

THE STRUCTURE AND FUNCTION OF GREEN-LIPPED MUSSELS

NZ CURRICULUM ACHIEVEMENT OBJECTIVES LEVEL 1-4
SCIENCE

NATURE OF SCIENCE: UNDERSTANDING ABOUT SCIENCE,
INVESTIGATING ABOUT SCIENCE, COMMUNICATING IN SCIENCE

ECOLOGY

MATHEMATICS AND STATISTICS: STATISTICAL INVESTIGATION

ACTIVITY 1: Let's Investigate how they work

YOU WILL NEED



- Fresh green lipped mussels from your local supermarket
- Collect 5 litres of murky sea water from a local beach (the murkier the better)
- Make your own sea water by adding 35 grams (6 teaspoons) of salt to 1 litre of tap water
- To make it cloudy add 1 teaspoon of flour or 2-3 teaspoons of moist soil or mud
- 2 x 1000ml beakers or clear containers with wide necks like preserving jars
- Watch or timer
- Cellphone or device with timelapse software (free apps are available for cellphones)



LET'S GET STARTED

- Fill your 2 clear containers with equal amounts of cloudy seawater. Keep the water below 20°C.
- Place one green-lipped mussel into one of the containers. This will be the test sample. Leave the other one as the control.
- Time the experiment and observe the mussel in action as it filters the seawater. Stop the experiment when the seawater becomes clear. Take photos throughout the experiment or take a time lapse movie.
- Express your results as time taken for seawater to clear /1 litre for 1 mussel, this is your filtration rate.



FURTHER EXPERIMENTS YOU MIGHT LIKE TO TRY

- Increase the number of mussels sequentially and record their filtration times. Predict what might happen first.
- Collect your data and present it in a table. You can also express your results as a graph. What does the information in your table or graph tell you? Does it differ from your prediction? Explain why.
- Repeat this experiment but this time weigh the mussels and express your results by weight instead of number.
- Try a different type of shellfish like cockles and pipis.
- Can you think of any other experiments you would like to try.



ACTIVITY 2: Let's look inside



INTERESTING FACTS

Mussels are a 'mollusc' and have a foot, a shell and a mantle. The mantle makes the shell and produces its colour. Ridges on the shell are growth lines and show how it grows, like the growth rings of a tree. Their shells are made of layers of calcium carbonate, a chemical similar to chalk. As the mussel inside the shell grows, another layer is added to the outer edge of the shell. The oldest part of a shell is called the umbo. The shell protects the mussel from waves and other physical damage, and predators. Mussels are a bivalve (they have 2 shells). Their two shells are connected together by muscles and a hinge and open up allowing the mussel to feed. At low tide the shells are pulled tightly together to prevent water loss. Mussels attach themselves to the seafloor with their byssal threads. Mussels feed by circulating water over their gills and filtering out plankton. They can filter 6-9 litres of seawater an hour.



Prior to dissection establish the student's prior knowledge. Discuss the role of mussels in our marine environment. REFER TO:

reviveourgulf.org.nz
sciencelearn.org.nz/videos/730-revive-our-gulf

YOU WILL NEED

- Live mussels (in shells) from supermarket
- A knife and an adult to open the mussels
- Trays or newspaper to carry out the dissection on



<p>1 Measure your mussel and compare it with the rest of the class. Is it smaller or larger than the average size?</p>	<p>2 Can you open your mussel? Do you think it is a bivalve or a univalve?</p>	<p>3 Describe the outside of the shell. What colours can you see?</p>	
<p>13 The gills are used to breathe and filter plankton out of the water. How many gills are there.</p>			<p>4 Is there anything growing on the shell?</p>
<p>12 The foot looks like a large dark tongue. What is it used for?</p>			<p>5 Label the umbo (oldest part of the shell) and the hinge on the photo.</p>
<p>11 The mantle tissue is located at the edge of the shell. It adds new shell to the outer edge. What colour is it?</p>			<p>6 Does your mussel have byssal threads? (These are hairy threads that attach the mussel to the seafloor)</p>
<p>10 Find the adductor muscle that pull the shell closed. How many are there?</p>			<p>9 Is your mussel a male or female?</p>

Adapted from the NZ Rocky Seashore Activities, NZ marine studies centre University of Otago

