Stage 2 Chemistry – Assessment Type 1: Investigations Folio

Science as a Human Endeavour Investigation – Graphene

This task has a focus on science as a human endeavour; how science interacts with society.

Use the following two articles to start exploring the potential uses of graphene that is found in large quantities in Eyre Peninsula.

**Adelaide is at the epicentre of global research to exploit the “limitless” potential of graphene the world’s most exciting material.**

<http://www.adelaidenow.com.au/business/adelaide-is-at-the-epicentre-of-global-research-to-exploit-the-limitless-potential-of-graphene-the-worlds-most-exciting-material/news-story/cb129a551ca2386d256ae241d8206e43>

**Scientists create wonder sieve capable of making seawater drinkable**

<http://www.news.com.au/technology/innovation/inventions/scientists-create-wonder-sieve-capable-of-making-seawater-drinkable/news-story/df63895fbb2d21cfaf3636f0404ef6e0>

Use one or more of the key concepts of science as a human endeavour to develop a focus for an investigation. Make your topic quite specific to enable you to analyse information in depth. For example:

Research Hub for Graphene Enabled Industry Transformation set up in South Australia

Graphene could be a valuable material for use in the clean-up of oil spills

Could graphene be used in desalination plants?

Can South Australia become a graphene valley?

Select, analyse and synthesise information from different sources to explain the science relevant to the focus of your investigation and show its connections to science as a human endeavour.

Prepare a scientific report, which must include the use of scientific terminology and:

* an introduction to identify the focus of the investigation and the key concept(s) of science as a human endeavour that it links to
* relevant chemistry concepts or background
* an explanation of how the focus of the investigation illustrates the interaction between science and society, including a discussion of the potential impact of the focus of the investigation, e.g. further development, effect on quality of life, environmental implications, economic impact, intrinsic interest
* a conclusion that summarises the connection between your topic and the key concept(s) of science as a human endeavour
* citations and referencing.

The report, which can be in a format of your choice, 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.

**The key concepts of Science as a Human Endeavour in the study of Chemistry are:**

Communication and Collaboration

* Science is a global enterprise that relies on clear communication, international conventions, and review and verification of results.
* Collaboration between scientists, governments, and other agencies is often required in scientific research and enterprise.

Development

* Development of complex scientific models and/or theories often requires a wide range of evidence from many sources and across disciplines.
* New technologies improve the efficiency of scientific procedures and data collection and analysis. This can reveal new evidence that may modify or replace models, theories, and processes.

Influence

* Advances in scientific understanding in one field can influence and be influenced by other areas of science, technology, engineering, and mathematics.
* The acceptance and use of scientific knowledge can be influenced by social, economic, cultural, and ethical considerations.

Application and Limitation

* Scientific knowledge, understanding, and inquiry can enable scientists to develop solutions, make discoveries, design action for sustainability, evaluate economic, social, cultural, and environmental impacts, offer valid explanations, and make reliable predictions.
* The use of scientific knowledge may have beneficial or unexpected consequences; this requires monitoring, assessment, and evaluation of risk and provides opportunities for innovation.
* Science informs public debate and is in turn influenced by public debate; at times, there may be complex, unanticipated variables or insufficient data that may limit possible conclusions.

**Marking Rubric**

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| --- | --- | --- |
| **Criterion** | **Comment** | **Grade** |
| IAE3: Analysis and interpretation of data and other evidence to formulate and justify conclusions. |  |  |
| **KA2:** Development and application of chemical concepts in new and familiar contexts. |  |  |
| **KA3:** Exploration and understanding of the interaction between science and society. |  |  |
| **KA4:** Communication of knowledge and understanding of chemical concepts and information, using appropriate terms, conventions, and representations. |  |  |
| **Overall:** |  |  |

**Performance Standards for Stage 2 Chemistry**

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| --- | --- | --- | --- | --- | --- | --- |
|  | | **A** | **B** | **C** | **D** | **E** |
| **Investigation, Analysis and Evaluation** | **1**  **2**  **3**  **4** | 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. | 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. | 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 the 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. | Identifies a simple 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 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. | 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. |