Molarity HW Video Guide and Take-Home Score: ___/3 NDB→

After actively watching both videos on molarity carefully and thinking critically, complete this sheet. This assignment will count as both a HW grade and a Quiz/Classwork grade. It's a good way to boost both grade categories, and your overall grade.

You are responsible for learning molarity and I will help you (if you need) during AEP after you have learned the basics and completed this. One of the things you have to learn as a young adult is how to take more control and responsibility for your learning. Here is a great example of how this works.

Part I: Key molarity concepts.

1) Write the normal equation for **molarity** in the first box.
   In the second box, rearrange the equation to solve for **moles**.
   In the third box, rearrange the equation to solve for **volume of solution**.

2) What unit of **volume** is required for the equation?

3) Which of the following words is a general synonym for **molarity**? Circle the correct answer.
   a. Ionic capacity
   b. Concentration
   c. Solubility
   d. Relative mass
   e. Thermal conductivity
   f. Solvent identity

4) Explain the difference between a **solute** and a **solvent**, using one complete sentence.

5) Fully explain what you should do if you have **mL** for the volume of solution instead.

6) Fully explain what you should do if you have **grams** for the amount of solute.

7) Which solution has a higher **molarity**? Place a checkmark next to the one with the highest molarity.
   _____ Solution X has a volume of **1.0 L**, and has **2.0 mol** of solute.
   _____ Solution Y has a volume of **2.0 L**, and has **2.0 mol** of solute.
   _____ Solution Z has a volume of **0.5 L**, and has **1.5 mol** of solute.

*Part II: Calculate the **molarity** of each problem. Show ALL work. Include units. And read the note below.*
IMPORTANT: One way to express molarity is using brackets like this: **[ ]**.
So, the phrase "the molarity of $KNO_3(aq)$" can be expressed quite simply and quickly as $[KNO_3]$. You could read [sugar] as "the molarity of sugar." I'm sure you got it!

8) A student dissolves 2.5 mol of NaCl in water, and creates a solution with a volume of 500 mL. Determine [NaCl] of the solution.

9) A solution has a volume of 1.25 L, and it contains 0.75 mol of glucose. Determine $[C_6H_{12}O_6]$.

10) There are 50.0 g of sodium nitrate ($NaNO_3$) dissolved in 750 mL of solution. Calculate $[NaNO_3]$.

*Part III: Calculate the **amount of solute in** each solution. Read the question carefully; there are two ways to express the amount of solute.*

11) Mrs. Johnson's students are using an aqueous glucose solution for AP Biology, where the molarity $[C_6H_{12}O_6]$ is **0.25 M**. If the solution has a volume of **1.50 L**…
    a. …how many **moles** of glucose are inside?

    b. …how many **grams** of glucose are inside? The molar mass of glucose is 180. g/mol.

12) During the winter, a de-icer solution is used on many car windows to quickly remove the frost without having to scrape it off. These solutions are usually a salt or some other solute dissolved in solvent. A bottle of Ice-B-Gone spray has a volume of **680 mL**, and the dissolved solute is $MgCl_2$. If $[MgCl_2]$ is **0.35 M**, calculate…
    a. …the number of **moles** of $MgCl_2$ inside the bottle.

    b. …the **mass** of $MgCl_2$ inside the bottle. The molar mass of $MgCl_2$ is 95.2 g/mol.

Part IV: Just one question: Scott needs to prepare a **6.0 M** solution of ammonium chloride, NH_4Cl. If he uses **481.5 g of NH_4Cl**, what **volume** (in L) should his solution be? (Hint: *Rearrange* equation, then *convert* g → mol using molar mass of NH_4Cl)