# Molar Volume of a Gas

## OBJECTIVES

- **Determine** the volume of hydrogen produced by the reaction of a known mass of magnesium with hydrochloric acid.
- **Compute** the volume of the gas at standard temperature and pressure.
- **Relate** the volume of gas to the moles of magnesium reacted.
- **Infer** the volume of one mole of gas at standard temperature and pressure.

## INTRODUCTION

Magnesium is an active metal that readily reacts with hydrochloric acid to produce hydrogen gas. In this experiment, you will react a known amount of magnesium with hydrochloric acid and collect and measure the volume of hydrogen gas produced. From the volume of the gas measured at atmospheric pressure and the temperature of the lab, you can calculate the volume of the gas at standard temperature and pressure. Knowing the mass of magnesium, you can calculate the moles of magnesium consumed and determine the volume of hydrogen at STP produced by the reaction of one mole of magnesium. This conclusion can then be related to the balanced equation for the reaction.

## SAFETY

**Always wear safety goggles and a lab apron to protect your eyes and clothing.** If you get a chemical in your eyes, immediately flush the chemical out at the eyewash station while calling to your teacher. Know the location of the emergency lab shower and the eyewash station and the procedure for using them.

**Do not touch any chemicals.** If you get a chemical on your skin or clothing, wash the chemical off at the sink while calling to your teacher. Make sure you carefully read the labels and follow the precautions on all containers of chemicals that you use. If there are no precautions stated on the label, ask your teacher what precautions you should follow. Do not taste any chemicals or items used in the laboratory. Never return leftovers to their original containers; take only small amounts to avoid wasting supplies.

**Call your teacher in the event of a spill.** Spills should be cleaned up promptly, according to your teacher's directions.

**Never put broken glass in a regular waste container.** Broken glass should be disposed of properly according to your teacher's instructions.