

## Chemical equations

Write balanced symbol equations for the following chemical reactions.  
Remember to balance the equations, and to include the state symbols.

1. barium chloride + sodium sulphate → barium sulphate + sodium chloride
2. calcium + oxygen → calcium oxide
3. calcium carbonate + sulphuric acid → calcium sulphate + carbon dioxide + water  
 $H_2SO_4 \text{ (aq)}$
4. carbon + oxygen → carbon dioxide
5. copper + oxygen → copper(II) oxide
6. copper(II) carbonate + hydrochloric acid → copper(II) chloride + carbon dioxide + water  
 $HCl \text{ (aq)}$
7. copper(II) oxide + sulphuric acid → copper(II) sulphate + water
8. hydrogen + chlorine → hydrogen chloride
9. hydrogen + lead(II) oxide → lead + steam
10. hydrogen + oxygen → steam
11. iron + chlorine → iron(III) chloride
12. iron(III) chloride + ammonium hydroxide → iron(III) hydroxide + ammonium chloride
13. magnesium + steam → hydrogen + magnesium oxide
14. magnesium + sulphuric acid → hydrogen + magnesium sulphate
15. sodium + oxygen → sodium oxide
16. sodium hydroxide + copper(II) sulphate → sodium sulphate + copper(II) hydroxide
17. sodium hydroxide + phosphoric acid → sodium phosphate + water  
 $H_3PO_4 \text{ (aq)}$
18. sodium hydroxide + sulphuric acid → sodium sulphate + water
19. zinc + copper(II) sulphate → copper + zinc sulphate
20. zinc + hydrochloric acid → zinc chloride + hydrogen

## Chemical Equations Answers

1.  $\text{BaCl}_2 \text{ (aq)} + \text{Na}_2\text{SO}_4 \text{ (aq)} \rightarrow \text{BaSO}_4 \text{ (s)} + 2\text{NaCl} \text{ (aq)}$
2.  $2\text{Ca} \text{ (s)} + \text{O}_2 \text{ (g)} \rightarrow 2\text{CaO} \text{ (s)}$
3.  $\text{CaCO}_3 \text{ (s)} + \text{H}_2\text{SO}_4 \text{ (aq)} \rightarrow \text{CaSO}_4 \text{ (s)} + \text{CO}_2 \text{ (g)} + \text{H}_2\text{O} \text{ (l)}$
4.  $\text{C} \text{ (s)} + \text{O}_2 \text{ (g)} \rightarrow \text{CO}_2 \text{ (g)}$
5.  $2\text{Cu} + \text{O}_2 \text{ (g)} \rightarrow 2\text{CuO} \text{ (s)}$
6.  $\text{CuCO}_3 \text{ (s)} + 2\text{HCl} \text{ (aq)} \rightarrow \text{CuCl}_2 \text{ (aq)} + \text{CO}_2 \text{ (g)} + \text{H}_2\text{O} \text{ (l)}$
7.  $\text{CuO} \text{ (s)} + \text{H}_2\text{SO}_4 \text{ (aq)} \rightarrow \text{CuSO}_4 \text{ (aq)} + \text{H}_2\text{O} \text{ (l)}$
8.  $\text{H}_2 \text{ (g)} + \text{Cl}_2 \text{ (g)} \rightarrow 2\text{HCl} \text{ (g)}$
9.  $\text{H}_2 \text{ (g)} + \text{PbO} \text{ (s)} \rightarrow \text{Pb} \text{ (s)} + \text{H}_2\text{O} \text{ (g)}$
10.  $2\text{H}_2 \text{ (g)} + \text{O}_2 \text{ (g)} \rightarrow 2\text{H}_2\text{O} \text{ (g)}$
11.  $2\text{Fe} \text{ (s)} + 3\text{Cl}_2 \text{ (g)} \rightarrow 2\text{FeCl}_3 \text{ (g)}$
12.  $\text{FeCl}_3 \text{ (aq)} + 3\text{NH}_4\text{OH} \text{ (aq)} \rightarrow \text{Fe(OH)}_3 \text{ (s)} + 3\text{NH}_4\text{Cl} \text{ (aq)}$
13.  $\text{Mg} \text{ (s)} + \text{H}_2\text{O} \text{ (g)} \rightarrow \text{H}_2 \text{ (g)} + \text{MgO} \text{ (s)}$
14.  $\text{Mg} \text{ (s)} + \text{H}_2\text{SO}_4 \text{ (aq)} \rightarrow \text{H}_2 \text{ (g)} + \text{MgSO}_4 \text{ (s)}$
15.  $4\text{Na} \text{ (s)} + \text{O}_2 \text{ (g)} \rightarrow 2\text{Na}_2\text{O} \text{ (s)}$
16.  $2\text{NaOH} \text{ (aq)} + \text{CuSO}_4 \text{ (aq)} \rightarrow \text{Na}_2\text{SO}_4 \text{ (aq)} + \text{Cu(OH)}_2 \text{ (aq)}$
17.  $3\text{NaOH} \text{ (aq)} + \text{H}_3\text{PO}_4 \text{ (aq)} \rightarrow \text{Na}_3\text{PO}_4 \text{ (aq)} + 3\text{H}_2\text{O} \text{ (l)}$
18.  $2\text{NaOH} \text{ (aq)} + \text{H}_2\text{SO}_4 \text{ (aq)} \rightarrow \text{Na}_2\text{SO}_4 \text{ (aq)} + 2\text{H}_2\text{O} \text{ (l)}$
19.  $\text{Zn} \text{ (s)} + \text{CuSO}_4 \text{ (aq)} \rightarrow \text{Cu} \text{ (s)} + \text{ZnSO}_4 \text{ (aq)}$
20.  $\text{Zn} \text{ (s)} + 2\text{HCl} \text{ (aq)} \rightarrow \text{ZnCl}_2 \text{ (aq)} + \text{H}_2 \text{ (g)}$