**GNED 162**

**Introduction to Environmental Science**

**Lab 6 (Scientific Method 2)**

**Instructions:**

In this lab you will devise an experiment to answer two questions:

1. Does temperature play a role in the rate in which Alka-Seltzer will dissolve in water?
2. Does surface area play a role in the rate in which Alka-Seltzer will dissolve in water?

All of the materials that you should need to conduct this experiment are provided on your lab tables. If you think you will need additional materials please let me know. As a guide, use water at three different temperatures for question 1 and Alka-Seltzer at three different surface areas (sizes) for question 2. Please take time to plan what you are going to do to save time. Planning also improves safety.

Your write-up for this lab should be in the format outlined below and is due next Wednesday March 7th. In your conclusion discuss the practical significance of your results, listing references where appropriate.

1. Question (s): Does temperature play a role in which Alka-Seltzer will dissolve in water? Does surface area play a role in the rate in which Alka-Seltzer will dissolve in water?

2. Hypotheses: If the water is warmer and the surface area is small, then the Alka-Seltzer will more quickly dissolve than if it were in cool water and larger.

3. Materials and Method: Materials: Hot plate, 3 beakers, 6 Alka-Seltzers, butter knife, graduated cylinder, thermometer, plate, timer

Method:

 *Testing Temperature*

1. Fill a beaker up to 200 mL. Heat it to 70 degrees Fahrenheit on the hot plate.
2. Place a full-sized Alka-Seltzer in the water and time how long it takes until the observer can no longer see the pill at all.
3. Repeat the scenario with two more beakers and two more Alka-Seltzer tablets. For the next two times, heat the water to 90 degrees and then 110 degrees Fahrenheit.

*Testing Surface Area*

1. Fill a beaker up to 200 mL. Heat in to 70 degrees Fahrenheit.
2. Place a full-sized Alka-Seltzer in the water and time how long it takes until the observer can no longer see the pill at all.
3. Repeat the scenario with two more beakers. It should be repeated with half of a pill, and then one quarter.

4. Results (please put data you obtained in tabular form):

*Testing Temperature*

|  |  |
| --- | --- |
| **Water Temperature**  | **Time to Dissolve** |
| 70 degrees F (21 degrees C) | 44.22 seconds |
| 90 degrees F (32 degrees C) | 25.0 seconds |
| 110 degrees F (43 degrees C) | 15.73 seconds |

*Testing Surface Area*

|  |  |
| --- | --- |
| **Surface Area** | **Time to Dissolve** |
| Full Pill | 40.27 seconds |
| Half Pill | 30.51 seconds |
| ¼ Pill | 29.13 seconds |

5. Conclusion: Alka-Seltzer dissolves more quickly in higher water temperatures. When observed at the same water temperature, Alka-Seltzer dissolves more quickly as its surface size decreases. Our hypothesis was right!