**STAGE 2 CHEMISTRY**

Assessment type and task clearly identified.

**ASSESSMENT TYPE 1: Investigations Folio**

**Practical (Design): Electrolytic Cell**

**Purpose**

Electrolytic cells are used industrially to produce a variety of chemicals.

This assessment provides you with the opportunity to investigate concepts relating to electrolysis, and to demonstrate your ability to:

The purpose of the task links it to the Learning Requirements and the Assessment Design Criteria being assessed.

* deconstruct a problem in order to design and conduct an investigation
* collect, record and display data
* analyse and interpret data to form a justified conclusion
* evaluate procedures and their effect on the data
* communicate your understanding of concepts relating to electrochemistry

**Description of the problem**

What factors could affect the time required to produce a specific amount of a particular chemical that is made in an electrolytic cell?

**Part A Deconstruct the problem and design an investigation procedure**

You will need to provide evidence of your deconstruction of the problem, your choice of question and justification for the various parts of your method.

Work with a partner to:

* investigate a chemical that is produced by electrolysis that is suitable for you to produce in the laboratory
* brainstorm possible factors that could affect the time taken to produce a specific amount of this chemical

Individually:

* select one factor to investigate. Provide reasons for your choice of independent variable.
* determine what amount of chemical is reasonable to produce in your investigation. You may carry out a preliminary test in the laboratory to help make this decision. Record your observations to help modify your method if necessary.
* write an investigable question that asks what quantity/measure of this factor is required to produce this amount of your chemical in 30 seconds.
* identify factors that can be controlled and those that cannot be controlled
* design and write a method to test your question. Include a list materials required and a detailed list of steps in dot points. Justify your choice of equipment and the various steps in the method.

Present your deconstruction ideas, your proposed method and a justification of your method on a maximum of 4 sides of an A4 page. Consider using a concept map, flow chart, tables etc. to present your ideas succinctly.

Submit your deconstruction evidence for teacher feedback and your list of requirements three days before undertaking the practical investigation.

**Part B Practical investigation**

Students have opportunities to work collaboratively.

Carry out your approved investigation with your partner.

**Part C Investigation Report**

Individually write a practical report that includes:

* introduction with relevant chemistry concepts, and either a hypothesis and variables, or an investigable question
* materials/apparatus\*
* method that was implemented
* identification and management of safety and/or ethical risks
* results, including table(s) and/or graph(s)
* analysis of results, identifying trends, and linking results to concepts
* evaluation of procedures and their effect on data, and identifying sources of uncertainty
* conclusion, with justification.

The report should be a maximum of 1500 words if written, or a maximum of 9 minutes for an oral presentation, or the equivalent in multimodal form.

Only the following sections of the report are included in the word count:

introduction, analysis, evaluation and conclusion.

Your deconstruction evidence should be attached to your report.

**Assessment conditions**

Requirements of the task and timelines are clear to students.

**Part A**

Plan the investigation in the laboratory under teacher supervision.

**Part B**

The practical is completed in the laboratory during a ninety-minute lesson.

**Part C**

An individual practical report is completed and submitted for assessment no later than seven days after completion of Part B.

In the report the specific features IAE1, IAE2, IAE3, IAE4 and KA4 are assessed:

Task meets assessment specifications as described in the subject outline:

* individual practical report is submitted
* at least one practical investigation gives students the opportunity to deconstruct a problem in order to design their own procedure and justify their plan
* at least one practical investigation gives students the opportunity to investigate a question for which the outcome is uncertain
* requirements of the report are clearly listed

Performance Standards for Stage 2 Chemistry

| - | Investigation, Analysis, and Evaluation | Knowledge and Application |
| --- | --- | --- |
| A | Critically deconstructs a problem and designs a logical and coherent chemistry investigation with detailed justification.  Obtains, records, and represents data, using appropriate conventions and formats accurately and highly effectively.  Systematically analyses and interprets data and evidence to formulate logical conclusions with detailed justification.  Critically and logically evaluates procedures and discusses their effect on data. | Demonstrates deep and broad knowledge and understanding of a range of chemical concepts.  Applies chemical concepts highly effectively in new and familiar contexts.  Critically explores and understands in depth the interaction between science and society.  Communicates knowledge and understanding of chemistry coherently, with highly effective use of appropriate terms, conventions, and representations. |
| B | Logically deconstructs a problem and designs a well-considered and clear chemistry investigation with reasonable justification.  Obtains, records, and represents data, using appropriate conventions and formats mostly accurately and effectively.  Logically analyses and interprets data and evidence to formulate suitable conclusions with reasonable justification.  Logically evaluates procedures and their effect on data. | Demonstrates some depth and breadth of knowledge and understanding of a range of chemical concepts.  Applies chemical concepts mostly effectively in new and familiar contexts.  Logically explores and understands in some depth the interaction between science and society.  Communicates knowledge and understanding of chemistry mostly coherently, with effective use of appropriate terms, conventions, and representations. |
| C | Deconstructs a problem and designs a considered and generally clear chemistry investigation with some justification.  Obtains, records, and represents data, using generally appropriate conventions and formats, with some errors but generally accurately and effectively.  Undertakes some analysis and interpretation of data and evidence to formulate generally appropriate conclusions with some justification.  Evaluates procedures and some of their effect on data. | Demonstrates knowledge and understanding of a general range of chemical concepts.  Applies chemical concepts generally effectively in new or familiar contexts.  Explores and understands aspects of the interaction between science and society.  Communicates knowledge and understanding of chemistry generally effectively, using some appropriate terms, conventions, and representations. |
| D | Prepares a basic deconstruction of a problem and an outline of a chemistry investigation.  Obtains, records, and represents data, using conventions and formats inconsistently, with occasional accuracy and effectiveness.  Describes data and undertakes some basic interpretation to formulate a basic conclusion.  Attempts to evaluate procedures or suggest an effect on data. | Demonstrates some basic knowledge and partial understanding of chemical concepts.  Applies some chemical concepts in familiar contexts.  Partially explores and recognises aspects of the interaction between science and society.  Communicates basic chemical information, using some appropriate terms, conventions, and/or representations. |
| E | Attempts a simple deconstruction of a problem and a procedure for a chemistry investigation.  Attempts to record and represent some data, with limited accuracy or effectiveness.  Attempts to describe results and/or interpret data to formulate a basic conclusion.  Acknowledges that procedures affect data. | Demonstrates limited recognition and awareness of chemical concepts.  Attempts to apply chemical concepts in familiar contexts.  Attempts to explore and identify an aspect of the interaction between science and society.  Attempts to communicate information about chemistry. |