

Geography: Managing our catchment

This PDF is interactive. Click on underlined words and sentences to be directed to online resources.

RESOURCE OVERVIEW

This resource presents two teaching ideas that support the Australian Curriculum Year 7 Geography content descriptions that relate to catchment management.

1. Water connections

Examines where our drinking water comes from and how Aboriginal Peoples are connected to water.

2. Catchment Management

Investigates the components of a catchment, the potential impacts such as water pollution, farming, urbanisation and drought and how these impacts are managed.

The first teaching idea provides activities that introduce the natural and urban water cycles. It also asks students to consider the value of water to Aboriginal Peoples. The second teaching idea asks students to explore their local catchment to see how they are connected to water. They consider the impacts of various activities on their catchment and offer suggestions about how it should be managed to ensure a sustainable future.

Both of these teaching ideas provide Year 7 students with important and familiar contexts to extend their understanding of water in the world.

The teaching ideas offer students opportunities to:

- brainstorm, generate and discuss ideas regarding water as a class
- conduct independent and group research regarding water in their catchment area
- play an online simulation game
- analyse articles and video clips relating to the topic.

Students develop a better understanding of their local catchment when they can experience it directly through fieldwork. Information about conducting field work can be obtained from a range of sources including water utilities, local natural resource management agencies and local or state government websites. Alternatively, your local catchment authority or another organisation may provide excursions and field work opportunities.

Relevant links to field work activities are provided in the ‘Managing our waterway’ Year 7 Science teacher guide in this series and in the [Fieldwork](#) (see footnote 1) section of the GeogSpace website. Some of these teaching ideas require access to digital projection technology; alternatively, students can view the information on personal devices or via hardcopy worksheets. (The GeogSpace website developed by the Australian Geography Teachers Association supported by Education Services Australia.)

AUSTRALIAN CURRICULUM² YEAR 7 HUMAN AND SOCIAL SCIENCES (HASS F-6/7 - GEOGRAPHY) LINKS

Knowledge and Understanding

- Unit 1: Water in the world

The classification of environmental resources and the forms that water takes as a resource (ACHASSK182)

The ways that flows of water connect places as it moves through the environment and the way this affects places (ACHASSK183)

The economic, cultural, spiritual and aesthetic value of water for people, including Aboriginal and Torres Strait Islander Peoples and peoples of the Asia region (ACHASSK186)

AUSTRALIAN CURRICULUM YEAR 7 GEOGRAPHY (7-10) LINKS

Geographical Knowledge and Understanding

- Unit 1: Water in the world

The classification of environmental resources and the forms that water takes as a resource (ACHGK037)

The ways that flows of water connect places as it moves through the environment and the way this affects places (ACHGK038)

The economic, cultural, spiritual and aesthetic value of water for people, including Aboriginal and Torres Strait Islander Peoples and peoples of the Asia region (ACHGK041)

Aboriginal and Torres Strait Islander histories and cultures cross-curriculum priority

TEACHING IDEAS

1. WATER CONNECTIONS

Students review the water cycle and explore the way that flows of water connect places in the environment and the forms that water takes (ACHASSK182/ACHGK037; ACHASSK183/ACHGK038). They use an interactive diagram to demonstrate the various forms that water can take and build a topical vocabulary. Students also explore the connection Aboriginal Peoples have with water (ACHGK041/ACHASSK186). Students are encouraged to research the origins of their own/their town’s (or city’s) water supply to understand their connection to the water they use.

1 Australian Geography Teachers Association (GeogSpace) <<http://www.geogspace.edu.au/support-units/fieldwork/fi-introduction.html>>

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Activities

- a. What is the water cycle?
- b. Water and Aboriginal Peoples
- c. Where does my water come from?

1a. What is the water cycle?

Students gain an understanding of the water cycle, water types and geographical water features whilst building their water vocabulary.

1. Students reflect on what they already know about water by brainstorming two lists. List One should include the varied forms that water can take. List Two should include words and phrases that can be used to describe the water cycle. Using an interactive whiteboard or Bring Your Own Technology (BYOT), upload the interactive diagram of the [Dynamic and complex: the global water cycle](#) (see footnote 3). Allow students time to study the interactive diagram and add to their existing vocabulary lists of water forms and water cycle verbs. Students research and record definitions for any new vocabulary. *This interactive map runs on Flash so it is advised that students play it using computers or laptops.*
2. Display the following terms for students to research and write a short paragraph on each water type or sketch an annotated diagram. Provide examples of where each type of water can be found.
 - Groundwater
 - Soil moisture
 - Surface water

Suggested resource: The Yarra Valley Water site has a diagram of [the natural water cycle](#) (see footnote 4) and provides a description of terminology.

1b. Water and Aboriginal Peoples

Students read the information about Aboriginal connections to water and watch two videos – one about Aboriginal culture in north-west New South Wales and one from the website for the feature film ‘Twelve Canoes’. Students answer the following questions related to the article and videos:

1. [Aboriginal heritage and culture – Connections to land and water](#) (article) (see footnote 5)

- What significance does water have in Aboriginal dreamtime stories?
- What is the meant by the term ‘cultural flow’?

2. [Through our Eyes – Welcome to Mutawintji with Mark Sutton](#) [8:59] (see footnote 6)

In the video, Mark Sutton describes the importance of water and the landscape to the Aboriginal people around Mutawintji in northern New South Wales. Explain how water is significant to Aboriginal culture in that area.

3. [The swamp – Twelve Canoes](#) (see footnote 7)

This video describes the relationship between the Yolngu people and the Arafura Swamp of north-east Arnhem Land. *Select the video entitled ‘The Swamp’, the icon in the bottom right corner.*

- How are Aboriginals connected to the ‘swamp’ in north-central Arnhem Land in the Northern Territory?
- What difficulties do Aboriginal communities face with management of their ‘swamp’?

3 Science Learning Hub (Dynamic and complex: the global water cycle) <<http://sciencelearn.org.nz/Contexts/H2O-On-the-Go/Sci-Media/Animations-and-Interactives/Dynamic-and-complex-the-global-water-cycle>>

4 City West Water, South East Water and Yarra Valley Water (The natural water cycle) <<http://www.yvw.com.au/Home/inyourcommunity/Education/Educationalmaterials/Secondarystudents/Naturalwatercycle/index.htm>>

5 Australian Government (Murray Darling Basin Authority – Aboriginal heritage and culture) <<http://www.mdba.gov.au/discover-basin/people/aboriginal-heritage-culture>>

6 Australian Broadcasting Corporation (Through our eyes – Welcome to Mutawintji with Mark Sutton) <<https://www.youtube.com/watch?v=LYOPWp7tnOY>>

7 Twelve canoes <<http://www.12canoes.com.au/>>

1c. Where does my water come from?

Students investigate the journey of water from 'catchment to tap'. The following activity describes the water supply system for Sydney. If possible, source information about your local water supply system from your water utility, authority or corporation.

1. Display the information on [Our water supply system](#) (see footnote 8) web page on an interactive whiteboard or ask students to read the information on their BYOT device. *Note: If digital projection technology is unavailable teachers can print the information from Water NSW site.*
2. Ask students to take notes about each process and the journey that water takes before it gets to our taps — beginning with the section 'Freshwater treatment'.
3. Students create a flow chart or labelled diagram of the journey of their water from 'catchment to tap', including alternative pathways such as desalination.

2. CATCHMENT MANAGEMENT

Students explore what a catchment is and how water connects places in a catchment (ACHASSK183/ACHGK038). They make a catchment model, use Google Earth to explore their catchment virtually and then create a conceptual diagram of their catchment. Students also explore impacts on catchments and play the 'Catchment detox' game to appreciate the challenges of managing a catchment sustainably.

Activities

- a. What's in a catchment?
- b. Identifying impacts
- c. Managing a catchment

2a. What's in a catchment?

Students virtually explore their local catchment using Google Earth to identify the land uses and the natural and man-made features. Students create a conceptual diagram of their catchment including the land uses and features they identified in their research. Students further investigate how certain human or built features can impact water quality.

1. Pose the question to the class: 'What is a catchment?' Capture student responses, using them to devise a class definition. Explain that students will investigate their local catchment and use this information to create a conceptual diagram of their catchment area later on.
2. Take students outside to create a physical representation of a catchment. For this model, you need:
 - a tarp (tarpaulin)
 - a full watering can
 - items placed under the tarp to represent three-dimensional landforms (e.g. bricks).

Lay a tarp on the ground and ask students to prop up the edges so that the water flows inwards. Place items under the tarp to form land contours, replicating the natural environment. Using a watering can, evenly distribute the water across the landscape. Students can view the paths that the water takes and where the water rests once it has stopped flowing. Ask students to describe what they have just seen and how this activity models what happens in a catchment area. Discuss how the water connects parts of the catchment and affects places downstream.

3. Students are now ready to research their local catchment area. Information can be sourced from state or local governments or natural resource management agencies such as regional catchment authorities or Local Land Services (NSW) regions. Google Earth assists students in researching their catchment area. They list the land uses and largest natural and human features of their catchment.

8 Water NSW (Our water supply system) <<http://www.waternsw.com.au/water-quality/education/learn/water-supply-system>>

4. Students draw a basic map of the catchment indicating connecting waterways and water collection points such as lakes or dams. Ask students to write a short paragraph about how waterways connect to each other and connect communities.
5. Using the internet, students locate their catchment area on an aerial satellite map and discuss the distribution of built-up areas in their catchment and how they are connected by waterways. It can be challenging for students to interpret the slope or topography of a landscape from a two-dimensional representation. You could start with a familiar feature such as the waterway closest to the school and ask students to identify the direction of the water flow at this place in the catchment.
6. Download the [Explaining our catchment](#) lesson sequence (see footnote 9). Students use lessons five to seven to create a conceptual diagram of their catchment area. This could be conducted as group work or individually.
7. Display the [High school resources – Catchment land use impacts](#) fact sheet (see footnote 10) and pose the question: 'How can human or built features and land uses impact the quality of water in other parts of the catchment?' Record student responses and discuss with the class.

2b. Identifying impacts

Students identify potential impacts of land uses and environmental and human or built features on their local catchment. Students perform their own research on a topic identified as a potential risk to their catchment. Students investigate the cause of their impact and identify current strategies used to manage it.

1. Divide students into pairs to brainstorm potential impacts to their local catchment that require management.
2. As a class, discuss and record student responses. Ask students to categorise the responses into natural and human impacts.
3. Divide students into groups (up to six) to research one area of concern for catchment management. Groups may choose from one of the topics below or choose a topic of their own. They investigate their topic and report their findings back to the class. As a class, devise some focus questions that will be answered in their research. Topics:
 - vegetation clearing
 - urbanisation
 - farming
 - drought
 - flood
 - water pollution

Each group develops a research action plan. A good example of a research action plan can be found on page 17 of the [Geography Years 7-10 Syllabus \(2003\)](#) (see footnote 11) published by the Board of Studies, Teaching and Educational Standards NSW.

Extension: Suggest alternative management strategies for your topic.

Examples of websites for research relevant to the Sydney area include:

- a) [What is a catchment?](#) (see footnote 12) — This resource provides information on how water pollution and ground cover removal affect catchments.

9 Queensland Government (Explaining our catchment) <<https://publications.qld.gov.au/storage/f/2014-12-12T01%3A22%3A06.516Z/water-life-year7-geography-explaining-catchment.pdf>>

10 Water NSW (Catchment land use impacts) <<http://www.waternsw.com.au/water-quality/education/resources/high-school>>

11 Board of Studies, Teaching and Educational Standards NSW (Geography Years 7-10 Syllabus <http://www.boardofstudies.nsw.edu.au/syllabus_sc/pdf_doc/geography_710_syl.pdf>

12 Georges River Catchment (What is a catchment?) <<http://www.georgesriver.org.au/What-is-a-catchment.html>>

b) [Landuse research](#) (see footnote 13) — This web page provides information on land use in Sydney catchments by Water NSW.

c) [Georges River: Impacts and problems](#) (see footnote 14) — This web page provides information on the impacts and problems in the Georges River catchment.

d) [Catchment land use impacts](#) (see footnote 15) — This lesson plan provides information on pollution sources within a Sydney catchment.

2c. Managing a catchment

Students participate in the interactive '[Catchment detox](#)' game (see footnote 16) where they need to manage a river catchment and create a sustainable and thriving economy. This game demonstrates the interconnectedness of the catchment and the consequences of management decisions. The aim of the game is to minimise environmental problems, maintain water levels and water quality, and generate income.

1. Read the following introduction to the students:

'The catchment detox game will give you an idea about how difficult it is to manage a river catchment. You will be responsible for the whole catchment. You decide what activities you undertake: for example, whether to plant crops, log forests, build factories or set up national parks. The aim is to avoid environmental problems whilst simultaneously providing food and wealth for the population.'

2. While students play the game, ask them to take notes on any problems, issues or concerns they encounter in managing the catchment. These issues could be technological, environmental or ethical.

3. As a class, discuss the issues that students faced during the game and ask the class to offer and discuss possible solutions.

This game runs on Flash so it is advised that students play it using computers or laptops.

13 Water NSW (Landuse research) <<http://www.waternsw.com.au/water-quality/science/catchment/landuse>>

14 Georges River Catchment (Impacts and problems) <<http://www.georgesriver.org.au/Impacts-and-Problems.html>>

15 Water NSW (Catchment land use impacts) <http://www.waternsw.com.au/_data/assets/pdf_file/0004/58261/Lesson-plan-catchment-impacts.pdf>

16 Australian Broadcasting Corporation (Catchment detox) <<http://www.abc.net.au/science/catchmentdetox/files/home.htm>>



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