

A Chemical or Physical Change: What is it?

Introduction

A chemical change is when the atoms re-arranged. It just doesn't do it on its own. Energy is needed before or transferred after the experiment. Evidence that a chemical changes has occurred is a gas is produced, the temperature changes, a substance appears, a solid is formed, a color change occurs, a new odor is produced, etc. A physical change does not involve any change in the chemical composition of a substance such as melting, freezing and dissolving. You can get back what you started with by reversing the process because no energy exchange has occurred?

The Diet Coke® and Mentos® experiment is all over the Internet, but how does it work? Is it a chemical or a physical change? You might think that there is some ingredient in a Mentos® candy that is causing a chemical reaction with the soda, like the way baking soda reacts with vinegar. But is it a chemical reaction or a physical change? What is the evidence that a chemical change occurs?

The first half of the story is something called a saturated solution, which is in this case a carbonated beverage or soda pop. All of the bubbles in a soda pop that make you burp come from carbon dioxide gas that is dissolved into the soda solution. This is a gas – liquid solution. While the soda is in the bottle, the gas is kept in solution by the pressurized conditions inside the bottle. But after you pour some soda into a glass, the gas bubbles stay trapped in the solution by the surface tension of the water. No wonder soda makes you burp— those gas bubbles are just sitting in there waiting to escape!

Objective:

1. Identify characteristics of a simple physical change (e.g. heating or cooling can change water from one state to another and is reversible)
2. Explain that matter has different states (e.g. solid, liquid, gas) and that each state has distinct physical properties
4. Identify types of solutions

Procedure:

1. Go outside
2. Ask the students what's in Diet Coke
 - a. You're looking for water and Carbon Dioxide
3. Dump about 5-9 Mentos into the Diet Coke and walk away
4. Have the students record their observations
5. Ask the students what kind of change occurred. What evidence was there. Take the temperature before and after.
 - a. There may be a more complicated chemical change occurring, but in general the mentos offer a rough surface for the CO₂ to form bubbles and escape from the Coke
6. Repeat with the same soda, what happened?