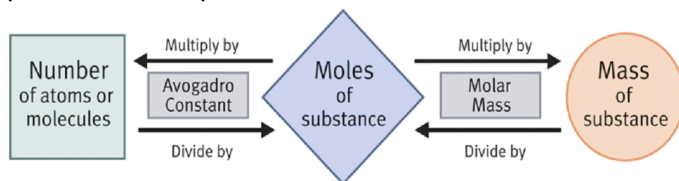
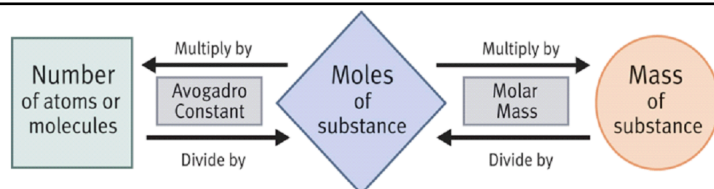


TUESDAY, JANUARY 27, 2015



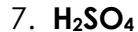
Use the conversion chart above to solve the following MOLE problems.

- How many moles are in 150 grams of copper? _____
This conversion is _____ to _____.
- How many molecules are in exactly 1 Mole of Carbon? _____
- What is the mass that is equal to exactly 1 Mole of Zinc? _____



- How many moles are in 2.40×10^{25} molecules of Argon?
This conversion is _____ to _____.
- What is the mass that is equivalent to 0.65 moles of Fluorine?
This conversion is _____ to _____.
- How many molecules are in 3.40 moles of Lithium?
This conversion is _____ to _____.

Determine the number of atoms of each element in the following formulas.



H: _____

S: _____

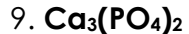
O: _____



Ba: _____

O: _____

H: _____



Ca: _____

P: _____

O: _____



Mg: _____

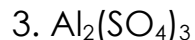
C: _____

H: _____

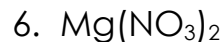
O: _____

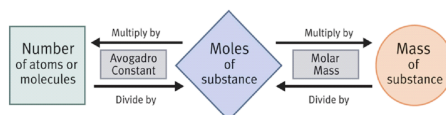
THURSDAY, JANUARY 29, 2015

Calculate the **molecular or formula mass** in **amu** of each of the following compounds:



Calculate the **molar mass** in **grams/mole** of each of the following compounds:





Now use the conversion chart to complete the following mole conversions.

7. How many moles are in 150.0 grams of $\text{Ca}(\text{OH})_2$?

This conversion is _____ to _____.

8. How many grams are equal to 3.4 moles of AgNO_3 ?

This conversion is _____ to _____.

1. TAKE OUT YOUR PERIODIC TABLE.
 - WE ARE GOING TO START WITH NOTES TODAY AND DO OUR WARM UP AFTER.
2. GET A CALCULATOR IF YOU NEED ONE.

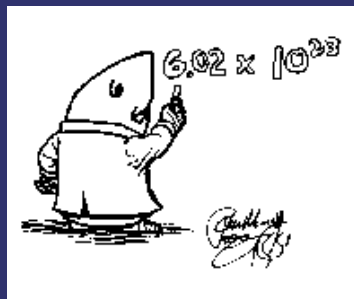
The Mole



A REVIEW of Mole Conversions

Recall: The Mole

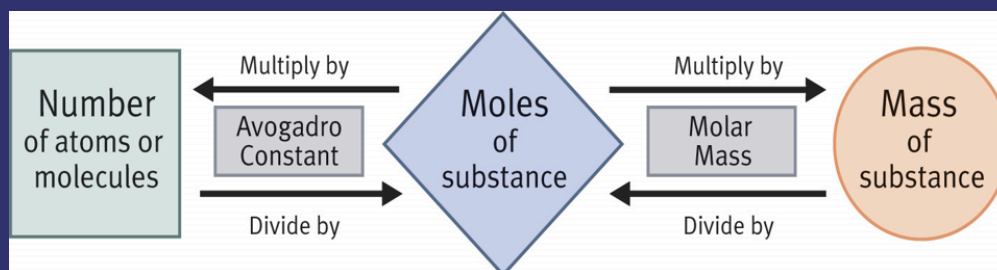
The MOLE (M) is the amount of a substance that contains as many elementary entities as there are atoms in exactly 12.00 grams of ^{12}C



$$1 \text{ Mole} = \text{Avogadro's \#} = 6.02 \times 10^{23}$$

Mole Conversions

- LET'S REVIEW CONVERSIONS BETWEEN MOLES AND MOLECULES FIRST

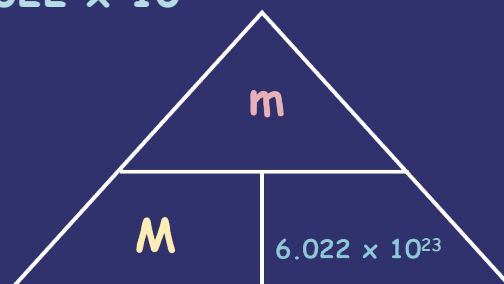
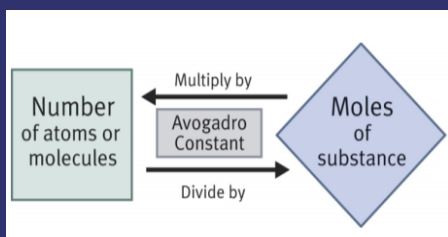


REMEMBER: Converting Between Moles & Molecules

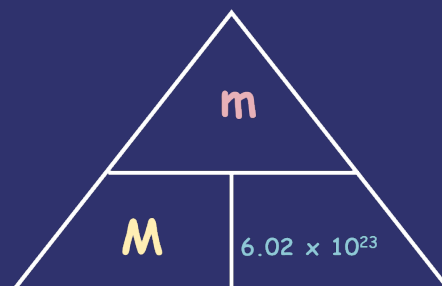
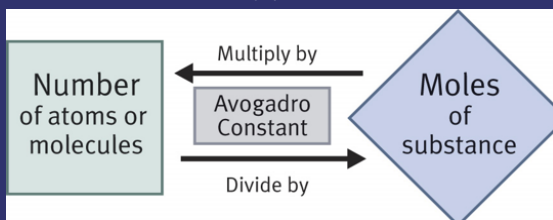
- To convert between moles (M) and molecules (m), use AVOGADRO'S NUMBER

$$\text{molecules} = \text{Moles} \times 6.022 \times 10^{23}$$

$$\text{Moles} = \text{molecules} \div 6.022 \times 10^{23}$$



Question: How many molecules are in 2.5 Moles of krypton?



Solution: # Moles \times Avogadro's # = # molecules

$$2.5 \text{ M} \times 6.02 \times 10^{23} = \underline{\hspace{2cm}}$$



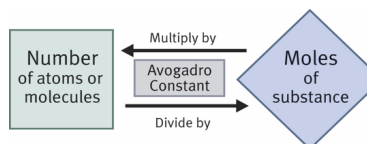
PROBLEMS TO TRY!!

1. How many atoms in 2.65 Moles of oxygen?

pull 1.60×10^{24} atoms of oxygen

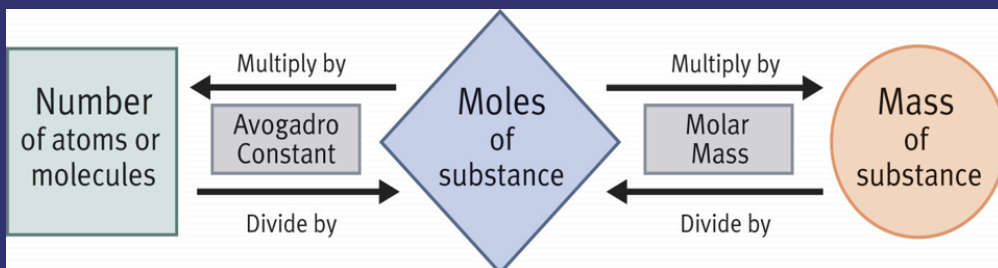
2. How many moles in 2.40×10^{24} molecules of carbon?

pull Solution = $.400 \times 10^1$ moles of carbon



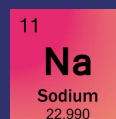
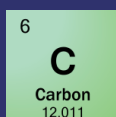
Mole Conversions

- LET'S LOOK AT MOLES AND GRAMS CONVERSIONS...
- We have some new concepts to consider



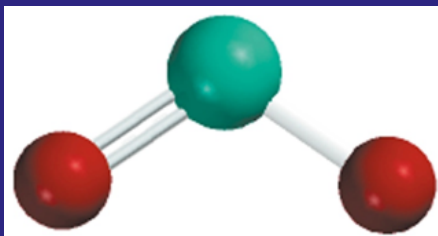
REVIEW: Atomic Masses

- The MOLE (M) is also equal to the atomic mass of any element on the periodic table
- Look at the "atomic masses" on the periodic table. What do these represent?
 - > The MASS of an atom (in amu)
 - > amu = atomic mass unit
 - > 1 Carbon-12 atom = 12.00 amu



Formula/Molecular Mass

- Molecular mass is the sum of the atomic masses (in amu) in a molecule
- Add up the atomic masses of the compound



Example: SO_2

$$\begin{array}{r}
 1 \text{ S} \quad 32.1 \text{ amu} \\
 + 2 \text{ O} \quad (16.0 \text{ amu})2 \\
 \hline
 SO_2 \quad 64.1 \text{ amu}
 \end{array}$$

For any molecule

molecular mass (amu) = molar mass (grams)

$$1 \text{ molecule } SO_2 = 64.07 \text{ amu}$$

$$1 \text{ mole } SO_2 = 64.07 \text{ g } SO_2$$



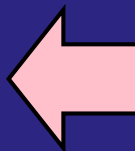
Formula Mass vs. Molar Mass

- Molecular Mass/Formula Mass: If you have a single molecule, the mass is measured in amu instead of grams
 - > Is the same numerical value as 1 mole of molecules
 - > Only the units are different (amu vs. grams/M)
- THE POINT: You may hear any of these terms which mean the SAME NUMBER... just different units

Molar Mass

- Example: Calculate the molar mass of CaCl_2
- CaCl_2 has 1 Calcium atom and 2 Chlorine atoms
- So we look up the masses of calcium and chlorine on Periodic Table

$$\begin{array}{r}
 1 \text{ Ca} = 40.1 \text{ g/M} \\
 + 2 \text{ Cl} = (35.5 \text{ g/M}) \times 2 \\
 \hline
 \text{CaCl}_2 = 111.1 \text{ g/M}
 \end{array}$$



MAKE SURE TO
MULTIPLY CHLORINE'S
MASS BY TWO

REMEMBER:

- The units for molar mass are grams/Mole

Molar Mass

Example: Calculate the molar mass of N_2O_5

- N_2O_5 has 2 Nitrogen atoms and 5 Oxygen atoms

$$\begin{array}{r} 1 \text{ N} = (14.0 \text{ g/M}) \times 2 \\ + 5 \text{ O} = (16.0 \text{ g/M}) \times 5 \\ \hline \text{N}_2\text{O}_5 = 108.0 \text{ g/M} \end{array}$$

REMEMBER:

- The units for molar mass are grams/Mole

Mole Conversions

- So now we should be able to do MOLE CONVERSIONS FOR COMPOUNDS TOO!!!

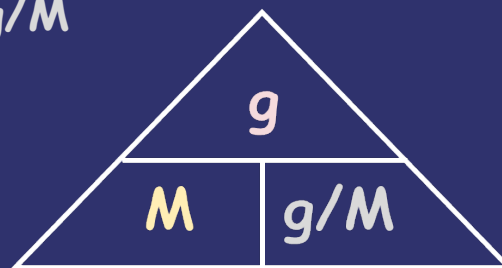
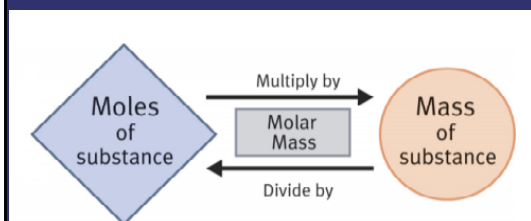


Converting Between Grams and Moles

- To convert between **grams** and **moles** you must first calculate the **molar mass** from the Per. Table

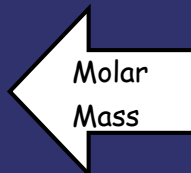
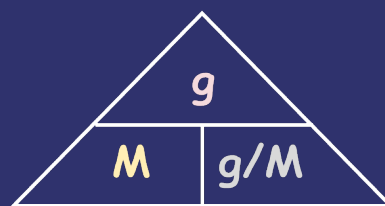
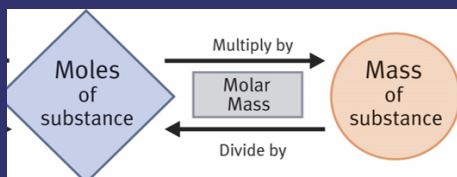
$$\text{grams} = \text{Moles} \times \text{g/M}$$

$$\text{Moles} = \text{grams} / \text{g/M}$$



Ex: Converting Between Grams and Moles

Question: How many moles are in 100 grams of NaCl?



$$1 \text{ Na: } 23.0 \text{ g/M}$$

$$1 \text{ Cl: } + 35.5 \text{ g/M}$$

$$58.5 \text{ g/M}$$

Solution: **Mass of substance** \div **Molar Mass** = **Moles**
 $100 \text{ grams} \div 58.5 \text{ g/M} =$

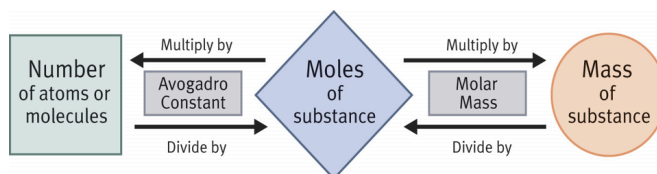
PROBLEMS TO TRY! YOU WILL NEED MOLAR MASS

1. How many moles is 165 g of carbon dioxide?

PROBLEMS TO TRY! YOU WILL NEED MOLAR MASS

2. How many grams is 5.3×10^{26} molecules of aluminum nitride, AlN ?

I'm converting between _____ and _____



PROBLEMS TO TRY! YOU WILL NEED MOLAR MASS

3. How many molecules is 25 grams of NaOH?

I'm converting between _____ and _____

