



Reactions of Acids

Name _____ Class _____

Acids react with many materials, including metals. When an acid reacts with a metal, it produces a salt and releases hydrogen gas.

1. Complete the general word equation for the reaction between an acid and a metal.

acid + metal → _____ + _____

Metals can be organised based on their reactivity. Part of the reactivity series for some common metals is shown below.

2. Complete the reactivity series by writing in the missing metals. Choose answers from the box.

aluminium	gold	iron
potassium		
sodium		
calcium		
magnesium		
zinc		
tin		
lead		
copper		
silver		
platinum		

most reactive

least reactive

3. Which observation would identify a gas as hydrogen?

Tick **one** box.

☐

The gas relights a glowing splint.

☐

The gas turns limewater cloudy.

☐

The gas makes a squeaky pop when presented with a lit splint.

The name of the salt produced in a reaction between a metal and an acid depends on the metal and the acid involved in the reaction. The first part of the name comes from the metal, and the second part comes from the acid.

For example, **potassium** reacts with **sulfuric acid** to produce **potassium sulfate**.

The table below shows the general name of the salt produced by each acid.

Name of Acid	Name of Salt
sulfuric acid	sulfate
hydrochloric acid	chloride
nitric acid	nitrate

4. Complete the table to give the name of the salt produced in each reaction. The first one has been done for you.

Metal	Acid	Salt
sodium	hydrochloric acid	sodium chloride
zinc	nitric acid	
magnesium	sulfuric acid	
aluminium	hydrochloric acid	
silver	nitric acid	
copper	sulfuric acid	

5.

- a. What is the word equation for the reaction between calcium and hydrochloric acid?

Tick **one** box.

- ☐ hydrochloric acid + calcium → calcium sulfate + hydrogen
- ☐ hydrochloric acid + calcium → calcium chloride + hydrogen
- ☐ hydrochloric acid + calcium → calcium sulfate + oxygen
- ☐ hydrochloric acid + calcium → calcium chloride + oxygen

- b. Complete the word equation for the reaction between magnesium and hydrochloric acid.

magnesium + hydrochloric acid → _____ + _____



Acids also react with metal oxides and metal hydroxides. Metal oxides and metal hydroxides are bases so they will neutralise the acid, producing water as well as the metal salt. This is called a neutralisation reaction.

6.

- a. Complete the general word equation for the reaction between an acid and a metal oxide.

acid + metal oxide $\rightarrow$ _____ + _____

- b. Write the word equation for the reaction between sulfuric acid and potassium hydroxide.

Acids also react with metal carbonates. The reaction between an acid and a metal carbonate produces a metal salt, water and carbon dioxide gas. Carbon dioxide gas can be tested for using limewater. The general equation for the reaction is:

acid + metal carbonate $\rightarrow$ metal salt + water + carbon dioxide

7. Complete the word equation for the reaction below.

nitric acid + calcium carbonate $\rightarrow$ _____ + _____ + _____



Reactions of Acids **Answers**

Acids react with many materials, including metals. When an acid reacts with a metal, it produces a salt and releases hydrogen gas.

1. Complete the general word equation for the reaction between an acid and a metal.



Metals can be organised based on their reactivity. Part of the reactivity series for some common metals is shown below.

2. Complete the reactivity series by writing in the missing metals. Choose answers from the box.

aluminiumgoldiron

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sodium

calcium

magnesium

aluminium

zinc

iron

tin

lead

copper

silver

gold

platinum

most reactive

least reactive

3. Which observation would identify a gas as hydrogen?

Tick **one** box.

- ☐ The gas relights a glowing splint.
- ☐ The gas turns limewater cloudy.
- ☒ The gas makes a squeaky pop when presented with a lit splint.

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For example, **potassium** reacts with **sulfuric acid** to produce **potassium sulfate**.

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4. Complete the table to give the name of the salt produced in each reaction. The first one has been done for you.

Metal	Acid	Salt
sodium	hydrochloric acid	sodium chloride
zinc	nitric acid	zinc nitrate
magnesium	sulfuric acid	magnesium sulfate
aluminium	hydrochloric acid	aluminium chloride
silver	nitric acid	silver nitrate
copper	sulfuric acid	copper sulfate

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- a. What is the word equation for the reaction between calcium and hydrochloric acid?

Tick **one** box.

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- ☒ hydrochloric acid + calcium → calcium chloride + hydrogen
- ☐ hydrochloric acid + calcium → calcium sulfate + oxygen
- ☐ hydrochloric acid + calcium → calcium chloride + oxygen

- b. Complete the word equation for the reaction between magnesium and hydrochloric acid.

magnesium + hydrochloric acid → **magnesium chloride + hydrogen**



Acids also react with metal oxides and metal hydroxides. Metal oxides and metal hydroxides are bases so they will neutralise the acid, producing water as well as the metal salt. This is called a neutralisation reaction.

6.

- a. Complete the general word equation for the reaction between an acid and a metal oxide.

acid + metal oxide → **metal salt + water**

- b. Write the word equation for the reaction between sulfuric acid and potassium hydroxide.

sulfuric acid + potassium hydroxide → potassium sulfate + water

Acids also react with metal carbonates. The reaction between an acid and a metal carbonate produces a metal salt, water and carbon dioxide gas. Carbon dioxide gas can be tested for using limewater. The general equation for the reaction is:

acid + metal carbonate → metal salt + water + carbon dioxide

7. Complete the word equation for the reaction below.

nitric acid + calcium carbonate → **calcium nitrate + water + carbon dioxide**