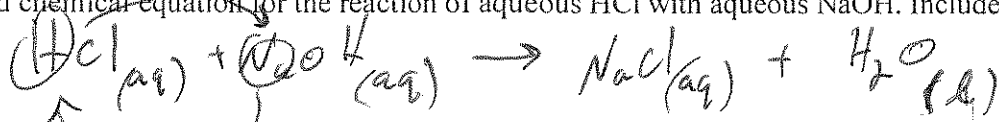


Pre-lab:

1. Write a balanced chemical equation for the reaction of aqueous HCl with aqueous NaOH. Include state symbols.



2. If you dissolved 1.04 g of NaOH in exactly 100.0 mL of water, what is the molarity of the NaOH? Show your work.

$$\frac{\text{mol}}{\text{L}} = M \quad \frac{1.04 \text{ g NaOH} \left| \frac{1 \text{ mol}}{40.0 \text{ g}} \right.}{0.1 \text{ L}} = 0.26 \text{ M NaOH}$$

3. Suppose the unknown molarity HCl in this lab was 1.00 M. How many mL of 0.25 M NaOH would be required to react with 5.0 mL of the HCl? Show your work.

$$\frac{1.00 \text{ mol HCl}}{\text{L}} \left| \frac{0.005 \text{ L}}{1 \text{ L}} \right. = 0.005 \text{ mol HCl} \rightarrow 0.005 \text{ mol NaOH}$$

$$\frac{0.005 \text{ mol NaOH}}{0.25 \text{ mol NaOH}} \left| \frac{1 \text{ L}}{1000 \text{ mL}} \right. = 0.02 \text{ L} = 20 \text{ mL}$$

4. If exactly 23.45 mL of 0.218 M NaOH was required to titrate an HCl solution, how many moles of HCl were present? Show your work.

titrate = neutralize

$$\frac{0.218 \text{ mol NaOH}}{\text{L NaOH}} \left| \frac{0.02345 \text{ L}}{1 \text{ L}} \right. = 0.00511 \text{ mol HCl present}$$

5. If the titration in question 4 used 5.00 mL of HCl, what was the molarity of the HCl?

$$M = \frac{0.00511 \text{ mol}}{0.005 \text{ L}} = 1.022 \text{ M HCl}$$

6. Why is it important to not have any air bubbles trapped in the buret before you start the titration? _____

it would give you an inaccurate measurement of volume

Data and Analysis:

1. Record your data in the table below. Don't forget units.

Mass of NaOH:	1.0g
pH of NaOH using pH paper:	base
litmus paper test of NaOH:	blue
pH of HCl using pH paper:	Acid
litmus paper test of HCl:	red

Titration #	Student Doing Titration	Initial Buret Reading	Final Buret Reading	Notes (if any)
1				
2				
3				

2. What color does litmus paper turn in basic solution? blue in acidic solution? red

3. Calculate the concentration of your NaOH solution in molarity. Show your work. 100ml

$$\frac{1.0g \text{ NaOH}}{40g} \times \frac{1 \text{ mol NaOH}}{40g} \times \frac{1}{0.1L} = 0.25M$$

4. Each individual: calculate the mL of NaOH used in your titration. 2.3 mL NaOH avg

5. Each individual: calculate the moles of HCl that you titrated. Show work.

$$\frac{0.25 \text{ mol}}{L} \times 0.0073 \text{ L} = 5.75 \cdot 10^{-4} \text{ mol NaOH}$$

6. Each individual: calculate the molarity of the HCl based on your titration. Show work.

$$\frac{5.75 \cdot 10^{-4} \text{ mol HCl}}{0.005 \text{ L}} = \boxed{0.012M}$$

7. Record the values of molarity calculated by each person in your group. Calculate the average

Molarity by _____	Molarity by _____	Molarity by _____	AVERAGE
			0.012M

8. What in the experiment could have caused differences between the results of lab members? You need to think about experimental issues. Making mistakes in calculations is not an experimental error and you are expected to check each other's calculations in this lab!

- way past the endpoint

- etc.

- not measuring correctly