

# GEOGRAPHY CHALLENGE

[www.geographychallenge.nsw.edu.au](http://www.geographychallenge.nsw.edu.au)

## Introduction

Geography Challenge is a new online interactive program from the NSW Curriculum and Learning Innovation Centre for Year 9 and 10. It supports student to:

- examine environmental issues in Narawang wetland
- conduct virtual fieldwork
- carry out a Research Action Plan (RAP)
- examine the broader context of Homebush Bay and nearby communities
- apply a range of geographical skills such as using interactive maps and Geographic Information Systems
- apply a range of research techniques to a geographical investigation.

Geography Challenge is different from other virtual field trips. Geography Challenge allows students to actively engage in the fieldwork process and requires students to analyse the data they collect in a variety of different ways and from a range of perspectives. Many other virtual fieldtrips tend

to be fairly static, and the student remains quite isolated from the active process of completing and analysing fieldwork.

## Land and water management

Geography Challenge is based on a real site, Narawang Wetland, which is located within the boundaries of Sydney Olympic Park, Homebush Bay. Narawang Wetland, along with the nearby Parramatta River and its tributary Haslams Creek has suffered the effects of intense human use over time. It therefore provides a rich source of material for the Stage 5 topic Land and water management.

### Geographical processes

The Geography Challenge program examines basic fluvial processes, wetlands functioning and factors affecting water quality. The program examines climatic features of Homebush Bay and the native flora and fauna of the area.

### Perceptions of different groups

A range of different perspectives are explored in the examination of geographical issues at Narawang Wetland. Simulated survey results of park users are analysed and interviews are



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conducted with various community members. A virtual committee meeting is used as a method of collecting data and informing conclusions. A range of authentic characters provide an opportunity for students to explore the different viewpoints within the community. Students are able to interview community stakeholders, and can choose from a selection of questions to generate a response. In this way the perceptions of different groups are represented including local residents, Indigenous groups, conservationists, property developers, and environmental managers are considered.

## Individual, group and government responses to the issue

Students are able to explore responses to land and water management in Narawang Wetlands through links to secondary data sources such as pamphlets, websites and academic articles. Students are encouraged to propose their own individual actions for managing the issues and engaging in the political process to encourage change. Community groups and events such as Streamwatch and Clean Up Australia are discussed.

## Decision-making processes involved in management

In the process of collecting data on Narawang Wetlands, students examine a simulated local council meeting discussing the issues of development in areas surrounding the wetlands. This exposes students to the processes involved in decision-making at the local council level including meeting procedures, council recommendations and differing viewpoints and compromise. The generalised nature of the council meeting is balanced by a council committee meeting which is focused specifically on the issue of water and pests within the area. This reflects the variety of roles and functions of different bodies and groups within a local council. Students are also prompted to find their own local council area by examining the Local Government Directory.

## Management of the issue and implications for sustainability, social justice and equity

Students are required to analyse the data they have collected in relation to the concept of sustainability. Students are asked to reflect on a number of questions which relate to the

conflicting ideals of economic development, environmental protection and social well-being.

## Assessment

The program allows student results to be saved automatically into a PDF report. The teacher has access to their students' progress through the teacher's dashboard. The teacher can view the proportion of the program that has been completed as well as access the actual PDF report the student is creating. When the student completes the Virtual Field Trip the results will also appear in the Research Action Plan for analysis.



## Research Action Plan

### Identifying an aim

Students are required to focus on one of three issues: pests, water and human interactions. They examine general information about each of the three issues and make a choice about focusing on one of them. Students are able to watch a short video outlining the importance of the aim in research, and are then asked to writing their own research aim based on their chosen topic of water, pests or human interactions.

### Generating focus questions

A short video outlines the significance of a well-structured set of research questions to the integrity of thorough geographical research. Students are provided with a selection of possible focus questions which relate to water, pests and human interaction to provide them with support in developing their own research questions. Students are asked to write three focus questions of their own that shapes the direction of their data collection and research analysis.

## Primary and secondary data

Definitions and examples of primary and secondary data sources are provided. A short video describes the benefits of each form of data. An interactive activity requires that students categorise a variety of data collection techniques into primary or secondary data and provides students with instantaneous feedback. Students need to outline some of the data techniques which will allow them to complete their research.

## Identifying techniques to collect data

Students are able to explore the specific techniques to carry out research on their topic. A video and slide show are provided which demonstrate some of these techniques. Students are asked to identify specific techniques that may be useful in their research.

## Collecting data

Data is collected from virtual experiments, a survey of park users, attendance at a virtual council meeting and council committee meeting, virtual interviews with community stakeholders and publications.



## Processing and analysing data

Processing and analysing of the data is divided into four sections - the virtual field trip, survey, publications and sustainability. The results from the virtual field trip are used by students to compare the four sites and draw conclusions. Students in a class are asked to analyse the data in different ways dependent on the original issue they choose and the beginning of the RAP: water, pests or human interactions. Students are supplied with simulated survey results which relate to each of the three research themes. Questions

to complete again relate to the research theme chosen by the student. In the collect data stage, students were provided with access to a range of publications related to land and water management in Narawang Wetlands and Homebush Bay more generally. Students are provided with a question which relates specifically to their theme. Students are asked analyse the data they have collected in relation to the impacts on sustainability.

## Communicating research findings

Students are provided with a range of options to present their data. Students can write an information report, design a multimedia presentation or website, and present their data in table and graphs. Guidance and scaffolding is provided for each form of presentation. Students are also provided with advice on referencing their work.

## Proposing action

Students are encouraged to write a letter, contribute to a wiki or blog and to write tweets about their proposed actions. A letter writing scaffold is provided to assist students. There are also links to community events and programs.

## Geographical skills and fieldwork

### Using various types of maps and flow charts

Students are given the opportunity to explore a variety of maps related to land and water management in Narawang Wetland. An interactive map allows the students to identify the natural and built features of the area surrounding Narawang. Historical maps have been included which show colonial developments in the area, and a Google-style aerial photograph is provided to allow students to orient themselves with the virtual field sites.

A basic GIS-style map provides students with an introduction to using Geographical Information Systems. Students examine land uses in the area surrounding Narawang Wetland to explore the location of different uses and are able to examine the relationship between landuse types and the location of different ecosystems and water management strategies.



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## Weather monitoring

Students undertake a range of simulated field tests to determine weather conditions such as tests on air temperature, cloud cover, light intensity, relative humidity and wind speed. In each test the purpose, unit of measurement and required weather equipment are discussed. Results are given for four sites and students are asked to compare their results and explain anomalies.

## Water quality monitoring

Simulated water tests are conducted at three different sites with markedly different characteristics. Students should be able to determine the impacts of stormwater, flushing, and relative isolation from human impacts. The abiotic water tests conducted are dissolved oxygen, nitrate, pH, phosphate, salinity, water temperature and turbidity. Relative colour charts are included for students to analyse their results. The test simulations are designed to not only give realistic results for analysis, but also to teach students how to use the relevant pieces of equipment. Students are also able to complete an abiotic test of water quality by examining macroinvertebrates collected from each of the sites. Students must examine a water bug identification chart and identify each of the species in their samples to complete this section of the fieldwork.

## Observations

Students are able to carry out a number of simulated field observations including identifying human interactions with the environment and viewing flora and fauna present. Twelve different interactive panoramas are provided for students to identify key features of the landscape. Three panoramas are provided for each of the four fieldwork sites. Students are required to record their observations in a series of tables with reference to flora and fauna identification charts and a chart of human interactions.

## Field sketch and transect

Students are asked to examine a number of different field sketches of a particular part of Narawang Wetland. They are asked to judge the field sketches for accuracy and technical proficiency taking into account factors such as, labelling, shading, and use of colour.

Students are able to examine an interactive transect showing changes to vegetation types approaching a water body. An interactive view of a landscape showing intervals of 20 metres is provided. Students are able to look along the landscape to examine changes down a slope, on approach to a pond and back up a slope. As the students move along the transect, descriptions are provided outlining details of the vegetation found in each section. Students complete activities to construct their own version of a transect. They are supported to visually identify the plant and tree types as well as the names of the species.



## Surveys and interviews

Using Geography Challenge, virtual interviews can be conducted with a selection of community stakeholders. Students can select a number of questions which relate to their research area and read the responses of the individuals. Students are provided with information about the design and distribution of surveys and are introduced to the concept of sampling.

## Calculating local relief

The local relief of Narawang Wetland is explored within the GIS-style activity. Contour lines are demonstrated on an aerial photograph along with the directions of surface water run-off. The local relief is used to explore the impact of nutrients rich waters of pest incidence, the risk of leachate and threats from nearby development.

## Recognise and account for change using statistical data

Students are required to explain the differences between the four different field sites. Each site has different characteristics and will generate different test results. Students are required to

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analyse the field data to account for differences in results. Climatic graphs based on Homebush Bay for two different years are provided for examination. Students identify differences in the statistics and are guided to account and explain anomalies between the two years and general climatic trends indicated by differences between months.

## Collect and use digital images

Students use digital images through their examination of the interactive panoramas. These panoramas allow students to click on sections of the landscape to enlarge important features. In the flora and fauna observation panorama, students are able to zoom in to examine particular species such as the jointed twig-rush. In the human interactions panorama students can zoom in to examine human alterations to the environments and human uses. Students compare these result for the four test sites.

## ICT

Geography Challenge seamlessly integrates the mandatory ICT requirements of the Stage 5 geography syllabus into teaching and learning.

## Creating documents

As part of a Research Action Plan students need to communicate the findings of their research. Students are asked to write an information report about their findings, and given information about using this particular text type. Students are taught how to write an introduction and conclusion and what to include in body paragraphs. Guidance is provided on referencing and including visual stimuli.

## Creating a multimedia presentation

In Geography Challenge, students can design a multimedia presentation or website to present their findings. Students need to draw on their research to examine management strategies currently implemented in Narawang. Students are provided with guidance on planning the presentation and suggestions on appropriate software applications to use.

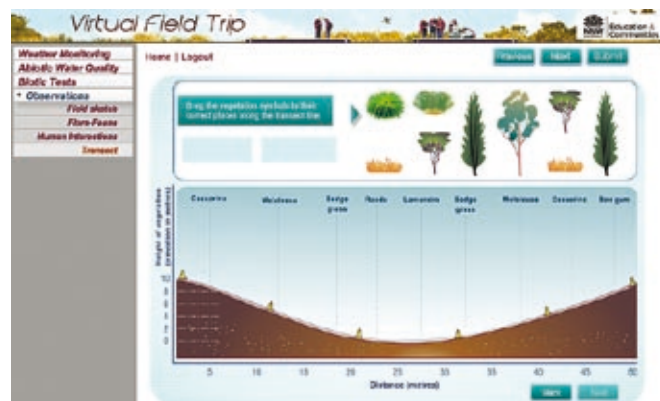
## Using a database and importing data

As students undertake the Virtual field trip an electronic database of their results is created. On

completion students can access this database for further analysis. Further, students create their own databases in Microsoft Excel to allow the creation of tables of graphs. Students are encouraged to create tables and graphs using different software applications and websites to present their findings. They can then import these graphs and tables into their work, such as the information report.

## Analysing websites and using electronic information

Links to a range of relevant websites are provided for students to explore. Students must analyse these sites to find information relevant to their research topic. Access is provided to a range of real and simulated electronic information. Students are required to access and collect these sources and interpret them in relation to their chosen research topic. Students also critically analyse these electronic sources for validity and accuracy.



## Literacy

Geography Challenge supports the acquisition and use of literacy skills to manipulate and communicate their geographical understanding. Geography Challenge supports students understanding texts, through glossaries, images, videos and audio. To assist reading and understanding, in each section of the website glossaries are provided which are easily accessed from any page. Video is provided to reinforce the text provided on each page to assist comprehension. Text is chunked in small sections to allow students to absorb elements of topics such as fieldwork, or research techniques and gradually build their knowledge to grasp more complex concepts. Activities are provided to boost student engagement with metalanguage. To assist

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processing of geographical information, activities support students to summarise information for particular audiences. Scaffolds for letter writing and report writing are provided to support students in communicating their knowledge in a written form.

## Numeracy

Numeracy is integrated through Geography Challenge, particularly in the analysis of fieldwork. In the Narawang Wetland section, students analyse statistical data such as climatic graphs of Homebush Bay. They interpret the climatic graphs and determine possible causes of difference between two years. In the Research Action Plan students apply mathematical information and concepts to account for variance in test results across four separate field sites. Students analyse quantitative survey data and draw conclusions. Students may manipulate statistical data through the creation and interpretation of a variety of graphs to present their findings.

## Values and attitudes

### Ecological sustainability and a just society

Geography Challenge supports students to undertake a sustainability analysis of student research where students examine the three components of sustainability and assess how well Narawang Wetlands is managed in relation to these concepts.

### Intercultural understanding

In the Narawang Wetland section students explore the ways in which the area has been used by Indigenous people in the past. Students examine archaeological artefacts such as bone implements, cutting tools and blades used by the Wanngal clan. Students are able to conduct a virtual interview with an Indigenous representative. They examine the perspective of the Indigenous representative about the significance of the local environment to his community, changes to the area, future developments, and management. Students also examine the opinions of an Indigenous representative in the Council meeting minutes available in the collect data section of the Research Action Plan.

Students are able to experience a multicultural

perspective of the issues of land and water management of Narawang Wetlands. In addition to an examination of Indigenous perspectives, students can explore how management of the area is viewed by a migrant representative in the virtual local council meeting.

### Informed and active citizenship

Geography Challenge allows students to demonstrate their knowledge and understanding of civics and citizenship. Students are able to explore different aspects of decision-making processes at the local scale through an examination of local council and committee meetings and interviews. They are able to consider the opposing views of different segments of community, and are encouraged to become actively involved in the decision-making process in the Propose action section.

## Australian Curriculum

Geography Challenge has been designed to support the Australia Curriculum and will be updated as the new Australian Curriculum and NSW syllabus are finalised. This program supports the new Year 10 topic "Environmental challenges and geography", using river basins as a case study. Geography Challenge examines environmental challenges and their consequences, biophysical processes, underlying causes of environmental challenges, and management strategies. Further, it introduces students to spatial technologies as an analysis tool. Geography Challenge addresses many of the geographical inquiry and skills, general capabilities and cross curriculum priorities.

## Conclusion

Geography Challenge is a detailed study of a significant environmental, cultural and historic Australian site. It will improve student engagement in learning geographical content and make students more enthusiastic about conducting geographical research. The smooth integration of technology, including interactive activities, will absorb students in learning and improve attitudes towards geography. Geography Challenge can be used as an assessment for learning tool and will improve teacher confidence in teaching research methodologies.