Dougherty Valley HS Chemistry
National Mole Day Celebration

Worksheet #7

Name: **Period:** **Seat#:**

Introduction: The date, October 23rd, had been designated as National Mole Day, starting at 6:02 AM. In celebration of this special date, you will be given an opportunity to make amazing artwork in class, but first…

Part I – ALL DIMENSIONAL ANALYSIS WORK MUST BE IN LINE METHOD WITH UNITS!

1) Look up the definition of a mole. The chemistry "mole" not the weird little animal!

2) A mole is sometimes referred to as Avogadro's # when we are writing it as a conversion factor with mole and molecules as our units on the conversion factor. Sometimes we aren't calculating molecules, we might be calculating atoms, or ions, etc. You can use the word "particles" to be generic so it applies to anything. Write Avogadro's # as a conversion factor just like we do for something like inches and feet $\frac{12\ in}{1\ ft}$.

3) Using Avogadro's number as a conversion factor, figure out how many atoms are in 3.58 moles of an element.

$$\frac{3.58}{} \quad \frac{\text{atoms}}{} =$$

4) Using Avogadro's number as a conversion factor, figure out how many moles are in 5.45×10^{25} molecules.

$$\frac{5.45 \times 10^{25}}{} \quad \frac{1}{} =$$

5) We can figure out how much one mole of something weighs by using the periodic table and atomic masses to calculate the "molar mass." The mass of *one atom* of Carbon is 12.01 amu but the mass of *one mole* of Carbon conveniently works out to be 12.01 grams! So the molar mass of carbon is $\frac{12.01\ grams}{1\ mole}$ – which is another conversion factor we can use! Using the molar mass of Bromine, calculate how much 6.79 moles of Bromine would weigh.

$$\frac{6.79}{} \quad \frac{}{1 \text{ mole}} =$$

6) Using the molar mass of the element with the electron configuration $1s^2 2s^2 2p^6 3s^1$ calculate how many moles are in 15 grams of that element.

$$\frac{\text{g}}{} \quad \frac{}{} =$$

7) How many molecules are in 30 grams of H_2O? Use molar mass AND Avogadro's Number this time!
HINT - the mole mass of a molecule is the sum of all the individual atom masses in the molecule!

$$\frac{30}{} \quad \frac{1 \text{ mole}}{} \quad \frac{\quad}{\quad} =$$

8) This time you figure out the line set up all by yourself! Convert 3.45×10^{18} atoms of Fluorine into moles.

9) Write a procedure, and show the dimensional analysis calculations required to determine how many grams of aluminum foil you would need to make a foil sculpture that contains *exactly* 1.23×10^{24} atoms of aluminum.

PROCEDURE

CALCULATIONS

10) As a lab group, actually make an aluminum foil sculpture with 1.23×10^{24} atoms of aluminum! Sketch your sculpture. Give it a title and a description! We will vote on them! There will be prizes!

Sculpture Title:

Description:

Sketch of Sculpture