# Identifying Ions

GCSE Chemistry · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

## 1. Worked example

**Describe how to carry out a flame test. (3 marks)**

Step 1 · Clean

Dip a nichrome wire loop in hydrochloric acid and hold it in a blue Bunsen flame until no colour shows.

Step 2 · Sample

Dip the loop in the solid sample (or its solution).

Step 3 · Observe

Hold it in the edge of the blue flame and record the colour.

**Answer: Clean wire, dip in sample, hold in blue flame, observe colour**

Check: Clean the loop between samples so results are not contaminated.

## 2. Now try one with the steps

**A solution gives a white precipitate with sodium hydroxide that dissolves when excess is added. Identify the metal ion. (1 mark)**

Step 1 · White precipitates

Step 2 · Excess

**Answer:**

## 3. Practice

Show your working. The marks tell you how much is expected.

**1.** State the flame test colour for lithium ions. [1]

**2.** State the flame test colour for potassium ions. [1]

**3.** State the colour of the precipitate formed when sodium hydroxide is added to a solution containing $Cu^{2+}$ ions. [1]

**4.** State the colour of the precipitate formed with sodium hydroxide and $Fe^{3+}$ ions. [1]

**5.** State the colour of the precipitate formed with sodium hydroxide and $Fe^{2+}$ ions. [1]

**6.** Describe the test for carbonate ions. [2]

**7.** Describe the test for sulfate ions. [2]

**8.** Explain how to distinguish between a solution containing $Al^{3+}$ ions and one containing $Mg^{2+}$ ions. [2]

**9.** Explain why dilute nitric acid is added before silver nitrate in the halide test. [1]

**10.** Explain why hydrochloric acid, not sulfuric acid, is used in the sulfate test. [1]

**11.** Calculate the relative formula mass of copper(II) hydroxide, $Cu(OH)_2$. (Cu = 63.5, O = 16, H = 1) [1]

**12.** Calculate the relative formula mass of barium sulfate, $BaSO_4$. (Ba = 137, S = 32, O = 16) [1]

**13.** Write the ionic equation for the formation of iron(III) hydroxide from $Fe^{3+}$ ions and hydroxide ions. [2]

**14.** Explain why flame tests may not identify the metal ions in a mixture. [1]

## 4. Before you hand it in

**Using hydrochloric acid before silver nitrate**

Use dilute nitric acid in the halide test.

**"Iron gives a brown precipitate."**

$Fe^{2+}$ → green precipitate; $Fe^{3+}$ → brown precipitate.

**Using a dirty flame test loop**

Clean the loop in acid and flame until no colour shows.