Dilutions and Molarity Worksheet

$$\boxed{M_1V_1 = M_2V_2}$$

Remember that you can change the concentration of a solution by adding more solvent. While you cannot increase the concentration of a solution in this manner, you can create a more dilute solution by increasing the amount of solvent. You can determine the amount of a solution needed to dilute by using the following:

$$M_1 \times V_1 = M_2 \times V_2$$

Where M = molarity and V = volume. M_1 and V_1 are the initial solution's molarity and volume, while M_2 and V_2 are the final solution's molarity and volume. If needed, you can find the molarity of a solution by the usual formula: M = moles of solute/ liters of solution

Use the formula and information above to solve the following problems. Show your work and watch labels. The first three problems are questions regarding molarity and the others involve the dilutions formula above.

1. Determine the number of grams of $NaHCO_3$ that are in one liter of a 2.1 M solution

2.

3. Determine the number of grams of $NaNO_3$ that are present in 500 mL of a 1.0 M solution.

4. Determine the number of grams of CCl_4 in 450 mL of a 3.2 M solution.

5. You need to make 300 mL of a 0.40 M solution of sodium chloride. The only available solution is 1.0 M. Determine how to make the needed dilution.

6. You have to make 500 mL of a 0.50 M $BaCl_2$. You have 2.0 M barium chloride solution available. Determine how to make the needed dilution

7. You need to make 10.0 L of 1.2 M KNO$_3$. What molarity would the potassium nitrate solution need to be if you were to use only 2.5 L of it?

8. Using a 4.0 M solution of MgSO$_4$, determine how to make 300 mL of a 1.7 M dilution.

9. If you dilute 174 mL of a 1.6 M solution of LiCl to 1.0 L, determine the new concentration of the solution.

10. One liter of a solution is prepared by dissolving 125.6 g of NaF in it. If I took 180. mL of that solution and diluted it to 500. mL, determine the molarity of the resulting solution.

11. *Challenge Question: Exactly 16.0 mL of a solution A is diluted to 300 mL, resulting in a new solution B that has 0.50 M concentration. If the solution was made with NaCl, determine the number of grams of NaCl needed to make 1.00 L of the original solution A.*