Mixtures of Acids and Bases Worksheet

As you work through the steps in the lab procedures, record your experimental values and the results on this worksheet.

Table A: Calculated and Measured pH's of Acid and Bse Mixtures

Reaction #	Reagents	Calculated pH	Measured pH
1 Water + Strong Base	10 mL H_2O		
	+ 5 mL NaOH		
	+ additional 5 mL NaOH		
	+ additional 5 mL NaOH		
2 Strong Acid + Strong Base	10 mL HCl		
	+ 5 mL NaOH		
	+ additional 5 mL NaOH		
	+ additional 5 mL NaOH		
3 Weak Acid + Strong Base	10 mL NH_4Cl		
	+ 5 mL NaOH	to be calculated in lab	
	+ additional 5 mL NaOH	to be calculated in postlab	
	+ additional 5 mL NaOH	to be calculated in postlab	
4 Weak Base + Strong Base	10 mL $NaC_2H_3O_2$		
	+ 5 mL NaOH	to be calculated in lab	
	+ additional 5 mL NaOH	to be calculated in postlab	
	+ additional 5 mL NaOH	to be calculated in postlab	

1. For reaction series 1, water reacting with strong base, compare the pH's you calculated in your prelab to the pH's you measured in Data Table A. Please explain any inconsistencies between your calculated and measured results.

2. For reaction series 2, strong acid reacting with strong base, compare the pH's you calculated in your prelab to the pH's you measured in Data Table A. Please explain any inconsistencies between your calculated and measured results.

3. For reaction series 3, compare the pH you calculated in your prelab for a 0.1 M NH4Cl solution in Data Table A with the pH you measured. Please explain any inconsistencies between your calculated and measured results.

4a. Construct a reaction table for the mixture of 10.0 mL of 0.1 M NH4Cl with 5.0 mL of 0.1 M NaOH.

	$NH_4^+(aq)$	+	$OH^-(aq)$	→	$NH_3(aq)$	+	H_2O (l)
initial							---
change(Δ)							---
final							---

4b. Calculate the equilibrium concentrations of NH_4^+, NH_3, H_3O^+ and OH^- in the resulting solution.

4c. Calculate the pH of the resulting solution.

4d. How does this compare to the pH you measured? Please explain any inconsistencies.

5. For reaction series 4, compare the pH you calculated in your prelab for a 0.1 M $NaC_2H_3O_2$ solution Data Table A with the pH you measured. Please explain any inconsistencies between your calculated and measured results.

6a. Construct a reaction table for the mixture of 10.0 mL of 0.1 M $NaC_2H_3O_2$ with 5.0 mL of 0.1 M NaOH. Using LeChatelier's principle, explain the effect of OH^- on the reaction of $C_2H_3O^{2-}$ with water.

	$C_2H_3O_2^-$ (aq)	+	H_2O (l)	$\rightarrow$	$HC_2H_3O_2$(aq)	+	OH^-(aq)
initial			---				
change(Δ)			---				
final			---				

6b. Calculate the equilibrium concentrations of $C_2H_3O_2^-$, $HC_2H_3O_2$, H_3O^+ and OH^- in the resulting solution.

6c. Calculate the pH of the resulting solution.

6d. How does this compare to the pH you measured? Please explain any inconsistencies.