Name: _____ Period: _____ Date: _____

Investigating Factors that Affect the Rate of Photosynthesis

Procedure:

1. Go to this website: http://www.kscience.co.uk/animations/photolab.swf
2. View the parts of the simulation. Play with the buttons to see how they work.
3. Set the lamp **color to white.**
4. Set the **light intensity to 10**.
5. Set the **CO2 level to full bottle**.
6. Set the **temperature to 25.**
7. Click on the green timer button and *count how many bubbles* are produced in **30 seconds**.
8. Click the green timer button to stop the timer. Record your data.
9. Click the red timer button to reset the timer.
10. Repeat steps 3-9 for each of the scenarios. Use the tables as a guide for what factors to change

FACTOR #1:
How does LIGHT INTENSITY affect the rate of photosynthesis?

Color	*Light Intensity*	*CO2 Level*	*Temperature*	*# of Bubbles Produced*
White	10	Full	25	
White	20	Full	25	
White	30	Full	25	
White	40	Full	25	

1. What is the independent variable?_____ _____
2. What is the dependent variable?_____
3. What are the constants?_____
4. What is the optimal light intensity?_____

FACTOR #2:
How does CO2 level affect the rate of photosynthesis?

Color	*Light Intensity*	*CO2 Level*	*Temperature*	*# of Bubbles Produced*
White	20	Full	25	
White	20	Half	25	

1. What is the independent variable?_____ _____
2. What is the dependent variable?_____
3. What are the constants?_____
4. What is the optimal CO2 level?_____

Name: _____ Period: _____ Date: _____

FACTOR #3:
How does temperature affect the rate of photosynthesis?

Color	*Light Intensity*	*CO2 Level*	*Temperature*	*# of Bubbles Produced*
White	20	Full	10	
White	20	Full	25	
White	20	Full	40	

1. What is the independent variable?_____ _____
2. What is the dependent variable?_____
3. What are the constants?_____
4. What is the optimal temperature?_____

FACTOR #4:
How does light color affect the rate of photosynthesis?

Color	*Light Intensity*	*CO2 Level*	*Temperature*	*# of Bubbles Produced*
White	20	Full	25	
Orange	20	Full	25	
Green	20	Full	25	
Blue	20	Full	25	

1. What is the independent variable?_____ _____
2. What is the dependent variable?_____
3. What are the constants?_____
4. What is the optimal light color?_____

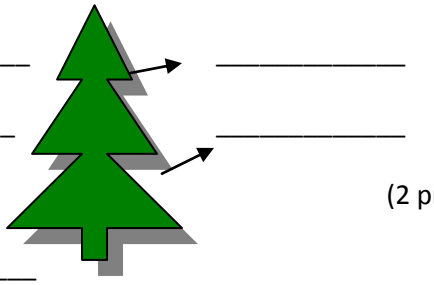
Conclusion: Fill in the table below with the optimum factors for photosynthesis. Complete the last simulation *with the optimal factors* to determine how many bubbles will be produced in 30 seconds.

Color	*Light Intensity*	*CO2 Level*	*Temperature*	*# of Bubbles Produced*

Name: _____ Period: _____ Date: _____

Answer the following questions:

1. Where does PHOTOSYNTHESIS happen in the cell? _____
2. What color is a chloroplast? _____
3. What color of light produced the most bubbles? _____
4. What is inside the bubbles that are being released? _____
5. Fill in the diagram below to explain the process of photosynthesis:



→_____ _____

→_____ _____

(2 reactants) (2 products)

→ _____

(Catalyst)

6. Write the equation for photosynthesis.

Conclusion—Summarize your findings

Directions: Using your data and your answers from the questions above, write a conclusion paragraph to summarize your results. HOW did the factors you tested affect photosynthesis? What were the OPTIMAL factors? What happened when you used OPTIMAL factors? WHY do you think that happened? Was there any bias? (Did you have any previous ideas influencing your choices? *Cite evidence! Use specific data to support your claims.*

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Name: _____ Period: _____ Date: _____

Lab Report Rubric

	4 Meets Expectations	3 Meets most Expectations	2 Meets some Expectations	1 Does not meet most Expectations
Conducting investigations	• Consistently conducts lab according to guidelines and safety procedures • Consistently stays on task and focused during lab • Consistently uses tools, procedures and techniques accurately • Consistently measures accurately	• Often conducts lab according to guidelines and safety procedures • Often stays on task and focused during lab • Often uses tools, procedures and techniques accurately • Often measures accurately	• Sometimes conducts lab according to guidelines and safety procedures • Sometimes stays on task and focused during lab • Sometimes uses tools, procedures and techniques accurately • Sometimes measures accurately	• Rarely conducts lab according to guidelines and safety procedures • Rarely stays on task and focused during lab • Rarely uses tools, procedures and techniques accurately • Rarely measures accurately
Gathering and presenting data	• Collects data accurately in tables • Consistently includes labels for data • Consistently calculates accurately	• Collects data in tables with minimal error • Often includes labels for data • Calculates accurately with minimal errors	• Collects data in tables with several errors • Sometimes includes labels for data • Sometimes calculates accurately	• Rarely collects data accurately in tables • Rarely includes labels for data • Rarely calculates accurately
Identifying variables and making inferences	• Accurately identifies variables and cause and effect relationships • Accurately identifies trends in data	• Identifies variables and cause and effect relationships with minimal error • Identifies trends in data with minimal error	• Sometimes identifies variables and cause and effect relationships • Sometimes identifies trends in data	• Rarely identifies variables and cause and effect relationships • Rarely identifies trends in data
Supporting conclusions with data	• Accurately concludes whether findings support the hypothesis • Accurately accounts for errors and bias	• Often concludes whether findings support the hypothesis • Often accounts for errors and bias, with minimal errors	• Sometimes concludes whether findings support the hypothesis • Sometimes accounts for errors and bias, perhaps with several errors	• Does not accurately conclude whether findings support the hypothesis • Does not account for errors and bias
Format, organization, vocabulary and style	• Consistently and accurately uses vocabulary • Completes all sections of the outlined lab report	• Most times uses vocabulary accurately • Completes most sections of the outlined lab report	• Sometimes uses vocabulary accurately • Completes some sections of the outlined lab report	• Rarely uses vocabulary • Does not complete sections of the outlined lab report
Additional Comments and Feedback				