

The procedure illustrated for calculating the formula mass of a water molecule can be used to calculate the mass of any unit represented by a chemical formula. In each of the problems that follow, the atomic masses from the periodic table in the back of the book have been rounded to two decimal places.

SAMPLE PROBLEM F

Find the formula mass of potassium chlorate, KClO_3 .

SOLUTION

The mass of a formula unit of KClO_3 is found by summing the masses of one K atom, one Cl atom, and three O atoms. The required atomic masses can be found in the periodic table in the back of the book. In the calculation, each atomic mass has been rounded to two decimal places.

$$1 \text{ K atom} \times \frac{39.10 \text{ amu}}{\text{K atom}} = 39.10 \text{ amu}$$

$$1 \text{ Cl atom} \times \frac{35.45 \text{ amu}}{\text{Cl atom}} = 35.45 \text{ amu}$$

$$3 \text{ O atoms} \times \frac{16.00 \text{ amu}}{\text{O atom}} = 48.00 \text{ amu}$$

$$\text{formula mass of } \text{KClO}_3 = 122.55 \text{ amu}$$

PRACTICE

Answers in Appendix E

- Find the formula mass of each of the following:
 - H_2SO_4
 - $\text{Ca}(\text{NO}_3)_2$
 - PO_4^{3-}
 - MgCl_2

extension

Go to go.hrw.com for more practice problems that ask you to calculate formula mass.



Keyword: HC6FRMX

Molar Masses

In Chapter 3 you learned that the molar mass of a substance is equal to the mass in grams of one mole, or approximately 6.022×10^{23} particles, of the substance. For example, the molar mass of pure calcium, Ca, is 40.08 g/mol because one mole of calcium atoms has a mass of 40.08 g.

The molar mass of a compound is calculated by summing the masses of the elements present in a mole of the molecules or formula units that make up the compound. For example, one mole of water molecules contains exactly two moles of H atoms and one mole of O atoms. Rounded to two decimal places, a mole of hydrogen atoms has a