



Balancing Chemical Equations

In order to balance a chemical equation, one must follow certain rules:

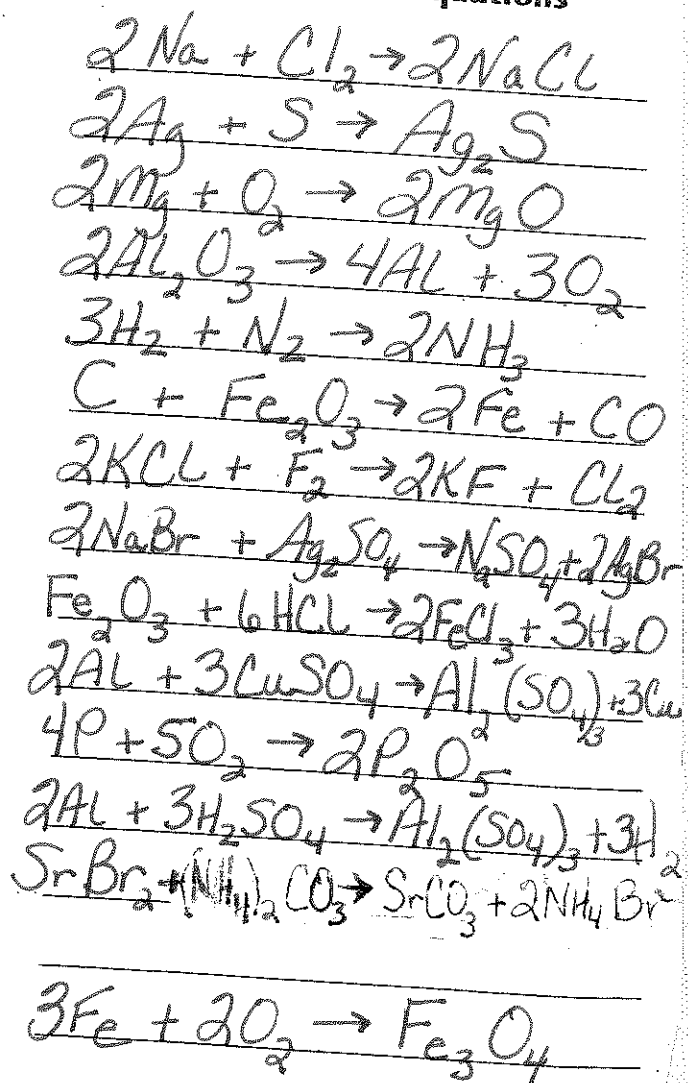
1. Make sure the formulas are correct for all the products and reactants.
2. Make sure the reactants are on the left side of the arrow and that a plus sign separates individual reactants and products.
3. Count the number of atoms of each element on both sides of the equation. A polyatomic ion is unchanged on both sides of the equation counts as a single unit, as if it were an element.
4. Balance the elements one at a time using coefficients. Subscript numbers cannot be changed.
5. Make sure all the coefficients are in the lowest possible ratio.

Practice by writing the balanced equation for each skeleton equation.

Skeleton equations

1. $\text{Na} + \text{Cl}_2 \rightarrow \text{NaCl}$
2. $\text{Ag} + \text{S} \rightarrow \text{Ag}_2\text{S}$
3. $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$
4. $\text{Al}_2\text{O}_3 \rightarrow \text{Al} + \text{O}_2$
5. $\text{H}_2 + \text{N}_2 \rightarrow \text{NH}_3$
6. $\text{C} + \text{Fe}_2\text{O}_3 \rightarrow \text{Fe} + \text{CO}$
7. $\text{KCl} + \text{F}_2 \rightarrow \text{KF} + \text{Cl}_2$
8. $\text{NaBr} + \text{Ag}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{AgBr}$
9. $\text{Fe}_2\text{O}_3 + \text{HCl} \rightarrow \text{FeCl}_3 + \text{H}_2\text{O}$
10. $\text{Al} + \text{CuSO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + \text{Cu}$
11. $\text{P} + \text{O}_2 \rightarrow \text{P}_2\text{O}_5$
12. $\text{Al} + \text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + \text{H}_2$
13. $\text{SrBr}_2 + (\text{NH}_4)_2\text{CO}_3 \rightarrow \text{SrCO}_3 + \text{NH}_4\text{Br}$
14. $\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
15. $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_3\text{O}_4$

Balanced equations



CHEMISTRY FOR EVERYDAY

KEY



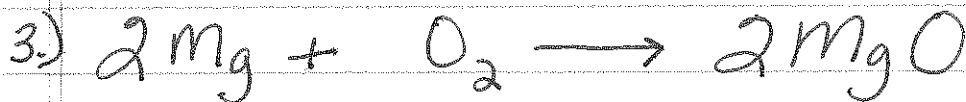
$$\begin{aligned} \text{Na} &= \cancel{\#}2 \\ \text{Cl} &= 2 \end{aligned}$$

$$\begin{aligned} \text{Na} &= \cancel{\#}2 \\ \text{Cl} &= \cancel{\#}2 \end{aligned}$$



$$\begin{aligned} \text{Ag} &= \cancel{\#}2 \\ \text{S} &= 1 \end{aligned}$$

$$\begin{aligned} \text{Ag} &= 2 \\ \text{S} &= 1 \end{aligned}$$



$$\begin{aligned} \text{Mg} &= \cancel{\#}2 \\ \text{O} &= 2 \end{aligned}$$

$$\begin{aligned} \text{Mg} &= \cancel{\#}2 \\ \text{O} &= \cancel{\#}2 \end{aligned}$$



$$\begin{aligned} \text{Al} &= \cancel{\#}4 \\ \text{O} &= \cancel{\#}6 \end{aligned}$$

$$\begin{aligned} \text{Al} &= \cancel{\#}4 \\ \text{O} &= \cancel{\#}6 \end{aligned}$$



$$\begin{aligned} \text{H} &= \cancel{\#}6 \\ \text{N} &= \cancel{\#}2 \end{aligned}$$

$$\begin{aligned} \text{H} &= \cancel{\#}6 \\ \text{N} &= \cancel{\#}2 \end{aligned}$$



$$\text{C} = 1$$

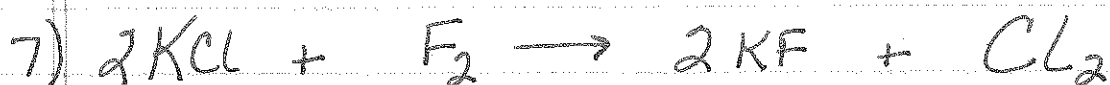
$$\text{Fe} = 2$$

$$\text{O} = 3$$

$$\text{C} = 1$$

$$\text{Fe} = 2$$

$$\text{O} = 1$$



$$\text{K} = 2$$

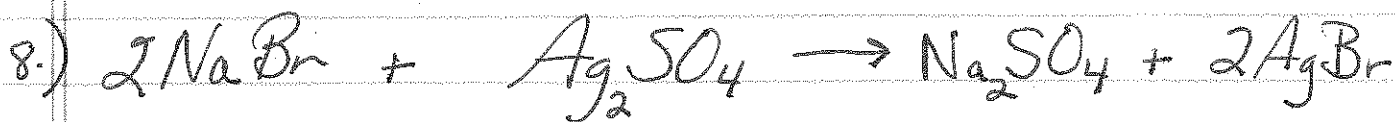
$$\text{Cl} = 2$$

$$\text{F} = 2$$

$$\text{K} = 2$$

$$\text{Cl} = 2$$

$$\text{F} = 2$$



$$\text{Na} = 2$$

$$\text{Br} = 2$$

$$\text{Ag} = 2$$

$$\text{S} = 1$$

$$\text{O} = 4$$

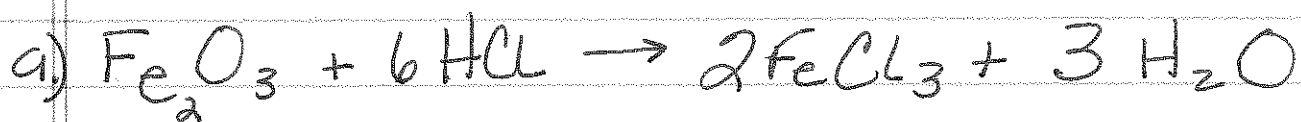
$$\text{Na} = 2$$

$$\text{Br} = 2$$

$$\text{Ag} = 2$$

$$\text{S} = 1$$

$$\text{O} = 4$$



$$\text{Fe} = 2$$

$$\text{O} = 3$$

$$\text{H} = 6$$

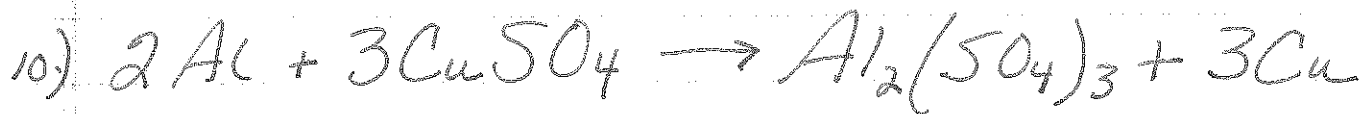
$$\text{Cl} = 6$$

$$\text{Fe} = 2$$

$$\text{O} = 3$$

$$\text{H} = 6$$

$$\text{Cl} = 6$$



$$Al = \cancel{#} 2$$

$$Cu = \cancel{#} 3$$

$$S = \cancel{#} 3$$

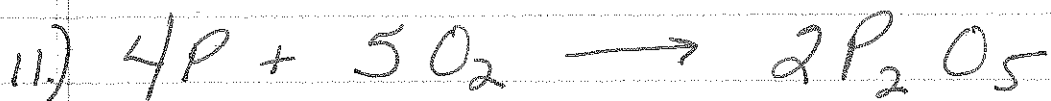
$$O = \cancel{#} 12$$

$$Al = 2$$

$$Cu = \cancel{#} 3$$

$$S = 3$$

$$O = 12$$



$$P = \cancel{#} 4$$

$$O = \cancel{#} 10$$

$$P = \cancel{#} 4$$

$$O = \cancel{#} 10$$



$$Al = \cancel{#} 2$$

$$H = \cancel{#} 6$$

$$S = \cancel{#} 3$$

$$O = \cancel{#} 12$$

$$Al = 2$$

$$H = \cancel{#} 6$$

$$S = 3$$

$$O = 12$$



$$Sr = 1$$

$$Br = 2$$

$$N = 2$$

$$H = 8$$

$$C = 1$$

$$O = 3$$

$$Sr = 1$$

$$Br = \cancel{#} 2$$

$$N = \cancel{#} 2$$

$$H = \cancel{#} 8$$

$$C = 1$$

$$O = 3$$



$$\text{C} = 2$$

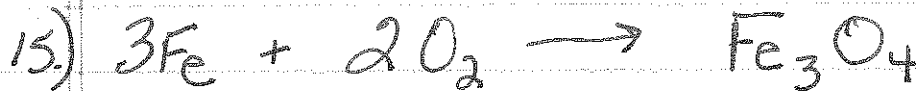
$$\text{H} = 6$$

$$\text{O} = 2$$

$$\text{C} = 1$$

$$\text{H} = 2$$

$$\text{O} = 3$$



$$\text{Fe} = 3$$

$$\text{O} = 4$$

$$\text{Fe} = 3$$

$$\text{O} = 4$$



C = 24

H = 12

O = 214

C = 184

H = 212

O = 314