



Section A:

1. Write the general equation for reaction of a metal and acid.
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2. Complete the table below to show the formulae and ions in different acids.

Name of acid	Molecular Formula	Ions formed when in solution
Hydrochloric acid		
Nitric acid		
Sulphuric acid		

3. Complete the sentences below about the salts formed from metal and acid reactions.

- Hydrochloric acid forms salts ending in 'chloride'.
- Nitric acid forms salts ending in '_____.
- Sulfuric acid forms salts ending in '_____.

4. Complete the word equations below:

(a) Copper + nitric acid → _____

(b) Zinc + hydrochloric acid → _____

(c) Aluminium + nitric acid → _____

(d) Lead + sulfuric acid → _____

(e) Sodium + hydrochloric acid → _____

5. Complete the gaps in the equations below

Word equation: calcium + [] → calcium sulfate + hydrogen

Chemical equation: $\text{Ca}_{(s)} + \text{H}_2\text{SO}_4_{(aq)} \rightarrow \text{CaSO}_4_{(aq)} + []$

Ionic equation: [] → $\text{Ca}^{2+}_{(aq)} + \text{H}_2_{(g)}$

Half equations:
 $\text{Ca}_{(s)} \rightarrow []$ (oxidation)
 $2\text{H}^{+}_{(aq)} + 2\text{e}^{-} \rightarrow []$

Section B





For each of the following reactions of metals and acids, write

- (a) the word equation
- (b) the chemical equation
- (c) the ionic equation
- (d) the two half equations – labelling each as either reduction or oxidation

Use the guidance in this box for support with writing half equations.

Steps for writing half equations:

1. **Pick one element** that's on both sides of the equation
2. Write down **reactant → product**, copying from the equation exactly
3. **Balance the atoms and ions**
4. **Add up the charges** on both sides
5. **Balance the charges** with electrons

1. Lithium and nitric acid

- (a) _____
 - (b) _____
 - (c) _____
 - (d) _____
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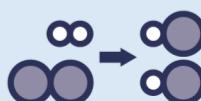
2. Magnesium and hydrochloric acid

- (a) _____
 - (b) _____
 - (c) _____
 - (d) _____
-
-

3. Aluminium and hydrochloric acid

- (a) _____
 - (b) _____
 - (c) _____
 - (d) _____
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Section C





Calcium and hydrochloric acid react to form a salt and hydrogen gas.

1. State which salt is produced in this reaction.

2. Give the test for hydrogen gas.

Describe the result of the test if hydrogen is present.

Test _____

Result _____

3. Write the ionic equation for this reaction

4. Explain which species is reduced in this reaction.

Write the half equations to support your answer.

5. A scientist carried out this reaction using 40 g of calcium and 72 g hydrochloric acid.

At the end of the reaction 2 g of hydrogen gas was collected.

Calculate the mass of calcium chloride formed.

6. Calculate the relative formula mass of hydrochloric acid.

