Names:

# Endothermic and Exothermic Reaction Lab

**Introduction:**

Many chemical reactions release energy in the form of heat, light, or sound. These are exothermic reactions. Exothermic reactions may occur spontaneously. They are denoted by a negative heat flow (heat is lost to the surroundings). In the lab, exothermic reactions produce heat or may even be explosive. Other chemical reactions absorb energy in order to proceed, these are endothermic reactions. Endothermic reactions cannot occur spontaneously. Work must be done in order to get these reactions to occur. When endothermic reactions absorb energy, a temperature drop is measured during the reaction. Endothermic reactions are characterized by positive heat flow (into the reaction).

**Part 1: Endothermic Reaction**

**Materials**

- Thermometer
- Small Styrofoam Cup
- 500mL Beaker
- 25mL 0.5 M Citric Acid Solution
- 15g of Baking Soda
- Stirring Rod
- Elastic Gloves
- Paper Towels
- Safety Goggles

**Procedure:**

1. Place the Styrofoam cup within the beaker.
2. Add the 25mL of citric acid to the cup.
3. Record the temperature of the fluids in the cup. Complete this step two additional times, and then calculate the average value.
4. Mix the 15g of baking soda to the cup using the stirring rod.
5. Record the temperature 30 seconds after the mixture is made. Complete this step two additional times, and then calculate the average value.
6. Record any observations made during the experiment.

**Data:**

Data Table:

| | **Trial 1** | **Trial 2** | **Trial 3** | **Average** |
|---|---|---|---|---|
| **Temperature Before Mixture** | | | | |
| **Temperature After Mixture** | | | | |
| **Temperature Change** | | | | |

Observations:

**Analysis:**

1. Create a hypothesis for this reaction.

2. What are common uses for citric acids?

3. What is the word formula of the reaction?

4. What is the chemical reaction of the reaction? Balance the reaction.

5. What type of reaction was witnessed?

6. Why was the mixture stirred?

7. What was the temperature change in the reaction?

8. Explain why the temperature changed.

9. Why was the Styrofoam cup used?

10. What other examples of this reaction have you observed before?

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