# Science on the Web

Activity 9
Greenhouse Gases

*T*he semester was finishing up for Jane. She was just a little bit sorry, because she had really liked her teachers and her classes. Still, finals and term papers had yet to be done, and she wished *those* were over. She had to do a term paper about the use of the Web, but by this time she was pretty knowledgeable about what was on the Web and how to use a browser to get to those resources.

What worried Jane more was her science project, involving the study of "greenhouse gases" and how they affect global warming. That was taking a lot more time than she had planned. Although she thought she could find the information, she wasn't sure what to do with it. She was required to get actual data and do an analysis. That would be hard, she thought. She *had* done some data analysis with her Hazards study. She knew that plots and graphs can help to "see" what the data are saying. Then Mr. Goodman gave her some questions to answer that structured her research.

Still, Jane knew almost nothing about greenhouse gases. She decided to start at the Environmental Research Laboratories of NOAA.
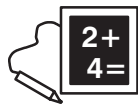
2+
4= **Background on Greenhouse Gases**

The Aeronomy Laboratory, of NOAA Environmental Research Laboratories, studies greenhouse gases extensively.

http://www.erl.noaa.gov

> AL Aeronomy Laboratory
> Greenhouse Warming (under "The Environmental Issues") — Read about the importance of this issue. (It is short enough to print out.)
> Stratospheric ozone — Notice the plot about what thinner ozone means.

? **Questions**

9–1. What are the greenhouse gases?

9–2. What are their properties?

Look at Ozone

Return to the NOAA Environmental Research Laboratories home page (**www.erl.noaa.gov**)

> CMDL Climate Monitoring and Diagnostics Laboratory.
> South Pole Ozone Profiles.
> Select an Ozone Profile (by date).
> Request Ozone Profile.

? **Questions**

9–3. Look at several ozone plots. Do they all look the same?

9–4. What do the two profile lines show?

Downloading CO_2 Data

Ozone seems to go up and down every year. How can you see trends in variable data? You can compare highs and lows from year to year. You can also look at other factors. Let's look at the concentration of CO_2 as it varies over the years.

Return to the CMDL home page.

> Data available by anonymous ftp —You will be getting files from an **ftp** site and navigating directories as you did with **gopher**.

> Carbon Monoxide, Carbon Dioxide, and Methane
> co2

      flask
      README

You will see a long text file. What are the "Warnings" at the beginning about? This file will tell you all about the data. You won't need to remember all of this. The files you will get are easy to read. But note the station names and codes where the measurements were taken. As an example, we'll be using **spo** (South Pole Scott–Amundson Station) data. You will want to remember a few more stations' IDs.

      month
      spomm.co2

Look at the data in this file (station code, year, month, concentrations of CO_2 in parts per million).

Save these data by selecting **File—Save As**. Check the default directory in your pop–up menu, check the filename that will be used, and select the format as "text." (You can also "grab" the data and copy to a word-processor file as you did in Activity 7.)

Heads Up!

*When you have a Web page up and select **File—Save As**, you can choose to save the source instead of the text. That is, you can save the actual HTML (hypertext markup language) code that is used to present the page you are looking at. You can look at the HTML code and see how the page was made as well as identify the links. This may be useful to you as you begin to design Web pages of your own.*

The stations with the longest records are the biggest files. Save a couple of the largest files (still only 6 kbytes). You should have at least three stations of CO_2 data.

? Questions

9–5. Load the CO_2 data into a spreadsheet or graphing program. Plot the three stations' data on one plot. Do you see any trends in the data?

9–6. Do the longer data sets show a stronger trend than the shorter data sets?

Comparing CO_2 with CH_4 data

Return to the site and grab the methane (CH_4) data for **spo** (follow the instructions above, except go to the **ch4** directory instead of the **co2** directory)**.**

? Questions

9–7. What is the most noticeable difference between methane concentrations and carbon dioxide concentrations?

9–8. Load the CH_4 data into a spreadsheet or graphing program. What trends can you see in the data?
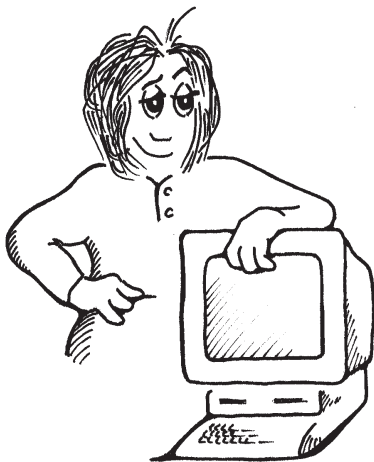
*J*ane learned a lot about the Web and at least a little about how science is done. We hope you did, too. Happy browsing!