

RATE OF PHOTOSYNTHESIS

In an automobile factory, the number of cars that come off an assembly line is determined by many things. For example, if the iron and steel are not available, the car body cannot be made. If the electricity goes off in the factory, the machines that make the cars cannot work. When the workers are gone, machines may not operate. If the raw materials are lacking, no cars can be produced.

The leaf factory works the same way! Without the raw materials (carbon dioxide and water), no photosynthesis occurs. Let's investigate several ideas scientists have discovered about what determines how fast glucose is made by plants.

Light. Light is a necessary ingredient for plants to grow. Plants are green because the chlorophyll contained in the leaves reflects away green light while absorbing the rest of the light as energy to be used in the process of photosynthesis. Green plants contain much smaller amounts of other colors in their leaves, but because of the chlorophyll, they appear green. When autumn comes, the leaves on trees change colors when the chlorophyll is stored elsewhere in the trunk, stems, and branches. The leaves die and fall off. With all of this in mind, look at the illustration of the green plants grown under different colors of light. See figure 2. The first plant was grown under green light. Remember that green plants reflect away most of the green light. Green plants absorb all the other colors of light and use it as energy in the process of photosynthesis. The other three plants grew different amounts under the different colors of light. Think about the results of growing green plants under different colors and answer the following questions.

Figure 2



Each of the plants was grown the same way except under different colored lights.



Do this activity.

1.43 Using the Internet, Library, or other reference books, choose **one** of the following sense organs, draw a detailed picture of how it's made, and write a brief report (less than one page) on how it works. Be sure to include how the sense organ is able to send messages to the brain.

- eye (sight)
- ear (hearing)
- nose (smell)
- tongue (taste)



Adult Check

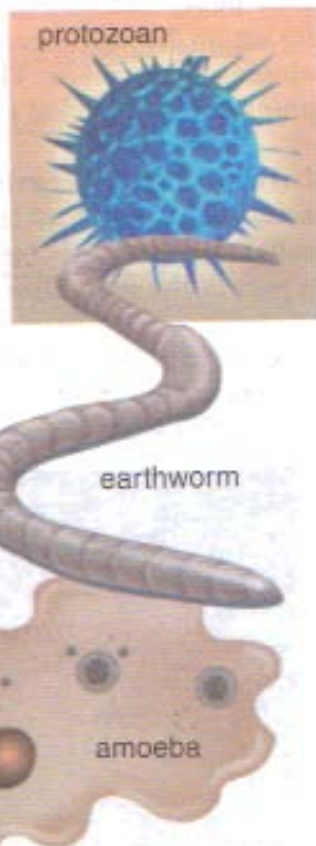
Initial

Date

RESPONSE AND BEHAVIOR.

All living things have ways to respond to their environments. We call these response actions the *behavior* of living things. Simple organisms (like protozoa, amoeba, and even earthworms) respond to their environments without thinking or being taught. Their response is part of their nature and is not learned. Simple organisms respond to light, heat, pollution, and food without using a brain to process the information received from the senses. Their responses are *reflex actions*. These reflex actions of simple organisms are "born" within them. They are due to the very simple nervous systems of these organisms. Reflex responses help the organisms protect and preserve themselves. Humans and other animals also exhibit behavior due to reflex actions.

Humans and most animals have more complex nervous systems than simple organisms. They are able to respond and behave in a greater variety of ways. Many animals have another inborn behavior "programmed" within them. This is called *instinct*. However, some of their responses and behaviors are developed after birth and are called *learned responses*. Humans are also capable of learned responses. There are a variety of learned responses, including *conditioned responses*, *trial and error*, and *habit*. In this part of the LIFEPAC, you will learn more about the main types of responses and behaviors of animals and humans.



SIMPLE ORGANISMS HAVE REFLEX RESPONSES ONLY

SELF TEST 1

Match these items (each answer, 2 points).

- | | | | |
|-------|-------|--|---------------|
| 1.01 | _____ | occurs when anything changes its location in space | a. work |
| 1.02 | _____ | a push or pull action | b. steam |
| 1.03 | _____ | the force that pulls things toward the center of the earth | c. water |
| 1.04 | _____ | the metric measurement of work | d. gravity |
| 1.05 | _____ | force x distance | e. force |
| 1.06 | _____ | force used to walk up the steps | f. stationary |
| 1.07 | _____ | force used to move a windmill | g. motion |
| 1.08 | _____ | some engines operate on this force | h. muscular |
| 1.09 | _____ | force used to generate some electricity | i. foot-pound |
| 1.010 | _____ | English (customary) measurement of work | j. joule |
| | | | k. wind |

Answer true or false (each answer, 2 points).

- | | | |
|-------|-------|---|
| 1.011 | _____ | Our bodies are in constant motion even when they appear to be at complete rest. |
| 1.012 | _____ | All matter, except hard objects like steel and iron, are in motion. |
| 1.013 | _____ | All things in the universe are in motion. |
| 1.014 | _____ | More force is required to pull an object than to lift it. |
| 1.015 | _____ | Scientists define work as force moving an object through a distance. |
| 1.016 | _____ | An object may be in motion when compared to another object but stationary compared to a third object. |
| 1.017 | _____ | A moving body will continue in motion in spite of forces acting upon it. |
| 1.018 | _____ | The same amount of work is done when 20 pounds are lifted 100 feet as when 100 pounds are lifted 20 feet. |
| 1.019 | _____ | If you have 10 boxes to be lifted to a platform, the same amount of work is done whether 1 person or 5 people move the boxes. |
| 1.020 | _____ | Gravity pulls things toward the center of the earth. |

SCIENCE 610: LIFE PAC TEST

Match these items (each answer, 2 points).

- | | | |
|-----------|---|------------------|
| 1. _____ | the loudness of sound | a. Gregor Mendel |
| 2. _____ | a growth chemical made by plants | b. hemoglobin |
| 3. _____ | xylem and phloem bundles in the leaf | c. Galileo |
| 4. _____ | the color produced by mixing green and red light | d. ellipse |
| 5. _____ | a by-product of photosynthesis | e. orbit |
| 6. _____ | a substance whose molecules consist of atoms that are chemically united | f. oxygen |
| 7. _____ | openings found on the underside of a leaf | g. compound |
| 8. _____ | iron-rich protein that carries oxygen | h. Carl Correns |
| 9. _____ | the person who experimented with incomplete dominance in four-o'clocks | i. veins |
| 10. _____ | the person who discovered radio waves from space | j. stomata |
| 11. _____ | the person who discovered the principle of dominance | k. auxin |
| 12. _____ | organisms that fix nitrogen on the roots of legumes | l. yellow |
| 13. _____ | liquid waste eliminated from the blood | m. Karl Jansky |
| 14. _____ | the rate of doing work | n. bacteria |
| 15. _____ | a major division of the Periodic Table | o. urine |
| 16. _____ | the curving pathway in space | p. nonmetals |
| 17. _____ | the shape of the earth's orbit around the sun | q. power |
| 18. _____ | developed refracting telescope for astronomy | r. orange |
| | | s. amplitude |

Answer true or false (each answer, 1 point).

19. _____ Isaac Newton invented the reflecting telescope.
20. _____ The palisade layer of the leaf is the main place where photosynthesis occurs.