

GCSE



CCEA GCSE TEACHER GUIDANCE
Double Award Science
Practical Manual

Unit 7: Practical Skills

C3: Investigate the reactivity of metals

Investigate the reactivity of metals

In this experiment we will determine the relative reactivity of 4 metals:

Iron, Magnesium, Copper and Zinc

In order to determine the relative reactivity of each metal we will carry out displacement reactions by reacting each metal with a solution of another metal ion. If the metal is more reactive than the metal in solution (present as an ion), then a displacement reaction will occur and we will observe a change in the reaction.

‘A more reactive metal will displace a less reactive metal from its ion in solution’

Apparatus and Chemicals

Test-tube rack

Test-tubes x3

Copper(II) sulfate solution (0.5 mol/dm^3)

Magnesium sulfate solution (0.5 mol/dm^3)

Zinc sulfate solution (0.5 mol/dm^3)

Iron(II) sulfate solution (0.5 mol/dm^3)

Pieces of copper foil (3 small pieces approx. 1 cm^2)

Zinc (3 small granules or pieces of foil approx. 1 cm^2)

Iron (3 small ungalvanised nails)

Magnesium ribbon (3 small pieces 1 cm length)

The reactivity of Fe

Method

1. Half-fill separate test-tubes with copper(II) sulfate, magnesium sulfate and zinc sulfate solutions.
2. Add a piece of iron to each test-tube.
3. Leave for 3 minutes, record observations.

Name of Solution	Observations at the start	Observations after 3 minutes	Displacement reaction? "Yes/No"

Therefore iron is more reactive than: _____

Iron is less reactive than: _____

The reactivity of Zn

Method

1. Half-fill separate test-tubes with copper(II) sulfate, magnesium sulfate and iron(II) sulfate solutions.
2. Add a piece of zinc to each test-tube.
3. Leave for 3 minutes, record observations.

Name of Solution	Observations at the start	Observations after 3 minutes	Displacement reaction? "Yes/No"

Therefore Zinc is more reactive than: _____

Zinc is less reactive than: _____

The reactivity of Cu

Method

1. Half-fill separate test-tubes with magnesium sulfate, iron(II) sulfate and zinc sulfate solutions.
2. Add a piece of copper to each test-tube.
3. Leave for 3 minutes, record observations.

Name of Solution	Observations at the start	Observations after 3 minutes	Displacement reaction? "Yes/No"

Therefore Copper is more reactive than: _____

Copper is less reactive than: _____

The reactivity of Mg

Method

1. Half-fill separate test-tubes with copper(II) sulfate, iron(II) sulfate and zinc sulfate solutions.
2. Add a piece of magnesium to each test-tube.
3. Leave for 3 minutes, record observations.

Name of Solution	Observations at the start	Observations after 3 minutes	Displacement reaction? "Yes/No"

Therefore Magnesium is more reactive than: _____

Magnesium is less reactive than: _____

Write the order of reactivity of the 4 metals starting with the most reactive:

For each displacement reaction that occurred, write a balanced symbol equation.

Write the ionic equation for each reaction that occurred.