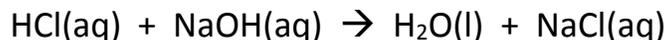


## Titration Lab – Absent Version

Name: \_\_\_\_\_

Purpose: To calculate the molarity of an acid by titrating it with a base of known molarity.

The following acid-base reaction will take place.



In this lab, 5.0 mL of HCl will be titrated with 0.050 M NaOH until the equivalence point is reached. Equivalence point occurs when the exact moles base needed to completely react with all moles of acid has been added to the reaction flask. In other words, equivalence point is when the moles of acid equals the moles of base.

Since moles of HCl will equal the moles of NaOH, the following formula can be derived:

$$M_a V_a = M_b V_b$$

Where  $M_a$  is the molarity of the acid,  $V_a$  is the volume of acid,  $M_b$  is the molarity of the base and  $V_b$  is the volume of base.

**In this lab,  $V_a = 5.0$  mL and  $M_b = 0.050$  M.**

Procedure:

1. Gather materials:
  - a. Goggles, apron
  - b. Erlenmeyer flask (250 mL)
  - c. Graduated cylinder (10 mL)
  - d. Beaker (100 mL)
  - e. Wash bottle
  - f. Sheet of white paper
2. Use 100 mL beaker to obtain approximately 20 mL of HCl.
3. Measure 5.0 mL of HCl using the graduated cylinder.
4. Pour the 5.0 mL of HCl into the Erlenmeyer flask.
5. Add 2 drops of phenolphthalein indicator to the flask.
6. Add 10 mL of water to the flask. Swirl.
7. Place the flask under the buret.
8. Record the initial volume of the base (buret) to 2 decimal places.
9. Open the stopcock to add NaOH to the flask.
10. Titrate until pale pink color stays.
11. Record final volume of the base (buret).
12. Dispose of the flask contents down the sink. Rinse the flask.
13. Repeat Steps 3-13 two more times.

Data:

<b>Trial</b>	<b>Volume HCl (mL)</b>	<b>Initial Volume NaOH (mL)</b>	<b>Final Volume NaOH (mL)</b>	<b>Observations (color or solution)</b>
1	5.0 mL	1.20	12.45	Very bright pink
2	5.0 mL	12.45	22.50	Pale pink
3	5.0 mL	22.50	32.45	Pale pink

Calculations:

For each trial:

- a) Calculate volume of NaOH used.
- b) Calculate the molarity of HCl.