**ACTIVITY: Mapping my local water catchment**

**Activity idea**

In this activity, students use online topographic maps to view their local catchment area(s) and consider how elevation, land use and human interactions influence local waterways.

By the end of this activity, students should be able to:

* locate an area of interest on an online topographic map
* identify some of the local features on the topographic map
* consider how features such as relief and vegetation influence water movement and water flows in a chosen catchment
* consider how human influences might or do impact water in the chosen catchment
* use content vocabulary associated with water catchments and topographic maps.

# For teachers

## Introduction/background

A water catchment is an area of land and the water that collects and moves through it. Catchments influence the biodiversity and ecology of stream and river systems.

A topographic map is a representation of features that appear on the Earth’s surface. For example:

* hydrography – rivers, streams, lakes, wetlands or estuaries
* vegetation – areas of native bush, plantation forests, native grasslands or cleared areas
* relief – contours, mountains, valleys or flat areas
* cultural – roads, railways, towns, cities, buildings, dams or flood protection.

Online topographic maps allow users to view a location on various scales – the larger the scale of the map, the smaller the area it covers. Zooming in also shows the natural and cultural features in greater detail. On the other hand, small-scale views allow users to examine mountain ranges and very large catchment areas – such as the Waikato River’s 14,456 km2 catchment.

The article [Water catchments](https://www.sciencelearn.org.nz/resources/2873-water-catchments) and the interactive [Water flows and catchments](https://www.sciencelearn.org.nz/image_maps/89-water-flows-and-catchments) provide information about catchment areas and how rivers change as they flow from an upper catchment – the headwaters – to the lower catchment – where the river leaves the catchment at a single point or outlet. The resources also explain the influence of catchments on water quality.

This activity encourages students to look at a local water catchment area on a topographic map, observe the natural and cultural features and consider how they affect or impact the streams, rivers, wetlands, lakes and/or estuaries – the hydrography – of the area.

Prior to starting the activity, consider any content vocabulary your students may need to know to use the topographic map, such as headwaters, contours, elevation, vegetation and outlet.

## What you need

* Access to [Water flows and catchments](https://www.sciencelearn.org.nz/image_maps/89-water-flows-and-catchments)
* Access to an online topographic map of your area (for New Zealand users, see <https://www.topomap.co.nz/>)

## What to do

1. Use the [Water flows and catchments](https://www.sciencelearn.org.nz/image_maps/89-water-flows-and-catchments) interactive to learn what a water catchment is and to find out why knowing about water catchments is important.
2. View an online topographic map. Find examples and discuss how it is a visual representation of features including:
* hydrography – rivers, streams, lakes, swamps, estuaries
* vegetation – areas of native bush, plantation forests, cleared areas
* relief – contours, mountains, flats
* cultural – roads, railways, buildings, dams, towns and cities.
1. Use the map to learn more about the water catchment of a significant waterway in your local area or region.
2. Use the questions below to elicit and engage student thinking.

## Questions to deepen student understanding

Choose a meaningful location, then use some of the following questions to explore the topography map:

* What streams or rivers can you see?
* What is the difference between a stream and river?
* Can you find the headwaters (the start) of a stream or river?
* Do you know which direction the water is flowing? What clues can you use to determine this?
* Does the stream or river begin in a hilly or mountainous area? What clues can you use to determine this?
* What kind of vegetation does the stream or river flow through? What information does the map give you about vegetation?
* Does the vegetation stay the same or change as the stream or river moves from its upper catchment to a middle or lower catchment? What clues can you use to determine this?
* Are there areas where humans have changed the type of vegetation, for example, put in plantation forestry, horticulture or pasture?
* How do you think vegetation influences the biodiversity and ecology of a stream or river?
* Are there tributaries that flow into the stream or river? What are their catchments like?
* Where is the outlet for the stream or river? How has the elevation changed? What type of water body does it flow into?
* What are some of the cultural features in the stream or river catchment?
* How do you think these might affect the stream or river?

Choose a sizeable town or city and use the following questions to explore the topography map:

* Is there a stream or river close to the town or city?
* Are there tributaries that flow into the stream or river? What are their catchments like?
* Are there cultural features that might affect the stream or river as it flows through the urban area, for example, quarries, landfills, wastewater treatment plants, flood protection/stop banks or bridges?

## Extension ideas

* Choose a local maunga/mountain. Observe the effects of elevation on the creation of stream headwaters. Mt Taranaki is a striking example.
* Choose a location that has an estuary system, such as Kaipara Harbour or Invercargill. Observe the interactions between the streams, rivers and wetlands.
* The South Island has a wide variety of water catchments – braided rivers, fiords, glaciers and glacier lakes. Observe the role of relief (contours, elevation, flat areas) on both the hydrographic and the cultural features of the Southern Alps.
* Consider how the various features create or influence water catchments.
* Local catchments and the streams and rivers in them can be very important to the people who live in them. Learn more in [Te mana o te awa](https://www.sciencelearn.org.nz/resources/448-te-mana-o-te-awa) and [Wai Māori](https://www.sciencelearn.org.nz/image_maps/88-wai-maori).
* Learn about the history of your local catchment and how it has changed over the years. Create a timeline. Check out the [History of the Waikato River](https://www.sciencelearn.org.nz/resources/1863-history-of-the-waikato-river) timeline as an example.