24. Drawing Conclusions Use **Table 3** to decide if a redox reaction would occur between the two species, and if so, write the balanced equation. Explain your reasoning.
a. Cl_2 and Br_2
b. Sn^{2+} and Zn

25. Drawing Conclusions An element that disproportionates must have at least how many different oxidation states? Explain your reasoning.

USING THE HANDBOOK

26. Several reactions of aluminum are shown in the common reactions section for Group 13 of the *Elements Handbook*. Use these reactions to answer the following:
a. Which of the five reactions shown are oxidation-reduction reactions? How do you know?
b. For each redox reaction you listed in item **a,** identify what is oxidized and what is reduced.
c. Write half-reactions for each equation you listed in item **a.**

27. Aluminum is described in Group 13 of the *Elements Handbook* as a self-protecting metal. This property of aluminum results from a redox reaction.
a. Write the redox equation for the oxidation of aluminum.
b. Write the half-reactions for this reaction, and show the number of electrons transferred.
c. What problems are associated with the buildup of aluminum oxide on electrical wiring made of aluminum?

RESEARCH & WRITING

28. Oxidizing agents are used in the cleaning industry. Research three different oxidizing agents used in this area, and write a report on the advantages and disadvantages of these compounds.

29. Oxidizing and reducing agents play important roles in biological systems. Research the role of one of these agents in a biological process. Write a report describing the process and the role of oxidation and reduction.

ALTERNATIVE ASSESSMENT

30. Boilers are used to convert water to steam in electric power plants. Dissolved oxygen in the water promotes corrosion of the steel used in boiler parts. Explain how dissolved oxygen is removed from the water in boilers.

31. Performance For one day, record situations that show evidence of oxidation-reduction reactions. Identify the reactants and the products, and determine whether there is proof that a chemical reaction has taken place.