Gases and Atmospheric Chemistry

UNIT 4 OVERALL EXPECTATIONS

- What laws govern the behaviour of gases?
- What are the relationships between the temperature, pressure, volume, and number of moles of a gas?
- What modern technologies depend on gas chemistry?
- What environmental phenomena and issues are related to gases?

Unit Issue Prep

You probably ride in a car or a bus several times a week, if not every day. What gases do these vehicles produce? How can we prevent environmental harm from vehicle emissions? Think through this issue as you study the material in Unit 4. You will have a chance to debate your point of view with your classmates at the end of the unit.

Did you realize that air turbulence is caused by the behaviour of gases? Turbulence can be caused by changes in air pressure in the atmosphere. Airplanes are designed, however, to adjust to the behaviour of atmospheric gases. The combustion in the engines, the shape of the airplane, and the air mixture that passengers breathe are all designed to take gas behaviour into account.

Gas behaviour and gas reactions are part of everyday life. For example, photosynthesis is a reaction that uses carbon dioxide gas, along with other reactants, to produce oxygen gas. High in the atmosphere, ozone gas interacts with dangerous ultra-violet light to protect us from the Sun's harsh rays.

Scientists study gases to understand how they react. This understanding can help prevent further damage to the environment. It also leads to advances in gas-related technology. Carbonated soft drinks, air bags, medical anaesthetics, scuba equipment, and rocket engines are all based on gas chemistry.

In this unit, you will learn about the relationships between the pressure, temperature, volume, and number of moles of a gas. You will see how all these relationships are combined in the ideal gas law: an equation that predicts the behaviour of a gas in almost any situation.