**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 10 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**

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| --- | --- | --- | --- | --- | --- | --- |
|  | | **A** | **B** | **C** | **D** | **E** |
| **Investigation, Analysis and Evaluation** | **1**  **2**  **3**  **4** | **Critically** deconstructs a problem and **designs** a **logical, coherent**, and **detailed** chemistry investigation.  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 their effects on data. | **Logically** deconstructs a problem and **designs** a **well-considered** and **clear** chemistry investigation.  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 effects on data. | Deconstructs a problem and **designs** a **considered** and **generally clear** chemistry investigation.  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 effects on data. | 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 a **basic** conclusion.  **Attempts** to evaluate procedures **or** suggest **an** **effect** on data. | 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. |
| **Knowledge and Application** | **1**  **2**  **3**  **4** | 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. | 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. | Demonstrates knowledge and understanding of a **general** range of chemical concepts.  Applies chemical concepts **generally effectively** in **new o**r 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. | 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. | Demonstrates some **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. |