

Cellular Respiration Virtual Lab

Carbon Transfer Through Snails and *Elodea*



Background:

All organisms are dependent on a healthy **carbon dioxide-oxygen balance**. Photosynthesis and cellular respiration are key processes in maintaining this balance. Plants, through the process of photosynthesis, use energy absorbed from sunlight, water, and carbon dioxide to produce sugars and oxygen. Animals **and** plants, through the process of cellular respiration, use oxygen and sugars to produce carbon dioxide, water, and the energy needed to maintain life.

Purpose:

To determine how carbon dioxide cycles through a biological system by performing the “**Carbon Transfer Through Snails and *Elodea***” virtual experiment found on this webpage:

http://www.classzone.com/cz/books/bio_07/resources/htmls/virtual_labs/virtualLabs.html

Procedure: Follow the steps to the lab given on the screen until you complete all seven (7) steps. You will need to fill in the lab notebook as you go, but you will *only be graded on what you put on this assignment sheet*.

1. Read through the **problem** tab. Create your own question for what you are **investigating** in this experiment.
 - a. **Problem (in question form):**

2. **Explore** the lab to learn what is available to you in your investigation. You must click on **each** item in the checklist. Describe the materials you will be using in this lab.
 - a. What is **Bromthymol Blue**? Why is the BTB in the beaker **green**?

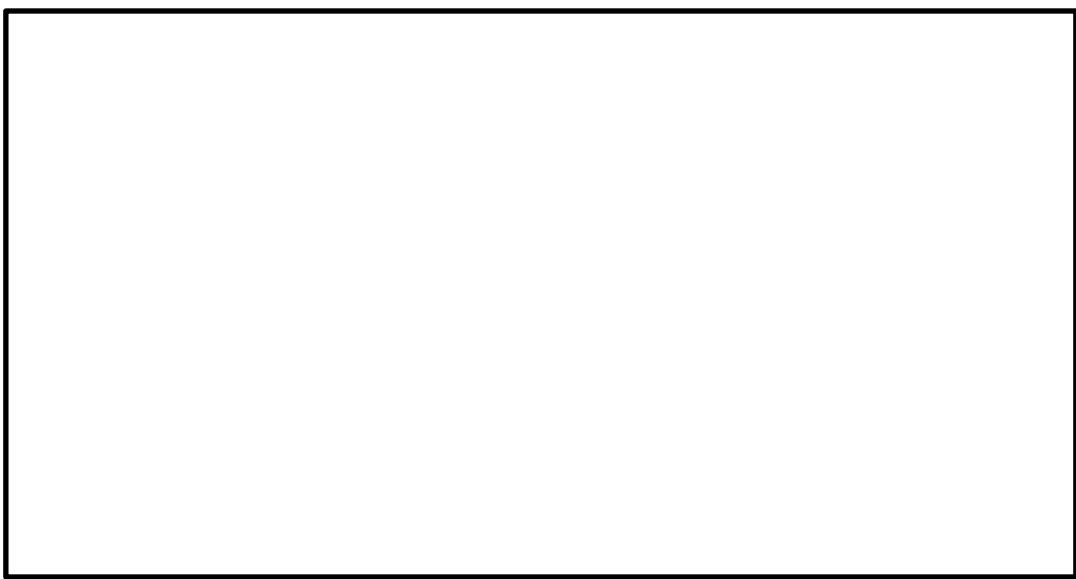
 - b. If snails use lungs to breathe, you can conclude that they **release** which *gas* into their environment as a result of **respiration**?

 - c. If *Elodea* is an aquatic plant, you can conclude that it **releases** which *gas* into its environment as a result of **photosynthesis**?

 - d. What is the purpose of the **growth light**?

 - e. What is the purpose of the **test tube rack cover**?

- f. Draw the picture seen on the CO₂ – O₂ Cycle poster.



- g. If no carbon dioxide is present in your test tube it will be a _____ color. If a medium amount of CO₂ is present, your test tube will be a _____ color. If a large amount of CO₂ is present, your test tube will be _____.

3. Hypothesis:

Explain how carbon dioxide (CO₂) cycles in aquarium water through snails and *Elodea*.

If ____ I add a snail and elodea to a test tube with bromthymol blue. ____

then _____

because _____

4. The **independent variable** in an experiment is the variable which will be *altered* by you, the scientist. In the case of this experiment, the independent variable will be **the number of snails and/or number of elodea plants** in each test tube.
- a. Identify the **dependent variable**(what you, the scientist, will *measure*) in this experiment:

5. Data/Results:

You will be using **8 test tubes** for this experiment. Fill your test tubes and perform the experiment **according to the data chart** found below.

First Test Tube Rack – Placed under the *growth light*:

TEST TUBE WITH BTB	INDEPENDENT VARIABLES	BEGINNING COLOR	COLOR PREDICTION	COLOR RESULT
Tube # 1 (control)	No snails, No <i>Elodea</i>	<i>Green</i>		
Tube #2	2 snails	<i>Green</i>		
Tube #3	2 <i>Elodea</i>	<i>Green</i>		
Tube #4	2 snails, 2 <i>Elodea</i>	<i>Green</i>		

Second Test Tube Rack – Placed under the *test tube cover*:

TEST TUBE WITH BTB	INDEPENDENT VARIABLES	BEGINNING COLOR	COLOR PREDICTION	COLOR RESULT
Tube # 1 (control)	No snails, No <i>Elodea</i>	<i>Green</i>		
Tube #2	2 snails	<i>Green</i>		
Tube #3	2 <i>Elodea</i>	<i>Green</i>		
Tube #4	2 snails, 2 <i>Elodea</i>	<i>Green</i>		

6. Conclusions:

Complete the following sentences.

- a. In the test tubes which contained only snails....
- b. In the test tubes which contained only Elodea under the light....
- c. In the test tubes which contained only Elodea in the dark.....
- d. In the test tubes which contained both snails and Elodea under the light....

Discussion:

1) **Conclude.** What is the relationship between snails and *Elodea*?

2) **Analyze.** Why did the color of the Bromthymol Blue (BTB) solution change in certain test tubes?

3) **Analyze.** What was the importance of a control in your experiment? What would you conclude if the color of the solution in the control changed?

4) **Infer.** When you began the experiment, was there CO₂ in the water? In the test tubes that contained Elodea, where did the CO₂ go?

5) **Infer.** Which gas did the snails release? What observation supports this inference?

6) **Apply.** Based on the results of your experiment, explain why you need to add the Elodea to your snail aquarium.