Grams and Particles Conversion Worksheet

**There are three definitions (equalities) of the mole. The second one that we will explore is:**

1 mole = 6.02 x 1023 particles 🡨*particles* could mean atoms, ions, molecules, or formula units

**Each definition can be written as a set of two conversion factors. For this second definition they are:**

**1 mole = Avogadro’s number can be written as: 1 mole *OR* 6.02 x 1023 particles**

 **6.02 x 1023 particles 1 mole**

**How do you choose which conversion factor to use?** *Look at what you were given in the problem.*

* *If you are given particles, then you would choose the conversion factor on the left so that “particles” will cancel out.*
* *If your are given moles and want to go to particles, then use the conversion factor on the right so that the “moles” can cancel out and not be in your final answer.*

**The Steps to Solving Mole Problems:**

1. **Write down the value(s) that you are given in a problem.**
2. **Choose a conversion factor that has the unit that you want to get rid of on the bottom and the unit that you want in your answer on the top.**
3. **Cancel out the units from the top left and bottom right, and then find the answer by multiplying all the stuff on the top together and dividing it by the stuff on the bottom.**

Solve **any 12** of the following:

1) How many molecules are there in 24 grams of FeF3? **(molar mass of FeF3 is 113 g/ mole)**

**24 grams x \_\_\_1 mole x 6.02 x 1023 molecules = 1.28 x 1023 molecules**

 **113 grams 1 mole**

2) How many molecules are there in 450 grams of Na2SO4?

3) How many grams are there in 2.3 x 1024 atoms of silver? **(molar mass of Ag is 108g/mole)**

**2.3 x 1024 atoms** **x** \_\_\_\_**1 mole\_\_\_\_\_ x \_108 grams = 421 grams of silver**

 **6.02 x 1023 atoms 1 mole**

4) How many grams are there in 7.4 x 1023 molecules of AgNO3?

5) How many grams are there in 7.5 x 1023 molecules of H2SO4?

6) How many molecules are there in 122 grams of Cu(NO­3)2?

7) How many grams are there in 9.4 x 1025 molecules of H2?

8) How many molecules are there in 230 grams of CoCl2?

9) How many molecules are there in 2.3 grams of NH4SO2?

10) How many grams are there in 3.3 x 1023 molecules of N2I6?

11) How many molecules are there in 200 grams of CCl4?

12) How many grams are there in 1 x 1024 molecules of BCl3?

13) How many grams are there in 4.5 x 1022 molecules of Ba(NO­2)2?