Bio I
Study Guide: Energy and Photosynthesis

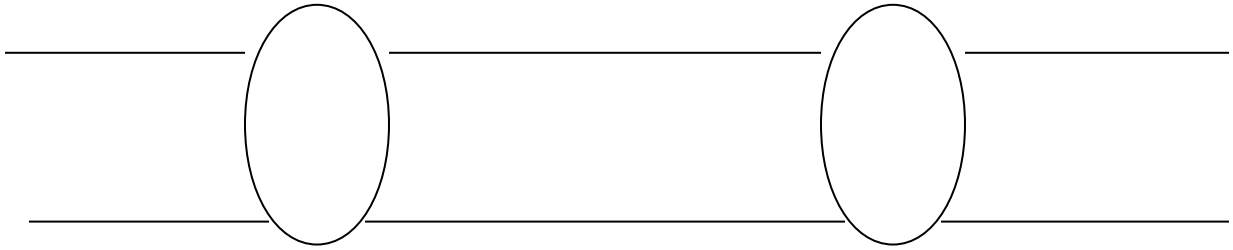
1. ATP and ADP are examples of a nucleic acid. List the three components of a nucleotide of these structures.
2. List and explain two differences between ATP and ADP.
3. Explain how ATP is formed? Where is the energy stored in ATP?
4. Explain how energy from ATP is released?
5. Fill in the table with the appropriate information:

	ATP	**ADP**	**NADPH**	**$NADP^+$**
Represents			Omit	Omit
Posses energy?				
Equation showing release of energy				
Equation showing capture of energy				

6. How is the energy stored in NADPH different from that of ATP?
7. Diagram a chloroplast. Include the following components: stroma, thylakoid, grana, thylakoid membrane, and pigments.
8. Examining each component on the chloroplast diagram of #7, explain the importance and function of each.
9. Why is it an advantage for a plant to have tons of different pigments, such as chlorophyll a, chlorophyll b, and the accessory pigments?
10. What is the relationship between pigments and the photosystems found in the thylakoid membrane?
11. Fill in the table with the appropriate information pertaining to the Light-dependent reaction.
    HINT: Remember for any reaction, reactants are what the reaction starts with; products are the end result of a reaction.

Where does the reaction take place?	
What reactants are required?	
Are enzymes or electrons involved?	
Brief summary of process	
What are the products?	

12. Explain the main steps of the Light-dependent reaction using the diagram below:



13. Designate the two electrons lost from each photosystem as Electron #1 and Electron #2. These electrons are moved throughout the reaction above. Explain where they go and where do the replacement electrons come from.
14. Photolysis is an important reaction that plays a role in the Light-dependent reaction. Explain this reaction and its importance.
15. Fill in the table with the appropriate information pertaining to the Calvin cycle.
    HINT: Remember for any reaction, reactants are what the reaction starts with; products are the end result of a reaction.

Where does the reaction take place?	
What reactants are required?	
Are enzymes or electrons involved?	
Brief summary of process	
What are the products?	

16. Illustrate in the space below the steps of the Calvin cycle. Once complete, go back and explain what is happening in each main step.

17. How many molecules of carbon dioxide enter the Calvin cycle? Explain your answer.
18. What is the summative formula for photosynthesis? Explain for each component the following information:
    - What are the reactants of photosynthesis?
    - What are the products of photosynthesis?
    - The reaction it is present in photosynthesis: Light-dependent reaction or Calvin cycle
    - Its role in photosynthesis – Why is it present?