**Unit 6- *The Mole & Molar Mass***

**What is a Mole?**

* You can measure \_\_\_\_\_\_\_\_\_,
  + or volume,
* Or you can count \_\_\_\_\_\_\_\_\_\_\_.
* We measure mass in grams.
* We measure volume in liters.
* We count pieces in **\_\_\_\_\_\_\_\_\_\_.**

**Moles are:**

* abbreviated as \_\_\_\_\_\_\_\_\_\_
* Defined as the number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atoms in exactly 12 grams of carbon-12.
* 1 mole is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ representative particles.
* Treat it like a very large dozen
* 6.02 x 1023 is called: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Representative Particles:**

* The smallest pieces of a substance:
  + For a molecular compound: it is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + For an ionic compound: it is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (made of ions).
  + For an element: it is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    - Remember the 7 diatomic elements (made of molecules)

**The Mole:**

* A mole of carbon dioxide contains Avogadro’s number of CO2 molecules.
* Each CO2 molecule is made up of how many atoms?

**Counting Atoms:**

* How many oxygen atoms in the following?
  + CaCO3
  + Al2(SO4)3

**Molar Mass:**

* The molar masses of any two elements must contain the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of atoms.
* In order to measure the mass of a mole of a compound, we simply \_\_\_\_\_\_\_\_\_ the individual molar masses of each atom in the compound.
* If we wanted to know the molar mass of sulfur trioxide (SO3), we would have to add up the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for each of the atoms.
  + mass of S = O =
  + \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_ g/mol
* We would say sulfur trioxide has a molar mass of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ grams per mole

**Problems:**

* What is the molar mass of
  + Water, **H2O**?
  + Hydrochloric acid, **HCl**?
  + Aluminum oxide, **Al2O3**?
  + Magnesium hydroxide, **Mg(OH)2**?