Short laboratory-based investigation: Global cycles

This sample has been compiled by the QSA to help teachers plan and develop assessment instruments for individual school settings. It demonstrates the following criterion:

- Working scientifically

Assessment instrument

Either written or non-written responses could be used to assess investigations of short duration with a field or laboratory focus. Written responses might be expected to:

- outline the objectives of the activity
- present gathered and processed data
- summarise conclusions.

Presentation: A practical report of 500 words.

Task: Choose **one** of the following investigations.

- **Rates of ice melting due to global warming**
  Concern has been expressed that when icebergs and floating ice sheets melt, sea levels will rise. In some instances, ice melts on land. Design an investigation to observe the change in "sea level" when ice melts on land or when floating.
- **The variable density of water**
  Have you ever noticed what happens to the temperature of water in a lake as you go deeper into it? Why should the deep water be colder? Where would you find the densest water? Design an investigation to determine at what temperature water has the greatest density.
- **Cooling rates and weather**
  How does the Earth's surface heat up and cool down? Design an investigation to compare the cooling rates of different types of materials on the Earth's surface.
- **The effects of weathering on various rock types**
  Design an investigation to demonstrate the effect of various forms of weathering on a variety of different rock types.

Working scientifically (WS) refers to devising and implementing investigations. It encompasses collecting, analysing and organising information, solving problems, and using mathematical techniques and ideas. This objective also includes planning and organising activities and using technology (Earth Science syllabus, page 7).

WS

To complete this task you must:

1. recognise and identify investigation question/s for the chosen investigation
2. design an investigation and complete a risk assessment
3. implement the investigation using scientific techniques and following procedures safely and correctly
4. collect and organise the data
5. assess and critically evaluate the validity and adequacy of the data.

Students may use a journal/logbook to provide evidence of planning the scientific investigation and to show the contribution of each student to group work.

Verification folios must contain a minimum of six and maximum of 10 assessment tasks. At least one short laboratory-based or field-based investigation undertaken in Year 12 must be included in the verification folio.

Instrument-specific criteria and standards

	Standard A	Standard B	Standard C	Standard D	Standard E
Working scientifically	The student consistently: • recognises and identifies investigation question/s for a problem on global cycles including those that are novel and/or complex	The student consistently: • recognises and identifies investigation question/s for a problem on global cycles including some with elements of novelty and/or complexity	The student consistently: • recognises and identifies investigation question/s for a straightforward problem on global cycles	The student consistently: • recognises a straightforward problem on global cycles	The student consistently: • recognises a problem on global cycles
	• plans a scientific investigation on global cycles with many elements of novelty and/or complexity	• plans a scientific investigation on global cycles with some elements of novelty and/or complexity	• plans a scientific investigation on global cycles of straightforward problems	• participates in planning a scientific investigation on global cycles of straightforward problems	• participates in some aspects of planning a scientific investigation on global cycles of straightforward problems
	• implements investigations using scientific techniques and following procedures safely and correctly	• implements investigations using scientific techniques and following procedures safely and with few errors	• implements investigations using scientific techniques and following procedures safely but with some errors	• implements investigations using scientific techniques and following procedures safely but with many errors	• follows instructions for some aspects of investigation but with little attention to safety issues and with little procedural accuracy
	• records and organises relevant information logically and systematically	• records and organises relevant information	• records relevant information	• records some information	• records minimal information
	• assesses and critically evaluates the validity and adequacy of qualitative and quantitative data.	• assesses the validity and adequacy of qualitative and quantitative data.	• assesses some aspects of the validity and adequacy of qualitative and quantitative data.	• offers observations about the validity and adequacy of qualitative and quantitative data.	• offers observations about qualitative and quantitative data.

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