

Name: _____

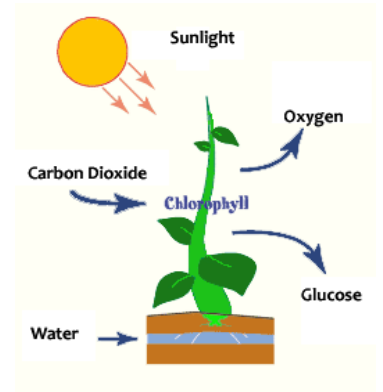
Period: _____

Date: _____

Photosynthesis Online Lab Investigation: Which Colors of the Light Spectrum are Most Important for Plant Growth?

Background: Photosynthesis is the process in which plants use light energy, water and carbon dioxide (CO₂) to produce food (glucose). Plants use the food they make for growth and for carrying out other life processes.

Sunlight is the natural energy source for photosynthesis. White light from the sun is a mixture of all colors of the light spectrum: red, orange, yellow, green, blue and violet. Light can either be absorbed or reflected by substances called **pigments**. Most plants are green because the *pigment* (colored molecule) **chlorophyll** *reflects* green and yellow light and absorbs all the other colors of the light spectrum.



Purpose: In this virtual lab, you will perform an experiment to investigate which **colors** of the light spectrum cause the **most** plant growth. You will calculate the plant growth by measuring the height of each plant under different colors of light. You will compare measurements and interpret a graph to determine which colors of the spectrum cause the most growth.

You will be using this website to complete the lab:

http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS12/LS12.html

Pre-lab Questions

1. What is the **goal** of photosynthesis?
2. What are the **reactants** of photosynthesis? **Where** do they come from?
3. What are the **products** of photosynthesis? **Where** do they go?
4. What is **chlorophyll**?
5. What **colors** of the light spectrum does chlorophyll **absorb**?
6. Why do plants look **green** or yellow green?

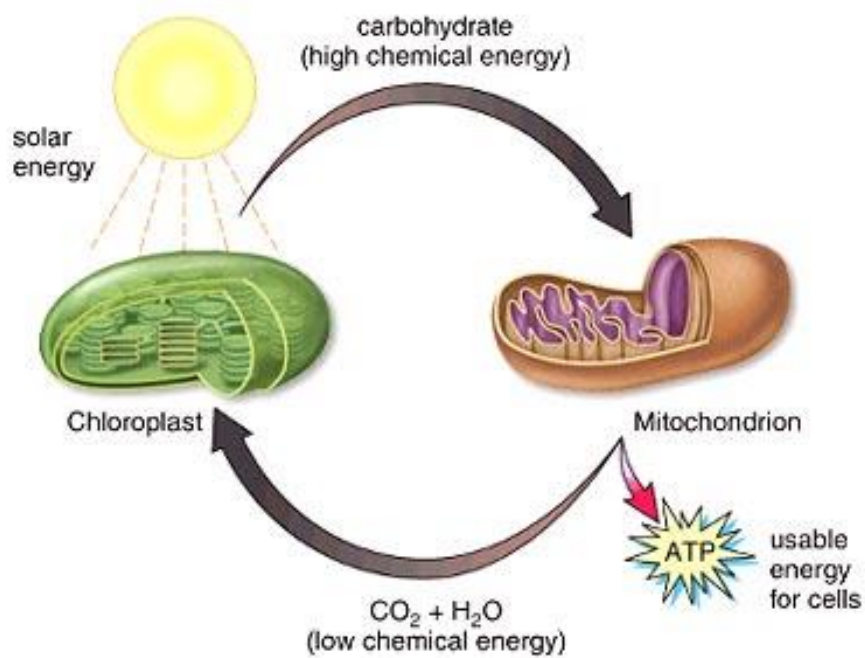
7. What is the **independent** (manipulated) variable in this experiment?

8. What is the **dependent** (responding) variable in this experiment?

9. List as many **variables** that you would need to **control** in this experiment that you can.

10. What would happen if you changed **more than one** of the variables you listed above?

11. Explain what is being illustrated in the picture below. Also, label the picture with the following labels: mitochondria, chloroplast, ATP, CO₂, solar energy (sunlight), carbohydrates (glucose), H₂O.



Explanation of picture above:

Hypothesis

Write a hypothesis about which color of the light spectrum creates the most plant growth.

If I _____

then _____.

Data Table

After you complete your hypothesis, begin the procedure listed in the left hand window of the lab website. Be sure to test **all** the colors on **all** the plants. Record your data in the data table below.

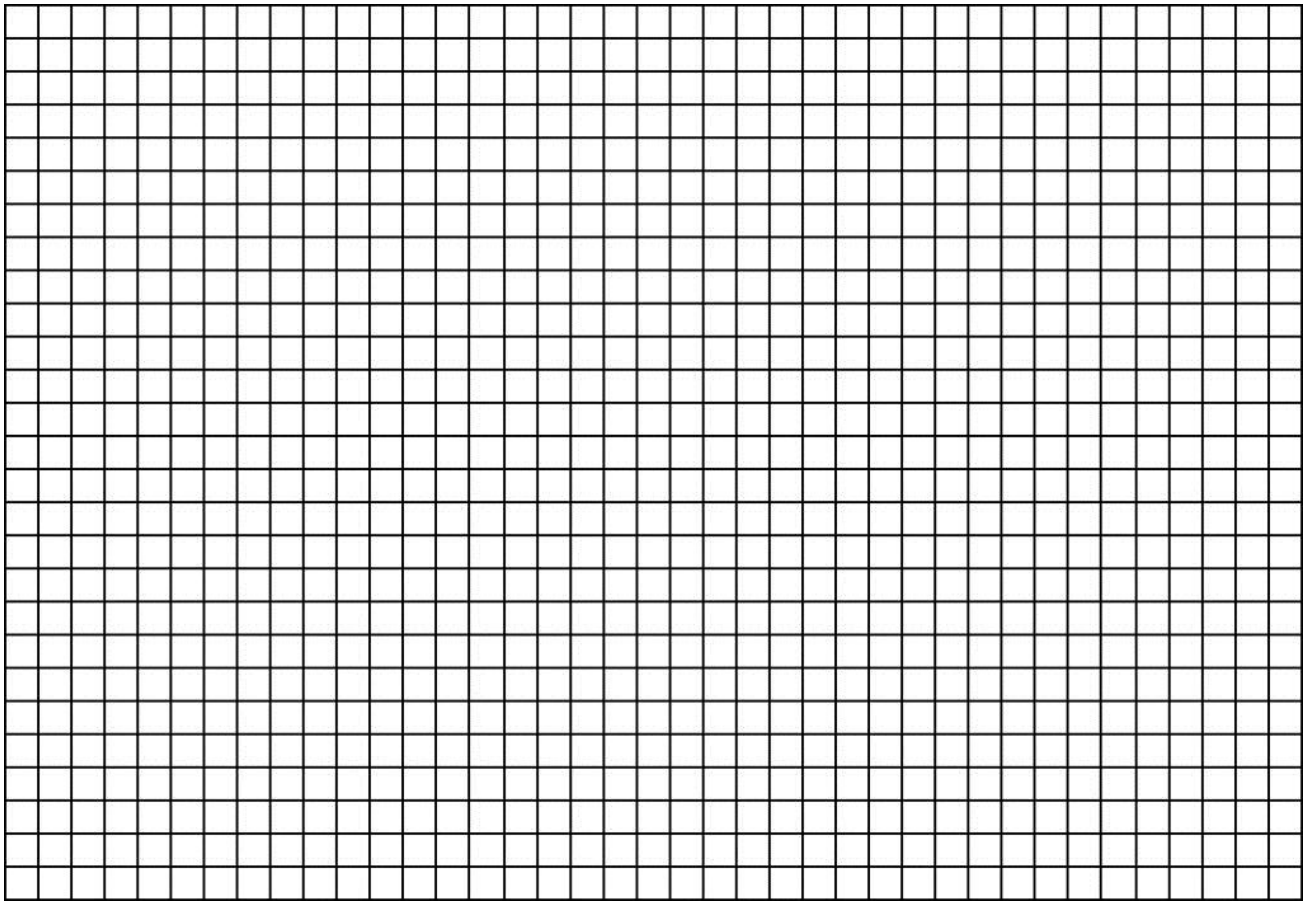
Measurement

Which colors of the light spectrum are most important for plant growth?

Filter Color	Spinach Avg. Height (cm)	Raddish Avg. Height (cm)	Lettuce Avg. Height (cm)
Red			
Orange			
Green			
Blue			
Violet			

Graph

Graph your results below. Be sure to include a **descriptive title**, proper **units** and **axes labels**. Be sure to create a **legend** to show which color of line represents which plant.



Analysis Questions

1. Was your hypothesis correct? Why or why not?
2. How did you test your hypothesis? Which variables did you **control** in your experiment and which variable did you **change** in order to compare your growth results?
3. Analyze the results of your experiment. Did your data **support** your hypothesis? Explain. If you conducted tests with more than one type of seed, explain any differences or similarities you found among types of seeds.
4. What **conclusions** can you draw about which color in the visible spectrum causes the **most** plant growth?
5. Given that white light contains all colors of the spectrum, what growth results would you expect under **white** light?
6. Do plants have mitochondria in addition to chloroplasts? Explain.