How Do You Balance Chemical Equations?

Worksheet

Balancing uses coefficients (whole numbers placed before formulas) to ensure equal atoms on both sides. The law of conservation of mass requires the same number of each element's atoms before and after the reaction.

Questions

1. What is the coefficient of O in: H + O HO?

A) 1
B) 2
C) 3
D) 4

2. Balance: 2Na + Cl NaCl. What is the coefficient of NaCl?

A) 1
B) 2
C) 3
D) 4

3. What law does balancing satisfy?

A) Law of proportions
B) Conservation of mass
C) Avogadro's law
D) Boyle's law

4. In balancing, can you change HO to HO?

A) Yes, if needed
B) No - subscripts are fixed
C) Only on one side
D) Only for redox

5. Balance: H + O HO

6. Balance: Fe + O FeO

7. Balance: CH + O CO + HO

8. Define: What is a balanced chemical equation?

9. Define: What are coefficients?

10. Define: Which rule must balancing obey?

Answer Key

1. B) 2 - Balanced: 2H + O 2HO. The coefficient of O is 1 (implied, not written).

2. B) 2 - Balanced: 2Na + Cl 2NaCl. The coefficient is 2.

3. B) Conservation of mass - Balancing ensures the law of conservation of mass is satisfied.

4. B) No - subscripts are fixed - Subscripts define the compound. You can only use coefficients to balance.

5. Unbalanced: H + O HO Count atoms: Left: H=2, O=2 Right: H=2, O=1 O is unbalanced. Add coefficient 2 to HO: H + O 2HO Recount: Left: H=2, O=2 Right: H=4, O=2 H is now unbalanced. Add coefficient 2 to H: 2H + O 2HO Left: H=4, O=2; Right: H=4, O=2

6. Unbalanced: Fe + O FeO Count atoms: Left: Fe=1, O=2 Right: Fe=2, O=3 Both unbalanced. Try coefficient 4 for Fe and 3 for O: 4Fe + 3O 2FeO Recount: Left: Fe=4, O=6 Right: Fe=4, O=6

7. Count atoms: Left: C=3, H=8, O=2 Right: C=1, H=2, O=4 Start with C: 3 coefficients on CO 3CO H: 8 atoms need 4HO 4HO Check O: Right side has 3(2)+4(1)=10; need 5O CH + 5O 3CO + 4HO

8. An equation where the number of atoms of each element is the same on both sides.

9. Whole numbers placed before chemical formulas to balance atoms (e.g., 2HO means two water molecules).

10. The law of conservation of mass - the same atoms exist before and after the reaction.