

Math Connections Worksheet

There are three math equalities. They are:

- 1. $1 \text{ mole} = 6.02 \times 10^{23} \text{ particles}$
- 2. $1 \text{ mole} = 6.02 \times 10^{23} \text{ particles} \times \text{molar mass}$
- 3. $1 \text{ mole} = 22.4 \text{ L}$ for a gas at STP

Each equality can be written as a set of two conversion factors. They are:

$$\left(\frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ particles}} \right) \quad \left(\frac{6.02 \times 10^{23} \text{ particles}}{1 \text{ mole}} \right)$$

$$\left(\frac{1 \text{ mole}}{g = \text{molar mass} \times \text{mole}} \right) \quad \left(\frac{g = \text{molar mass} \times \text{mole}}{1 \text{ mole}} \right)$$

$$\left(\frac{1 \text{ mole}}{22.4 \text{ L}} \right) \quad \left(\frac{22.4 \text{ L}}{1 \text{ mole}} \right)$$

Math Skills Connection

1. How many moles of magnesium is 6.02×10^{23} atoms of magnesium?

$$6.02 \times 10^{23} \text{ atoms} \left(\frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ atoms}} \right) = 1 \text{ mole}$$

2. How many molecules are there in 4.00 moles of glucose, $C_6H_{12}O_6$?

$$4.00 \text{ moles} \left(\frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mole}} \right) = 2.41 \times 10^{24} \text{ molecules}$$

3. How many moles are 1.20×10^{24} atoms of phosphorus?

4. How many atoms are in 5.750 moles of zinc?