SBI4U: Photosynthesis & Comparisons Review Questions

1. Sketch a diagram of a chloroplast and label it. Indicate where the processes of photosynthesis occur.

2. Describe a photosynthetic pigment (ie chlorophyll). Why do photosystems use groupings of more than one type of pigment?

3. Define: complex/antenna complex, reaction centre, photosystem, primary electron acceptor.

4. Summarize the key events of Non-cyclic electron flow. Why is it so-called?

5. Explain the similarities and differences between the electron transport chains occurring in the mitochondria with the electron transport chain associated with photosystem II.

6. Summarize cyclic electron flow. Why does a plant need cyclic electron flow?

7. Outline the 3 Phases of the Calvin Cycle. What is the end product of photosynthesis?

8. What forms can it be in and what does the plant do with the different forms?

9. How are the Light reactions and the Calvin cycle linked?

10. Why is the Calvin cycle called “dark reactions” or light independent reactions?

11. Energy changes forms twice during photosynthesis. What are these changes?

12. What are 3 ways you could you limit the rate of photosynthetic activity?

13. Explain the main differences between C3 and C4 plants. Explain the differences exhibited by CAM plants.

14. What is the significance of stomata?

15. How do various environmental conditions such as temperature, light colour, light intensity, CO_2 and O_2 concentration levels affect the rate of photosynthesis? Explain why each affects photosynthesis the way it does.

What Would Happen to the Photosynthesis Process, and the Plant as a Whole If…

1. The temperature around a C3 plant was raised to 40 ˚C for one hour, and then increased again to 60 ˚C for three hours?

2. A C3 plant was exposed to an atmosphere with 78 % oxygen, and 22 % Carbon Dioxide?

3. All of the stomata on a C4 plant closed during the day?

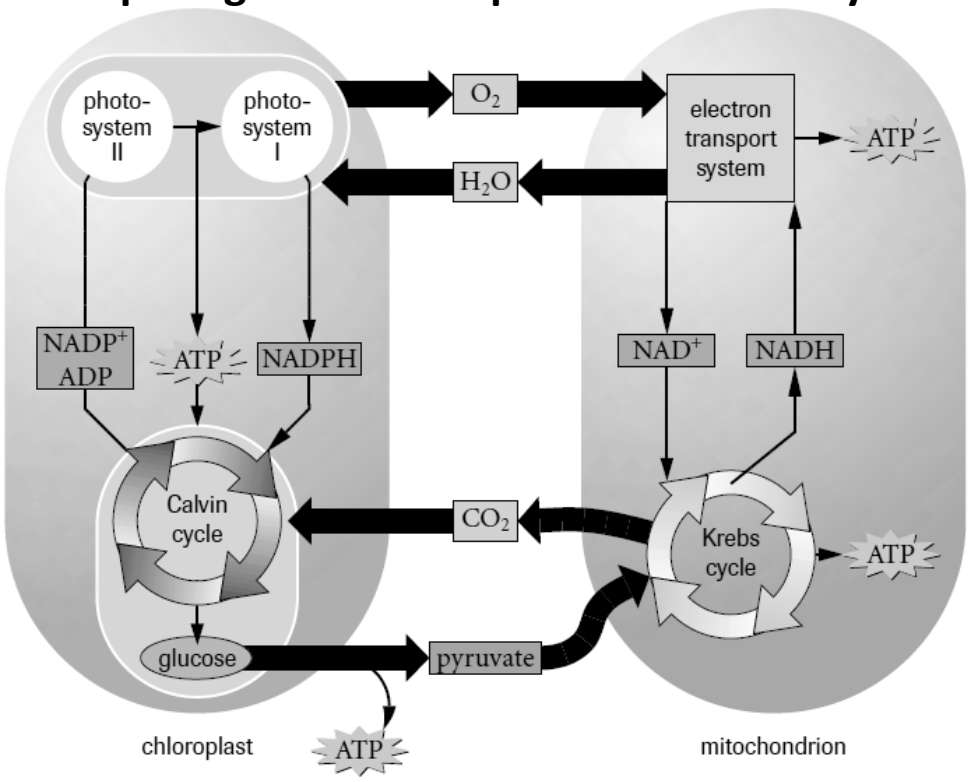
Tougher Photosynthesis & the Environment Questions

1. A plant completes the light reactions of photosynthesis and produces ATP and NADPH. However, the enzyme Rubisco is ineffective as it has been denatured. What do you suspect has happened to this plant? What makes you think this?

2. There are two plants growing in your backyard. Plant A grows really tall in the spring, and then shrivels during the summer. Plant B grows a little bit in the spring, and then shoots up in the summer. What type of plants do you suspect they are?

3. You examine two leaves under a microscope. One has significantly more chlorophyll than the other. What do you suspect about these two plants?

Comparing Cellular Respiration & Photosynthesis



	Criteria	Photosynthesis	Respiration
Overall	Reactants		
	Products		
	Energy		
e-	Electron Source		
	Electron Carriers		
ETC	Electron Profile		
	Electron Source		
	Electron Sink		
	Products		
ATP Synthesis	Molecule pumped to create gradient		
	Membrane-embedded molecule		
	Location of H^+ reservoir		
	Location of ATP synthesis		

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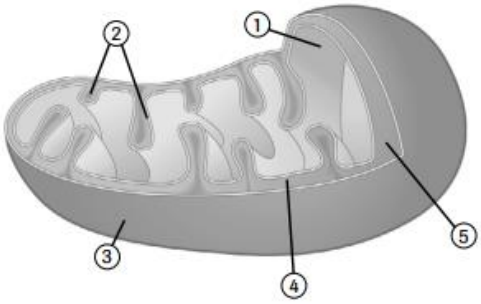
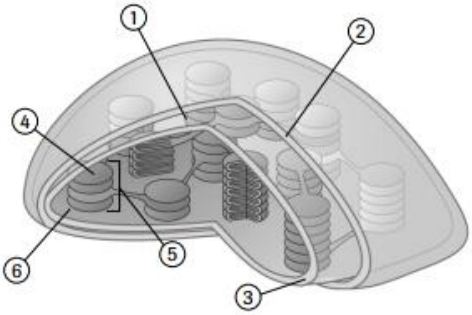
Comparing Chloroplasts & Mitochondria

Criteria	Mitochondria	Chloroplast	
Diagrams			
	1	1	
	2	2	
	3	3	
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	5	5	
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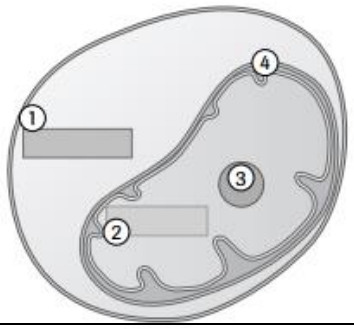
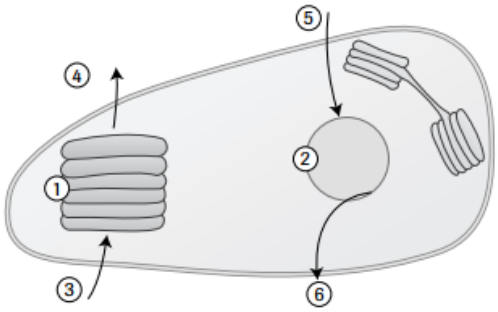
Structural Comparisons			
Overview of Metabolic Process			
	1	1	
	2	2	
	3	3	4
	4	5	6
Reactants			
Products			
Pathways / Location			