

Displacement Reactions

KS3 Chemistry · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

An iron nail is put into blue copper sulfate solution. What happens?

Step 1 · Compare reactivity

Iron is more reactive than copper.

Step 2 · Prediction

Iron displaces copper from the solution.

Step 3 · Observations

A red-brown coating of copper forms on the nail; the blue colour fades to pale green sulfate forms.

Answer: iron + copper sulfate → iron sulfate + copper

Check: The more reactive metal ends up in the compound.

2. Now try one with the steps

Will copper react with zinc sulfate solution?

Step 1 · Compare

Step 2 · Rule

Answer:

3. Practice

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

1. In a displacement reaction, which metal takes the place of the other? [1]

2. Which is more reactive: magnesium or copper? [1]

3. Will magnesium react with copper sulfate solution? (yes or no) [1]

4. Will copper react with magnesium sulfate solution? (yes or no) [1]

5. Complete: zinc + copper sulfate → _____ + _____ [2]
- _____
6. What colour is the copper that forms in a displacement reaction? [1]
- _____
7. Why does blue copper sulfate solution fade when zinc is added? [2]
- _____
8. Put these metals in order of reactivity, most reactive first: copper, magnesium, iron, zinc. [2]
- _____
9. Is the reaction of zinc with copper sulfate exothermic or endothermic? [1]
- _____
10. Metal Q reacts with iron sulfate but not with zinc sulfate. Is Q more or less reactive than iron? [1]
- _____
11. Using question 10, is Q more or less reactive than zinc? [1]
- _____
12. A student adds the same mass of four metals to copper sulfate and measures the temperature rise: Mg 30 °C, Zn 12 °C, Fe 6 °C, Cu 0 °C. What pattern do you see? [2]
- _____
13. Name TWO control variables for the investigation in question 12. [2]
- _____
14. Why is silver jewellery not damaged by copper sulfate solution? [1]
- _____

4. Before you hand it in

Swapping the wrong way: 'copper displaces zinc'.

Check the reactivity series first; the higher metal wins.

"The copper is made from nothing."

Copper atoms are released from the compound more reactive metal takes their place.

Forgetting to swap the metal names in the products.

A + B sulfate → A sulfate + B.

Thinking displacement only happens in solutions.

Thermite (aluminium + iron oxide) and carbon extracting metals (C29) are also displacement.