The Scientific Method - *Plop Plop Fizz Fizz*

**Objective:** Apply scientific method to determine which type of water will dissolve alka-seltzer tablet faster.

**Anchor(s) Addressed:**
- S8.A.1.1.2 Explain how certain questions can be answered through scientific inquiry and/or technological design.
- S8.A.1.1.3 Use evidence, such as observations or experimental results to support inferences about a relationship.
- S8.A.2.1 Apply knowledge of scientific investigation or technological design in different contexts to make inferences to solve problems.

**Materials:**
- Tap water, warm water, cold water, salt water, acidic water, beakers, stop watch.

**Scenario:**
Miss Traynor has frequent heartburn and indigestion. She typically takes alka-seltzer to soothe her upset stomach. However, she found herself wondering if there is a faster way to dissolve her alka-seltzer tablets. Are you able to tell her what type of liquid will dissolve the alka-seltzer the fastest?

**Assignment:**
Use the scientific method to answer the question: *What factors will make an alka-seltzer tablet dissolve faster?* Record all of your responses in the lab.

**Procedure:**
1. Get in your lab groups and obtain all materials.
2. Record the question to be answered on your Student Activity Worksheet.
3. As a group, **form a hypothesis** to the question (remember, a hypothesis includes a predicted answer AND an explanation for that predicted answer in If…then format). Record your hypothesis on the Student Activity Worksheet.
4. Test your hypothesis by completing the following experiment:
   a. Fill your beaker with 250 milliliters tap water.
   b. Get stop watch ready to prepare for adding alka-seltzer.
   c. Add half tablet of alka-seltzer to water and DO NOT MOVE BEAKER.
   d. Record the amount of time it takes for the tablet to completely dissolve.
   e. Follow steps a-d for warm water, cold water, salt water, acidic water.
5. Construct a **bar graph** that compares the type of water used and dissolve time. Use colored pencils, a ruler & the following information:
   a. Graph Title: Water type versus alka-seltzer dissolve time
   b. X-axis Label: Water type
   c. Y-axis label: Alka-seltzer dissolve time (in seconds)

6. Complete the Analysis
In this lab, you will develop and test a hypothesis, analyze data and draw conclusions.
You are given guidance at each step of the way. Fill out this form completely - do not skip steps!

Step 1: Question or Observation

Question: 

________________________________________________________

Variables to test: Tap water, Warm water, Cold water, Salt Water, Acidic water (using vinegar)

Of the variables above, which should serve as your CONTROL group? ________________

In this experiment, the independent variable is the type of water (warm, salt..etc). What is the dependent variable, or the thing you will be measuring? __________________________

Step 2: Develop a hypothesis.

________________________________________________________

________________________________________________________

________________________________________________________

Step 3: Design and Conduct and Experiment

Answer this question regarding your experimental design:

A) What safety precautions should you take? __________________________

Step 4: Create a table to record your results.

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<thead>
<tr>
<th>Type of Water</th>
<th>Dissolve Time (in seconds)</th>
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Step 5: Graph your data.

Step 6: Draw Conclusions – in a complete sentence, answer your experimental questions.

1. Was your hypothesis supported or refuted? _______________________________________________
   ___________________________________________________________________________________
   ___________________________________________________________________________________

2. What was the control in this experiment? _______________________________________________

3. What was the independent variable in this experiment? ___________________________________

4. What was the dependent variable in this experiment? ___________________________________

5. What type of water dissolved the alka-seltzer the fastest? _________________________________
   ___________________________________________________________________________________
   ___________________________________________________________________________________

6. What type of water dissolved the alka-seltzer the slowest? ________________________________
   ___________________________________________________________________________________
   ___________________________________________________________________________________