

Exercise 3.3c

Mole-Mass Conversions

Name: _____

Date: _____ Per: _____

The *mole* is a unit of amount used in chemistry to group fundamental particles (atoms, ions, molecules, formula units) into packages large enough to be used in the laboratory. It provides a bridge between the number of particles in a sample and a measurable mass in grams. A mole of a substance is defined as *the mass of substance containing the same number of fundamental units as there are atoms in exactly 12.000 g of ¹²C*. Since all atomic masses are expressed relative to ¹²C, the atomic mass listed on the period table represents the mass of 1 mole of that element in grams.

One Step: Mole → Mass Conversions

$$\frac{\text{mol } X}{1 \text{ mol } X} \left| \frac{\text{molar mass } X}{1 \text{ mol } X} \right. = \text{g } X$$

One Step: Mass → Mole Conversions

$$\frac{\text{g } X}{\text{molar mass } X} \left| \frac{1 \text{ mol } X}{\text{molar mass } X} \right. = \text{mol } X$$

DIRECTIONS: Calculate the mass of:

- 1.00 mol cobalt atoms
- 0.638 mol arsenic atoms
- 0.0100 mol sodium atoms
- 7.18×10^{-4} mol argon atoms
- 3.156 mol potassium atoms
- 2.51 mol silver atoms
- 111.0 mol sulfur atoms
- 0.00512 mol arsenic atoms
- 1.25 mol iron atoms
- 3.65 mol iron atoms

DIRECTIONS: Calculate the number of moles in:

- 87.4 g calcium
- 12.5 g copper
- 1.25 kg silicon
- 146 g helium
- 12.5 g copper
- 3.41 mg chromium
- 0.002541 g helium
- 2.561 g hydrogen atoms
- 0.0012 g titanium
- 0.00200 g zinc