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:

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

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

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

Mole-Particle Conversions

1. How many moles of magnesium is 3.01×10^{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, $C_6H_{12}O_6$?

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

3. How many moles are 1.20×10^{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 N_2O_5?