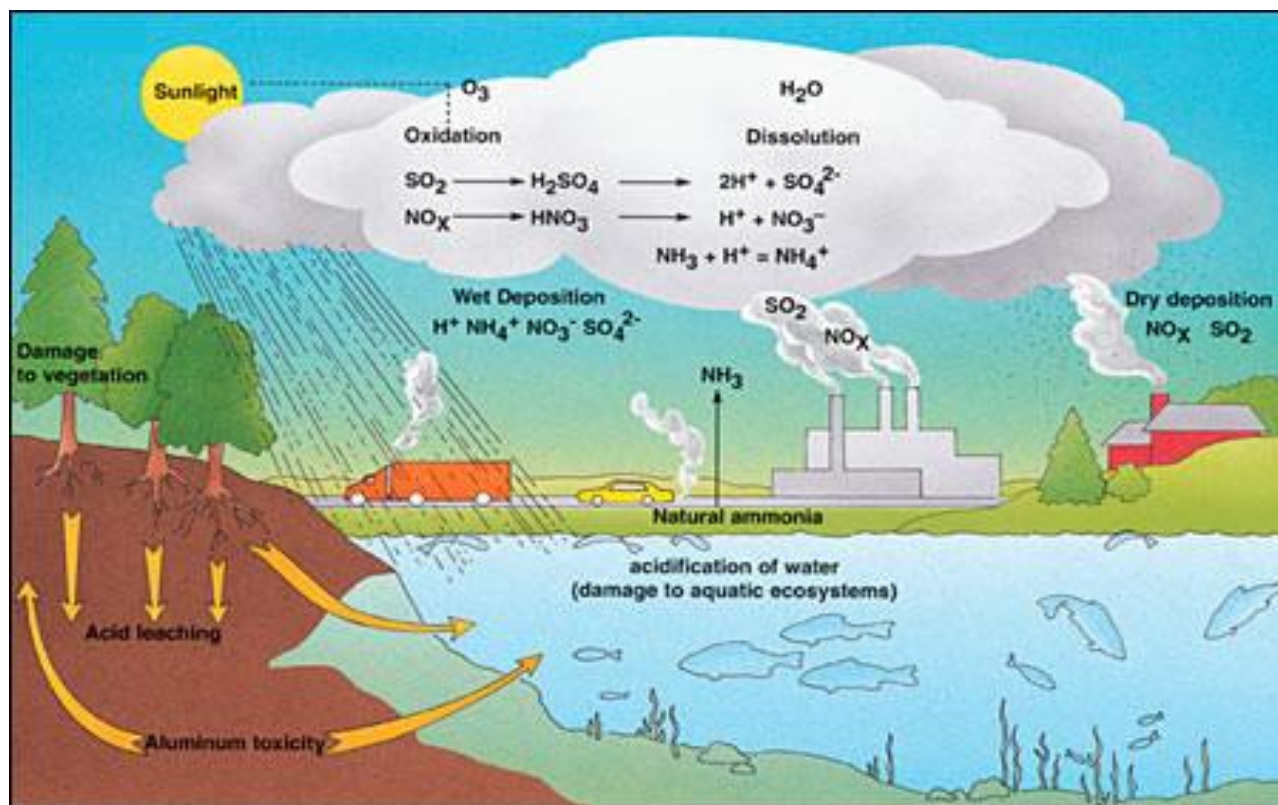


## 1.10: Acid Precipitation

Technology can be seen as a double-edged sword. It cuts through human problems with one edge while scarring the environment with the other. The technologies that contribute to acid precipitation are an example. Coal-burning plants, cars and trucks, metal smelters, and oil refineries provide energy, transport, and materials for the industrial world. At the same time, they produce oxides of sulfur and nitrogen, among the most dangerous of air pollutants.

### The Problem with Combustion

Sulfur dioxide ( $\text{SO}_2$ ), a poisonous gas, is released when fossil fuels are burned. Nitrogen oxides ( $\text{NO}_x$ ) are released from automobile combustion and power plants. When the oxides of sulfur and nitrogen are released into the air, they combine with water to form acids. Upon entering the water cycle, the acids return to Earth in the form of snow or rain called acid precipitation.



SNC1P

## **The Effects of Acid Precipitation**

Acid precipitation eats away marble, metal, mortar, rubber, and plastics. In humans, it can worsen respiratory problems such as asthma and bronchitis. In higher concentrations the acids can cause eyes to water, and may even irritate the skin.

Within ecosystems, acid precipitation places many land and water organisms at risk. It kills microbes in the soil that are essential to the nitrogen cycle, and it increases the leaching of nutrients from the soil. In addition, aluminum released from soil particles can be carried into lakes with the spring runoff, where it kills fish and other aquatic life. In forests, acid precipitation can damage leaves directly, but the most serious effects happen because the damaged tissues of trees become targets for fungus or bacterial infections. Trees that grow in areas low in limestone, where the soil has little capacity to neutralize the acid, are the most likely to be damaged.

## **Cars and Acid Precipitation**

The greatest threat to the environment from acid precipitation is the car, and the problem may be getting worse. Although modern vehicles using modern fuels produce far less sulfur and nitrogen oxides than they used to, there are many more millions of them on the road. Strict emission controls, the development of cleaner fuels, and reducing the use of cars are all steps in the right direction.

At a time when developed countries are looking at reducing the use of cars to reduce pollution, the demand for cars in developing countries is increasing because owning a car is seen as a mark of success and wealth. Canada and other developed countries are leading an attempt to reduce air pollution by encouraging all nations to reduce their use of cars. Is it fair for Canadians to expect people in other parts of the world to rely less on cars when they are just beginning to enjoy the benefits? Should Canadians be expected to act first to show a commitment to reducing pollution?

**Worksheet 1.10: Acid Precipitation**

1. In your own words, explain the causes of acid precipitation.
2. List three sources of the pollutants that cause acid precipitation.
3. Describe how acid precipitation can kill trees.
4. In a diagram, describe problems caused by acid precipitation when it reaches vulnerable soil.
5. Motor vehicles are probably the largest source of the pollutants that cause acid precipitation. Suggest some ways that you could change your transportation habits to reduce the amount of pollutants produced.