Chemistry I Name _____

Date _____ Per ____

Notes: Diluting Solutions

• When you're mixing a very concentrated acid with water, the rule is:__"Do as you oughtta, _____add acid to water."_____

• What's the basic principle behind diluting solution? ____The number of moles in the solution __before the dilution equals the number of moles in the solution after the dilution. _____

• What's the formula this principle produces? ____$V_1M_1 = V_2M_2$_____

Sample Problems:

1. If you add 105 mL of water to 250. mL of a 3.97 M HCl solution, what's the molarity of the new solution?

$V_1M_1 = V_2M_2$

V_1 = 250. mL — 250. mL x 3.97 M = 355 mL x M_2

M_1 = 3.97 M

V_2 = 105 mL + 250. mL = 355 mL — M_2 = 2.80 M

M_2 = ?

2. If you have 5.00 L of a 3.00M HNO_3 solution and you add it to 2.00 L of water, what will be the molarity of the diluted solution?

$V_1M_1 = V_2M_2$X = 900. mL

V_1 = 5.00 L — 5.00 L x 3.00 M = 7.00L x M_2

M_1 = 3.00 M

V_2 = 5.00 L + 2.00L = 7.00 mL — M_2 = 2.14 M

M_2 = ?

3. How much water must you add to 300. mL of a 6.00 M NaOH solution to make it a 1.50 M solution?

Let = mL of water added — $V_1M_1 = V_2M_2$

V_1 = 300. mL — 300 mL x 6.00 M = (300. mL + X) x1.50 M

M_1 = 6.00 M

V_2 = (300. mL + X) — 300. mL + X = 1200

M_2 = 1.50 M

X = 900. mL

4. How many mL of 4.00 M H_3PO_4 are needed to prepare 125 mL of a 3.05 M solution?

$V_1M_1 = V_2M_2$

V_1 = ? — V_1 x 4.00 M = 125 mL x 3.05 M

M_1 = 4.00 M

V_2 = 125 mL — V_1 = 95.3 mL

M_2 = 3.05 M