



Mapping our waterway

year

7

Geography

For the draft  
Australian Curriculum

Water:  
Learn it for life!

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First published January 2012

Reprint November 2013

CS2869

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# Mapping our waterway

## Introduction

In this lesson sequence, your students will assess the health of a local waterway and create a digital map illustrating the overall health of the waterway. Digital maps and other spatial technologies allow students to view, manipulate, display and analyse data in relation to location. Spatial technologies also afford students opportunities to engage with data in different ways while enhancing problem solving, analysis and fieldwork skills.

The spatial industry is booming due to recent advances in global positioning system (GPS) technology and the ability to share large amounts of information digitally via the internet. Introducing these technologies to upper primary students raises their awareness of the importance of spatial technologies while they explore different issues in the classroom. Students can develop these skills across a range of learning areas, particularly those related to geography and science. These formative skills will be very valuable in a wide range of future careers.

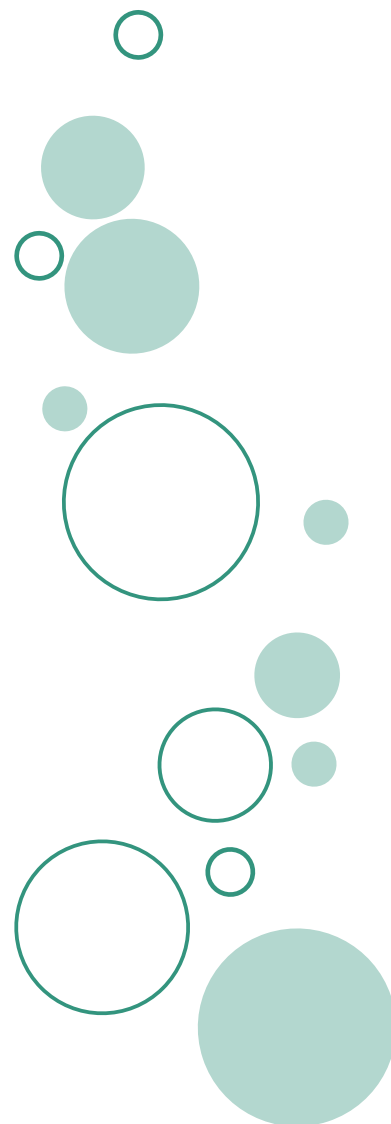
This activity is designed to:

- extend students' understanding of their local catchment or waterway
- emphasise the links between water quality and the spatial patterns of human activities
- enhance students' knowledge of waterway health by conducting fieldwork in their local area
- give students the skills to use simple spatial technologies, such as Google Maps and Google Earth, to manipulate and display their findings and share those findings in a meaningful way.

The lesson sequence is divided into two distinct parts with an optional activity:

- Part 1 – Assess the health of your waterway
- Part 2 – Create a Google Map showing waterway health
- Optional activity – Create a Google Earth tour showing waterway health.

Google Maps is an online tool available via a web browser. Google Earth is stand-alone software that needs to be downloaded and installed.



## ❖ Lesson overview

Phase	Teacher	Student
<b>Preparation</b>	<ul style="list-style-type: none"> <li>• Create Google account</li> <li>• Reconnoitre field sites in terms of accessibility, safety, student facilities (if it is a full or half day) and features to be noted. You could use this opportunity to photograph the site.</li> <li>• Organise the excursion</li> <li>• Install Google Earth and ensure student access to Google Maps</li> <li>• Book computer access</li> <li>• Practise using relevant digital tools (Google Maps and Google Earth)</li> </ul>	<ul style="list-style-type: none"> <li>• Create Google account</li> <li>• Complete and return excursion forms</li> </ul>
<b>Part 1 – Assess waterway health</b>	<ul style="list-style-type: none"> <li>• Guide students through the waterway assessment and data collection process at the first site by modelling how to:               <ul style="list-style-type: none"> <li>– observe</li> <li>– photograph</li> <li>– record data</li> <li>– test the water quality</li> <li>– evaluate</li> <li>– compare and share results and conclusions</li> </ul> </li> <li>• Upload images from the excursion prior to Part 2</li> </ul>	<ul style="list-style-type: none"> <li>• Assess the health of the local waterway at a variety of field sites</li> <li>• Record field data to evaluate each site</li> <li>• Collect digital images</li> </ul>
<b>Part 2 – Create digital map</b>	<ul style="list-style-type: none"> <li>• Demonstrate key features of Google Maps to students</li> <li>• Troubleshoot computer issues as they arise. Other students can be employed in this role as they are identified as being suitable.</li> </ul>	<ul style="list-style-type: none"> <li>• Create a Google Map under teacher direction</li> <li>• Appropriately display findings from Part 1</li> </ul>
<b>Optional activity</b>	<ul style="list-style-type: none"> <li>• Demonstrate key features of Google Earth to students</li> <li>• Troubleshoot computer issues as they arise. Other students can be employed in this role as they are identified as being suitable.</li> </ul>	<ul style="list-style-type: none"> <li>• Create a Google Earth tour illustrating findings from Part 1</li> </ul>



## Australian Curriculum links

There are many valid connections between this activity and the Australian Curriculum for Science and Geography, particularly for students in Years 5 to 7. The activity could be undertaken as part of a larger unit of work that introduces concepts relating to water and water management. It could be conducted through either or both subject areas, depending on the needs of your work program.

The structure of the activity lends itself to the inquiry processes outlined in the Australian Curriculum: Geography. Ask students to consider a research topic that allows them to develop key questions and collect relevant data to address the issue.

This activity also supports the Sustainability cross-curriculum priority. It provides a rich opportunity to discuss sustainable water management issues—particularly those related to your local waterway. As students investigate the health of their waterway, they can identify ways they can act to improve its sustainability.

Students can communicate their findings about the health of their waterway in a variety of ways. They could compose a map or use the map in a report or presentation. Encourage your students to take some action to rectify any issues that were identified. Local councils and catchment groups are a great starting point to connect your students with others concerned about the health of your waterway.

## Learning objectives

Students will:

- develop information communication and technology (ICT) skills in the use of spatial technologies
- record field study data
- analyse and synthesise data
- classify and compile data
- perceive patterns in data
- compare and contrast information
- interpret the meaning of maps
- compose a map
- display information
- reflect on their learning processes and apply new understandings.

## Equipment

For the class

- a digital camera

For each group

- copy of the waterway health check assessment sheet (Resource 1)
- one small (approx 500 mL) container to assess water clarity
- a dip net to catch invertebrate animals (waterbugs) in the water (Resource 2)
- one large (over 2 L) container to assess the diversity of invertebrate animals

## Preparation

Each student sets up a Google account before undertaking the computer-based portion of the activity. The instructions are included below. Ensure that Google Maps can be accessed at school using a student login. Book a computer lab with at least one computer between two students.

Identify at least three different field study locations for data collection that demonstrate a range of ecosystem health states: healthy, moderate and unhealthy. Prepare water quality testing kits for each group comprising a waterway health check sheet (Resource 1), and one small and one large container. The waterway health check sheets can be laminated for reuse. Make dip nets from wire coat hangers and old stockings using instructions in 'How to make your own dip net' (Resource 2).

Install Google Earth if you are undertaking the optional Google Earth activity. For more detailed installation instructions, search YouTube or similar sites for videos on 'Google Earth install'. If undertaking this optional activity, ensure that Google Earth can be used on the school network.

## Setting up Google accounts

At least one week prior to undertaking the computer-based part of the activity, students should set up their Google account. This will give them access to the 'My Places' feature of Google Maps and also allow them to use Panoramio, Google's free online image repository. Note: Only the teacher should upload the images to Panoramio for students to use in this exercise.

Students go to <[www.google.com/accounts](http://www.google.com/accounts)> to set up their Google account. The free Google account gives students access to Panoramio as well as Google's other tools and resources.

Students enter their personal details and then verify their account using another email address. On some occasions, Google will ask for verification via mobile phone. Google will send an SMS to the nominated mobile phone that contains a short code. This code will need to be entered into the appropriate website to verify the account. Google's privacy policy related to mobile telephones can be found at <[www.google.com/mobile/privacy.html](http://www.google.com/mobile/privacy.html)>.

## Uploading images

In Step 3 you will be asked to import the images that you take in the field into Panoramio. The classroom teacher will do this step, not the students. You should select no more than two or three images for each site and upload them with suitably descriptive titles. Ensure that you consider all relevant privacy legislation in your jurisdiction when you select images for upload as these images will be available to the general public. Panoramio has an account limit of 2 GB.

If the file size of the images is over 1 MB, use an online image editor such as Pixlr to reduce the size of the file before you upload it. Reduce the file size to 96 DPI (dots per inch) or reduce the size of the longest side of the image to about 600 pixels.

# Lesson steps

This lesson sequence is about using Google Maps to map waterway data. It is suited to middle years students.

## Part 1: Assessing the health of the waterway

### » Getting started

Before you go into the field, use Google Maps or Google Earth as a class to help you orient your students to their data collection sites. You could also make some waterway health predictions based on the information in the mapping software—locations of features on the map as well as land use at and around each site—before you head into the field.

### » Collect qualitative data about a local waterway

At your first data collection site, students suggest the different factors that might contribute to the health of a waterway; for example:

- the number and health of the trees
- how clean the water is
- how much bank erosion exists
- the amount of litter in and around the waterway.

Discuss each of the variables they will be investigating in their waterway health check (Resource 1) and explain what they should be looking for when evaluating each variable.

Measure the health of your local waterway at three or more separate locations using the waterway health check in Resource 1. Give each variable a score out of 10, where a higher score indicates a better performance or outcome against the criterion being measured. Model your thinking processes for students by ‘reflecting out loud’ as you allocate scores across the nine variables for the first site only. Students then collect their own data at the remaining sites.

Take a number of photographs at each location while your students are collecting data. These will be used later in the classroom portion of the activity.

Quantitative data are numerical data that describe something in terms of quantities. Qualitative data are not numerical. They describe something in terms of a characteristic or some quality.

### » Assess water quality at each location

Students assess each site according to the nine separate variables in the waterway health check (Resource 1). Students rate the performance of each site against all nine variables, giving each criterion a score out of ten. Each site will therefore achieve a total score between zero and 90 that reflects its overall health. Students tally their data for each location and record a total score out of the possible 90.

In the classroom, discuss how you will determine the overall health of each site by compiling the scores for each variable and the categories you will use to rate each site (Table 1). Students use these categories to allocate different symbols to each site in their mapping component of the activity. Suggested categories can be found in Table 1.

Table 1: Suggested categories and scores for sites

Total score	Rating
0–30	Unhealthy
31–60	Moderate
61–90	Healthy

## Part 2: Creating a map of the waterway

### » Post images online via Panoramio

This step should be undertaken by the teacher after the data and images have been collected and before the students create their waterway health check maps in Google Maps.

Go to the Panoramio website and sign in to your Panoramio account using your Google Account information. You might be asked to select a username before you can continue. Your username will be made public and can be seen by any Panoramio user, including your students.



The image shows the Panoramio sign-in interface. At the top, it says 'Panoramio | Google'. Below that, it says 'Sign in to Panoramio with your Panoramio OR Google Account'. There are two input fields: 'Email:' with a placeholder 'ex: pat@example.com' and 'Password:'. Below the password field is a checkbox labeled 'Stay signed in' and a 'Sign in' button. At the bottom, there is a link that says 'Can't access your account?'.

Click on the 'Upload your photos' button to begin uploading your images. Select only two or three images for each site and upload them. Ensure that you have permission to post images of students online before you select your images for upload. Once you have posted the image in Panoramio it can be seen by anyone, although you can delete images if you need to.

Change the title for each image so that it can be easily identified, for instance 'Site one – Looking upstream' or 'Site three – Riparian vegetation'. You should also add 'tags' to your images. These are words that allow users to find images with particular characteristics. For example, the image being used in Step six of this exercise has the following tags: '2007', 'may', 'class', 'school', 'water', 'quality', 'health', 'check', 'test' and 'testing'.



The image shows the Panoramio upload interface. At the top, there is a blue button that says 'Upload your photos'. Below that, there is a 'Select photo:' label followed by a text box containing 'G:\RWDMR\Waterwise' and a 'Browse...' button. At the bottom, there is a blue 'Upload' button.

Once your images are online, you can access the URL for each image. You will be given specific instructions for this in Step six.

To save your students from searching, give them direct access to your Panoramio page. Do this by using the URL given to you on your Panoramio homepage once you have signed into the site.



The image shows a web browser address bar with the URL 'http://www.panoramio.com/photo/53631657' highlighted by a green oval. Below the address bar is the Panoramio logo.

You could write this URL on the board or give it to your students via email, moodle or even a word document.

You can also place your images on a map for users to search by location. Click the 'Map this photo' button and search for a location. You can then refine the location of the photo by moving the red placemark on the map.

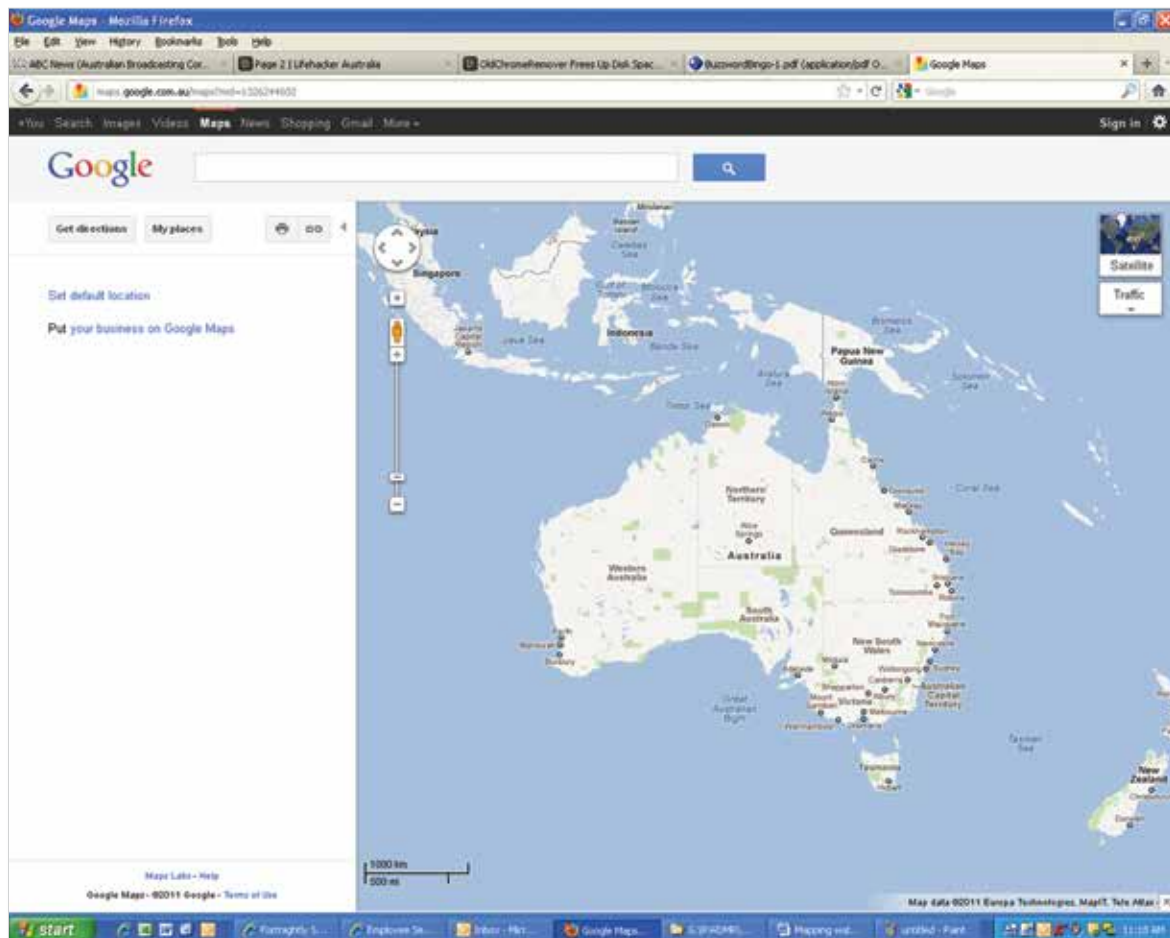


The image shows a button with a red location pin icon and the text 'Map this photo'.

## » Basics of Google Maps

Navigate to Google Maps at <[www.google.com.au/maps](http://www.google.com.au/maps)> using your web browser—Internet Explorer, Mozilla Firefox or Google Chrome. Google Maps is a simple online tool that allows you to view maps and satellite images of the world. Once you have signed into Google Maps with your account, you can create and save your own maps over the base maps provided by Google.

A range of instructional videos to help you use Google are available from <[www.contoureducation.com/resources/videos](http://www.contoureducation.com/resources/videos)>.



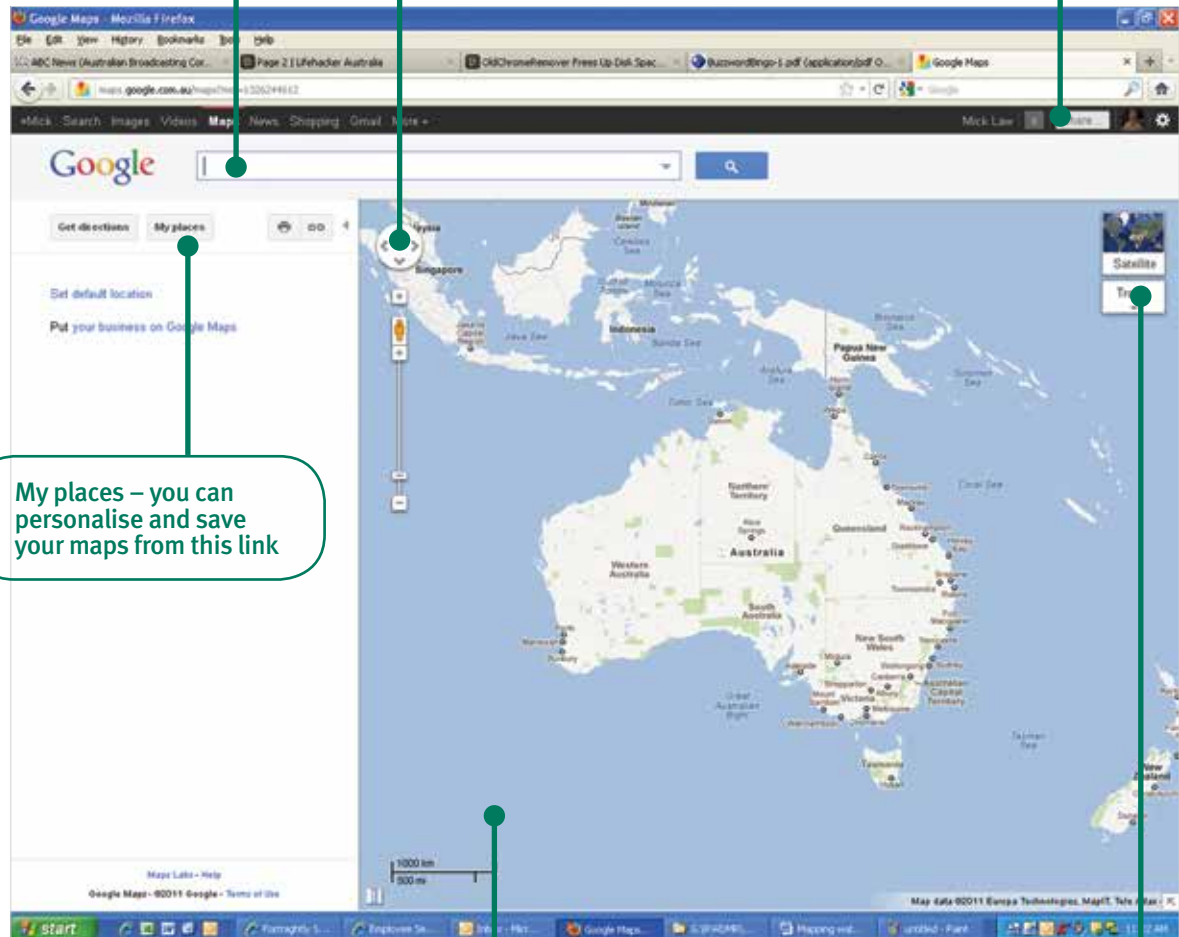
Demonstrate the basic elements of Google Maps outlined in the videos above, including:

- basic navigation (zoom and pan with mouse, see Table 2)
- how to turn different map types (maps, satellite, terrain) on and off (in-map menu)
- how to search for a location (search bar)
- how to turn labels on and off (under in-map menu).

Search bar – you can search for locations (names or addresses) here

Navigation – move around the map as well as zoom in and out. You can also access street view from the yellow man icon

Account information – you can edit your account information from these links



My places – you can personalise and save your maps from this link

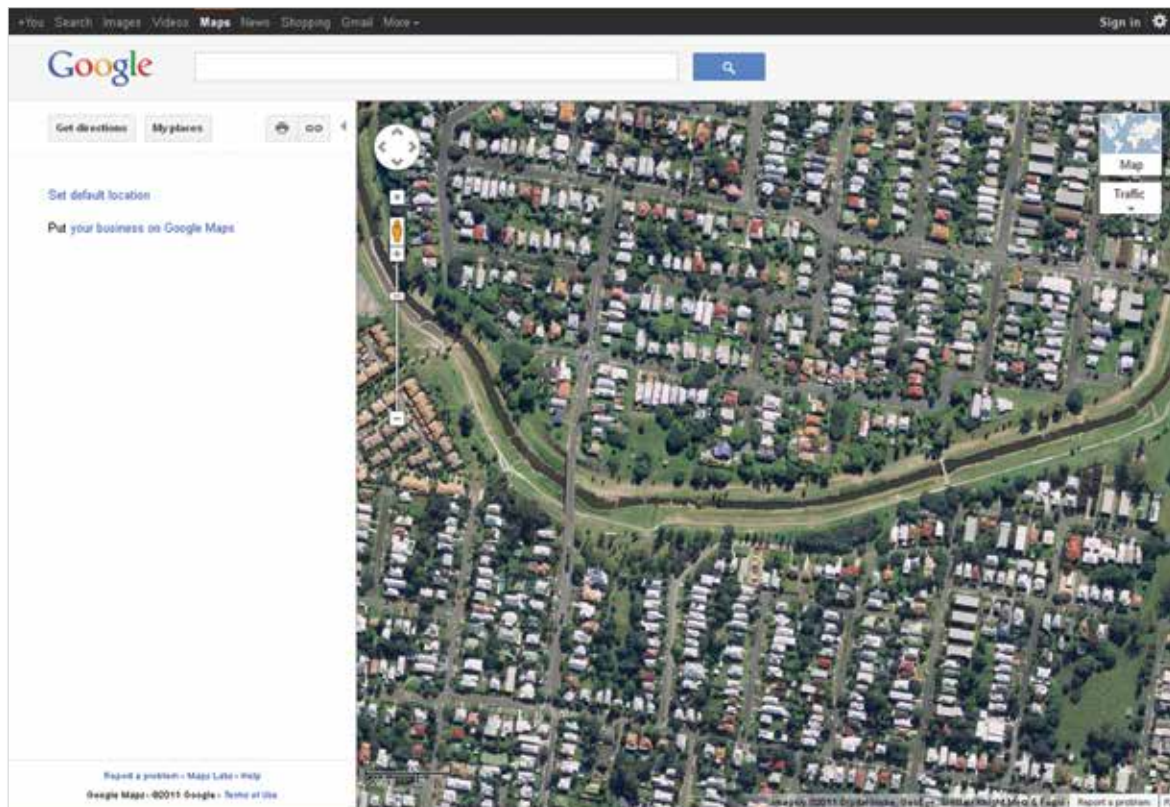
Map viewer – the map data are contained in this area of the screen

Map types – you can change the type of map you are viewing (see over for more information)

Table 2: Types of map views

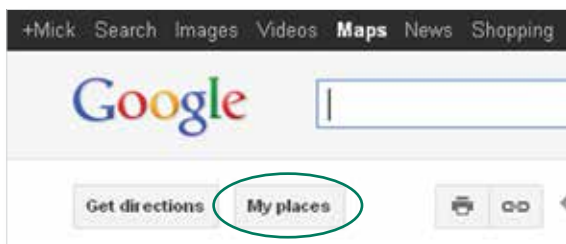
<b>Map</b>	A plain street map showing main features
<b>Satellite</b>	A satellite image (not real time)
<b>Hybrid</b>	A satellite image with some features (such as roads) identified
<b>Terrain</b>	A relief map showing elevation and contour lines
<b>Earth (if installed)</b>	A 3D terrain view showing the lay of the land (similar to Google Earth)

Students use the search bar to search for a location, address, landmark or street that is close to their first data collection site. Once they locate the first site, students use the satellite image to navigate to the exact location of the first field site. Place the first placemark.

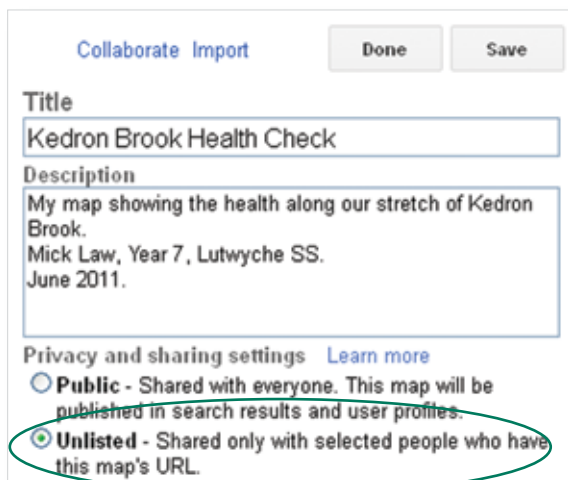


## » Create map

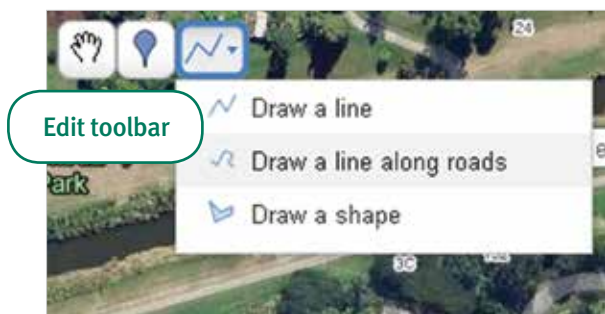
Click on 'My Places' to open the My Places function in Google Maps. If this is the first map to be created in Google Maps, students will be taken to a short video introducing the product. Click on 'Get started' to begin creating your first map.



Enter a title and description for the map. It is best to have your students select 'Unlisted' in the Privacy settings to keep their map accessible to only those with the URL for that map.

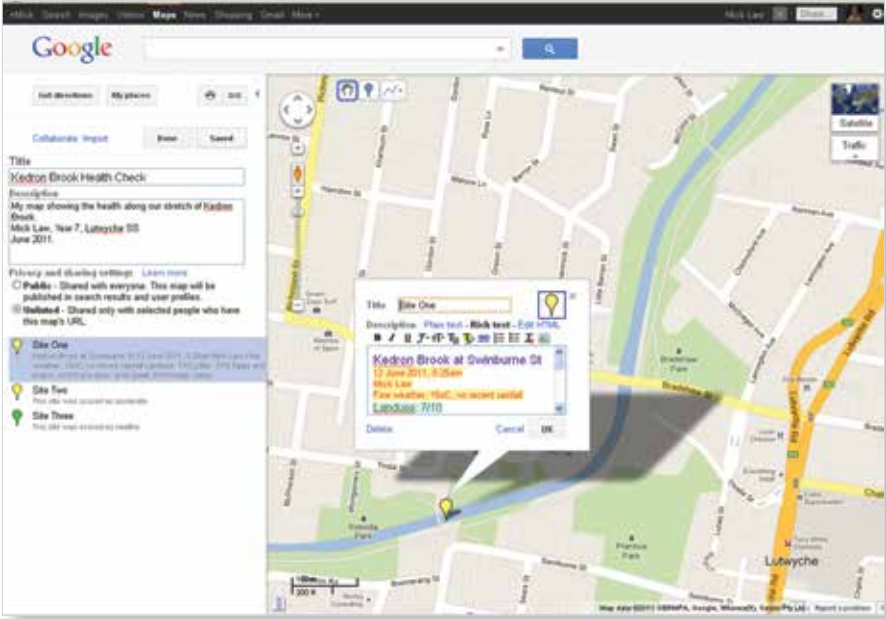
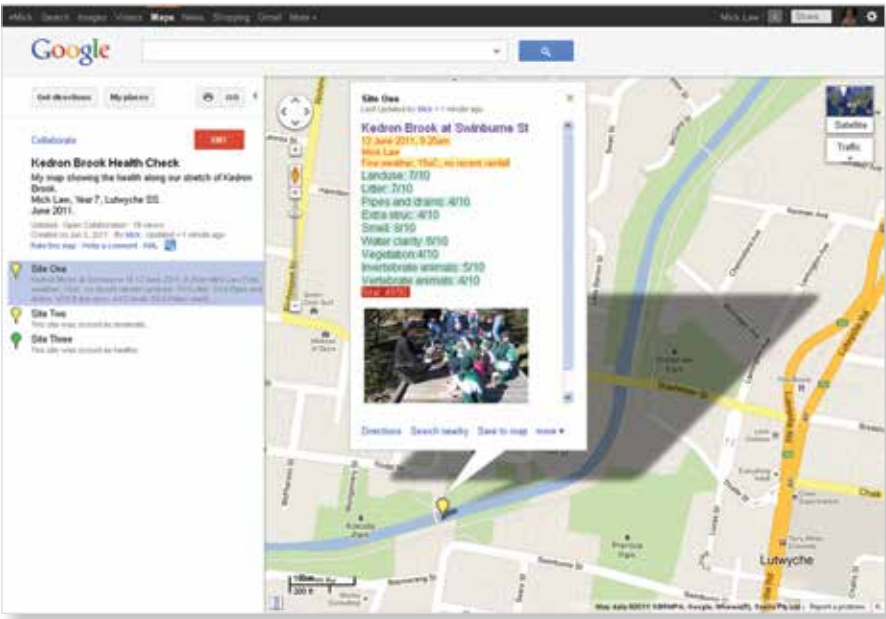


This is the 'Edit' mode of Google Maps. The edit toolbar is now visible and lets you place features such as points, lines and shapes on your map.



There are two modes in Google Maps—the viewing mode and the edit mode. As you are now in edit mode, you should be able to change the name of your map as well as edit features on the map. The viewing mode simply lets you view the map and the data it contains. If you are in edit mode, use the ‘Done’ button to switch to viewing mode. If you are in viewing mode, use the ‘Edit’ button to switch to edit mode. See Table 3 for a comparison of the two modes taken from a completed map.

Table 3: Comparing edit mode and viewing mode in Google Maps

<p><b>Edit mode</b></p>	
<p><b>Viewing mode</b></p>	

Whilst in edit mode, click the placemark button to place a placemark on the map. Click the button once to activate the tool and then click again on the location you would like to mark. Students should use the satellite map to make sure that they place their placemark accurately.



After the placemark has been placed, enter 'Site One' in the Title field. Students enter the following information in the Description field:

- name of the waterway and location
- date and time data were collected
- data collector
- current and recent weather, specifically any recent rainfall
- scores for each variable out of ten
- total score for the site out of 90.



Students can adjust the location of a placed placemark by clicking on the symbol and dragging it whilst in edit mode. Placemarks can be deleted by hitting 'Delete' from within the placemark box in edit mode, as indicated in the previous image.

## » Insert images into placemarks

Open a placemark from the Legend or by clicking on it in the map. Make sure you are in edit mode. See the previous step for more information on edit and viewing modes, including how to switch between each.

Click the 'Rich text' button in the middle of the placemark box to open the rich text toolbar. Here you can format your text and images with a variety of tools.



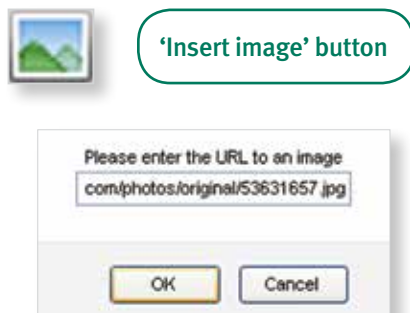
Students open a new tab or a new window under the File menu in their web browser and open the teacher's Panoramio page in a separate tab. Select the image that they would like to insert into their Google Map. Click on the image until the image is all that can be seen on the screen. Copy the URL of this page for the image, not the URL for the page where the image is located.

Right-click on the image and, if using Internet Explorer, select 'Properties'. From here students can copy the URL for the image in the middle of the Properties box.



If you are using Google Chrome or Mozilla Firefox (Internet Explorer alternatives) you can simply right-click on the image and select 'Copy image URL' or 'Copy image location'. You should demonstrate this step to your students using the data projector or interactive whiteboard.

Demonstrate how to insert this image into students' Google Maps by using the 'Rich text' toolbar. Click on the 'Insert image' button and then paste the URL for that image into the pop-up box. Click 'Ok' and your image should be visible inside the placemark box. If you can only see a small box with a red cross inside, you are most likely using the URL for the page and not the URL for the image itself.



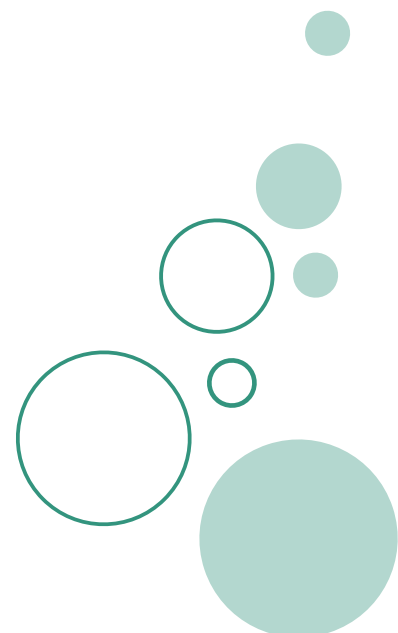
Adjust the size of images within a placemark, if needed, by clicking on the image in edit mode and dragging the small white handles to resize. You can also change the location of the image inside your placemark box by clicking and dragging the image to the desired location.

You can also insert a video into your Google Map if you can access online video sites through your school network. In edit mode copy the HTML/embed code for the video you wish to use and paste this under the 'View HTML' button in the placemark box.

## » Format placemark descriptions

Google Maps comes with a range of tools that you can use to personalise your placemarks. Ensure that your students have entered all their text and images before you show them these tools to avoid unnecessary distractions.

If the rich text toolbar isn't visible in your placemark, select the 'Rich text' button, as you did in the previous step. Use the tools here to format the text in your placemark.






## »Format symbols based on overall assessment

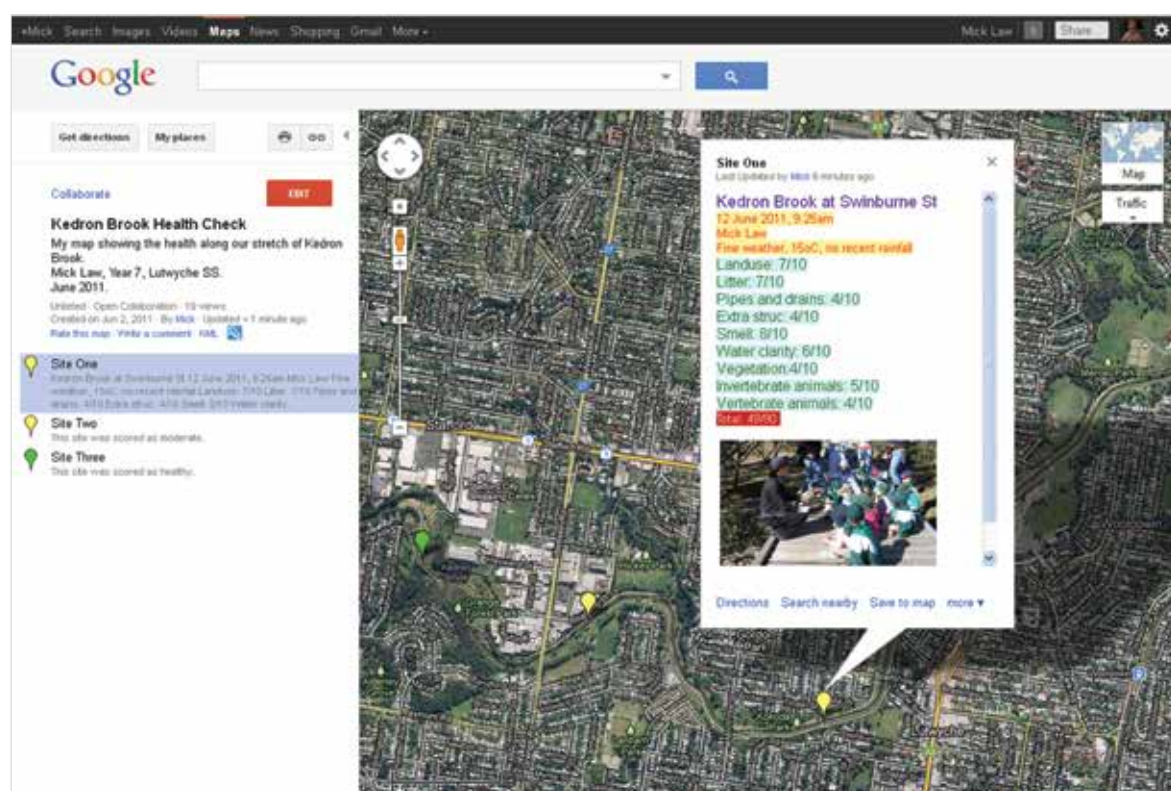
Demonstrate how to change/edit map symbols to reflect their findings. Once they have finished adding their data and formatting the text within each placemark, students can change their map symbols.

In edit mode, open the placemark for the first data collection site. Click on the icon in the top-right corner of the placemark box to see the icons that Google has provided. Choose appropriate symbols and colours for each site, given their overall rating. An example can be found in Table 4.

Table 4: Suggested health indicator symbols

Overall rating	Possible symbol
Unhealthy	(red) 
Moderate	(yellow) 
Healthy	(green) 

Google Maps also allows you to use icons as map symbols. You will need the URL for the image you would like to use as a symbol. When you are changing your symbol, click on 'Add an icon' and enter the URL into the pop-up box. Click on 'Ok' and your icon will be imported into your map as a new symbol.



## » Share map

There is a range of options for sharing your completed map. Remember that the map has been saved online and now can be shared just like any other online media (such as images or videos). You can:

- email your map to someone
- embed the map on a blog or website
- copy a direct link for hyperlinking in documents or to web pages
- export your map to Google Earth.

These options can be found in the top-right corner of your map.

## » Use map

Now that you have conducted your waterway health check, use this information in a meaningful way.

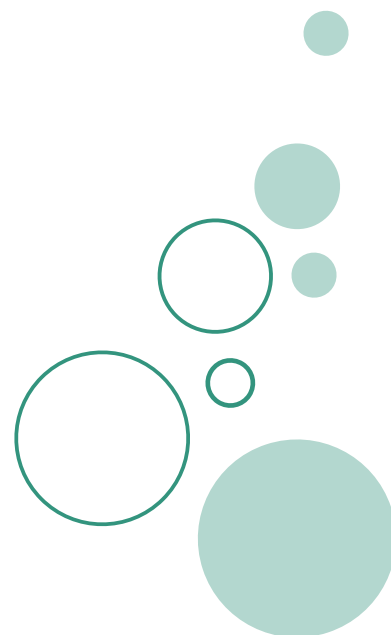
Students could:

- use the map in a report
- develop their own action plan to improve the health of the waterway, perhaps with a fictitious budget
- create a blog or wiki and embed their Google Map for others to view. (This would be great to track the changing health of the waterway over time as more of your students record data.)
- contact a local catchment group or local council to see what action has already been undertaken and what future action is proposed along the waterway. The class could actively participate in partnerships projects.

## » Culminating questions and tasks

Some culminating questions or tasks could include:

- What are your three most significant findings—good or bad—at each site?
- What, if any, impact have humans had on the health of your waterway?
- How does land use at each site affect its health?
- What is the healthiest aspect of each site?
- What is the biggest problem at each site?
- How important are different land uses to the health of each site?
- What would you do to improve waterway health along the stretch of the waterway for which you collected data?  
(Students can create column graphs to compare the similarities and differences between data at the sample sites.)
- What things do you do that contribute to reducing or improving the health of your local waterway?
- Can you suggest any improvements to the data collection process?
- How would you change your data collection method to get more accurate information about the health of your waterway?



## Optional activity: Using Google Earth to create a tour of your waterway

You can export your Google Map into Google Earth to create a tour of your waterway. You should ensure that your students have finished formatting their Google Map placemark boxes before they export to Google Earth.

### 1. Export map to Google Earth

Once your map is finished in Google Maps you can export this map for use in Google Earth. Click on the 'View in Google Earth' button to save your map as a .kml file—.kml and .kmz are the two standard file types in Google Earth in the same way as .doc or .docx are standard file types in Microsoft Word. Choose a suitable location for this file and save it.

Double-click on the file to open it. Google Earth should open automatically if it is installed on your machine.



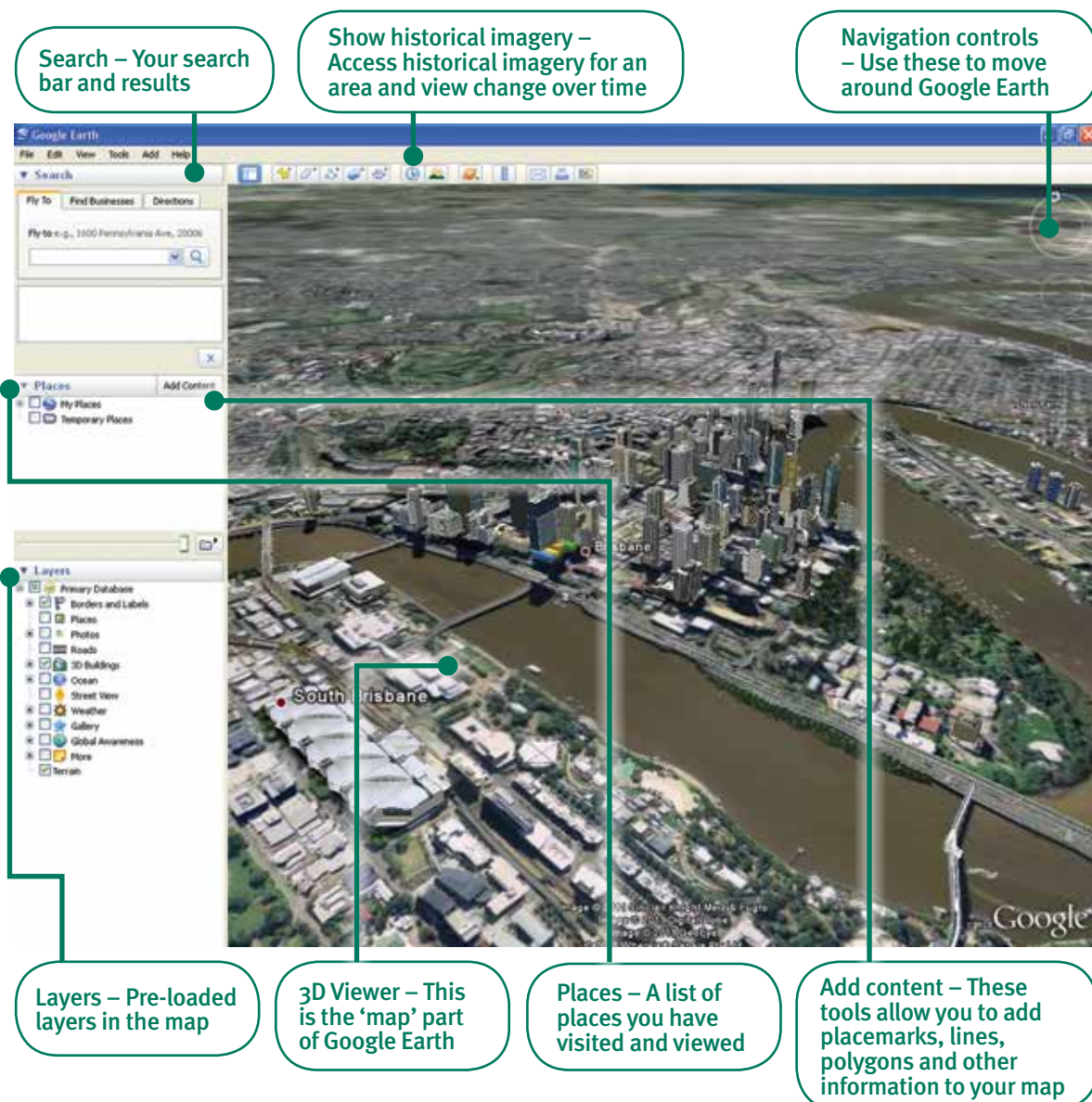
### 2. Google Earth basics

As you did for the Google Maps activity, demonstrate the following aspects of the application:

- basic navigation (zoom, pan and tilt camera with mouse)
- how to turn different map types (maps, satellite, terrain) on and off ('Layers' section)
- how to search for a location ('Search' section)
- how to turn labels on and off (under 'Layers' section)
- how to turn 'Places', 'Photos' and '3D Buildings' off in the 'Layers' section before beginning.

Instructional videos explaining these Google Earth tools can be found at <[www.contoureducation.com/resources/videos](http://www.contoureducation.com/resources/videos)>.

Google Earth is relatively simple to use; although, like any new software, it does take some time to become familiar with it.



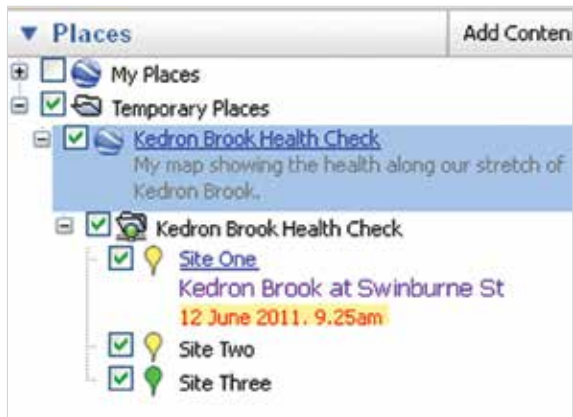
There are also many 'keyboard shortcuts' to save you using buttons and tools within the software. You can find an extensive list by searching for 'Google Earth keyboard shortcut'. The main keys you will use are summarised in Table 5.

**Table 5: Keyboard shortcuts**

<b>Zoom to placemark</b>	Double-click on placemark in 'Places' section
<b>Move around map</b>	Arrow keys
<b>Rotate map</b>	Shift + left/right arrow
<b>Tilt map</b>	Shift + left mouse button (and drag up or down)
<b>Zoom in and out</b>	Mouse scroll button
<b>Reset view to north</b>	'n' key
<b>Reset tilt to top-down</b>	'u' key
<b>Reset both</b>	'r' key

### 3. Establish folders

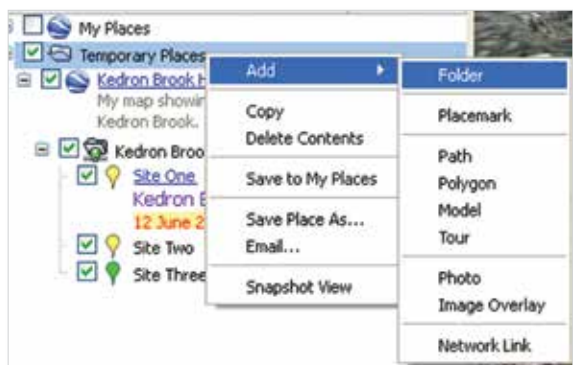
The 'Places' section should look like this:



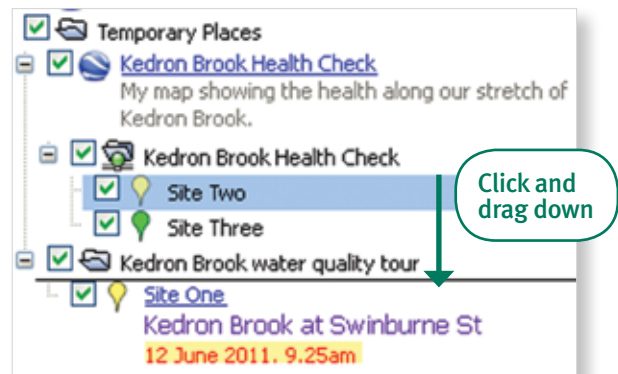
Note that the example 'Kedron Brook Health Check' file opens under the 'Temporary Places' folder and that it contains a sub-folder also called 'Kedron Brook Health Check' but with a network folder icon. This sub-folder contains the placemarks that were created in Google Maps.

The 'Kedron Brook Health Check.kml' file is linked to your Google Map, so each placemark is linked to the placemark in your 'My Places' in Google Maps. This is indicated by the network folder icon. We need to disengage the placemarks from the network folder so that we can customise them, rather than having them revert to the view and symbol shown in Google Maps every time we open the file.

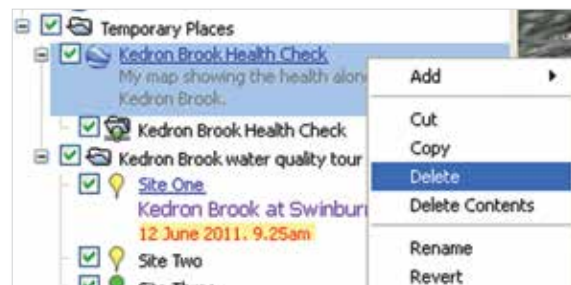
Create a new folder in Google Earth under the 'Temporary Places' section. Right click on the 'Temporary Places' folder and click on 'Add' and 'Folder'. Call this folder 'Your waterway water quality tour'. This example will be called 'Kedron Brook water quality tour'. Note that this new folder breaks the link that is set up between your Google Map and the .kml file you saved.



Click and drag the placemarks, one by one, into your new folder. Your tour will follow the order of placemarks in this folder. You can adjust this order by clicking on a placemark and dragging it up or down within the 'Kedron Brook water quality tour' folder.



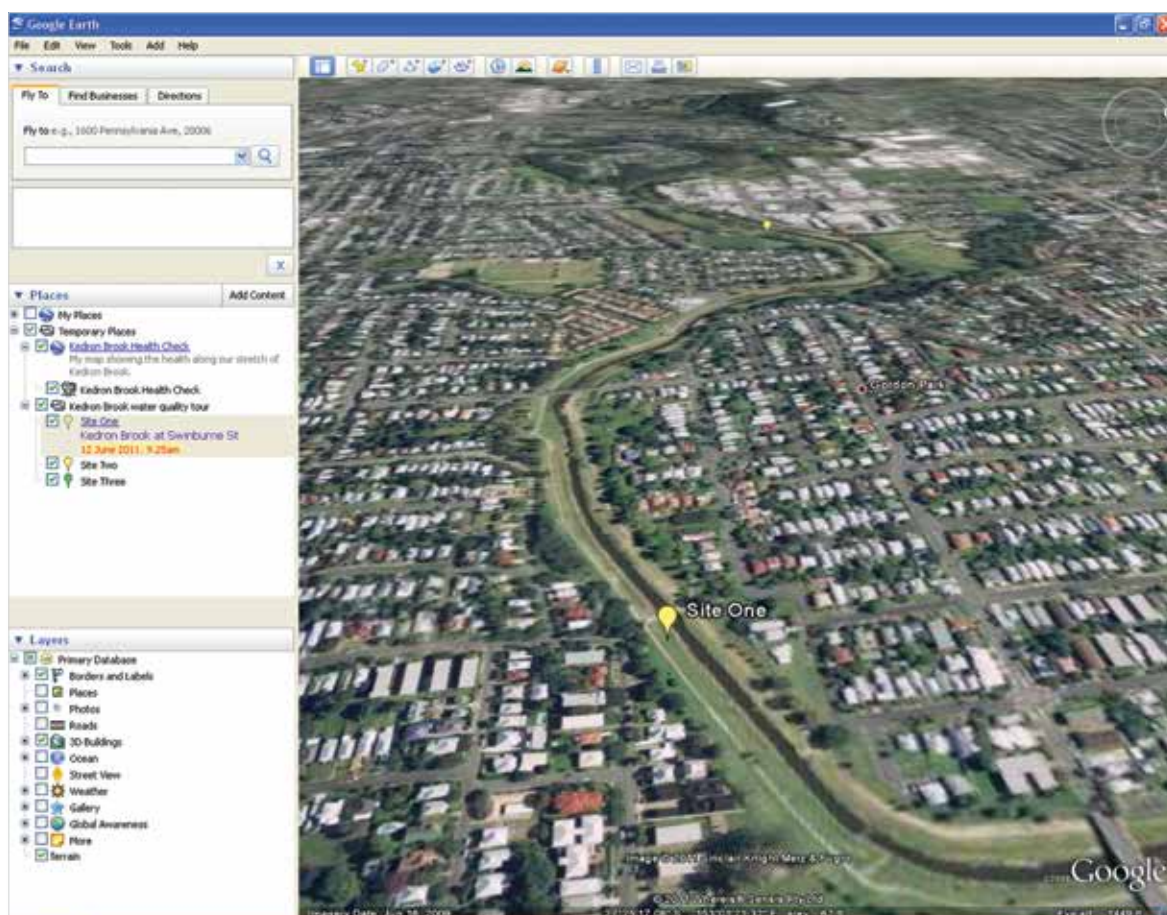
Delete the original folders by right-clicking on the file you saved from Google Maps, then selecting 'Delete'. The folder name should have the blue Google Earth logo next to it.



#### 4. Update view and symbols

Each site has a ‘view’ attached to it so that when you fly to that site—via a tour or by double-clicking on the placemark—it always navigates to the same view. When you import from Google Maps the default view is a top-down view of the location.

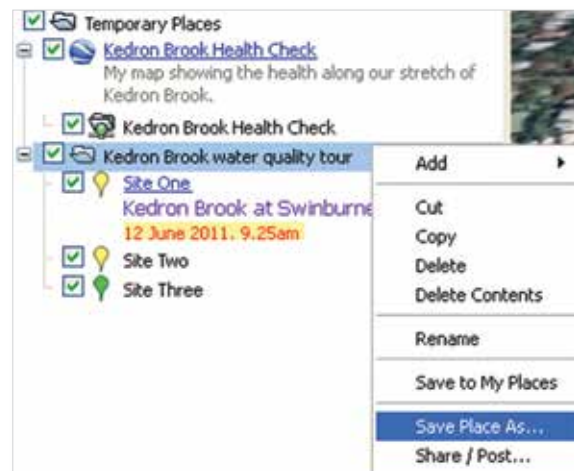
Double-click on the first site to fly to the view that has been saved to that placemark. Show your students how to adjust the view to make it more interesting—by holding the Shift key and left mouse button to tilt and rotate the camera. You might want to show a particular natural feature or specific land use in the area surrounding your data collection site. Once you have changed the orientation, altitude and camera angle, right-click on the placemark and select ‘Snapshot view’. This will record that view to your placemark.



You will also need to refresh your map symbols. Follow the same steps as you did in Google Maps to change the symbol or to import your own symbols.

## 5. Save tour

Update the view and symbol for each location, then right-click on your 'Your waterway water quality tour' folder. Select 'Save place as' as in the image opposite. The folder name will become the filename and you should keep the file type as .kmz as this file type works better with tours that contain data. From now on, when you make a change to the tour you should save using this method.



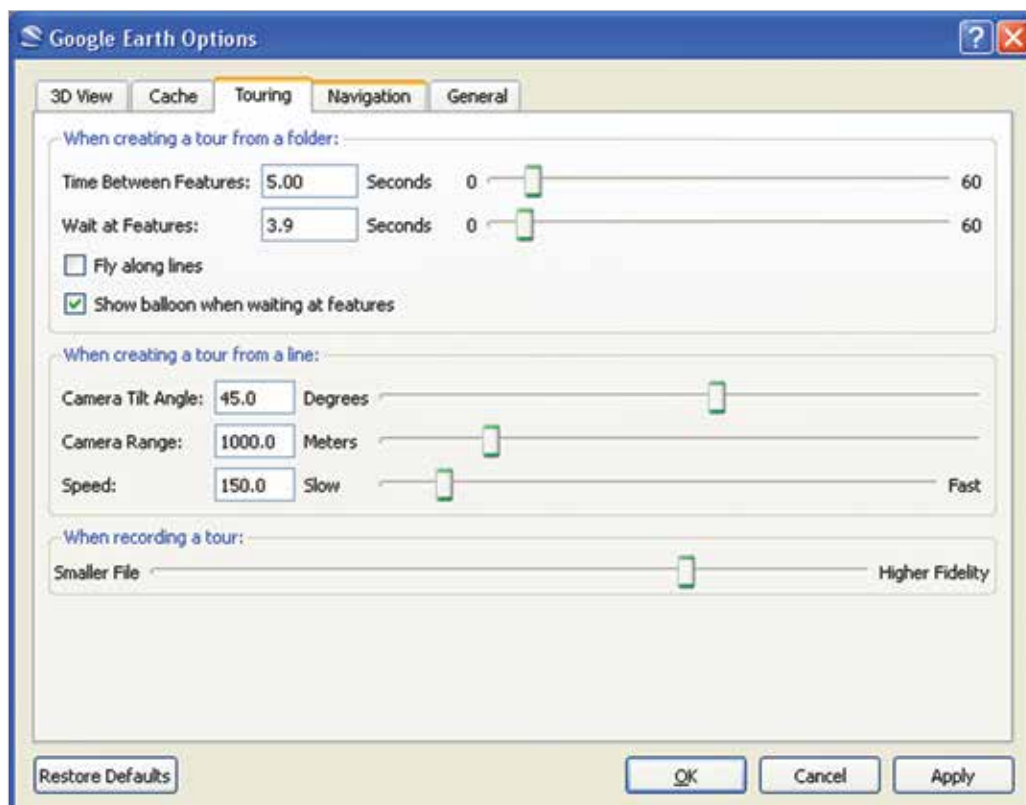
## 6. Create and play tour

To play your tour, you first need to load it into Google Earth. At the bottom of the 'Places' section a 'Play Tour' button will appear when you click on the top-most folder in the file you imported.



The camera will now swing from the first location to the last. You can change the order of placemarks by clicking and dragging the placemarks in the 'Places' section.

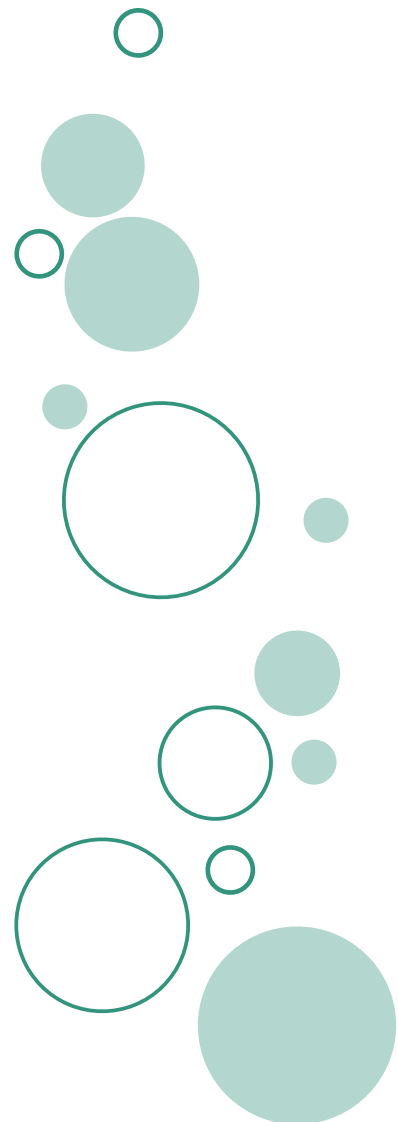
You can also change the settings of how long the camera stays at each location and how long it takes to fly to the next. Click on the 'Tools' menu and hit 'Options'. Click on the 'Touring' tab to get all of the options related to tours in Google Earth.



## 7. Share map

As with Google Maps, you can print and email your maps; but in Google Earth you can also:

- send your map as an attachment (the .kmz file is very small and easy to email)
- post your .kmz file online or on an internal website for easy access
- export the map screen as an image for use in reports or presentations as per the screen capture below.



# Resource 1

## ➤ Guide for rating your local waterway

# A Waterways Health Check

## A Waterways Health Check



Each waterway pictured here is different. How would you rate the health of the waterway? This document gives you a system that helps you score a waterway by examining it in a number of different ways.

How healthy is your local creek, stream, lake or wetland? Here's a simple guide that will help you rate the health of your local waterway. It's easy, doesn't take too much time or require complex equipment, and it will allow you to tune into a vital component of our environment.

How's your local creek? Is it a place of thriving life, clear water and healthy fish? Is it an area that you enjoy visiting? Is it a place that's a little dirty, a little smelly, a little tricky that's best avoided? Our wetlands, creeks, streams and lakes (which we'll refer to collectively as waterways) are far more than just a part of the scenery – they're the lifeblood of the environment. They provide homes for wildlife and plants, water supplies for homes, industries and farms, and places of recreation and enjoyment for us all.

Besides being important environments themselves, waterways are also the health of the surrounding land because they're the collection point for water coming from all around. A healthy waterway usually reflects that the local environment is in good shape, whereas an unhealthy waterway often means other things are going wrong somewhere in the catchment.

But how can you tell if a waterway is healthy? It's actually quite simple to estimate the overall condition of these environments. You don't need high-tech equipment or chemicals, but you do need your senses. You can use your senses and a genuine concern for the waterway.

### What's in a feeling?

When you visit a waterway you very quickly form an opinion on whether it's healthy. It's more of a feeling than a number, but you can learn to understand what you're feeling. It's not a feeling, but a feeling. It's based on what you see, smell, and touch. It's not a feeling, but a feeling. It's based on what you see, smell, and touch. It's not a feeling, but a feeling. It's based on what you see, smell, and touch.

### What rates?

We've suggested five areas or categories you might like to consider. Each category is rated out of 10, and the lower the mark the better the health of the waterway. In that category we've also suggested things you might like to consider. Each category is rated out of 10, and the lower the mark the better the health of the waterway. In that category we've also suggested things you might like to consider.

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# Resource 1 (continued)

## Waterway health check

Make notes on each category on a separate sheet

### Site information

#### Name of wetland/waterway:

If unnamed, what is the closest town, suburb or road.

#### Location:

Provide sufficient details so that you or someone else using your directions can return to exactly the same spot to repeat your rating.

#### Date:

#### Weather:

#### Has it rained in the last 24 hours?

(If yes, was it heavy rain?):

#### Area being rated:

Create a simple site map using a road directory or local plan. Mark in features that might affect your waterway. Mark in where you made your rating.

Provide enough detail so that when you repeat your rating you're examining the same area. For example, you might look at an area 50 metres on either side of the waterway, stretching up and down the waterway as far as you can see.

#### CATEGORY 1

### land use

Walk around the area surrounding your waterway. Record land uses that you see or land uses you're aware of in the local area.

Create a list of places where water comes from that flows into your waterway.

#### Rating Category 1

0. Lots of industry nearby, most of land cleared, soil bare, environment disturbed
1. Some industry, some land cleared
2. Some commercial, recreational and residential land use
3. No human use at all, in its natural state
4. No human use at all, in its natural state
5. No human use at all, in its natural state
6. No human use at all, in its natural state
7. No human use at all, in its natural state
8. No human use at all, in its natural state
9. No human use at all, in its natural state
10. No human use at all, in its natural state

YOUR RATING ☐



What's the land being used for around your waterway?

#### CATEGORY 2

### litter

Make notes on the type of litter floating on or in the water or on the surrounding land. (Include natural litter such as leaves sticks and animal faeces.)

If litter seems to collect in one particular area, take a photo of that area each time you monitor your waterway so you can compare litter buildup.

#### Rating Category 2

0. Lots of human litter such as car bodies, tyres, plastics and cans, oily films and/or excessive algae growth.
1. A lot of human litter, cans, plastics or algae.
2. Some human litter such as garden rubbish and plastics
3. One or two pieces of human litter, and local vegetation such as leaves floating in the water
4. No human use at all, preserved in its natural state
5. No human use at all, preserved in its natural state
6. No human use at all, preserved in its natural state
7. No human use at all, preserved in its natural state
8. No human use at all, preserved in its natural state
9. No human use at all, preserved in its natural state
10. No human use at all, preserved in its natural state

YOUR RATING ☐



What kind of litter is found in your waterway, and how much is there?

#### CATEGORY 3

### pipes and drains

Look for pipes, drains or trenches leading into your waterway. Examine what's coming out of them (by smell and sight: don't touch or taste), record how many there are and make notes on what you think they're there for.

Without touching the discharge from the pipes, figure out a method of calculating what the volume of any discharge is.

#### Rating Category 3

0. A number of pipes from industry and/or sewage treatment and/or urban stormwater.
1. Some pipes or trenches
2. No pipes from industry, but some urban stormwater drainage
3. No pipes or drains
4. No pipes or drains
5. No pipes or drains
6. No pipes or drains
7. No pipes or drains
8. No pipes or drains
9. No pipes or drains
10. No pipes or drains

YOUR RATING ☐



What are the pipes and drains bringing to your waterway?

#### CATEGORY 4

### extra structures / modifications

In addition to pipes and drains, record the presence of other artificial structures such as weirs, concrete banks, piers or any artificial modification of the water flow.

Describe what effect you think these structures have had on the waterway.



Stormwater filters such as shown here are designed to catch litter that might accumulate in other areas.

#### Rating Category 4

0. A number of artificial structures, large modification of natural flow
1. Some artificial structures or some flow modification
2. No concrete structures or minimal modification of water flow
3. No extra structures or artificial modifications
4. No extra structures or artificial modifications
5. No extra structures or artificial modifications
6. No extra structures or artificial modifications
7. No extra structures or artificial modifications
8. No extra structures or artificial modifications
9. No extra structures or artificial modifications
10. No extra structures or artificial modifications

YOUR RATING ☐

# Resource 1 (continued)

## CATEGORY 5 smell

Sit by the waterway and record any smells. Take a sample of water and record its smell (don't taste it). A strong natural smell in wetlands and estuaries should be recorded as 6 or more.

**Take a sample of water in a glass jar and ask other people how they would judge the smell. Is it the water that smells or something else at the waterway?**

YOUR RATING ☐



The water is clear but doesn't smell very nice!

## CATEGORY 6 water clarity

Collect a water sample in a clear container. Hold it up to the light. Record how clear the sample is.

**If your water sample is murky, allow it to stand for a couple of days. Do particles settle out of it, causing it to become clearer?**

YOUR RATING ☐



It's looking good!

### Rating Category 5

0. Very strong, unnatural chemical smell
1. Strong unnatural smell
2. Stronger decaying smell or slight unnatural smell
3. Very slight smell, perhaps natural decay
4. No smell / natural smell

## CATEGORY 7 vegetation

Look at the banks and the land extending from the waterway. Note if the vegetation is natural or introduced, and if the soil is eroded or stable.

**Using flora books or consulting local experts, learn the names of your local plants. Create a list of species growing around your waterway.**



There's vegetation around but the banks themselves are eroded and appear unstable.

YOUR RATING ☐

### Rating Category 7

0. Lots of introduced plants, much clearing, bare ground, pasture, extensive erosion
1. Mixed plants, much clearing, large eroded areas
2. Mixed native and introduced plants. Some clearing. Small corridor of vegetation. Some minor erosion.
3. Mainly native plants. Natural vegetation extends up to 30m from water, no erosion
4. No vegetation visible at all

## CATEGORY 8 invertebrate animals

(insects, crustaceans, molluscs and so on)

Sit by your waterway and look for invertebrate animal activity. Run a scoop net through the water and see if you can catch insects or other invertebrates.

**Scrape up the first centimetre of sediment with a tin. Put it into an ice cream container and wash it with lots of water. Draw any animals you find.**

YOUR RATING ☐



Run a scoop net through the water and see what you catch.

### Rating Category 8

0. No invertebrate animal life visible at all
1. Only one or two types of animal life visible (probably snails, leeches or worms)
2. Fewer than five types of animals found
3. At least seven types of animals found
4. Many types of animals found including insect larvae and nymphs

## CATEGORY 9 vertebrate animal life

(birds, reptiles, fish, amphibians and mammals)

Sit by your waterway and look for vertebrate animal activity. Note both the variety and number of birds. Look for fish, listen for frogs and record any animal tracks.

**Using bird books, learn the names of birds around your waterway and compile a list. Keep a chart of what birds are around at what times of year.**

YOUR RATING ☐



What birds are using the waterway near you?

### Rating Category 9

0. No vertebrate animal life visible at all
1. One type of animal life (birds)
2. Two types of animals found
3. Many types of vertebrate animals found

total score

# Resource 2

## ❖ Making a dip net

### Fact sheet



#### How to make your own dip net

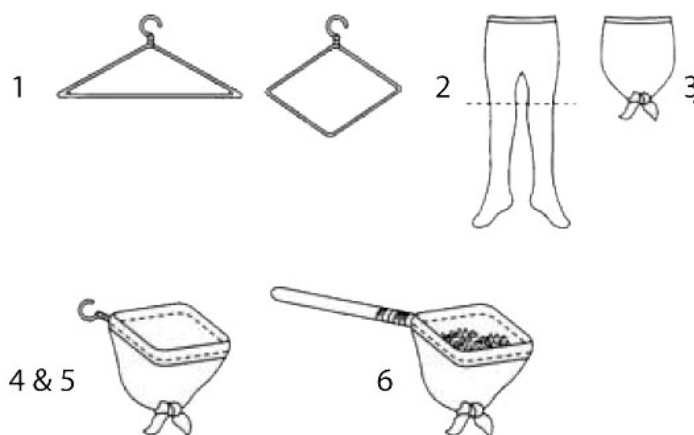
##### Equipment needed

- wire coat hanger
- needle and thread
- panty-hose
- string or tape
- a stick or rod

##### Instructions

1. Bend the coat hanger so that it is almost square.
2. Cut the legs off the panty-hose half way.
3. Tie the legs together to form a basket. You may need to trim some more off the legs.
4. Place the panty-hose through the coat hanger and fold the waist band of the panty-hose over the coat hanger to form a hem. It is important to fold the panty-hose so that the hem is outside the net. This will prevent water animals from becoming lodged in the hem.
5. Sew the hem to hold the coat hanger firmly in place.
6. Attach the coat-hanger to the stick or rod using string or tape.

Now that you have made your own dip net, remember to bring it on your field trip!



Fact Sheet – produced for the Waterwatch Queensland website <[www.qld.waterwatch.org.au](http://www.qld.waterwatch.org.au)> 2007