## USING THE HANDBOOK

**38.** Aluminum is described in Group 13 of the *Elements Handbook* as a self-protecting metal, and can be used in preventing corrosion of iron structures. Using electrochemical data, explain how aluminum protects iron structures.

## RESEARCH & WRITING

**39.** Go to the library, and find out about the electroplating industry in the United States. What are the top three metals used for plating, and how many metric tons of each are used for electroplating each year in the United States?

**40.** Investigate the types of batteries being considered for electric cars. Write a report on the advantages and disadvantages of these types of batteries.

## ALTERNATIVE ASSESSMENT

**41.** **Performance** Take an inventory of the types of batteries used in your home. Find out the voltage supplied by each battery and what electrochemical reaction each uses. Suggest why that electrochemical reaction is used in each case.

**42.** In our portable society, batteries have become a necessary power supply. As consumers, we want to purchase batteries that will last as long as possible. Advertisements tell us that some batteries last longer than others, but do they really? Design an investigation to answer the question. Is there a difference in longevity between the major brands of AA batteries? Add a cost-effectiveness component to your design.

**43.** When someone who has a silver filling in a tooth bites down on an aluminum gum wrapper, saliva acts as an electrolyte. The system is an electrochemical cell that produces a small jolt of pain. Explain what occurs, using half-cell reactions and $E^0$ values.

extension

**Graphing Calculator** **Equilibrium Constant for an Electrochemical Cell**

Go to **go.hrw.com** for a graphing calculator exercise that asks you to calculate an equilibrium constant for an electrochemical cell.

**Keyword: HC6ELEX**