

# AQA Chemistry A-level

## Required Practical 8

Measuring the EMF of an electrochemical cell

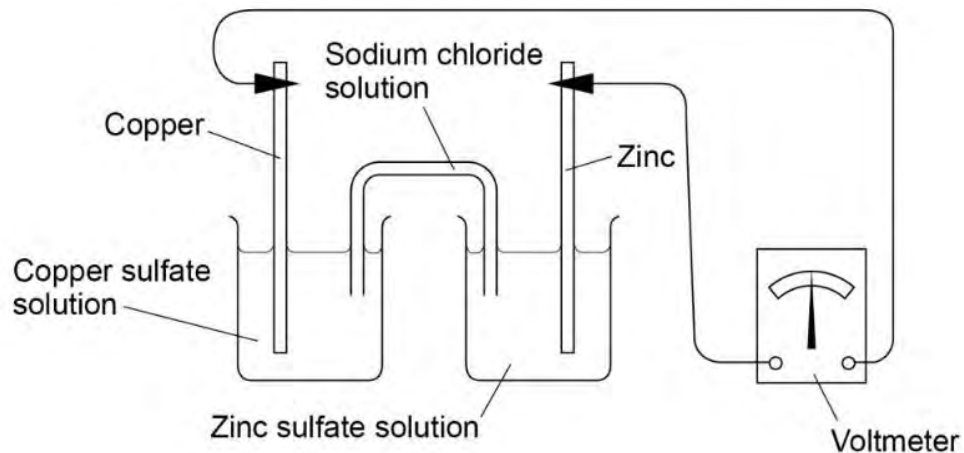


## Setting up an electrochemical cell: zinc and copper

Method	Accuracy	Explanation
1. Clean a piece of copper and a piece of zinc using emery paper or fine grade sandpaper.	<ul style="list-style-type: none"> <li>Removes the oxide layer on the metal.</li> </ul>	
2. Degrease the metal pieces using some cotton wool and propanone.		Grease could prevent the cell working as efficiently.
3. Place the copper into a 100 cm <sup>3</sup> beaker with about 50 cm <sup>3</sup> of 1.0 mol dm <sup>-3</sup> CuSO <sub>4</sub> solution.		This is a half-cell.
4. Place the zinc into a 100 cm <sup>3</sup> beaker with about 50 cm <sup>3</sup> of 1.0 mol dm <sup>-3</sup> ZnSO <sub>4</sub> solution.		This is a half-cell.
5. Lightly plug one end of a plastic U-tube with cotton wool and fill the tube with the solution of 2.0 mol dm <sup>-3</sup> sodium chloride solution (NaCl), then plug other end.		
6. Join the two beakers with U-tube so that the plugged ends are in the separate beakers.	<ul style="list-style-type: none"> <li>Ensure the ends are fully submerged in the solutions.</li> </ul>	
7. Connect the Cu <sub>(s)</sub>  Cu <sup>2+</sup> <sub>(aq)</sub> and Zn <sub>(s)</sub>  Zn <sup>2+</sup> <sub>(aq)</sub> half-cells by connecting the metals using crocodile clips and leads. Include a voltmeter in the circuit in order to read off the voltage.		Allows the cell EMF to be found.

Diagram:





### Salt bridges:

- Allow the movement of ions between electrodes and to complete the circuit.
- Must not react (inert) with the electrolyte or ions in solution and must conduct electricity.
- Platinum is often used.
- Alternatively, a strip of filter paper saturated with NaCl solution can be used instead of a U-tube.

### Comparing electrode potentials of different metals:



Method	Accuracy	Explanation
1. Clean a piece of copper using emery paper or fine grade sandpaper.	<ul style="list-style-type: none"> <li>Removes the oxide layer on the metal.</li> </ul>	
2. Connect to the positive terminal of a voltmeter using a crocodile clip and one of the leads.		
3. Cut a piece of filter paper to about the same area as the copper and moisten with sodium chloride solution. Place it on top of the metal.		
4. Connect a second lead to the voltmeter and use the crocodile clip to connect the lead to a piece of a different metal.		
5. Hold the metal against the filter paper. Record the voltage reading, including the sign.		Cell potential can be positive or negative.
6. Repeat with different metals and compare the electrode potentials.		

**Diagram:**

