

# Chemistry of Gases— Demonstration Summaries and Concepts



## ***Collecting Gases by Water Displacement—Demonstration Procedure***

Gas generator bottles provide an easy way to generate and collect gas samples for demonstration purposes. Specific instructions are included for generating hydrogen gas and collecting the gas by water displacement.

## ***Underwater Fireworks—Chemical Demonstration***

Every day can be the 4th of July with this exciting demonstration. Chlorine and acetylene gas are bubbled into the bottom of a large graduated cylinder filled with water. As the bubbles collide, the two gases react to produce instantaneous, bright flashes of light.

## ***Flaming Vapor Ramp—Safety Demonstration***

Vapors from a volatile, flammable liquid are heavier than air and can travel along a countertop to an ignition source. Their flames will quickly follow the vapor trail back to the source and may result in a large fire or explosion. Illustrate the importance of fire safety rules with this safe demonstration of the density and flammability of hydrocarbon vapors.

## ***The Collapsing Bottle—A Carbon Dioxide Demonstration***

Can an invisible gas cause a two-liter plastic soda bottle to suddenly collapse in on itself? Fill a plastic soda bottle with carbon dioxide gas and add sodium hydroxide solution. Observe as the bottle gets hot and then collapses as it is crushed inward by the force of atmospheric pressure.

## ***Solubility of Carbon Dioxide—Dry Ice Color Show***

Add a small piece of dry ice to a series of colored indicator solutions and watch as the solutions immediately begin to “boil” and change color. Teach students about sublimation and the acid–base properties of dry ice with this colorful and “cool” demonstration.

## ***Solubility of Ammonia—Indicator Color Show***

Teach students about gas solubility and the acid–base properties of ammonia gas with this indicator color show. Ammonia gas is collected in jumbo pipet bulbs and a drop of indicator solution is drawn into each pipet bulb. The ammonia gas instantly dissolves and the bulb immediately fills with a different color indicator solution.

## **Concepts**

- Generation of gases
- Water displacement
- Hydrogen gas
- Chlorine gas
- Acetylene gas
- Chemical properties
  
- Density of gases
- Flammability
- Fire safety
  
- Carbon dioxide gas
- Acid–base reactions
- Atmospheric pressure
  
- Carbon dioxide gas
- Sublimation
- Acid–base indicators
  
- Ammonia gas
- Gas solubility
- Acid–base indicators