Biology Internet Assignment: Cellular Energy

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Go to the websites below and watch the animations answering the questions as you go

# The Light-Dependent Reactions

[**http://highered.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::535::535::/sites/dl/free/0072437316/120072/bio13.swf::Photosynthetic%20Electron%20Transport%20and%20ATP%20Synthesis**](http://highered.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::535::535::/sites/dl/free/0072437316/120072/bio13.swf::Photosynthetic%20Electron%20Transport%20and%20ATP%20Synthesis)

1. In what organelles does photosynthesis occur?
2. What are the internal membranes of chloroplasts called?
3. What surrounds the thylakoid membrane system, and how would you describe it?
4. What is a photosystem
5. What does a photon of light 1st strike?
6. What happens when the photon of light strikes this?
7. How many molecules are split for each photon of light?
8. What replaces the electrons lost from photosystem II?
9. What is the job of plastiquinone (in other words, what does it do)?
10. What does the arrival of the excited electron to the b6-f complex cause?
11. Where are H+ ions pumped from and to in this process?
12. What does this generate?
13. As protons pass through ATP synthase, what happens?
14. What is this process known as?
15. What happens to electrons as they move to photosystem I
16. What is the final destination of electrons at the end of the electron transport chain?
17. What replaces electrons lost from photosystem I

# How Glycolysis Works

[**http://www.mcgrawhill.ca/school/applets/abbio/quiz/ch05/how\_glycolysis\_works.swf**](http://www.mcgrawhill.ca/school/applets/abbio/quiz/ch05/how_glycolysis_works.swf)

Background information: you can think of the word “oxidation” as meaning “breakdown”

1. How do cells derive energy?
2. What does the breakdown of glucose in glycolysis produce
3. The energy released during the breakdown (oxidation) of glucose is used to make what molecule
4. What does the 1st step of glycolysis entail?
5. In the conversion of the 2 3-carbon molecules to pyruvate, what are electrons transferred to? What is formed?
6. What happens to pyruvate under aerobic conditions? Under anaerobic conditions?
   1. Aerobic: i
   2. Anaerobic:

# How the Krebs Cycle Works

[**http://www.mcgrawhill.ca/school/applets/abbio/quiz/ch05/how\_the\_krebs\_cycle\_wor.swf**](http://www.mcgrawhill.ca/school/applets/abbio/quiz/ch05/how_the_krebs_cycle_wor.swf)

1. In what process is glucose broken down into pyruvate
2. Where does this process occur (it won’t directly tell you the answer, you have to look at the picture)
3. What molecule actually enters the Krebs cycle?
4. Where does the Krebs cycle take place?
5. What molecule is produced (removed) from pyruvate to convert it to Acetyl CoA
6. What else is formed in this process?
7. The 2 carbon acetyl portion of acetyl CoA is attached to what in the next step?
8. What is then removed and released from this 6-carbon molecule
9. What else is made in this step
10. What 3 things are produced in the 2nd oxidation
11. What 2 things are created when the 4 carbon molecule is oxidized?
12. Critical Thinking: what step is this most similar to in the Calvin cycle of Photosynthesis? Explain.
13. Each glucose molecule can form how many molecules of pyruvate?
14. For each glucose molecule, how many turns of the Krebs cycle are necessary to completely break down the pyruvate molecules?
15. Critical Thinking: How many turns of the Calvin cycle are required to make 1 complete molecule of glucose?

# ATP Synthase

[**http://vcell.ndsu.nodak.edu/animations/atpgradient/movie-flash.htm**](http://vcell.ndsu.nodak.edu/animations/atpgradient/movie-flash.htm)

1. What type of energy is often used to perform biological work, and where does this energy come from?
2. Whats another name for a hydrogen ion?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is a concentration gradient?
4. What else is inorganic phosphate also known as?
5. Where is ATP is synthesized? What is the complex called that actually synthesizes ATP?
6. What type of concentration gradient is used to drive the production of ATP?
7. How many hydrogen ions enter the complex?
8. Where do they enter the complex from?
9. Where does the second hydrogen ion exit into?
10. How many protons must go through the complex to generate 1 molecule of ATP
11. What maintains the mitochondrial hydrogen ion gradient?

Label the following