

Physical and Chemical Changes Lab

Introduction:

Chemistry is the study of matter and the changes it undergoes. These changes are classified as physical or chemical changes. When a physical change occurs, the physical properties of the substance – such as size, shape, density, or state – are altered, but its chemical make-up remains the same.

Chemical changes, also known as chemical reactions, result in the formation of one or more new substances with different chemical properties and composition from the original material. A chemical change can be indicated by any of the following observations:

1. change in color
2. production of heat, light or sound
3. evolution of a gas
4. formation of solid from 2 liquids (precipitation)

In this investigation, you will conduct tests on several substances and then use your data to determine whether the resulting changes are chemical or physical. As you observe each change, remember to ask yourself, “Has the change altered the identity of the substances?” Write down what you observe with all five senses.

Materials:

1 candle
matches or lighter
measuring cups and spoons
10 pennies
table salt (NaCl)
vinegar
1 shallow glass or plastic bowl
water

1 nail or screw
paper towels
baking soda
1 piece of paper
plastic spoons
plastic cups

Procedure:

1. Burning Candle:

- a. Secure the candle to a candleholder.
- b. Light the candle with matches.
- c. Allow the candle to burn for 1-2 minutes.
- d. Record your observations here:

2. Clean Pennies:

- a. Pour 1 teaspoon of salt and $\frac{1}{4}$ cup of vinegar into the bowl.
- b. Stir this until the salt dissolves.
- c. Place all 10 pennies into the solution. Allow these to sit for 5 minutes.
- d. Set your bowl aside, you'll need it for step 4!
- e. Record your observations on the change in your pennies here:

3. Oxidizing Pennies:

- a. Take half of your pennies from step 2 and place them on a paper towel to dry.

- b. Take the other half and rinse them well under running water. Place these on a second paper towel. Make sure you know which pile is which!
 - c. Allow these dry for about an hour.
 - d. The pennies that were rinsed should still look clean and shiny, but the other set of pennies should have oxidized. Record your observations here:
- 4. Copper Plated Nails:
 - a. Place a nail or a screw so that it is half in the solution you used in step 2 to clean the pennies.
 - b. Allow 30 minutes to pass and then take out the nail/screw.
 - c. Record your observations here:
- 5. Tearing Paper:
 - a. Tear a small piece of paper into tiny pieces.
 - b. Record your observations here:
- 6. Baking soda (NaHCO_3) and acetic acid ($\text{HC}_2\text{H}_3\text{O}_2$):
 - a. Measure out a $\frac{1}{2}$ tablespoon of baking soda into a plastic cup
 - b. Over your kitchen sink, add 1 cup of vinegar to the baking soda and allow them to mix.
 - c. Record your observations here:

Conclusions:

For each of the six experiments you did, tell whether you witnessed a chemical or physical change and why. Answer in complete sentences. (For example: Tearing paper was a ____ change because ____). Use your observations and notes for your explanation of why. Saying it was a chemical change because something new was made is not acceptable. You must use your observations to explain how you know something new is made.

1. Burning Candle:

2. Clean Pennies:

3. Oxidizing Pennies:

4. Copper Plated Nails:

5. Tearing Paper:

6. Baking soda (NaHCO_3) and acetic acid ($\text{HC}_2\text{H}_3\text{O}_2$):