spaces in the connector. When the current is turned off, the decrease in temperature causes the aluminum to contract, creating a small gap between it and the connector. Oxidation of the aluminum can now fill the gap created, further increasing the resistance of the connection. The temperature of the connection is slightly higher the next time current flows through the wire. This cycle can continue until either the connection burns out or surrounding building materials ignite. The aluminum oxidation problem is made worse if aluminum is in contact with copper or steel and trace amounts of moisture. Under these circumstances, aluminum corrodes even faster.

5.13 CASE STUDY: PIERCING PROBLEMS

CASE STUDY 5.13 QUESTIONS

(Page 419)

Understanding Concepts

1. Nickel allergies are difficult to overcome because metallic objects containing nickel are very common.
2. Metals such as silver and gold would not be affected by the acidity of skin because they are listed below hydrogen on the activity series.
3. A lower pH value indicates increased acidity. Perspiration with a lower pH increases the rate of release (oxidation) of nickel from a piercing.
4. Washing removes most of the electrolytes from your skin or the back of the watch. Reducing the concentration of electrolytes reduces the rate of corrosion.
5. Tongue piercing is riskier than earlobe piercing because the tongue is thicker and contains far more blood vessels than the earlobe, making the healing period for a tongue piercing much longer than that for an ear piercing. Longer healing times and increased blood flow also increase the risk of infection. Furthermore, since a tongue piercing is continually bathed by saliva, the risk of nickel being oxidized out of the piercing and ingested is greatly increased.

Making Connections

6. Wearing jewellery is a very ancient custom, with deep roots in many traditions. Jewellery can symbolize one's financial status, marital status, social affiliation, sexual orientation, etc. While wearing jewellery may make a person a target for theft, people wear jewellery to make a statement, to make themselves blend in with or stand out from the crowd, to show appreciation for a gift, to attract a partner, or for many other reasons.
   (Student evaluations of their own use of jewellery will vary, but should include some of the abovementioned considerations.)
7. Student answers will vary. However, most will agree that some standardization and formal training should be required, especially for practitioners who administer tongue piercings.
   Possible training requirements include:
   - training in antiseptic methods
   - screening clients for certain medical conditions or medications that may cause prolonged bleeding
   - screening clients who have compromised immune systems
   - providing appropriate client education on the risks of the procedure before proceeding, and screening clients who do not understand the potential risks
   - educating clients to follow appropriate oral hygiene practices
   - the importance of follow ups with medical professionals should complications arise
   - how to maintain a sterile environment where the procedure is performed

5.14 INVESTIGATION: FACTORS THAT AFFECT THE RATE OF CORROSION

(Pages 420–421)

Prediction

(a) **Part 1:** The corrosion of the nail in distilled water will be significantly less than in the solutions because distilled water contains no ions. Corrosion will probably occur fastest in the acidic solution, $HCl_{(aq)}$, and more slowly in the basic and neutral solutions, $NaOH_{(aq)}$ and $NaCl_{(aq)}$.