

How Do You Balance Chemical Equations?

Worksheet

To balance an equation, adjust coefficients (numbers before formulas) so atom counts are equal on both sides. Start with the most complex molecule, balance each element in turn, and check your work. Never change subscripts-only coefficients.



Questions

1. Balance: $N + H \rightarrow NH$

- A) $N + H \rightarrow NH$
- B) $N + 3H \rightarrow 2NH$
- C) $2N + 6H \rightarrow 4NH$
- D) $1N + 1H \rightarrow 1NH$

2. In the equation $2H + O \rightarrow 2HO$, what does the coefficient 2 mean?

- A) There are 2 oxygen atoms
- B) There are 2 moles of hydrogen gas
- C) There are 2 bonds
- D) Subscript changed

3. Which must never be changed when balancing?

- A) Coefficients
- B) Subscripts
- C) Reactants
- D) Arrows

4. Balance: $Ca + O \rightarrow CaO$

- A) $Ca + O \rightarrow CaO$
- B) $2Ca + O \rightarrow 2CaO$
- C) $2Ca + 1O \rightarrow 2CaO$
- D) $1Ca + 2O \rightarrow 1CaO$

5. Balance: $H + O \rightarrow HO$

6. Balance: $C + O \rightarrow CO$

7. Balance: $Fe + O \rightarrow FeO$

8. Define: What is a balanced chemical equation?

9. Define: What is the Law of Conservation of Mass?

10. Define: What are coefficients in an equation?

Answer Key

1. B) $N + 3H_2 \rightarrow 2NH_3$ - 2 N atoms and 6 H atoms on each side. Coefficient 2 for NH_3 and 3 for H_2 balance.
2. B) There are 2 moles of hydrogen gas - A coefficient indicates moles of that substance in the balanced equation.
3. B) Subscripts - Subscripts are part of the chemical formula and cannot change; only coefficients adjust.
4. C) $2Ca + 1O_2 \rightarrow 2CaO$ - 2 Ca, 2 O on each side. Coefficients 2 and 2 balance the equation.
5. Unbalanced: 1 H, 1 O (left) vs 2 H, 1 O (right) Add coefficient 2 to H_2 : $H_2 + O \rightarrow 2HO$ Check: 2 H, 2 O on both sides Balanced: $H_2 + O \rightarrow 2HO$
6. Unbalanced: 1 C, 2 O (left) vs 1 C, 2 O (right) Both sides already equal Balanced: $C + O_2 \rightarrow CO_2$ (no coefficients needed)
7. Left: 1 Fe, 2 O; Right: 2 Fe, 3 O Try $4Fe + 3O_2 \rightarrow 2Fe_2O_3$ Check: 4 Fe, 6 O on both sides Balanced: $4Fe + 3O_2 \rightarrow 2Fe_2O_3$
8. An equation where the number of each atom is the same on both the reactant and product sides.
9. Matter cannot be created or destroyed in a chemical reaction; mass is conserved.
10. Whole numbers placed before a chemical formula to balance the equation. They represent molar ratios.

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