



# Introduction to Chemistry— Experiment Summaries and Concepts

## ***Observation and Experiment—Introduction to the Scientific Method***

The scientific method is not a rigid path, it is a process—a process of discovery. Discovery begins as students make careful observations and then ask key questions about what they have observed. The process of discovery continues as students design controlled experiments to answer their questions. A fun and easy way to introduce students to the study of chemistry—students can actually hold an experiment in their hands to see and feel what chemistry is all about.

## ***Introduction to Measurement—Mass, Length, and Volume***

Much of what we know about the physical world has been obtained from measurements made in the laboratory. This traditional experiment introduces important lab skills students will use throughout the year. Students make measurements using the metric system, learn the meaning of significant figures, and compare the accuracy and precision of laboratory measurements.

## ***Discovering Density—Looking for Patterns and Trends***

When measurements are made, sometimes patterns and trends emerge and relationships among different variables become evident. One of the best ways to recognize the existence of relationships involving numerical data is to plot the data on a graph. Don't just give your students the definition and equation for density—let them discover the concept for themselves. Students collect mass and volume data, analyze the relationship, and apply it to identify “silver or gold.”

## ***Beverage Density—Sugar Content Analysis***

What factors determine the density of a solution? Can the density of a solution be used to determine how much of a particular substance is dissolved in it? In this interesting adaptation of a traditional density experiment, students measure the densities of five reference solutions containing known amounts of sugar, then use this information to determine how much sugar is in their favorite beverages. A great way to show students how chemistry relates to the “real world.”

## ***Separation of a Mixture—Percent Composition***

Most of the substances that we come in contact with every day—from the air we breathe to the water we drink and the foods we eat—are mixtures. How can the components of a mixture be separated and identified? In this classic, inquiry-based experiment, students study the physical properties of substances, then design a procedure to separate and analyze a mixture.



## ***What Is a Chemical Reaction?—Evidence of Change***

We live in a world of change. Within our bodies, we depend on complex chemical changes to breathe, to see, indeed to grow. What is a chemical change? How can we identify a chemical change? In this microscale experiment, students gather evidence to determine that a chemical change has taken place. Identifying chemical change, students also discover patterns in chemical reactivity.



### **Concepts:**

- Chemistry
- Scientific method
- Observations
- Experiment
  
- Measurement
- Accuracy vs. precision
- Significant figures
- Experimental error
  
- Mass and volume
- Density
- Accuracy vs. precision
- Water displacement
  
- Density
- Solution
- Concentration
- Calibration curve
  
- Mixture vs. pure substance
- Physical changes
- Physical properties
- Mass percent composition
  
- Chemical change
- Chemical reaction
- Chemical properties
- Conservation of mass