**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.

**Performance Standards for Stage 1 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 d**esigns** 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. |