

## Photosynthesis Virtual Lab

**Found at:** [www.glencoe.com/sites/common\\_assets/science/virtual\\_labs/LS12/LS12.html](http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS12/LS12.html)

**Question:** 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 to produce food. Plants use the food they make for growth and for carrying out other life processes.

Sunlight is the natural energy source for photosynthesis. While 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 chlorophyll reflects green and yellow light and absorbs the other colors of the spectrum.

### **Objectives:**

- Carry out an experiment to determine which colors of the light spectrum are used in photosynthesis as evidenced by plant growth.
- Measure plant growth under lights of different colors of the spectrum.

### **Pre-Lab Questions:**

1. Click the video button. Watch the animation to learn about how light affects photosynthesis. Summarize the video below.
2. Why do plants generally appear green?
3. Hypothesis: Which part of the light spectrum causes the most plant growth and increased photosynthesis, and which causes the least plant growth? Assume all other conditions other than color of the light are the same for each seed as it grows.

## Procedure:

On your screen, you should see 6 pots, broken into two groups. Under each pot is a box that allows you to change the color of the light. In the middle, you can select the different seed types, and below that you can access a ruler to measure the seeds. When you switch the light on, the simulation will run for a “30 day” period, and you will be able to measure the plants. Follow the steps below to carry out your experiment.

1. Click on “spinach” to fill each pot with spinach seeds.
2. Set the light under the first set of pots to red. Set the light under the second set to violet.
3. Switch the light switch button to “on” and wait for the simulation to run through.
4. Using the ruler, measure the height of each of the plants in the simulation, recording the data below. Be sure that your measurements match the color of the light.
5. Reset the simulation. Repeat steps 1-4 with spinach seeds under blue, green, and orange light.

SPINACH GROWTH UNDER DIFFERENT LIGHT				
<i>Light Color</i>	<i>Growth of Plant 1</i>	<i>Growth of Plant 2</i>	<i>Growth of Plant 3</i>	<i>Average Height</i>
Red				
Violet				
Blue				
Green				
Orange				

6. Now, click on “radish” to fill each pot with radish seeds.
7. Set the light under the first set of pots to red. Set the light under the second set to violet.
8. Switch the light switch button to “on” and wait for the simulation to run through.
9. Using the ruler, measure the height of each of the plants in the simulation, recording the data below. Be sure that your measurements match the color of the light.
10. Reset the simulation. Repeat steps 1-4 with radish seeds under blue, green, and orange light.

RADISH GROWTH UNDER DIFFERENT LIGHT				
<i>Light Color</i>	<i>Growth of Plant 1</i>	<i>Growth of Plant 2</i>	<i>Growth of Plant 3</i>	<i>Average Height</i>
Red				
Violet				
Blue				
Green				
Orange				

11. Now, click on “Lettuce” to fill each pot with lettuce seeds.
12. Set the light under the first set of pots to red. Set the light under the second set to violet.
13. Switch the light switch button to “on” and wait for the simulation to run through.
14. Using the ruler, measure the height of each of the plants in the simulation, recording the data below. Be sure that your measurements match the color of the light.
15. Reset the simulation. Repeat steps 1-4 with lettuce seeds under blue, green, and orange light.

LETTUCE GROWTH UNDER DIFFERENT LIGHT				
Light Color	Growth of Plant 1	Growth of Plant 2	Growth of Plant 3	Average Height
Red				
Violet				
Blue				
Green				
Orange				

### Post Lab Questions:

1. Under which light source did the spinach grow the most? The least?
2. Under which light source did the radish grow the most? The least?
3. Under which light source did the lettuce grow the most? The least?
4. Overall, which light source would you say allows plants to undergo the most photosynthesis and growth? And the least? Why is this so?

5. 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.
6. Given that white light contains all colors of the spectrum, what growth results would you expect under white light?
7. Why is it important to understand concepts such as photosynthesis? How is photosynthesis essential for life on Earth?