The Mole Notes

Measuring matter

1. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an object is, the harder it is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_ represent a specific \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Pair =
4. Ream =
5. Gross =
6. Units make counting objects \_\_\_\_\_\_\_\_\_\_\_\_\_
7. Different units are used to count different things, but the **\_\_\_\_\_\_\_\_\_\_\_\_** it represents is always **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Mole - SI base unit to measure the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Abbreviated =
2. Number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atoms in exactly \_\_\_\_\_\_\_\_\_ of pure \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Number =
4. Called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ number
5. Counts \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in that substance

Mass and the Mole

1. A mole always contains the same **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** but moles of different substances have different **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. Molar mass – mass in \_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of any \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Element’s molar mass =

* Measured in units –

1. Moles to Mass
2. Find the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for the substance
3. Atomic mass = **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
4. **\_\_\_\_\_\_\_\_\_\_\_\_\_** the molar mass by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
5. Mass to Moles
6. Find the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for the substance
7. Atomic mass = **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
8. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** by the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
9. Mass to # of Particles

\_\_\_\_\_\_\_ Steps:

1. Convert \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Convert \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Mass** | **Moles** | **# of Particles** |
| 2.5 g Au |  |  |
|  | 4.95 mol Zn |  |
|  |  | 3.95 x10²³ atoms C |
|  | 12.5 mol Cu |  |
|  |  | 8.75 x 10²¹ atoms Sc |
| 49.6 g Se |  |  |

Moles and Compounds

1. Chemical formulas tell how many **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of that molecule or formula unit

C₄H₁₀ =

CuSO₄ =

Al(OH)₃ =

1. Converting between moles of compound and moles of individual element

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ # of moles by amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Example: How many moles of H are in 5.5 mol H2O?

1. Molar mass of Compounds
2. Molar mass =
3. Moles to Mass in Compounds
4. Find the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for the compound
5. Atomic mass = **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
6. **\_\_\_\_\_\_\_\_\_\_\_\_\_** the molar mass by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
7. Mass to Moles in Compounds
8. Find the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for the substance
9. Atomic mass = **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
10. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** by the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
11. Mass to # Particles
12. Convert **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
13. 2. Convert **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
14. Individual Particle # of each element
15. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the # of particles of the total compound by the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Example: A sample contains 1.61 x 1023 units of AlCl3

Al = \_\_\_\_\_ mol \_\_\_ x 1.61 x 1023 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ particles of Al

Cl = \_\_\_\_\_ mol \_\_\_ x 1.61 x 1023 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ particles of Cl

1. Mass of 1 formula unit of a compound
2. \_\_\_\_\_\_\_\_\_\_\_ molar mass of the compound by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Molar mass of AlCl3 is 133.33. 133.33/6.02 x 1023 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ per unit of AlCl3

Percent Composition – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a compound

Equation:

Empirical formula – smallest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of elements in a compound

Examples:

Steps for determining the empirical formula:

1. Find number of \_\_\_\_\_\_\_\_\_\_\_\_ of each element

* If % is given, assume that total mass is \_\_\_\_\_\_\_\_\_\_\_\_\_ so that \_\_\_\_\_\_\_\_\_\_ of each element = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Convert \_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_ using the molar mass from periodic table
2. \_\_\_\_\_\_\_\_\_\_\_\_\_ each mole value by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_ to the nearest whole #. This is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the elements and is represented by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the empirical formula

* If the number is too far to round (x.1 ~ x.9), \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ each solution by same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to get the lowest whole number
* Example:
* Example:
* Example:

Molecular Formula – tells the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of atoms in a compound

To find molecular formula from empirical formula:

1. \_\_\_\_\_\_\_\_\_\_ experimental molar mass by mass of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_ the subscripts by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Use the subscripts to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The molecular formula is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the empirical formula