

# Photosynthesis Virtual Lab

Observation: Many different factors can affect the rate of photosynthesis such as temperature, light intensity, levels of CO<sub>2</sub>, and wavelengths (color) of light.

## PART 1: TEMPERATURE

<http://www.kscience.co.uk/animations/photolab.swf>

Notice that there are 4 things you can control in the simulation (scan your mouse over each object): temperature (10→40), light intensity (5→45), amount of CO<sub>2</sub>, and color of light (white, orange, green, blue).

1. Write a problem question to test effect of temperature.
2. Write a hypothesis for the relationship between temperature (10, 15, and 40 degrees) and photosynthesis rate (as measured by O<sub>2</sub> bubble output).
3. Design and run an experiment to test the effect of temperature change on photosynthesis. Be sure to keep all your variables, except temperature, constant.
  - a. Create a table to show the levels of the variables you are controlling.
  - b. Create a table to show the number of O<sub>2</sub> bubbles created at different temperatures.
  - c. Create a graph to show the relationship between temperature and photosynthesis.
4. What does the data show about how temperature affects the rate of photosynthesis? (Start off with "As the.....")

## PART 2: LIGHT INTENSITY AND WAVELENGTH

[http://www.mhhe.com/biosci/genbio/biolink/j\\_explorations/ch09expl.htm](http://www.mhhe.com/biosci/genbio/biolink/j_explorations/ch09expl.htm)

In this simulation, you will be manipulating two variables: light intensity and light wavelength. The amount of ATP produced will change depending upon the set parameters.

Your task is to use the simulation to determine how wavelength and intensity affect the rate of photosynthesis (and the production of ATP). Keep in mind you are dealing with two variables, so in order to determine absolutely how each factor affects photosynthesis, you must keep one variable constant while manipulating the other variable.

1. Write a problem question to test effect of light intensity.
2. Write a hypothesis for the relationship between light intensity and photosynthesis rate (as measured by ATP production in the light dependent reaction).
3. Design and run an experiment to test the effect of light intensity on photosynthesis. Be sure to keep the wavelengths variable constant.
  - a. Create a table to show the ATP created at different light intensities.
  - b. Create a graph to show the relationship between light intensity and photosynthesis.
4. Write a problem question to test effect of light wavelength.
5. Write a hypothesis for the relationship between light wavelength and photosynthesis rate (as measured by ATP production in the light dependent reaction).
6. Design and run an experiment to test the effect of light wavelength on photosynthesis. Be sure to keep the light intensity variable constant.
  - a. Create a table to show the ATP created at different light wavelengths.
  - b. Create a graph to show the relationship between light wavelength and photosynthesis

Use your data to answer the experimental questions. Answer clearly how light wavelength affects the reaction, and how light intensity affects the reactions. Offer an explanation of the results, taking into account the principles of photosynthesis and the light reaction.