

Name \_\_\_\_\_

Period \_\_\_\_\_

AP Biology

MADER CHAPTER 7 GUIDED NOTES: PHOTOSYNTHESIS

1. List and briefly describe the:

**Light-dependent reactions**

a. \_\_\_\_\_

b. \_\_\_\_\_

**Light-independent reactions (Calvin cycle)**

c. \_\_\_\_\_

2. Explain why the light-dependent reactions are called as such:

\_\_\_\_\_

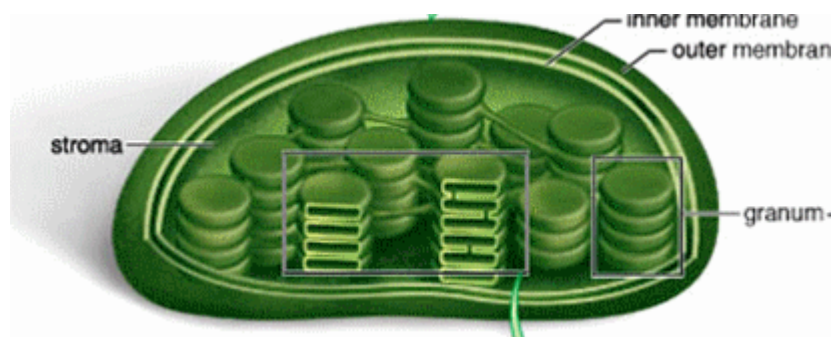
3. Explain why the light-independent reactions are called as such:

\_\_\_\_\_

4. Write the summary equation for photosynthesis:

\_\_\_\_\_

5. Label the structure of the chloroplast



6. Indicate the role of each structure within the leaf:

a. mesophyll cells \_\_\_\_\_

b. thylakoid \_\_\_\_\_

c. thylakoid membranes \_\_\_\_\_

d. grana \_\_\_\_\_

e. stroma \_\_\_\_\_

f. photosystem \_\_\_\_\_

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g. stomates \_\_\_\_\_

7. What is the source of oxygen released from photosynthesis? \_\_\_\_\_

8. Light is a form of \_\_\_\_\_ energy and is divided into packets of energy called \_\_\_\_\_

9. Visible light has a wavelength range of \_\_\_\_\_ .

Chlorophyll a absorbs \_\_\_\_\_ light at wavelength of \_\_\_\_\_ and chlorophyll b absorbs \_\_\_\_\_ light at wavelength of \_\_\_\_\_ whereas they reflect \_\_\_\_\_ light.

10. What other pigments exist in green leaves and what is their function?

\_\_\_\_\_  
\_\_\_\_\_

11. What does chlorophyll do when excited by photons? \_\_\_\_\_

\_\_\_\_\_

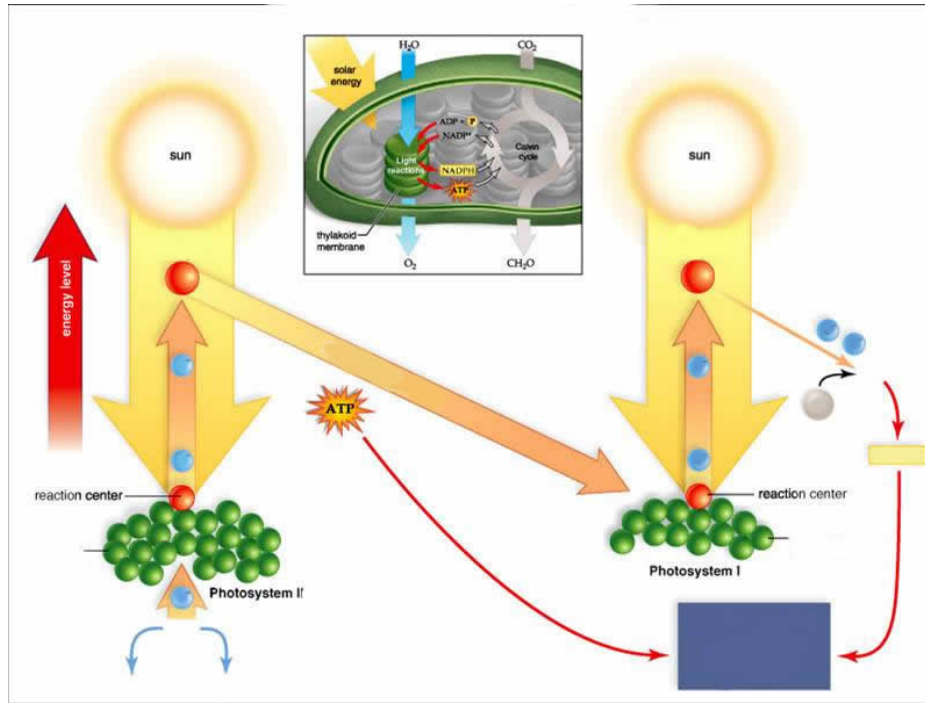
12. What is a photosystem? \_\_\_\_\_

\_\_\_\_\_

13. Label the diagram and explain the difference between Photosystem I and Photosystem II.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

14. With 2 different colored pencils, follow the energy paths of both **cyclic** and **noncyclic** electron flow. (the diagram is not from your text, but it better illustrates the concept



15. Explain how cyclic electron pathway differs from noncyclic electron pathway.

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16. What is the function of the electron transport chain of Photosystem II?

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17. How is ATP synthesis coupled with the reactions of Photosystem II?

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18. Within the thylakoid membrane and stroma, indicate what happens to each of the following:

a. water \_\_\_\_\_

b. high energy electrons \_\_\_\_\_

c. H<sup>+</sup> \_\_\_\_\_

d. oxygen \_\_\_\_\_

e. NADP<sup>+</sup> \_\_\_\_\_

f. ADP \_\_\_\_\_

19. Where in the chloroplast is the H<sup>+</sup> concentration highest? \_\_\_\_\_

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20. Explain what happens during carbon fixation. \_\_\_\_\_

21. The products of the Calvin cycle are \_\_\_\_\_

22. For each of the materials the plant uses during the photosynthesis list which stage they are used in, their source, their role, and what their fate is.

a. water \_\_\_\_\_

b. CO<sub>2</sub> \_\_\_\_\_

c. NADP<sup>+</sup> \_\_\_\_\_

d. ADP \_\_\_\_\_

e. H<sup>+</sup> \_\_\_\_\_

23. Why is the Calvin cycle also called “carbon fixation”?

24. What environmental and internal challenges have forced both C<sub>4</sub> and CAM plants to evolve alternatives to the photosynthesis system used by other plants?

25. Why do high oxygen levels inhibit photosynthesis?

26. What happens during photorespiration and why is it considered bad for plants?

27. What evolutionary adaptations to the Calvin cycle are seen in **C<sub>4</sub> plants** like sugar cane?

28. Draw a diagram to show the anatomical adaptations seen in C<sub>4</sub> plants to accommodate their variation on the Calvin cycle.

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\_\_\_\_\_

29. What evolutionary adaptation to the Calvin cycle is seen in **CAM plants** like cacti?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_