3. (Answers will vary.) Choices of alternative fossil fuels include natural gas (largely methane), propane, and other petro-leum fractions.

Generating Power from Propane

Advantages	Disadvantages
Propane generators are portable.	Their portability makes them easy targets for thieves.
Power can be made available in an emergency.	Generators are very noisy.
Propane is readily available.	Propane is a relatively expensive form of fuel.

4. (Answers will vary.) Geothermal energy is very useful in areas that are geographically suitable, but few such areas exist in Canada. Solar energy is highly useful for small-scale energy production and many homes already use this source for home and water heating. Canada does not get sufficient intense sunshine for large-scale production.
5. (Answers will vary.) Hydrogen fuel has potential in combustion engines, but probably more in fuel cell application as suggested at the Ballard web site provided.
6. (Answers will vary.) The Chernobyl disaster was a significant example of human error leading to catastrophic short- and long-term effects.

CHAPTER 5 LAB ACTIVITIES

INVESTIGATION 5.1.1 MEDICAL COLD PACKS

(Page 347)

Experimental Design
(a) Add a measured mass of the unknown salt to a measured mass of water and stir to dissolve the solid. Measure the temperature change that occurs in the water, and use calorimetric calculations to determine an experimental enthalpy of solution which may be compared to accepted values.

(b) mass of water $= m_1$

mass of solid $= m_2$

initial temperature of water $= T_1$

final temperature of water $= T_2$

$q = mc\Delta T$

$q = m_1(4.18)(T_1 - T_2)$

enthalpy of solution $= \dfrac{q}{m_2}$

Procedure
(c) 1. Measure 100 g of water into a Styrofoam cup.
   2. Measure its initial temperature.
   3. Add a measured mass of the unknown salt to the water.
   4. Stir to dissolve the solid, and measure the minimum final temperature of the solution.

Analysis
(d) See above. A mass of 10 g of ammonium chloride would absorb about 2800 J of heat, causing a temperature change in 100 g of water of about 6.7ºC.

Evaluation
(e) % difference $= \dfrac{|\text{accepted value} - \text{experimental value}|}{\text{accepted value}} \times 100\%$

(f) We are not completely confident: Errors could occur in measurements of mass or temperatures, or as a consequence of heat loss to the air.
(g) Since the temperature change in the water would be too small, the calculated heat of solution would be too low.
(h) Since the temperature change in the water would be too small, the calculated heat of solution would be too low.