**Names \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Rate of Reaction Lab – Make Up Lab**

**Background**

You have learned about the different types of reactions, now you will explore what conditions can either speed up or slow down a reaction. We call the speed of a reaction the Reaction Rate.

1. List conditions that you think could speed up or slow down a reaction:
2. For your reaction you will be testing the reaction rate of Alka Seltzer and water. The Data below gives the time it takes for ¼ tablet to react in 100 mL of room temperature water (23⁰C), cold water (5⁰C), and hot water (98⁰C).
3. **Write a hypothesis:** Write a hypothesis that includes how you think the speed of the reaction (rate) will be affected by cooling down the water **and** heating it up.

**Hypothesis:**

**Materials**

200 mL Beaker Alka Seltzer Tablets

Water Timer

Ice Hot Plate

**Procedures**

1. For the control, a 200 mL beaker was filled with 100 mL of water that is room temperature (23 C⁰).
2. An Alka Seltzer tablet was broken in 4 equal size pieces. One was dropped into the water and the reaction was timed from when it was dropped until the bubbles stopped. This time is recorded on the table on the back side of the paper. This is the control test.
3. Steps 1-2 were repeated and recorded. Calculate the average reaction time for the control.
4. Step 2 was repeated in water that had been cooled to 5⁰C and water that had been heated to 98⁰C and the reaction time was recorded in the table. Then the tests were run a second time.

**Question: What is the Independent Variable in this experiment?**

**Question: What should be kept as Constant Variables in each test (name at least 3 things):**

1. Calculate and average reaction time for each, just like you did with the control. Record all of your results in the table.

**Data/Observations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Reaction Time** | **Average Reaction Time** | **Other Observations** |
| **Control Test:** ¼ tablet, water at room temperature | 42 seconds |  | Fizzing immediate |
| **Control Test:** ¼ tablet, water at room temperature | 38 seconds | Same as above |
| **Variable 1, Test 1:** waterat5⁰C | 98 seconds |  | Fizzing much slower, fewer bubbles |
| **Variable 1, Test 2:** waterat5⁰C | 105 seconds | Same as above |
| **Variable 2, Test 1:** waterat98⁰C | 13 seconds |  | Vigorous fizzing, water became frothy |
| **Variable 2, Test 2:** waterat98⁰C | 20 seconds | Same as above |

**Graph**

Create a **Bar** **Graph** of the data. You should graph the average reaction time for the Control Test and the other two variables you chose. Make sure you include a title your graph, axis labels, and a key.

**Title:**

**Analyze Data and Draw Conclusions**

1. Compare each of the 2 variables with the control test and describe how changing that variable changed the reaction rate.
2. Was your hypothesis supported or not? Why did you reach this conclusion?
3. For each variable, write WHY you think the reaction rate was changed in the way it was.
4. Read the section on page 147 of your book titled “**How Reactions Occur**”. Then review your answer for #2. Is there anything you would change about your answer? Explain why you would or would not change your answer.