Photosynthesis WebQuest

http://www.mhhe.com/biosci/bio_animations/02_MH_Photosynthesis_Web/index.html

- **For this animation, you will need to plug in your headphone/earplug to hear the narration. If you don't have sound, you can turn on the text CAPTIONS, using the options menu, and read along instead.**
- **You can pause the animation at any point, or replay parts of it to answer the following questions (just fill in the blanks).**

1. In order for plants to grow, they need inputs of _____, _____, and _____.
2. Light travels in both waves and in particles. What is a particle of light called? _____
3. Plants on earth do not use the entire electromagnetic spectrum of energy for photosynthesis, they use just the Visible Light portion. What range of wavelengths does this part of the spectrum include? _____ nm to _____ nm.
4. Because of the dominant pigments in their leaves, plants **reflect** mostly what colors (wavelengths) of light? _____ and _____ .
5. What colors (wavelengths) of light do they **absorb** most? _____ and _____.
6. Photosynthesis consists of two sets of reactions, the _____ and the _____.
7. In what part of the chloroplast do each set of reactions take place?

8. When photons of light hit the clusters of pigments in the photosystems, what does it do to the **electrons** in the chlorophyll?

9. In photosystem II (PS2), an enzyme breaks water molecules up into hydrogen ions (H^+), oxygen, and electrons. What is this water-splitting process called? _____.
10. The hydrogen ions accumulate on the INSIDE or OUTSIDE of the thylakoid (choose one), creating a concentration gradient. (hint: look at the picture and count the little purple "+" ions)

11. As we learned in a previous chapter, when there is more of a molecule on one side of a membrane, it will _____ through the membrane to get to the other side.
12. To pass through the thylakoid membrane, the H^+ ions must go through special protein channels called _____, which enzymatically adds a phosphate to ADP molecules, forming _____ (energy).
13. In what photosystem (pigment cluster) do the electrons from PS2 end up? _____.
14. The electrons from PS1 are energized by photons of light and end up getting picked up by ("reducing") a molecule of $NADP^+$ into _____.
15. The two final products of the light-dependent reaction are _____ and _____.
16. The Calvin Cycle (CC), which ultimately produces the sugar, consists of _____ steps.
17. In Carbon Fixation (which means carbon "attachment") the Calvin Cycle begins when a molecule of RuBP attaches to a molecule of _____ dioxide (which enters through the stomata). This forms a 6-carbon compound, initially, which immediately splits into two _____ - carbon compounds.
18. In the Reduction step, molecules of _____ and _____ from the light-dependent step (photosystems) are used to reduce (add electrons to) the products of the Calvin Cycle.
19. In the final step of the Calvin Cycle, the initial 5-carbon compound, RuBP, is _____.
20. In each cycle, one molecule of CO_2 in taken up. It takes three cycles to produce a molecule of G3P, which stands for _____.
21. The G3P made in the Calvin Cycle can then be used to make several products: _____ _____ _____
22. It takes _____ (how many) G3P molecules to make a single molecule of glucose phosphate. Therefore, how many complete cycles of the Calvin Cycle are needed to produce glucose? ____
23. What are three other carbohydrates can plants make from the glucose phosphate? _____ , _____, and _____.
24. Write the correct chemical formula for glucose _____
25. What gas is an essential by-product of photosynthesis? _____