

**RATE AFFECTING FACTORS LAB INSTRUCTIONS**

In this lab you will be performing four different lab tasks. Each task will demonstrate one of the four major rate affecting factors. You will take qualitative AND quantitative data. Your purpose is to be able to observe which factors affect the rate, which direction they affect the rate (faster or slower), and also to EXPLAIN why they affected the rate the way they did.

**TEMPERATURE****Cold vs. Hot**

<b>Equipment:</b> Alka Seltzer tablets x 2 Small Beakers x 2 Hot Plate x 1 Thermometer x 1 Timer (Phone) x 1 Beaker tongs x 1	<b>Procedure:</b> 1) Fill both beakers with _____ mL of water 2) Place one beaker on the hot plate 3) Begin to heat the beaker on the hot plate until it reaches a temperature of _____ °C. Continue onto Step 4 while you wait for the water to heat up. 4) Have your timing device ready! Place an Alka Seltzer tablet into the beaker of cold water – <i>start the timer as soon as it hits the water.</i> 5) Continue timing until the foam has risen and then dropped down and disappeared – <i>NOTE: do not wait until all the bubbles have stopped or you will be here all day! Just wait until the top level of foam has disappeared.</i> 6) Remove the beaker of hot water from the hot plate. Place on the lab bench. 7) Repeat steps 4 and 5 using the beaker of hot water. 8) Rinse out the beakers to use for the Surface Area Task
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**SURFACE AREA****Small vs. Large**

<b>Equipment:</b> Alka Seltzer tablets x 2 Small Beakers x 2 Timer (Phone) x 1 Mortar and Pestle x 1	<b>Procedure:</b> 1) Fill both beakers with _____ mL of water 2) Have your timing device ready! Place an Alka Seltzer tablet into one of the beaker of – <i>start the timer as soon as it hits the water.</i> 3) Continue timing until the foam has risen and then dropped down and disappeared – <i>NOTE: do not wait until all the bubbles have stopped or you will be here all day! Just wait until the top level of foam has disappeared.</i> 4) Crush one of the tablets in the mortar and pestle until it is a fine powder. 5) Have your timing device ready! Pour the crushed Alka Seltzer tablet into the beaker of cold water – <i>start the timer as soon as it hits the water. Try to get all the powder in as fast as possible!</i> 6) Continue timing until the foam has risen and then dropped down and disappeared like before. 7) Rinse out the beakers to use for the Concentration Task
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**CONCENTRATION****Low vs. High**

<b>Equipment:</b> Small Beakers x 2 Graduated cylinder x 2 Timer (Phone) x 1 Crystal violet solution ( $1.5 \times 10^{-5} \text{M}$ ) 2M NaOH 0.5M NaOH Pipets x 3	<b>Procedure:</b> 1) Put 10mL of crystal violet solution into each beaker 2) Put 10mL of 2M NaOH into one of the beakers, and time the reaction 3) Put 10mL of 0.5M NaOH into the other beaker, and time the reaction 4) Rinse out the beakers and graduated cylinders
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**CATALYST****Not Present vs. Present**

<b>Equipment:</b> Test tubes x 3 Test tube rack x 1 Small graduated cylinder x 1 Pipets x 2 Spatula x 1 Granulated Zinc Copper turnings 1M H <sub>2</sub> SO <sub>4</sub> 0.5M Cu <sub>2</sub> SO <sub>4</sub>	<b>Procedure:</b> 1) Put a few pieces of granulated zinc into each of the three test tubes. Try to have approximately the same amount in each test tube 2) Add 5mL of 1M H <sub>2</sub> SO <sub>4</sub> to test tube #1 – Note the rate of produced gas bubbles 3) Add a few copper turnings to test tube #2 – make sure they are in contact with the zinc! 4) Add 5mL of 1M H <sub>2</sub> SO <sub>4</sub> to test tube #2 – Note the rate of produced gas bubbles 5) Add 5mL of H <sub>2</sub> SO <sub>4</sub> to test tube #3. 6) Add 1mL of the copper sulfate solution using a pipette – the pipette is marked with tape to show where 1mL would be - Note what happens to the color of the copper sulfate solution and what happens to the surface of the pieces of zinc.
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