

### Mole Conversions Worksheet

There are three mole equalities. They are:

$$1 \text{ mol} = 6.02 \times 10^{23} \text{ particles}$$

$$1 \text{ mol} = \text{g-formula-mass (periodic table)}$$

$$1 \text{ mol} = 22.4 \text{ L for a gas at STP}$$

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

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

$$\left( \frac{1 \text{ mole}}{\text{g-formula-mass}} \right) \quad \left( \frac{\text{g-formula-mass}}{1 \text{ mole}} \right)$$

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

#### Mole-Particle Conversions

1. How many moles of magnesium is  $3.01 \times 10^{22}$  atoms of magnesium?

$$3.01 \times 10^{22} \text{ atoms} \left( \frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ atoms}} \right) = 5 \times 10^{-2} \text{ moles}$$

2. How many molecules are there in 4.00 moles of glucose,  $\text{C}_6\text{H}_{12}\text{O}_6$ ?

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

3. How many moles are  $1.20 \times 10^{25}$  atoms of phosphorous?

4. How many atoms are in 0.750 moles of zinc?

5. How many molecules are in 0.400 moles of  $\text{N}_2\text{O}_5$ ?