

How to Balance a Chemical Equation

Reactants → Products

Step 1: Translating the word equation. Write a chemical equation from the word equation using the proper symbols for the elements which make up the compounds and molecules found in the equation.

Example:

Magnesium + Oxygen → Magnesium Oxide (word equation)

 Mg + O₂ → MgO (chemical equation)

Step 2: Balance the atoms. Fill in each blank with a coefficient (a numerical multiplier of all the atoms in the formula that follows it) to balance each element in the equation.

- ✓ Start with the most complex substance in the equation, the one with the largest number of atoms or different types of atoms.
- ✓ End with the least complex substance, such as an element by itself.

1 Mg + 1/2 O₂ → 1 MgO

Step 3: Adjust the coefficients. Fill in each blank with the smallest whole number coefficients that balance the equation. **DO NOT CHANGE THE SUBSCRIPTS OR CHEMICAL SYMBOLS FOR THE ELEMENTS!**

2 Mg + 1 O₂ → 2 MgO

Step 4: Check your work. Check to see that the # of atoms for each element on the reactant side (left) = the # of atoms for each element on the product side (right).

2 types of elements in the chemical equation:

1. Magnesium (Mg)
2. Oxygen (O)

- ✓ 2 Mg atoms on the left side = 2 Mg atoms on the right side
- ✓ 2 O atoms on the left side = 2 O atoms on the right side

Step 5: Specify the states of matter. The abbreviations used for these states of matter are solid (*s*), liquid (*l*), gas (*g*), and aqueous solution (*aq*).

2 Mg_(s) + 1 O_{2(g)} → 2 MgO_(s)