1. During the light dependent reactions where do H+ ions accumulate?

2. What are the TWO sources of these H+ ions?

3. During photosynthesis, which molecule  
acts as the final electron acceptor at the end of the electron transport chain?

4. Write the overall equation for cellular respiration.   
  
5. How does this compare to the equation for photosynthesis?

6. Which color wavelength(s) of light do/does chlorophyll absorb best?

7. In which kind of plants would you find bundle sheath cells? (C3 C4  CAM)

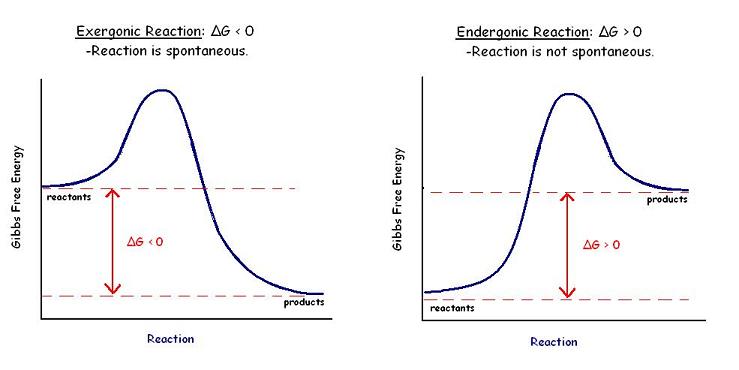
8. Give an example of a C4 plant?

9. C4 and CAM plants have evolutionary adaptations that allow them to do what?

10. Why do plants switch to cyclic rather than noncyclic photophosphorylation?

11. Where does the oxygen that ends up in glucose during the Calvin cycle originally come from?

12. What are the products of the light dependent reactions?



A B  
13. Which of these diagrams represents a chemical reaction with a +∆G ?

14. TRUE OR FALSE The ∆G of this reaction would decease if an enzyme was added.

15. NONCOMPETITIVE enzyme inhibitors bind to the \_\_\_\_\_\_\_\_\_\_ site on an enzyme.  
 active allosteric

16. If oxygen is low or unavailable what pathway do cells use to obtain energy?

17. Explain why NADH produces more ATP than FADH2 when it passes its electrons through electron transport in the mitochondria?

18. Compare the amount of ATP produced during the 3 stages of cellular respiration.

19. What determines whether a cell does fermentation or switches into Krebs cycle?

20. Name the two types of fermentation and give example of an organism that uses each kind.

21. Cells can get ATP from doing glycolysis. Continuing on into fermentation produces no additional energy. For what reason do cells do fermentation?

22. What is the electron acceptor at the end of the electron transport chain in mitochondria?

23. Where do the carbons from glucose end up following the Krebs cycle?

24. Another name for the Krebs cycle is   
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

25. Explain the effect of temperature on an enzyme catalyzed reaction.

26. Which contains more energy -  
 a gram of fat or a gram of carbohydrate?

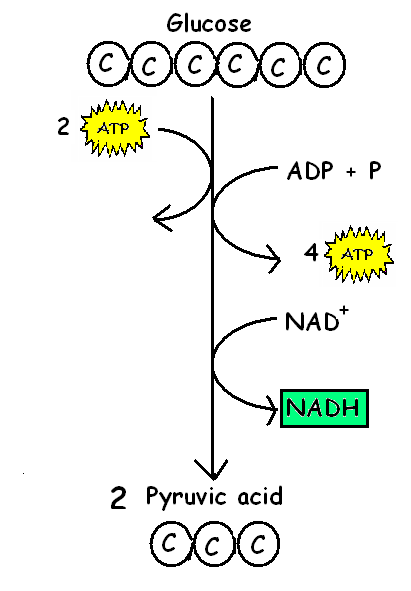
27. Which bonds are disrupted in an enzyme when it denatures?

28. What is the cofactor found in chlorophyll?

29. The hydrolysis of ATP is a – Δ G reaction. Explain how cells use energy coupling to provide power for cell activities that are endergonic?

30. Tell how C4 and CAM plants differ in the way they fix carbon.

31. Name a cell part where you would find chemiosmosis happening.



32. Using energy from breaking a chemical   
bond to add a phosphate directly from a   
  
phosphorylated molecule to ADP without   
  
a proton gradient as shown at the right is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

33. How many “turns” of the Calvin cycle are required to make   
 ONE MOLECULE of glucose?

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34. MATCH THE FOLLOWING WITH THEIR LOCATION  
(You can use them once, more than once, or not at all)  
  
\_\_\_\_\_\_ Splitting of water A. STROMA  
 B. THYLAKOID SPACE  
\_\_\_\_\_\_ Calvin cycle C. THYLAKOID MEMBRANE  
 D. CYTOPLASM  
\_\_\_\_\_\_ Electron Transport Chain   
  
\_\_\_\_\_\_ Phosphorylation of ADP →ATP   
  
\_\_\_\_\_\_ Reduction of NAPD+ → NADPH  
  
\_\_\_\_\_\_ Build up of H+ ions

ANSWERS  
1. In the thylakoid space  
2. From water splitting; Proton pumps in ETC move H+ from stroma to thylakoid space  
3. NADP+  
4. C6H12O6 + 6 O2 → 6 CO2 + 6 H2O + energy  
5. Exact opposite  
6. Red and blue-violet  
7. C4  
8. Corn, sugar cane  
9. Photosynthesize in hot dry conditions; avoid photorespiration  
10. Need more ATP than NADPH to do Calvin cycle  
11. CO2  
12. O2, ATP, NADPH  
13. B; products have more energy than reactants  
14. FALSE; enzymes change activation energy but NOT overall ∆G  
15. allosteric  
16. Fermentation  
17. NADH drops off its electrons higher up in the ETC; FADH2 skips the first proton pump  
18. Glycolysis- net 2 ATP; Krebs cycle- 2 ATP; ETC- (10 NADH X3 + 2 FADH2 X 2) =34 ATP  
 (Plus net 2 from glycolysis + 2 from Krebs minus 2 ATP for transport = 36 total ATP/1 glucose)  
19. Availability of oxygen  
20. Alcoholic- bacteria make beer, wine; yeast makes bread  
 Lactic acid-human muscle cells during exercise;   
 bacteria –yogurt, sauerkraut, pickles  
21. Needs to get rid of built up pyruvic acid AND regenerate NAD+  
22. oxygen  
23. As CO2 in atmosphere  
24. Citric acid cycle/tricarboxylic acid (TCA) cycle  
25. Increasing temp speeds up reaction up to a point. Too hot-denatures enzymes  
26. Fats store more energy than carbs  
27. Disrupts hydrogen/ionic bonds/phobic/philic interactions in 2°, 3°, 4° structure (NOT primanry)  
28. Magnesium (Mg)  
29. Cells couple the – Δ G reaction of hydrolysis of ATP to provide power for + Δ G reactions.  
30. See your Venn   
31. Mitochondria or chloroplasts  
32. Substrate level phosphorylation  
33. Two turns. Each makes a 3-carbon molecule (G3P)  
34. Splitting of water- B (thylakoid space); Calvin cycle-A (stroma); Electron transport chain –C (thylakoid membrane);  
 Phosphorylation of ADP →ATP – A (stroma); Reduction of NAPD+ → NADPH- A (stroma);   
 build up of H+ ions – B (thylakoid space)