# Warm Up

How many moles are in $2.14 \times 10^{24}$ molecules of $NO_2$?

$$2.14 \times 10^{24} \text{ molecules } NO_2 \times \frac{1 \text{ mol } NO_2}{6.02 \times 10^{23} \text{ molecules } NO_2} =$$

WANT
HAVE

EXP
EE
$\times 10^x$

3.55 mol $NO_2$

$$2.17 \times 10^{23} \text{ molecules Br}_2 \times \frac{1 \text{ mol Br}_2}{6.02 \times 10^{23} \text{ molecules Br}_2}$$

$$= \boxed{0.360 \text{ mol Br}_2}$$

How many atoms are in 6.08 moles of $C_4H_8$?

$$6.08 \, \text{mol} \, C_4H_8 \times \frac{6.02 \times 10^{23} \, \text{molecules} \, C_4H_8}{1 \, \text{mol} \, C_4H_8} \times \frac{12 \, \text{atoms}}{1 \, \text{molecules} \, C_4H_8}$$

$$= \boxed{4.39 \times 10^{25} \, \text{atoms}}$$

# #5   p. 292

$(2.75 \times 10^{24} \text{ atoms})$

How many atoms are in 7.51 moles of $CO_2$?

$(1.36 \times 10^{25} \text{ atoms})$

# Molar Mass

-      the molar mass of a substance represents the mass of one mole of the substance
    - it is expressed in grams per mol (g/mol)

To determine the molar mass of a substance:
- make sure the formula is written properly
- determine the number of atoms of each element
- use the atomic molar masses of each atom from the periodic table and multiply this by the number of atoms
- add the mass of the atoms together so as to represent the total mass of the substance in grams per mole

Ex.  What is the molar mass of $(NH_4)_3PO_4$?

$$N \longrightarrow 3 \times 14.01 = 42.03$$
$$H \longrightarrow 12 \times 1.01 = 12.12$$
$$P \longrightarrow 1 \times 30.97 = 30.97$$
$$O \longrightarrow 4 \times 16.00 = \underline{64.00}$$
$$149.12 \text{ g/mol}$$

$$1 \text{ mol} = 149.12 \text{ g}$$

# Find the molar mass of:

**a)** $H_2O$

$\hookrightarrow (2 \times 1.01) + (1 \times 16.00) = 18.02 \, g/mol$

H               O

**b)** $Ca(NO_3)_2$

**c)** $C_6H_{12}O_6$

Once molar mass is established, a conversion can be made from grams to moles or moles to grams (depending on the measurement of the sample)

Mm = $\dfrac{m}{n}$ ⟵ **mass (g)**

$\qquad$ ⟵ **# of moles**

Ex. How many moles are found in 100.g of NaCl?

$$100.g \; NaCl \times \dfrac{1 \; mol \; NaCl}{58.44 \; g \; NaCl} = \boxed{1.71 \; mol \; NaCl}$$

$$NaCl \longrightarrow (1 \times 22.99) + (1 \times 35.45) = 58.44 \, g/mol$$

Ex. What is the mass of 5.00 mol of NaCl?

# Homework

p. 296  #7-15

7,8,13-15

$$:N \equiv C - \ddot{F}:$$

X

Tetrahedral

$Ag^+$  O  $Ag^+$

O        O

$Ag^+$  O  $Ag^+$

$C_2$

$S + P_x \longrightarrow Sp + Sp$

$\sigma$

$P_y, P_z$

$\pi$