**INVESTIGATIONS FOLIO – Science as a Human Endeavour**

**Fuels**

**Purpose of task**

Investigate one aspect of Australia’s current use of fossil fuels and sources of renewable energy. Select a recent innovation or development in renewable energy sources that is designed to minimise the future impact of fossil fuel use for energy production in Australia. Consider the potential impacts of using these fuels, such as economic, social, political and environmental.

In this task you should focus on at least one of the following aspects of Science as a Human Endeavour:

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.

**Part A: Information Search and Planning**

Use the internet and other sources of information to do an initial search for innovative methods/technologies related to the use of fuels in Australia. Record the resources in a reference list, using Harvard referencing, to assist in your selection of information for your report.

Check your sources and the question you have chosen with your teacher before you proceed.

Date Due:

Search for any further information that will enable you to provide a comprehensive and detailed report, with highly relevant chemistry. Choose the format of your work. The report may be presented in any suitable format; suggestions include interview with an expert, newspaper article, multimedia presentation or poster.

Check in with your teacher for feedback.

Date Due:

**Part B: Report**

Your report should 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
* citations and referencing.

**Assessment Conditions:**

Some class time is provided for research and support. Students have **2 weeks** to complete the task.

Students may submit one draft for feedback.

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.

**Assessment Design Criteria**

Knowledge and Application: KA 2, 3, 4

| - | 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. |

Performance Standards for Stage 2 Chemistry