



ACIDS: WRITING EQUATIONS

metal + acid → salt + hydrogen

metal oxide + acid → salt + water

metal hydroxide + acid → salt + water

acid	formula	salt	ion
hydrochloric acid	HCl	chloride	Cl ⁻
sulfuric acid	H ₂ SO ₄	sulfate	SO ₄ ²⁻
nitric acid	HNO ₃	nitrate	NO ₃ ⁻
ethanoic acid	CH ₃ COOH	ethanoate	CH ₃ COO ⁻

Positive ions Li⁺ Na⁺ K⁺ Mg²⁺ Ca²⁺ Zn²⁺ Cu²⁺ Fe²⁺ Al³⁺ Fe³⁺ **Negative ions** O²⁻ (oxide) OH⁻ (hydroxide)

Step 1 Write the word equation.

Step 2 Work out the formula of the salt from its ions. The charges must cancel out. Use brackets if you need more than one of a group of atoms, e.g. Mg(NO₃)₂.

Step 3 Write the formula of every substance. Hydrogen is H₂. Water is H₂O.

Step 4 Balance the equation. Only change the big numbers in front. Never change a formula.

Example 1 magnesium and hydrochloric acid

word magnesium + hydrochloric acid → magnesium chloride + hydrogen

salt Mg²⁺ and Cl⁻ so two Cl⁻ are needed: MgCl₂

symbol Mg + 2HCl → MgCl₂ + H₂

Example 2 magnesium and ethanoic acid

word magnesium + ethanoic acid → magnesium ethanoate + hydrogen

salt Mg²⁺ and CH₃COO⁻ so two ethanoate ions are needed: (CH₃COO)₂Mg

symbol Mg + 2CH₃COOH → (CH₃COO)₂Mg + H₂

1) Name the salt made in each reaction.

- a) zinc + hydrochloric acid d) calcium + hydrochloric acid
- b) magnesium oxide + sulfuric acid e) copper(II) oxide + nitric acid
- c) potassium hydroxide + nitric acid f) sodium hydroxide + ethanoic acid

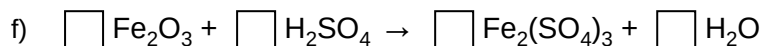
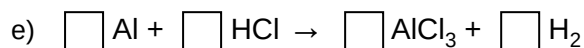
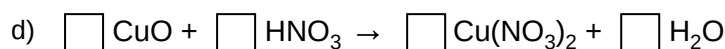
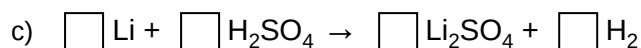
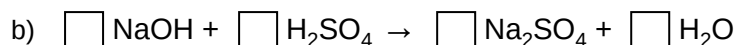
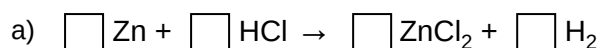
2) Complete the word equations.

- a) magnesium + sulfuric acid → + ...
- b) zinc oxide + hydrochloric acid → + ...
- c) sodium hydroxide + sulfuric acid → + ...
- d) iron + hydrochloric acid → + ...
- e) aluminium oxide + nitric acid → + ...
- f) calcium hydroxide + ethanoic acid → + ...

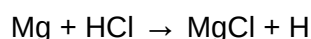
3) Write the formula of each salt.

- a) sodium chloride e) magnesium nitrate
- b) zinc sulfate f) aluminium chloride
- c) calcium chloride g) iron(III) sulfate
- d) potassium sulfate h) calcium ethanoate

4) Balance these equations. Write the balancing numbers in the boxes (leave a box empty if the number is 1).



5) A student wrote this equation for the reaction between magnesium and hydrochloric acid. Find the mistakes and write the correct equation.



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6) Write the word equation and the balanced symbol equation for the reaction between:

a) zinc and sulfuric acid

word

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symbol

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b) magnesium oxide and hydrochloric acid

word

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symbol

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c) potassium hydroxide and nitric acid

word

.....

symbol

.....

d) calcium hydroxide and hydrochloric acid

word

.....

symbol

.....

e) potassium hydroxide and ethanoic acid

word

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symbol

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f) iron(III) oxide and nitric acid

word

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symbol

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g) aluminium hydroxide and sulfuric acid

word

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symbol

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