Internal Assessment Resource

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Tiritiri Matangi Education

Achievement Standard Biology 91158: Investigate a pattern in an ecological community, with supervision

Resource reference: Biology 2.6

Resource title: Between the Tides

Biodiversity on a Rocky Shore at Tiritiri Matangi Island (Hobbs Beach)

Education support and ID Charts available from the Tiritiri educators and guides

Credits: 4

Achievement	Achievement with Merit	Achievement with Excellence
Investigate a pattern in an ecological community, with supervision.	Investigate in-depth a pattern in an ecological community, with supervision	Comprehensively investigate a pattern in an ecological community, with supervision.

Student instructions

Introduction

This assessment activity requires you to produce a report about a pattern (or absence) in an ecological community.

You will investigate: **zonation** in the **intertidal zone on the rocky shore at Hobbs Beach on Tiritiri Matangi Island** in relation to exposure during the tidal cycle.

The investigation must involve **analysing** and **interpreting** information about **this community**, **an environmental factor** relating to a pattern and how this might affect **at least two species in the ecosystem** (ie. the community and abiotic environment).

You will use the **field data and observations collected during your field work** and the **resource information** provided by the teacher.

Part 1: Research in class prior to trip. You will have about 2-3 weeks from _____

to carry out **research** into the intertidal community found at Tiritiri Matangi Island on Hobbs Beach, any **environmental factors** that affect the community and to research rocky shore **survey methods**. During this time you can discuss ideas with other students and your teachers..

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Part 2: Survey on the field trip. You will have 2-3 hours on _____2014 to carry out a survey of the intertidal rocky shore community of Tiritiri Matangi Island on Hobbs Beach and to collect your data.

You may compare the field data you collected during your field work with the data from another group, and/or with historical data or data from different locations found on the *The NZ Seashore Survey website* (www.mm2.net.nz).

Use references from texts and/or online on the rocky shore environment to follow up the **biology of your chosen organisms.**

Task Part 1: Collecting and processing information

This **task is not assessed**, but it helps you prepare for writing your report. You can complete this work individually or as part of a group, and discuss your ideas and questions with other people, including your teacher.

Choose a focus for your investigation eg

 comparative study of the distribution of organisms on a rocky shore from high tide to low tide

For your data collection, you should choose at least five organisms (even though you may only write about two) and use this information to choose two <u>named</u> organisms that are related to each other, and to the pattern you are investigating.

Make sure you collect enough information to allow you to discuss:

- the biology of your chosen organisms in terms of their

- ecological niche,
- **adaptations** (you could consider structural, behavioural or physiological adaptations) to occupy their niche in the intertidal zone
- the **inter-relationships and interactions** with other organisms in the intertidal zone that might affect their distribution (eg; predation, competition, commensalism... etc)
- the **environmental factors** that could affect your organisms (biotic and abiotic)

Data Collection Process

At school preparation prior to the field trip:-

- spend 1-2 periods at school on a sloping lawn prior to your field trip practising how to set out a transect line and the use of quadrats with the collection of data of 5 plants present (grass, dandelion plantain etc - give the plants a number if you do not know their names). Practise how to record the profile of the research area using rise and run method.
- Prepare a **results table** for the field trip.

On the field trip: Record the following:

• **Number of organisms of each species** you find in your quadrats by using the following method:

1. Stretch a tape measure, or length of string (your transect line), across the rocky shore between the high and low tide marks.

2. Place your quadrat at regular intervals (eg; 3 m or 5 m) along the transect beginning at the low or high tide mark. Where you begin depends whether the tide is going in or out.

3. Count the number of each species in each quadrat and record as a tally in your results table

• Details of the biotic and abiotic environment

1. Record substrate nature and surface temperature variability along your transect. Make notes of any apparent inter-specific influences. Note anything else that may be relevant.

• **Profile of the shore along your transect** (Not now required for this AS but it's helpful you have some idea of the steepness/profile of the shore and the rise of the tide)

1. Use rise and run method or a length of string or tape measure held horizontally (lined up with the horizon) and a metre stick held vertically, measure and record the change in height, as you move from one quadrat to the next.

Notes:

1. How can you ensure that the samples you are counting **are representative** of the patterns in the intertidal zone on Hobbs Beach rocky shore as a whole? Discuss this with reference to:

- > Transect placement
- > Quadrat size
- > Number of samples
- Quadrat placement

Ensure you **name all your sheets and files** and place you material in a folder or clear file. At the end of the field trip **your teacher will collect all the folders/files** from each student for distribution at the next biology class.

Part 2: Written Report

Back at school you will spend 3-4 periods collating your data from your group and an ensuring you have all your notes and data together in a folder.

For authenticity the folder cannot be taken from the classroom but you may bring in research material. The written report cannot be pre written at home and handed in

Under examination conditions you will complete your written report individually in class, over 4 periods. You will have access to your class notes, research information, field data and observations and any other resources you need to help you write your report. You will not have access to the internet during that time or smart phones or any other devices.

Your report will be assessed on how comprehensively you identify, describe and explain a pattern (or absence) in your chosen ecological community, by relating it to environmental factors (biotic and abiotic) and the biology (adaptations) of interrelated organisms of different species.

Your report should include:

- 1. **Introduction** a brief description of your investigation focus, including details of your chosen area(s) and the scientific names of the organisms investigated.
- 2. Biology of the Ecological Community information about the organisms in the community you investigated. Describe the ecological niche and adaptations of at least two species, and relevant interrelationships between these organisms.
- **3.** Abiotic Environment description of the abiotic factors found in the area you investigated. You could include observations or measurements collected in fieldwork.
- **4.** The data you used to identify a distribution pattern this can either be compiled by you e.g. a graph or table, or it could be processed data from other sources. It

needs to be included in the report and referenced if it is from another sources, either as an appendix or in the body or the report.

- 5. Description of Pattern describe the findings (and/or observations) from the fieldwork/collected data and use these to identify the distribution pattern (or absence of a pattern) in the ecological community. You could include tables or graphs in this section, to clearly show the distribution pattern.
- 6. Discussion relate the pattern in the community to the biology of the organisms and the environmental factors in the ecosystem.
 - a. explanations for how or why the biology (adaptations, interrelationships) of at least two species relates to the pattern (or absence of a pattern).
 - b. discussion of how environmental factors (abiotic and/or biotic) might affect the organisms in the community, and how this relates to the observed distribution pattern, or absence of a pattern. This could involve elaborating, applying, justifying, relating, evaluating, comparing and contrasting, and/or analysing.
- 7. Include: **Bibliography** a list of the information sources you used to help you write your report, written in a format that allows other people to find the information sources. This will not be assessed, but it is expected good practice to acknowledge information sources you used in your work.

Below are some references that may be useful:

http://www.otago.ac.nz/marinestudies/resources/download/mm2/Ecology%20of%20the%20 NZ%20Rocky%20Shore%204.5MB.pdf

http://www.seafriends.org.nz/enviro/habitat/intro.htm

Portobello Marine Life Database: http://www.otago.ac.nz/marinestudies/database/newdatabase/index.html!!

New Zealand Rocky Shore Guide: http://www.marine.ac.nz/resources

New Zealand Marine Studies Centre's Marine Metre Squared Seashore Survey biodiversity monitoring project https://www.mm2.net.nz/

Conditions of Assessment related to this achievement standard can be found at http://ncea.tki.org.nz/ResourcesVforValignedVstandards/Science/Biology/LeveIV2V Biology/RelatedVresources