

Writing Chemical Equations

1. Complete the following table:

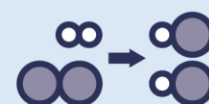
Chemical name	Chemical Formula
Hydrochloric Acid	HCl
Nitric Acid	HNO₃
Sulfuric acid	H ₂ SO ₄
Hydrogen	H ₂
Calcium chloride	CaCl ₂
Sodium Hydroxide	NaOH
Sodium chloride	NaCl
Copper carbonate	CuCO ₃
Copper sulphate	CuSO ₄
Copper oxide	CuO
Potassium carbonate	K ₂ CO ₃
Potassium nitrate	KNO ₃

2. Complete the general equations to show the products formed in each of the reactions with acids:

- a. Metal + acid → **salt + hydrogen**
- b. Metal oxide + acid → **salt + water**
- c. Metal hydroxide + acid → **salt + water**
- d. Metal carbonate + acid → **salt + water + carbon dioxide**

3. Use the general equations from question 2 to predict the products of these reactions and complete the word equations:

- a. Calcium + hydrochloric acid → **calcium chloride + hydrogen**
- b. Hydrochloric acid + sodium hydroxide → **sodium chloride + water**
- c. Sulfuric acid + copper carbonate → **copper sulfate + water + carbon dioxide**





d. Hydrochloric acid + copper oxide → **copper chloride + water**

e. Nitric acid + potassium carbonate → **potassium nitrate + water + carbon dioxide**

4. Use the table in Q1 to help you write **balanced** symbol equations for each of the reactions in Q3.

a. **$\text{Ca} + 2 \text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2$**

b. **$\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$**

c. **$\text{H}_2\text{SO}_4 + \text{CuCO}_3 \rightarrow \text{CuSO}_4 + \text{H}_2\text{O} + \text{CO}_2$**

d. **$2 \text{HCl} + \text{CuO} \rightarrow \text{CuCl}_2 + \text{H}_2\text{O}$**

e. **$2 \text{HNO}_3 + \text{K}_2\text{CO}_3 \rightarrow 2 \text{KNO}_3 + \text{H}_2\text{O} + \text{CO}_2$**

5. Use Q3/Q4 to help you answer these questions.

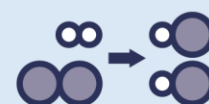
a. Which reactions would cause a positive result for the squeaky pop test?

a. Calcium + hydrochloric acid → calcium chloride + hydrogen

b. Which reactions would cause a positive result for the limewater test?

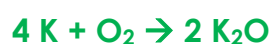
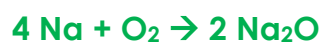
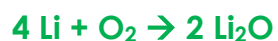
c. Sulfuric acid + copper carbonate → copper sulfate + water + carbon dioxide

e. Nitric acid + potassium carbonate → potassium nitrate + water + carbon dioxide

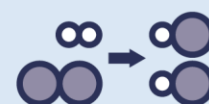




6. Alkali metals react with oxygen to form metal oxides. Write a word equation and a **balanced** symbol equation to show the reaction of lithium, sodium and potassium with oxygen.



7. Alkali metals react with water to form metal hydroxides and hydrogen gas. Write a word equation and a **balanced** symbol equation to show the reaction of lithium, sodium and potassium with water.

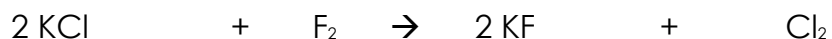




Stretch:

8. A more reactive halogen can displace a less reactive halogen from an aqueous solution of its salts.

e.g. Potassium chloride + fluorine \rightarrow Potassium fluoride + chlorine



A displacement reaction occurs in this case because fluorine is more reactive than chlorine, so fluorine displaces the chlorine from the salt.

Determine if a reaction would occur in each case. If a reaction would occur write a word and balanced symbol equation for each one:

