***Lab Report for Science Fair***

**Scientific Method**

1. Make Observations
2. Think of a question
3. Research the topic
4. Make a hypothesis
5. Plan the experiment
6. Conduct the experiment
7. Record the data
8. Analyze and Interpret the data
9. Make a conclusion

**Start Here!**

**Vocabulary to Know:**

1. Control
2. Independent Variable
3. Dependent Variable

**Make an observation**

*In previous labs, we saw that vinegar and baking soda react in some way to blow up a balloon.*

**Question**

*What happens when we add more of the baking soda? (Independent Variable)*

**Research the Topic**

*According to Thinkquest.org, this is actually a reaction between acetic acid and sodium bicarbonate. Acetic Acid is found in Vinegar, soda, lemon juice, among other substances. Sodium Bicarbonate is found in our baking soda. They form carbonic acid which easily breaks apart into water and carbon dioxide.*

**Hypothesis**

*Because both substances are required for the reaction, increasing one or the other should produce more carbon dioxide. (NOTE: This is incorrect)*

**Lab Report**

**Plan the Experiment**

*Synopsis:*

*When you mix baking soda with Vinegar (Pepsi), the reaction will cause a balloon to blow up. We will be increasing the amount of baking soda to see if it will increase the expansion of the balloon.*

*Needed Materials Per Trial*

* *Two balloons*
* *Two paper cups*
* *1 Box of Baking soda*
* *Vinegar or 20 oz. Pepsi*
* *Plastic Spoon*
* *Two Test Tubes*
* *A beaker*
* *A spring scale*
* *A loose measuring tape to measure circumference.*

***Procedure***

***Step 1:***

*Using the spring scale, measure out a constant amount of baking soda to use as the control group. You can either measure out 2 tablespoons and then find its mass, or pick a small mass to use. Make sure that you write down that number so you can use the same amount in each control group. Place the (?) grams of baking soda in balloon 1 and label.*

***Step 2:***

*Pick three increased amounts of baking soda to use in three different trials. (For example: If your control group is 5 grams of baking soda, your 3 experimental groups could be 10 g, 15 g, and 20 grams.) Fill balloon 2 and label.*

***Optional:***

*Create a stand for each of your test tubes. Cut a hole in the bottom of two paper cups big enough for the test tube to stand inside.*

***Step 3:***

*Use a beaker to measure out 25 ml of vinegar (Pepsi) and pour into each of the test tubes per trial.*

***Step 4:***

*Roll each balloon onto one the 2 test tubes. Prepare your data collection tools to run the experiment. (You may want to have a second person help you hold the test tube so you don’t spill it.)*

***Step 5:***

*Tip up the control balloon so the baking soda falls into the test tube and vinegar. Guide the balloon with your hand as it fills up. This will ensure it doesn’t pop off of the tube.*

***Step 6:***

*As soon as the reaction stops (you don’t see the balloon getting any bigger) use your tape measure to find the circumference of the middle of the balloon. Record your answer in a* ***data table.***

***Step 7:***

*Repeat steps 5-6 for the experimental group. Run three trials of the entire experiment to check for errors.*

**Conduct the Experiment**

[follow plan exactly]

**Data Collection**

|  |  |
| --- | --- |
| **Trial 1** | **Trial 2** |
| |  |  |  | | --- | --- | --- | | **Baking Soda** | **Control**  5 g | **Experimental**  10 g | | **Circumference** | 15 cm | 16 cm | | |  |  |  | | --- | --- | --- | | **Baking Soda** | **Control**  5 g | **Experimental**  15 g | | **Circumference** | 15.5 cm | 15 cm | |

|  |
| --- |
| **Trial 3** |
| |  |  |  | | --- | --- | --- | | **Baking Soda** | **Control**  5 g | **Experimental**  20 g | | **Circumference** | 14 cm | 14.5 cm | |

**Data Analysis and Interpretation:**

According to our data and results, the circumference of the balloon really did NOT change much. In fact, in trial 2, the circumference went down in the experimental group even though 3 times as much baking soda was used compared to the control.

**Conclusions:**

Our data shows that the amount of carbon dioxide produced in the reaction is NOT controlled by the amount of baking soda put into the experiment. Even though the circumference of the balloon did go up in two of the three trials, it did not increase enough to draw a solid conclusion.

**Error Analysis:**

The tool used to measure circumference in this case was a loose measuring tape. This may have caused inaccurate results. It is also possible that the center of the balloon was not measured each time in the same spot.