

Internal Assessment Resource

Education for Sustainability Level 2

This resource supports assessment against Achievement Standard 90811 version 2

Standard title: Explain how human activity in a biophysical environment has consequences for a sustainable future

**Credits:** 4

Resource title: A future for our ngahere

**Resource reference:** Education for Sustainability 2.2B v3

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| This resource:* Clarifies the requirements of the standard
* Supports good assessment practice
* Should be subjected to the school’s usual assessment quality assurance process
* Should be modified to make the context relevant to students in their school environment and ensure that submitted evidence is authentic
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| Date version published by Ministry of Education | February 2015 Version 3To support internal assessment from 2015 |
| Authenticity of evidence | Teachers must manage authenticity for any assessment from a public source, because students may have access to the assessment schedule or student exemplar material.Using this assessment resource without modification may mean that students’ work is not authentic. The teacher may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

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Teacher guidelines

The following guidelines are supplied to enable teachers to carry out valid and consistent assessment using this internal assessment resource.

Teachers need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing students against it.

Context/setting

This assessment activity requires students to carry out an investigation of the Maungatautari Mountain environment, in order to present a submission to the Waikato Regional Council comprehensively explaining how the creation of the Maungatautari ecological island has consequences for a sustainable future.

Conditions

It is suggested that the assessment activity take place over 8-10 weeks of in- and out-of-class time.

Resource requirements

Students should have access to:

* Internet, for research and communication.
* Technology and equipment, as and where appropriate.
* [www.sanctuarymountain.co.nz/](http://www.sanctuarymountain.co.nz/). Access to this website is essential as it contains relevant data, and provides an account of the development process, ongoing maintenance and work being undertaken in the Maungatautari ecological island project.

Additional information

This assessment activity is based on the assumption that students have an in-depth understanding of: the principles and aspects of sustainability; research methods and data analysis; evaluation; and wherever possible Māori concepts and values relating to the environment, particularly a familiarity with Article 2 of the Treaty of Waitangi.

The activity used to assess against this standard, with the choice of a suitable context, could be used in conjunction with assessment activities for EfS 2.1 (AS90810) and 2.5 (AS91734).

Other possible contexts

Although this resource is focused on the Maungatautari Mountain environment, you may adapt it to other environments more relevant to your location such as coastal and marine environments, rivers, or lakes. If you change the context for the activity, you need to provide equivalent relevant resources.

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Student instructions

Introduction

This assessment activity requires you to carry out an investigation of the Maungatautari Mountain environment to explain how human activity has consequences for its sustainability. You will present your findings and conclusions in the form of a submission to the Waikato Regional Council.

You are going to be assessed on how comprehensively you explain how the creation of the Maungatautari ecological island has consequences for a sustainable future.

The following instructions provide you with a way to structure your work to demonstrate what you have learnt to allow you to achieve success in this standard.

Teacher note: You will need to read these student instructions and modify them if necessary to meet the needs and interests of your students.

Task

Carry out an investigation of the Maungatautari Mountain environment to explain how human activity has consequences for its sustainability. Explain your findings and conclusions in an individual submission that you will present to the Waikato Regional Council, in a format that you choose. Options can include, but are not restricted to: visual display or model; datashow/PowerPoint; speech or debate; formal presentation or lecture; song or artwork.

Submit a logbook that documents your data collection and measurement methods. The information may come from direct observations, collection of field data, tables, graphs, resource sheets, photographs, videos, websites, and/or reference texts.

You may work individually or in a group, but you will be assessed individually. Include evidence of your individual contributions in your logbook if working in a group.

You have 8 weeks to complete this task.

Gather information

* Visit Maungatautari, including the ecological island.
* Research Maungatautari Mountain’s biophysical environment. You need to:
* Collect and analyse relevant data and evidence (including taking measurements) to find out about and describe the ecology of the ngahere (bush). Make sure the data collection and measurement methods are suitable and appropriate. These could include transects, quadrats, bird counts, rodent monitoring etc.
* Choose a physical system that interacts with the ecology of the ngahere (bush). The physical system may be either: geological (such as history, structure, substrate, sedimentation) or climatic (such as rainfall, temperature) and collect data and evidence about this system, and its influence on the ecology of the bush.
* Research the Maungatautari ecological island project. To do this you will need to:
* Consult any relevant stakeholders e.g. land owner(s), iwi/hapū group(s), community group(s), local/regional council(s), neighbours, businesses, or local experts about the project.
* Outline the development process and ongoing work being undertaken in the Maungatautari ecological island project.
	+ Identify the consequences of the project for the ngahere ecosystem. Note that consequences may be either positive or negative.

Finalise your presentation

Organise your findings and submission.

Include:

* An explanation of the characteristics of the Maungatautari Mountain’s biophysical environment. This includes:
* Explaining the ecology of the bush (ngahere) on the mountain (e.g. name species and explain their inter-relationships). You may need to include maps, showing the location of the ecological island, the pest-proof enclosures and any data collection points.
* Explaining the physical system and how it interacts with the ngahere (bush) ecology of the mountain.

Support your explanations with the data and evidence you have collected.

* An explanation of the Maungatautari ecological island project and its consequences for the sustainability of the mountain’s biophysical environment.
* Your insightful conclusions about how and why the project has consequences and wider implications for a sustainable future. These may include:
* Projecting future impacts.
* Suggesting possible future options for actions that show personal and social responsibility for a sustainable future.
* Making recommendations regarding funding of this and/or other ecological islands.

Provide a clear, logical argument, supported by evidence.

Present your findings and submit for assessment

* Present your findings in a submission to the Waikato Regional Council.
* Submit your logbook.

Resources

http://[www.sanctuarymountain.co.nz/](http://www.sanctuarymountain.co.nz/) is an essential website specifically related to the Maungatautari ecological island.

Other useful websites related to bush environments and ecological islands include:

[http://www.forestandbird.org.nz/campaigns/](http://www.forestandbird.org.nz/campaigns/we-love-marine-reserves/marine-reserves-faq)

<http://www.doc.govt.nz>

[http://www.biodiversity.govt.nz](http://www.biodiversity.govt.nz/seas/biodiversity/index.html)

<http://www.sciencelearn.org.nz/>

<http://www.waikatobiodiversity.org.nz/educational_resources/>

<http://maungatrust.org/>

<http://www.landcareresearch.co.nz/science/plants-animals-fungi/ecosystems>.

<http://www.nzhistory.net.nz/politics/treaty-of-waitangi>.

Assessment schedule: Education for Sustainability 90811 – A future for our ngahere

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| Evidence/Judgements for Achievement  | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| Explain how human activity in a biophysical environment has consequences for a sustainable future. The student has: * Explained the characteristics of Maungatautari Mountain as a biophysical environment including:
	+ A description of the ecological system of the bush (ngahere)

*“Maungatautari Mountain is mostly covered in mature forest that contains some large very old rimu and rata trees. Most of the totara has been milled from the forest. Our transects showed that there are also rewarewa, kamahi, tawa, mangeao, hinau, pukatea and miro trees. The forest provides a habitat of many of our most endangered species, including kiwi,* [*takahe*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/40/Takahe)*,* [*hihi (stitchbird)*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/39/Hihi%20-%20Stitchbird)*,* [*pitoitoi (North Island robins)*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/42/North%20Island%20Robins%20-%20Pitoitoi)*, tieke (saddleback),* [*kaka*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/38/North%20Island%20Kaka) *and* [*kakariki*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/41/Kakariki)*, bats, frogs, reptiles, tuatara and giant weta..... The saddleback feeds on weta, weevils and other insects and fallen seeds and berries. Hihi feeds on rata nectar when it is flowering.”** + one physical system that interacts with the ngahere

*“The Geological System: The mountain is a volcano which has been extinct for thousands of years. Its upper slopes contain many large volcanic rocky outcrops. These have been weathered and eroded over the years producing sediments. These have washed down to form fertile soils further down onto the lower valleys and slopes of the mountain and surrounding land. The mountain is large and has different altitudes and ranges from rock to soil underneath, so we see a range of habitats containing different species of both plants and animals living on the mountain habitats. The slopes and eroding crater are quite steep and that has saved the forest from a lot of exploitation from farming and milling as the upper reaches of the forest are inaccessible.....”*Evidence of data collection and measurement is found in the student’s logbook.* Explained what the Maungatautari ecological island project involves and its consequences for the sustainability of the biophysical environment of the mountain.

*“The human activity identified is the creation of an ecological island. This involved building a pest proof fence around the forest and the removal and ongoing monitoring of the pests inside the fence. This has created a pest-free environment for our native birds, other animal species and bush to regenerate. Its purpose is to provide protection and increase the chances for the survival of our native species. It has provided a safe habitat and protection of many of our native species.... It has involved a large group of people working together in different ways at different times to achieve all the tasks necessary to get the project happening. For example…”* *“The formation of the Maungatautari ecological island has created an environmental sanctuary. It has had a positive consequence for the overall environment on the maunga, especially in terms of the health of the ngahere. The successful pest removal has improved the quality of habitat improving the availability of food and successful breeding of bird species due to less predation. Endangered species have been released onto the mountain within the sanctuary, for example kiwi and hihi. There have also been more sightings of bird life outside the fence within the wider environment. There also has been data collected showing an increase in the number of germinating seedlings growing in the understory of the bush....”** Drawn conclusions about the consequences of the project for a sustainable future.

*“Based on our investigations and research data, we can show an increase in unbanded hihi (stitchbirds). This supports the conclusion that a pest-proof environment creates a safe habitat and increased food supply to sustain larger populations of particular species. The predator-proof fence is ensuring the sustainable future of endangered native species by the increase in population numbers. This shows the value of ecological islands and their ongoing monitoring and maintenance.”* In addition to the submission, the student has submitted a logbook containing evidence of their individual contributions and of data collection and measurement methods.*The examples above are indicative samples only.* | Explain in depth how human activity in a biophysical environment has consequences for a sustainable future.The student has: * Explained the characteristics of Maungatautari Mountain as a biophysical environment including:
	+ A description of the ecological system of the bush (ngahere)

*“Maungatautari Mountain is mostly covered in mature forest that contains some large very old rimu and rata trees. Most of the totara has been milled from the forest. Our transects showed that there are also rewarewa, kamahi, tawa, mangeao, hinau, pukatea and miro trees. The forest provides a habitat of many of our most endangered species, including kiwi,* [*takahe*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/40/Takahe)*,* [*hihi (stitchbird)*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/39/Hihi%20-%20Stitchbird)*,* [*pitoitoi (North Island robins)*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/42/North%20Island%20Robins%20-%20Pitoitoi)*, tieke (saddleback),* [*kaka*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/38/North%20Island%20Kaka) *and* [*kakariki*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/41/Kakariki)*, bats, frogs, reptiles, tuatara and giant weta..... The saddleback feeds on weta, weevils and other insects and fallen seeds and berries. Hihi feeds on rata nectar when it is flowering.”** + one physical system that interacts with the ngahere

*“The Geological System: The mountain is a volcano which has been extinct for thousands of years. Its upper slopes contain many large volcanic rocky outcrops. These have been weathered and eroded over the years producing sediments. These have washed down to form fertile soils further down onto the lower valleys and slopes of the mountain and surrounding land. The mountain is large and has different altitudes and ranges from rock to soil underneath, so we see a range of habitats containing different species of both plants and animals living on the mountain habitats. The slopes and eroding crater are quite steep and that has saved the forest from a lot of exploitation from farming and milling as the upper reaches of the forest are inaccessible....”*Evidence of data collection and measurement is found in the student’s logbook.* Explained what the Maungatautari ecological island project involves and its consequences for the sustainability of the biophysical environment of the mountain.

*“The human activity identified is the creation of an ecological island. This involved building a pest proof fence around the forest and the removal and ongoing monitoring of the pests inside the fence. This has created a pest-free environment for our native birds, other animal species and bush to regenerate. Its purpose is to provide protection and increase the chances for the survival of our native species. It has provided a safe habitat and protection of many of our native species.... It has involved a large group of people working together in different ways at different times to achieve all the tasks necessary to get the project happening. For example…”* *“The formation of the Maungatautari ecological island has created an environmental sanctuary. It has had a positive consequence for the overall environment on the maunga, especially in terms of the health of the ngahere. The successful pest removal has improved the quality of habitat improving the availability of food and successful breeding of bird species due to less predation. Endangered species have been released onto the mountain within the sanctuary, for example kiwi and hihi. There have also been more sightings of bird life outside the fence within the wider environment. There also has been data collected showing an increase in the number of germinating seedlings growing in the understory of the bush....”** Drawn informed conclusions based on a clear and logical evidence-based argument about why the Maungatautari ecological island project has consequences for a sustainable future.

*“Based on our investigations and research data, (reference made to own data or other sources ...) we can see an increase in unbanded stitchbirds. This shows that a pest-proof environment creates a safe habitat for breeding native populations of bird species. More sightings of unbanded hihi mean we are seeing younger birds and this is an indicator of successful breeding. For a sustainable future, the ongoing maintenance and monitoring of this ecological island is required as well as the introduction of other appropriate species back onto the maunga.. Another aspect of the project that is also contributing to a sustainable future is that the project has brought a lot of people together to work on a common cause. If we are to have a better future, teaming up to achieve goals is one possible approach that has been proven to be successful by this project. It shows what can be done when people work together.”*In addition to the submission, the student has submitted a logbook containing evidence of their individual contributions and of data collection and measurement methods.*The examples above are indicative samples only.* | Comprehensively explain how human activity in a biophysical environment has consequences for a sustainable future.The student has: * Explained the characteristics of Maungatautari Mountain as a biophysical environment including:
	+ A description of the ecological system of the bush (ngahere)

*“Maungatautari Mountain is mostly covered in mature forest that contains some large very old rimu and rata trees. Most of the totara has been milled from the forest. Our transects showed that there are also rewarewa, kamahi, tawa, mangeao, hinau, pukatea and miro trees. The forest provides a habitat of many of our most endangered species, including kiwi,* [*takahe*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/40/Takahe)*,* [*hihi (stitchbird)*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/39/Hihi%20-%20Stitchbird)*,* [*pitoitoi (North Island robins)*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/42/North%20Island%20Robins%20-%20Pitoitoi)*, tieke (saddleback),* [*kaka*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/38/North%20Island%20Kaka) *and* [*kakariki*](http://www.sanctuarymountain.co.nz/interactive_wildlife_finder/c/23/id/41/Kakariki)*, bats, frogs, reptiles, tuatara and giant weta..... The saddleback feeds on weta, weevils and other insects and fallen seeds and berries. Hihi feeds on rata nectar when it is flowering.”** + one physical system that interacts with the ngahere

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*“The human activity identified is the creation of an ecological island. This involved building a pest proof fence around the forest and the removal and ongoing monitoring of the pests inside the fence. This has created a pest-free environment for our native birds, other animal species and bush to regenerate. Its purpose is to provide protection and increase the chances for the survival of our native species. It has provided a safe habitat and protection of many of our native species.... It has involved a large group of people working together in different ways at different times to achieve all the tasks necessary to get the project happening. For example…”* *“The formation of the Maungatautari ecological island has created an environmental sanctuary. It has had a positive consequence for the overall environment on the maunga, especially in terms of the health of the ngahere. The successful pest removal has improved the quality of habitat improving the availability of food and successful breeding of bird species due to less predation. Endangered species have been released onto the mountain within the sanctuary, for example kiwi and hihi. There have also been more sightings of bird life outside the fence within the wider environment. There also has been data collected showing an increase in the number of germinating seedlings growing in the understory of the bush....”** Drawn insightful conclusions about the wider implications of how and why the Maungatautari ecological island project has consequences for a sustainable future.

“A predator-free environment improves the quality of habitat, increases food availability and nesting sites (data referenced...). These aspects are important for the future survival of populations. I recommend that future potential sites for predator-proof fencing and pest eradication are identified and funding sought to create more safe habitats ... Another consequence I have identified during my investigation is the impact this project has had on the local community, including hapū. The community have become strong advocates for the Maungatautari environment and have worked together towards a sustainable future for the maunga. In order for our native species to survive we need to create more ecological islands like this one. There could be other implications if this does not happen such as if a disease was to spread through Maungatautari then....” In addition to the submission, the student has submitted a logbook containing evidence of their individual contributions and of data collection and measurement methods.*The examples above are indicative samples only.* |

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.