**Science as a Human Endeavour Task:**

**Developments in Metal Extraction**

**Purpose of task**

This task has a focus on the Science as a Human Endeavour key concept of **Development.**

The demand for metals used to make lithium-ion batteries is increasing and so more ore deposits need to be found and more efficient technologies need to be developed for extracting metals from ores.

**Part A: Information Search and Planning**

Use the following sources of information to gather information related to the extraction, from ores, of metals used in lithium-ion batteries.

# **X-rays of rocks show their super-fluid past, and reveal mineral deposits vital for batteries**

<https://theconversation.com/x-rays-of-rocks-show-their-super-fluid-past-and-reveal-mineral-deposits-vital-for-batteries-107360>

# **New reagents selected for nickel extraction**

<https://phys.org/news/2015-04-reagents-nickel.html>

# [**Technology Allows Inexpensive Extraction of Rare Earth Elements**](https://sagov-my.sharepoint.com/personal/robyn_pillans_sa_gov_au/Documents/Documents/Chemistry%202019/Technology%20Allows%20Inexpensive%20Extraction%20of%20Rare%20Earth%20Elements%20https:/www.technologynetworks.com/.../technology-allows-inexpensive-extraction-of...)

<https://www.technologynetworks.com/analysis/news/technology-allows-inexpensive-extraction-of-rare-earth-elements-293306>

Select information on one aspect of developments related to the extraction, from ores, of metals used in lithium-ion batteries. Use further sources to gather more information to prepare a report.

Check your sources and the topic/question you have chosen to report on 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; 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 aspects relating to how technological advances change ways of working scientifically, the impact of advances in science on society or the influence of society on scientific research. Record all resources in a reference list, using Harvard referencing.

**Assessment Conditions:**

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

One draft may be submitted for feedback.

Word Count: maximum of 1000 words or 6 minutes for an oral presentation.

| - | 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 1 Chemistry