

Scientific Method: Alka-Seltzer

Abstract (Extra Credit): (Final Lab Report)

The abstract is a short paragraph summarizing purpose, problem examined, results, and outcomes of the lab. This will come at the front of the lab, but should be the last thing written.

Introduction/Statement of Problem: (Science Journal Pre-lab + Final Lab Report)

In this introductory lab, we will be practicing following the rules of the scientific method (including forming a hypothesis, recording data, and writing a conclusion), with a special focus on identifying and properly manipulating our different variables. Copying is cheating. Don't copy.

You will be given 6 Alka-Seltzer tablets, 3 cups, a thermometer, a stopwatch, and water at 3 different temperatures (cold, room temperature, and hot). This first experiment will test the effects of water temperature on the time it takes to dissolve an Alka-Seltzer tablet. What temperature of water will make an Alka-Seltzer tablet dissolve fastest?

Hypothesis: (Science Journal Pre-lab + Final Lab Report)

If the **independent variable** changes, then the **dependent variable** will change,
If the _____, then _____.

Variables: (Science Journal Pre-lab + Final Lab Report)

Independent Variable: _____

Dependent Variable: _____

Constants: _____

Materials and Equipment: (Science Journal Pre-lab + Final Lab Report)

6 Alka-Seltzer tablets

Water

Thermometer

3 plastic cups

Stopwatch

Procedure: (Science Journal Pre-lab + Final Lab Report)

1. Verify that you have all required materials; know where to get appropriate temp. water.
2. Draw the following table into your science journal (under Data and Observations header).

	Temperature (°C)	Trial 1 (seconds)	Temperature (°C)	Trial 2 (seconds)	Average Time (seconds)
Room Temperature Water					
Cold Water					
Hot Water					

3. Pour 100 mL of water into cup. (You will fill the cup with one of three different temperatures of water, so be sure to note which temperature of water you are currently testing).
4. Using a thermometer, measure and record the temperature (°C) of the water in the cup.
5. Remove the thermometer from the cup. Do not use it to stir the solution.
6. Working with a partner, have one person prepare the stopwatch while the other prepares to drop the Alka-Seltzer tablet into the cup. If the tablet is broken or otherwise not whole, please note this in your Data and Observations section.
7. Count one, two, three. On three, have the stopwatch person start the time while the tablet person drops the tablet into the water. (secret text to help deter cheaters!)
8. You should observe a reaction once the tablet enters the water. Watch for the entire tablet to dissolve.
9. Once the tablet has completely dissolved, and is no longer producing bubbles, stop the stopwatch.
10. Record the time in your data table.
11. Rinse out your cup (if necessary) and repeat steps 3 – 10 for each of the required temperatures and trials.
12. Make a graph of the average reaction time in seconds (y-axis) vs. temperature (x-axis).

Data and Observations: (Science Journal + Final Lab Report)

	Temperature (°C)	Trial 1 (seconds)	Temperature (°C)	Trial 2 (seconds)	Average Time (seconds)
Room Temperature Water					
Cold Water					
Hot Water					

Please include any additional observations, including possible sources of error or mistakes that may impact the outcomes of the lab.

This section should also include any illustrations that support your lab observations.

Analysis: (Science Journal + Final Lab Report)

Create a simple graph with dependent variable on y-axis, independent variable on x-axis. Be sure to include title and axis labels.

Independent variable: _____

Dependent variable: _____

What was the rate of reaction (average time) in each type of water?

Room Temperature: _____ seconds

Hot Water: _____ seconds

Cold Water: _____ seconds

Why was it important to have two trials for each type of water?

Would it have improved the lab to perform even more trials for each type of water? Why or why not.

Did any of your individual trials produce unusual results? If so, do you know why?

What was the independent variable?

What was the dependent variable?

What were the constants?

How did changing the independent variable affect your dependent variable?

Results/Conclusion: (Final Lab Report)

This section is answered in a paragraph format. You will write a summary of your data and findings. You will also address whether your hypothesis was correct or incorrect. You must include evidence from **this lab** that supports your conclusion. You should also include any possible sources of error. This is especially important if anything went wrong during the execution of the lab, but should be addressed regardless of any known errors.

Other questions you may address include:

Did you identify any possible improvements or changes if you were to do the lab again?

Did your lab or outcomes generate any additional questions to explore?