approximately one-third of Ontario's electricity is generated by burning fossil fuels, the demand for electricity created by electrolytic processes indirectly contributes to our acid rain problem.

Making Connections

13. (a) The use of magnesium and aluminum decreases the mass of a vehicle. Lighter vehicles require less fuel, thereby increasing their fuel efficiency.
    (b) The production of lighter, more fuel-efficient vehicles should result in a decrease in harmful exhaust emissions per vehicle. Conversely, an increase in demand for aluminum would result in increased emissions of the pollutants associated with manufacturing aluminum: PAHs, greenhouse gases from the production of carbon anodes, and perhaps CO_2 and SO_2 emissions if fossil fuels are used to generate electricity.
14. Recycling aluminum costs much less, per tonne, than extracting new aluminum from bauxite. This is partly because it uses less energy, which reduces the pollution resulting from electricity generation. Furthermore, avoiding the extraction process minimizes the production of PAHs and other toxic chemicals that this process releases. Finally, recycling keeps used aluminum out of rapidly filling landfill sites.
15. (a) Health effects resulting from exposure to chromium(VI) oxide, commonly called chromium trioxide, include burning of the skin and mucous membranes, vomiting, pain in the stomach and oesophagus, burns to tissue (such as sores on the skin or damage to the eye, which could lead to blindness), cancer, and possible death if ingested.
    (b) 52 mg/kg oral/rat
    (c) Chromium trioxide is over 100 times more toxic than rubbing alcohol.

Extension

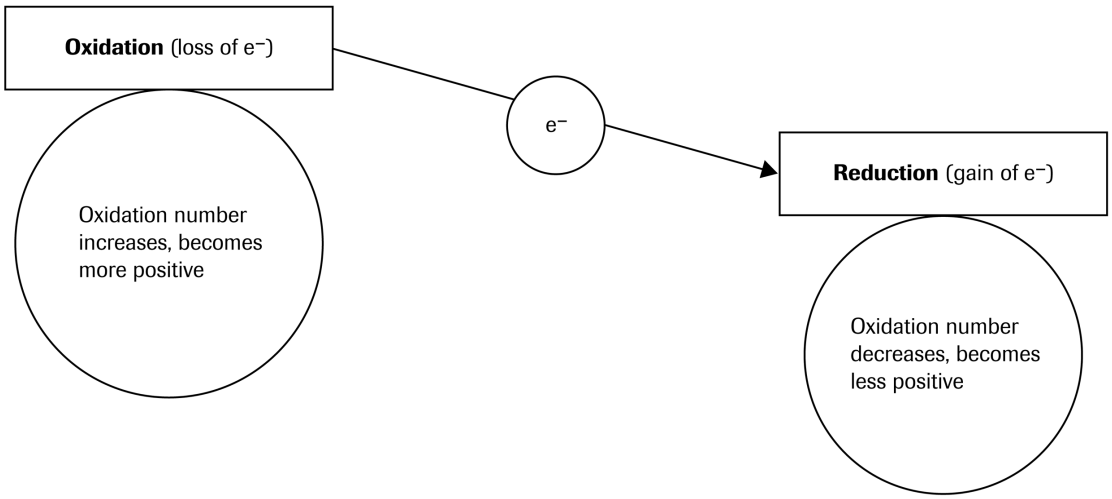
16. (a) Vapour deposition is a plating technique in which an object is coated with a thin film of particular substance from the gas phase. The substance is first vaporized at a high temperature and then passed over the object to be plated. Some of the gaseous atoms/molecules are then deposited on the cooler surface of the object to be plated.
    (b) Some consumer products that are coated using vapour deposition are some automotive components, bathroom fixtures (chromium plating on steel), solar cells, bottles, and jewellery.

UNIT 5 SUMMARY

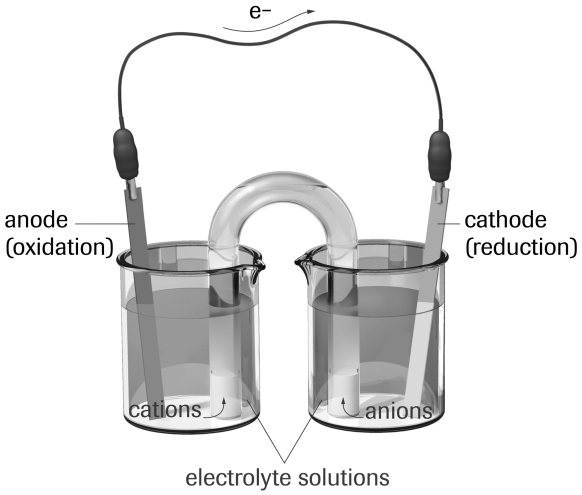
(Page 441)

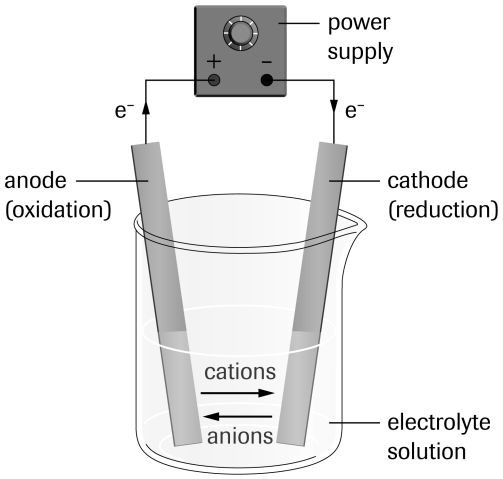
MAKE A SUMMARY

1.



2. (a)





(b) Applications of galvanic cells:
batteries
fuel cells
corrosion

(c) Applications of electrolytic cells:

Application	Anode	Cathode	Electrolyte
electrorefining	impure copper	pure copper	a soluble copper compound such as copper(II) sulfate
production of aluminum	graphite	graphite	cryolite
gold plating	gold	object to be plated	a soluble gold compound such as gold(III) chloride

UNIT 5 PERFORMANCE TASK: BUILDING AN ELECTRICAL INVENTION

(Pages 442–443)

The following is a sample Performance Task report.

INVENTION: FRUIT CELLS

Planning and Proposal

(a) **Preparation**

In this performance task, I will construct galvanic cells using different metals and fruit to see how many fruit cells it takes to light an LED. Research indicates that citrus fruits are usually a good choice, and that several pieces of fruit will be needed, connected in series.