CONCEPT: MOLES & AVOGADROS NUMBER

- Normally we use the mass of a material, but you'll need to know the *moles* or *# of particles*.
  - **Mole (*n*)** = the _____ of material equal to $\mathbf{N_A}$ = _____ particles ← known as Avogadro's Number.
  - This applies to *ANY* substance:
    - 1 mol Nitrogen (N) = 6.022×10^{23} *N* atoms
    - 1 mol H_2O = 6.022×10^{23} H_2O molecules
    - 1 mol dollars = 6.022×10^{23} dollars
- You'll need to know how to convert between mass, moles, and # of particles.

***M* =** molar mass of material (a.k.a atomic mass in any periodic table, expressed in $\frac{g}{mol}$)

EXAMPLE: Calculate the following:

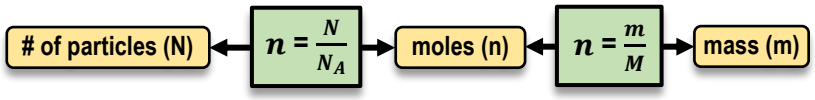
a) How many moles is 8.33×10^{37} Carbon atoms?

b) How many grams of aluminum is 2.35 mol Al? (Molar mass Al = 26.98)

c) How many particles are in 24g of H_20? (Molar mass H_20 = 18.02 g/mol)

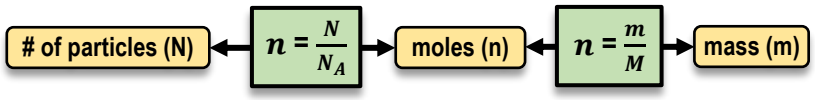
PROBLEM: If the molar mass of hydrogen is 1.008 g/mol, what is the mass (in grams) of 2 hydrogen atoms?

A) 0.5004
B) 3.35×10^{-24}
C) 2.016
D) 1.69×10^{-24}



CONSTANTS
$N_A = 6.022\times10^{23}$

PROBLEM: If the molar mass of water (H_2O) is 18 g/mol, how many molecules of H_20 are in a 1.5L bottle of water?



CONVERSIONS
$1\ L = 1\ kg$