

AP Biology
Blue Sheet Ch 10
Photosynthesis

1. Explain the importance of photosynthesis to the biosphere.
2. Distinguish between and give examples of *autotrophs* (both photo- and chemo-) and *heterotrophs*.
3. Why is it not correct to state that autotrophs are self-dependent?
4. Write a complete, balanced equation for photosynthesis.
5. Where in plants does chlorophyll tend to be concentrated the most? Be specific, and propose an explanation as to why it is found where it is.
6. Explain how plants obtain the major reactants for photosynthesis.
7. Sketch a typical mesophyll cell and label all of the major parts.
8. Explain how C.B van Neil proposed oxygen is produced in photosynthesis. What evidence did he have to support his theory? Why can it be said that the oxygen is just a byproduct of photosynthesis?
9. How did more modern scientific investigation prove that van Neil had made a correct statement regarding the production of oxygen in photosynthesis?
10. Explain the following statement: "*Photosynthetic rate is dependent upon both the quality and the quantity of light*".
11. List the major pigments found in plants and describe the major role each has. How did comparing action spectrum to absorbance spectrum lead scientists to the existence of the accessory pigments?
12. How does the structure of a chlorophyll molecule allow it to be embedded within the plasma membrane?
13. In the summertime, why does black pavement feel so hot, but lighter surfaces feel cooler?
14. Explain what a photosystem is and how they are involved (generally for now) in photosynthesis. Sketch a basic photosystem and explain what happens when it is stimulated by a photon of light.s
15. How do photosystem I and photosystem II differ from one another?
16. What is the main purpose of splitting water in the light dependent reactions of photosynthesis?
17. What is photophosphorylation? Explain how it is accomplished in the light dependent reactions of photosynthesis.
18. Explain the overall process of the light reactions of photosynthesis. (noncyclic electron flow) A good answer should include the following terms (among others): reduction, thylakoid, photosystem I, photosystem II, NADP^+ , NADPH , H_2O , O_2 , photophosphorylation, ATP , ADP , H^+ , P700, and P680.
19. Contrast the process that takes place in cyclic electron flow. How does cyclic electron flow help contribute to the efficiency of photosynthesis? Explain how negative feedback may be involved in determining whether electrons are passed along the cyclic or noncyclic pathway.

20. Explain how plants are able to generate ATP energy during the light dependent reactions of photosynthesis?
21. Summarize what is consumed and produced during the light dependent reactions of photosynthesis.
22. Why is it incorrect to state that the Calvin cycle does not require light energy to take place even though they are commonly called the light independent reactions?
23. Explain what takes place in each of the three steps of the Calvin cycle (*carbon fixation, reduction, and regeneration*). A good answer here should include the following terms (among others): CO₂, stroma, NADPH, ATP, G3P, rubisco, RuBP, 3-phosphoglycerate, and 1,3-biphosphoglycerate.
24. What problems exist for plants that need to undergo photosynthesis, but live in hot, dry areas? How do plants respond to these conditions?
25. What conditions have C₄ plants evolved mechanisms to overcome? Explain the overall process of C₄ photosynthesis and give some examples of plants that undergo C₄.
26. How have cacti (and other CAM plants) developed the ability to exist in hot, arid areas like the desert?