

Beyond Labz 1: Creating a Solution of Known Molarity

OBJECTIVE: Make an approximately 2 M solution of Sodium Bicarbonate and calculate the percent error of your experiment.

HELPFUL FORMULAS

- Sodium Bicarbonate= Baking Soda= NaHCO_3
- Molarity (M)= mol/L
- Sodium Bicarbonate MW= 84.007 g/mol
- Volume used= 25mL (0.025L)
- Percent Error= $\left| \frac{\text{Actual value} - \text{Expected value}}{\text{Actual value}} \right| \times 100\%$

PROCEDURE

Tip: If you are having trouble finding something in this lab, click on the bell to go to the help book. Under "Titration" click "The Laboratory" to find names and locations of objects in the lab

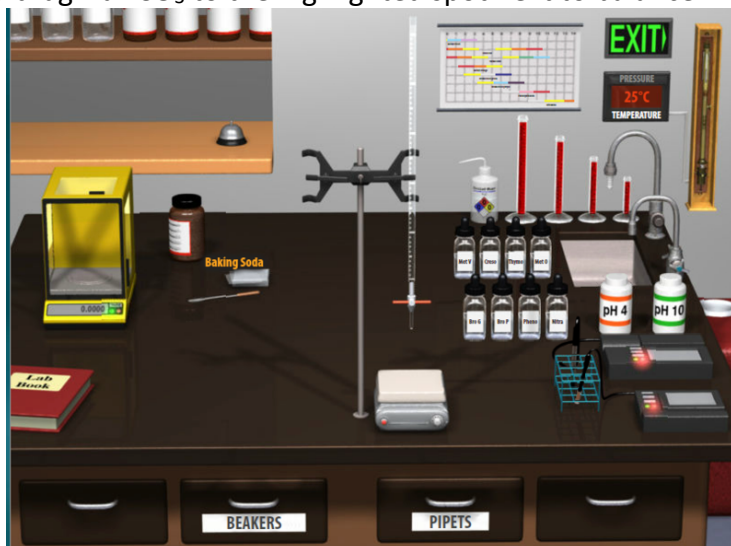
1. Before starting the experiment, calculate the amount of NaHCO_3 needed (in grams) to make 25 mL of 2 M NaHCO_3 solution.

Amount of NaHCO_3 needed: _____ g

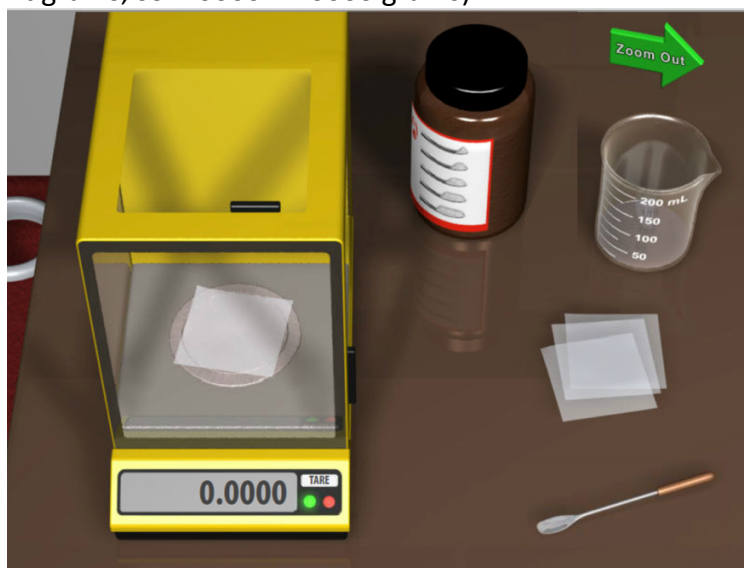
2. In Beyond Labz, click on "Reactions and Stoichiometry" then, "Creating a Solution of Known Molarity"
3. First you will need to retrieve your reagent from the stockroom (note: NaHCO_3 might already be on the bench, see the photo under step 3d for what this would look like)
 - a. Click on the shelves of the "stockroom" to view reagents
 - b. Click and drag NaHCO_3 to one of the highlighted spots on the counter



- c. Click on the green arrow that says “return to lab”
- d. Click and drag NaHCO_3 to the highlighted spot next to balance



4. Next you will need to weigh out the amount of reagent you determined in step 1
 - a. Click on the “BEAKERS” drawer, then click and drag beaker to the highlighted spot next to the NaHCO_3 reagent bottle
 - b. Zoom in on the balance by clicking on it
 - c. Drag a piece of weigh paper to the balance and press “tare” (Note: the balance is in the unit grams, so 2.0000= 2.0000 grams)



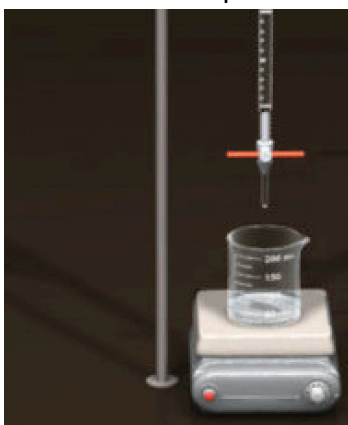
- d. Click on the cap of the NaHCO_3 bottle to remove it
- e. Click and drag the scoop to the top of the open NaHCO_3 bottle. Hold the scoop over the beaker to fill it with reagent, then drag to the weigh paper and release (make sure there is visible white powder on the tip of the scoop after you drag it away from the bottle). This can be tricky on this software, so be patient with this step. Note: You may not be able to scoop out the exact amount of solid NaHCO_3 you determined was necessary to make your 2 M solution in step 1. Get as close

as you can, but don't spend too much time on this part of the exercise. In chemistry, preparing the exact target solution's concentration is often not too important provided that it is in the same ballpark as the target solution concentration (within ~5%) and you use the exact solution concentration (calculated using the actual mass of solute) for your reaction stoichiometry later in the experiment.

- f. Once you have the desired amount of NaHCO_3 , take a screenshot of your set up. Insert the photo at the bottom of this document.

Amount of NaHCO_3 weighed: _____ g

- g. Click and drag weigh paper to beaker
- h. Click on green "Zoom out" arrow, click on beaker and drag to highlighted spot on top of stir plate, underneath burette (note: we will not use the burette today, but the beaker should be on the stir plate to utilize the stirring function)



5. Finally, it's time to make the solution
 - a. Click on 25mL graduated cylinder (The second largest graduated cylinder; when you hover over it says "25mL empty"), and drag under water faucet until it visibly fills up with water
 - b. Click on full 25mL graduated cylinder, drag to beaker, and release (beaker should visibly fill with water)
 - c. Click the large silver button on the right side of the stir plate to turn the motor on and stir your solution
6. Calculate the molarity of the solution you just made, as well as the percent error against the target solution concentration

Molarity of actual solution: _____ M

Percent error: _____%

7. Submit this document to canvas for your GSI to check over your experiment and results