

Env. - Complete 1 circled question per snow day !!

- China relies on coal for two-thirds of its commercial energy usage, partly because the country has abundant supplies of this resource. Yet China's coal burning has caused innumerable and growing problems for the country and for its neighboring nations. Also, because of the South Asian Brown Clouds (**Core Case Study**), the Pacific Ocean and the West Coast of North America are experiencing air pollution resulting from China's use of coal. Do you think China is justified in developing this resource to the maximum, as other countries—including the United States—have done with their coal resources? Explain. What are China's alternatives?
- Considering your use of motor vehicles, now and in the future, what are three ways in which you could reduce your contribution to photochemical smog?
- Should tall smokestacks (see chapter-opening photo) be banned to help prevent downwind air pollution and acid deposition? Explain.
- Explain how sulfur impurities in coal can lead to increased acidity in rainwater and to the subsequent depletion of soil nutrients. Write an argument for or against requiring the use of low-sulfur coal in all coal-burning facilities.
- If you live in the United States, list three important ways in which your life would be different if citizen-led actions during the 1970s and 80s had not led to the Clean Air Acts of 1970, 1977, and 1990, despite strong political opposition by the affected industries. List three important ways in which your life in the future might be different if such actions do not lead now to the strengthening of the U.S. Clean Air Act. If you do not live in the United States, research the air pollution laws in your country and explain if and how they could be strengthened.
- List three ways in which you could apply Concept 18-6 to making your lifestyle more environmentally sustainable.
- Congratulations! You are in charge of the world. Explain your strategy for dealing with each of the following problems: (a) indoor air pollution, (b) outdoor air pollution, (c) acid deposition, and (d) ozone depletion.

Doing Environmental Science

Find out whether or not the buildings at your school have been tested for radon. If so, what were the results? What has been done about any areas with unacceptable levels of radon? If this testing has not been done, talk with school officials about having it done. You could also test

for radon in your room or apartment or in the main living area of the house or building where you live. (Radon testing kits are available at affordable prices in most hardware stores, drug stores, and home centers.)

Global Environment Watch Exercise

Go to the *Ozone Depletion* portal and use the information to determine the latest research on the effectiveness of international efforts to reduce the use of CFCs. Research

the use of substitutes such as HFC-22 and report on any potential pitfalls related to using such substitutes. What, if anything, is being done to address these problems?

Data Analysis

The U.S. Clean Air Act limits sulfur emissions from large coal-fired boilers to 0.54 kilograms (1.2 pounds) of sulfur per million Btus (British thermal units) of heat generated. (1 metric ton = 1,000 kilograms = 2,200 pounds = 1.1 ton; 1 kilogram = 2.20 pounds.)

- Given that coal used by power plants has a heating value of 27.5 million Btus per metric ton (25 million Btus per ton), determine the number of kilograms (and pounds) of coal needed to produce 1 million Btus of heat.

- About 10,000 Btus of heat input are required for an electric utility to produce 1 kilowatt-hour (kwh) of electrical energy. How many metric tons (and how many tons) of coal must be supplied each hour to provide the input heat requirements for a 1,000-megawatt (1-million-kilowatt) power plant?
- Assuming that this power plant uses coal with 1.00% sulfur and operates at full capacity 24 hours per day, how many metric tons (and how many tons) of sulfur will be released into the atmosphere each year?