Marine Science 2019 v1.2

Unit 2 sample assessment instrument

August 2018

Research investigation

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Schools develop internal assessments for each senior subject, based on the learning described in Units 1 and 2 of the subject syllabus. Each unit objective must be assessed at least once.

Unit objectives

This assessment instrument is used to determine student achievement in the following objectives:

2. apply understanding of marine ecology and biodiversity, and marine environmental management
3. analyse evidence about marine ecology and biodiversity, and marine environmental management
4. interpret evidence about marine ecology and biodiversity, and marine environmental management
5. investigate phenomena associated with marine ecology and biodiversity, and marine environmental management
6. evaluate processes, claims and conclusions about marine ecology and biodiversity, and marine environmental management
7. communicate understandings, findings, arguments and conclusions about marine ecology and biodiversity, and marine environmental management.

Note: Objective 1 is not assessed in this instrument.

Queensland Government
Queensland Curriculum & Assessment Authority
For all Queensland schools
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Subject	Marine Science		
Technique	Research investigation		
Unit	Unit 2: Marine biology		
Topic	Topic 1: Marine ecology and biodiversity Topic 2: Marine environmental management		
Conditions			
Duration	10 hours class time		
Mode	Written response — scientific essay	**Length**	1500–2000 words
Individual/ group	Individual	**Other**	—
Resources available	School library (online: internet and school intranet, databases, journals)		

Context

Investigate one of the following claims:

- Scientific evidence from the impact of floods can be used to make predictions about the loss of marine biodiversity.
- Advances in remote sensing radar imagery play a significant role in monitoring marine mammal populations.
- Marine biosecurity measures in Australia cannot prevent the invasion of new marine species.

You may identify an alternative claim in consultation with your teacher. This claim must be related to Unit 2 subject matter.

Task

Gather secondary evidence related to a research question in order to evaluate the claim. Develop your research question based on a number of possible claims provided by your teacher.

Obtain evidence by researching scientifically credible sources, such as scientific journals, books by well-credentialed scientists, and websites of governments, universities, independent research bodies, or science and technology manufacturers. You must adhere to research conventions.

To complete this task, you must:

- select a claim to be evaluated
- identify the relevant scientific concepts associated with the claim
- pose a research question addressing an aspect of the claim
- conduct research to gather scientific evidence that may be used to address the research question and subsequently evaluate the claim
- analyse the data to identify sufficient and relevant evidence
- identify the trends, patterns or relationships in the evidence
- analyse the evidence to identify limitations
- interpret the evidence to construct justified scientific arguments
- interpret the evidence to form a justified conclusion to the research question
- discuss the quality of the evidence
- evaluate the claim by extrapolating the findings of the research question to the claim
- suggest improvements and extensions to the investigation
- communicate findings in an appropriate scientific genre, i.e. scientific essay.

Stimulus
—
Checkpoints
☐ Week 1: Select claim and develop research question.
☐ Week 2: Identify sources and conduct research.
☐ Week 3: Analyse and evaluate evidence.
☐ Week 4: Submit draft.
☐ Week 5: Submit final response.
Feedback
Authentication strategies
• The teacher will provide class time for task completion.
• Students will provide documentation of their progress at indicated checkpoints.
• The teacher will collect and annotate drafts.
• The teacher will conduct interviews or consultations with each student as they develop the response.
• Students will use plagiarism-detection software at submission of the response.
• Students must acknowledge all sources.

Scaffolding

The response must be presented using an appropriate scientific genre (i.e. scientific essay) and contain:

- a claim
- a research question
- a rationale for the investigation
- justified scientific arguments using evidence
- a conclusion to the research question based on the interpretation of the evidence
- evaluation of the claim and suggestions of improvements and extensions to the investigation
- a reference list.

An example of how one of the claims could be developed into a research question

Claim: Advances in remote sensing radar imagery play a significant role in monitoring marine mammal populations, i.e. 'Drones save dugongs'.

Research question: Does ***x*** (i.e. the increase in use of unmanned aerial vehicles) in ***y*** (i.e. Moreton Bay) increase the ***z*** (i.e. reliability) of ***c*** (i.e. counting the population) of ***d*** (i.e. local dugongs)?

Developing the research question:

1. Identify the key (important) terms in the claim.
   a. remote sensing radar imagery
   b. significant
   c. monitoring
   d. marine mammal
   e. population
   f. reliability
2. Propose questions that need to be addressed to refine key terms and narrow the focus of the claim.
   a. What is remote sensing radar imagery?
   b. How is it used in ecological monitoring?
   c. What is a local marine mammal?
   d. How are marine mammal numbers monitored?
   e. Where is the population of the marine mammal distributed?
3. Conduct research to gather information to address the questions.
   a. What is an unmanned aerial vehicle? Where are they used?
   b. How is the population of dugongs currently monitored?
   c. How is the population of dugongs calculated?
4. Draft the research question to address the claim.
   a. Can unmanned aerial vehicles be used to count dugongs?
5. Refine and focus the research question.
   a. Does the increase in the use of unmanned aerial vehicles increase the reliability of counting the population of dugongs?
6. Present the research question to the teacher for approval.
   a. Does the increase in the use of unmanned aerial vehicles in Moreton Bay increase the reliability of counting the local population of dugongs?

Note: You cannot use this sample research question for your investigation.