

Theme three: Human impact on the Harbour

Level 4 Social Science

Level 4 Science



*Living
Waters*

TIAKINA NGĀ TAONGA - PROTECT THE TREASURES

Theme three:

Human impact on the Harbour

Level 4 Social Science

Achievement Objectives:

- Explain the different ways that events have causes and effects.

Conceptual understandings:

- Plants and animals in Porirua Harbour and Catchment live in an environment best suited to them and are affected in many ways by changes to their habitat.
- Different values and perspectives influence the decisions people make about use of Porirua Harbour and Catchment and its resources.
- Human decisions, including our own decisions, can affect the environmental sustainability of Porirua Harbour and Catchment, both positively and negatively.

Level 4 Science

Achievement Objectives:

- Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced.
- Explore various aspects of an issue and make decisions about possible actions.

Learning framework

Links to social inquiry approach	Activities	What to look for
Establishing what we know		
Focus of learning topic What is Ecological degradation?	1. Ecological degradation 2. Ecological degradation – cause and effect	Building conceptual understandings of <ul style="list-style-type: none"> • Key concepts such as the cause and effect of pollution.
Experiencing the Harbour		
Selecting a context What causes pollution in our harbour?	3. What lives in the harbour? 4. Field trip – train journey through the catchment 5. Post field trip reflections	Deepening understanding of <ul style="list-style-type: none"> • What lives in the harbour • The different causes for pollution within the Porirua harbour and catchment.
Building on knowledge		
Finding information What is the effect of human action on the harbour?	6. Human actions and ecological degradation	Building conceptual understandings by Developing insight into the way human actions directly link to pollution within the harbour and catchment

Planning for action		
<p>Exploring values and perspectives</p> <p>Do we all want the same thing for the harbour?</p> <p>Considering responses and decisions</p> <p>How can rules be used to protect the harbour?</p>	<p>7. Protecting the harbour</p> <p>8. Problems need solutions</p>	<p>Developing critical thinking by</p> <p>Encouraging students to:</p> <ul style="list-style-type: none"> • Try to understand different groups' values and perspectives around their resource. • Analyse different responses and decisions to their particular resource • Evaluate the consequences of changes to rules concerning their resource • Decide the best ways to ensure people have sustainable access to the resource, now and in the future.
So what, now what		
<p>Social action</p> <p>What can I do to protect the harbour?</p>	<p>9. Our solution</p>	<p>Deepening sense of kaitiakitanga by</p> <ul style="list-style-type: none"> • Finding a solution to a problem they identified and achieving a desired outcome.

Establishing what we know

Activity 1: Ecological degradation

Write the word Ecological Degradation on the board and discuss its meaning. It may be beneficial to break the term down into Ecology and Degrade to help students understand the concept

- In groups of three, ask students to draw a T-chart and note down any things that may cause ecological degradation on one side, and any possible effects of ecological degradation on the other.
- As a class, discuss any ecological degradation they have seen in their community; for example, pollution or sedimentation.

Activity 2: Ecological Degradation – cause & effect

Watch the *Living Waters* episode: [April: Pollution](#) and [August: Sediment](#).

- Ask the students to add to their cause and effect T-chart anything else mentioned in the documentary, put a star besides ones that are mentioned that they have already recorded and to cross out any that don't apply to the Porirua Harbour and Catchment.
- Draw or copy an empty cause and effect T-chart onto 12 large sheets of paper, and give each piece the title of one of the other *Living Waters* documentaries: Recreation, Fishing, Shags, Pollution, Tides, Urban Catchment, Pauatahanui Reserve, Sediment, Creatures Great and Small, The Rural Catchment, The Industrial Catchment and The Future. Each of these titles represents a context relevant to the Porirua Harbour and Catchment. Ask students to go around the room writing in any causes or effects they think would apply to that context.

Experiencing the Harbour

Activity 3: What lives in the harbour?

Display a [large map](#) of the Porirua Harbour and Catchment, or as a class create one as a mural. Identify where the school is located, any nearby streams the students will be familiar with, and where the field trip in Activity 4 will take place. Discuss and locate the different habitats for example fresh water streams, intertidal zone, deep sea, swamp.

- Discuss with the students how streams flow into the harbour and; therefore, the health of the harbour is affected by the health of the streams.
- In small groups, ask the students to draw pictures of each of the living things they can think of in the Porirua Harbour and Catchment. Encourage them to think of both plants and animals. They can then stick their pictures on to the map in the area they think that organism lives in relation to the habitats located earlier. (Note: use blutac or post-it notes as students will get the opportunity to move these later on as they refine their knowledge.)

The following two resources will help your students to learn more about the plants, animals and habitats of the harbour and catchment:

- *At the Beach – explore and discover the New Zealand sea shore* by Ned Barraud & Gillian Candler. Refer to the pages about mudflats to guide student's learning about the plants and animals that they could expect to find in the Pauatahanui Inlet.
- This title in the Building Science Concepts series is about the intertidal zone and contains activities to extend this aspect of the topic: <http://scienceonline.tki.org.nz/What-do-my-students-need-to-learn/Building-Science-Concepts/Titles-and-concept-overviews/Tidal-Communities>

Activity 4: Train journey through the catchment

Travelling by train is an excellent way to experience the harbour and catchment. It's possible to travel from Plimmerton through to Takapu Road and observe the different types of habitats in the catchment (swamp, outer harbour, Onepoto and Pauatahanui arms, and streams), as well as visible evidence of how human activity has impacted on the quality of the harbour as a natural resource. For example Porirua Stream changes a lot from Takapu Road Station through to Porirua Station. From healthy natural edges through to unhealthy looking water, litter and hard artificial edges once it gets closer to the industrial zone of Kenepuru. Students will also be able to observe a variety of human activities that would have an impact on the harbour such as roads and housing, farmland, stormwater outlets, the reclaimed land around Mana Marina and so on. Planning a scavenger hunt type activity beforehand will help focus student's attention and guide their observations. There are also opportunities to get off the train to either explore streams and waterways (e.g. Takapu Road or Redwood), or the outer harbour such as Plimmerton Beach.

As with all field trips we strongly urge teachers to visit the site prior to taking students there. The Ministry of Education has excellent guides for safe outdoor experiences:

<http://eotc.tki.org.nz/EOTC-home/EOTC-Guidelines>

Information about train timetables and costs can be found here:

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

Or phone 0800 801 700

Activity 5: Post field trip reflections

When you return to the classroom, display the T-charts from Activity 2 around the room, add photos, drawings or descriptions of the human impacts found on the train journey, and discuss which context most interests the class. Teachers may want their class to choose the same context, or they may want groups of students to choose their own.

Building on knowledge

Activity 6: Human actions and ecological degradation

Watch the Living Waters episode: *January: Recreation*.

Choose one learning context from the documentary for the class to use as a model, and fill out a [consequence wheel](#). This may be done with individual reading groups or as a whole class activity.

- In the centre of their wheel, ask them to write their context.
- In the next ring out, ask them to place human actions that have effects in this context.

Encourage the students to include plant and animal life in their consequence wheel to see how changes in their habitat have affected them.

Students can watch the *Living Waters* documentary for their con-

text as well as explore other areas of information, such as books, the Internet, interviewing experts and/or class field trips.

Once the modelling consequence wheel is completed, give the students another blank wheel and ask them to fill it out for their context.

When each group has filled out their consequence wheel, they can use this information to decide on the issue they want to consider for their social action.

Planning for action

Activity 7: Protecting the Harbour

The causes and effects generated in the consequence wheel will affect different stakeholders in different ways.

- Discuss this with the students and brainstorm all the different stakeholders that may be affected by their chosen issue. You may wish to include the plant or animal life of the harbour and catchment as one of the groups.
- Brainstorm different rules that might have been put in place to protect the harbour from this issue; for example, rules around speed limits and fishing quotas. Choose a rule or category of rules to analyse, for example you may choose the rules for paua gathering.
- In groups, ask students to complete a PCQ (Pros, Cons, Questions) with an extra column on the righthand side for values, for one of the stakeholders affected by this rule. Ensure that each group is analysing a different stakeholder. You may want to do this as a Hot Potato activity where the students pass the sheets of paper around to different groups and add their ideas to each sheet.

An example PCQ chart for drivers if a rule was that every tyre sold included a \$5 fee for managing heavy metal runoff from tyres

Pros	Cons	Questions	Values
Heavy metal pollution in harbour would be decreased		Would it really make much difference?	The harbour is an ecological treasure
	Makes it more expensive to buy tyres	Would the increased cost make people replace their tyres less often?	We want value for money
The harbour would look nicer		How long would it take for these efforts to make a difference?	The harbour gives us nice views

Adding \$5 to every tyre sold to go towards managing runoff

As a class, discuss how the same rule could be a pro for one stakeholder, but a con to another. Ask students why this could be and explain that this shows they have a different perspective. The perspectives and opinions of the different groups show us what their values are.

- Using the PCQ charts, brainstorm what they think the values of each group might be.
- Discuss how several groups may share values, but for different reasons. For example, commercial or recreational fishers may value sustainability to ensure their future catch, the local iwi may value sustainability to maintain a vital food source.
- Decide on the values that the class thinks should be considered when rules are made about the harbour and catchment.

Student activity

Using the same process, students can now analyse the perspectives and values of the groups that would be affected by the issue they have chosen for their context. For example if they have chosen the context of recreation, they may choose the issue of the smell noticed by the Waka Ama groups.

Activity 8: Problems need solutions

As a class, discuss how problems can be solved.

- Ask the students to identify a problem that has occurred in the school, for example, rubbish being blown around the playground.
- Discuss how this problem was solved, who was involved in the solution and how did they choose the best solution for everyone.

Use the **POOChI** model to help the class decide on the best way to solve the issue identified earlier:

1. Identify the **Problem** (chosen in the finding information section)
2. Generate **Options** to solve the problem
3. Predict **Outcomes** for each option – analysing both short and long term positive and negative outcomes.
4. To do this, use the information gathered in the Exploring values and perspectives section. You may want to have a class debate as described in the Level 3 plan.
5. **Choose** the best option
6. What do **I** think about this? How does this affect me?

Students can then use the POOChI model to generate the best solution for their issue. Encourage the students to consider the outcomes for various groups before they choose their solution.

So what, now what?

Activity 9: Our solution

Students will now choose the best way of implementing their solution, or influencing decision makers to do so. Some ideas are below:

- Create a petition
- Write letters to the government and/or councils
- Create an awareness campaign in the community
- Clean up an area of the harbour or catchment
- Create a plan or model

These resources may be of use:

- The Greater Wellington Regional Council [Take Action for Water ideas](#) for reading activities using School Journal and other publications.
- Biodiversity NZ have an interactive game called Up the Creek. Click here to go to the [site](#) with kid's activity and teacher information.