

Name: _____ Period: _____ Date: _____

Molar Masses

The molar mass of a substance is the mass of one mole (6.02×10^{23} units) of the substance. The mass in grams of one mole of an element's atoms is equal to the numerical value of that element's atomic weight. These values for each element can be found on the periodic table.

To find the molar mass of a substance, multiply the number of moles of each element by the molar mass of the element. Then add the masses of the various elements.

Example 1: What is the molar mass of iron(III) oxide, Fe_2O_3 ?

$$\begin{array}{rclcl} 2 \text{ mol Fe} & = & 2 \times 55.85 \text{ g} & = & 111.7 \text{ g Fe} \\ 3 \text{ mol O} & = & 3 \times 16.00 \text{ g} & = & 48.00 \text{ g O} \end{array}$$

$$\text{Molar Mass of } Fe_2O_3 = (111.7 \text{ g Fe} + 48.00 \text{ g O}) = 159.7 \text{ g } Fe_2O_3$$

Example 2: What is the molar mass of magnesium hydroxide, $Mg(OH)_2$?

$$\begin{array}{rclcl} 1 \text{ mol Mg} & = & 1 \times 24.31 \text{ g} & = & 24.31 \text{ g Mg} \\ 2 \text{ mol O} & = & 2 \times 16.00 \text{ g} & = & 32.00 \text{ g O} \\ 2 \text{ mol H} & = & 2 \times 1.008 \text{ g} & = & 2.016 \text{ g H} \end{array}$$

$$\text{Molar Mass of } Mg(OH)_2 = (24.31 \text{ g} + 32.00 \text{ g} + 2.016 \text{ g}) = 58.33 \text{ g } Mg(OH)_2$$

Determine the molar mass of each substance.

