

IS OUR WATER SAFE FOR SWIMMING?

A GUIDE FOR TESTING FOR E-COLI



Ngā mihi nui ki ngā rangatira mō āpōpō, ngā tauira, kaiako me te hapori whānui o Māhia me Rongomaiwāhine. Ānei tētahi o ngā hua mō koutou. Haere tonu i tō mahi putaiao, ā, kei kōnei mātou ko ESR ki te awhina.

Nā Arna Whaanga, rātou ko Miriama Ainsley,
ko Georgia Bell tēnei pukapuka i tuhi.

Nā Elaine Moriarty me Te Kaupapa Māori o Te Parehuia
te kōrero putaiao i koha mai.

Nā Komene Kururangi I whakamāori.

Nā Mark O'brien ngā pikitia
(www.monsta.co.nz)

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A guide for testing for *E. coli*.

Developed by Te Kura Kaupapa Māori o Te Parehuia with the support
of the Institute of Environmental Science and Research (ESR)



Collect the gears that you need for sampling: appropriate clothes, shoes, sunblock, drink bottles and other gears for the walk to the sampling site.

Prepare the sampling gear: the water collection bucket, the water container, sampling bags, permanent markers, and other gears needed for collection.





Carefully walk to the sampling site. Be careful of the cars on the road. Sing a song along the way!



When you arrive to the river have a look at the health indicators. Does it look healthy? Dirty? What colour is it? Does it have a smell? Have a look for living animals and plants in the water. Do they look healthy? Is there a good representation of different species?

Collect some water using
the sampling bucket.



Hold on to the rope attached to the bucket to collect the water. Be careful not to drop it in the river!



Pour the water from the bucket into a water container with a spout.





Write the details of the collected sample onto the sampling bag. Include the sampling location, the name of the collector, and the dilution factor of the water.

Transfer the water from the water container into the sampling bag.





Prepare dilutions of the water sample using sterile water, we usually use bought drinking water. Depending on how polluted the water is, we usually do a 1:2 and a 1:10 sample, as well as an undiluted sample.

Put the nutrient pill into the sampling bag. This is the food needed for the bacteria to grow. Fold the top of the bag several times and close it by folding over the wire tabs.



Shake the bag and leave it until the colour of the nutrient pill turns white in colour.



Carefully transfer
the contents of the
sampling bag into the
compartment bag.

Don't forget to label the
bag beforehand!

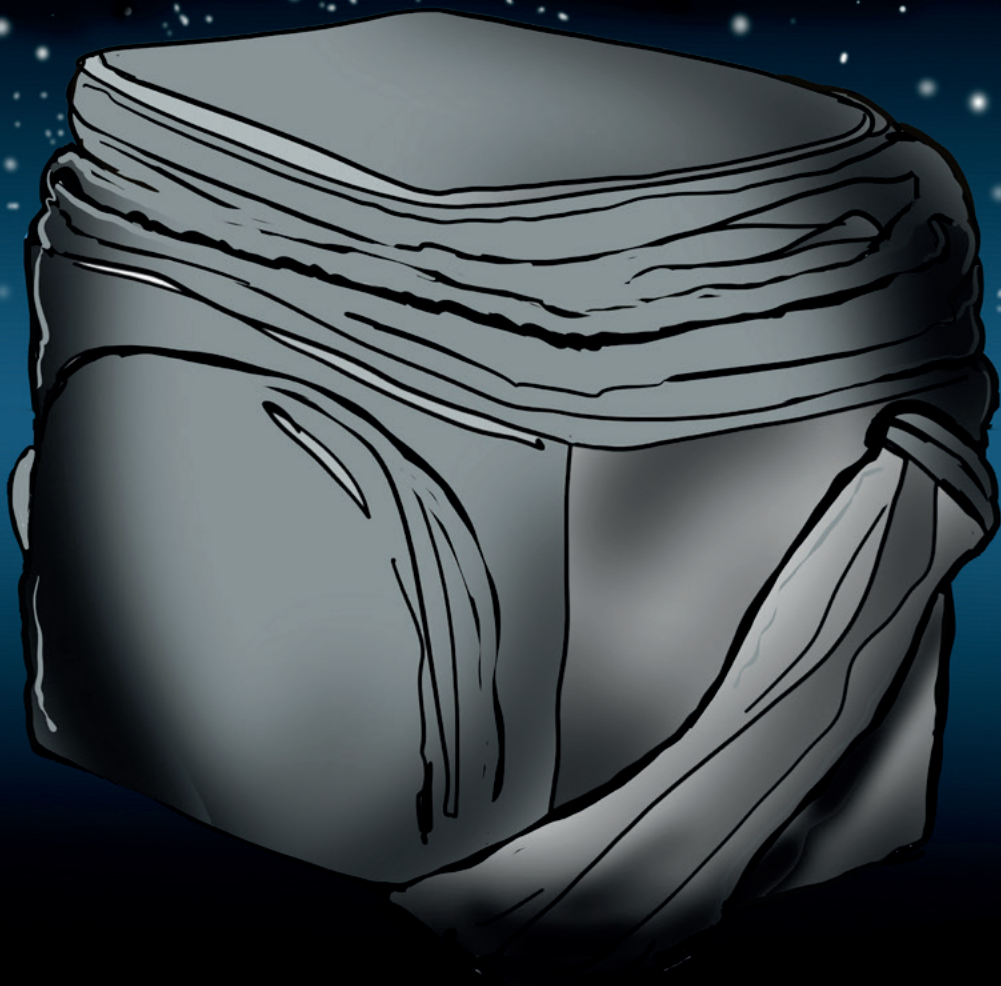




Place the bag
inside the incubator
and set the temperature
to 37° C.

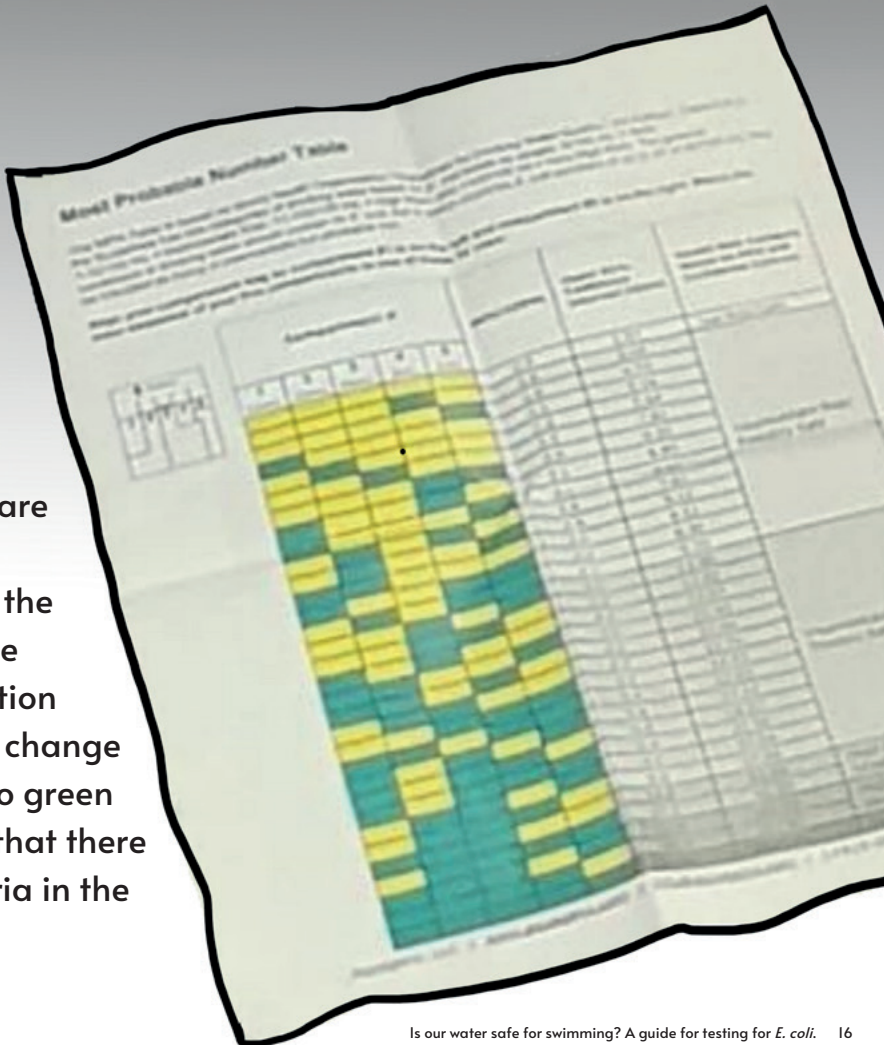


Incubate the samples overnight. Make sure that the incubator is in a well ventilated area. The bacterial growth can get pretty smelly!





The next day compare the colour change in the bags to the concentration chart. The change in colour to green indicates that there are bacteria in the sample!



Record the concentration of bacteria in the water.

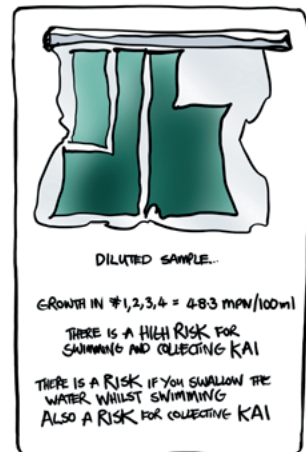
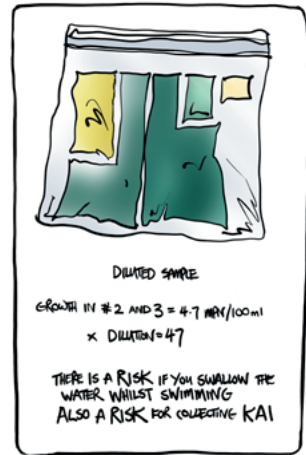
Don't forget to take the dilution factors into account: multiply the dilution number with the concentration indicated by the chart to find out the original amount of bacteria that was in the sample.

Discuss the results from the analyses with the class, community and wider whānau.

What are the take away messages?

What are the differences from previous samplings?

Is the water safe for swimming or collecting mahinga kai?





Here are the scientists of the day! They worked very hard! We can use science to make our environment and people healthy!

Here is some of the equipment that you'll need:

- bucket
- hat
- sunblock
- high visibility vest
- sterile water (bought or clean tap water)
- incubator
- The Aquagenx® (CBT EC+TC MPN) testing kits and contents: compartmented bag, sampling bag, nutrient pill and concentration chart



ABOUT THIS RESOURCE:

This resource was developed out of a Curious Minds MBIE funded project led by Te Kura Kaupapa Māori o Te Parehuia with the support of the Institute of Environmental Science and Research (ESR).

This resource acts as a sampling guide for testing water quality using the Aquagenx® (CBT EC+TC MPN) testing kits (<https://www.aquagenx.com/cbt-ectc/>).

The resource outlines the protocol for testing *E. coli*, a type of bacteria found in faeces from warm-blooded animals. It is used as a faecal indicator organism, or, an indicator of faecal contamination. *E. coli* is not harmful itself but faeces can contain pathogens, (disease causing microbes) that can make us ill.

Measuring the amount of bacteria, or concentration, is important for understanding the health risk for some activities. For example, drinking water must not contain any *E. coli* for it to be considered safe. However, swimming may contain lower concentrations of *E. coli* and not pose a risk of illness.

High *E. coli* concentrations generally indicate a risk for harvesting wild foods such as shellfish. Faecal contamination can contain other components that are harmful to the environment as well, such as nutrients from farm waste, or chemicals from sewage.

For more information about *E. coli* and water quality in Aotearoa you can check out:

The Learning Hub

<https://www.sciencelearn.org.nz/resources/1899-e-coli-the-biotech-bacterium>

LAWA

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

<https://www.lawa.org.nz/learn/factsheets/faecal-indicators/>

Ministry for the Environment

<https://www.mfe.govt.nz/fresh-water/tools-and-guidelines/microbiological-guidelines-recreational-water>

The contents of the Aquagenx® (CBT EC+TC MPN) testing kits:
compartmented bag, sampling bag, nutrient pill and concentration chart.

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