

# Marine Science 2019 v1.3

## Unit 1 sample assessment instrument

August 2022

### Student experiment

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.

### Assessment objectives

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

2. apply understanding of an ocean planet and the dynamic shore
3. analyse evidence about an ocean planet and the dynamic shore
4. interpret evidence about an ocean planet and the dynamic shore
5. investigate phenomena associated with an ocean planet and the dynamic shore
6. evaluate processes, claims and conclusions about an ocean planet and the dynamic shore
7. communicate understandings, findings, arguments and conclusions about an ocean planet and the dynamic shore.

**Note:** Objective 1 is not assessed in this instrument.

<b>Subject</b>	Marine Science
<b>Technique</b>	Student experiment
<b>Unit</b>	Unit 1: Oceanography
<b>Topic</b>	Topic 1: An ocean planet Topic 2: The dynamic shore

<b>Conditions</b>			
<b>Duration</b>	10 hours class time		
<b>Mode</b>	Written response — scientific report	<b>Length</b>	1500–2000 words
<b>Individual/group</b>	Group work with individual report	<b>Other</b>	—
<b>Resources available</b>	School science laboratory and library (online: internet and school intranet, databases, journals)		
<b>Context</b>			
<p>You have completed the following practicals in class:</p> <ul style="list-style-type: none"> <li>• Mandatory practical: Conduct water quality tests on a water sample.</li> <li>• Suggested practical: Conduct a convection experiment.</li> <li>• Suggested practical: Investigate thermoclines (using ice and water, and hot and cold coloured water); salinity (using student-made straw hydrometers); stratification (using salt and fresh water).</li> <li>• Suggested practical: Conduct a wave tank experiment.</li> <li>• Suggested practical: Conduct a beach profile/dune transect and use sand sifts to decide on sphericity (roundness of sand grains).</li> </ul>			
<b>Task</b>			
<p>Modify (i.e. refine, extend or redirect) an experiment in order to address your own related hypothesis or question.</p> <p>You may use a practical performed in class, a related simulation or another practical related to Unit 1 (as negotiated with your teacher) as the basis for your methodology and research question.</p>			
<b>To complete this task, you must:</b>			
<ul style="list-style-type: none"> <li>• identify an experiment to modify*</li> <li>• develop a research question to be investigated*</li> <li>• research relevant background scientific information to inform the modification of the research question and methodology</li> <li>• conduct a risk assessment and account for risks in the methodology*</li> <li>• conduct the experiment*</li> <li>• collect sufficient and relevant qualitative and/or quantitative data to address the research question*</li> <li>• process and present the data appropriately</li> <li>• analyse the evidence to identify trends, patterns or relationships</li> <li>• analyse the evidence to identify uncertainty and limitations</li> <li>• interpret the evidence to draw conclusion/s to the research question</li> <li>• evaluate the reliability and validity of the experimental process</li> <li>• suggest possible improvements and extensions to the experiment</li> <li>• communicate findings in an appropriate scientific genre, i.e. scientific report.</li> </ul>			

\* The steps indicated with an asterisk above will be completed in groups. All other elements must be completed individually.

### Stimulus

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### Checkpoints

- Term 2 Week 3: Select experiment and identify proposed modifications.
- Term 2 Week 4: Perform experiment and process data.
- Term 2 Week 6: Analyse and evaluate evidence.
- Term 2 Week 7: Submit draft.
- Term 2 Week 9: Submit final response.

Criterion	Marks allocated	Result
<b>Research and planning</b> Assessment objectives 2, 5		
<b>Analysis of evidence</b> Assessment objectives 2, 3, 5		
<b>Interpretation and evaluation</b> Assessment objectives 4, 6		
<b>Communication</b> Assessment objective 7		
<b>Total</b>		

### 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 a draft.
- Students will use plagiarism-detection software at submission of the response.
- Students must acknowledge all sources.
- The teacher will compare the responses of students who have worked together in groups.

## Scaffolding

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

- a research question
- a rationale for the experiment
- reference to the initial experiment and identification and justification of modifications to the methodology
- raw and processed qualitative and/or quantitative data
- an analysis of the evidence
- conclusion/s based on the interpretation of the evidence
- evaluation of the methodology and suggestions of improvements and extensions to the experiment
- a reference list.

### An example of how one of the practicals could be modified to develop a research question

**Practical that will be modified:** Conduct a beach profile/dune transect and use sand sifts to decide on sphericity (roundness of sand grains).

**Research question:** Does the ratio of plastic to sand increase with proximity (m) to Tangalooma jetty?

### Developing the research question:

Description	Example
Identify the independent variable to be investigated	Proximity to jetty (m)
Identify the dependent variable	Ratio of plastic to sand
Identify the methodology to be used	Transect technique using a user guide, e.g. from Australian Marine Debris Initiative <a href="http://www.tangaroablue.org/resources/clean-up-data-collection/amdi-how-to-videos-manual/">www.tangaroablue.org/resources/clean-up-data-collection/amdi-how-to-videos-manual/</a>
Draft research questions	Is there more plastic near the jetty?
Refine and focus the research question	Does the amount of plastic increase closer to the Tangalooma jetty?
Present research question to teacher for approval	Does the ratio of plastic to sand increase with proximity (m) to Tangalooma jetty?

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



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