Chemistry 20	Unit 3
Lesson 5 - Dilution and Distillation	84 mins

Dilution vs Distillation

Dilution - Add more solvent to **DECREASE** concentration	Distillation - To boil a solution to separate the the solute and solvent - **INCREASE** concentration

Calculate

$n_1 = n_2$ $C_1V_1 = C_2V_2$ units MUST match	$C_1 = 1.25\ mol/L$ $V_1 = 2000\ mL$ $C_2 = 0.3125\ mol/L$ $V_2 = ??\ mL$ $C_1V_1 = C_2V_2$ $V_2 = \frac{C_1V_1}{C_2}$ $V_2 = \frac{(1.25\ mol/L)(2000\ mL)}{(0.3125\ mol/L} = 8.00 \times 10^3\ mL$ ADD 36 mL of solvent to a 12 mL sample of a concentration of 48000 ppm What is the new concentration? $C_1V_1 = C_2V_2$ $C_1 = 48000\ ppm$ $V_1 = 12\ mL$ $C_2 = ???$ $V_2 = 48\ mL\ (12\ to\ start\ +\ 36\ extra)$ $C_2 = \frac{C_1V_1}{V_2}$ $C_2 = \frac{(48000\ ppm)(12\ mL)}{48\ mL}$ $C_2 = 1.2 \times 10^4\ ppm$

Chemistry 20 - Unit 2 - Dilution and Distillation

Name: ___________________________________

You may find the following formulas useful:

$C = \frac{n}{V}$ $m = Mn$	$d = \frac{m}{V}$ $C_1V_1 = C_2V_2$

1. To test the hardness of water, an industrial chemist performs an analysis using 100.0 mL of a 0.250 mol/L standard solution of ammonium oxalate. What mass of ammonium oxalate is needed to make this solution?

2. Calculate the mass of solid sodium hydroxide needed to make 500 mL of a 10.0 mol/L cleaning solution.

3. When acidified, potassium permanganate is a lethally powerful oxidizing agent. Mr. Pruden's dog, Maggie, decides to prepare 500.0 mL of a 0.0750 mol/L potassium permanganate solution. What mass of potassium permanganate is required to prepare this solution?

4. Maggie realizes that her solution is too weak, but with the help of a distillation apparatus, manages to reduce 500.0 mL of the 0.0750 mol/L solution to a volume of 200.0 mL. What is the resulting concentration?

5. The next step in Maggie's nefarious plan is to produce 4.00 L of a 10.0% hydrochloric acid solution, using a 36.0% stock solution. How much of the stock solution will Maggie need to use?

6. Maggie mixes her potassium permanganate with his hydrochloric acid, but alas, the reaction does not work as desired. Undeterred, my dog decides to produce 2.00 L of 0.200 mol/L sulfuric acid solution from a 17.8 mol/L stock solution. How much of the stock solution is necessary?

7. In a rage, Mr. Pruden kicks over Maggie's doghouse and scolds his dog for getting into his chemicals again. Afterwards, Mr. Pruden takes 5.00 mL of a 0.005000 mol/L $CuSO_{4(aq)}$ solution and dilutes it to a final volume of 100.0 mL. What is the final concentration of the diluted solution?

8. Maggie's antics will not stop! She seizes 50.00 mL of a 1.50 mol/L nitric acid solution and adds 950.00 mL of water to it. What is the new concentration of nitric acid?

9. 15.00 grams of potassium dichromate is added to water, preparing 100.00 mL of solution.
    a. What is the concentration of this solution?

    b. If 200.00 mL of water are added to the solution, what is the resulting concentration?