

# Carbon sequestraion and climate change lab

[Science](#), [Biology](#)



CARBON SEQUESTRATION AND CLIMATE CHANGE LAB Exercise Answers to Questions The purpose of the control test tube is to prove that Elodea does sequester carbon. By having a test tube that has no elodea, the colour changes of the yellow bromothymol blue indicator can be compared.

Differences in colour changes of the indicator will help reaching a conclusion as to whether or not the elodea sequesters carbon.

2. Elodea as an aquatic plant sequesters carbon from the water by the process of photosynthesis. Carbon sequestration by elodea in aquatic ecosystems helps to increase the pH level of the water in which it is found. This is not the only effect that elodea has because when it respire, it releases the carbon dioxide into the water. Release of carbon dioxide into the water lowers water pH. Elodea photosynthesizes only when it is exposed to light but respiration is constant because the plant will always require energy. The effect of respiration, however, does not overly influence the pH since aquatic plants have a low energy requirement (Lal).

3. Amount of light penetrating the water is a limiting factor to terrestrial carbon sequestration by aquatic plants. For the aquatic plants to be able to sequester the carbon, light is needed to facilitate the process of photosynthesis.

Another limiting factor is the amount of aquatic plants in the water. Aquatic plants sequester carbon when they are alive and when they die, the organic matter that is rich in carbon remains in the dead matter (Lal). As aquatic plant coverage increases, therefore, so does the terrestrial sequestration that accompanies it.

The population of aquatic life feeding on the aquatic plants also determines

the amount of carbon that aquatic plants can sequester. In the aquatic ecosystem, the aquatic plants are at the base of the food chain. The size of the subsequent food level will determine the population of the plants that will remain available to sequester carbon.

#### Exercise 2: Answers to Questions

1. Accuracy and precision of measurements in the experiment is influenced by the process of estimation. An estimate is subjective in nature, and is prone to errors because it will depend on the person carrying out the estimate. Individual differences such as height and eyesight will affect the estimates that are made. The same tree will, therefore, have different height estimates for different individuals.

Estimating wood volume of branches is also introduces errors to the experiment because branches are not perfect cylinders. The diameter of a tree branch reduces as you move from the stem to the branches; the calculations do not account for this fact.

Another potential source of error is the disregard of fuel efficiency of a vehicle. This varies with the model of the vehicle, the type of engine it has, and the type of fuel it uses. Calculating using mileage only does not put into consideration these differences that will determine the amount of carbon released by the vehicle into the atmosphere.

2. Planting forests is not sufficient to uptake the CO<sub>2</sub> emitted by vehicles. Despite the large number of trees, these trees do not take up CO<sub>2</sub> throughout their lives. Trees only take up CO<sub>2</sub> when there is light and the process of photosynthesis is in process. Seasonal changes in the U. S are accompanied by varying light intensities directly influencing the amount of

photosynthesis that is occurring. Seasonal changes also mean that in seasons such as fall and winter, the efficiency of trees in taking up CO<sub>2</sub> is compromised. It is, therefore, necessary for the U. S to take measures to reduce CO<sub>2</sub> emissions.

3. Vehicle exhaust is not the only source of CO<sub>2</sub> to the atmosphere. Natural sources of CO<sub>2</sub> to the environment include respiration by living things. All living things, plants and animals, produce CO<sub>2</sub> during respiration, and it goes to the atmosphere.

Unnatural CO<sub>2</sub> sources to the atmosphere include burning of fossil fuels. Fossil fuels are rich in their carbon content, and when used as fuel for various industries by man, the carbon released is emitted into the environment. Another unnatural CO<sub>2</sub> source is afforestation. In some regions, man clears tree-cover to promote agriculture. This is usually followed by fallowing, usually by burning. These two process combined contribute to the build-up of CO<sub>2</sub> in the atmosphere.

4. Carbon storage in trees can be permanent depending on what happens to the tree once it dies. Trees collect carbon within them during their lives (Lal). If the trees are burnt when they die, the carbon that they had accumulated is released back to the atmosphere; thus carbon storage is not permanent. If, however, the tree is converted to lumber once it dies, then the carbon it had stored remains in storage. In this way, carbon storage is permanent.

5. Depending on the calculations, the portion of the tree that was not accounted for is the roots. Inclusion of the roots, however, does not change the response to question 2. Roots are not responsible for the process of photosynthesis which utilizes CO<sub>2</sub> from the atmosphere. Inclusion of the

roots does not change the calculations or conclusions in any way.

#### Synthesis and Conclusion Questions: Answer

The evidence that is most convincing in its support for climate change is the amount of carbon that is emitted from automobile exhaust. Vehicles are the main mode of transport that is used by man, and their number is continually increasing. The increase in vehicle numbers is directly proportional to the amount of fuel they will use, and by extension the amount of carbon emitted to the environment. Global climate is a real phenomenon and its potential effects in an ecological context are real. Global warming is a result of the carbon content in the atmosphere increasing, and it is already being experienced (Lal). Global warming has been responsible for the receding snow cover in the world, as has been observed in recent times.

#### Work Cited

Lal, Rattan. " Carbon Sequestration." Philosophical Transactions of the Royal Society (2008): 815-830. Web.