

# Science: *Investigating our local waterway – for Years 4 and 5*

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## RESOURCE OVERVIEW

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This resource presents three teaching ideas that support Australian Curriculum Years 4 and 5 Science in the context of investigating a local waterway.

### **1. Meet our local waterway**

Investigates the components of a waterway ecosystem, how these components interact and the adaptations that help living things to survive in their environment.

### **2. A health check for our waterway**

Uses various methods to assess and draw conclusions about the health of a local waterway.

### **3. Impacts on our waterway**

Explores how humans and natural factors impact on waterways and considers ways to improve the health of a local waterway.

The first teaching idea introduces students to a waterway in their local area to explore the living and non-living components of that waterway and its importance to the surrounding environment and community. In the second teaching idea students apply their knowledge from the first activity and conduct field work to assess the health of a local waterway. The third teaching idea investigates natural and human impacts on waterways. These teaching ideas help Year 4 and 5 students learn about the science of waterways experientially by exploring their local waterway.

Ideally these teaching ideas would be used sequentially. They can be used at the start of the unit to provide a 'real world' setting or later in the unit to demonstrate how science concepts can be applied in their local area.

The teaching ideas offer students opportunities to:

- brainstorm, generate and discuss ideas
- perform a 'real world' assessment of an ecosystem
- analyse video clips.

Prior to the lesson, select a suitable site on a local waterway to be investigated by the class. Visit the waterway and take photos or a video of the field study site. Ensure that the excursion and field work complies with your school's excursion and health and safety procedures and invite additional parents/carers or school staff to assist with supervision.

### **AUSTRALIAN CURRICULUM<sup>1</sup> YEAR 4 SCIENCE LINKS**

#### **Science Understanding**

- Biological sciences

Living things depend on each other and the environment to survive (ACSSU073)

- Science as a Human Endeavour

Science knowledge helps people to understand the effect of their actions (ACSHE062)

### **AUSTRALIAN CURRICULUM YEAR 5 SCIENCE LINKS**

#### **Science Understanding**

- Biological sciences

Living things have structural features and adaptations that help them to survive in their environment (ACSSU043)

- Science as a Human Endeavour

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)

#### **Sustainability cross-curriculum priority**

## **TEACHING IDEAS**

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### **1. MEET OUR LOCAL WATERWAY**

Students explore how living things relate to each other and their environment in a local waterway. They also investigate adaptations that help organisms survive in this environment. Students identify parts of the waterway, learn key terms such as habitat and biodiversity and are introduced to the concept of a food chain. A video outlines the importance of wetlands—a type of waterway. Students then focus on what organisms need to survive in waterways. They explore: some specific adaptations, the relationships between organisms and their environment, and how a healthy environment contributes to survival (ACSSU073; ACSSU043).

Activities

- a. Interactions in our waterway
- b. A recipe for survival

#### **1a. Interactions in our waterway**

Students are introduced to a waterway in their local area.

- a. Display a series of photographs and/or a video of your local waterway. Ask

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students to discuss where the photographs or videos were taken. Show the location of the waterway using Google Earth. Explain that students will visit it to carry out field work.

b. Using the photographs and/or videos, ask students to:

- identify what they can see in the photographs (e.g. plants, animals, rocks, water, etc.)
- explain what a waterway is
- suggest any other things that might be in the waterway which are not in the photographs (e.g. things too small to see such as bacteria or microbes, or things hidden from view).

c. On individual cards, write the names of things suggested in Step b) and help students to sort them into living and non-living things.

d. Students have a dictionary race to find the meanings of the terms biodiversity, catchment, ecosystem and habitat. Discuss the meanings of the terms and decide on a class definition for each.

e. Watch the first two minutes of the video [Crittters: Where they wriggle](#) [8:19] (see footnote 2) which gives some reasons why wetlands (a type of waterway) are important. Students then suggest reasons why their local waterway is important.

f. Using the 'Construct a food chain' lesson ideas in Section 1.3 of the [Understanding ecosystems](#) (see footnote 3) resource as a guide, introduce the concept of a food chain and the different roles that organisms play in waterway ecosystems. Explain that food chains represent one of the ways that organisms depend on each other to survive.

g. Demonstrate the food chain using the [Food chains: the wetlands](#) (see footnote 4) learning object. Ask students if they can think of any other living things which might be in their local waterway and add them to the cards from Step c). In groups of three or four, students can make a food chain using these cards. Demonstrate and discuss what happens when one living thing is removed from a food chain. This discussion could lead to a discussion on the importance of maintaining biodiversity.

h. Working in the same groups, students brainstorm some of the interactions between the different parts of the waterway such as:

- living and living—animals eat the plants

- living and non-living—rocks can provide shelter for small animals or support for plants

- non-living and non-living—water washes soil and rocks away or rocks weather and erode to form soil.

i. Students create a [mind map](#) (see footnote 5) showing the interactions between the living and non-living parts of the waterway. This can be done on the board or using a program or app such as Mindomo. The mind map will be further developed in Teaching idea 1b. (Mindomo is available online or as an app. Teachers can register to use this program for free.)

### **1b. A recipe for survival**

Students consider three factors which affect the survival of living things in a waterway:

- how well suited the living things are to the environment
- how the living and non-living parts of the waterway work together
- how healthy the waterway is.

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2 Natural Resources Adelaide and Mt Lofty Ranges (Crittters: Where they wriggle) <<http://www.teachertube.com/video/crittters-where-they-wriggle-117005>>

3 Natural Resources Adelaide and Mt Lofty Ranges: Best of catchment connections #2 (Understanding ecosystems) <[http://www.naturalresources.sa.gov.au/files/sharedassets/adelaide\\_and\\_mt\\_lofty\\_ranges/nrm\\_education/best-of-catchment-connections-f2-rep.pdf](http://www.naturalresources.sa.gov.au/files/sharedassets/adelaide_and_mt_lofty_ranges/nrm_education/best-of-catchment-connections-f2-rep.pdf)>

4 Scootle (Food chains) <<http://www.scootle.edu.au/ec/viewing/L1144/index.html>>

5 Wikihow <<http://www.wikihow.com/Make-a-Mind-Map>>

1. Using the information in [Life in our waterways](#) (see footnote 6) (pages 40–41 and 52–53) as a guide, discuss some adaptations which help animals survive in a wetland.
2. Students explore how a River Red Gum, a clump of reeds, a fish or a duck live in wetlands and waterways in different seasons in the 'A changing place to live' activity on pages 38 to 41 of the [Life in our waterways](#) resource.
3. Students watch the next segment [2:00–4:30 minutes] of the video [Critters: Where they wriggle](#) which introduces the waterbugs (macroinvertebrates) found in waterways. Distribute A4 coloured copies of the [Junior macroinvertebrate ID chart](#) (see footnote 7) and 'Freshwater macro-invertebrates' notes (pages 52–53 of the [Life in our waterways](#) resource) to pairs of students. Ask the pairs to choose a macroinvertebrate and identify any adaptations the macroinvertebrate might have that helps it survive in a wetland. Each pair shares their ideas with the class. Ask students to identify the similarities or differences between the different macroinvertebrates.
4. Students can add the living things mentioned in the video (macroinvertebrates) to their mind map [Step h] of Activity 1a.
5. Ask students to identify any other ways they could assess the health of their waterway. Introduce students to the [Waterways health check](#) (see footnote 8) and discuss the different aspects of the waterway they will investigate to determine its health i.e. land use, litter, pipes and drains, extra structures/modifications, smell, vegetation, water clarity, invertebrate animals and vertebrate animal life. Add these terms to the mind map.
6. Watch the final section [4:20–7:20 minutes] of the video [Critters: Where they wriggle](#) to preview how students will safely conduct their field work in teaching idea 2.

## 2. A HEALTH CHECK FOR OUR WATERWAY

Students visit a local waterway and use what they have learnt to investigate the health of the waterway (ACSHE083).

Activities

- a. Exploring our waterway
- b. The health of our waterway

### 2a. Exploring our waterway

Students visit the waterway and make observations based on what they have learnt in previous activities.

Each group will need a clipboard, pen/pencils, [Junior macroinvertebrate ID chart](#), [Results data sheet](#) (Aquatic macroinvertebrate record sheet) (see footnote 9), [Waterways health check](#) rating sheet, a clear container to check the water clarity, spare paper to record observations, equipment (such as nets, buckets, pipettes, petri dishes, a spoon, ice cube trays and shallow flat trays) for macroinvertebrate sampling and a digital camera to document their field work.

- a. Working in small groups, students follow the instructions and assess the health of the waterway using the [Waterways health check](#).
- b. Students draw a simple 'mud map' of the waterway including things they observe in it and take photos to illustrate their observations.
- c. Students identify the macroinvertebrates using the [Junior macroinvertebrate ID chart](#) and record what they see on the [Results data sheet](#).

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6 Waterwatch Victoria (Living in wetlands) <[http://www.vic.waterwatch.org.au/file/inform/living\\_in\\_wetlands.pdf](http://www.vic.waterwatch.org.au/file/inform/living_in_wetlands.pdf)>

7 Natural Resources Adelaide and Mt Lofty Ranges (Junior macroinvertebrate ID chart) <[http://www.naturalresources.sa.gov.au/files/sharedassets/adelaide\\_and\\_mt\\_lofty\\_ranges/plants\\_and\\_animals/macroinvertebrates-junior-identification-fact.pdf](http://www.naturalresources.sa.gov.au/files/sharedassets/adelaide_and_mt_lofty_ranges/plants_and_animals/macroinvertebrates-junior-identification-fact.pdf)>

8 Waterwatch Australia (Waterways health check) <<http://nrmonline.nrm.gov.au/catalog/mgl:2879>>

9 Natural Resources Adelaide and Mt Lofty Ranges (Results data sheet) <[http://www.naturalresources.sa.gov.au/files/sharedassets/adelaide\\_and\\_mt\\_lofty\\_ranges/monitoring\\_and\\_evaluation/schools/amlr-me-schools-aquatic-macros-record-work.pdf](http://www.naturalresources.sa.gov.au/files/sharedassets/adelaide_and_mt_lofty_ranges/monitoring_and_evaluation/schools/amlr-me-schools-aquatic-macros-record-work.pdf)>



## 2b. The health of our waterway

Back at school, students collate and analyse their findings from the field visit to assess the health of the waterway.

- a. Review students' findings for the different categories in the [Waterways health check](#).
- b. Tally the macroinvertebrates observed by each group on the [Results data sheet](#) and discuss the sensitivity of the macroinvertebrates they found. Discuss what this tells us about the health of the waterway—some species are more tolerant of pollution than others so if the waterway is healthy the sensitive macroinvertebrate will likely be found.
- c. Working in their Activity 2a groups, students create a poster to show: the key features of the waterway, their conclusions about the health of the waterway, and the reasons they came to those conclusions. Students can present their findings to the class using the posters and other information they gathered or photographs they took.



## 3. IMPACTS ON OUR WATERWAY

Students explore the ways in which natural and human factors impact on the health of a waterway and how a scientific understanding helps to improve the health of waterways. They learn about a variety of impacts through a demonstration then compare impacts with those that affect their local waterway. Students draw together what they know to help educate their community to care for its waterways (ACSSU073; ACSSU075; ACSHE062; ACSHE083).

Activities

- a. Natural and human factors affecting waterways
- b. Helping our waterways

### 3a. Natural and human factors affecting waterways

Students learn about factors which impact on waterways.

- a. Conduct the 'Danny the Drip' activity found in the [Danny the Drip](#) (see footnote 10) teachers' notes using the Danny the Drip story pack. Students answer the questions in 'Step 2: Follow up discussion' and participate in 'Step 3: Clean up'.

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10 Natural Resources Adelaide and Mt Lofty Ranges (Danny the Drip teacher notes) <[http://www.naturalresources.sa.gov.au/files/sharedassets/adelaide\\_and\\_mt\\_lofty\\_ranges/monitoring\\_and\\_evaluation/schools/amlr-me-schools-danny-drip-teacher-notes-gen.doc](http://www.naturalresources.sa.gov.au/files/sharedassets/adelaide_and_mt_lofty_ranges/monitoring_and_evaluation/schools/amlr-me-schools-danny-drip-teacher-notes-gen.doc)>

- b. Ask students to brainstorm any other factors (natural or human) that impact on waterways (e.g. erosion, droughts, floods, wastewater) including factors they observed in their field work and the rating criteria in the [Waterways health check](#) — land use, litter, pipes and drains, extra structures/modifications, smell, water clarity, vegetation and animal life. Suggest factors such as erosion, droughts and floods and loss of habitat if students don't suggest them.
- c. As a class, piece butcher's paper together and draw a large concept map of a waterway including all the impacts you identified.

### **3b. Helping our waterways**

Students draw together what they know about waterways to educate their community to care for its waterways.

Individually, students can create something to show how the community can improve the health of their local waterway. This could be a static creation such as an A3 poster, an illustration, a comic strip or a written story that could be displayed in their local community. Students briefly explain their poster to the class or at school assembly or display their creations in the community or at a community event.

Alternatively, students could create a presentation, a short video clip, a play or dance or song, tell a story or conduct a campaign that focuses on one impact - e.g. litter/pollution, etc. This option gives students the chance to present their knowledge using their strengths or interests and might engage the community in a more interactive way.



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