NOTES #2 STOICHIOMETRY A AP CHEMISTRY

1. MEASURING MASS

A. AMU's . . . What are they?_____

The mass of an atom is determined by what?_____

e'	9.1095×10^{-28} grams	negligible amu
P^+	1.67252×10^{-24} grams	
n^O	1.67495×10^{-24} grams	

**Notice that n^O is more massive than a proton, why?_____

**Is 10^{-24} grams very convenient to deal with?_____

B. AMU (_____)

1 AMU = mass of 1.0 P^+ ≈ mass of 1.0 n^O

C. All atomic masses on the periodic table are relative to the mass of _____

EX: Using a mass spectrometer, hydrogen has been found to be 8.400% as massive as C-12. How many AMUs are in a hydrogen atom?

_____

2. MOLAR MASS AND THE MOLE

A. A scientist said, " one atom of C-12 has been set to weigh exactly 12.0 AMU. . . .Okay, I like the number 12.0 and I really don't want to re-write the periodic table, but I would like to measure in something more convenient, like grams. Isn't the ratio of mass the same if we use grams instead of the original amus? I wonder how many atoms are in 12.0 grams of C-12?"
This idea led to Avagodro's number!

B. 1 mole (mol) = _____particles, the # of atoms found in 12.0 g of C-12.

EX: 1 atom of Na =_____ 1 mol of Na or 6.02×10^{23} Na atoms = _____

C. Molar Mass = mass of 1.0 mole of a substance. Units = _____

You can calculate the molar mass of anything. . . .elements, compounds, ions, volkswagens, etc. . .

EX: molar mass of methane $CH_{4\,(g)}$ _____ = 16.05 g/mol

3. ISOTOPIC ABUNDANCY

If 1 P^+ = 1 n^O = 1 AMU, then how do we get the decimal points on the periodic table?

A. The masses on the periodic table represent the average mass and abundance of all of the _____ for that element.

B. Isotope:_____

EX:	^{63}Cu	vs.	^{65}Cu
Actual Mass	62.93 AMU		64.93 AMU
%Abundance	69.09%		30.91%

What's the weighted atomic mass for copper? (figure this out like you would your grade)
EX: There are two isotopes for Cl, ^{35}Cl and ^{37}Cl. Which one is more abundant?

EX: There are three isotopes for H, ^{1}H, ^{2}H, and ^{3}H. Which one is more abundant?

4. PUTTING IT ALL TOGETHER. . .SIMPLE CONVERSIONS!

GRAMS ↔ MOLES ↔ # OF PARTICLES

EX: How many sugar molecules are in 2.3 grams of glucose, $C_6H_{12}O_6$?

EX: How many C atoms are in the above sample?

EX: How many atoms are there total?

5. PERCENT COMPOSITION % by mass of each element in a compound

$$\%A = \frac{\text{grams A}}{\text{grams total}} \times 100$$

EX: calculate the % water in the hydrate, magnesium sulfate heptahydrate.

Following the above procedure, you should be able to find the percent composition for any compound!!!