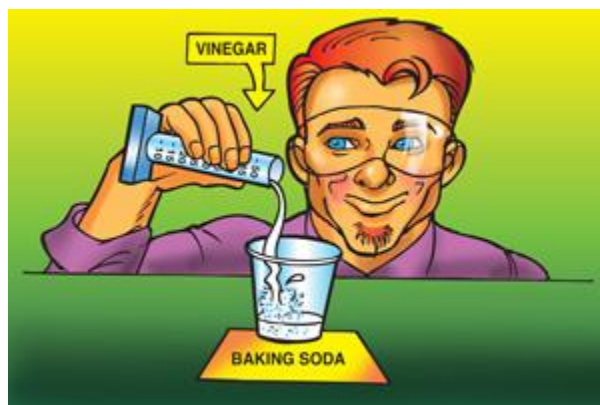


# Chemistry Lab: Chemical Reaction between Sodium Bicarbonate and Vinegar



## Names:

In this experiment you will learn about the chemical formulas of sodium bicarbonate and vinegar, and the individual elements these two compounds make up. You will also learn what a chemical equation is and what reactants and products are.

## Materials:

Sodium bicarbonate

Vinegar - Acetic Acid

Graduated Cylinder

Beaker

Triple Beam Balance

Spoon

Flask

Balloon

Paper Cup (do not get this wet - keep it dry)

Vernier Labquest

Vernier temperature probe

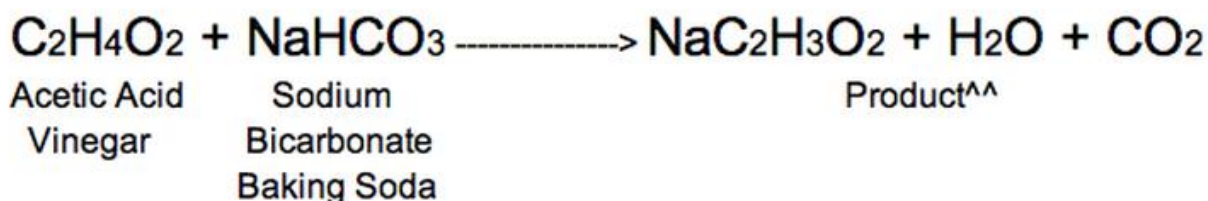
Background: Vinegar is acetic acid ( $C_2H_4O_2$ ) and water. Acetic acid is made of 2 carbon atoms, 4 hydrogen atoms, and 2 oxygen atoms. Baking soda is sodium bicarbonate ( $NaHCO_3$ ). Sodium bicarbonate is

made of 1 sodium ion, 1 hydrogen atom, 1 carbon atom, and 3 oxygen atoms.

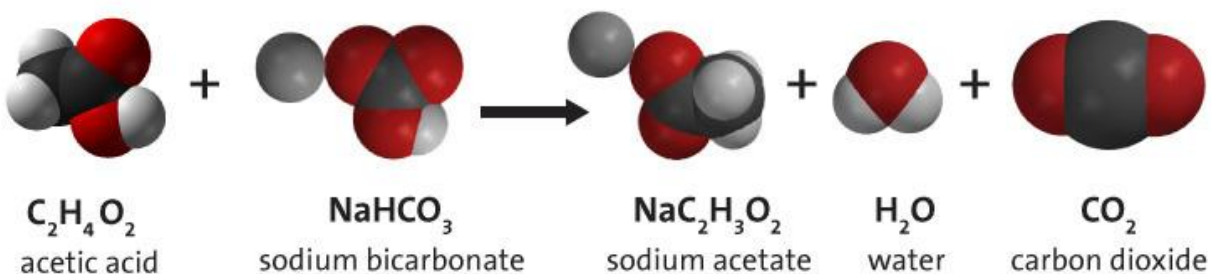
**Endothermic Reaction:** A chemical reaction in which heat is absorbed and the temperature decreases.

**Exothermic Reaction:** A chemical reaction in which heat is released and the temperature increases.

### Chemical Equation:



Reactants^^



### Procedures for Experiment #1:

1. Measure out 30 grams of sodium bicarbonate in a paper cup.
2. Measure out 40 milliliters of acetic acid in a graduated cylinder.
3. Pour the vinegar in your flask.
4. Pour the sodium bicarbonate in your flask - IMMEDIATELY PUT YOUR BALLOON ON THE MOUTH OF YOUR FLASK SO IT FITS SNUGGLY.
5. Observe and record what happens in the flask and the balloon. Describe in detail what is happening during this reaction: (Use red font in when writing your observations)

**Questions: (Insure your answers are in red font)**

1. What are the two reactants in this equation?
2. What are the three products in this equation?
3. What are the solids in this chemical reaction?
4. What are the liquids in this chemical reaction?
5. What are the gasses in this chemical reaction?
6. How many Total atoms of each are in the reactants of this equation?
  - a. Sodium (Na):
  - b. Carbon (C):
  - c. Hydrogen (H):
  - d. Oxygen (O):
7. How many Total atoms of each are in the products of this equation?
  - a. Sodium (Na):
  - b. Carbon (C):
  - c. Hydrogen (H):
  - d. Oxygen (O):
8. What gas is given off or produced?

**Procedures for Experiment #2:**

1. Turn on your Vernier Labquest and insure the temperature probe is attached. Record the temperature of the air here after 2 minutes: \_\_\_\_\_
2. Take the balloon off and give to Mr. Hanson
3. Dump out the solution in your flask into the sink.
4. Measure 15 grams of sodium bicarbonate in your paper cup.
5. Measure out 20 milliliters of acetic acid in your graduated cylinder.

6. Pour the sodium bicarbonate into your flask.
7. Pour the acetic acid into your flask.
8. **IMMEDIATELY:** put the temperature probe into the flask and stir the solution with the probe. **LOOOOOOOK!** At the temperature on the Labquest computer, record the temperature after 2 minutes of stirring and keep the temperature probe end in the solution at all times.. Insure it is either the highest temperature or the lowest temperature recorded.

**Questions:**

1. What kind of chemical reaction is this? Explain why?