

Biodiversity in the Pekapeka Wetlands

Internal Assessment Resource
Education for Sustainability Level 2

Achievement Standard Education for Sustainability 90811 v 2: Explain how human activity in a biophysical environment has consequences for a sustainable future

Resource title: What is the future for our wetlands?

Credits: 4

Resource reference: Education for Sustainability 2.2A v3

Achievement	Achievement with Merit	Achievement with Excellence
Explain how human activity in a biophysical environment has consequences for a sustainable future.	Explain in depth how human activity in a biophysical environment has consequences for a sustainable future.	Comprehensively explain how human activity in a biophysical environment has consequences for a sustainable future.

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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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.

Internal Assessment Resource

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 activity requires students to conduct an inquiry into how a human activity has consequences for the sustainability of the Pekapeka Wetlands environment. They will comprehensively explain their findings to an identified stakeholder in a format that they choose.

Conditions

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

Make sure you have evidence of students' assessments to be used for moderation. This may mean recording certain formats chosen by students to present their findings, e.g. speech or debate, formal presentation, lecture, or song.

Resource requirements

Students should have access to:

- Internet, for research and communication.
- Technology and equipment, as and where appropriate.
- Guidance on communicating with relevant stakeholders.
- Useful websites containing relevant information related to the Pekapeka Wetland environment

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 Pekapeka Wetlands, you may adapt it to other environments more relevant to your location such as local rivers, harbours,

coastlines, bush, farm, or urban environments. If you change the context for the activity, you need to provide equivalent relevant resources.

Internal Assessment Resource

Achievement standard: 90811

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

Credits: 4

Resource title: What is the future for our wetlands?

Resource reference: Education for Sustainability 2.2A v3

Student instructions

Introduction

This assessment activity requires you to conduct an inquiry in order to explain to an identified stakeholder how a human activity has consequences for the sustainability of the Pekapeka Wetlands environment.

You are going to be assessed on how comprehensively you explain how your chosen human activity has consequences for the sustainable future of the Pekapeka Wetlands biophysical environment.

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

Conduct an inquiry in order to explain how a human activity has consequences for the sustainability of the Pekapeka Wetlands environment and present your findings to an identified stakeholder in a format that you choose. Options can include, but are not restricted to: visual display or model; data show/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 (e.g. Hawke's Bay Regional Council), 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 assessment activity.

Gather information

- Use HBRC publication *Pekapeka Swamp: A Story of Survival* by Garth Eyles. Class sets available to borrow through HBRC: enviro@hbrc.govt.nz
- Visit the Pekapeka wetland environment.

- Carry out research about the Pekapeka Wetland's biophysical environment. This will include the ecological system (such as invertebrates, flora and fauna) and one physical system from the list below
 - i Hydrological systems (such as water flow, capacity, stream inputs, and clarity)
 - ii Geological systems (such as history, structure, substrate, sedimentation)
 - iii Climatic systems (such as rainfall, temperature)
 - iv Atmospheric systems (such as carbon dioxide levels).
- Collect and analyse relevant data and evidence, including taking measurements, to find out about the ecological system and the physical system. Make sure the data collection and measurement methods are suitable and appropriate e.g. water flow, substrate, sediment type, water quality, and key species.
- Research a human activity that has an impact on the Pekapeka Wetland environment. This will involve:
 - Choosing a human activity. Activities may include:
 - i Farming practices such as irrigation, fertiliser use, effluent control
 - ii Sewage treatment and disposal
 - iii Riparian planting
 - iv Recreational use of the area such as walking, hunting, fishing, picnicking
 - v Water use
 - vi Power generation.
 - Outlining what your chosen human activity involves, which includes:
 - i Identifying the consequences it has on the wetland environment. Note that consequences may be either positive or negative.
 - ii Identifying relevant stakeholders associated with the human activity you have chosen.
 - iii Consulting with stakeholders where relevant e.g. land owner(s), iwi/hapu group(s), community group(s), local/regional council(s), neighbours, businesses, local experts.
- Identify which stakeholder you will deliver your findings to.

Finalise your presentation

Organise your findings and presentation in the selected format.

Include:

- An explanation of the characteristics of the biophysical environment of the wetland. This includes:
 - Explaining the ecological system of the wetland (e.g. name species and explain their inter-relationships). You may need to include a map of the wetlands, showing the location(s) you are referring to specifically, as the ecological environment varies in different areas of the wetland.
 - Explaining the physical system and how it interacts with the ecological environment.

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

- An explanation of the human activity and its consequences for the sustainability of the wetland.

- Your insightful conclusions about how and why the human activity 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.

Provide a clear, logical argument, supported by evidence.

Present your findings and submit for assessment

- Present your findings to your chosen stakeholder in the selected format.
- Submit your logbook.

Resources

Useful websites which contain relevant information related to the Pekapeka Wetland environment include:

HBRC publication *Pekapeka Swamp: A Story of Survival* by Garth Eyles is a comprehensive resource related specifically to the Pekapeka Wetlands and the impact of some human activity upon it. Contact HBRC for class sets: enviro@hbrc.govt.nz

Excerpt: [Microsoft Word - Pekapeka presentation Sept 2018 website version.docx \(wetlandtrust.org.nz\)](#)

www.doc.govt.nz

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

www.forestandbird.org.nz

www.biodiversity.govt.nz

[Home » Hawke's Bay Biodiversity \(biodiversityhb.org\)](#) www.niwa.co.nz

[Using the Cultural Health Index: How to assess the health of streams and waterways \(environment.govt.nz\)](#)

Local Council websites:

[Hawke's Bay Regional Council | New Zealand \(hbrc.govt.nz\)](http://www.hbrc.govt.nz)

[Hastings District Council | New Zealand \(hastingsdc.govt.nz\)](http://www.hastingsdc.govt.nz)

[Napier City Council | New Zealand](http://www.napier.govt.nz)

[Central Hawke's Bay District Council | New Zealand \(chbdc.govt.nz\)](http://www.chbdc.govt.nz)

[Wairoa District Council | New Zealand \(wairoadc.govt.nz\)](http://www.wairoadc.govt.nz)

Assessment schedule: Education for Sustainability 90811 – What is the future for our wetland?

Evidence/Judgements for Achievement	Evidence/Judgements for Achievement with Merit	Evidence/Judgements for Achievement with Excellence
<p>Explain how human activity in a biophysical environment has consequences for a sustainable future.</p> <p>In this example using the Waikato River, the student has:</p> <ul style="list-style-type: none"> • Explained the characteristics of the Waikato River as a biophysical environment including: <ul style="list-style-type: none"> – its ecological system • <i>“The Waikato River is the longest river in New Zealand and includes a variety of freshwater ecosystems, supporting many organisms, both native and introduced. Different organisms live in different parts of the river. We studied the river where it passes through Hamilton. The fish species are eating freshwater plants or the invertebrates that feed on the plants. In turn they are eaten by other fish, shags and people. (Diagram of simplified food web provided) The native fish species here include eels, kokopu and koura (data referenced). In some of the wetlands and streams around the river, and closer to the coast at Port Waikato, there are more species including whitebait. These fish rely on there being enough food and oxygen in the river water.....”</i> <ul style="list-style-type: none"> – one physical system that the ecological system interacts with <p><i>“The Hydrological System: The flow of the river varies as it travels down from Lake Taupo to Port Waikato. There are several sets of waterfalls and rapids where the water runs very fast and other deeper slower moving</i></p>	<p>Explain in depth how human activity in a biophysical environment has consequences for a sustainable future.</p> <p>In this example using the Waikato River, the student has:</p> <ul style="list-style-type: none"> • Explained the characteristics of the Waikato River as a biophysical environment including: <ul style="list-style-type: none"> – its ecological system • <i>“The Waikato River is the longest river in New Zealand and includes a variety of freshwater ecosystems, supporting many organisms, both native and introduced. Different organisms live in different parts of the river. We studied the river where it passes through Hamilton. The fish species are eating freshwater plants or the invertebrates that feed on the plants. In turn they are eaten by other fish, shags and people. (Diagram of simplified food web provided) The native fish species here include eels, kokopu and koura (data referenced). In some of the wetlands and streams around the river, and closer to the coast at Port Waikato, there are more species including whitebait. These fish rely on there being enough food and oxygen in the river water.....”</i> <ul style="list-style-type: none"> – one physical system that the ecological system interacts with <p><i>“The Hydrological System: The flow of the river varies as it travels down from Lake Taupo to Port Waikato. There are several sets of waterfalls and rapids where the water runs very fast and other deeper slower moving</i></p>	<p>Comprehensively explain how human activity in a biophysical environment has consequences for a sustainable future.</p> <ul style="list-style-type: none"> • In this example using the Waikato River, the student has: • Explained the characteristics of the Waikato River as a biophysical environment including: <ul style="list-style-type: none"> – its ecological system <p><i>“The Waikato River is the longest river in New Zealand and includes a variety of freshwater ecosystems, supporting many organisms, both native and introduced. Different organisms live in different parts of the river. We studied the river where it passes through Hamilton. The fish species are eating freshwater plants or the invertebrates that feed on the plants. In turn they are eaten by other fish, shags and people. (Diagram of simplified food web provided) The native fish species here include eels, kokopu and koura (data referenced). In some of the wetlands and streams around the river, and closer to the coast at Port Waikato, there are more species including whitebait. These fish rely on there being enough food and oxygen in the river water.....”</i></p> <ul style="list-style-type: none"> – one physical system that the ecological system interacts with <p><i>“The Hydrological System: The flow of the river varies as it travels down from Lake Taupo to Port Waikato. There are several sets of waterfalls and rapids where the water runs very fast and other deeper slower moving</i></p>

<p><i>sections of water. There are hydro-electric dams along the river from Taupo to Karapiro with lakes behind them and the water level below them is controlled, altering the amount of water flowing in the river..... Organisms that inhabit the river environment must contend with the conditions in the particular location. In Hamilton the river level fluctuates, due to rainfall and hydro activity. The quality of the water varies depending on.... We found that (data referenced regarding water quality)."</i></p> <p>Evidence of data collection and measurement is found in the student's logbook.</p> <ul style="list-style-type: none"> Explained a human activity and its consequences for the sustainability of the river environment. <p><i>"Farming: Farming is a human activity that happens along the length of the Waikato River. Farms use river water for irrigation and as water for stock by pumping it into their trough systems. Most farms apply fertiliser to increase grass growth and productivity....."</i></p> <p><i>"Some of the practices that happen on farms have an impact on the Waikato River. For example, fertiliser run-off adds more nutrients to the water, either running straight off the farm into the river, into the streams that feed the river, or by being washed underground, where they work their way to the river eventually. The most common fertilisers that are used and are found in our waterways are phosphorus and nitrogen. The consequences of this include increased nutrients in the river water and a decline in water quality. The increased nutrients can affect the organisms living in the river....."</i></p> <ul style="list-style-type: none"> Drawn conclusions about the consequences of the human activity for a sustainable future. 	<p><i>sections of water. There are hydro-electric dams along the river from Taupo to Karapiro with lakes behind them and the water level below them is controlled, altering the amount of water flowing in the river..... Organisms that inhabit the river environment must contend with the conditions in the particular location. In Hamilton the river level fluctuates, due to rainfall and hydro activity. The quality of the water varies depending on.... We found that (data referenced regarding water quality)."</i></p> <p>Evidence of data collection and measurement is found in the student's logbook.</p> <ul style="list-style-type: none"> Explained a human activity and its consequences for the sustainability of the river environment. <p><i>"Farming: Farming is a human activity that happens along the length of the Waikato River. Farms use river water for irrigation and as water for stock by pumping it into their trough systems. Most farms apply fertiliser to increase grass growth and productivity....."</i></p> <p><i>"Some of the practices that happen on farms have an impact on the Waikato River. For example, fertiliser run-off adds more nutrients to the water, either running straight off the farm into the river, into the streams that feed the river, or by being washed underground, where they work their way to the river eventually. The most common fertilisers that are used and are found in our waterways are phosphorus and nitrogen. The consequences of this include increased nutrients in the river water and a decline in water quality. The increased nutrients can affect the organisms living in the river....."</i></p> <ul style="list-style-type: none"> Drawn informed conclusions, based on a clear and logical, evidence-based argument about why human activity in the Waikato River 	<p><i>sections of water. There are hydro-electric dams along the river from Taupo to Karapiro with lakes behind them and the water level below them is controlled, altering the amount of water flowing in the river..... Organisms that inhabit the river environment must contend with the conditions in the particular location. In Hamilton the river level fluctuates, due to rainfall and hydro activity. The quality of the water varies depending on.... We found that (data referenced regarding water quality)."</i></p> <p>Evidence of data collection and measurement is found in the student's logbook.</p> <ul style="list-style-type: none"> Explained a human activity and its consequences for the sustainability of the river environment. <p><i>"Farming: Farming is a human activity that happens along the length of the Waikato River. Farms use river water for irrigation and as water for stock by pumping it into their trough systems. Most farms apply fertiliser to increase grass growth and productivity....."</i></p> <p><i>"Some of the practices that happen on farms have an impact on the Waikato River. For example, fertiliser run-off adds more nutrients to the water, either running straight off the farm into the river, into the streams that feed the river, or by being washed underground, where they work their way to the river eventually. The most common fertilisers that are used and are found in our waterways are phosphorus and nitrogen. The consequences of this include increased nutrients in the river water and a decline in water quality. The increased nutrients can affect the organisms living in the river....."</i></p> <ul style="list-style-type: none"> Drawn insightful conclusions about the wider implications of how human activity in the
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<p><i>“If the current poor farming practices such as using excess fertilisers that run off into the streams and river continue, then the water quality in the river will continue to decline (data referenced ...). This will have further impact on the living organisms in our streams and river. Excess nutrients will cause an increase in algae and pest plants causing a decrease in oxygen in the water, reducing biodiversity and how much clean useable water is available. If reduced water quality continues it will impact on how much clean water we will be able to use in the future. Better water quality means a more sustainable future.”</i></p> <p>In addition to presenting their findings, the student has submitted a logbook containing evidence of their individual contributions and of data collection and measurement methods.</p> <p><i>The examples above are indicative samples only.</i></p>	<p>environment has consequences for a sustainable future.</p> <p><i>“If the current poor farming practices such as using excess fertilisers that run off into the streams and river continue, then the water quality in the river will continue to decline (data referenced ...). One common fertiliser that has been overused is phosphorus. Phosphorus runoff is common as it attaches to fine sediment particles; in areas of erosion this sediment and phosphorus will runoff into waterways. This will have further impact on the living organisms in our streams and river, excess nutrients will cause increase in algae and pest plants causing a decrease in oxygen within the water, reducing biodiversity and also reducing how much clean usable water is available. If reduced water quality continues it will impact on how much clean water we will be able to use in the future.”</i></p> <p>In addition to presenting their findings, the student has submitted a logbook containing evidence of their individual contributions and of data collection and measurement methods.</p> <p><i>The examples above are indicative samples only.</i></p>	<p>Waikato River environment has consequences for a sustainable future.</p> <p><i>“If the current poor farming practices such as using excess fertilisers that run off into the streams and river continue, then the water quality in the river will continue to decline (data referenced ...). Phosphorus runoff is common as it attaches to fine sediment particles; in areas of erosion this sediment and phosphorus will runoff into waterways. This will have further impact on the living organisms in our streams and river, excess nutrients will cause increase in algae and pest plants causing a decrease in oxygen within the water, reducing biodiversity and also reducing how much clean usable water is available. In order for future generations to be able to use and enjoy clean usable water in our streams and rivers, we need to create awareness among the farming sector, and develop incentives to encourage responsible practices. One way to do this could be... (example provided). This relates to the social aspect of sustainability as if action is not taken, then the human activity of farming will have consequences for how future generations and communities can use our waterways... (example provided).”</i></p> <p>In addition to presenting their findings, the student has submitted a logbook containing evidence of their individual contributions and of data collection and measurement methods.</p> <p><i>The examples above are indicative samples only.</i></p>
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Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.

