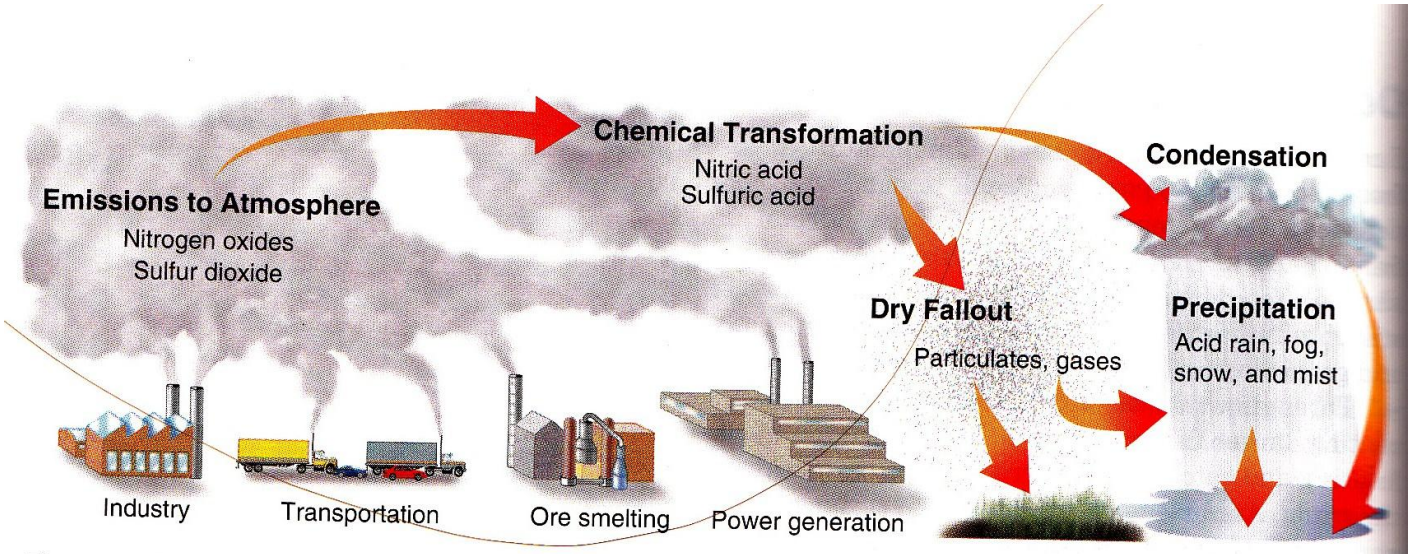
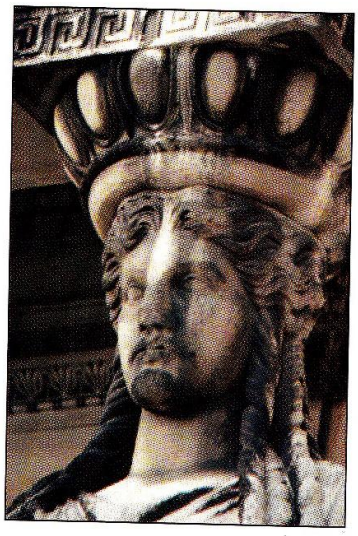


Figure 6–12 Acid rain results from the chemical transformation of nitrogen and sulfur products that come from human activities. The face of the statue (below) shows damage from acid rain.
Interpreting Graphics *What pathways do the chemicals in atmospheric emissions take on their way to becoming acid rain?*



Air Resources

Air is a common resource that we use every time we breathe. Although it's easy to take air for granted, preserving air quality remains a challenge for modern society.

If you live in a large city, you have probably seen **smog,** a mixture of chemicals that occurs as a gray-brown haze in the atmosphere. Smog is primarily due to automobile exhausts and industrial emissions. Because it threatens the health of people and animals with asthma or respiratory conditions, smog is considered a pollutant. A **pollutant** is a harmful material that can enter the biosphere through the land, air, or water.

The burning of fossil fuels can release pollutants that cause smog and other problems in the atmosphere. Potentially toxic chemicals, like nitrates, sulfates, and particulates (pahr-TIK-yoo-lits), are especially troublesome in large concentrations. Particulates are microscopic particles of ash and dust that can enter the nose, mouth, and lungs, causing health problems over the long term. Today, most industries use technology to control emissions from factory smokestacks. Strict automobile emission standards and clean-air regulations have improved air quality in many American cities, but air pollution is an ongoing problem in other parts of the world.

Many combustion processes, such as the burning of fossil fuels, release acidic gases containing nitrogen and sulfur compounds into the atmosphere. When these gases combine with water vapor in the air, they form drops of nitric and sulfuric acids. These strong acids can drift for miles before they fall as **acid rain.** Acid rain can kill plants by damaging their leaves and changing the chemistry of soils and standing-water ecosystems. Acid rain may also dissolve and release toxic elements, such as mercury, from the soil, freeing those elements to enter other portions of the biosphere. **Figure 6–12** shows the processes that lead to the formation of acid rain.

CHECKPOINT *What is a pollutant?*