Preparation and standardization of 0.1 M NaOH solution

1. **Preparing the NaOH solution**
2. Tare a weighing dish on a balance, and weigh out the calculated amount of NaOH as close as using whole pallets allow you.

**Note:** Minimize the exposure of the NaOH pellets to air, because it quickly absorbs moisture and CO2. Don’t try to break up pellets, you will determine later the exact concentration of the solution made from the NaOH. Make sure to close the NaOH container when you are done.

1. Transfer the NaOH pellets into an Erlenmeyer flask, add about 30-40 mL water, and make a solution.
2. Transfer the solution into a 500-mL volumetric flask, and fill the flask to the mark. Close the opening of the flask with a piece of Parafilm, hold the Parafilm with your thumb, and mix the solution thoroughly by inverting the flask a few times.
3. Transfer the solution into a plastic bottle.
4. Fill a 150-mL beaker about half with the solution, and cover it with a watch glass to keep moisture and CO2 out. This is your stock solution.
5. **Setting up the titration setup**
6. Mount a buret with a clamp on a stand with enough room for a 250-mL Erlenmeyer fit below the tip. Place a funnel into the buret.

**Note:** The buret should be be mounted by its lower third.

1. Place a waste beaker under the tip, open the stopcock.
2. Rinse the buret with some water from a squeeze bottle, and once the water drained, rinse it with some stock solution (a few mL).
3. Close the stopcock and fill the buret with the stock solution. The stock solution in the buret is the titrant.

**Note:** while filling the buret, lift the funnel to allow the air to come out.

1. Open the stopcock and allow the solution to drain into the waste beaker until all of the air from the tip is removed.
2. Read and record the volume with two decimal places.
3. Place a white paper on the stand below the buret for a better contrast.
4. **Performing a test trial**
5. Weigh out potassium hydrogen phthalate (KHP) between 0.30 - 0.35g into a tared weighing dish.

**Note:** Exercise caution to transfer the weighing from the balance room to the lab preventing any loss of the sample.

1. Transfer the crystals into a 250-mL Erlenmeyer flask, and rinse the dish into the Erlenmeyer flask to ensure quantitative transfer.
2. Dissolve the crystals, and add enough water to have about ½” liquid in the flask.
3. Add three drops of phenolphthalein indicator.
4. Place the flask under the buret.
5. Add 1 mL of the titrant at a time while continuously swirling the liquid in the Erlenmeyer flask.
6. When the solution turns purple, read the volume from the buret.
7. Calculate the used amount of NaOH solution and subtract 2 mL from it. This is your rough volume.
8. **Performing the titration**
9. Refill the buret, take and record an initial reading.
10. Number three weighing dishes and weigh out between 0.30-0.35 g of KHP into each.
11. Make solutions from the three samples in Erlenmeyer flasks just like before (C.2-4). Number the flasks as well.

**Note:** Do not forget to add 3 drops of phenolphthalein.

1. Place the first flask under the buret, and add the calculated rough volume of NaOH in one shot while swirling the liquid in the Erlenmeyer flask.
2. After the rough volume was added, continue to add the titrant *one drop at a time* while swirling the solution until the solution turns pale “baby-pink”. This point is the equivalence point.

**Note:** As the titration approaches the equivalence point the temporary purple color where the titrant hits the solution persists longer before the solution thoroughly mixed. Near the equivalence point you may want to add half a drop by allowing half a drop hanging from the tip of the buret, and transfering the drop into the solution by touching the tip with the inner wall of the flask and washing the droplet into the solution by swirling.

1. Read and record the final reading.
2. Perform the titration of the remaining two samples the same way (D.1-6).
3. Calculate the exact concentration of the stock solution.
4. Label the plastic bottle, including the exact concentration. Save the stock solution for the next lab.