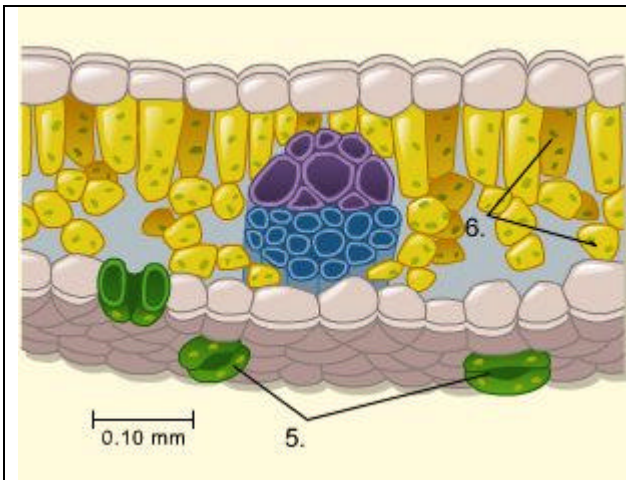


1. The cell organelle where the chemical reactions of photosynthesis takes place is called the
 - a. mitochondria
 - b. chloroplast
 - c. vacuole
 - d. stomata
 - e. chlorophyll

2. Biologists refer to autotrophs as producers because
 - a. autotrophs convert energy into the organic food material of ecosystems.
 - b. autotrophs release the oxygen produced in photosynthesis.
 - c. autotrophs produce the consumers.
 - d. autotrophs produce water used by living things.
 - e. autotrophs produce the carbon dioxide that consumers use.

3. Which of the following is the pathway that energy takes through an ecosystem such as a forest?
 - a. heterotroph > autotroph > consumer
 - b. light > producer > consumer
 - c. producer > consumer > autotroph
 - d. light > heterotroph > autotroph
 - e. producer > light > consumer

4. In addition to light, photosynthesis requires
 - a. carbon dioxide and oxygen.
 - b. oxygen and glucose.
 - c. water and carbon dioxide.
 - d. oxygen and water.
 - e. water and glucose.



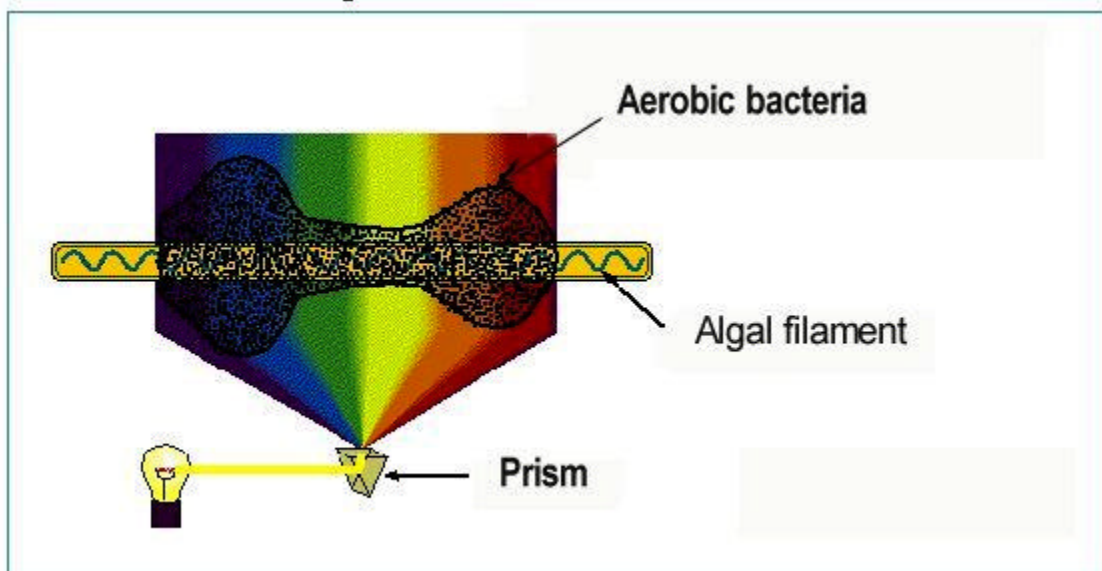
5. What is the function of the leaf pores labeled #5 in the drawing to the left?
- production of chlorophyll for the whole leaf
 - transport of water up to the leaves from roots
 - pathways for CO_2 to enter leaves
 - reproduction by production of seeds
 - main pathways for light to enter leaves
6. The cell layer in a leaf that is the main site for photosynthesis is called
- epidermis.
 - mesophyll.
 - cuticle.
 - stomata.
 - thylakoid.

7. Which of the following accurately describes a characteristic of light energy?
- Shorter wavelengths of light have more energy than longer wavelengths.
 - Longer wavelengths of light have more energy than shorter wavelengths.
 - Wavelengths of light only determine color, not energy.
 - Red light photons have more energy than blue light photons.
 - Only green light has enough energy to drive photosynthesis.
8. Of the following, which color of light is *least* effective as an energy source for photosynthesis?
- Blue
 - Red
 - Orange
 - Green
 - Yellow

9. The light reactions of photosynthesis release O_2 by
- splitting CO_2 .
 - splitting H_2O .
 - extracting O_2 from $C_6H_{12}O_6$.
 - extracting O_2 from chlorophyll
 - removing O_2 from ATP
10. Which of the following processes occurs during *both* photosynthesis *and* cellular respiration?
- conversion of light energy to chemical energy
 - release of CO_2 by the breakdown of food
 - sugar production by the Calvin cycle
 - use of an ATP synthase to produce ATP
 - release of O_2

Use the information below to help answer questions 11 and 12.

A scientist named Thomas Engelmann illuminated a filament of algae with light that passed through a prism. This exposed different segments along the length of the alga to different wavelengths of light. He added aerobic (oxygen-loving) bacteria and then noted in which areas the bacteria congregated. The greatest number of bacteria were located near the algal segments illuminated by the red and blue light.



11. Which of the following is the best explanation for the congregation of the bacteria in the areas illuminated with red and blue light?
- Bacteria released excess carbon dioxide in these areas.
 - Bacteria congregated in these areas due to an increase in the temperature caused by the red and blue light.
 - Bacteria congregated where photosynthesis released the most oxygen.
 - Bacteria were attracted to red and blue light.
 - Bacteria congregated in these areas due to an increase in the temperature caused by photosynthesis.
12. If you ran the same experiment without passing light through a prism, what would you predict?
- There would be no difference in results.
 - The bacteria would be relatively evenly distributed along the algal filaments.
 - The total number of bacteria present would decrease due to an increase in the oxygen concentration.
 - The total number of bacteria present would increase due to an increase in the carbon dioxide concentration.
 - The total number of bacteria would decrease due to an increase in the temperature of the water.
13. The main function of the light reactions of photosynthesis is
- to produce energy-rich glucose from carbon dioxide and water.
 - to convert light energy to energy-rich molecules (ATP and NADPH.)
 - to produce water used in respiration.
 - to convert light energy to sugar (G3P).
 - to use ATP to make glucose.

Rf values for pigments

Carotene

0.95

Chlorophyll a

0.20

Chlorophyll b

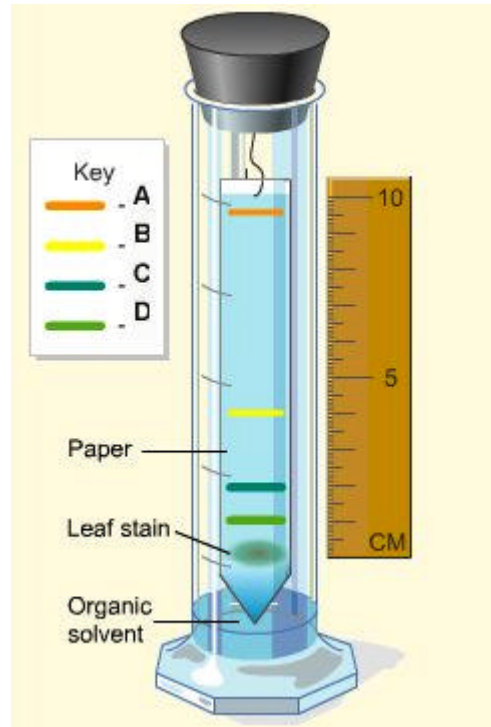
0.10

Use the data above and the figure to the right to answer question 14.

14. Paper chromatography can separate different pigments in leaves. Which pigment band represents chlorophyll a?

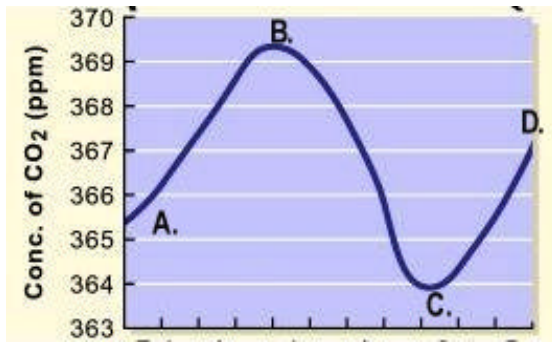
- a. A band
- b. B band
- c. C band
- d. D band
- e. Chlorophyll a is not shown on this

chromatogram.



15. In green plants, the main function of the Calvin cycle is to

- a. use ATP to release carbon dioxide.
- b. use NADPH to release carbon dioxide.
- c. split water and release oxygen.
- d. produce water from hydrogen and oxygen.
- e. construct sugars from carbon dioxide.



16. The above graph represents the northern hemisphere levels of CO₂ in the atmosphere over a 12-month period. Based on the global carbon cycle, which part of the graph represents the growing season in the Northern hemisphere?
- A → B
 - B → C
 - C → D
 - A → D
 - A → B plus C → D
17. The greenhouse effect of the atmosphere
- is counteracted by photosynthesis, which removes carbon dioxide from the atmosphere.
 - is increased by photosynthesis, which adds carbon dioxide to the atmosphere.
 - is counteracted by the burning of gasoline, which removes oxygen from the atmosphere.
 - is counteracted by the burning of wood, which adds carbon dioxide to the atmosphere.
 - is counteracted by the addition of carbon dioxide to the atmosphere, since carbon dioxide removes excess heat from the Earth's surface and reflects it back into space.