**The mole is a counting unit**

**Similar to a dozen, except instead of 12, it’s 602 billion trillion 602,000,000,000,000,000,000,000**

**6.02 X 1023 (in scientific notation)**

**This number is named in honor of Amedeo \_\_\_\_\_\_\_\_\_ (1776 – 1856), who studied quantities of gases and discovered that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ what the gas was, there were the\_\_\_\_\_\_\_\_\_\_ number of molecules present**

* **1 dozen cookies = 12 cookies**
* **1 mole of cookies = 6.02 X 1023 cookies**
* **1 dozen cars = 12 cars**
* **1 mole of cars = 6.02 X 1023 cars**
* **1 dozen Al atoms = 12 Al atoms**
* **1 mole of Al atoms = 6.02 X 1023 atoms**

**Note that the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is always the same, but the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is very different!**

**Mole is abbreviated mol (gee, that’s a lot quicker to write, huh?)**

**Suppose we invented a new collection unit called a rapp. One rapp contains 8 objects.**

**1. How many paper clips in 1 rapp?**

 **a) 1 b) 4 c) 8**

**2. How many oranges in 2.0 rapp?**

 **a) 4 b) 8 c) 16**

 **3. How many rapps contain 40 gummy bears?**

 **a) 5 b) 10 c) 20**

**1 mole C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**1 mole H2O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**1 mole NaCl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**(technically, ionics are compounds not molecules so they are called formula units)**

 **6.02 x 1023 Na+ ions and**

 **6.02 x 1023 Cl– ions**

**Avogadro’s Number as Conversion Factor**

**(Write the conversion factor)**

**Note that a particle could be an atom OR a molecule!**

**1. Number of atoms in 0.500 mole of Al**

 **a) 500 Al atoms**

 **b) 6.02 x 1023 Al atoms**

 **c) 3.01 x 1023 Alatoms**

**2.Number of moles of S in 1.8 x 1024 S atoms**

 **a) 1.0 mole S atoms**

 **b) 3.0 mole S atoms**

 **c) 1.1 x 1048 mole S atoms**