boards the space station.



3. State *two* changes in the chemical composition of the space station atmosphere that would result from turning on more lights.

   Less CO_2, More O_2

4. State *two* changes in the chemical composition of the space station atmosphere as a result of the astronaut coming on board the space station. More CO_2, less O_2

5. Identify *one* process being controlled in the setup shown in the diagram.

Photosynthesis