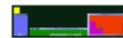


Revised August 2009



AP WORKSHEET 14b: Titration Simulation



The acid-base titration computer simulation to accompany this worksheet is located at http://www.chem.iastate.edu/group/Greenbowe/sections/projectfolder/flashfiles/stoichiometry/acid_base.html

Go to the computer simulation and select the following.

- (i) Strong Acid vs. Strong Base
- (ii) Fill the buret with Base
- (iii) HNO_3 as the acid and KOH as the base
- (iv) Phenolphthalein as the indicator

The computer will automatically assign a molarity and volume for the acid.

1. Using the slider, add 10.0 mL of the KOH . Write a chemical equation that illustrates what happens when HNO_3 reacts with KOH .
2. Titrate to the end point. Getting the exact end point, requires care (adding dropwise) and will be reached when there is a permanent pale pink color in the flask. A dark pink color means you have missed the end point and must start over.
3. Fill in the table below.

Molarity of Acid	
Volume of Acid	
Volume of Base	

4. Calculate the molarity of the base, enter this number (to three sig. figs) and click-on "OK".
5. Calculate the pH of the acid before any base is added.
6. Make a sketch of a graph of pH (y axis) against volume of base added (x axis) and indicate the following points: the initial pH of the acid and the equivalence point (and its pH).

Revised August 2009



Go to the computer simulation and select the following.

- (i) Weak Acid vs. Strong Base
- (ii) Fill the buret with Base
- (iii) CH₃COOH as the acid and NaOH as the base
- (iv) Phenolphthalein as the indicator

The computer will automatically assign a molarity and volume for the acid.

7. Using the slider, add 10.0 mL of the NaOH. Write a chemical equation that illustrates what happens when CH₃COOH reacts with NaOH.

8. Titrate to the end point. Getting the exact end point, requires care (adding dropwise) and will be reached when there is a permanent pale pink color in the flask. A dark pink color means you have missed the end point and must start over.

9. Fill in the table below.

Molarity of Acid	
Volume of Acid	
Volume of Base	

10. Calculate the molarity of the base, enter this number (to three sig. figs) and click-on "OK".

11. Calculate the pH of the acid before any base is added, given that the acid dissociation constant (K_a) for CH₃COOH is 1.8×10^{-5} M.

12. Make a sketch of a graph of pH (y axis) against volume of base added (x axis) and indicate the following points: the initial pH of the acid and the equivalence point (and its pH).