

Many factors influence how fast a reaction occurs. This lab will investigate some of these factors.

Materials:

Box of Alka-Seltzer  
Graduated cylinder  
Beakers (6)  
Stopwatch  
Hot Plate  
Balance  
Ice cubes  
Water  
Mortar and pestle  
Thermometer  
Small soda bottle  
Balloon (2)  
Funnel- make a paper one  
String  
Ruler

Procedure:

**Part A. Temperature and Reaction Rate**

1. Heat 300 ml of water on the hot plate until near boiling (over 80°C)
2. Carefully pour 100 ml of water into a separate beaker and record the exact temperature.
3. Be ready with the stopwatch.
4. Open one tablet and add it to the 100 ml of hot water. Make sure to start the stopwatch exactly when you add the tablet. Stop the stopwatch when the reaction (major bubbles) comes to a complete stop. **DO NOT STIR!**
5. Repeat this process for 3 additional temperatures: approximately 40°C, 10°C.
  - **BE SURE TO RECORD THE EXACT TEMPERATURE FOR EACH EXPERIMENT!!**
  - **BE SURE TO USE 100 ml FOR EACH EXPERIMENT**
  - You will need the ice for temperatures below room temperature and they may be used to help lower the temp of the hot water.
  - You do NOT have to perform the experiments on the temperatures in order!

You must create a **LINE GRAPH** of your results. Temperature is your x-axis.

**Part B. Particle Size and Reaction Rate**

1. Pour 100 ml of room temperature water in a beaker and record the exact temperature.
2. Be ready with the stopwatch.
3. Open one tablet and add it to the 100 ml of water. Make sure to start the stopwatch exactly when you add the tablet. Stop the stopwatch when the reaction (fizzing with lots of bubbles) comes to a stop. **DO NOT STIR!**
4. Repeat this process for two additional scenarios:
  - i. Break the tablet into 8 pieces of approximately the same size before you add it to the water.
  - ii. Using the mortar and pestle, crush the tablet into powder and place this in a clean dry beaker and add 100 ml of water to the powder. **(water must be added to powder or powder floats and does not properly react)**

Make a CHART of your data from this section for your report.

**Part C. Amount of Reactant and Amount of Product**

1. Measure 50 ml of dilute Acetic acid (vinegar) and pour it into the soda bottle.
2. Measure out 5 grams of sodium bicarbonate (baking soda) and using a funnel, pour it into the balloon.
3. Making sure to keep the baking soda in the bottom of the balloon, stretch the balloon over the neck of the soda bottle (do not get the baking soda in the bottle yet)
4. Carefully lift the balloon and allow the baking soda to run into the bottle and mix with the vinegar.
5. Swirl the bottle to mix the two chemicals.
6. Wait for the bubbling to stop.
7. Using a string. Measure the circumference of the balloon at the widest part.
8. Repeat the process using 100 ml of dilute Acetic acid and 10 grams of baking soda.

Make a CHART of your data from this section for your report.

**QUESTIONS:**

1. What is the relationship between temperature and reaction rate?
2. What is the relationship between particle size and reaction rate?
3. What can you determine about the amount of reactant used related to the amount of product obtained.