

# TOGETHER FOR OUR MOANA - WE'RE SHAPING OUR FUTURE

## KŪTAI / MUSSELS

### NZ CURRICULUM LINKS:

Learning areas:	Achievement objectives:
<p><b>Te Ao Māori</b> Te reo (language), tikanga (customs and traditional values)</p>	<p>By learning te reo Māori, students are able to participate with understanding and confidence in situations where te reo and tikanga Māori predominate and to integrate language and cultural understandings into their lives ; strengthen Aotearoa New Zealand’s identity in the world.</p>
<p><b>Aotearoa NZ Histories</b> <i>Turangawaewae me te kaitiakitanga - Place and environment</i></p>	<p>Understand how places influence people and people influence places. Understand how people view and use places differently.</p>
<p><b>English</b></p>	<p>Listening, Reading, Viewing</p>
<p><b>Science</b></p>	<p>Living things and how they interact with the environment. Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced. Planet earth and beyond - Interacting systems. Describe how natural features are changed and resources affected by natural events and human actions.</p>

## Overview

Find out about how mussels can help to keep the moana clean.

## Learning intention

Tamariki are learning to understand the importance of mussels in the moana.

## Success criteria

Students can explain how mussels can help the moana.

# LEARNING SEQUENCE

Based on the Inquiry model



### Inspire

Provoke curiosity  
and wonder



### Explore/Educate

Gather information  
Use / apply  
learning



### Activate

Reflect and act

## Background information for teachers:

Mussels are a bit like ecosystem engineers. They provide food for species like snapper, remove nitrogen and improve water clarity. A single mussel can single-handedly filter up to two bathtubs of water a day.

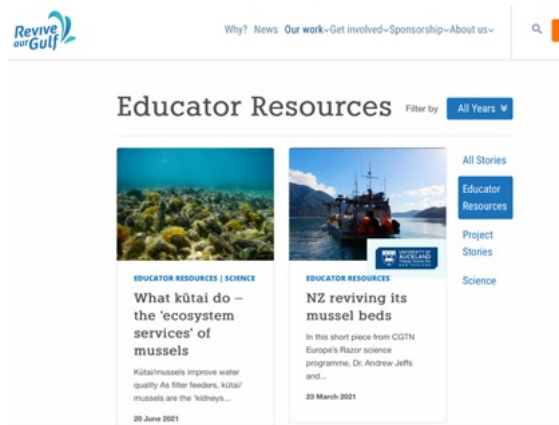
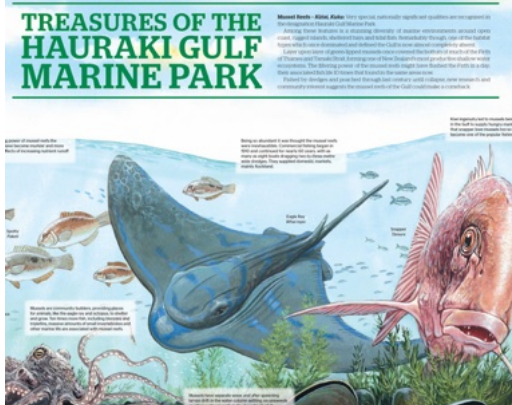
The inner Hauraki Gulf once had over 600km<sup>2</sup> of sub-tidal mussel reefs - about 80,000 rugby fields worth! This means that at their prime mussels could have filtered the water every day. Now it would take two years for the few remaining reefs to do this.

In the 1960s, mussel beds, which carpeted the Hauraki Gulf, were dredged to oblivion to be sold for food.

In 2021 to rebuild the mussel population, iwi, scientists and conservationists dropped 60 tonnes of adult mussels off Okahu Bay.

[Poster - Mussel Reefs](#)

[Revive our Gulf educator resources](#)



# LESSON PLAN

## Mussels / Kūtai - filter feeders

Teachers are encouraged to choose and adjust activities to suit the learning needs and interests of their tamariki.



### Inspire

 Allow approximately 10 mins

- **Watch this Young Ocean Explorers video** - [Young Ocean Explorers video - how do you clean a dirty ocean?](#)



*Video is 4:50 minutes*

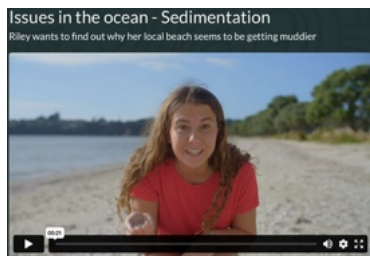
- **Discuss** - why do you think there are fewer mussels in the Hauraki Gulf / Tīkapa Moana than there were many years ago?



## Educate

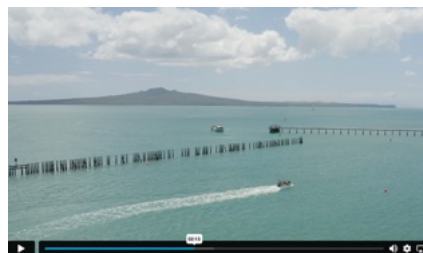
 Allow approximately 25 mins

- **Sedimentation** - What is sedimentation and where does it come from? Do this [Young Ocean Explorers quiz](#) and discuss what could be done.



- **Experiment** - Do this experiment OR watch the [example video](#) from Science Learning Hub to find out how mussels clean the ocean. **INSTRUCTIONS:** Each group (or whole class) needs a glass jar and a live mussel. Teachers - you can buy live mussels at most supermarkets. Please note - some children / teachers may not feel comfortable doing this given that it is using a live mussel - you will know your class best. You can watch the example video as an alternative.
  - Mix in 1 Tbsp flour with a jar of sea water. Shake.
  - Put a mussel in each jar
  - Leave jars in a cool place for an hour or more (keep water under 20 degrees)
  - Remember to keep a 'control' jar with sediment but NO mussel to compare with.
  - You might like to experiment with the amount of sedimentation or with the number of mussels in each jar. What happens if you leave two mussels in one jar? What happens if you have more or less sedimentation?
  - What happens if you leave the mussels for longer?
  - You could try a [mussel dissection](#) after your experiment to find the different parts of a mussel.

- **Tikanga** - How are mussels important to Māori? [Find out more.](#)
- **Watch** - [The Ōkahu Bay project.](#) Find out how a group of people together are making a difference.  
*Video is 5 minutes*



- **Explore** [this poster from the Hauraki Gulf Forum](#) - look at all the life that mussel reefs can support!



## Activate

 *Timing will vary*

# DAILY ACTION



**MAKE A DIFFERENCE** for our moana - pick up at least 1 piece of kirihou / plastic each day. [Log how many pieces your class picks up on the Young Ocean Explorers website.](#)

- **Get involved.** Find a waterway and organise to plant around it to stop sedimentation. Make a plan and research what to plant. What will grow well in that area? What are good plants for the environment and for creatures? [Here are some suggestions to help you.](#)

- **Watch** - Riley helps plant native plants at Blue Duck Station, helping filter the water that ends up in the Tasman Sea.

*Video is 6:33 minutes*



Riley can't find the ocean here!



# EXTRA LEARNING IDEAS AND RESOURCES

## Read

- School Journal Level 2, August 2012 has a story on kūtai / mussels.
- About [the work of 'Revive Our Gulf'](#)
- Extension - [read facts about marine sedimentation - DOC](#)

## Watch

Young Ocean Explorer Hope Story videos

- [Harakeke and rope](#) *Video is 5:46 minutes*
- [Revive Our Gulf](#) *Video is 3:08 minutes*



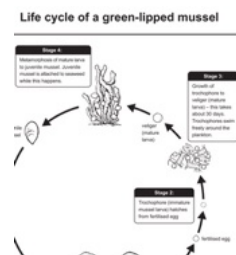
## Research

- Find out - What else helps keep water clean? Read or watch ['Mātauranga Māori- that which is passed down.'](#)

*Video is 1:52 minutes*



- [Lifecycle of a mussel](#) - which stage is also known as 'spat'?



# EXTRA LEARNING IDEAS AND RESOURCES

## Read

- Experiment - Erosion and Soil. [Watch this video](#) and / or [try this experiment](#) to find out more about soil erosion.

*Video is 7:35 minutes*



- Changes over time - explore [this poster](#) from the Hauraki Gulf Forum to see how land use has changed and affected the ocean



## Find out more:

There are many other lesson ideas from Young Ocean Explorers - choose another one. [Young Ocean Explorers](#) You can find out about some of the amazing creatures that live in or visit the Hauraki Gulf. There are also lessons on some of the amazing places in Tikapa Moana. Or you could explore ideas of how people are connected to the moana / ocean.