

# Chemistry Middle School Lesson Plan

## Changes in Matter

*Grade Level:* 6<sup>th</sup> grade

*Prepared by:*  
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**Objectives:** Students will develop evidence to classify changes as either physical or chemical and explore properties that effect changes in matter.

### Science standards

**11A:** Demonstrate that students can apply the concepts, principles, and processes of scientific inquiry by (1) constructing an inquiry hypothesis; (2) designing and conducting a scientific inquiry investigation; (3) collecting and organizing data; (4) interpreting the results of analysis to produce findings; and (5) reporting the results of an investigation.

**12C3b:** Model and describe the chemical and physical characteristics of matter (e.g., atoms, molecules, elements, compounds, mixtures).

**13A:** Demonstrate that students can apply scientific habits of mind.

### Background

#### Matter

Matter is defined to be anything that has mass as well as volume. Matter undergoes changes when acted upon by forces. Matter changes involve energy changes. The study of chemistry emphasizes matter and its changes.

#### States of Matter

The three most common states of matter include solids, liquids, and gases. The primary differences between the states of matter involve the spacing between molecules as well as the forces that hold the molecules

together. Solids are usually most closely packed, have the most restricted motion and stronger forces pulling the particles together. Liquids usually are less dense than solids with intermediate forces and more rotating movements. Gas particles disperse with very little interactions between molecules and have quite low density.

## Changes in Matter

Changes in matter are generally categorized as physical, chemical, or nuclear. The physical changes do not create new substances; melting, evaporation, and dissolving are typical physical changes where the spacing between the molecules changes without creating a new substance. Chemical changes like iron rusting and burning gasoline create new substances. The creation of a new substance produces new properties like a new color, new odor or new taste. Another sign that often indicates a chemical change is bubbling without heating due to the formation of a new gas. Energy changes accompany all changes in matter but are usually larger and more measurable in chemical changes. The new substance formed in a chemical is a result of some change in the reactants on the electron level. The last type of change is a nuclear change like the nuclear fusion occurring on the sun or nuclear fission occurring at some power plants. These changes produce huge energy changes as the nucleus of atoms are changed.

### Introduction

Students will classify changes in matter as physical and chemical changes based on observations recorded in a lab activity. Students will design a plan to demonstrate pressure change as a result of Alka-Seltzer mixing with water in a capped film canister. Students will perform an activity that will demonstrate chemical and/or physical changes and record their observations. The recorded observations will act as support for their classifying the type of change based on experimental evidence.

### Materials

1. Alka-Seltzer tablets

2. Water in water bottles
3. Film canisters with lids
4. Spatulas
5. Balances
6. Graduated cylinders – small ones 10 – 25 mL
7. Mortar and pestle sets
8. Dropper pipettes
9. Safety goggles/glasses
10. Paper towels

### Activity procedure

1. Set Induction: Matter or Not
2. Contrast Physical and Chemical Changes
3. Classify examples with think-share-pair groups
4. Pose the question and give instructions for the lab
5. Groups perform investigation and gather data
6. Summarize and critique the groups' results
7. Individual reflection – exit card “What new ideas or questions do you have as a result of today’s lesson?” “What did you learn about matter and its properties doing this investigation?”
8. Enrichment: Design an experiment that will send the lid or canister the furthest in the air.

### Lab Form and Power Point Presentation Links

[\*\*Lab Form\*\*](#)

[\*\*Power Point Presentation\*\*](#)