Review

strong acids

<u>name the following:</u>

HCl

HClO

$HClO_2$

$HClO_3$

$HClO_4$

$Fe(OH)_2$

<u>write the formulas</u>

nitric acid

nitrous acid

hydronitric acid

magnesium hydroxide

name the following:

HCl hydrochloric acid

HClO hypochlorous acid

$HClO_2$ chlorous acid

$HClO_3$ chloric acid

$HClO_4$ perchloric acid

$Fe(OH)_2$ Iron (II) hydroxide

write the formulas

nitric acid HNO_3

nitrous acid HNO_2

hydronitric acid H_3N

magnesium hydroxide $Mg(OH)_2$

strong acids

H_2SO_4

HBr

HI

HNO_3

$HClO_4$

HCl

Titration Lab Test

_____ /10 points

Lab technique

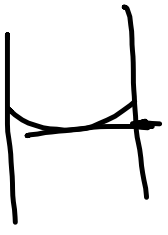
_____ Rinse Buret with water and current chemical (+1 point)
_____ Forgot to add phenolphthalein (-1)
_____ Measure known with graduated cylinder (+1)
_____ Proper clean up(+1)
_____ All Data collected (+2)
_____ Correct answer (+1)

Known _____ 0.5M NaOH (Record known name/concentration.)

- Bring about 50 mL from stock solution back to your lab station.
- Put known in buret.

Unknown _____

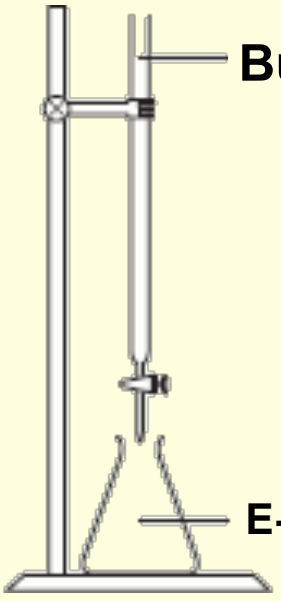
- Goes in beaker below buret
- Use _____20_____ mL of unknown.
- Don't forget to use 3-5 drops of Phenolphthalein.



Data 49.4 + 33.7

Trial 1	Trial 2	Trial 3
Start: 0.6mL - 50mL Finish: 0mL - 33.7 Change 83.1 mL Volume of Unknown = 20mL Calculations		

Titration



Buret: contains titrant

- **known concentration**
- **known volume**
  (change in volume)

example

0.81 M HBr

titrate 57mL HBr

use to figure out moles

$$M = \frac{\text{moles}}{\text{liters}}$$

E-flask: contains solution to analyze and indicator

- **known volume**
- **unknown concentration**

25 mL base

unknown molarity

moles of base = moles of acid

	Acid	Base
M	0.81	**1.85**
mol	0.046	= 0.046
L	0.057	0.025

$$HX + BOH \rightarrow BX + HOH$$

$$H^{+1} + OH^{-1} \rightarrow HOH$$

I	0.046 mol	0.046 mol	
S	-0.046 mol	-0.046 mol	+0.046 mol
E	0	0	0.046 mol

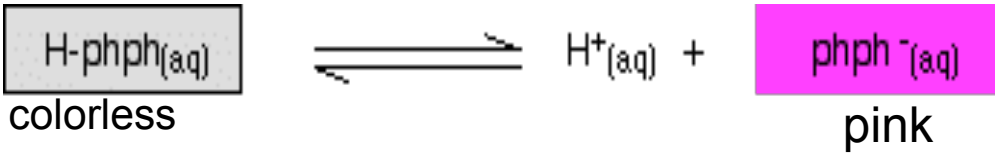
$$0.81M = \frac{x \text{ mol}}{0.057L}$$

x=0.046 mol acid = 0.046 mol base

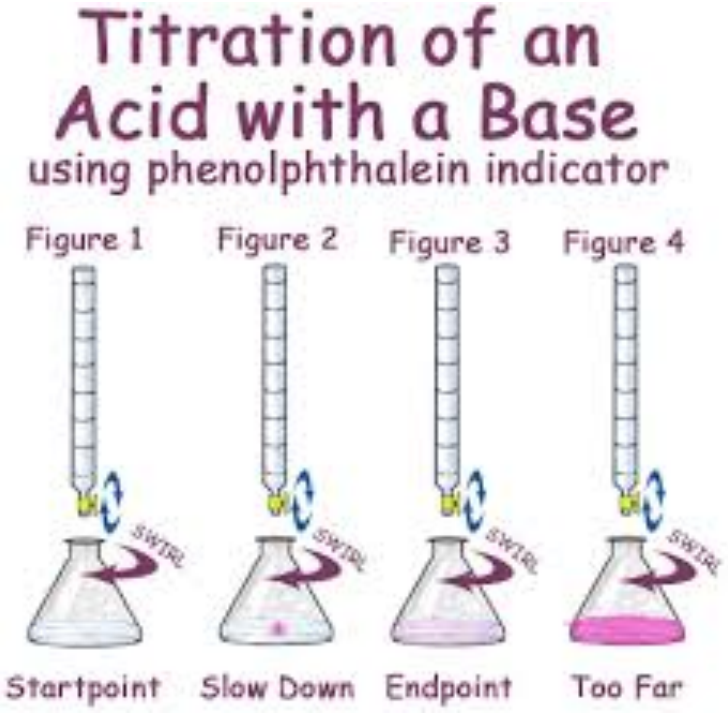
$$\frac{0.046 mol}{0.025L} = \mathbf{1.85\ M\ base}$$

Phenolphthalein

-- commonly used indicator for titrations and is a very weak acid.

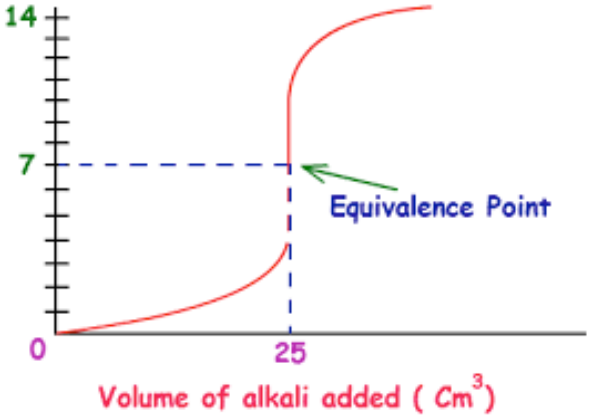


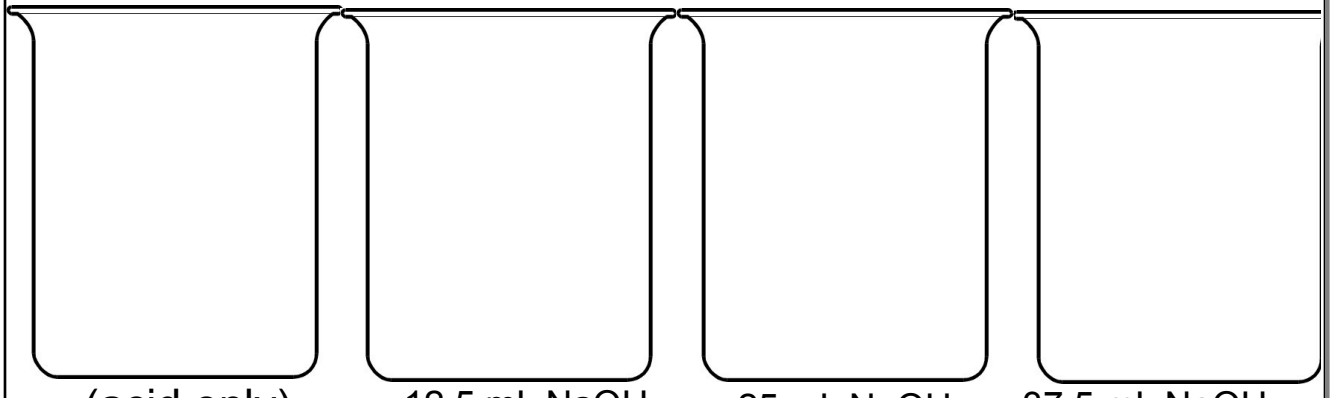
colorless pink



Good Endpoint Bad Endpoint (Overly Titrated)

What is happening to the pH as you titrate?





(acid only)
0 mL NaOH

12.5 mL NaOH

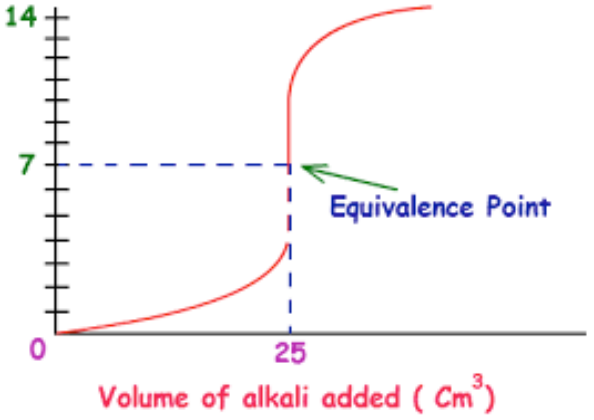
25 mL NaOH

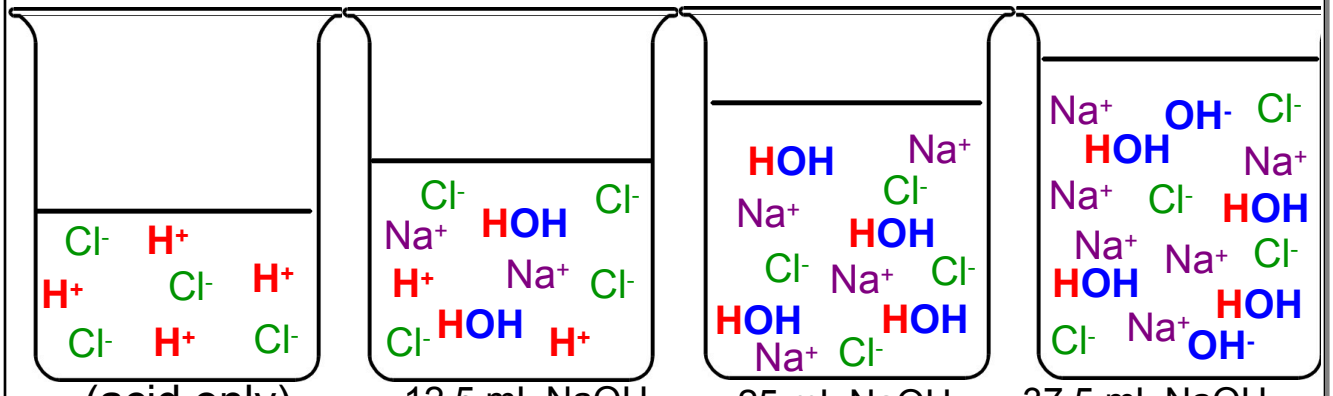
37.5 mL NaOH

H^+ Cl^- Na^+ OH^-

HOH

What is happening to the pH as you titrate?





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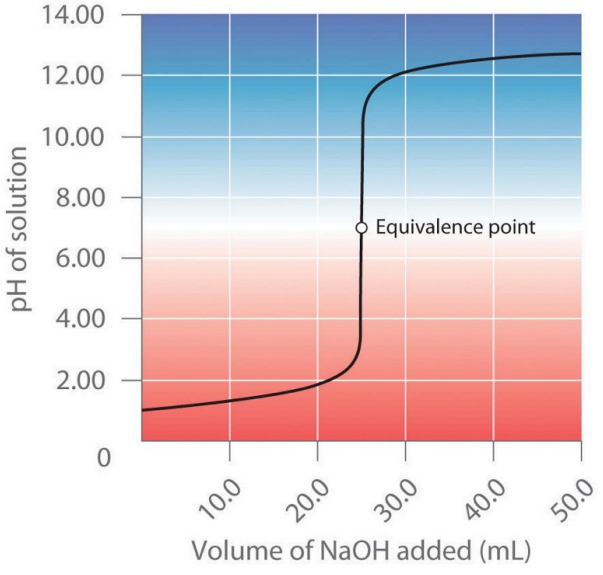
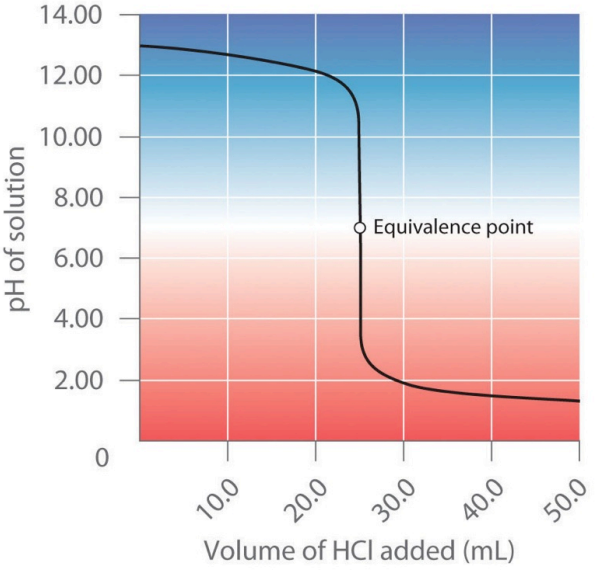
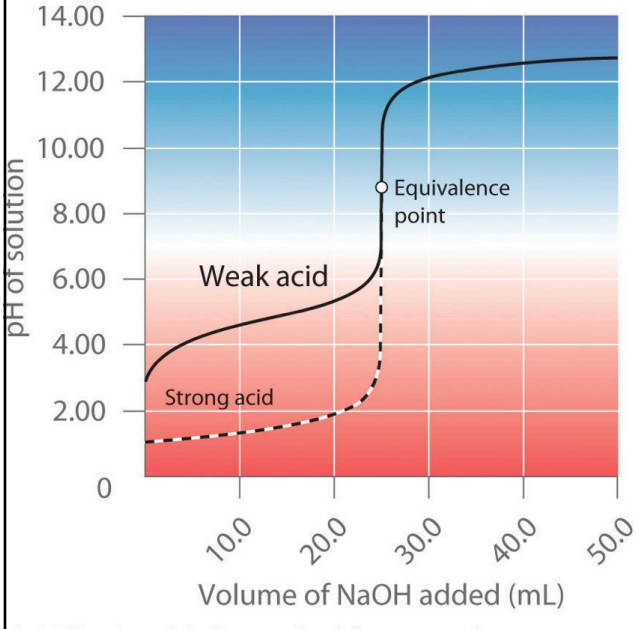


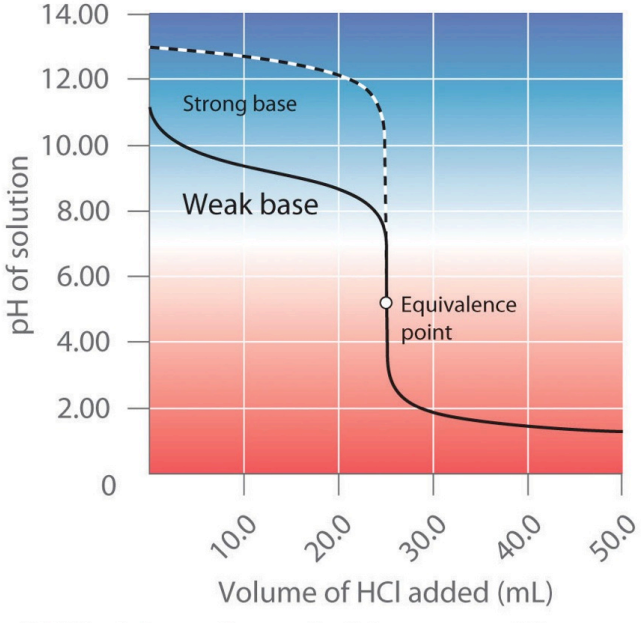
(a) Strong acid titrated with strong base



(b) Strong base titrated with strong acid



(a) Weak acid titrated with strong base



(b) Weak base titrated with strong acid