

Incorporating Climate Change into Biology Concepts

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Climate change is recognized by a majority of climate scientists as a critical issue that will affect the planet for many years. To help them become knowledgeable citizens, high school students should obtain the background needed to make informed decisions about potential strategies for mitigation and adaptation. While both students and teachers are interested in addressing climate change in the science classroom, determining exactly how this should be accomplished raises several interesting questions.

Because every science course already takes a full year, adding a unit on climate means finding content to remove, which is not easily done. Educators have long known, however, that applying basic scientific principles to real world issues can improve student interest in science. Some teachers may find it easier to integrate climate concepts into their current framework rather than making room for a climate unit. The carbon cycle and carbon sequestration, for example, are often covered in a biology class and are fundamentally important to understanding climate change and mitigation. However, this issue is controversial, and students may bring preconceptions and attitudes about climate to the classroom. If students do not believe climate change has anthropogenic causes, their attitudes could be a barrier to learning and a disruption to small group discussions. This study explored if teaching the biological concepts of the carbon cycle and carbon sequestration in an integrated manner with climate change increased or decreased student interest in the activities and knowledge about these carbon concepts.

Data were collected from rising high school sophomores participating in a summer science program at the University of Florida. Two versions of a half-day program on the carbon cycle were offered to 47 youth. One version introduced climate change as a consequence of increasing atmospheric carbon dioxide and sequestration as a potential solution. The other version refrained from mention of climate until after the posttest. There was a significant increase in knowledge only among students who participated in activities connecting carbon cycle concepts and climate change. Almost all of the students (44 out of 47) stated that they felt knowing that the carbon cycle and carbon sequestration are an important part of climate change made the activities more interesting because it made the activities more relevant and important to them. This suggests that incorporating climate change into biological concepts, such as the carbon cycle, could increase student knowledge gain by making the lesson more interesting to students, helping them learn more about biological concepts and climate change.

Students expressed a variety of attitudes about climate change, some of which are strongly associated with their perception of their parents' attitudes about climate and their political preference. These attitudes did not affect students' level of interest in the activities and increased knowledge.

This handout accompanies a presentation given at the 2013 PINEMAP Annual Meeting. For more information, visit the project web site: <http://www.pinemap.org>.



Pictures shown from top to bottom are:

1. Showing the connection between the carbon cycle, the greenhouse effect, and climate change.
2. Students moving through the biological portion of the carbon cycle.
3. Students mapping the entire carbon cycle.
4. Students measuring trees to determine their carbon storage.