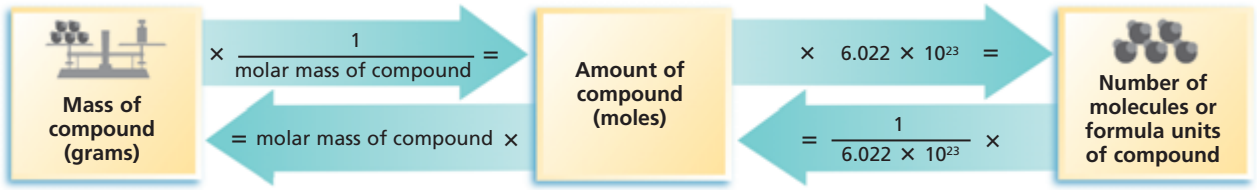
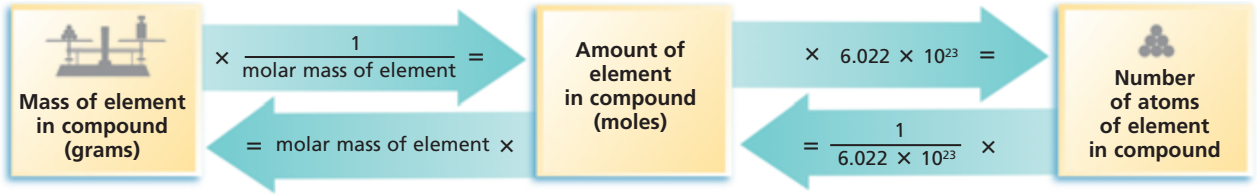


(a)



(b)

FIGURE 4 (a) The diagram shows the relationships between mass in grams, amount in moles, and number of molecules or atoms for a given compound. (b) Similar relationships exist for an element within a compound.

Molar Mass as a Conversion Factor

The molar mass of a compound can be used as a conversion factor to relate an amount in moles to a mass in grams for a given substance. Recall that molar mass usually has the units of grams per mole. To convert a known amount of a compound in moles to a mass in grams, multiply the amount in moles by the molar mass.

$$\text{amount in moles} \times \text{molar mass (g/mol)} = \text{mass in grams}$$

Conversions of this type for elements and compounds are summarized above in **Figure 4.**

SAMPLE PROBLEM H

What is the mass in grams of 2.50 mol of oxygen gas?

SOLUTION

1 ***ANALYZE***

Given: 2.50 mol O_2
Unknown: mass of O_2 in grams

2 ***PLAN***

moles O_2 ⟶ grams O_2
To convert amount of O_2 in moles to mass of O_2 in grams, multiply by the molar mass of O_2.

$$\text{amount of } O_2 \text{ (mol)} \times \text{molar mass of } O_2 \text{ (g/mol)} = \text{mass of } O_2 \text{ (g)}$$