

Discussion-Oriented Exercises on Two Hot Topics: Global Warming and Tropical Deforestation

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These exercises focus on two issues of global importance: global warming (the “greenhouse effect”) and tropical deforestation. We hope that by doing these exercises and through class discussions, the students will develop an understanding of the biological phenomena related to each issue. They should then, as world citizens, be able to form intelligent, fact-based opinions as these issues evolve and new information becomes available.

Climatic data for the past century suggest that the earth's atmosphere is warming and that this is due to the build up of heat-retaining gases, such as carbon dioxide. These gases are by-products of industry and are released through the use of fossil fuels. While the burning of fossil fuels adds increasing amounts of carbon dioxide to the atmosphere, the fast pace of deforestation in the tropics is decreasing the removal of CO₂ by plants during photosynthesis. As a result, the CO₂ concentration is rising. Carbon dioxide, and other atmospheric gases, retain much of the longer-wavelength energy that is radiated from the earth and this increases the temperature of the atmosphere. This is much like heat retention within a greenhouse.

The exercise concerning the “greenhouse effect” asks the students to predict biological responses to a given change in climate. They first consider the responses of a variety of species to changes in temperature and precipitation. Next, they evaluate the confounding effect of migration rates, soil preferences, and other parameters that determine species habits.

Tropical deforestation is another global issue. This topic provides an avenue for the discussion of many subjects, all of which are at least tangential to biology. These include political science, economics, sociology, medicine and public health, agriculture, and biodiversity. The exercise is intended to foster an understanding of the causes and consequences of tropical deforestation and to illustrate the complexity and multidisciplinary nature of land management decisions.

Prior to each exercise we recommend showing a series of slides or video to provide background information and to explain the basis of each problem.