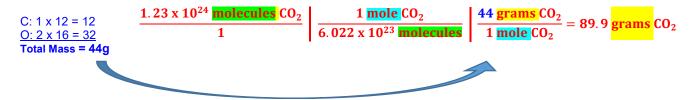
Stoichiometry - 2 Step Conversions

[Must Show All Work]

1) How many grams are in 1.23 x 10²⁴ molecules of CO₂?



2) How many liters are in 1.23 x 10²⁴ molecules of CO₂?

3) How many atoms are in 3.25 grams of sodium?

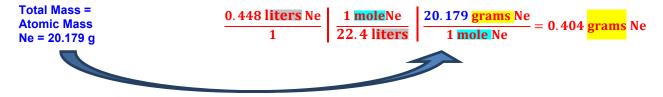
$$\frac{3.25 \text{ grams Na}}{1} \left| \frac{1 \text{ mole Na}}{23.0 \text{ grams Na}} \right| \frac{6.022 \times 10^{23} \text{ atoms Na}}{1 \text{ mole Na}} = 8.51 \times 10^{22} \text{ atoms Na}$$

4) How many molecules are in 7.50 grams of water vapor? H₂O

Stoichiometry – 2 Step Conversions

[Must Show All Work]

5) How many grams are in 0.448 liters of neon gas? Ne



6) How many liters are in 25.0 grams of methane gas? CH4

C: 1 x 12 = 12
H: 4 x 1 = 4
Total Mass = 16g
$$\frac{25.0 \text{ grams } CH_4}{1} \left| \frac{1 \text{ mole } CH_4}{16 \text{ grams } CH_4} \right| \frac{22.4 \text{ liters}}{1 \text{ mole } CH_4} = 35.0 \text{ liters } CH_4$$

7) Challenge: How many atoms are in 10.0 liters of oxygen gas? O2

$$\frac{10.0 \text{ liters } O_2}{1} \left| \frac{1 \text{ mole } O_2}{22.4 \text{ liters } O_2} \right| \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mole } O_2} = 2.69 \times 10^{23} \text{ molecules } O_2$$

The reason this is a challenge question is that oxygen gas is a molecule. So you need to convert liters to molecules. Then you need to realize that the oxygen gas molecule is diatomic so it contains 2 atoms. Therefore, you must multiply the number of molecules by 2 to get the number of atoms.

$$2.69 \times 10^{23} \text{ molecules } \times 2 = 5.38 \times 10^{23} \text{ atoms oxygen}$$

8) Challenge: List all the diatomic gases and write their chemical formulas?

 $\begin{array}{ccc} \text{Hydrogen gas} & \text{H}_2 \\ \text{Nitrogen gas} & \text{N}_2 \\ \text{Oxygen gas} & \text{O}_2 \\ \text{Fluorine gas} & \text{F}_2 \\ \text{Chlorine gas} & \text{Cl}_2 \\ \text{Bromine gas} & \text{Br}_2 \\ \text{Iodine gas} & \text{I}_2 \\ \end{array}$