

# Scientific Method Lab Using Alka-Seltzer: Part 1

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_ Group \_\_\_

## Part I

In this activity we will use Alka-Seltzer and water to explore the scientific method. You will need to:

- Make observations and inferences
- Identify variables
- Collect data
- Graph data
- Interpret your graphs
- Follow safety procedures

When using the scientific method you must first \_\_\_\_\_.

**Problem:** In this lab, you'll investigate how increasing the temperature of water, affects the time it takes for Alka-Seltzer to dissolve.

**Hypothesis:** **If** you \_\_\_\_\_ the temperature of water, **then** the time it will take for Alka-Seltzer to dissolve will \_\_\_\_\_.

Next you need to design an experiment to test the hypothesis. Today you will all do the same experiment, while in the next lab you and your partner(s) will need to design a different experiment using the same equipment. That experiment will use different variables.

**Variables:** Remember, there are \_\_\_\_\_ types of variables: the \_\_\_\_\_ variable, the \_\_\_\_\_ variable, and the \_\_\_\_\_ variable. Identify the three different types of variables we will use in this lab in the spaces below.

**Independent Variable:** The independent variable is \_\_\_\_\_

**Dependent Variable:** The \_\_\_\_\_

**Controlled Variables:** \_\_\_\_\_

**Materials:** Safety glasses, thermometer, 250 ml beaker, water at various temperatures, Alka-Seltzer tablet

Part of designing an experiment is following a set of procedures. Today you will all follow the same set of procedures that will be given to you; however in the next lab you will need to develop your own set of procedures.

### Procedures:

Each lab group will be assigned a group number (#) and will need to gather data for one temperature range. **Circle the group # that you have been assigned.** At each temperature range the data will be averaged for all of the groups.

Group #	Temperature Range
1 and 2	5° – 10° C
3 and 4	10° – 15° C
5 and 6	15° – 20° C
7 and 8	20° – 25° C
9 and 10	25° – 30° C
11 and 12	30° – 35° C
13 and 14	40° – 45° C
15	45° – 50°

1. Get 200 ml of water at the approximate mid-point of your temperature range. Record the temperature of the water in Table 1 below. If you have to add ice to cool the water down, once it cools to the correct temperature, remove the ice and thermometer (place on paper towel), then pour off excess water so you are only using 200 ml of water. (Remember, the amount of water is a controlled variable, so all groups must use the same amount of water.
2. **(Read all of this step before continuing)** Drop the Alka-Seltzer tablet into your beaker of water. Start the stop watch at the instant the tablet enters the water. Stop the stop watch when the last piece of the tablet dissolves. You do not need to wait for all of the bubbling to stop, just watch carefully for all pieces of the tablet to disappear. Record the time to the nearest tenth of a second that it took to dissolve the Alka-Seltzer in **Table 1** below. If the time to dissolve took more than one minute, you will need to change the minute time to seconds (60 seconds for each minute).

**Data Table 1 (your individual data)**

Group Number	Temperature °C	Time (Seconds)

3. Record your data from **Data Table 1** onto **Data Table 2 (see below)** in the section for your group.
4. Average the temperatures to the nearest whole degree for each of the two/three groups and record it in the data chart below. Average the times to the nearest tenth of a second for each group and record the average time in the data chart below.

**Data Table 2 (class data)**

Group Number	Average Temperature °C	Average Time (Seconds)
1 and 2		
3 and 4		
5 and 6		
7 and 8		
9 and 10		
11 and 12		
13 and 14		
15		

### Graphing Directions

1. Graph the average temperature versus the average time. Time will be on the y-axis while temperature will be on the x-axis. You will first need to set up an appropriate scale for each axis that includes all of the class data and uses most of the graph.
2. Place tick marks every 5 lines along each axis. Also put tick marks at the lower left corner of your graph.
3. Write a zero for the start of the x-axis and another zero for the start of the y-axis.
4. Number each tick mark along the x-axis by 5's.
5. Number each tick mark along the y-axis by 10's.
6. Then create a single "best-fit" straight line graph that passes through the plotted points.

Title \_\_\_\_\_



