

Name: _____

Period: _____

Date: _____

Topic 1: Photosynthesis

1. Write the chemical equation for photosynthesis.



2. Explain why it is beneficial for a plant to have accessory pigments.

they can absorb wavelengths of light that chlorophyll cannot, increasing the amount of energy that can be used for photosynthesis; they can also protect against UV rays

3. Look at the chart to the right and answer the following questions:

- a. What color of light do the carotenoid pigments absorb the most efficiently?

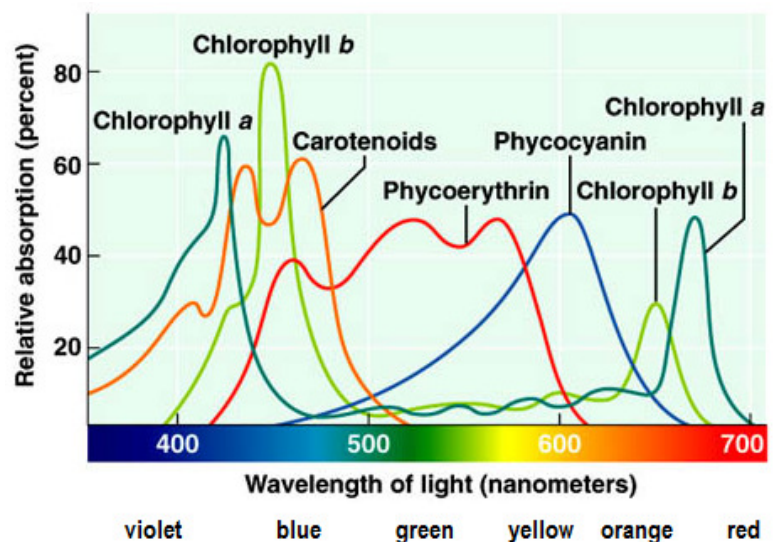
blue

- b. A plant that is concentrated in phycocyanin would probably appear what color?

red-violet

- c. In the ocean, long wavelengths of light are absorbed in shallow water while the short wavelengths of light can penetrate much more deeply. Which accessory pigment do you think would be the LEAST likely to be found in a seaweed living deep below the surface?

phycocyanin



4. In photosynthesis, oxygen is released as a waste product. Where does this oxygen come from?

the splitting of water in the light-dependent reactions

5. What is the importance of the stomata on the leaves of plants?

they allow for the exchange of gas (CO_2 and O_2)

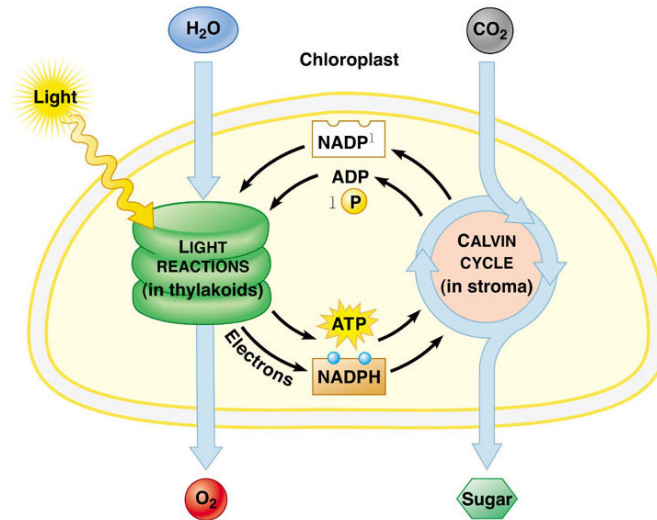
6. Why do plants produce glucose?

it is their food; they break it down to produce ATP for cellular functions

7. Why were we able to measure photosynthetic rate in the lab by counting bubbles? Why did we add baking soda (sodium bicarbonate) to the water to increase the reaction?

Baking soda dissolved in the water releases CO_2 , which can be used in photosynthesis

Light-Dependent and Light-Independent Reactions



Light Dependent Reactions

8. Where do the light dependent reactions take place? **Thylakoid membrane**
9. What happens when the photosystems (pigment-containing reaction centers) absorb sunlight energy? **Electrons get excited**
10. Where do the electrons go? **Transferred down electron transport chain**
11. What happens to water? **it is split**
12. What happens to the H^+ protons? **The form a concentration gradient across the thylakoid membrane**
13. What happens to the oxygen? **It is released as waste**
14. How is ATP generated? **Hydrogen ions flow through ATP Synthase, regenerating ATP from ADP**
15. The light energy from the sun is converted to what type of energy and stored where? **It is converted to chemical energy stored in the bonds of the glucose molecule**
16. What are the products of the light dependent reactions? **ATP and oxygen (waste)**

Light Independent Reactions (Calvin Cycle)

17. Where does the Calvin cycle take place? **stroma**
18. What molecule does it need to get from the environment? **CO_2**
19. What is the resulting molecule? **Glucose ($C_6H_{12}O_6$)**
20. Is the light-dependent reaction necessary for the light-independent reaction to take place? Why or why not? **Yes, the ATP from the LD reactions is necessary for the LI reaction to take place**
21. Where does the energy for the light-independent reaction come from (since we know it isn't light)? **ATP**