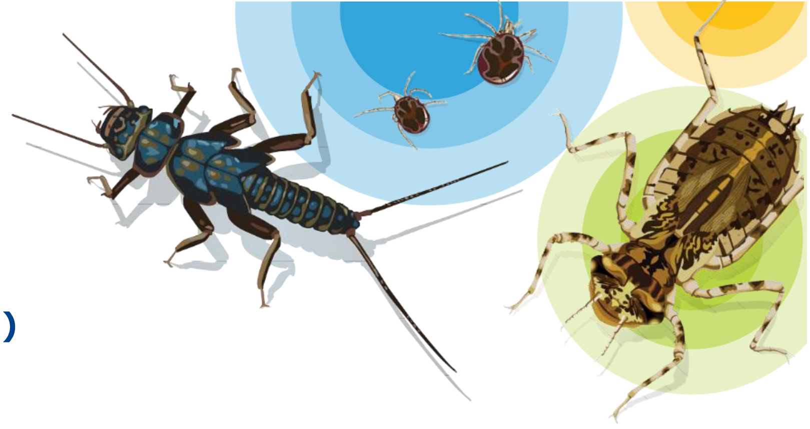
WATERWATCH



|Identifying waterbugs (Years 7–8)

Lesson sequence

Introduction

Waterbugs (aquatic macroinvertebrates) are key indicators of waterway health. This series of lessons uses local waterbugs to explore the identification, classification and feeding relationships of organisms.

Students classify waterbugs by their observable structural features and investigate the biodiversity of local freshwater environments. They develop a dichotomous key using their own criteria for classifying macroinvertebrates and consider how biologists use keys in their field work. They use their understanding about the types of waterbugs to create a food web for their local waterway.

Ideally, students should experience macroinvertebrate monitoring activities in the field. For detailed instructions about conducting a field excursion to monitor macroinvertebrates, refer to *Teacher guide: Running a waterbug session with students* <https://www.melbournewater.com.au/media/8431/download>

Victorian Curriculum F–10[1] links:

Levels 7 and 8

Science

Science Understanding

Science as a Human Endeavour

Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (VCSSU090)

Biological sciences

There are differences within and between groups of organisms; classification helps organise this diversity (VCSSU091)

Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity (VCSSU093)

However, if you are unable to take the students to a local waterway for a field excursion, you can collect a macroinvertebrate sample on the morning of the lesson and the students can sort and identify the organisms in the classroom (Refer to the *Waterbug identification in the classroom* instructions (page 5) in the *Teacher guide: Running a waterbug session with students*).

Activity 1: Identifying waterbugs

Students participate in a field excursion to a local waterway. They identify waterbugs, record and analyse the data and consider how these organisms can be used to indicate the ecological health of a waterway.

 Victorian Curriculum and Assessment Authority (VCAA) <victoriancurriculum.vcaa.vic.edu.au/> Accessed 3 January 2019.

Activity 2: Classifying waterbugs

Students explore how organisms are classified and devise a dichotomous key for waterbugs.

Activity 3: Waterbug food webs

Students explore the feeding relationships of organisms in the Maribyrnong River and devise a food web using data from their local waterway.

Activity 1: Identifying waterbugs

Students identify waterbugs in a water sample and consider how these organisms can be used to indicate the ecological health of a waterway using the sensitivity scores of each species.

This activity is most effective when conducted as a field excursion. If that is not possible, a waterbug sample can be collected early on the morning of the activity and students view the waterbugs in the classroom. Amend the activity steps below as required. Additional equipment could include magnifying lamps with LED lights, digital microscopes (10X magnification) and laptops.

Equipment

For the teacher:
Teacher guide: Running a waterbug session with students
<https://www.melbournewater.com.au/media/8431/download>
Waterbug sampling equipment: net, pole, bucket and gloves

Waterbug Census video [2:24]
<www.youtube.com/watch?time_continue=3&v=uaRsl4AdA7E>

Scope: Waterbugs video [3:13] <www.youtube.com/watch?v=ufUrn0_mmGo>
Interactive whiteboard or data projector (if available)
An A3 laminated hardcopy or digital version of *What waterbugs can you find?* poster <www.melbournewater.com.au/media/6751/download> or the online guide *A beginners guide to waterbug identification* <www.melbournewater.com.au/media/117/download> for class display

A copy of the *Dive into the underwater world with the Waterbug Census* infographic from the *Waterbug Census: discovering the world of waterbugs* brochure <www.melbournewater.com.au/media/442/download> for class display
Images of the waterway sampling site

For each group:
As per the equipment list in the *Teacher guide: Running a waterbug session with students* (page 7).

Preparation

Refer to pages 2–6 of the *Teacher guide: Running a waterbug session with students.* This guide provides detailed instructions about how to conduct a field excursion and how to collect waterbugs for an in-class waterbug identification activity. Topics include: acknowledgement of the Aboriginal connection to the local area, what are waterbugs, why they are important, how they can be used to assess waterway health, safety aspects, data sheets, detailed instructions for sampling, sorting, identifying and analysing waterbug data and information about waterway hygiene. Ensure that you comply with your school safety requirements.

Take photographs of the sampling site or gather some images of local waterways that can be used to explain waterway terminology e.g. riparian vegetation; verge; banks; riffles, pools or runs; aquatic plants; snags; stones, sand or silt substrates (*Habitat assessment* – Resource 2 of the *Teacher guide,* pages 13–14).

Stormwater pollution and sewerage spills can have significant impact on the ecological health of waterways in urban areas. Information about the drainage (stormwater) and sewerage systems in Melbourne can be found from the following websites:
Sewerage – <www.melbournewater.com.au/community-and-education/about-our-water/sewerage>. This web page also includes a useful animation that shows what happens in sewer spills.

Drainage system – <www.melbournewater.com.au/community-and-education/about-our-water/flooding/drainage-system> This web page explains how Melbourne's drainage system works.

Prior to the excursion, explain the context of the activity in the classroom (Steps 1–6).

Activity steps

Discovering

1. Before the excursion, ask students to list animals that live in your local waterway.

   Then pinch your thumbs and forefingers together to make a small diamond. Ask them to suggest which animals this size live in the waterway. Discuss their responses. Explain that the animals they will be looking at are, on average, the size of the space between your fingers. What roles might these organisms play in the waterway ecosystem?

2. Play the *Waterbug Census* video which explains that waterbugs can be used as biological indicators of the health of a waterway. They are an important part of the food chain for larger animals that live in the waterway such as platypus. The video shows how a sample is collected from different areas of a site, how it is sorted and the waterbugs identified using poster charts and a key. A datasheet is used to record data and calculate a sensitivity rating for the waterbugs.

   Alternatively, play the slightly less technical *Scope: Waterbugs* video. This video also explains how waterbugs can be used to monitor the levels of pollution in waterways. It covers waterbug adaptations including how they breathe and hunt.

3. Discuss why waterbugs are important in our local environment e.g. they support the food chain and without them the turtles, platypus, fish, birds and frogs wouldn't be able to survive; they are useful indicators of pollution or environmental degradation. The infographics in the *Waterbug Census: Discovering the world of waterbugs* brochure are useful to highlight key discussion points.

4. Introduce the term 'aquatic macroinvertebrates'. Explain that this is another term for waterbugs – 'aquatic' means water, 'macro' means big (or big enough for us to see

without using a microscope) and 'invertebrate' means without a backbone – so an aquatic macroinvertebrate is a waterbug that we can see with our naked eye.

5. Show images of the local waterway. Explain how the waterbug sample is collected. Use the terms: riparian vegetation; verge; banks; riffles, pools or runs; aquatic plants; snags; stones, sand or silt substrates and explain their meaning. A drawing, diagram or showing an enlarged, laminated photograph of a waterway may be useful. Alternatively, digital photographs of a local waterway could be used to explain these terms.
6. Explain how to look for waterbugs in the sample and how to identify them using the identification guide. Work through the *Habitat assessment* student worksheet (Resource 2 of the *Teacher guide)* and the Waterbugs data form so that these forms and their terminology are familiar.

Identifying waterbugs, recording and analysing data in the field

7. On the excursion, follow the *Waterbug identification and data collection activity* instructions in the *Teacher guide: Running a waterbug session with students* (pages 8–9). Explain how to look for waterbugs in the sample and how to identify them. Students record the data on the *Waterbugs data form* and calculate the SIGNAL score for their sample. Collate and display the group signal scores and discuss the results using the focus questions on page 9.

Waterbugs and waterway health

8. Discuss the sensitivities of the waterbugs that were found and what they indicate about the water quality of the local waterway. What factors would affect the health of the waterway?
9. Explain that in the next lesson they will explore how biologists classify waterbugs into groups.
10. Discuss how pollutants find their way into waterways. Explain what stormwater is and how it flows through urban areas. Explore the drainage system managed by Melbourne Water. Compare and contrast the stormwater and sewerage systems in Melbourne.

'Stormwater is surface run-off from rain and storm events that enters the drainage system. It carries many pollutants, including leaves, sediment, oil and other hydrocarbons that are a major cause of pollution in our rivers, creeks, lakes and bays[2]'.

Taking action

11. Ask students to suggest actions they and their family can take to help protect their waterways and improve the biodiversity of the area. Examples include:
    - picking up dog poo when walking your dog as it enters waterways via stormwater. Increased nutrients affect water quality
    - putting litter in the bin because litter can enter waterways via stormwater
    - minimising the chemicals and contaminants such as fertilisers, herbicides, pesticides and paint that go into stormwater
    - washing the car on grass so the detergent doesn't drain into the stormwater system

[2] Environment Protection Authority Victoria (updated 21 Nov 2018) 'Stormwater'. Accessed 3 March 2019 from <www.epa.vic.gov.au/your-environment/water/stormwater>

- planting trees on the banks of waterways to create riparian vegetation. This increases shade and cools the water temperature. Cooler water contains higher levels of dissolved oxygen.

12. Ask students to suggest ways that they can educate the school community and wider community about the effects that pollution has on the animals living in a waterway. Identify the ideas that would be most effective and workable – and implement them.
13. Discuss how students and their families could participate in the Waterbug Census (see *Useful resources* below), providing Melbourne Water with important data for ongoing research and waterway management. Students could investigate other opportunities for involvement in local waterway improvement programs run by their local council or local Friends groups or Landcare.

Key messages

- Our waterways support a diverse range of plant and animal life, including waterbugs, native fish, frogs and platypuses. They are worth looking after.
- Everyone can help improve local rivers and creeks by reducing stormwater pollution – simple things like picking up after your dog, planting trees, binning rubbish and fixing oil leaks in your car can reduce the impacts.

Useful resources

Waterwatch Program
<www.melbournewater.com.au/community-and-education/waterwatch-program>
Melbourne Water's Waterwatch Program supports people to get involved in exploring and protecting their local waterways through the Frog Census, Platypus Census, Waterbug Census or becoming a water quality testing volunteer. In addition, schools can apply to participate in the River Detectives program.

The program also provides keen citizen scientists with training and tools to become involved in monitoring the health of our waterways. Data collected contributes to scientific research, management planning and on ground actions that improve the health of our waterways.

You can become involved by joining a Waterwatch group, attending one of their events, using the citizen science apps or downloading resources to learn more about your local waterway.

Waterbug Census
<www.melbournewater.com.au/community-and-education/waterwatch-program/waterbug-census>
Waterbugs (macroinvertebrates) are very useful biological indicators and students can join other citizen scientists in monitoring waterbugs in Melbourne Water's Waterbug Census. This data is important for ongoing research and water management.

River Detectives
<www.riverdetectives.net.au/>
The River Detectives sustainability program supports educators in schools and youth community programs to explore their local waterways with students. Some activities include monitoring waterways for waterbugs, collecting samples, recording findings and compiling data.

As part of the program, your group will receive a water monitoring kit (on loan), invitations to training sessions and access to more activities, resources and an interactive data recording portal. Applications open at the end of the school year for the following year.
Healthy Waterways, Waterways Program Handbook
<www.melbournewater.com.au/media/425/download>
Complete Waterways Training document, including safety information, macroinvertebrate identification and data forms.

Australian freshwater invertebrates interactive guide
<www.mdfrc.org.au/bugguide/index.htm>
This guide is designed to provide ecological and taxonomic information to enable community groups, students and scientists to readily identify inland aquatic invertebrates in more detail. It could be used by interested students.

Waterbugs higher level key
<www.thewaterbug.net/attachments/ALT_highkey_little.pdf>
This key provides a useful introduction to both waterbug identification and dichotomous keys.

The waterbug app
<thewaterbugapp.com/>
The waterbug app is a very useful tool for identifying and uploading waterbug data. Students can identify waterbugs using a dichotomous key with engaging cartoon diagrams to explain structural features.

River health and monitoring
<www.melbournewater.com.au/water/health-and-monitoring/river-health-and-monitoring>
Melbourne Water monitors rivers and creeks so they know if their condition changes or if the improvement programs need adjusting. Learn how Melbourne Water assess river health and view current data.

Other information includes: indicators of river health, the health of Melbourne's waterways, and key waterway values.

Know your river booklets
Know your river - Werribee River
Know your river - Yarra River
Know your river - Maribyrnong River
Know your river - Dandenong Creek
Know your river - Bass River

The booklets provide valuable teacher background information about the history, geography and wildlife of the Werribee River, Yarra River, Maribyrnong River, Dandenong Creek and Bass River.

Activity 2: Classifying waterbugs
Students explore how biologists use classification levels and dichotomous keys to identify species using waterbugs.

Equipment

For the teacher:
Interactive whiteboard or data projector, if possible.

An A3 laminated hardcopy or digital version of *What waterbugs can you find?* poster <www.melbournewater.com.au/media/6751/download> or the online guide *A beginners guide to waterbug identification* <www.melbournewater.com.au/media/117/download> for class display.

A copy of the *Waterbugs Agreed Level Taxonomy ALT key* <https://www.thewaterbug.net/attachments/ALT_highkey_little.pdf>) online or in hardcopy.

The waterbug app <thewaterbugapp.com/> on a tablet for class display.

For each group:
Access to the online A beginners guide to waterbug identification <www.melbournewater.com.au/media/117/download> or a hardcopy version
One set of *Waterbug cards* (Resource 1)

One sheet of paper

Preparation

It is beneficial to introduce the concept of dichotomous keys with one of the simple hands-on activities available online e.g. asking student groups to design a dichotomous key for common household items or a collection of different nuts, bolts and washers. This waterbug classification activity is designed to complement a simple hands-on introductory activity. *The Waterbugs Agreed Level Taxonomy ALT* key is a graphical dichotomous key with images of the waterbugs while *The waterbug app* is a digital dichotomous key with engaging cartoon diagrams to explain the difference between structural features. These keys provide a useful introduction to both waterbug identification and dichotomous keys. It is important that you don't display these keys until the students have designed their own versions.

Activity steps

Review

1. Review the different types of waterbugs by displaying images from the *What waterbugs can you find?* poster or *A beginners guide to waterbug identification*. Discuss how biologists keep track of the different types of waterbugs (and other kinds of organisms on our planet!). How do they sort out the different types of waterbugs and identify them?

   Alternatively, if students haven't done the waterbug identification activity, use Activity 1 steps 1–3 to elicit students' initial ideas about life in their local waterways to set the scene for this activity.

Grouping living things

2. Explain that biologists need to be able identify each type of organism and to do this they group all living things on Earth into the following categories from the general to the specific.

    Kingdom
    Phylum
    Sub-phylum
    Class
    Order
    Family
    Genus
    Species

    Students can devise a mnemonic to remember the order e.g. King Phillip Came Over For Good Soup. There are also visual representations of classification systems such as: <infogram.com/animal-kingdom-classification-chart-1gqgk26j9v08mn0>

3. Taxonomy is the science of classifying animals. Display the following table of the major taxonomic levels for humans.

Level	Classification of humans
Kingdom	Animalia
Phylum	Chordata
Sub-phylum	Vertebrata
Class	Mammalia
Order	Primates
Family	Hominidae
Genus	Homo
Species	Sapiens

4. Explain that vertebrates (animals with backbones) include birds, amphibians, mammals, fish and reptiles. All other animals are considered invertebrates. Remind students why waterbugs are called aquatic macroinvertebrates (see Activity 1).

Creating a dichotomous key

5. Explain that we can use a dichotomous key to identify the waterbugs. Dichotomous means divided in two parts. With a dichotomous key, there are two options to choose from.

6. Working in groups, students choose drawings of four or five different waterbugs they observed in Activity 1 and create a dichotomous key to identify these waterbugs. Alternatively, distribute copies of the *Waterbug cards* (Resource 1) to each group. Students select the criteria that can distinguish each of the organisms they are working with. Reinforce that the criteria need to be based on observable (structural) features.

Model how students might use the criteria such as:

- legs/no legs
- tail prongs/no tail prongs
- gills for breathing/no gills for breathing.

7. On a sheet of paper, students create a flow chart for their classification with each branch of the flow chart separating the waterbugs with a question. Questions should focus on features: for example 'Does it have six legs – yes/no?' rather than 'Is it an insect?' Students continue with their questions to separate the waterbugs.

Share

8. Groups share their classification flow charts with the class. Students combine their ideas to produce a final class flow chart. They compare and contrast the final flow chart with the *Waterbugs Agreed Level Taxonomy ALT key* or the dichotomous key in *The waterbug app*. Discuss why field biologists commonly use dichotomous keys to identify organisms rather than an identification chart or guide.

Extension activity

Ask students to research the three-domain system of taxonomy designed by Carl Woese in 1990. How does the taxonomic hierarchy used in the activity fit with the three-domain system? This activity is useful for reinforcing the idea that taxonomy is a human construct and can change over time.

Teacher background

The taxonomic levels above were devised by Carolus Linnaeus (1707–1778), a Swedish botanist, zoologist and physician.

The classification levels become more specific towards the bottom, more general towards the top.

Many organisms belong to the same kingdom but fewer belong to the same phylum and so on as you go down the taxonomic levels.

Two animals that belong to the same family and genus are more closely related than two animals that only belong to the same family.

You can learn a lot from the scientific name, e.g. Homo sapiens:
Homo = self or same, meaning same as me = humans
sapiens = wise

Therefore, Homo sapiens means wise human.

Useful resources

See Activity 1.

Activity 3: Waterbug food webs

Students explore a case study about the ecology of the Maribyrnong River focusing on the feeding relationships of waterbugs and other organisms in the catchment. Students apply their understanding about food webs to create a food web for the Maribyrnong River. They discuss the impact of human activity on the ecology of the river and create a food web for their local waterway ecosystem.

Equipment

For each student:
a copy of *Life in the Maribyrnong River* (Resource 2)
For each group:
Poster paper, pencils, erasers and pens

Optional:
a copy of *Know your river: Maribyrnong River* This booklet provides valuable teacher background information about the history, geography and wildlife of the Maribyrnong River.

a copy of *A beginners guide to waterbug identification*
<http://www.melbournewater.com.au/media/117/download>This guide assists students to identify the more common waterbugs found in the Melbourne area. It also provides information about the taxonomy of the waterbugs, their anatomy, distribution, diet and sensitivity to pollution.

Preparation

This activity is intended as a follow-up task to general introductory activities about feeding relationships. It presupposes that students understand the basics of food chains, trophic levels and food webs.

This activity can be conducted at different levels depending on the access to resources (such as those listed above) and the ability and interests of the students. The food web can also be created digitally[3] but, for the group activity, it is easier and quicker to create a hard copy poster.

Activity steps

Food web review

1. Ask students to consider the diversity of life they found in their local waterway and make a class list of the waterbugs and other organisms on a board.
2. Explain that, in this activity, they will start by creating a food web for the Maribyrnong River ecosystem. What other types of organisms need to be added to the list on the board e.g. detritus (dead plant and animal matter), producers (algae, plants), predators or consumers (birds, lizards, snakes, platypus).
3. Display the terms: Algae, Freshwater shrimp, Platypus and ask the students to draw the food chain for these organisms. Check their understanding of the arrow convention

[3] PowerPoint is an easy option if students are interested in creating digital versions of their food web posters. In Page Setup, select Custom and set the Width and Height for the poster e.g. 100cm by 100cm.

i.e. the arrow always points towards the 'eater'. You may need to explain their dietary requirements.

4. Add additional terms: Mosquito larvae, Fish. Ask students to draw another food chain using these terms and any of the terms used in the previous food chain. You may need to provide additional information about what they eat (refer to *Life in the Maribyrnong River* – Resource 2).
5. Students then combine these simple food chains by drawing a food web. Check their food chains to ensure students understand how to complete the task.

Maribyrnong food web

6. Working in groups, students use the information in *Life in the Maribyrnong River* (Resource 2) or the *Know your river: Maribyrnong River* and *A beginners guide to waterbug identification* to create a food web that shows the feeding relationships in the Maribyrnong River. Set a minimum number of organisms that need to be included (e.g. ten) and negotiate a time limit for the task. Once the students are in their groups, give them a couple of minutes to discuss how they are going complete the activity and assign tasks to the group members.
7. Students create a poster of their food web. Suggest that they draft their food web in pencil first.
8. Ask some groups to explain their food webs with the class.

Human impacts

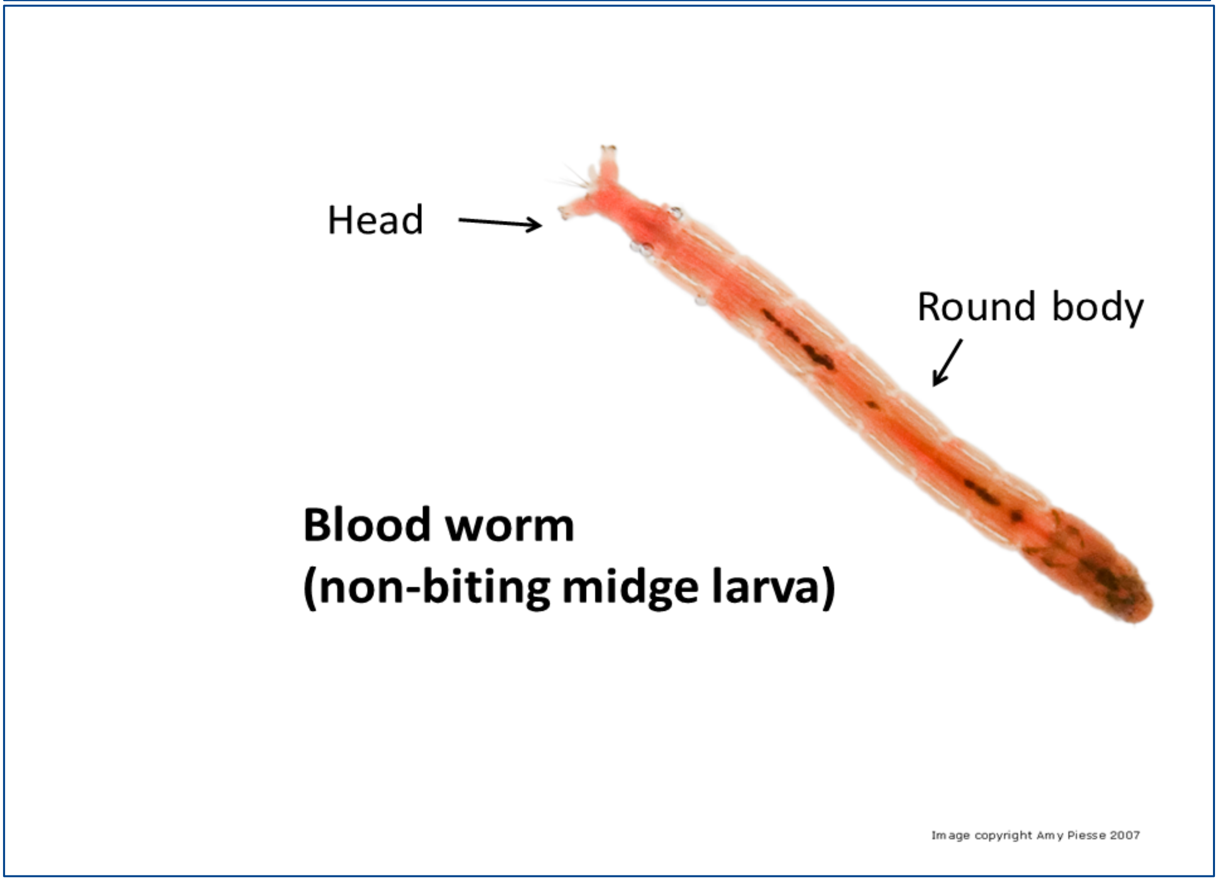
9. Display one of the food web posters and choose one organism e.g. platypus. Ask students what would happen to the food web if the population of that organism significantly increased or decreased.
10. Discuss how human activities (both positive and negative) affect the Maribyrnong River ecosystem. Students could research this question using resources such as *Know your river: Maribyrnong River* and other Melbourne Water resources about the Maribyrnong River.

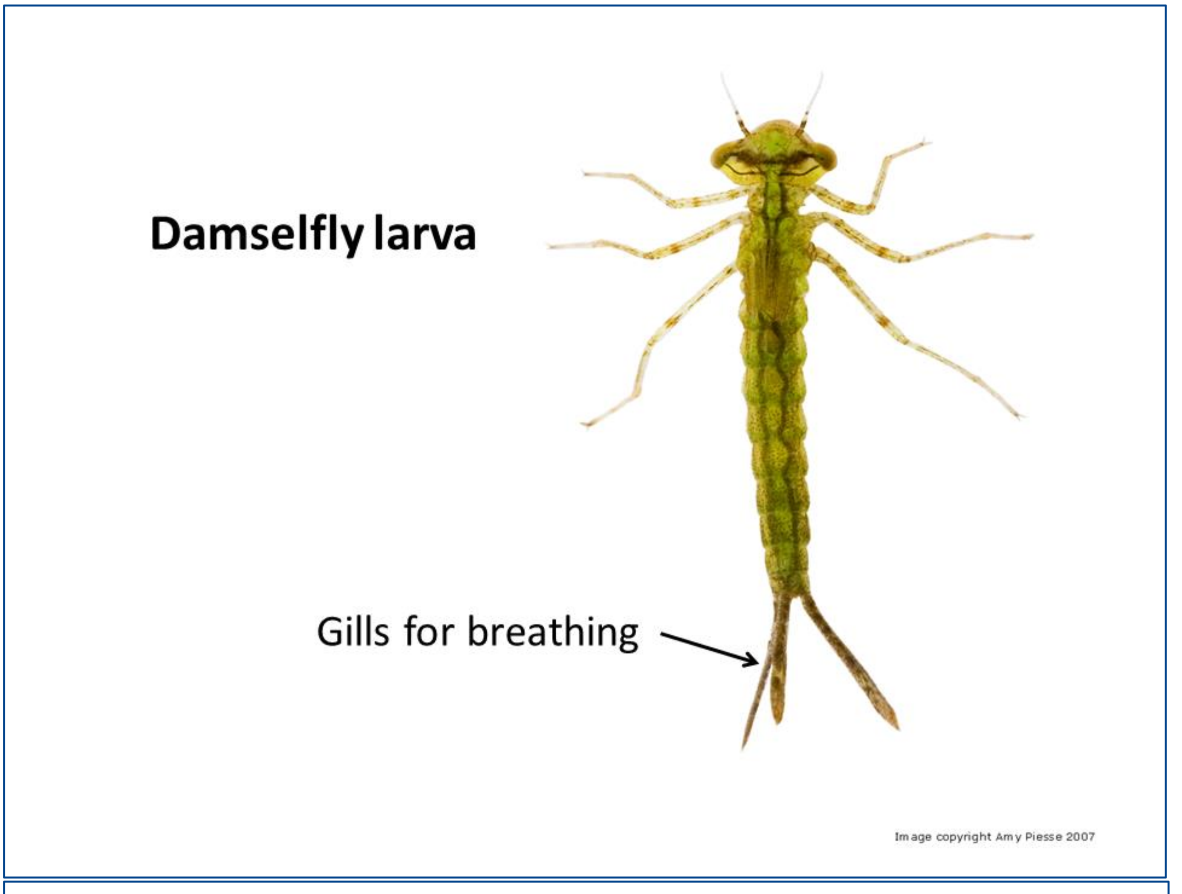
Food webs in my catchment

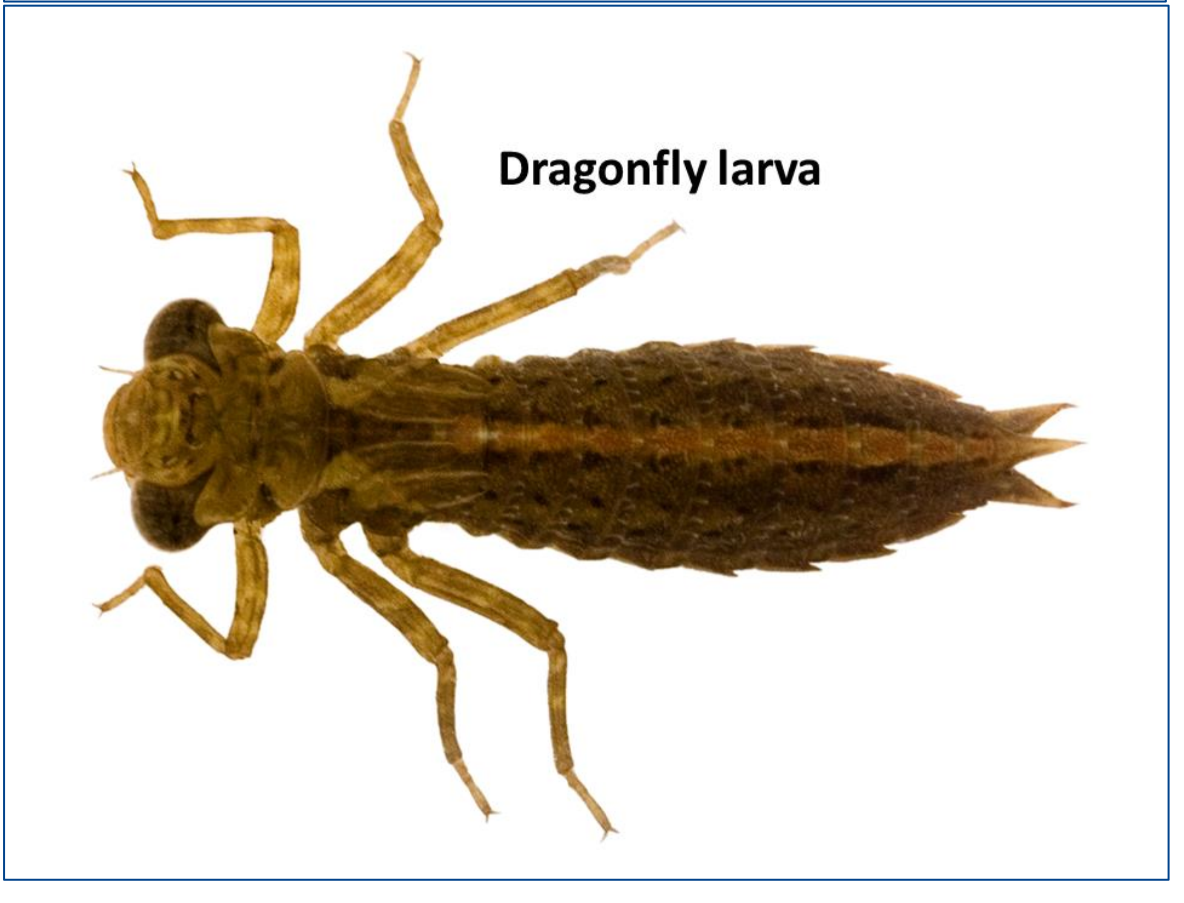
11. As a culminating activity, students use their waterbug sampling data and additional sources such as the *Atlas of Living Australia* <//www.ala.org.au/> to identify key organisms that live around their local waterway. They create a food web of their local waterway ecosystem and use the food web to draw conclusions about the impact of human activities on that ecosystem.

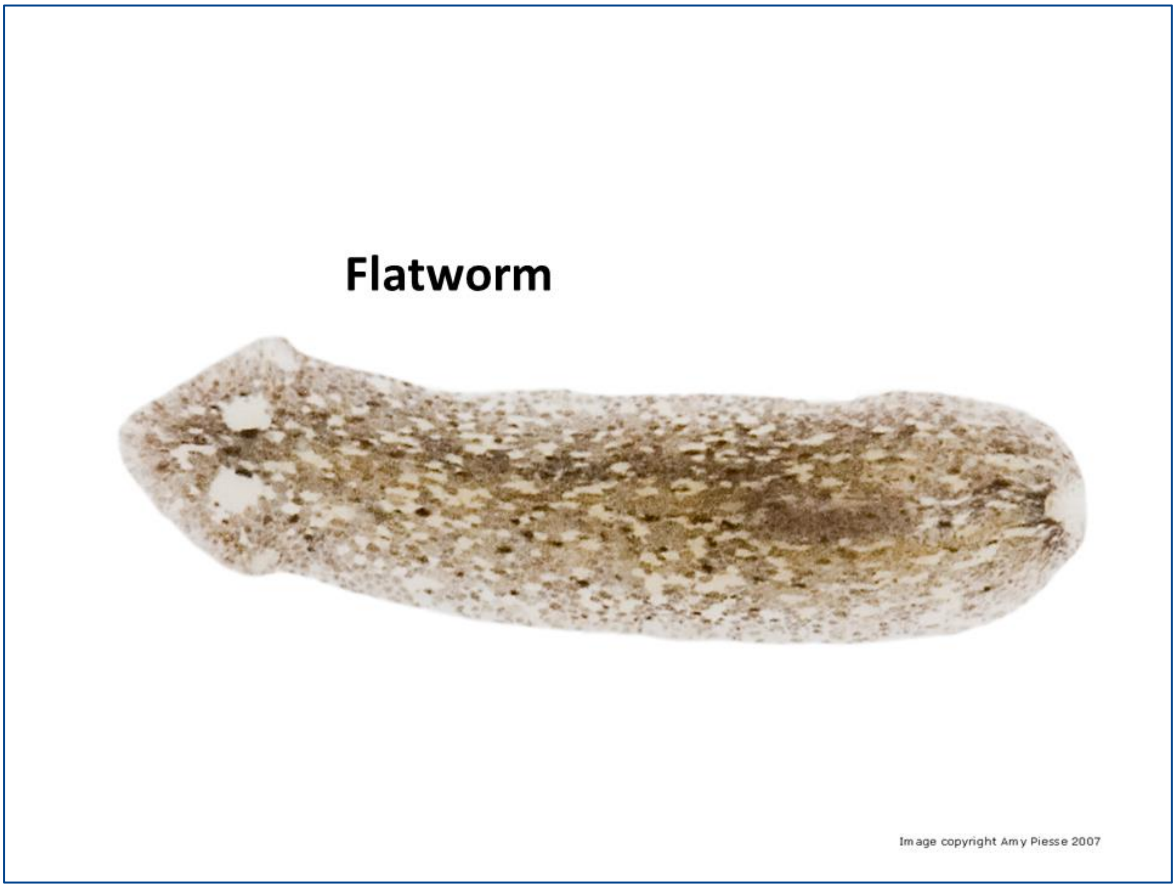
*The **Atlas of Living Australia** is the national database. Students can search the database by location to explore the organisms that have been found in their local area.*

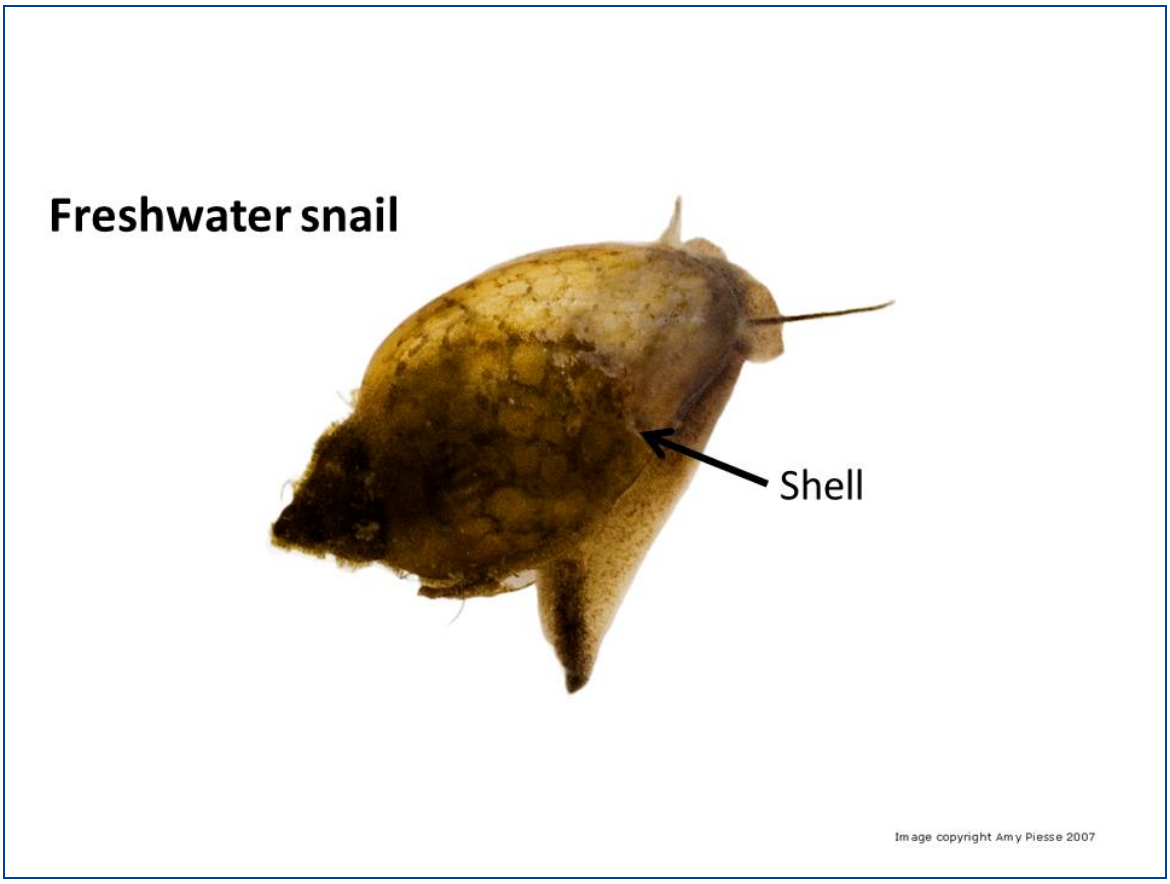
Resource 1 Waterbug cards

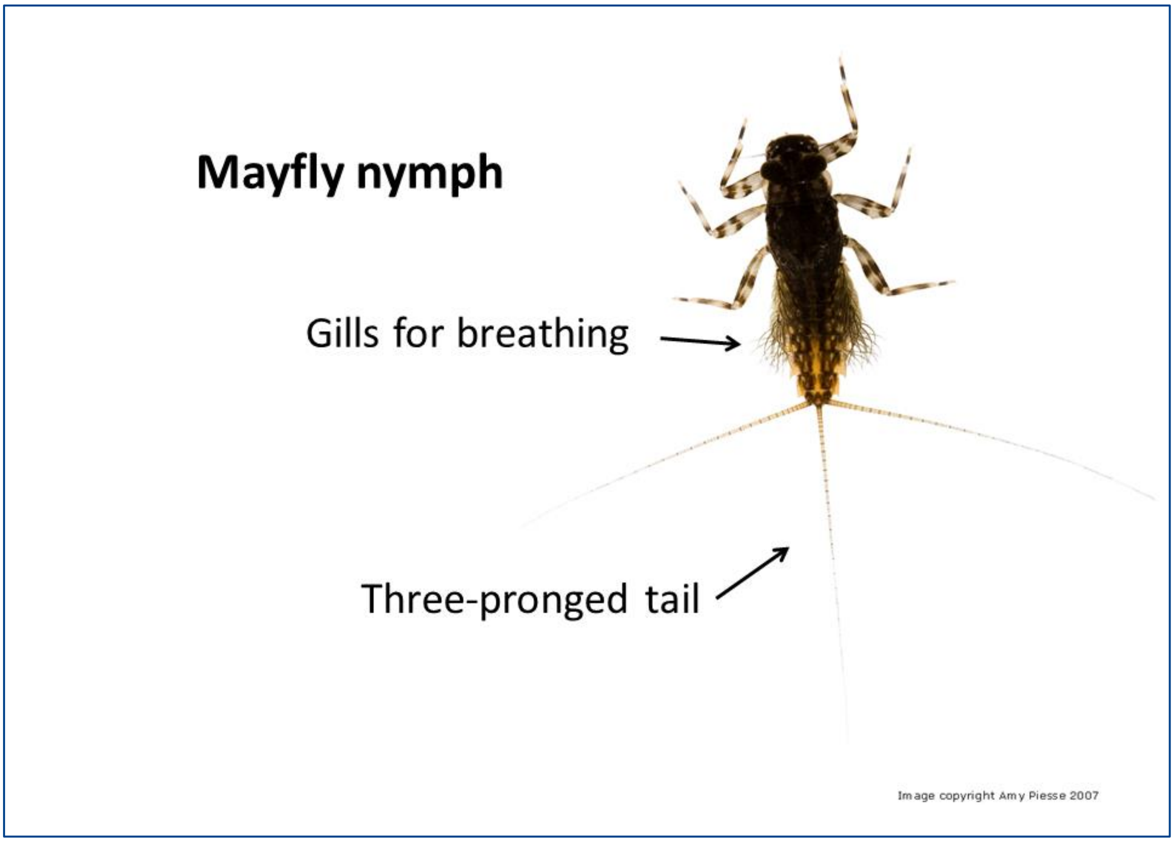



Damselfly larva
Gills for breathing
Image copyright Amy Piesse 2007


Dragonfly larva


Flatworm
Image copyright Amy Piesse 2007


Freshwater snail
Shell
Image copyright Amy Piesse 2007


Mayfly nymph
Gills for breathing
Three-pronged tail
Image copyright Amy Piesse 2007

Resource 2 Life in the Maribyrnong River

The Maribyrnong River is a long river that runs from the slopes of Mount Macedon, north-west of Melbourne, through the city to Port Phillip Bay. The Wurundjeri people have lived in and cared for this country for over 40,000 years.

The arrival of Europeans in the early 1800s brought new land uses to the area. Today, only 10% of the Maribyrnong catchment retains its natural vegetation. Instead, the catchment of the river now includes agricultural (80%) and urban development (10%), both of which have impacted on the health of the river.

*The **catchment** is the area of land from which water drains into a waterway.*

The rivers and creeks in this catchment have highly variable flows with long periods of low flows. They usually have poor water quality[4].

Stormwater run-off has a direct impact on the water quality of the Maribyrnong River. In agricultural areas, sediment and excess nutrients (nitrates and phosphates) are washed into the river. While in urban areas, stormwater is contaminated by pollutants, waste, litter and nutrients.

Because most of the Maribyrnong River receives relatively low rainfall, water has been drawn from the river for domestic and agricultural use since the mid 1800s. This has altered stream flows and affected the water quality of the river and the organisms that live in it.

Feeding relationships around the Maribyrnong River

Many species of birds, frogs, fish, mammals and macroinvertebrates still live in or around the Maribyrnong River. The feeding relationships (who eats what) of these different organisms gives an indication of the health of the river ecosystem. These feeding relationships can be represented by food chains and food webs.

Food chains and webs show how energy is transferred through the ecosystem. The food energy comes from plants, algae and some bacteria who use photosynthesis to convert the sun's light energy into chemical energy. In this process, carbon dioxide and water react to form more complex carbohydrate molecules such as sugars.

The detritivores such as bacteria and fungi decompose the detritus (dead plant and animal matter). The herbivores eat plants and the carnivores (predators) eat herbivores or other carnivores. Algae is also an important food source for macroinvertebrates in the Maribyrnong River.

[4] Melbourne Water (updated 3 Oct 2017), 'Maribyrnong catchment'. Accessed 3 March 2019 from <www.melbournewater.com.au/water/health-and-monitoring/river-health-and-monitoring/maribyrnong-catchment>

Creatures in the Maribyrnong River

Platypus – The platypus is one of the top predators in the Maribyrnong River system. However, its populations have declined and a program is in place to monitor and improve numbers. Platypus feed on a wide range of benthic (bottom-dwelling) macroinvertebrates, yabbies, worms, shrimp and small shellfish.

Nankeen night heron – The nankeen night heron is a stocky bird that lives around permanent water. It feeds at night on insects, crustaceans, fish and frogs. It lays its eggs in a loose stick nest over water.

Growling grass frog – The growling grass frog is one of the largest frogs in Australia. They were once found across a large area of south-east Australia, including Tasmania. The range of these frogs has declined over time but they can still be found along the Maribyrnong River. They mostly feed on land and eat beetles, moths, cockroaches and insect larvae.

Common galaxia – These small fish are found in still or slow-flowing streams. They mainly feed on terrestial insects they catch on the surface of the water but also eat aquatic insects and crustaceans.

Short-finned eel – Short-finned eels have a long snake-like body. Females can grow up to 90 cm. They feed at night on crustaceans, insects and fish.

Freshwater shrimp – These shrimp are small and translucent. They live on the bottom of waterways and feed mainly on tiny particles of detritus and algae.

Copperhead snakes – Copperhead snakes are found in habitats close to water. They are venomous but not aggressive – unless cornered. They hunt at night and eat insects, frogs, lizards and snakes.

Diving beetle larvae – Though small, diving beetle larvae are ferocious hunters with big heads and piercing mouthparts used to grab prey. They eat other aquatic insects, worms and tadpoles.

Baetid mayfly larvae – Baetid mayfly larvae (nymphs) swim by wiggling their abdomen. They feed mostly on microscopic algae and also on detritus.

Mosquito larvae – These are small worm-like animals that wriggle about in the water. They feed on algae and tiny particles of detritus.

Useful definitions

Aquatic: related to water

Crustaceans: a group of animals that includes crabs, shrimp, yabbies and barnacles

Detritus: decomposing plant and animal matter

Invertebrates: animals without a backbone

Nymph: one stage of incomplete metamorphosis (a small version of the adult)

Organism: any living thing e.g. animals, plants, fungi, bacteria

Terrestrial: on land