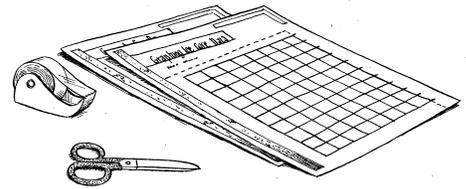
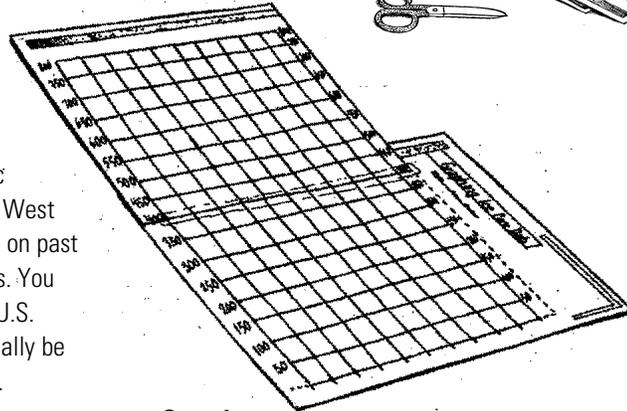


Secrets in the Ice



NOVA Activity **Mountain of Ice**

The U.S. International Trans-Antarctic Scientific Expedition (ITASE) to Antarctica drilled into the West Antarctic Ice Sheet to collect ice cores for data on past sulfate, sodium, and chloride ion concentrations. You will be analyzing some of the actual data that U.S. ITASE scientists obtained. The data will eventually be used to help understand global climate change.



Procedure

- ① Cut along the dotted lines of one of your blank graphs and line it up with the other one so that the bottom dark line of the graph you cut out and the top dark line of the other graph overlap. Tape the two graphs together.
- ② Label the dark vertical lines on both sides of the graphs in 50-degree increments (50, 100, etc.) up to the top dark line, which will be 800.
- ③ Use the *Ice Core Data* and *Graphing Ice Core Data* activity sheets to graph the data for all three chemicals (sulfate ion— SO_4^{2-} , sodium ion— Na^+ , and chloride ion— Cl^-) using the colored pencil assigned by your teacher for each chemical. Make sure you start with the top-most depth, 37,270 meters, and begin graphing at the left-most point on your graphs. Round off each data point to the nearest whole number before you graph it.
- ④ When you have graphed your data, read the Chemicals in the Ice information on the *Ice Core Data* activity sheet. Use this information to label your graphs with estimated years (represented by the dark lines extending beyond the bottom line of the graph) or seasons within the years. Note that the years do not fall at exactly spaced intervals because some years have more data points than others.
- ⑤ After estimating seasons and years, report your results to the class.

Questions

Write your answers on a separate sheet of paper.

- ① What years do you think this data set spans? How did you determine these years?
- ② What year does it appear that the volcanic sulfate from the unknown 1808–1809 volcano eruption arrived in Antarctica?
- ③ Look at your graph. What patterns, if any, do you see among the sodium, chloride, and sulfate ion concentrations?
- ④ Based on sulfate ion concentration peaks, when does spring seem to occur? Based on sodium and chloride ion concentration peaks, when does winter seem to occur? In what months do each of these seasons occur in the Southern Hemisphere?

