Name:_____ Date:_____ Group:_____

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Background and Reference

1. Write the chemical reactions for both photosynthesis and cellular respiration in the space provided below.

2. Describe the relationship between the reactants and products of photosynthesis and cellular respiration.

_____
_____
_____

3. Fill in the data chart below:

	Photosynthesis	Respiration
Energy	Energy from the Sun is needed for the process to begin	The energy molecule ATP is formed during this process
Water		
Carbon Dioxide		
Glucose		
Oxygen		
Location		
Organism it occurs in		

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Background and Reference, continued

4. Match each description with the correct process.

A: Photosynthesis **B: Cellular Respiration**

_____ a) Occurs only in cells containing chlorophyll

_____ b) Carried on by all cells

_____ c) Produces energy

_____ d) Produces carbohydrates (sugars)

_____ e) CO_2, H_2O, and ATP are products

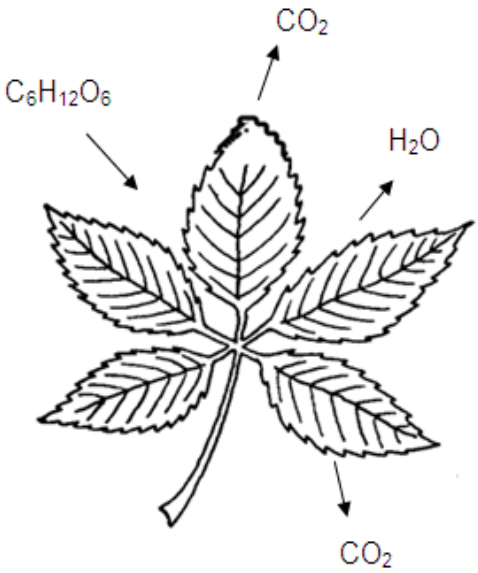
_____ f) CO_2 and H_2O are reactants

_____ g) Does not need light

_____ h) Occurs in mitochondria

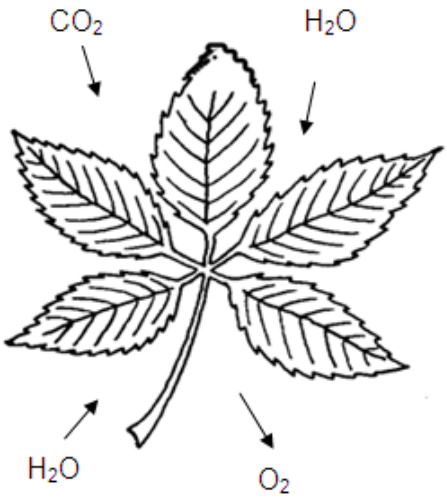
_____ i) Occurs in heterotrophs

_____ j) Breaks bonds between phosphates



Circle the process occurring in the plant above.

5. Cellular Respiration Photosynthesis



Circle the process occurring in the plant above.

6. Cellular Respiration Photosynthesis

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Background and Reference, continued

7.Where does the energy required to conduct the process of cellular respiration come from?

_____

8.What are the main reactants of cellular respiration?

_____

9.For each molecule of glucose broken down during glycolysis, what is produced?

_____

10.Use your knowledge of the three stages of respiration and fill out the following table:

Stage of Respiration	Location of stage	Amount of ATP Produced

11. Use your knowledge of the Krebs Cycle to complete the following table:

The molecule	binds with…	to form...
	Oxaloacetic acid	
NAD+		
		$FADH_2$

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Part I: Plan Your Investigation

1. My Question of Inquiry:

2. The Hypothesis:

3. My Prediction:

4. What is the independent variable (also known as the manipulated variable)?

5. What is the dependent variable (also known as the responding variable)?

6. Is there a control group or control variable for this investigation? Explain.

7. What materials, equipment and technology will be needed for this investigation?

8. List all safety precautions that must be taken.

9. What procedures will you perform to carry out this investigation? Use additional paper.

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Part II: Implement Your Investigation

Collect, Record, and Organize Data

Date Table

Test Tube	Contents	Starting Color	End Color	Light or Dark

Record information from the entire class.

Test Tube	Contents	Starting Color	End Color	Light or Dark
L1				
L2				
L3				
L4				
D1				
D2				
D3				
D4				

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Part II: Implement Your Investigation

Analyze Data

1. Summarize the relationship you observed regarding the *Elodea* set in light and the *Elodea* set in dark, and the snail set in light and the snail set in dark.

2. Summarize what you observed regarding the *Elodea* and snail set in light and the *Elodea* and snail set in dark.

3. Explain under what conditions would you expect for cellular respiration to stop in all test tubes.

4. Why did the color of the bromothymol blue (BTB) change from green to blue in the test tube with *Elodea* set in the light?

5. Why did the color of the bromothymol blue (BTB) change from green to yellow in the test tube with the *Elodea* and snail set in the dark?

6. What evidence did you observe that snails and plants both carry out cellular respiration? Be specific.

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Reflections and Conclusions

1. In your own words, describe the process of photosynthesis. Sketch a simple diagram used to support your description.

2. In your own words, describe the process of cellular respiration. Sketch a simple diagram used to support your description.

3. In the investigation, why was bromothymol blue used as an indicator?

4. Which of the test tubes in the investigation contained a balanced system? Explain your answer.

5. Using all of the following terms, develop a graphic organizer. Use another sheet of paper, if needed.

   Terms: Photosynthesis, cellular respiration, oxygen, carbon dioxide, water, light, energy, sugar (glucose), ATP, light cycle, dark cycle, Krebs cycle, Calvin cycle, energy transfer, electron transport chain, chloroplast, mitochondria, cytoplasm, glycolysis, thylakoid.