

Student  
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Chemistry I  
Date of report here

## Alka-Seltzer Lab

The focus of this lab is to investigate factors that influence how fast a reaction occurs.

### **Materials:**

- Box of Alka – Seltzer
- Graduated cylinder
- 6 beakers
- Stopwatch
- Hot plate
- Balance
- Ice cubes
- Water
- Mortar and pestle
- Thermometer
- Small soda bottle
- Balloon
- Funnel
- String
- Ruler

### **PART A TEMPERATURE AND REACTION RATE**

#### **Procedure:**

1. Heat 300 ml of water on the hot plate until near boiling.
2. Carefully pour 100 ml of water into a separate beaker and record the exact temperature.
3. Open one tablet and add it to the 100 ml of hot water. Make sure to start the stop watch.
4. Repeat this process for 3 additional temperatures, approximately 50, 30, and 10 degrees Celsius.

#### **Observations and Graph:**

As the temperature kept decreasing the time it took the reaction to complete increased. Our lab group decided to use our extra Alka- Seltzer as a personal experiment and add it to our water that was 12.8 degrees Celsius; this reaction took an additional 1 minute and 26 seconds.

**(Graph is attached)**

**\*\*Graphs may be computer generated or hand drawn on GRAPH PAPER and attached\*\***

**PART B PARTICLE SIZE AND REACTION RATE****Procedure:**

1. Pour 100 ml of room temperature water in a beaker and record the exact temperature.
2. Open one tablet and add it to the 100 ml of water. Make sure to start the stop watch exactly when you add the tablet. Stop the watch when the reaction comes to a complete stop. Do not stir!
3. Repeat this process for two additional scenarios:
  - a. Break the tablet into 8 pieces of approximately the same size before you add it to the water
  - b. Using the mortar and pestle, crush the tablet into powder and place this in a clean dry beaker and add 100 ml of water to the powder.

**Observations and Chart:**

When the particle size decreased the reaction time also decreased.

Size of Tablet	One Full Tablet	Tablet in 8 Pieced	Crushed Tablet
Time of Reaction (Sec)	60	49.5	12.8

**PART C AMOUNT OF REACTANT AND AMOUNT OF PRODUCT****Procedure:**

1. Measure 50 ml of dilute Acetic acid (vinegar) and pour it into the soda bottle.
2. Measure out 5 grams of baking soda (sodium bicarbonate) and using a funnel, pour it into the balloon.
3. Making sure to keep the baking soda in the bottom of the balloon, stretch the balloon over the neck of the soda bottle.
4. Carefully lift the balloon and allow the baking soda to run into the bottle and mix with the vinegar.
5. Swirl the bottle to mix the 2 chemicals.
6. Wait for bubbling to stop.
7. Using a string, measure the circumference of the balloon at the widest part.
8. Repeat the process using 100 ml of dilute Acetic acid and 10 grams of baking soda.

**Observations and Chart:**

The more Acetic acid and baking soda added the greater the circumference will be.

Amount of Acetic Acid (ml)	50	Amount of Acetic Acid (ml)	100
Amount of Baking Soda (g)	5	Amount of Baking Soda (g)	10
Circumference of Balloon (cm)	30	Circumference of Balloon (cm)	49

**Conclusions:**

By completing all three parts of this lab we were able to observe what influences reaction time. We observed that temperature, size, and amount are all products that affect a reaction time.

**Questions:**

- 1. What is the relationship between temperature and reaction rate?**  
The reaction rate is the lower the temperature the longer the reaction time.
- 2. What type of relationship is this?**  
It has a direct relationship.
- 3. What is the relationship between particle size and reaction rate?**  
The reaction rate is the smaller the particle size the faster the reaction time.
- 4. What type of relationship is this?**  
This type of relationship is a direct relationship.
- 5. What can you determine about the amount of reactant used related to the amount of product obtained.**  
The more reactant used the greater product obtained.
- 6. What is the chemistry term that would be used to accurately calculate the relationship between the amount of reactant and the amount of product?**  
The chemistry term is limiting reactant.
- 7. Write a balanced equation for the reaction of acetic acid with sodium bicarbonate.**  
$$\text{HC}_2\text{H}_3\text{O}_2 + \text{NaHCO}_3 \implies \text{NaC}_2\text{H}_3\text{O}_2$$
- 8. What was the gas that filled the balloon?**  
 $\text{NaC}_2\text{H}_3\text{O}_2$  is the gas that fills the balloon.