

Mole Conversions Worksheet

There are three mole equalities. They are:

- 1 mol = 6.02×10^{23} particles
- 1 mol = g-formula-mass (periodic table)
- 1 mol = 22.4 L for a gas at STP



Mole-Particle Conversions

- How many moles of magnesium in 3.01×10^{22} atoms of magnesium? [5.00×10^{-2} moles Mg]
- How many molecules are there in 4.00 moles of glucose, $C_6H_{12}O_6$? [2.41×10^{24} molecules $C_6H_{12}O_6$]

Mole-Mass Conversions

- How many moles in 28 grams of CO_2 ? [0.64 moles CO_2]
- What is the mass of 5 moles of Fe_2O_3 ? [800 grams Fe_2O_3]

Mole-Volume Conversions

- Determine the volume, in liters, occupied by 0.030 moles of a gas at STP. [0.67 L gas]
- How many moles of argon atoms are present in 11.2 L of argon gas at STP? [0.500 moles Ar]

Mixed Mole Conversions

- How many oxygen molecules are in 3.36 L of oxygen gas at STP? [9.03×10^{22} molecules O_2]
- Find the mass in grams of 2.00×10^{23} molecules of F_2 . [12.6 g F_2]
- Determine the volume in liters occupied by 14 g of nitrogen gas at STP. [11.2 L N_2]
- Find the mass, in grams, of 1.00×10^{23} molecules of N_2 . [4.65 g N_2]
- Aspartame is an artificial sweetener that is 160 times sweeter than sucrose (table sugar) when dissolved in water. It is marketed as *NutraSweet*. The molecular formula of aspartame is $C_{14}H_{18}N_2O_5$.
 - Calculate the gram-formula-mass of aspartame. [294.34 g/mol]
 - How many moles of molecules are in 10 g of aspartame? [3.4×10^{-2} moles asp]
 - What is the mass in grams of 1.56 moles of aspartame? [459 grams asp]
 - How many molecules are in 5 mg of aspartame? [1×10^{19} molecules]
 - How many atoms of nitrogen are in 1.2 grams of aspartame? [4.9×10^{21} nitrogen atoms]