Titration of Aspirin
REPORT SHEET

Do everything on this sheet before, during, and after the lab as indicated. Record your responses and data ON YOUR OWN PAPER and staple this sheet as the report cover onto those pages.

Name _____Date_____Period_____

Pre-Lab Questions:

1. Write the neutralization reaction for HCl combined with NaOH.
   (Notice the ratio of moles H^+ to OH^-)
2. When you titrate an acid by adding a base, what do you expect the approximate pH to be before neutralization? At neutralization? After neutralization if you keep titrating?
3. Compare the number of moles of acid and base added to a solution when they reach the point of neutralization.
4. Acetyl salicylic acid (the active ingredient in aspirin) has a formula of $C_9H_8O_4$. How many moles of base will be needed to neutralize are there in 0.25g?
   (Assume an equal mole ratio of H^+ to OH^-)
5. Find the concentration of 100.0 mL of HCl if 80.0 mL of 2.5 M NaOH is required to neutralize the acid.
   a) How many moles of base were added to the beaker to neutralize the acid?
   b) How many moles of acid were originally in the beaker?
   c) Using the original moles of acid and the original volume of acid in the flask, calculate the molarity of the HCl.

Data to collect:
Aspirin type
Tablet mass before grinding
Tablet mass after grinding
Starting volume of NaOH in buret
Volume of base used to reach titration equivalence point
Approximate pH when indicator changed color
Graph of pH vs volume of base added

(over)

Post-Lab Data Analysis:

Show all work.
Pay attention to units and sig. figs. to avoid simple mistakes.

1. Calculate the moles of base used to neutralize the acid for each type of aspirin.
2. Acetyl salicylic acid ($C_9H_8O_4$) is not a strong acid, which means that for every mole that dissolves, not an entire mole of H+ ionizes from the acid. Nevertheless, what hydrogen ions that did dissociate were completely neutralized by the hydroxide we added from the base. How many moles of H+ did we neutralize?
3. For simplicity's sake, we are going to assume that acetyl salicylic acid is a strong acid, and, therefore, the initial moles of H+ equals the initial moles of acid (not exactly true but will work for this situation). Since we are comparing aspirin to aspirin, we will be able to obtain a relative comparison of the amount of acid in each aspirin. Calculate the mass of the acid for each aspirin based on the number of moles that reacted with base.
4. Check the label on the bottles and determine if your calculation in #3 is valid. Account for any discrepancies in your calculation.

Conclusion:
1. What is the difference among regular, extra strength, and baby aspirin?
2. Explain three specific sources of experimental error in your experiment and what these do to your results. (If these are not very specific, you will not receive any points)
3. Why are aspirin substitutes used by many people?