**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solutions and Dilutions Inquiry Lab**

**Guiding Question:** How will adding water to a basic solution affect the Molarity of the basic solution?

**Pre-Lab:**

1. You will be creating solutions of aqueous sodium hydroxide. Identify the solute and solvent.
2. Define concentration and give three examples of concentration units.
3. Define what it means to dilute a solution.
4. A student says, “When water is added to a basic solution the Molarity of the solution decreases but the percent by mass will stay the same.” Write a claim to either support or disprove the student’s statement and defend your prediction.

**Prediction**:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Reasoning**:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Materials:** Volumetric flasks, graduated pipettes, beakers, balance, water, aqueous sodium hydroxide.

**Part 1:** Mass the volumetric flask. Calculate the mass needed to create a 0.50M NaOH solution in the box below. Mass the NaPH needed. Describe how you created your NaOH(aq) solution with specific supplies (graduated pipettes and volumetric flasks) and measurements on the lines provided. Mass the flask and the solution.





Mass of 50.00mL volumetric flask: \_\_\_\_\_\_\_\_\_ Mass of NaOH: \_\_\_\_\_\_\_\_\_\_ Mass of flask and solution: \_\_\_\_\_\_



**Part 2**: Mass the larger 100mL volumetric flask. Dilute your 50.00mL solution to 100.00mL. Calculate the new molarity of your solution in the box below. Describe how you will dilute your original NaOH(aq) solution with specific supplies and measurements on the lines provided. Mass the flask and solution.



Mass of 100.00mL volumetric flask: \_\_\_\_\_\_\_\_\_\_\_\_\_ Mass of flask and solution: \_\_\_\_\_\_\_\_\_\_\_

**Analysis Questions:**

1. Calculate the percent by mass of the NaOH in the solution in Part 1.
2. Calculate the percent by mass of the NaOH in the solution in Part 2.
3. Construct a **claim** that supports or contradicts the prediction made in the pre-lab questions. Provide **evidence** that supports your claim. Use your **reasoning** skills to explain why your evidence is relevant.
4. Use the dilution formula, M1V1=M2V2 to **verify** the molarity of the solution in Part two.
5. When Molarity and Volume are multiplied, what unit is left over? Why does the dilution formula make sense?

1. Calculate and **describe** how you would create a 50.0mL 2.50M NaOH using 20.0M concentrated solution and the equipment you have. Show all calculations.

