**Mineral and Rock Identification**

**Purpose of Task**

This task provides students with the opportunity to demonstrate their ability to apply their knowledge and understanding of earth and environmental science in the classification of rocks and minerals.

Students test unlabelled samples, record their observations and use these to identify familiar and new specimens.

**Procedure**

Minerals may be identified by testing the following properties:

colour, streak, cleavage, hardness, lustre, density, magnetism, and reaction to dilute hydrochloric acid

Rocks may be identified by observations of the following characteristics:

texture, grain size and minerology

**Results**

The results should be recorded in appropriate formats. Diagrams of rock samples identifying the minerals should be included.

**Discussion**

An analysis of the results should lead to a conclusion about the identity of each sample.

Examples of analysis statements include:

* A white mineral that has a hardness of 6 and obvious 90 degree cleavage planes can be identified as plagioclase.
* The minerals in the rock are interlocking and the grain size is large. Therefore the rock is of igneous origin and formed under the surface of the Earth.

For each of the rock samples, classify as sedimentary, igneous or metamorphic and write a short geological scenario, explaining how it could have formed.

Example:

* This rock is an intrusive igneous rock. It formed in the crust at very hot temperatures, it then spent a lot of time cooling (which explains the large crystal size) before it crystallised into a rock. It was then uplifted through tectonic forces and exposed at the surface of the Earth where a geologist then collected the rock and it ended up in this classroom.

**Application**

Three commonly used minerals in cosmetics are talc, mica and iron oxides.

* Examine samples of each of these minerals.
* Explain how the properties of each of these minerals make them useful in cosmetics.

**Report**

Use the following headings to write a report about your investigation:

**Procedure, Results, Discussion, Application**

**Assessment Conditions**

Students will be supervised and have 80 minutes to complete the mineral and rock identification test.

For teacher reference:

Select about 8 samples of different minerals and rocks for students to examine.

Minerals that could be identified include

* Biotite
* Muscovite
* Plagioclase
* Potassium Feldspar
* Quartz
* Calcite
* Hematite
* Pyrite
* Galena

Rocks that could be identified include

* Granite
* Basalt
* Schist
* Gneiss
* Sandstone
* Mudstone/siltstone
* Diorite
* Limestone
* Fossiliferous limestone
* Migmatite

Performance Standards for Stage 1 Earth and Environmental Science

| - | Investigation, Analysis, and Evaluation | Knowledge and Application |
| --- | --- | --- |
| A | Critically deconstructs a problem and designs a logical and coherent earth and environmental science 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 their effect on data. | Demonstrates deep and broad knowledge and understanding of a range of earth and environmental science concepts.  Applies earth and environmental science 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 earth and environmental science coherently, with highly effective use of appropriate terms, conventions, and representations. |
| B | Logically deconstructs a problem and designs a well-considered and clear earth and environmental science 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 earth and environmental science concepts.  Applies earth and environmental science 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 earth and environmental science mostly coherently, with effective use of appropriate terms, conventions, and representations. |
| C | Deconstructs a problem and designs a considered and generally clear earth and environmental science 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 earth and environmental science concepts.  Applies earth and environmental science concepts generally effectively in new or familiar contexts.  Explores and understands aspects of the interaction between science and society.  Communicates knowledge and understanding of earth and environmental science generally effectively, using some appropriate terms, conventions, and representations. |
| D | Prepares a basic deconstruction of a problem and an outline of an earth and environmental science 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 earth and environmental science concepts.  Applies some earth and environmental science concepts in familiar contexts.  Partially explores and recognises aspects of the interaction between science and society.  Communicates basic earth and environmental science information, using some appropriate terms, conventions, and/or representations. |
| E | Attempts a simple deconstruction of a problem and a procedure for an earth and environmental science 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 earth and environmental science concepts.  Attempts to apply earth and environmental science concepts in familiar contexts.  Attempts to explore and identify an aspect of the interaction between science and society.  Attempts to communicate information about earth and environmental science. |