

Name: \_\_\_\_\_

Date: \_\_\_\_\_



## Investigation #1: Physical or Chemical Change?

### Background information:

In chemistry, the term *change* can refer to both **physical** and **chemical changes**. In the simplest sense, a physical change is a change in the *form* of the original substance. A **chemical change** is a change in the *composition* of the original substance. A chemical change is also called a **chemical reaction**.

Chemists have developed a list of common signs that may indicate the occurrence of a **chemical change**. These include:

1. Bubbles of gas appear
2. A precipitate (solid) forms
3. An unexpected color change occurs
4. Gain or release of energy (heat or light)
5. A change in volume occurs
6. A change in electrical conductivity occurs
7. A change in melting point or boiling point occurs
8. A change in odor or taste occurs
9. A change in a distinctive chemical or physical property occurs;  
**not easily reversed**

**Physical changes** occur when objects undergo a change that does not change their chemical nature. A physical change involves a change in physical properties. Physical properties can be observed without changing the type of matter. Examples of physical properties include: texture, shape, size, color, odor, volume, mass, weight, and density. Change of state (ie. solid to liquid)

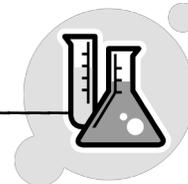
- Creation or separation of a **mixture** (including homogeneous mixtures, where the solute may not be visible)
- Physical deformation (cutting, denting, stretching, etc.)
- Physical relocation (moving an object)

Some examples of physical and chemical changes:

- If a piece of paper is cut up into small pieces, it is still paper.
- If you add water to a piece of string a chemical or physical reaction will not take place.
- Mixing sugar with water to dissolve sugar in the water. However, if one baked a cake with flour, water, sugar, and other ingredients, new substances would appear. Chemical reactions occur in the baking process, and the changes are chemical changes.

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## Investigation #1: Physical or Chemical Change?

### Lab Experiment #1

Materials: cornstarch, water, cup, stir stick

1. Place 30 mL of cornstarch in a cup
2. Add 10 mL of water and stir well
3. Place some of the mixture on a table.
4. Touch it with your fingertips

Is the product a liquid or a solid?

Did you observe a physical or chemical change?

Is the product a mixture or a pure substance?

### Lab Experiment #2

Materials: steel wool, vinegar, cup

1. Place the steel wool in the bottom of a cup.
2. Add 50 mL of vinegar.
3. Wait for 15 minutes.
4. Observe any changes.
5. Label the cup with your name and place in designated location in room.  
Observe it over the course of 3 or 4 days.

Did you observe a physical or chemical change?

What evidence is there that a physical or chemical change has taken place?

### Lab Experiment #3

Materials: 40 mL of skim milk, 10 mL of vinegar, 3 plastic cups, filter paper or coffee filter, plastic spoon, baking soda, 2 pieces of paper

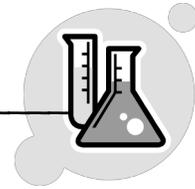
1. Pour about 40 mL of skim milk into a plastic cup. Add about 10 mL of vinegar and stir to mix.
2. Pour the mixture through a coffee filter into another cup.
3. Use a plastic spoon to scrape off the solid material that collects on the filter. Place this material in a third cup.
4. Add a pea-sized amount of baking soda to the third cup. Stir to mix.
5. You have made a natural glue! Try gluing two pieces of paper together to see how well the glue works.

Is making glue an example of a physical change or a chemical change?

What evidence is there that a physical or chemical change has taken place?

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**Directions:** You and your partner must select one experiment from the choices below. Follow the instructions for your experiment and complete the *scientific process* (hypothesis, observations, conclusions) on this worksheet. Note: You must complete the hypothesis before you begin your experiment!

**Hypothesis (what you think will happen and why):** \_\_\_\_\_

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**Procedure:** (given)

**Observations** (What did you observe? Write a description. Draw a diagram w/labels.):

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