# Sweet 16 Chemistry of Gases Tournament



Do your students eagerly compete to fill out their "March Madness" tournament brackets? Have some fun and inspire your students with March Madness chemistry! This activity combines the popularity of "bracketology" with a review of the preparation and properties of common gases. The historical foundation of modern chemistry was built on the study of gases, such as experiments with hydrogen and oxygen in the 18th century that led to the modern definition of an element versus a compound. From these historical roots, the study of gases continues to influence our lives. The role of "greenhouse gases," in particular, remains a vital area of research—and may help determine the winner of the Sweet 16 Chemistry of Gases tournament!

### **Review of Concepts**

- Common gases
- Acid-base properties
- Ideal gas law

- Solubility of gases in water
- Molar volume of gases at STP
- Greenhouse gases

#### **Tournament Rules**

The rules for filling out the tournament bracket are summarized below. A supplementary chemical reactions worksheet has been provided to help identify the contestants in the Sweet 16 Chemistry of Gases tournament.

- First round: Predict the name and formula of the gaseous product obtained in a chemical reaction involving the reactants listed in the first round. The gas "escapes" to the second round!
- Second round: Compare the solubility of the gases in water. The winner is the gas that dissolves in water to form an acidic solution.
- Semifinals: Calculate the density of each gas in g/L based on its molar mass (g/mole) and the molar volume of an ideal gas at STP (22.4 L/mole). The winner is the gas that is **more** dense.
- Final: The winner of the tournament is a "greenhouse gas" that is produced in large quantities in volcanic emissions.

## Connecting to the National Standards

This laboratory activity relates to the following National Science Education Standards (1996):

Unifying Concepts and Processes: Grades K-12

Constancy, change, and measurement

Content Standards: Grades 5-8

Content Standard B: Physical Science, properties and changes of properties in matter

Content Standard F: Science in Personal and Social Perspectives, natural hazards

Content Standards: Grades 9-12

Content Standard B: Physical Science, structure and properties of matter, chemical reactions

Content Standard D: Earth and Space Science

Content Standard F: Science in Personal and Social Perspectives, environmental quality, natural and human-induced

hazards

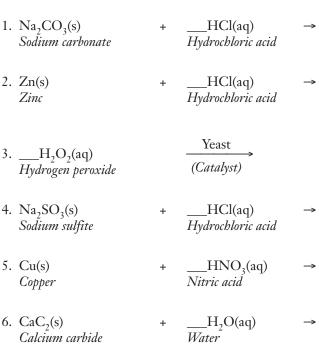
#### Extension

Add small pieces of dry ice to a series of acid-base indicator solutions—the solutions immediately begin to "boil" and change color. Teach students about sublimation and the acid-base properties of carbon dioxide with this colorful and "cool" demonstration!

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### Supplementary Chemical Equations Worksheet

Predict the products and balance the following chemical equations to identify the contestants in the Chemistry of Gases tourna-



HCl(aq)

Hydrochloric acid

Heat

8. NH<sub>4</sub>NO,

Sodium hypochlorite

7. NaOCl(aq)

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