
Teacher Guide: Unit 12 Electrons in Action

Guidance for Teachers

- Guidance on delivery – Page 149-151 – or reference to this from the specifications
- Resources - Page 155 – or reference to this from the specifications.

Guidance on Assessment

- Assessment guidance – Page 152-154 – or reference to this from the specifications
- Assessment Evidence grid Unit 12 – attached.

Assignment Work

- The assignment briefs included with this unit are expected to give ideas on how to cover the required assessment criteria
- It is important that the time spent on the topic area links to the mark awarded
- It is hoped that centres will use these ideas as a starting tool
- Outline guidance included with this unit gives help to support the requirements of the assignment. It is hoped that this should be used to help to support the standard required.

Suggested Time Allocation

- Based on 50-60 hours spent on this unit
- Includes work on assignment + teaching and learning time
- Some time should also be reserved for feedback and return of work after/before moderation.

Assessment Objective to be Covered	Mark Awarded	Possible Time Allocation
AO1	10	12
AO2	14	16
AO3	26	30

Teacher Resource Material

- Assessment Recording Sheet – suggestion of a possible method to collate marks from assignments
- Assignment No. 12.1: Production of Cell of Known Voltage
- Assignment No. 12.1: Outline Guidance/Commentary on Mark Allocation
- Assignment No. 12.2: Copper Plating
- Assignment No. 12.2: Outline Guidance/Commentary on Mark Allocation
- Assignment No. 12.3: Scooters for a Shopping Centre
- Assignment No. 12.3: Outline Guidance/Commentary on Mark Allocation
- Assignment No. 12.4: Efficiency of Commercial Cells.

Unit 12: Electrons in action				
What you need to do:				
<p>You need to produce evidence of your investigation into the principles and applications of electrochemical changes [50 marks].</p> <p>This evidence needs to include:</p> <p>AO1: a presentation outlining the applications of stated electrochemical changes [10];</p> <p>AO2: a comparison of commercial cells: non-rechargeable, rechargeable and fuel, including construction, resources, uses, sustainability, efficiency, safety and environmental issues [14];</p> <p>AO3: practical investigations into:</p> <p>(a) the factors which can change the potential difference of a cell and those which have no effect;</p> <p>(b) the factors which affect the efficiency of a simple laboratory experiment in which an object is copper plated [26].</p>				
How you will be assessed:				
Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
AO1	You will investigate redox equilibria and demonstrate a basic knowledge and understanding of the principles underlying at least two of the applications of electrochemical changes, including correct scientific terminology and conventions; [0 1]	you will investigate redox equilibria and demonstrate a sound knowledge and understanding of the principles underlying the full range of applications of electrochemical changes identified in this unit; you will give clear explanations and will use appropriate scientific terms and conventions accurately; [2 3]	you will investigate redox equilibria and demonstrate a thorough knowledge and understanding of the principles underlying the full range of applications of electrochemical changes identified in this unit; you will give clear explanations and will use appropriate scientific terms and conventions accurately throughout. [4 5]	/10
	You will demonstrate research into the production of electricity and metals, using some appropriate examples, selecting information and presenting it clearly; [0 1]	you will demonstrate research into the production of electricity and metals, using a range of examples, selecting and interpreting information and presenting it clearly; [2 3]	you will demonstrate research into the production of electricity and metals, using the full range of examples given, selecting and interpreting information and presenting it clearly. [4 5]	
AO2	You will describe at least one example of each of two types of commercial cells, make some comparisons and give a limited interpretation of information; [0 1 2 3 4]	you will describe three different commercial cells, make comparisons, give a good explanation and interpretation of information; [5 6]	you will describe a wide range of cells, make all comparisons, give a full explanation and interpretation of information. [7 8]	/14
	You will carry out some straightforward calculations of EMF of cells and quantity of charge; you will obtain and use data to compare the efficiency of commercial cells; [0 1 2]	you will carry out calculations of EMF of cells, quantities of charge and mass of products; you will obtain and use data to compare the efficiency of commercial cells and obtain correct solutions; [3 4]	you will carry out complex calculations of EMF of cells, quantities of charge and mass of products; you will obtain and use data to compare the efficiency of commercial cells and obtain correct solutions to the appropriate degree of accuracy. [5 6]	

Unit 12: Electrons in action (continued)				
Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
AO3	Using risk assessments, you will carry out measurements of EMF of cells and mass of copper plate; you will change at least one of the conditions of each experiment to obtain two sets of results for measurement of EMF and two sets of results for the measurement of copper plate; [0 1 2 3 4]	you will produce risk assessments, consistent with COSHH guidelines; you will carry out measurements of EMF of cells and mass of copper plate; you will change conditions to obtain more than two sets of results for measurement of EMF and more than two sets of results for the measurement of copper plate; you will work with an appropriate degree of accuracy; [5 6]	you will produce your own detailed risk assessments, consistent with COSHH guidelines; you will carry out a wide range of measurements of EMF of cells and mass of copper plate; you will consider and change a range of conditions to obtain corresponding sets of results for measurement of EMF and for the measurement of copper plate – at least one set of results show no effect; you will explain any practical techniques that will improve results; you will work with an appropriate degree of accuracy. [7 8]	
	You will make and record relevant observations and measurements from the above experiments; you will display the data appropriately, with help; [0 1 2 3]	you will make and record relevant observations and measurements from the above experiments, using precision in your measurements; you will display the data obtained accurately in a range of ways; [4 5 6]	you will make and record relevant observations and measurements from the above experiments, using precision in your measurements; you will display the data obtained accurately in a range of ways. [7 8 9]	
	You will give some interpretation of the results; you will evaluate your procedures; [0 1 2 3]	you will interpret the results and draw basic conclusions; you will evaluate your procedures; [4 5 6]	you will interpret the results in detail and draw conclusions; you will evaluate your procedures and suggest alternatives. [7 8 9]	
Total mark awarded:				/26
				/50