

SCIENCE

Stage 3 Adaptations of Living Things

Scientific Water Testing

Waterbug Survey (macroinvertebrate)
Field Trip



This resource supports the Georges Riverkeeper Stage 3
Education Module 9: Scientific Water Testing

Outcome: examines how the environment affects the growth, survival and adaptation of living things **ST3-4LW-S**

Key Inquiry Question: How do the structural features of living things support survival?

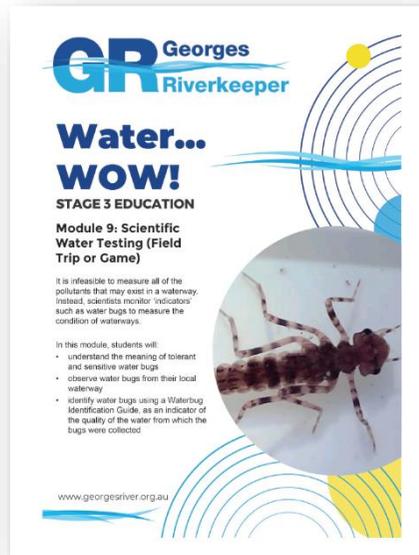
Learning Intentions: I can identify adaptations in living things

Success Criteria: I can describe some structural and behavioural adaptations in freshwater macroinvertebrates.

Overview:

Georges Riverkeeper's River Health monitoring of freshwater sites not only involves measuring water quality but also collecting waterbugs.

The waterbugs (freshwater macroinvertebrates) are very useful for determining the condition of the waterway from which they were collected. This is because waterbugs occur everywhere, they are relatively easy to catch, they are very diverse and different types of waterbug vary in their sensitivity to pollutants and other disturbances owing to human activities impacting waterways. That is, some waterbugs are very sensitive and others are far more tolerant of impacts to waterways. Highly impacted waterways will only have tolerant waterbugs, which differs from the occurrence of both sensitive and tolerant waterbugs in unimpacted streams. Information [source](#)



Yana'o Kai'eemagh' Walking on Georges River Country

Shannon Foster is a D'harawal Guriwal woman from Sydney with family from La Perouse and the Georges River. She is a Sydney D'harawal knowledge keeper and an artist who shares stories and weaving techniques from the Sydney Saltwater Country that have been passed down through her family over thousands of years. Watch Shannon's latest video recorded to celebrate [National Reconciliation Week in 2020](#) and explore the history of the Georges River with her.

National Reconciliation Week 2020 is an opportunity for us all to consider the role we play when it comes to strengthening the respect between the wider Australian community and Aboriginal and Torres Strait Islander people. National Reconciliation Week (NRW) is a time for all Australians to learn about our shared histories, cultures, and achievements, and to explore how each of us can contribute to achieving reconciliation in Australia. Reconciliation must live in the hearts, minds and actions of all Australians as we move forward, creating a nation strengthened by respectful relationships between the wider Australian community, and Aboriginal and Torres Strait Islander peoples. Visit the [Reconciliation Australia](#) website for more information.



How do macroinvertebrates determine river health?

Waterbugs, or freshwater macroinvertebrates, are small creatures that live in freshwater for either all or some of their lives. By looking at the type and number of water bugs in our waterways, we can tell how healthy the waterway is. Dr. David Reid from Georges Riverkeeper shows how to do a 'live pick' of waterbugs from a water sample in this [video](#). Information [source](#)

The summary of all the macroinvertebrate samples the Georges Riverkeeper collects is then documented in the [Georges River Report Card](#) which shows the river health grades across the catchment.



ACTIVITY 2: Macroinvertebrate adaptations

Macroinvertebrates have physical adaptations suited to living in specific aquatic environments. Creatures that live in fast-flowing water, like stoneflies and mayflies, often have claws or hooks for holding on to rocky substrates. Water boatmen live in slow-moving water so their legs are designed for swimming rather than holding on. The spiny-gilled mayfly has hairy legs to trap drifting food particles. Information [source](#)

Take a look at the amazing video of [macroinvertebrate sorting](#) from the 6:00 minute mark in this video. You will see macroinvertebrates close-up. Pause the video as you watch it to sketch some of the macroinvertebrates that are shown and record some adaptations you can identify from the video and photos.



ACTIVITY 1: School citizen science programs

This [video](#) looks at a student citizen science project by Office of Environment and Heritage to monitor macroinvertebrates and water quality in Warrumbungle National Park. The goal of this project was to introduce local school students to the concept of citizen science.

Another new program is the National Waterbug Blitz. The National Waterbug Blitz is Australia's first nationwide waterway monitoring event. Each year, Australians are encouraged to become 'citizen scientists' and investigate how healthy their local waterways and wetlands are, simply by exploring and identifying what waterbugs they contain. Find out how to [get involved](#), as anyone can participate.



ACTIVITY 3: Fieldwork for schools

The specialist teachers at the Georges River Environmental Education Centre conduct excursions and incursions for schools in the Georges River catchment. Georges River EEC is a NSW Department of Education school.

The programs they run are Science, Geography, Art or history focused and are aligned to the NSW Curriculum. The Centre is based at Chipping Norton Lake, and excursions are conducted from there or in your school grounds or a bushland area or creek near your school. Check out the [Georges River EEC website](#), phone direct on 02 9755 3189, or email via georgesriv-e.school@det.nsw.edu.au



These are free water education resources for teachers and students about water in the Georges River catchment in south Sydney, and more generally, in Australia. These education modules have been prepared for Stage 3 in primary schools.

They cover facts for kids about drinking water, water uses, the water cycle, water pollution, water conservation, rainfall, drought, floods, aquatic food webs, and how to measure water conditions using waterbugs, plus much more.

www.georgesriver.org.au/learn-about-the-river/schools

There are many different stakeholders and landowners in the Georges River Catchment who all have a responsibility to manage their land in a way that ensures there is a minimal impact on the river and its ecosystems.

Georges Riverkeeper's Members:



Georges Riverkeeper's Partners:

