



Earth Central: Global Warming

Project-based Learning

Investigative projects involving analysis of scientific data can be real stimuli for students to appreciate the true nature of science (D'Avanzo and McNeal 1997). The example here will allow you to evaluate the validity of the conclusions expressed in the popular press about a high-profile scientific topic, and it will also help you focus on how projects can address the learning goals you have for your students.

Global warming is a "hot topic" in the media and in political circles. We want you to examine two kinds of real data:

1. Instrumental global mean annual temperatures
2. A related environmental indicator, *either*
 - a) Mean annual CO₂, *or*
 - b) Mean annual solar irradiance, *or*
 - c) Annual volcanic index.

Obtain the data sets from the "UMass Global Warming Project" web site:

<http://k12s.phast.umass.edu/~warming>

Each set of data is plotted as a time series graph (handouts).

The data are also available online so they can be imported into an Excel spreadsheet. If you have good familiarity with Excel, you can do statistical analyses of the data, such as smoothing or correlation between the two sets.

Interpreting Data

From your examination of the temperature changes and your assigned data set (a, b, or c), elaborate on the following questions:

1. How do the environmental data you examined compare to the instrumental temperature record?
2. Should there be a physical connection between the environmental data and the temperature record?
3. Are global temperature changes a result of human activity?

Your graphs and interpretation of the data will form the basis for a poster presentation.

Reference: D'Avanzo, C., and McNeal, A.P., 1997, Research for all students: structuring investigation into first-year courses. In McNeal, A.P. and D'Avanzo, C., editors, Student-Active Science: Models of Innovation in College Science Teaching, Saunders, p. 279-300.