

GCSE Combined Science: Trilogy

Worksheet: Reactions of acids with metals

TIME 20 min	TOTAL 21 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Reactions of acids with metals

NAME _____

CLASS _____

DATE _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Some metals react with dilute acids.

0 1 . 1

Complete the word equation.

aluminium + sulfuric acid → +

.....

.....

.....

.....

[2 marks]

0 1 . 2

Name the salt produced when zinc reacts with dilute hydrochloric acid.

.....

.....

.....

[1 mark]

0 2

Acids react with some metals to produce a salt and hydrogen.

0 2 . 1

Complete the word equation.

zinc + hydrochloric acid → + hydrogen

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.....
[1 mark]

0 2 . 2

Describe the test for hydrogen and give the result.

.....

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.....

.....

[2 marks]

0 2 . 3

Name the salt formed when iron reacts with dilute sulfuric acid.

.....

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.....

.....
[1 mark]

0 3

Magnesium reacts with dilute hydrochloric acid. Bubbles of gas form and the magnesium disappears.

0 3 . 1

Name the salt produced.

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[1 mark]

0 3 . 2

Write a balanced symbol equation for the reaction.

.....

.....

.....

.....

[2 marks]

0 4

Magnesium, zinc and iron all react with dilute hydrochloric acid and dilute sulfuric acid.

0 4 . 1

Write a balanced symbol equation for the reaction of magnesium with dilute sulfuric acid.

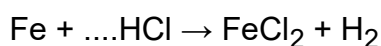
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.....

[1 mark]

0 4 . 2

Balance the equation for the reaction of iron with hydrochloric acid.



.....

.....

[1 mark]

0 4 . 3

A student added equal-sized pieces of magnesium, zinc and iron to separate test tubes containing the same volume of the same dilute hydrochloric acid. Describe how the observations would be different for the three metals.

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[3 marks]

0 4 . 4

Explain why copper does not react with dilute hydrochloric acid.

.....

.....

[1 mark]

0 5

A student wants to react magnesium ribbon with dilute hydrochloric acid and test the gas produced safely.

0 5 . 1

Describe how the student could collect a test tube of the gas produced.

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.....

[2 marks]

0 5 . 2

Describe the test for hydrogen and its positive result.

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.....

[2 marks]

0 5 . 3

Give one safety precaution for this experiment.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Reactions of acids with metals · 21 marks

Question 1 (3 marks)

01.1 [2 marks]

Answer: aluminium sulfate + hydrogen

- aluminium sulfate (1)
 - hydrogen (1)
-

01.2 [1 mark]

Answer: zinc chloride

- zinc chloride (1)
-

Question 2 (4 marks)

02.1 [1 mark]

Answer: zinc chloride

- zinc chloride (1)
-

02.2 [2 marks]

- put a burning / lit splint at the mouth of the test tube (1)
- (burns with a) squeaky pop (1)

Notes: Do not accept a glowing splint. The second mark depends on the first.

02.3 [1 mark]

Answer: iron(II) sulfate

- iron(II) sulfate / iron sulfate (1)

Notes: Allow iron sulphate. Do not accept iron(III) sulfate.

Question 3 (3 marks)

03.1 [1 mark]

Answer: magnesium chloride

- magnesium chloride (1)

03.2 [2 marks]

Answer: $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$

- correct formulae: $\text{Mg} + \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ (1)
- correctly balanced: $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ (1)

Notes: Ignore state symbols. Allow multiples.

Question 4 (6 marks)

04.1 [1 mark]

Answer: $\text{Mg} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2$

- $\text{Mg} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2$ (1)

04.2 [1 mark]

Answer: $\text{Fe} + 2\text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$

- 2 (HCl) (1)

04.3 [3 marks]

- magnesium fizzes most vigorously / produces bubbles fastest (1)
- zinc fizzes steadily / less than magnesium (1)
- iron produces bubbles slowly / least vigorous (1)

Notes: Allow a correct comparative order (magnesium > zinc > iron) for 2 marks if the observation (fizzing / bubbles) is not stated.

04.4 [1 mark]

- copper is less reactive than hydrogen (so cannot displace it from the acid) (1)
-

Question 5 (5 marks)

05.1 [2 marks]

- use a delivery tube to lead the gas into an upturned test tube filled with water in a trough (1)
- the gas pushes the water out and collects in the tube (collection over water) (1)

Notes: Allow collection in a gas syringe for both marks.

05.2 [2 marks]

- hold a lit splint at the open end of the test tube of gas (1)
 - a squeaky pop confirms hydrogen (1)
-

05.3 [1 mark]

- allow: wear eye protection / use dilute (not concentrated) acid / keep naked flames away except briefly for the test (1)
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