

Name: Key  
 Pd: \_\_\_\_\_ Date: \_\_\_\_\_

Chemistry 11  
 Dilution vs Titration

In this unit we have learned that you can **change** a solutions concentration by MIXING two of the **same substances** together:

**Example:**

What is the resulting concentration of NaCl if 50.0 mL of 1.0 M NaCl is mixed with 25.0 mL of 1.5 M NaCl?

$$[NaCl]_{F_1} = \frac{1.0M \times 0.0500L}{0.0750L} = 0.666 M NaCl$$

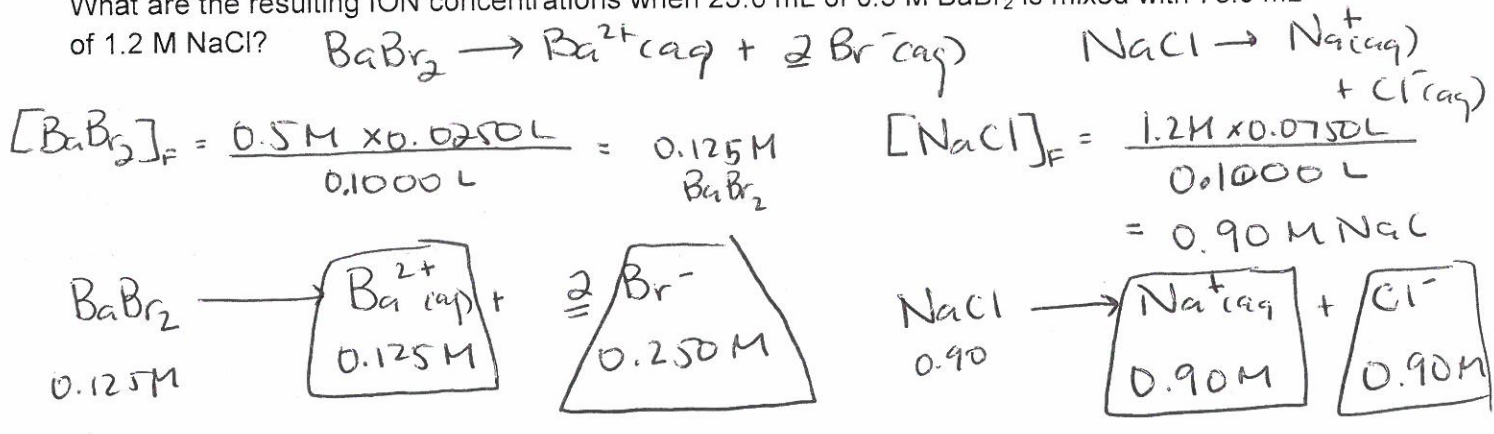
$$[NaCl]_{F_2} = \frac{1.5M \times 0.0250L}{0.0750L} = 0.50 M NaCl$$

$$\begin{array}{r} 0.666 M \\ 0.50 \\ \hline 1.166 \end{array} \rightarrow \boxed{1.17 M NaCl}$$

You can change a solutions concentration by **mixing two different substances** together:

**Example:**

What are the resulting ION concentrations when 25.0 mL of 0.5 M BaBr<sub>2</sub> is mixed with 75.0 mL of 1.2 M NaCl?

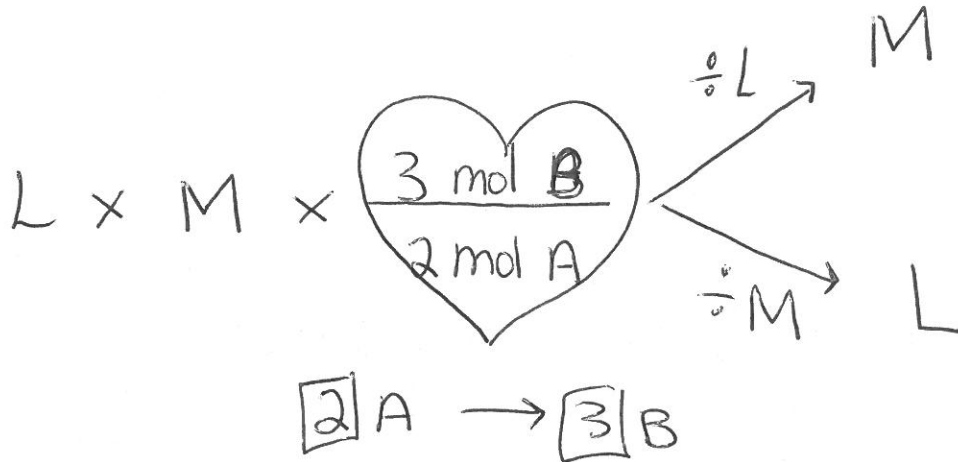


The **mixing** together of solutions is known as DILUTION and the EQUATION is:

$$M_I V_I = M_F V_F$$

HOWEVER,

When a solution of known volume and concentration is TITRATED with a solution with either unknown volume or concentration this is called a TITRATION and it is a STOICHIOMETRIC CALCULATION: (mole bridge)



**Example:**

If the following data were collected during a titration, calculate the **concentration** of the Barium hydroxide solution.

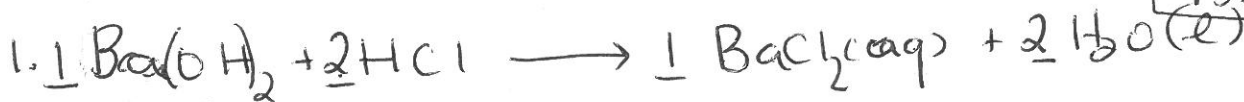
Titration Data:

Start here  
b/c  $L \times M = \text{mol}$

Volume of HCl (aq)	25.00 mL
Initial Volume of Ba(OH) <sub>2</sub> (aq)	10.26 mL
Final Volume of Ba(OH) <sub>2</sub> (aq)	24.08 mL
Concentration of HCl	0.525 M

Subtract these to determine the volume of Ba(OH)<sub>2</sub> used!

$$\begin{array}{r} 24.08 \\ - 10.26 \\ \hline 13.82 \text{ mL} \end{array}$$



2.  $0.02500 \cancel{\text{L}} \times \frac{0.525 \text{ mol HCl}}{\cancel{\text{L}}} \times \frac{1 \text{ mol Ba(OH)}_2}{2 \text{ mol HCl}} \times \frac{1}{0.01382 \text{ L}}$

$= 0.475 \text{ M Ba(OH)}_2$