

The Material World: Balancing Equations

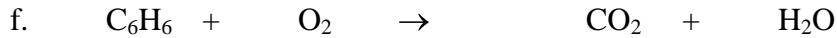
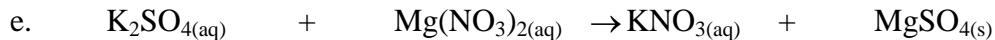
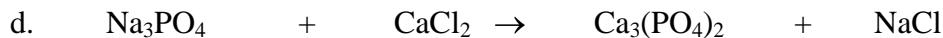
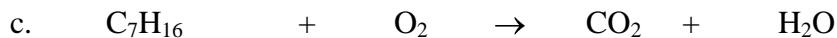
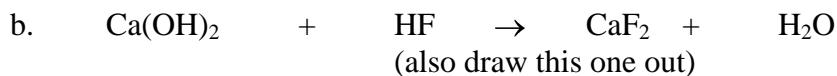
2. Balancing Chemical Equations: A Quick Review

Equations have to be balanced because in reality chemical reactions cannot destroy atoms; they only ionize or rearrange them.

RULES

1. You may introduce coefficients (big #'s in front of formulas or atomic symbols). Remember the coefficients can be thought of as the number of bound atoms or molecules.
2. You cannot change or add subscripts (small #'s that are part of formulas)
3. For each element, the total on the L.H.S. (Left Hand Side)= total on R.H.S. of the equation.

Examples: 1. Balance :



Example 2 Translate example 1 into a word equation

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Exercises

1. Balance the following. If the equation is already balanced, indicate that it is.
 - a. $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 - b. $\text{Cu} + \text{O}_2 \rightarrow \text{CuO}$
 - c. $\text{Be} + \text{O}_2 \rightarrow \text{BeO}$
 - d. $\text{Fe}(\text{NO}_3)_2 + \text{NaOH} \rightarrow \text{Fe}(\text{OH})_2 + \text{NaNO}_3$
 - e. $\text{NaBr} + \text{CuCl}_2 \rightarrow \text{NaCl} + \text{CuBr}_2$
 - f. $\text{Al}_2(\text{SO}_4)_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Al}(\text{OH})_3 + \text{CaSO}_4$
 - g. $\text{Pb}(\text{NO}_3)_2 + \text{KI} \rightarrow \text{KNO}_3 + \text{PbI}_2$
 - h. $\text{CaCl}_2 + \text{BaF}_2 \rightarrow \text{CaF}_2 + \text{BaCl}_2$
 - i. $\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}$
 - j. $\text{Li} + \text{H}_2\text{O} \rightarrow \text{LiOH} + \text{H}_2$
 - k. $\text{PbCrO}_4 + \text{HCl} + \text{FeSO}_4 \rightarrow \text{PbCl}_2 + \text{Cr}_2(\text{SO}_4)_3 + \text{FeCl}_3 + \text{H}_2\text{O} + \text{Fe}_2(\text{SO}_4)_3$
2. Draw **1b** and **1m** after they have been balanced.
3. Translate 1i and 1j into words.