# Year 9 Metals and the Reactivity Series Worksheet

Year 9 · KS3 Chemistry · Reactivity, displacement, extraction and corrosion

**Name:** ..... **Class:** ..... **Date:** ..... **Score:** / 49

## Section A: The reactivity series and reactions of metals [14 marks]

**1** Write these metals in order of reactivity, starting with the most reactive: magnesium, copper, potassium, zinc, sodium, iron, calcium, aluminium. **[3]**

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**2** Name the metal that matches each observation. Choose from: potassium, sodium, calcium, magnesium, copper. **[5]**

| Observation | Metal |
|---|---|
| No reaction with water or dilute acid | |
| Fizzes, floats, melts into a ball and moves on the surface of water | |
| Burns with a lilac flame on water and reacts very violently | |
| Steady stream of bubbles in cold water; solution turns cloudy | |
| Reacts very slowly with cold water but fizzes steadily with dilute acid | |

**3** Complete each word equation.

**(a)** sodium + water ⟶ sodium hydroxide + ..... **[1]**

**(b)** calcium + water ⟶ ..... + hydrogen **[1]**

**(c)** magnesium + hydrochloric acid ⟶ ..... + hydrogen **[1]**

**(d)** zinc + sulfuric acid ⟶ zinc sulfate + ..... **[1]**

**(e)** Challenge: balance the equation: $Na + H_2O \longrightarrow NaOH + H_2$ **[2]**

## Section B: Displacement reactions [12 marks]

**4** A more reactive metal can displace a less reactive metal from its compound. Predict whether each reaction happens. Write Yes or No. **[5]**

| Reaction | Does a reaction happen? |
|---|---|
| iron + copper sulfate solution | |
| copper + iron sulfate solution | |
| zinc + copper sulfate solution | |
| magnesium + zinc sulfate solution | |

| | |
|---|---|
| copper + magnesium sulfate solution | |

**5** Complete the word equation for zinc and copper sulfate: zinc + copper sulfate ⟶ ..... + ..... **[2]**

**6** Describe what you would see when an iron nail is placed in copper sulfate solution for ten minutes. **[2]**

**7** Three metals P, Q and R are tested. P displaces Q from a solution of Q sulfate. Q displaces R from a solution of R sulfate. R does not displace P from a solution of P sulfate. Put the metals in order of reactivity, most reactive first. **[3]**

## Section C: Extraction, uses and corrosion [14 marks]

**8** Gold and silver are found as pure metals in the ground. Explain why. **[1]**

**9** Iron oxide is heated with carbon to extract iron. Write the word equation, and explain why aluminium is not extracted this way. **[3]**

**10** Copper is used for water pipes and electrical wires. Give three properties that make it suitable. **[3]**

**11** Aluminium is a reactive metal, but aluminium window frames do not corrode quickly. Explain why. **[2]**

**12** Iron rusts. State two things needed for rusting and give three ways to prevent rust. **[5]**

## Section D: Data and practical skills [9 marks]

**13** A student adds the same amount of dilute hydrochloric acid to four metals and counts the bubbles in one minute.

| Metal | Bubbles in 1 minute |
|---|---|
| Magnesium | 42 |
| Zinc | 15 |
| Iron | 3 |
| Copper | 0 |

**(a)** Use the results to put the metals in order of reactivity. **[2]**

**(b)** Name the gas given off and give the test for it. **[2]**

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**(c)** Give three variables the student must keep the same. **[3]**

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**(d)** Suggest one safety precaution. **[1]**

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**(e)** Predict how calcium would react. Explain. **[1]**

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