

1.
 - a. Chloroplast
 - b. Plant
2. Chlorophyll
3.
 - a.
 - i. CO_2 = Carbon Dioxide
 - ii. H_2O = Water
 - iii. Sunlight energy = energy from sunlight
 - b. Stroma
 - c. Endergonic - energy is put in
 - d. The sun
4.
 - a. Calvin Cycle
 - b. Thylakoid
 - c. Stroma
5. Chlorophyll
6.
 - a. $\text{C}_6\text{H}_{12}\text{O}_6$ = Glucose
 - b. O_2 = Oxygen
 - c. H_2O = Water
7. To balance equation - To have enough carbon to make glucose
8. Black dots
9.
 - a. Photosystem I and II at a chlorophyll
 - b. Photosystem II
 - c. $\frac{1}{2}\text{O}_2$ and 2H^+
10. Right to left = A, B, C
11. MARK
 - a. Photosystem II: makes H^+
 - b. H^+ powers ATP synthase and leaves thylakoid
 - c. H^+ is used to make NADPH or used in the electron transport chain to keep the gradient of H^+ higher on the inside so it can keep powering ATP synthase
 - d. Electron transport chain also helps H^+ move through the membrane
 - e.
12.
 - a. NADP^+ reductase
 - b. Cytochrome complex
 - c. ATP synthase
13.
 - a. Electron transport chain from photosystem II
 - b. The P680 splits water and releases electrons
14. No
- 15.

- a. $2\text{H}_2\text{O} + \text{sunlight energy} + 2\text{H}^+ + 2\text{NADP}^+ \rightarrow 2\text{NADPH} + 4\text{H}^+$
 - b. No
 - c. 6O_2 , 18 ATP, 12 NADPH
- 16. The stroma
- 17.
 - a. Carbon fixation
 - b. Reduction
 - c. Regeneration
- 18.
 - a. 3
 - b. 5
 - c. $15 (3 * 5)$
- 19.
 - a. 3
 - b. 6
 - c. 3
 - d. $18 (6 * 3)$
- 20.
 - a. They break up the RuBP and become PGA
 - b. Then ATP and NADPH create PGAL from PGA
 - c. One of the PGALs is used to create sugar
 - i. The others are turned into RuBP with ATP so the cycle can repeat
- 21. Adding inorganic carbon from the atmosphere to create organic compounds for living organisms
- 22.
 - a. PGAL
 - b. PGAL as an H instead of an O^- on of the carbons
 - c. 6 ATP, 6 NADPH
 - d. No - PGA and PGAL have the same number of carbons and the number of PGA = number of PGAL
- 23.
 - a. 6 per cycle
 - b.
 - i. Oxygen: PGA
 - ii. Hydrogen: NADPH and ATP
- 24.
 - a. 5
 - b. 3 ATP
 - c. 15
 - d. RuBP
 - e. 3
 - f. Eventually turned into glucose
- 25.
 - a. 2 - PGAL has 3 carbon, but glucose needs 6

- b. 6
- c.
 - i. 18 ATP
 - ii. 12 NADPH

26. A

- a. ADP: electron transport chain
- b. NADP⁺: NADP reductase

27.

The light-dependent reactions replenish ATP and NADPH which are required for the light-independent reactions. The light-dependent reactions use the ADP and NADP⁺ to continue the cycle.

28.

- a. CO₂: Calvin cycle (used)
- b. H₂O: Both
 - i. Calvin cycle: produced
 - ii. Light dependent reaction: used
- c. Glucose: Calvin cycle (produced)
- d. O₂: Light dependent reaction (produced)

29. Sunlight → electrons → ATP → glucose

30. Cellular respiration

31. A

- a. Carbon dioxide: Straight decrease over time
- b. Oxygen: Straight increase over time
- c. RuBP: Decreases at the start and then fluxuates

32. A

- a. It is the same except 6H₂O was subtracted from each side (removing it from the products side of the reaction)
- b. Because this equation is just the overall. It goes through many steps and transformations before reaching this point.