CONCEPT: CALCULATING MOLAR MASS

- **Molar Mass** is a physical property that represents the mass of a substance divided by the amount of that substance.
  - □ The SI units for mass is kg and the amount of substance is moles, but molar mass is in _____.

Molar Mass Formula

Molar Mass = _____

  - □ Molar mass is also referred to as _____ weight, _____ weight or _____ mass.

EXAMPLE: Calculate the molar mass of the compound $(NH_4)_2SO_4$.

STEP 1: Count the **number** of each element within the given compound.

- □ If elements are within parentheses, just remember to distribute the **subscript** to each element.

$(NH_4)_2SO_4$ _____ **N** _____ **S**

_____ **H** _____ **O**

STEP 2: Find the **atomic masses** of each element from the Periodic Table.

7	1	16	8
N	**H**	**S**	**O**
Nitrogen	Hydrogen	Sulfur	Oxygen
14.01	1.008	32.07	16.00

STEP 3: Multiply together the **number** of each element with their **atomic masses** from the Periodic Table.

___ N x 14.01 g/mol = _____ g/mol

___ H x 1.008 g/mol = _____ g/mol

___ S x 32.07 g/mol = _____ g/mol

___ O x 16.00 g/mol = _____ g/mol

STEP 4: Add up the totals after multiplication to determine the molar mass of the compound.

CONCEPT: CALCULATING MOLAR MASS

PRACTICE: Calculate the molecular weight of $C_3H_5N_3O_3$.

PRACTICE: The reaction between nickel metal and hydrochloric acid is not a simple dissolution. The product formed is $NiCl_2 \cdot 6\ H_2O$ (s), nickel (II) chloride hexahydrate, which has exactly 6 waters of hydration in the crystal lattice for every nickel ion. What is the molar mass of nickel (II) chloride hexahydrate, $NiCl_2 \cdot 6\ H_2O$ (s)?

PRACTICE: What is the molar mass of diazepam also known as Valium if 0.05570 mol weighs 15.86 g?