

INTEGRATING ENVIRONMENTAL SCIENCE

20

Two Environmental Poisons

Some natural substances and some manufactured materials are known to be environmental poisons. Such materials are harmful to living things and the environment.

Mercury Poisoning

The silvery element mercury is poisonous if ingested. Like most other environmental poisons, the effect of poisoning from mercury depends on the amount of the mercury ingested and the length of exposure to it. If large amounts of mercury are ingested, the kidneys become clogged. This prevents the body from ridding itself of waste products, causing death within hours.

Mercury poisoning can also occur if very small amounts of mercury are ingested over a period of many years. Small amounts of mercury can enter the body through the lungs and skin. Prolonged exposure to mercury can result in loss of appetite and weight, changes in mental ability and personality, and loosening of the teeth.

The Dangers of Asbestos

Asbestos is the common name for a number of minerals that can be separated into long fibers. The fibers can be combined with other materials to make fireproof, long-lasting fabric as well as paper, building materials, and parts for use in cars and other machines. Asbestos was widely used in many countries, including the United States, until the 1970s, when it was discovered to be a health hazard.

Asbestos releases tiny, invisible fibers into the air. When the fibers are inhaled over a prolonged period of time, the lungs are damaged. Inhalation of asbestos fibers can result in asbestosis, a lung condition that reduces the lungs' ability to absorb oxygen. Asbestos fibers can also cause mesothelioma, a type of lung cancer.

Your Turn to Think

1. What organ is affected by exposure to large amounts of mercury?
2. What makes asbestos hazardous?
3. Many buildings built in the 1960s and 1970s used asbestos materials for insulation. Explain why it might be dangerous to remove the asbestos in these buildings.

CONNECTION TO SOCIAL STUDIES

21

● TVA: Finding Solutions

When Franklin D. Roosevelt established the Tennessee Valley Authority in 1933, he had in mind an agency that would find creative solutions to the environmental and economic problems of the day. He believed that a single agency with control over a variety of problems could look at each problem in a broader context. Roosevelt hoped this integration would lead to better, more permanent solutions.

Roosevelt's idea was a success. Over the years, TVA has been responsible for power production, river navigation, flood control, malaria prevention, reforestation, and erosion control in the Tennessee Valley. For example, in the 1930s, TVA built dams to control flooding, improve navigation, and generate electric power. The use of electricity made farms more productive. It also brought new industries into the area, supplying people with much-needed jobs.

New Challenges for TVA

Today, TVA uses its integrated approach to find solutions to new problems. For example, in 1999, TVA formed a partnership with the city of Memphis to use greenhouse gases from the city's wastewater treatment plant to produce electricity. TVA will mix the gases, mostly methane and carbon dioxide, with coal and use the resulting fuel to generate electricity.

This partnership will benefit both Memphis and TVA. The removal of greenhouse gases from the atmosphere will increase air quality in Memphis. TVA will benefit through reduced fuel costs. In addition, by using greenhouse gases, TVA will be less dependent on coal, a nonrenewable energy resource.

Your Turn to Think

1. How did TVA's electricity production in the 1930s benefit the surrounding area?
2. Explain the newly formed partnership between TVA and Memphis.
3. Explain why reducing TVA's dependence on coal is important.