

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

## **Lab Investigation: Effects of Carbon Dioxide on Air Temperatures in Sealed Plastic Bags**

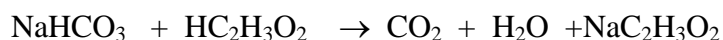
### **Objectives:**

- 1) To observe and measure how carbon dioxide affects air temperature in plastic bags when exposed to a light source.
- 2) To understand the connection between global warming and carbon dioxide emissions.
- 3) To understand how individuals can help lower carbon dioxide production.

### **Back Ground Information:**

Carbon dioxide is a trace gas that has existed in our atmosphere for billions of years. Scientists were not around then to measure the small amounts of CO<sub>2</sub>, but past CO<sub>2</sub> levels can be accurately measured by using ice core samples from glaciers. The gas was trapped in the glaciers as the glaciers formed. The CO<sub>2</sub> levels are measured in parts per million.

Many of you may also have seen the classic chemical reaction to demonstrate gas CO<sub>2</sub> production. When vinegar and baking soda are mixed, the following reaction takes place:



Lastly, carbon dioxide is released to the atmosphere when fossil fuels and other hydrocarbons are burned. Also, carbon dioxide is released through plant and animal respiration.

### **Lab Summary:**

Students will measure the internal air temperature of two 1- gallon plastic bags when exposed to light. One bag will contain a beaker with baking soda and vinegar and the other bag will contain just a beaker with vinegar. Students will use Vernier probes to measure temperatures in each bag for 10 minutes. Data will be recorded and graphed using LabPro/Logger Pro software. Students will analyze data when completed.

## Hypothesis:

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## Materials:

2- Vernier Temperature probes  
2- one gallon zip lock baggies  
80 ml. of vinegar  
balance

2-150 ml. beakers  
15 g. of baking soda  
light source- 100 W bulbs

## Procedure:

- 1) Hook up LoggerPro with two temperature probes.
- 2) Make sure computer is on and software recognizes two temperature probes.
- 3) Set up Data parameters- 10 minute duration, six readings per minute.
- 4) Place light on table. Keep distance between bags and light the same- approximately 24 inches.
- 5) In bag One, place beaker with 40 ml. of vinegar inside and insert temperature probe into middle of bag. Do not touch probe to beaker. Seal bag with temperature probe cord extending out of bag as demonstrated by instructor.
- 6) Repeat for Bag Two using 15 grams of baking soda to 40 ml. of vinegar in a 150 ml. beaker. Place beaker in baggie with temperature probe and seal bag.
- 7) Turn light on and click on Data Collect Icon to begin collecting data.

## Data Collection/Results:

Print out Data Table and Graph using software. Make sure graph has a title that accurately describes the data collected.

1. What were the initial temperature in Bag One and Bag Two?
2. What were the final temperatures in Bag One and Bag Two?
3. What were the temperature changes in Bag One and Bag Two during the ten minutes?

**Conclusions/Analysis:**

1. What major conclusion or conclusions can be derived from the data?
  
  
  
  
  
  
  
  
  
  
2. Were there any experimental design flaws? How could you improve the design of the activity?

**Application:**

1. If CO<sub>2</sub> level continue to increase as a result of burning fossils fuels, what are at least four ways that our planet will be affected.
  
  
  
  
  
  
  
  
  
  
2. How can you make a difference in limiting carbon dioxide production in the atmosphere?

