

GEOGRAPHY BULLETIN

Studying people, places and environments: Geographical skills and tools



The
Geography Teachers' Association
of New South Wales Inc.

Volume 48 No 2 2016

In this issue:

Unpacking the K-10 syllabus: Geographical inquiry skills and tools	5
Engaging with geographical tools and skills	15
Using technology to assist in the teaching and learning of geography	25
Resources for geography K-6	29
Biophysical Interactions: Malaria	36

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a geographer's
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of New South Wales Inc.

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Front cover: Typical street scene, Delhi with a young girl selling balloons. Source: L. Chaffer



Back cover: Streetscape, Shanghai, China. Source: J. Sillar

GEOGRAPHY BULLETIN

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The Geography Bulletin is a quarterly journal of The Geography Teachers' Association of New South Wales. The 'Bulletin' embraces those natural and human phenomena which fashion the character of the Earth's surface. In addition to this it sees Geography as incorporating 'issues' which confront the discipline and its students. The Geography Bulletin is designed to serve teachers and students of Geography. The journal has a particular emphasis on the area of the Pacific basin and its near neighbours and a specific role in providing material to help meet the requirements of the Geography syllabuses. As an evolving journal the Geography Bulletin attempts to satisfy the requirements of a broad readership and in so doing improve its service to teachers. Those individuals wishing to contribute to the publication are directed to the 'Advice to contributors' on the preceding page. Articles are submitted to two referees. Any decisions as to the applicability to secondary and/or tertiary education are made by the referees. Authors, it is suggested, should direct articles according to editorial policy.

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GEOGRAPHY BULLETIN



Volume 48, No2 2016
EDITOR: Lorraine Chaffer

Editorial	
Lorraine Chaffer	2
Unpacking the K–10 Syllabus: Geographical inquiry skills and tools	
Lorraine Chaffer	5
Engaging with geographical tools and skills	
Sharon McLean	15
Using technology to assist in the teaching and learning of geography	
Marco Cimino	25
Resources for geography K–6	
Lorraine Chaffer	29
Biophysical interactions: Malaria	
Marco Cimino	36
Benefits of GTA NSW membership.....	42
Advice to contributors	45

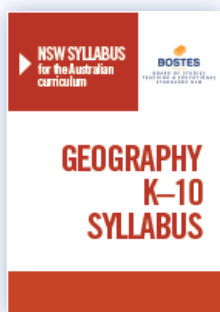
STUDENT
CONTENT
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Lorraine Chaffer, Editor

EDITORIAL

Welcome to the Second Edition of the Geography Bulletin for 2016 in which the NSW Geography Syllabus K-10 is the focus.



Geographical inquiry skills and tools underpin the new syllabus along with the seven key concepts – place, space, environment, scale, interconnection, sustainability and change. Three of the articles in this edition are devoted to the use of inquiry skills and tools in geographical education along with practical activities for the classroom.

Lorraine Chaffer looks at syllabus requirements in the article *'Unpacking the Geography K-10 syllabus: Geographical inquiry and skills'*.

Sharon McLean provides practical activities and advice for developing expertise in the use of tools such as maps, graphs and fieldwork in *'Engaging with geographical tools and skills'*.

Marco Cimino has contributed two articles. The first titled *'Using technology to assist in the teaching and learning of geography'* outlines a range of ICT applications to facilitate individual and collaborative inquiry learning. The second is a background briefing paper *'Biophysical interactions: Malaria'*. He examines Malaria as a biotic hazard, and the biophysical interactions between the biosphere, hydrosphere and lithosphere for preliminary geography.

This edition sees the first article written to support primary teachers who will teach Geography as a separate subject with its own identity for the first time in 2017. A section outlining appropriate resources for use in primary schools will become a regular feature of future editions. In *'Resources for Geography K-6'*, Lorraine Chaffer suggests a range of print and digital resources such as books, websites, CD's and Apps to support the K-6 content of the geography syllabus.

Regional conferences

Throughout the year GTANSW has been supporting primary and secondary teachers preparing for the implementation of the BOSTES Geography Syllabus K-10. Two regional conferences at Coffs Harbour and Wagga were organised to bring advice and ideas presented at the annual conference in April to country teachers.



Teachers using cartoons and visual resources to program at the Coffs Harbour GTANSW regional conference

Videod lectures

The 2016 HSC lecture series will be placed on the GTANSW website at end of Term 3. They will be available until the Geography examination is over. The lectures can be used by teachers for tutorials before the HSC exam.

Arthur Phillip Fieldwork Competition

A reminder to GTANSW members across the state to start collecting student entries for the Arthur Phillip Fieldwork awards

Competition entry forms have been revised to include Primary student entries and a greater emphasis on fieldwork and citizenship for secondary student entries. The aim of this is to increase the eligibility of entries for civics and citizenship awards. Look for the entry flyer in this bulletin, on the GTANSW website and in your school.



COS Building, 25 Nyrang St Lidcombe. Source: J Sillar

Please note the new GTANSW Office address for mailed and delivered fieldwork entries.

Entries can be mailed to:

GTANSW Office
PO Box 699 Lidcombe 1825

Please contact our office on 9716 0378 prior to delivering entries to the following location:

Lower Ground Floor, COS Building,
25 Nyrang St. Lidcombe

SPECIAL HSC BULLETIN EDITION

HSC teachers are encouraged to submit articles on sections of the three HSC Geography syllabus topics. This will assist new HSC teachers and those looking for updated resources to effectively teach the HSC course as they await news of a possible new HSC Geography course in the future.

This will be a resource by teachers for teachers.

See the back page of this bulletin for guidelines on presenting an article for publication. Email the editor with your proposal first to avoid overlapping with other writers.

Lorraine Chaffer Editor





Wagga Wagga – Friday 12 August 2016

This regional conference will focus on implementing the new NSW Geography K–10 Syllabus

Conference Programmes

TIME	ACTIVITY	PRESENTERS
8.30am – 9.00am	Registration	
9.00am – 9.45am	Keynote 1: Overview of key features of the new syllabus	Susan Caldis
9.45am – 10.30am	Keynote 2: Inquiry based learning	Grant Kleeman
10.30am – 11.00am	MORNING TEA	
11.00am – 12.30pm	WORKSHOP 1: Programming Stages 1 to 5	Lorraine Chaffer (Stage 1 to 3) Susan Caldis (Stage 4 and 5)
12.30pm – 1.00pm	LUNCH	
1.00pm – 1.30pm	Cross-Curriculum Priority: Asia	Susan Caldis
1.30pm – 3.00pm	WORKSHOP 2: Tools and Skills or Fieldwork for Primary	Grant Kleeman/Sharon McLean Lorraine Chaffer

Conference Cost

- Member \$150 member, Non-member \$180, Uni Student concession \$40

Regional conference registration available at www.gtansw.edu.au



Geography Teachers Association of NSW through the Professional Teachers' Council NSW – Board of Studies, Teaching and Educational Standards (BOSTES) (formerly the NSW Institute of Teachers) as the endorsed provider of Institute Registered professional development for the maintenance of accreditation at Proficient, Highly Accomplished, and Lead levels.

Scope of Endorsement

- All Standards of the Australian Professional Standards for Teachers at the level of Proficient and Highly Accomplished
- Standards 1-7 of the Australian Professional Standards for Teachers at the Lead level

Completing the *Geography: Thinking Ahead*, 12 August 2016 will contribute 5.40 hours of QTC Registered PD addressing 3.3.2; 6.2.2; 7.4.2 from the Australian Professional Standards for Teachers towards maintaining Proficient Teacher Accreditation in NSW.

www.gtansw.org.au

UNPACKING THE K–10 SYLLABUS:

Geographical inquiry skills & tools

Lorraine Chaffer
Vice President GTANSW
Geography Education Consultant

Glossary

Geographical data – quantitative or qualitative information about people, places and environments

Primary data – original materials collected by someone eg field notes, measurements, responses to a survey

Secondary information sources – sources of information collected, processed, interpreted and published by others eg census, newspaper articles and images or information in a published report.

Ethical protocols – the application of fundamental ethical principles when undertaking research and collecting information eg confidentiality, informed consent, citation and integrity of data.

NSW Syllabus for the Australian Curriculum Geography K–10 (BOSTES)

GEOGRAPHICAL INQUIRY SKILLS

In the NSW syllabus K–10 *Geographical Inquiry Skills* refers to the processes of acquiring, processing and communication geographical information.

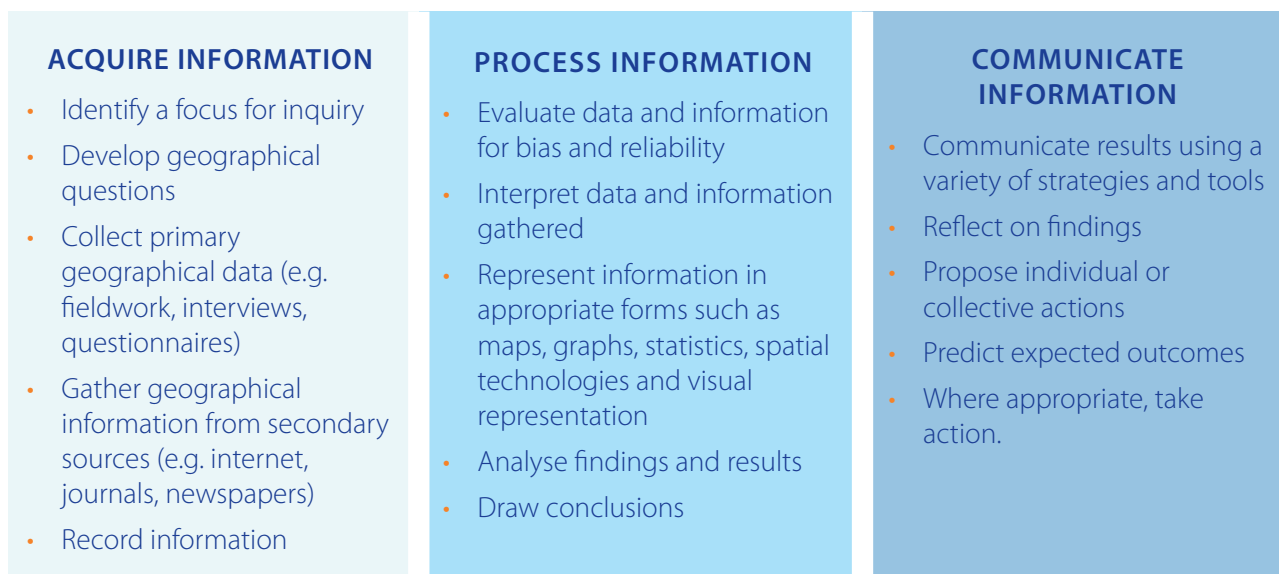


Figure 1: Geographical Inquiry skills. Adapted from NSW Syllabus for the Australian Curriculum Geography K–10 (BOSTES)

Throughout their studies Geography students will use elements of geographical inquiry such as studying a map or photograph in class, developing a question to investigate, taking photographs during fieldwork and using ICT to create a presentation.

Geographical inquiry is NOT A LINEAR PROCESS but a set of interconnected components. Inquiry can start with any of the activities in the Geographical Inquiry Skills

framework. As students progress from K–10 they will build their inquiry skills to the point where they can undertake an independent inquiry activity drawing on all components of the inquiry process.

Figure 2 was developed to assist teachers to unpack the different components of Geographical Inquiry and see relevant interconnections.

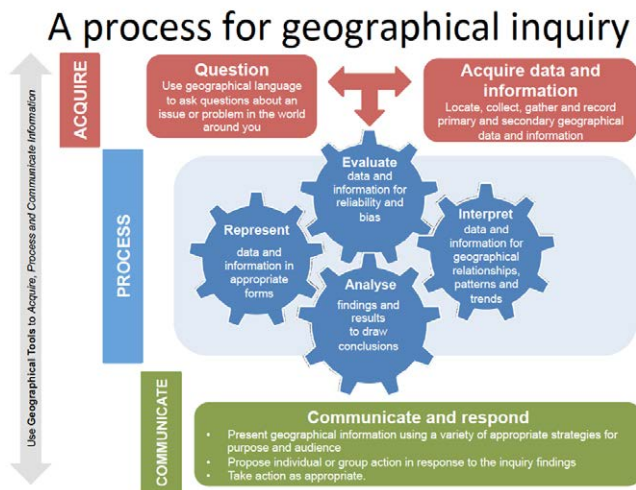


Figure 2: A process for geographical inquiry

Source: *Human Society and Its Environment Geography K-10 Teaching and Learning Framework*, NSW Department of Education. (Page 2)
www.hsiensw.com/geography-k-10.html

GEOGRAPHICAL TOOLS

Geographical Tools are used during geographical inquiry to acquire, process and communicate information – they include maps, fieldwork, graphs & statistics, visual representations and spatial technologies. Tools should be used to show geographical information at a range of scales.

Explicit teaching of the **rules, protocols and conventions** (previously referred to as skills) is essential for students to correctly use geographical tools, for example, stating latitude readings before longitude when locating places on a map and using ethical principles when collecting personal information during fieldwork.

The K–10 **Geographical Tools Continuum** provides examples of tools students **may use** in each stage of learning. Students are to be provided with opportunities to engage with each of the geographical tools in each stage. Teachers make decisions about the tools appropriate for the intended learning.

It is expected that by the end of stage 5 students will be familiar with a range of tools in each category of the skills continuum. It is also intended that students progressively move from using tools to acquire geographical data and information in the earlier stages of learning, to using tools for representing, synthesising and communicating the findings of geographical inquiry in later stages.

To avoid confusion about different tools and types of geographical information refer to the **Glossary** at the end of the Geography K-10 Syllabus.

TEACHING IN CONTEXT

Geographical inquiry skills and tools should be used to enhance student's geographical knowledge and understanding of syllabus content. For example:

- Using photographs to examine the characteristics of places (K–10)
- Examining topographic maps to study Earth's Environment (Stage 2) or landforms and water catchments (Stage 4)
- Identifying trends in global food production (Stage 5) using graphs, statistics and tables
- Creating flow diagrams and maps to represent connections between places (Stages 2 and 4)
- The use of synoptic charts to investigate hydrologic or atmospheric hazards such as cyclones and floods (Stage 4) or to explain environmental change such as the impact of east coast lows on coastal environments (Stage 5).

See Figure 12 for examples from each stage.

FIELDWORK

Fieldwork is **mandatory** tool in all stages of geographical inquiry. Students work outside the classroom to observe, measure, collect and record their own geographical information and represent that information. Information obtained in this way is known as **Primary data**. As students progress from Stage 1 to Stage 5 they will also move from guided fieldwork activities to independent inquiry



Figure 3: Students undertaking fieldwork
Source Macmillan: *Keys to fieldwork. Essential tools and skills*

UNPACKING THE K-10 SYLLABUS: Geographical inquiry skills & tools

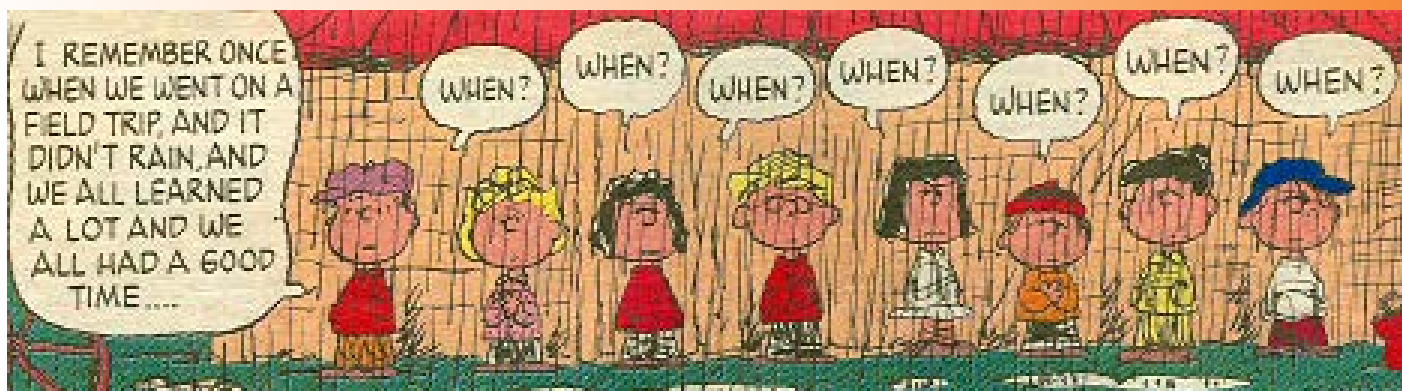


Figure 4: The value of fieldwork Source: www.sln.org.uk/geography/images/Cartoon%203.jpg

Fieldwork activities should

- be planned
- link to outcomes and content
- have a purpose eg a key inquiry question and post fieldwork task
- contain structured activities
- be identified in teaching program and scope and sequence documents
- involve students in actively gathering geographical data

Fieldwork activities may

- take place in a range of locations determined by the content. Sites can include school grounds; a local street or shopping centre or a distant place eg national park, coast, city
- be run by a classroom teacher or an environmental education or fieldwork provider such as Department of Education and Communities Environmental Education Centres, museums and zoos.

Fieldwork should be fun, engaging and productive. The findings from a fieldwork activity should be used to create something that will communicate a student's acquired knowledge and understanding – a map, model, story, report such as an explanation, or digital presentation.

Fieldwork equipment: High tech or low tech

Fieldwork equipment can be simple, for example laminated cloud identification charts, or more sophisticated such as

chemical water testing kit and apps on a smart phone or tablet device such as Solocator (iPhone app that adds location, direction and altitude to a photograph), Skitch (for annotating photographs) and Decibel (for determining noise levels). Fieldwork activities should be designed to allow students to collect data relevant to an inquiry.

Examples of simple fieldwork activities

- Use a compass to determine the direction of places
- Use a GPS to determine latitude, longitude and altitude of places on a walk
- Measure distance travelled using a pedometer, trundle wheel or GPS
- Collect samples eg plants
- Measure air temperature using thermometers
- Observe cloud cover and cloud type using a simple grid and a cloud chart
- Observe and sketch features of places
- Look and listen for evidence of wildlife eg footprints
- Observe and record landuse along a street
- Construct a transect to show change in an environment over a distance
- Complete a field sketch or annotated digital photograph of a place and its features
- Conduct a tally eg cars on a local street
- Undertake surveys or interviews

SPATIAL TECHNOLOGIES

Spatial technologies are geographical tools, to be used along with maps, graphs and statistics, fieldwork and visual representations to acquire, process and communicate geographical information. The "Continuum of Tools" in the syllabus provides examples of spatial technologies that could be used at each stage of study.

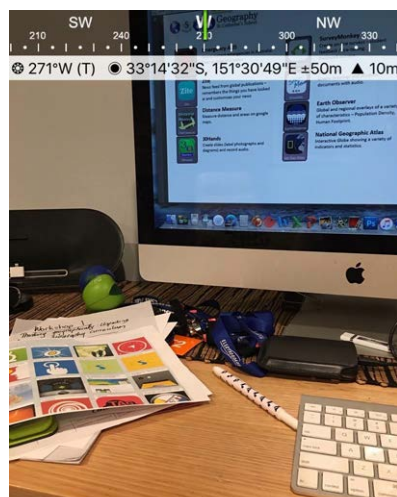


Figure 4: Solocator app. Source: L Chaffer

Stage	Spatial Technologies
ES1	Virtual maps
S1	Virtual maps Satellite images
S2 & S3	Virtual maps Satellite images Global positioning systems (GPS)
S4	Virtual maps Satellite images Global positioning systems (GPS) Geographic information systems (GIS)
S5	Virtual maps Satellite images Global positioning systems (GPS) Geographic information systems (GIS) Remote sensing data Augmented reality

Figure 5: Tools continuum for spatial technologies

Source: <http://syllabus.bos.nsw.edu.au/hsie/geography-k10/continuum-of-tools/>

GPS and GIS

A car GPS (Geographic Positioning System) used to get people to places and a phone used to find the nearest toilet block or to track a pizza are GPS and GIS applications. A GPS device locates places via satellite. The device can also collect data about a place eg latitude, longitude, altitude eg Garmin Sports app. The GPS device in a car or phone collects spatial data and plots it on a base map. Many mobile and tablet apps use existing GPS data to show the location of places on maps eg toilets. The Track my pizza app is a good example of a GIS application in action.

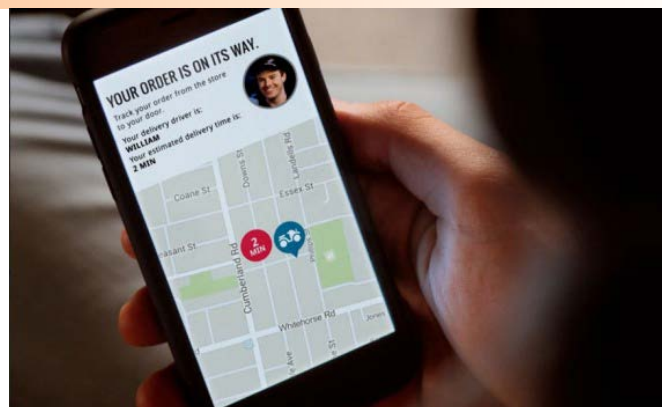


Figure 6: Track your dominoes pizza Source: www.smh.com.au/digital-life/digital-life-news/dominos-drivertracking-lets-you-follow-a-pizza-from-the-oven-to-your-door-20150507-ggw857.html

WHAT A RELIEF

The app uses the smart phone's GPS to help you locate the nearest publicly accessible toilet(s)

- Once the nearest toilet is located, the app will provide you the shortest route, via GPS, to the exact location
- App will enable users to write a review on existing facilities available at the toilets

Find a toilet

Users of this app can also add toilets that are not already listed for the benefit of others through crowd-sourcing

Figure 7: Find me a toilet app. Source: www.thehindu.com/news/cities/Delhi/app-to-locate-nearest-public-toilet/article8329300.ece

The digital mapping of spatial data is known as a GIS (Geographic Information System). Layers of information are placed over base maps such as a street map or aerial photo to create a visual image. Sophisticated GIS maps can have many layers of information created using computer hardware and software that captures, stores, organises, analyses and communicates spatial or geographical data. This data comes from remote sensing satellites.

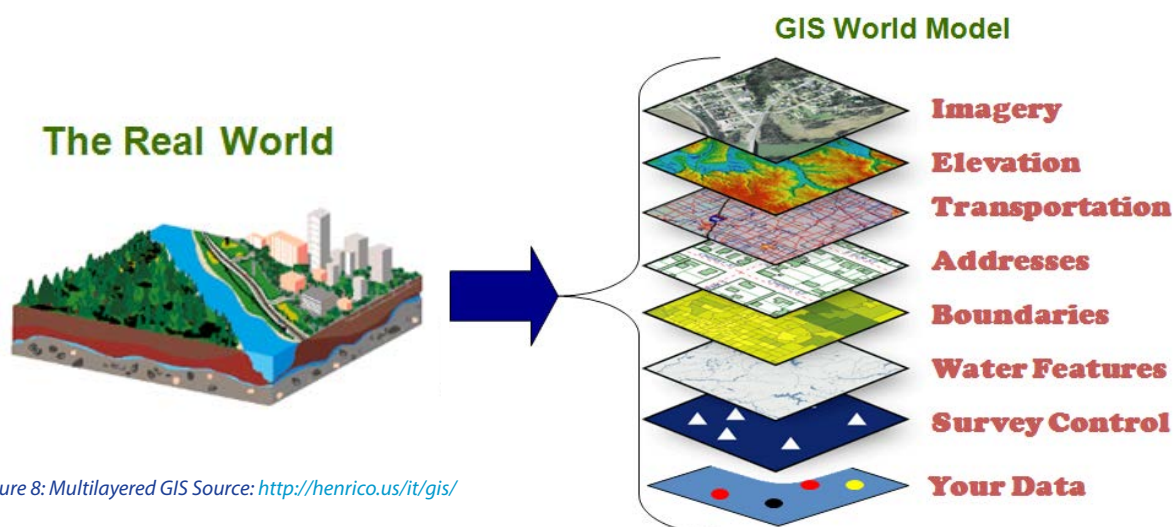


Figure 8: Multilayered GIS Source: <http://henrico.us/it/gis/>

UNPACKING THE K-10 SYLLABUS: Geographical inquiry skills & tools

There are many GIS based phone and tablet apps suited to classroom use, for example Shipfinder or Planefinder (different versions for iPhone and android). Planefinder is excellent for showing interconnections between places at a range of scales – local to global.

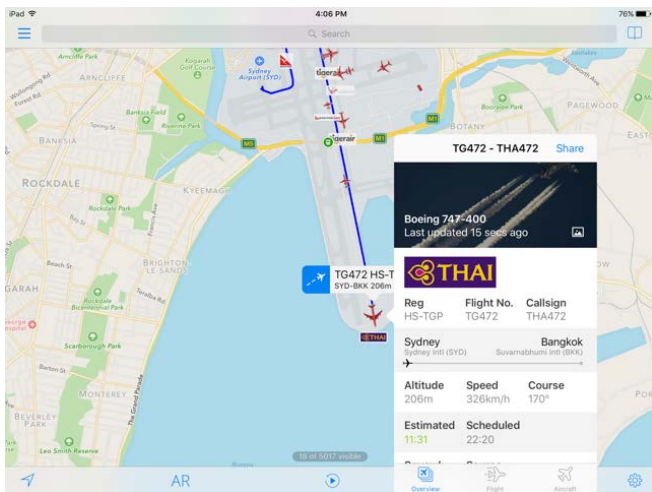


Figure 9: Planefinder app is an interactive GIS application Source: L Chaffer

GIS and fieldwork

Geography students can plot data collected at different **fieldwork** locations to create a simple GIS map. Google maps, Google Earth, National Geographic Mapmaker and Scribble Maps can be used to create a GIS to show geographical information.

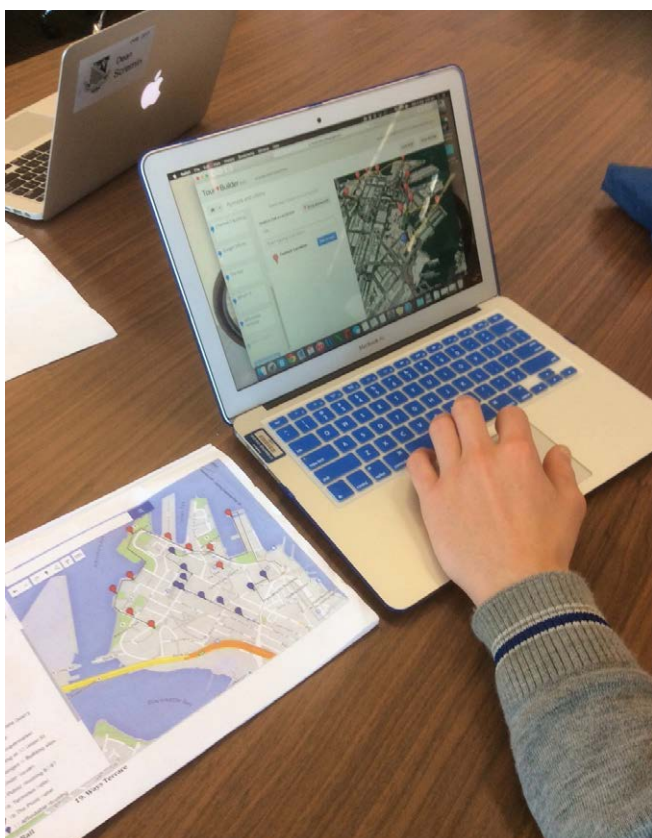


Figure 10: Student creating a Google Tour using fieldwork locations and data. Source: L Chaffer

The importance of spatial technologies in Geography

Spatial technologies are

- Sources of geographical information
- Ways of presenting geographical data
- Applicable to environmental management and disaster relief
- Provide career option for students –spatial technologies are a recognised growth area in employment

Applications of GPS and GIS in the geography classroom

- Collecting data about a location using a GPS device
- Geocaching – treasure hunts using GPS devices
- Creating maps to show the location of places and spatial distributions eg forests
- Plotting fieldwork data on a map to create a tour
- Showing changing spatial patterns using fieldwork data eg declining water quality along a river

Figure 11 can be used to evaluate teacher confidence in using and teaching about the range of geographical tools identified in the NSW K -10 Geography syllabus. The resulting analysis can be used to undertake professional learning in identified areas of weakness.

Resources

NSW Syllabus for the Australian Curriculum Geography K-10 (BOSTES) – <http://syllabus.bostes.nsw.edu.au/hsie/geography-k10/>

NSW Department of Education: Human Society and Its Environment Geography K-10 Teaching and Learning Framework (Page 2) – www.hsiensw.com/geography-k-10.html

Environmental Education Centres in NSW – www.curriculumsupport.education.nsw.gov.au/env_ed/centres/

What is GIS? – www.youtube.com/watch?v=oMUGp0rGf7I
www.youtube.com/watch?v=kEaMzPo1Q7Q

GIS and GPS careers – www.youtube.com/watch?v=M7tK9CjRmIo

Track your Dominoes pizza – www.youtube.com/watch?v=uotknd6hlxk

Contour Education YouTube channel – www.contoureducation.com/links

Books

Keys to Geography: Essential tools and skills. Revised Edition

Keys to Fieldwork: Essential skills and tools

TEACHER SELF-ASSESSMENT: Using geographical tools to acquire, process and communicate

TOOLS	NOT CONFIDENT	DEVELOPING	CONFIDENT
Maps			
Pictorial maps			
Using a globe			
Large-scale maps			
Small-scale maps			
Sketch maps			
Précis maps (S)			
Political maps			
Flowline maps			
Synoptic charts (S)			
Latitude & longitude. Degrees and minutes (S)			
Direction (cardinal)			
Direction (bearings) (S)			
Measure distances using scale			
Calculate area (S)			
Use map references to locate places			
Use grid and area references (S)			
Describe spatial distributions and /or patterns			
Visual representations			
Photographs, photo / field sketches			
Aerial photographs			
Flow diagrams			
Annotated diagrams			
Cartoons			
Mind maps (S)			
Multimedia			
Web tools			
Graphs & Statistics			
Tally charts			
Pictographs			
Line graphs			
Column graphs			
Pie graphs			
Scatter graphs			
Weather data			
Climate graphs			
Multiple tables / graphs on a geographical theme			
Statistics to find patterns and trends			
Population profiles (S)			
Fieldwork			
Observing, measuring, collecting and recording			
Conducting surveys and / or interviews			
Fieldwork instruments – eg. measuring devices, compasses, photographs, identification charts, GPS, GIS			
Spatial Technologies			
Virtual maps			
Satellite images			
Global positioning systems (GPS)			
Geographic Information Systems (GIS)			

Figure 11 Geographical tools from the K-1 Geography syllabus ((S = Suggestions for secondary only

UNPACKING THE K-10 SYLLABUS: Geographical inquiry skills & tools

Figure 12: Examples from each stage

SOME IDEAS for Integrating Tools and skills into teaching & learning activities for K-6

STAGE	GEOGRAPHICAL TOOLS					GEOGRAPHICAL INQUIRY SKILLS		
	Maps	Fieldwork	Graphs & Statistics	Spatial Technologies	Visual Representations	Acquiring	Representing	Communicating
						People live in places		
ES1	Types of maps Pictorial maps	Activities Observing and recording data	Tally cards Types of graphs Pictographs	Virtual maps	Photographs Illustrations Story books Multimedia	Use a story books with illustrations to examine places where people live Undertake fieldwork to observe and record data on the features of a special place	Represent features identified in a place using a pictograph Draw conclusions about how places can be represented using maps e.g. virtual maps Develop a pictorial map representing the classroom	Label the special features of a place on photographs . Discuss why a place portrayed in a story book or photograph should be looked after.
1	Types of maps Pictorial maps Large scale maps World map Globe	Activities Observing, collecting and recording data Conducting surveys	Tally cards Data tables Weather data Types of graphs Pictographs Column graphs	Virtual maps Satellite images	Photographs Illustrations Diagrams Story books Multimedia Web tools	Features of places		
						Use story books and multimedia to examine list of the natural and human features of different places Use a fieldwork activity to collect and record weather data at a local place Observe the features of a place using satellite images	Use an aboriginal calendar diagram to draw conclusions about cultural differences in how seasons are represented Draw a column graph to show seasonal variations in rainfall at different places in Australia using climate data tables .	Create a large scale map to show the location of local places Use a web tool to create a word cloud summarising the natural and human features of a place
						People and places		
						Use a pictorial map of Australia to identify places at different scales Use a globe to identify Australia's location in the world Conduct a survey the identify and record family connections to places	Annotate a world map showing connections to places identified in a survey Discuss a multimedia presentation about Aboriginal and Torres Strait Islander People's connections to places	A student describes a place they visit and give a reason for visiting that place using a map , a photograph , an illustration or an item in a show and tell lesson.

STAGE	GEOGRAPHICAL TOOLS					GEOGRAPHICAL INQUIRY SKILLS		
	Maps	Fieldwork	Graphs & Statistics	Spatial Technologies	Visual Representations	Acquiring	Processing	Communicating
2	Types of maps Large scale maps World map Globe Sketch maps	Activities Observing, measuring, collecting and recording data, Conducting surveys or interviews Fieldwork instruments measuring devices, maps, photographs	Tally cards Data tables Simple statistics Types of graphs Pictographs Column graphs	Virtual maps Satellite images GPS	Photographs Illustrations Diagrams Story books Multimedia Web tools	Use a world map to identify and list Australia's neighbouring countries in Asia and the Pacific Examine satellite images and a world map to compare urban settlement patterns in Australia and Asia – record location, distances and the distribution of settlements	Places are similar and different Use the True Size web tool to compare the size of different countries and draw conclusions about the size of Australia Use photographs, simple statistics, column graphs and maps to draw conclusions about similarities and differences in Australia and its neighbours	Create a diagram or data table to summarise key differences between Australia and a neighbouring country or a city in each place. Create a two-sided story book using illustrations or photographs to compare the daily life of people in two places. Use books e.g. <i>Mirror</i> by Jeannie Baker to stimulate ideas
	Maps to identify location, direction, distance, map references, spatial distributions and patterns					The earth's environment Undertake fieldwork to observe, measure and record data physical features of a local environment. Use a geocaching activity and GPS device to collect information about natural features of an environment	The earth's environment Identify distributions of different type of vegetation using world virtual maps Create a diagram to represent the connections between natural features of an environment	Student groups develop a simple multimedia presentation or web tool to describe an environmental issue and outline a proposal for better management of the related environment.
3	Types of maps Large scale small Scale maps Sketch maps Political maps, Topographic maps Flowline maps Maps to identify location, direction, distance, map references, spatial distributions and patterns	Activities Observing, measuring, collecting and recording data, Conducting surveys or interviews Fieldwork instruments measuring devices, maps, photographs and compasses, GPS.	Data tables Types of graphs Pictographs Column graphs Line graphs Climate graphs Multiple graphs on a geographical theme Statistics to find patterns	Virtual maps Satellite images GPS	Photographs Aerial photographs Illustrations Flow diagrams Annotated diagrams Story books Multimedia Web tools	Use media reports, maps and photographs to record data about the causes and effects of one contemporary bushfire disaster in Australia. Undertake fieldwork to observe, measure and record data showing a recent change to a local environment	Factors that shape places Analyse climate graphs to draw conclusions about human activities in different locations Interpret a topographic map to determine links between landforms and settlement Graphs statistics from data tables of bushfires in Australia	Create an illustrated bushfire minimisation poster that includes one flow diagram and relevant diagrams . Summarise the impacts of people and environments on places using an annotated diagram or mind map .
							A diverse and connected world Analyse world maps to identify different cultural groups Discuss how photographs and media reports influence people perceptions of places	Create a simple flow map using immigration statistics for African countries to Australia and describe the patterns shown Curate a collection of photographs to illustrate the benefits of intercultural understanding.

SOME IDEAS for integrating tools and skills into teaching & learning activities for 7 – 10

STAGE	GEOGRAPHICAL TOOLS				GEOGRAPHICAL INQUIRY SKILLS					
	Maps	Fieldwork	Graphs & Statistics	Spatial Technologies	Visual Representations	Acquiring	Processing	Communicating		
4	Types of maps Sketch maps, Relief maps, Political maps, Topographic maps Flowline maps, Choropleth maps, Isoline maps, Precis maps, Cartograms, Synoptic charts Maps to identify direction, scales and distance, area and grid references, latitude and longitude, altitude, area, contour lines, gradient, local relief	Activities Observing, measuring, collecting and recording data Developing and conducting surveys and interviews Fieldwork instruments Weather instruments, vegetation identification charts, compasses, GPS, GIS	Data tables Types of graphs Pie Graphs Column graphs Compound column graphs Line graphs Climate graphs Population profiles Multiple tables and graphs on a geographical theme Statistics to find patterns and trends	Virtual maps Satellite images GPS GIS	Photographs Aerial photographs Illustrations Flow charts Annotated diagrams Multimedia sources Field sketches Cartoons Web tools	Use topographic maps to identify distinctive landform features in a place or environment Take photographs and make observations & measurements of a local landform as a fieldwork activity	Create field sketches to record features of distinctive landforms Examine climate graphs to explain the distribution of landscapes Analyse vulnerability to geomorphic hazards e.g. landslides using photographs, climate graphs and relief maps .	Use annotated diagrams to explain the formation of distinctive landforms (geomorphic processes) Create a Google Tour GIS to show the global distribution of one type of geomorphic hazard and its consequences		
							Place and liveability			
							Collect photographs of places that illustrate differences in liveability Develop a set of criteria as a fieldwork instrument to assess the liveability of a place	Draw conclusions about the liveability of places for different age groups by analysing population profiles Create a multimedia presentation to describe and explain how liveability could be enhanced in a local place. A sketch map , annotated diagram and photograph should be included.		
							Water in the world			
							Use isoline maps, choropleth maps and multiple tables and graphs to describe the spatial distribution of water resources in Australia and other countries Use fieldwork instruments to measure water quality in a local water source	Analyse satellite images, GIS and topographic maps to draw conclusions about how water connects people and places in a catchment Interpret synoptic charts to explain a contemporary atmospheric or hydrologic hazard. Using a web tool such as Weebly or Glogster to present a proposal for addressing water scarcity in one place or country Create a flow chart illustrating the consequences of unsustainable water use		
					Interconnections					
					Develop and conduct interviews and surveys to determine the factors influencing teenagers connections to local places Study choropleth maps to identify and countries that are major global tourist destinations.	Examine graphs to determine trends in trade connections between places over time Analyse photographs, satellite images or multimedia resources to draw conclusions about the impacts of tourism on a place		Create a flowline map from data tables to illustrate the flows of people or a manufactured good between places at a global scale Collate a collections of cartoons, photographs and multimedia to illustrate Australia's connections to places in Asia		

UNPACKING THE K-10 SYLLABUS: Geographical inquiry skills & tools

STAGE	GEOGRAPHICAL TOOLS					GEOGRAPHICAL INQUIRY SKILLS		
	Maps	Fieldwork	Graphs & Statistics	Spatial Technologies	Visual Representations	Acquiring	Processing	Communicating
							Sustainable biomes	
5	Types of maps Relief maps Political maps Topographic maps Flowline maps Cadastral maps Thematic maps Isoline maps Landuse maps, Précis maps Special purpose maps, Cartograms Synoptic charts	Activities Observing, measuring, collecting and recording data, Developing and conducting surveys and interviews Fieldwork instruments eg Weather instruments, vegetation identification charts, compasses, GPS, GIS	Data tables Types of graphs Pie Graphs Column graphs Compound column graphs Line graphs Scatter graphs Climate graphs Population profiles Multiple tables and graphs on a geographical theme Statistics to find patterns and trends and to account for change	Virtual maps Satellite images GPS GIS Remote sensing data Augmented reality	Photographs Aerial photographs Illustrations Annotated diagrams Multimedia Field and photo sketches Cartoons Mind maps Web tools	Examine thematic maps to identify biomes and describe their spatial distribution on a global scale Observe, measure, collect and record data about factors affecting agricultural production and challenges to production during a fieldwork visit to an Australian farm	Analyse scatter graphs OR climate graphs to determine relationships between climate and biome distribution Interpret case studies, synoptic charts, illustrations or annotated diagrams to draw conclusions about the causes of food insecurity	Write a speech explaining the challenges facing the production of one agricultural product at a global scale. Support your speech with photographs and illustrations . Debate the statement: "Technology will solve global food insecurity" using examples, maps, graphs and statistics to support an argument.
						Use line graphs, pie graphs, population profiles and /or thematic maps to acquire key facts about the urbanisation of the world's population.	Analyse choropleth maps, climate statistics and landuse maps to explain settlement patterns in Australia and one other country	Create an infographic that contains multiple tables and graphs, special purpose maps and photographs to illustrate trends in urbanisation.
						Environmental change and management		
	Maps to identify direction, scale and distance, area and grid references, degrees and minutes of longitude, latitude and bearings, aspect, altitude, area, density, contour lines, gradient, local relief					Create inquiry questions on an environment to investigate using the geographical inquiry process Conduct fieldwork to observe, measure, collect and record data using appropriate fieldwork instruments to complete the inquiry	Analyse aerial photographs to describe to one environment. Support conclusions with case studies from Use a précis map and photo sketch to record an area of change in a local environment	Create a mind map or consequence diagram to explain the consequences of one environmental change Write a letter to a local government member proposing and justifying a solution of a local environmental change issue – include a sketch map, photograph or diagram
						Human wellbeing		
						Use interactive web tools such as Gapminder to identify differences in wellbeing between countries Examine choropleth maps to identify differences in human wellbeing across Australia Interview a representative of an aid organisation	Interpret multiple graphs and tables on a theme to draw conclusions about the human well being of different groups of people in Australia. Analyse graphs and statistics to identify recent patterns and trends in indicators of human wellbeing. Mindmap findings.	Create a TED Talk multimedia presentation to summarise the findings of a geographical inquiry into one human wellbeing issue Develop a campaign using visual resources e.g. cartoons, illustrations and photographs to raise awareness of a human rights issue

ENGAGING WITH GEOGRAPHICAL TOOLS AND SKILLS

Sharon McLean
St Ignatius' College, Riverview
Counsellor GTANSW

Geographical tools such as maps, graphs and statistics, spatial technologies and visual representations are the **tools** that enable students to develop **skills** in gathering, processing and communicating information. These skills are not only of benefit to geographers they are applicable to many other subjects and are also valuable for employment in a variety of occupations.

Providing students with tactile experiences in using geographical tools promotes understanding and application of the tools. It also engages students in fun, practical activities, many of which can be outside the classroom. Below are some hands on activities that can be used to explain aspects of these tools that students can utilise to gather, process and communicate information.

MAPS

Types of Maps

Activity

Exploring different types of maps can be done by creating a "My World Book" as shown in the image below. This lets students create different types of maps: political, landform, resource, population, picture or street map. This can be adapted for a variety of age groups using images, drawings or stickers to create different maps.



S McLean

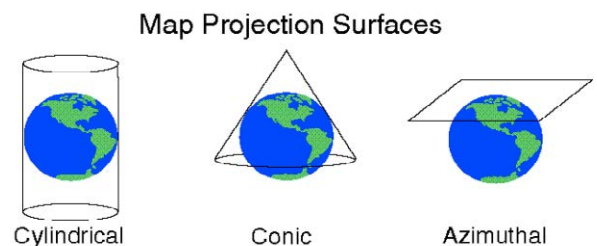
Map Projections

A map projection is a way to represent the earth's curved surface on a flat piece of paper. There are different types of projections; the three main ones are cylindrical, conical and azimuthal, though every flat map will distort the surface of the earth in some way.

Activity

A practical way to demonstrate a map projection is to wrap an orange in an A4 piece of paper to create a cylinder. The surface touching the paper around

the equator can be mapped accurately, the areas not in contact with the paper will be projected onto the paper and will be distorted.



Source: <http://www.ncgia.ucsb.edu/cctp/units/unit10/projsurfs.gif>

Latitude and Longitude

Latitude (shown as a horizontal line) is the angular distance, in degrees, minutes, and seconds of a point north or south of the Equator. Lines of latitude are often referred to as parallels of latitude. Longitude (shown as a vertical line) is the angular distance, in degrees, minutes, and seconds, of a point east or west of the Prime (Greenwich) Meridian Lines.

Activity

Using an orange as the globe is a hands-on approach and can be used in conjunction with Google Earth to establish the basic conventions of reading latitude and longitude.

1. Draw a line around the centre of their orange and name the Equator. Identify northern and southern hemispheres.
2. Draw a line halfway between the North Pole and the Equator and another halfway between the South Pole and the Equator, label the line 45°.

Engaging with geographical tools and skills

3. Draw half way between the Equator and 45° latitude in both the northern and the Equator, label the Tropics of Cancer and Capricorn.
4. Ask students what they notice about the lines they have drawn (parallel and equidistant).
5. Teacher or students peel the orange and the segment lines can be used to identify lines of longitude and identify East and West hemispheres. Ask students what they notice about the segment lines. (Intersect at the poles and therefore not parallel).



Source: <http://www.nea.org/tools/tips/Pumpkin-Geography.html>

Latitude and Longitude (continued)

Other activities include:

- making a latitude and longitude grid in the playground
- dividing the class room into hemispheres and students group desks into continents
- using pumpkins to make a globe.
- There are a myriad of websites and worksheets that can be used to assist in explaining latitude and longitude.
- Battleships game <http://passporttothenations.com/battleship-map-coordinates-game/>

Topographic Maps

• Scale

The scale on a map is a statement of the relationship between the measurement on the map and the corresponding measurement on the earth's surface. Below are common scales used on topographic maps. A scale of 1:100 000 means 1cm on the map **represents** 100 000 cm on the ground.

Scale	Fraction	Meters	Kilometers
1:100 000	$\frac{1}{100000}$	1000m	1km
1: 50 000	$\frac{1}{50000}$	500m	.5km
1:25 000	$\frac{1}{25000}$	250m	.25km

Large scale maps show more detail while small scale maps cover more area. A map with a scale of

1:20 000 means that the features on the map are drawn at 1/20000 of their actual size. A map with a scale of 1:50 000 means that the features on the map are 1/50000 of their actual size. 1/20000 is a larger fraction than 1/50000 and so the map 1:20000 is a larger scale map.

Activity

- * Use the **“My World Book”** to investigate small and large scale maps.

- * Google Earth can also be used to zoom to show small and large scale maps.
- * Students measure and draw their classroom, bedroom, playground to scale.

• Area References and Grid References

Topographic maps show the specific details in a relatively small area on the ground, such as landform features and urban areas. Latitude and longitude is useful for locating places on small scale maps

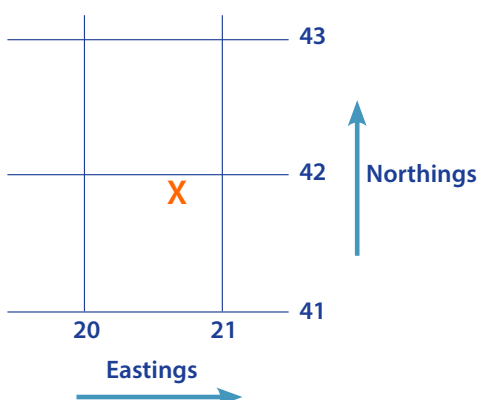
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MAPPING IT OUT: NSW Rural Fire Service media liaison officer Greg Potts with RFS members, 2009. Source: www.batemansbaypost.com.au/story/1030122/deua-fire-threat/

though on larger scale maps a grid system is used to locate specific features. The (horizontal) east-west axis grid numbers are called Eastings, and (vertical) north-south axis are called Northings. Eastings are always written before Northings. An area reference is located by using the bottom left hand corner of the grid square.

Area references are 4 figures: **eastings** before **northings**, bottom left hand corner of the grid.



For example the Area Reference for **X** is AR2041.
Grid references are 6 figure references that provide a more specific location.
The Grid Reference for **X** is GR207418.

Activity

Floor Map

Create a grid on the floor in the classroom or on a large sheet that can be folded up when not in use. Students use cards to place features on the map and record Area References and Grid References.

Materials

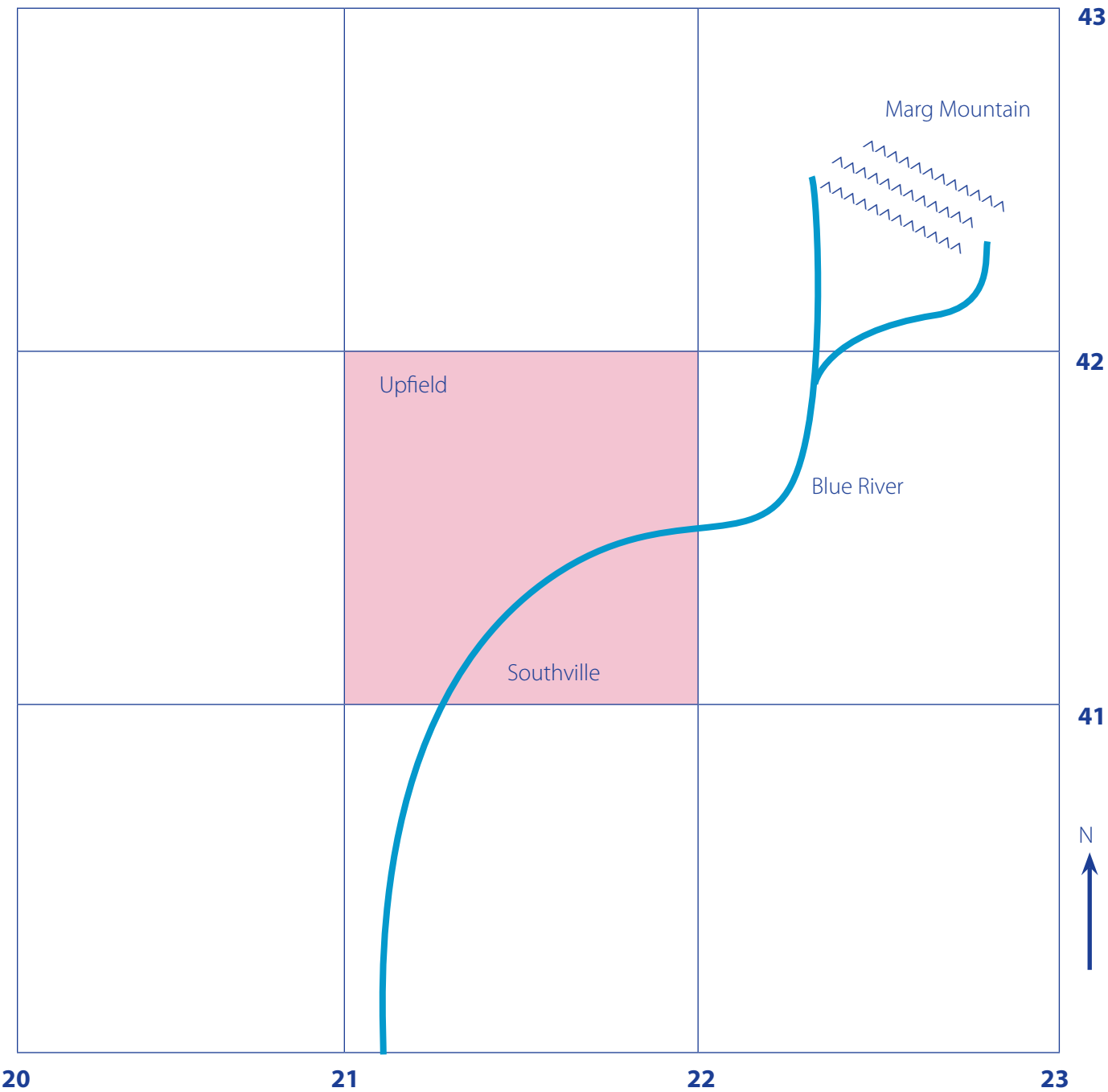
- Masking tape or string
- Grid numbers
- Packs of place cards labeled house, farm, mine, school, red, orange, and green environment cards.
- Marker cones or egg cartons for mountains
- Blue ribbon or streamers for rivers
- Worksheet

A floor map made using a large sheet can be reused



Activity: Floor Map

School Town



20 21 22 23

Scale 1cm: 500m

Legend

^^^^^^	Mountain
————	River
	Urban area
F	Farm
H	House
M	Mine
S	School

Worksheet for “School Town” Map

1. In the pack of cards you have been given, place the farm, house, mine and school cards on the floor map where you think is appropriate. Place a symbol for this feature on your map.

Feature	Symbol
Farm	
House	
Mine	
School	

2. In the table below record the Area Reference and Grid Reference of your cards.

Feature	Area Reference (4 figures)	Grid Reference (6 figures)
Farm		
House		
Mine		
School		

3. Look at where you have placed the house, school, farm and mine. In the table below list three environmental issues that could occur. Place a red card (severe environmental issue), orange card (potential environmental issue) and green card (no environmental issue) on the floor map.

	Environmental Issues
1	
2	
3	

4. Outline how you could prevent the red and orange environmental issue from occurring.

Red	
Orange	

Engaging with geographical tools and skills

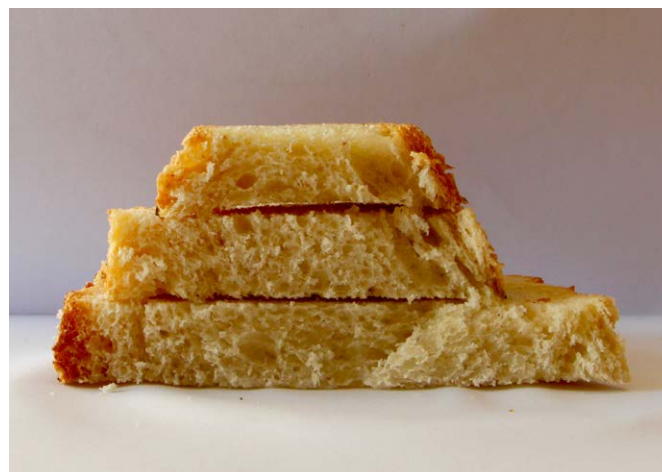
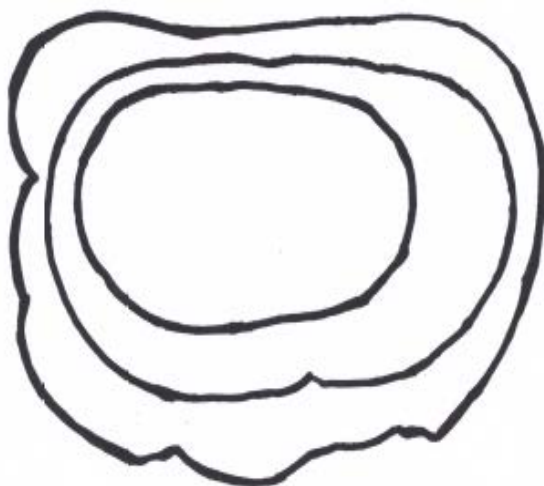
Contours

Contours join places of equal height and indicate the shape of the landforms.

Activity

A variety of products can be used to explain contours and landform features such as plasticine, Plaster of Paris, play dough, thick cardboard and bread.

Using three slices of sourdough or similar breads can create "Bread Hill". Students build "Bread Hill", and look at the bird's eye view of the landform. Dismantle the hill and then draw a line around each piece of bread to create a contour map. The hill can be constructed again, cut in half to create a cross-section view.



K Hilyard



K Hilyard

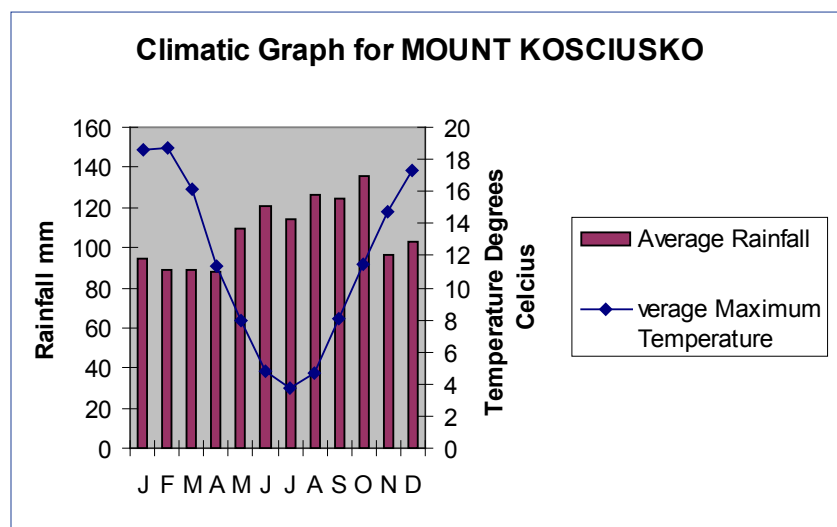
GRAPHS AND STATISTICS

Collecting statistics and creating graphs is a good way to incorporate fieldwork activities and use graphs to enable data to be communicated and interpreted.

Activity

Collect temperature, rainfall, wind information and create daily wall chart for the classroom. Simple instruments can be made such as the wind vane below. Students can look at patterns and also use the Bureau of Meteorology to look at longer term climate data. Climate graphs can be used to promote thinking and interpretive skills. The climate graph on page 18 and questions are adapted from David Leat's *Thinking through Geography*.

Living in Mount Kosciuszko



S McLean

Engaging with geographical tools and skills

1. Look at the climate graph on page 20, what patterns do you see?
2. Try to work out which month fits each of the five statements best.
3. Write down your reasons for choosing the month.

	Statement	Month	Reason
1	Today was the hottest day of the year		
2	There has been the most rain all year		
3	Today it was chilly and raining		
4	We have to keep fires burning all day to keep warm		
5	Many tourists come for bushwalks to Mount Kosciuszko		

VISUAL REPRESENTATIONS

Activity 1

This activity is applicable to natural and human features of the environment and factors that change places.

Divide students into small groups, each with an image from "Window" by Jeanie Baker.

Using the visible thinking routine ask each group to identify what they "see, think and wonder". Each group spends five minutes on each image. Groups then share their ideas.

Students can write a storyboard for the images or research change in their local area and create their own "window" into their area.



Activity 2

The thinking routine "think, puzzle, explore" can be used to start a topic and can be relevant to any topic. The images below on the timber industry in New Zealand would be a good starting point for Environmental Change and Management.



Picton, New Zealand (P McLean)



Napier, New Zealand (P McLean)

Engaging with geographical tools and skills

FIELDWORK

Fieldwork provides numerous opportunities in using tools to develop skills in acquiring, processing and communicating information outside the classroom and outside the textbook. Below is an example of how a survey can be used to gather information. The “Liveability Survey” that can be adapted to use in the local area and is applicable to Stage 4 Place and Liveability.

Observe what is around you and complete the liveability survey.

Measurement	Method of data collection	Count
Amount of traffic	Count passing traffic for 5 minutes	
Shops nearby	Look on a map or observe main shopping street	
Schools nearby	Observe	
Parks nearby	Observe	
Bus stops/taxis/transport	Observe	
Litter	Count amount	
Noise	Measure using iPhone app such as deciBel	
Housing ambience	Visit the street and decide ambience on a scale of 1-5	
Trees and gardens	Visit the street and decide how green the street is on a scale of 1-5	
Paths	Visit the street and decide how good are the paths on a scale of 1-5	
Streetlights	Visit the street and decide how effective are the streetlights in providing a well lit street at night on a scale of 1-5	

Give each measurement a score out of 5, with 5 being **excellent** and 1 being **poor**.

Amount of traffic

Many cars make a street dangerous and noisy. They can also cause pollution. It is harder for people to meet their neighbours if they live on a busy road.

1 Poor	2 Fair	3 Average	4 Good	5 Excellent
-----------	-----------	--------------	-----------	----------------

Access to shops

If shops are near to where you live you can easily get what you need.

1 Poor	2 Fair	3 Average	4 Good	5 Excellent
-----------	-----------	--------------	-----------	----------------

Access to schools

If there is a school nearby, children can walk to school which is better for them.

1 Poor	2 Fair	3 Average	4 Good	5 Excellent
-----------	-----------	--------------	-----------	----------------

Access to parks

Parks are places where children can play and people can do sport or walk the dog. They also look nice.

1 Poor	2 Fair	3 Average	4 Good	5 Excellent
-----------	-----------	--------------	-----------	----------------

Engaging with geographical tools and skills

Fieldwork (continued)

Fieldwork equipment can also be made by students to gather data.

Weather vane



Source: http://www.education.com/activity/article/wind_vane_first/

Resources

Area References and Grid References

<http://www.screenr.com/mEG>

Bearing

<https://www.screenr.com/vEG>

<http://subscription.echalk.co.uk/Geography/geography.html>

Cross Section

Echalk – <http://subscription.echalk.co.uk/Geography/geography.html>

<https://www.youtube.com/watch?v=StDYPluk25M>

Latitude and Longitude

http://www.bbc.co.uk/bitesize/ks3/geography/geographical_enquiry/geographical_skills/revision/6/

<https://www.youtube.com/watch?v=swKBi6hHHMA>

<http://www.nea.org/tools/tips/Pumpkin-Geography.html>

<http://passporttothenations.com/battleship-map-coordinates-game/>

Map Projections

<http://www.ncgia.ucsb.edu/cctp/units/unit10/projsurfs.gifSource>

Synoptic maps

http://www.bom.gov.au/lam/Students_Teachers/pressure.shtml

<https://www.youtube.com/watch?v=sbqZSzbGZjA>

Triangular Graph

<https://www.youtube.com/watch?v=jluVWDTpNcg>

Visible Thinking

http://www.visiblethinkingpz.org/VisibleThinking_html_files/VisibleThinking1.html

Weather Instruments to Make

<http://www.metoffice.gov.uk/learning/weather-for-kids/weather-station/wind-vane>

<http://www.metoffice.gov.uk/learning/weather-for-kids/weather-station/rain-gauge>

http://www.education.com/activity/article/wind_vane_first/

References

Baker, J. (2002) *Window* Second edition, London, Walker Books

Leat, D. (2008) *Thinking Through Geography* Fifth Edition, London, Chris Kingston Publishing

AGTA CONFERENCE 2017



The *2017 AGTA Conference: Geography for an inter-connected world* will be held from 9–12 January 2017 at the University of Melbourne in Melbourne. The conference organisational arrangements are being undertaken by the Geography Teachers' Association of Victoria.

Details will be available on the AGTA website including an invitation to present a workshop or lead a fieldwork trip, sponsorship options, conference accommodation, details of the pre-conference tour and conference program, earlybird registrations and conference newsletter are available at <http://www.agta.asn.au/>

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Stage 1

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- Let's Go Walkabout

Stage 2

- The Nature of Living Things
- The Wangal Walkabout

Stage 3

- Investigating the Mangrove Environment
- Bennelong and the Wangal

Junior Secondary Excursions

Geography NEW SYLLABUS

Stage 4

- Water in the World – A World-Class Suburb For Water Sensitive Urban Design
- Landforms and Landscapes – A Coastal Wetland
- Place and Liveability – Sydney Olympic Park: a place to live, work, learn and play

Stage 5

- Changing Places – Sydney Olympic Park: a colourful past, a bright future
- Environmental Change and Management – Challenges Of An Urban Wetland

Senior Secondary Excursions

- Biophysical Interactions / Ecosystems at Risk – Intertidal Wetlands
- Urban Places – Urban Renewal Case Study
- International Baccalaureate Programs

USING TECHNOLOGY TO ASSIST IN THE TEACHING AND LEARNING OF GEOGRAPHY

**Marco Cimino - HSIE Teacher,
Magdalene Catholic High School, Narellan**

Introduction

Geography may be one of the oldest disciplines in the world, however, that does not mean that the way it is taught in schools today should be equally as dated. Today, we have a wide variety of tools at our disposal to engage young people with their world. From personal experience, geography may be one of the toughest subjects to attract students if given the choice: many of them see geography as simply all about rocks and maps, however, it is so much more.

Thus, geography needs to address two issues in order to enter the 21st Century: it needs to provide students with authentic learning, giving them a real-world context; and it needs to utilise the technology at its disposal. It should ultimately keep in mind the following four elements of “digital learning” (State of Georgia’s Governor’s Office of Student Achievement, n.d.):

- **Time:** Learning is no longer restricted to the physical hours of the school day due to the growth of the Internet and the increase in Internet access. This means that students have the ability to learn at any time of the day.
- **Place:** Much like above, learning is now no longer restricted to within the physical walls of the classroom due to the Internet and an increase in Internet access. This has allowed students to learn anywhere and everywhere.
- **Path:** There are a range of new technological learning tools that has meant that students are now able to learn in their own style, thus leading to a more engaging approach. The benefits of these new learning technologies is that real-time data is made available to the teacher allowing them to modify and adapt a student’s learning needs. This easily provides for differentiation within lessons.
- **Pace:** Much like above, learning is now no longer restricted to the pace of the teacher or the rest of the class. New technologies now mean that students can learn at their own pace.

This paper will look at a variety of technological tools that could be easily integrated and used within the classroom in order to provide students with essential 21st Century skills and to give them a relevant and authentic geographical learning experience.

Social media

Social media often gets a bad rap, however, when used correctly, it can truly unleash a powerful learning experience. Twitter is one such example of a powerful social media tool. It provides teachers with the ability to connect with other educators from around the world. This allows a number of things:

- You can access real-time data and information from reliable sources
- You can engage in professional conversations with other around the world, allowing you to access new lesson ideas,
- You are able to grow your Personal Learning Network (PLN), giving you new professional development opportunities.

There are some organisational Twitter accounts that are particularly valuable in geography education, including:

- **The Australian Bureau of Statistics:**
This provides you with valid and reliable data direct from the Australian Bureau of Statistics (ABS), and the links take you straight to the relevant page, meaning you do not have to navigate the ABS site. This account is worth following simply because of the many uses the data provided has: it can be integrated within geography lessons or simply used as a reference source.
- **Census Australia:**
This gives you facts directly from the latest Australian Census. This account would be good for students in particular to follow as it gives them data with trivia about it as well. These resources can

Using technology to assist in the teaching and learning of geography

be useful for the New South Wales Geography K-10 syllabus units of 'Place and Liveability' when looking at communities and for investigating variations across Australia for the topic 'Human wellbeing'.

- **The Australian Bureau of Meteorology:**
This account provides you with both up-to-the-minute weather information and warnings, and also explanations of how weather and climate work. For example, videos and animations on how the El Niño-Southern Oscillation functions give students a clearer understanding of geographic processes.
- **National Geographic Education:**
Whilst this is North American, it still provides you with great resources that can be easily adapted to suit any classroom.

FAOknowledge, UN Development, UN Environment and Asia Education Foundation are other organisations that post geographically relevant tweets.

Tablet apps

A lot of individuals and entire classes also tweet about geography, giving you a host of tested lesson ideas. It is also possible to participate in Twitter chats or to simply read a hashtag's stream. A great hashtag is [#geographyteacher](#), which is constantly being used by educators worldwide to offer lesson ideas or links to useful websites. This offers up a world of professional learning to yourself, and easily searchable resources for your students. Meanwhile, Twitter chats are more structured and can generally take place at a certain time and follow a certain theme or set of questions. A great Twitter chat you can participate in is [#GeoChat](#). According to the chat moderators, this event happens at least once a month.

It is relatively easy to set-up a Twitter account (Twitter even have a [step-by-step guide](#)). Twitter is an excellent social media tool for teachers and students to acquire geographical information.

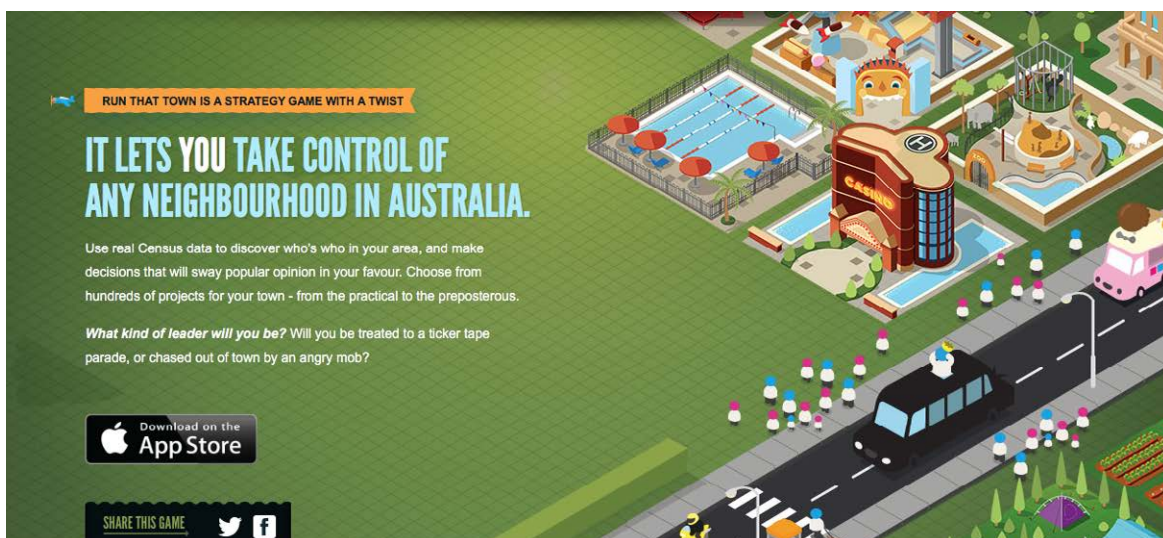


Figure 1: Run that Town app – <http://runthattown.abs.gov.au>



Using technology to assist in the teaching and learning of geography

Depending on the types of devices your students have, you should be able to find a number of tablet apps that will help both you and your students acquire, process, and communicate geographical information. One such app is a game developed by the Australian Bureau of Statistics, and one that I have been using to great success. *Run that Town* is a game that utilises the latest Australian Census data, and places students into the shoes of the Mayor of whichever suburb they choose. During the game, they will be faced with different scenarios based on community needs. They will be given real data in order to help them make their decisions. An example of this would be a community proposal to build a skate park. You will then be given demographic data such as the age structure of the suburb and the thoughts of residents towards the idea. This app fits well with the new New South Wales Geography syllabus unit of 'Place and Liveability' when looking at communities.

The new New South Wales Geography syllabus unit of 'Sustainable Biomes' could be well served by the use of National Geographic's *Food app*. This app provides students with engaging infographics and other information that highlights the current issues surrounding food security around the world.

There is also a wide variety of graphic organiser apps that allow students to process and communicate geographical information in an engaging way. These can be used in conjunction with media apps such as movie or comic book making apps.



Figure 2: National Geographic Food app – <http://theplate.nationalgeographic.com/2014/10/14/download-the-future-of-food-mobile-app/>

Google Apps for Education (GAFE) Products

An essential skill that students will need for the future is the ability to work collaboratively with others. This can be achieved through the use of the Google Apps for Education (GAFE) suite of products. Google

Docs and Google Slides allow students to process and communicate geographical information in a collaborative manner, and the benefit for teachers is that virtually every keystroke is recorded, allowing you to keep an eye on contributions. You also have the ability to write comments directly on the document that the students are working on, providing them with valuable, real-time feedback. Google Forms gives people the ability to acquire geographical information from a range of sources in a variety of manners. This could be in the form of Census-style surveys, which the data could then be analysed and presented in engaging ways. GAFE products also allow students to work from anywhere and at anytime, as long as they have their Google login details. This means that these tools are particularly effective for use out in the field: during field trips, students can easily gather, process, and communicate geographical data either individually or in groups.

A number of add-ons can also be integrated that will make your workflow more efficient: for example, *Flubaroo* is a great assessment tool that auto-grades quizzes made on Google Forms. Students can also download research add-ons, allowing them to investigate geographical information without having to leave their document, reducing the distractions involved in trawling through the Internet. Bibliography add-ons can also be integrated, providing students with a simple way of referencing their work and giving them a greater idea of academic honesty.



Figure 3: Google Expeditions – <https://www.google.com.au/edu/expeditions/#explore>

Using technology to assist in the teaching and learning of geography

A growing area of technology is Virtual Reality, and the Google Cardboard offers a relatively inexpensive way of delivering engaging content without having to leave the comfort of the classroom. They are essentially small cardboard boxes ranging in price from about \$10 (cardboard version) to over \$50 (durable plastic version) that work with a smartphone or tablet. It allows students to view content both in 3 dimensions and 360 degrees. Students can explore parts of the world otherwise inaccessible due to location or cost.

Google Expeditions is an emerging platform that allows teachers to “take students on a field trip” to anywhere in the world, and includes teacher notes, points of interest, and also questions that could be asked of the students during their “excursion.”

Other technologies

Minecraft is a very popular game used by both young and old, as it provides you the ability to be as creative as you can be. This tool fits well with the New South Wales Geography K–10 syllabus unit of ‘Landscapes and Landforms’, providing students with a platform to create their own “world.” This can then be used as a lead into a written exercise that prompts students to think about their “world.”

The ‘Landscapes and Landforms’ can also be served by websites such as a Global Elevation service. Figure 4 below shows how a global elevation website could provide students with an engaging and accessible way to acquire geographical information.

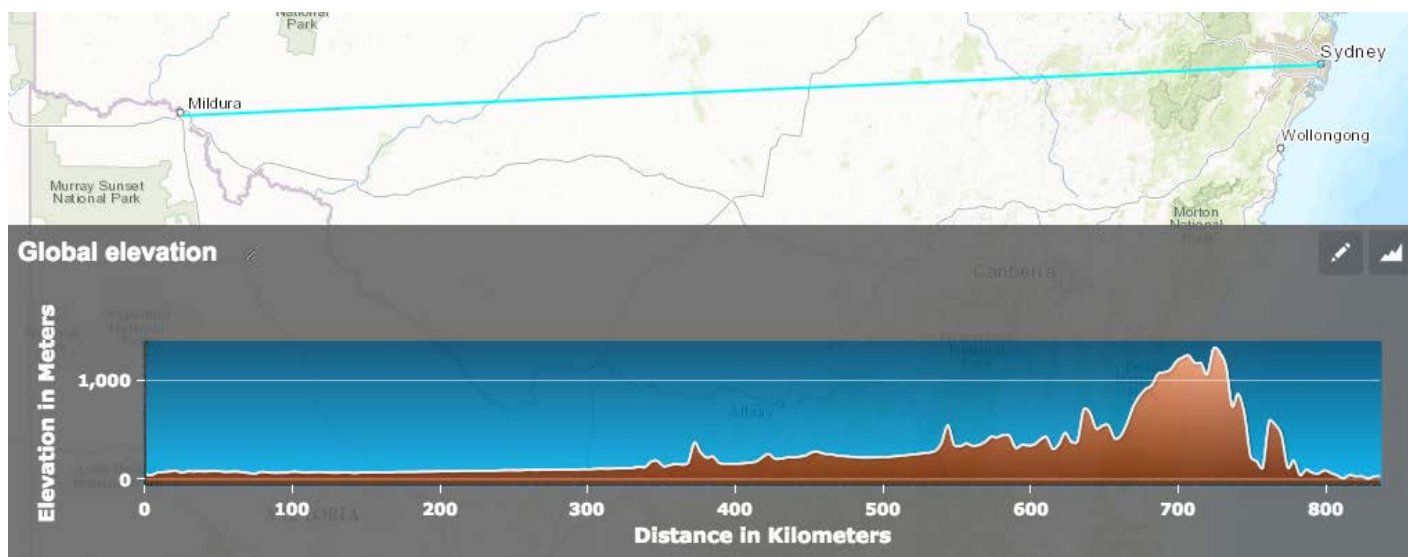


Figure 4: Global Elevation (Esri UK n.d.) – <http://esriukeducation.maps.arcgis.com/apps/Profile/index.html?appid=f0a2a2a3e1964129b22c715e31282f6c>

Conclusion

Whilst this paper in no way offers an exhaustive list of ways that digital resources could be used to make geography education more engaging and authentic, it is hoped that it provides you with a gateway to opening up your classroom to new and exciting possibilities.

Below: Northern Territory landform from 30,000ft. Source: J Sillar



Bibliography

Esri UK (n.d.) Global Elevation. <<http://esriukeducation.maps.arcgis.com/apps/Profile/index.html?appid=f0a2a2a3e1964129b22c715e31282f6c>> accessed, 21/7/2016

The Governor’s Office of Student Achievement (n.d.) What is Digital Learning? <<https://gosa.georgia.gov/what-digital-learning>> accessed, 21/7/2016

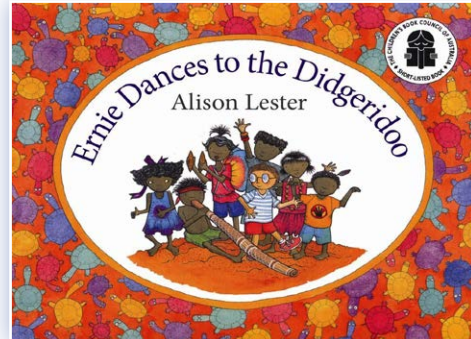
RESOURCES FOR GEOGRAPHY K-6

EARLY STAGE 1 and STAGE 1 PEOPLE AND PLACES

1. ERNIE DANCES TO THE DIGGERIDOO by Alison Lester (STORY BOOK)

Brief description

Ernie goes to live in Arnhem Land for a year and describes his new friends and their land in letters to his friends at home



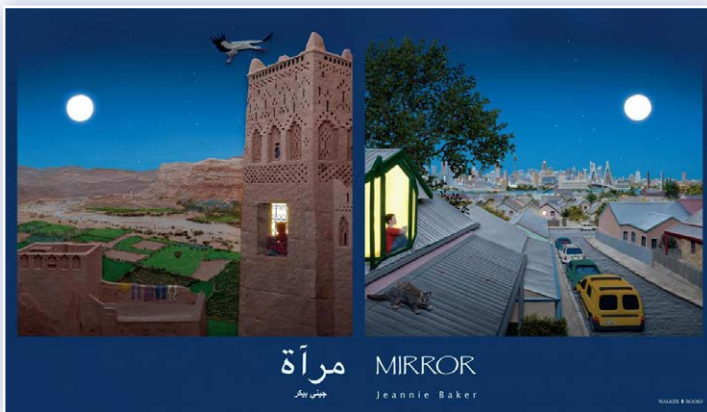
2. MIRROR by Jeannie Baker (PICTURE BOOK)

Brief description

Readers learn about the daily life of two boys and their families from different countries Australia and Morocco – viewed side by side in a unique book format

Other Jeannie Baker books with a geographical theme of PLACE include:

- *Where the forest meets the sea*
- *Window*
- *Home*



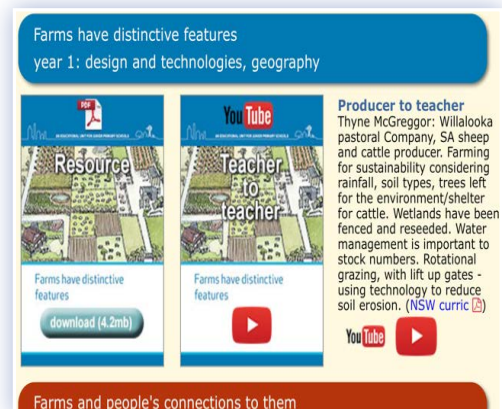
3. PRIMEZONE (PRIMARY INDUSTRIES WEBSITE)

Brief description

Teaching units about **farms** and **farming activities** in Australia
Examples include:

- Farms have distinctive features
- A year on a farm
- Farm diaries

Teacher resources and student activities incorporating multimedia links – www.primezone.edu.au/home/?id=5



4. GEORGE THE FARMER (Tablet app)

Cost around \$10 Aus. on the App store

Brief description

In interactive storybook with activities related to **farms** and **farming activities**

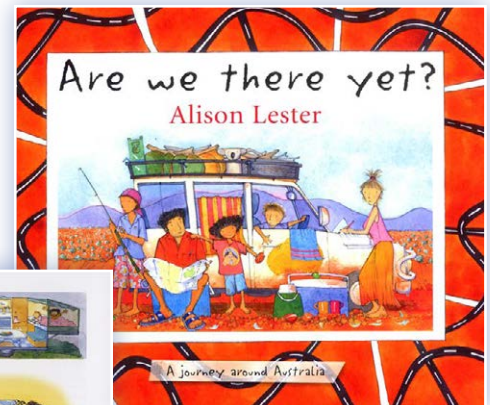
Teachers should watch the video clip “**Out and about on farms**” to see how farms can be investigated with students in Kindergarten and stage www.youtube.com/watch?v=EMlz1uiaFT0&feature=youtu.be

RESOURCES FOR GEOGRAPHY K–6

5. ARE WE THERE YET A journey around Australia by Alison Lester (ILLUSTRATED STORY BOOK)

Brief description

With maps, illustrations and clear sections this book follows the journey of a family to different places and environments in Australia supported by small snippets of geographical information.



EARLY STAGE 1 and STAGE 1 SYLLABUS LINKS

ES1 People live in places

Students explore the places they live in and belong to. They develop an understanding of what makes a place special and how this may differ for different people. (Including the Countries/Places important to Aboriginal or Torres Strait Islander Peoples).

Key concepts: Place, environment

Geographical tools: Visual representations, maps

Key inquiry questions: What are places like?
What makes a place special?

S1 Features of places

Students investigate the natural and human features of places. They describe the reasons places change and identify the active role of citizens in the care of places. They learn about how people describe the weather and seasons of places. Students explore activities occurring in places and how the spaces within places can be used for different purposes.

Key concepts: Place, environment

Geographical tools: Visual representations

Key inquiry questions: What are the features of, and activities in, places? How can we care for places?
How can spaces within a place be used for different purposes?

S1: People and places

Students explore places across a range of scales within Australia and Australia's location in the world. They describe connections people, including Aboriginal and Torres Strait Islander Peoples, have with places, both locally and globally. Students identify factors affecting people's accessibility to places.

Key concepts: place, space, environment, change,

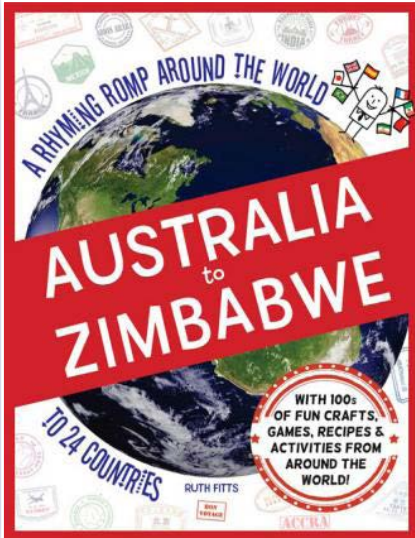
Geographical tools: Visual representations, maps.

Key inquiry questions: Where are places located in Australia? How are people connected to places?



Bunjil Shelter, Black Range Scenic Reserve, Stawell Vic.
Source: Wikimedia Commons

STAGE 2 PEOPLE, PLACES AND ENVIRONMENTS



1. AUSTRALIA TO ZIMBABWE by Ruth Fitts

Available online in Australia from various book sellers including Amazon & the Book Depository.

Brief description

The book explores 24 different places around the world through rhymes, photos, maps, and interactive activities.

The book includes 1000 photos from around the world, cultural activities including crafts, recipes and games, and recommendations for music, movies, books and online resources.

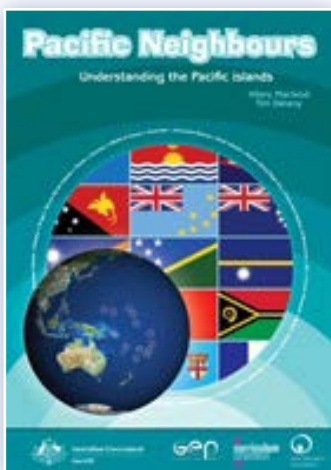
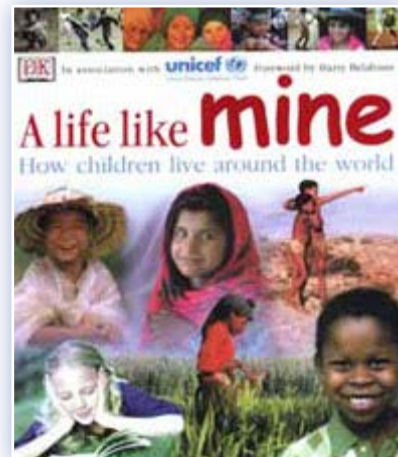
The Author website has video clips and activities to support each country.

www.australiatozimbabwe.com – The book cannot be purchased in Australia from this website

2. A LIFE LIKE MINE: How children live around the world (UNICEF)

A Life Like Mine is a sensitive and uplifting look at children's rights and how these rights are being met around the world. Through encounters with diverse children we learn not only about the efforts the world is making to look after every child, but also about the optimism and excitement with which children the world over pursue a good life for themselves

Unicef



3. AUSTRALIA'S NEIGHBOURS Understanding the Pacific Islands (GLOBAL EDUCATION)

(DOWNLOADABLE OR PUBLISHED BOOKLET and / or CD)

Download from www.globaleducation.edu.au/publications/pacific-neighbours.html

Brief description

A resource booklet created to develop understanding of the Pacific region. A CD-ROM contains PDFs of the book and extra teacher and student resources. Content and activities such as maps, climate graphs, statistics and photographs are suited to Stages 2 and 3

4. GLOBL EDUCATION: IMAGE AND PUBLICATIONS COLLECTIONS

Images – www.globaleducation.edu.au/1838.html

Brief description

An extensive collection of images, which can be downloaded for printing and classroom use by teachers and students



5. THE SHARK FIN SOUP (DOWNLOADABLE PDF CARTOON BOOK)

Food and agriculture organisation of the United Nations – www.fao.org/publications/card/en/c/befa250c-ecac-4d5d-aedd-e76f9719eacc/



This ebook links environment, human activities and sustainability through story telling, fact sheets and activities. Connections can be made to Asian countries where shark finning is practised.

In the Seychelles, sharks are considered prone to over-exploitation and population collapse and have been the subject of sustainability concerns. The practice of “finning” in the past was common. But today, shark finning has been shown as a non-sustainable practice. Today, although this practice is disappearing Seychellois think that efforts should continue to develop awareness raising where there is still a danger that coastal sharks species that are targeted for finning (Paraphrased from FAO website).

RESOURCES FOR GEOGRAPHY K–6

STAGE 2 SYLLABUS LINKS

Places are similar and different

Students examine natural and human features of Australia and the diverse characteristics of Australia's neighbouring countries. They explore the different climates, settlement patterns and demographic characteristics of places and use this information to imagine what it would be like to live in different places. Students consider how people's perceptions of places are the basis for actions to protect places and environments.

Key concepts: place, space, environment, sustainability, interconnection, scale

Geographical tools: Visual representations, maps, graphs & statistics

Key inquiry questions: How and why are places similar and different? What would it be like to live in a neighbouring country? How do people's perceptions about places influence their views about the protection of places?

The Earth's environment

Students explore the climate, natural vegetation and native animals of places in Australia and Asia. They examine the importance of natural vegetation and natural resources to the environment, animals and people and learn about the ways people value environments, including Aboriginal and Torres Strait Islander Peoples. Students identify sustainable practices and recognise that there are differing views on how sustainability can be achieved.

Key concepts: place, environment, interconnection, change, sustainability, scale

Geographical tools: Visual representation, maps

Key inquiry questions: How does the environment support the lives of people and other living things? How do different views about the environment influence approaches to sustainability?

How can people use places and environments more sustainably?

STAGE 3: PEOPLE, PLACES, ENVIRONMENTS & THE WORLD



1. BOOKFIRE

Written and illustrated by students of 3L, Turramurra North Public School (BOOK & PDF)

Written for the NSW syllabus this book covers the features of bushfires, causes and consequences and suggests ways people can reduce the impact of bushfires in the future – www.turranorthps.net.au

Click on the PDF on the school website to see the digital version or contact the school

RESOURCES FOR GEOGRAPHY K-6

2. COOL AUSTRALIA.ORG (WEBSITE)

www.coolaustralia.org/curriculum-materials/#body-wrapper

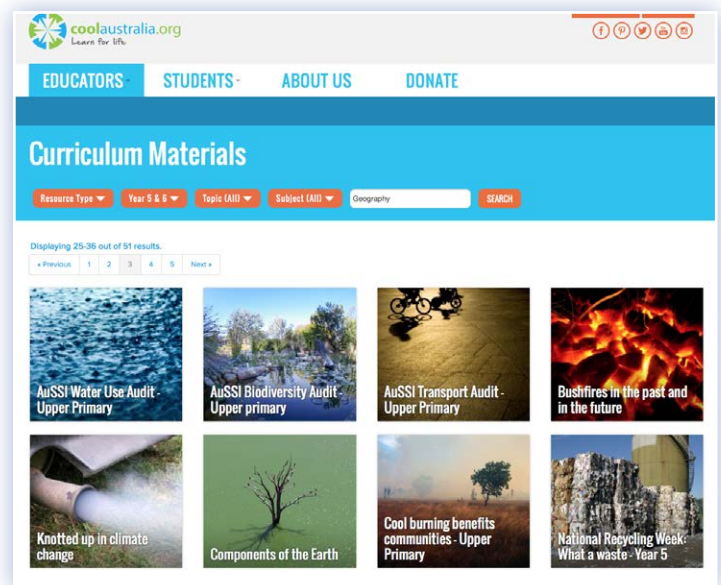
Resources for environmental education

Sign up for free to access teaching units and student worksheets.

Each unit comes with lesson plans, information sheets and student worksheets

Examples include:

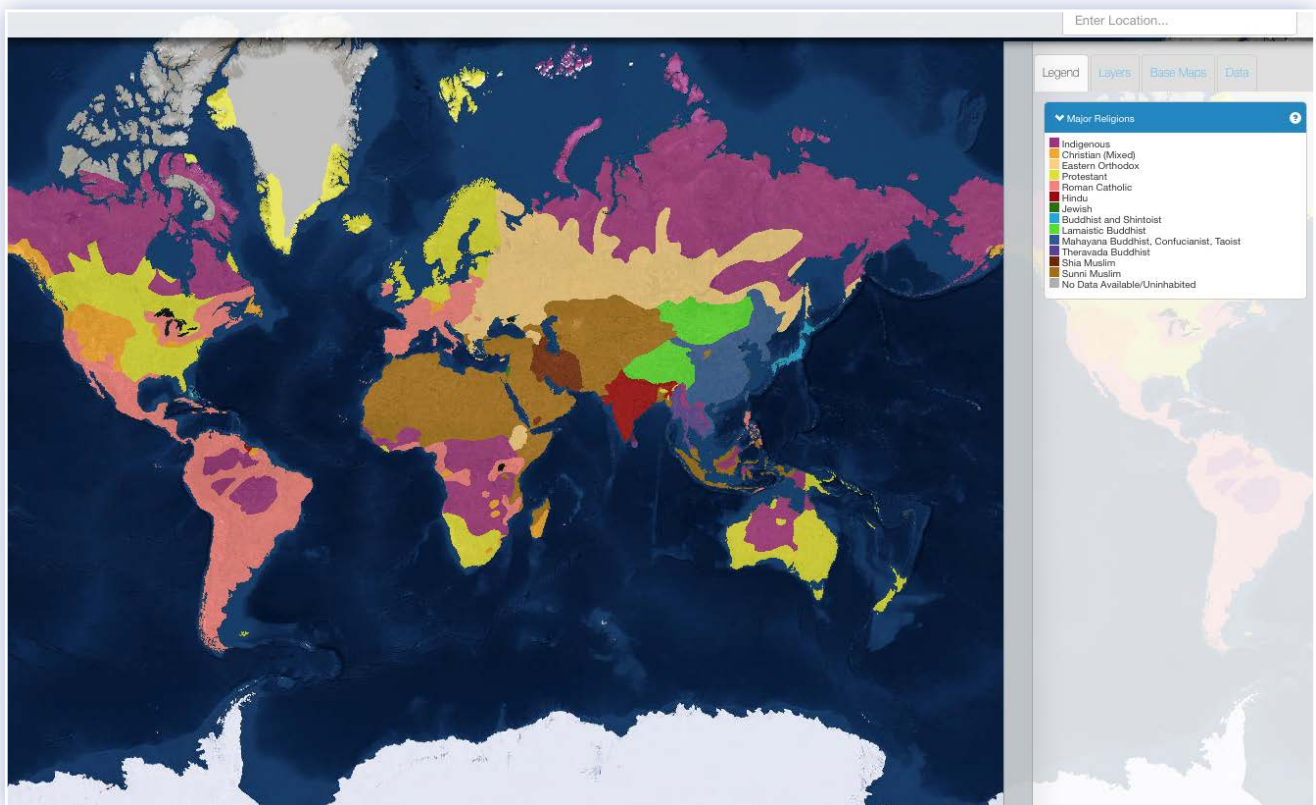
- Bushfires in past and in the future
- How do natural disasters affect the earth?
- - Aboriginals use fire to care for country worksheet)



3. NATIONAL GEOGRAPHIC MAPMAKER INTERACTIVE (WEBSITE)

<http://mapmaker.nationalgeographic.org>

Create GIS maps at a variety of scales by zooming in and out. Select from a variety of base maps and themes covering environmental and cultural themes such as a map of the world's major religions below created to illustrate cultural diversity at a global scale



STAGE 3: SYLLABUS LINKS

Factors that shape places

Students investigate how people change the natural environment in Australia and other places around the world. Students explore the impact bushfires have on Australian people, places and environments and propose.

Key concepts: place, space, environment, interconnection, sustainability, change, scale

Geographical tools:

Key inquiry question: How do people and environments influence one another? How do people influence places and the management of spaces within them? How can the impact of bushfires on people and places be reduced?

A diverse and connected world

Students explore countries of the Asia region and the connections Australia has with other countries across the world. Students learn about the diversity of the world's people, including the indigenous peoples of other countries. Students will explore and reflect upon similarities, differences and the importance of intercultural understanding.

Geographical tools:

Key inquiry question: How do places, people and cultures differ across the world? What are Australia's global connections? How do people's connections to places affect their perception of them?

A GEOGRAPHICAL TOOLS RESOURCE FOR K–6

1. SPATIAL EDUCATORS TOOLKIT (Prep – Year 6) (PDF)

www.dnrm.qld.gov.au/qsic/spatial-education/queensland-spatial-educators-toolkit

Selected pages from this resource produced by the Queensland Department of Natural Resources and Mines show how spatial technologies can be integrated into units and content.

Although the booklet was produced for Queensland, the content areas and links match those of the NSW BOSTES syllabus. NSW Globe needs to replace Queensland Globe in the spatial technologies list.

Sample pages from Spatial Educators Toolkit for Stage 3.

Year 6: A diverse and connected world

Key inquiry questions

- Where are we in our region and the world?
- How do places differ across the world?
- How do people and cultures differ across the world?
- What are Australia's connections, regionally and globally, between people and places?
- How does people's connection to place affect their perception of place?
- How do global connections change people and places?

Year 6 toolkit

Where are we in our region and the world?

Learning experiences and teaching strategies	Spatial resources
Use an online mapping tool to view Asia, the different regions and countries in Asia and to view the location of Australia in relation to our region and the world.	Online map services ^{NDV} Google Earth ^{NDV}

How do places differ across the world?

Learning experiences and teaching strategies	Spatial resources
Use Google Street View to undertake a virtual field trip to another country. Consider the differences between the place you visit and your local area.	Google Street View via Maps ^{NDV}
Compare and contrast urban environments from around the world using the visualisations and statistics provided. Consider what factors may be behind the differences in urban areas. How do Australia's urban areas compare to those presented?	Urban Observatory ^{NDV}

Below: Abandoned gold field, Croydon Qld. Source: Mining Journal – http://www.vision6.com.au/em/message/email/view?a=23788&id=1109917#utm_source=172340,6b14d710-42d2-cfb0-a3be-057c068b4e7b



BIOPHYSICAL INTERACTIONS: MALARIA

Marco Cimino - HSIE Teacher
Magdalene Catholic High School, Narellan

Syllabus link

This article provides a background for teachers to approach the Preliminary Stage 6 Geography unit of 'Biophysical Interactions.' This unit requires students to look at the four spheres we live and operate in, and their interactions with each other and ourselves. What this paper aims to achieve is to provide a case study that satisfies the syllabus dot-point of investigating an issue and showing how it can be sustainably managed. Malaria is a natural hazard that highlights the interactions between at least two of the four biophysical components: the biosphere and the hydrosphere. This paper satisfies all requirements within its relevant syllabus dot-point, looking at its spatial distribution and cause, interactions of the components of the biophysical environment, responses to the hazard, how climate change is affecting it, and what strategies can be used to mitigate it.

A case study investigating ONE issue in ONE of the biophysical components, to illustrate how an understanding of biophysical processes contributes to sustainable management in the environment. The investigation will include:

- identification and explanation of the key biophysical processes which relate to the issue
- scale of operation
- interactions with other components of the biophysical environment
- the sensitivity of the biophysical environment to change
- the importance of understanding key biophysical processes for effective management

Introduction

The United Nations Office for Disaster Risk Reduction defines a 'hazard' as "a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage" (n.d.). It is possible, therefore, to make a distinction between extreme events in nature that are not environmental hazards because people and property are not at risk, and environmental hazards in which people and property are at risk (Nagle 1998). The natural event can only be a hazard when there is a degree of community vulnerability. To be vulnerable, one must have a high level of susceptibility (the fact of being exposed) and a low level of resilience (the capacity to adapt and recover). This paper will examine malaria as a natural hazard, how it impacts on humans and in turn, how humans impact on the hazard. It will also discuss suitable management strategies, and offer some practical teaching strategies.

Malaria as a natural hazard

Malaria is caused by the invasion of the human bloodstream by a protozoan parasite of the Plasmodium genus. There are four species that currently infect humans: Plasmodium malariae, Plasmodium ovale, Plasmodium vivax and Plasmodium falciparum (Packard 2007). For malaria, a vector-borne disease (a disease spread by a living organism) to be transmitted, a malaria parasite must first be ingested by a female Anopheles mosquito, undergo sexual reproduction within it and then be passed to a second human through the bite of the infected mosquito (Packard 2007). The parasite must sexually reproduce within the mosquito before it can be passed on to another human (this takes roughly 14 days). The fact that the average female Anopheles mosquito survives for roughly 10 to 21 days means that if the mosquito ingests the parasite close to the end of its life cycle, the parasite dies with the mosquito and can no longer infect a human (Packard 2007). Figure 1 below illustrates the malarial life cycle.

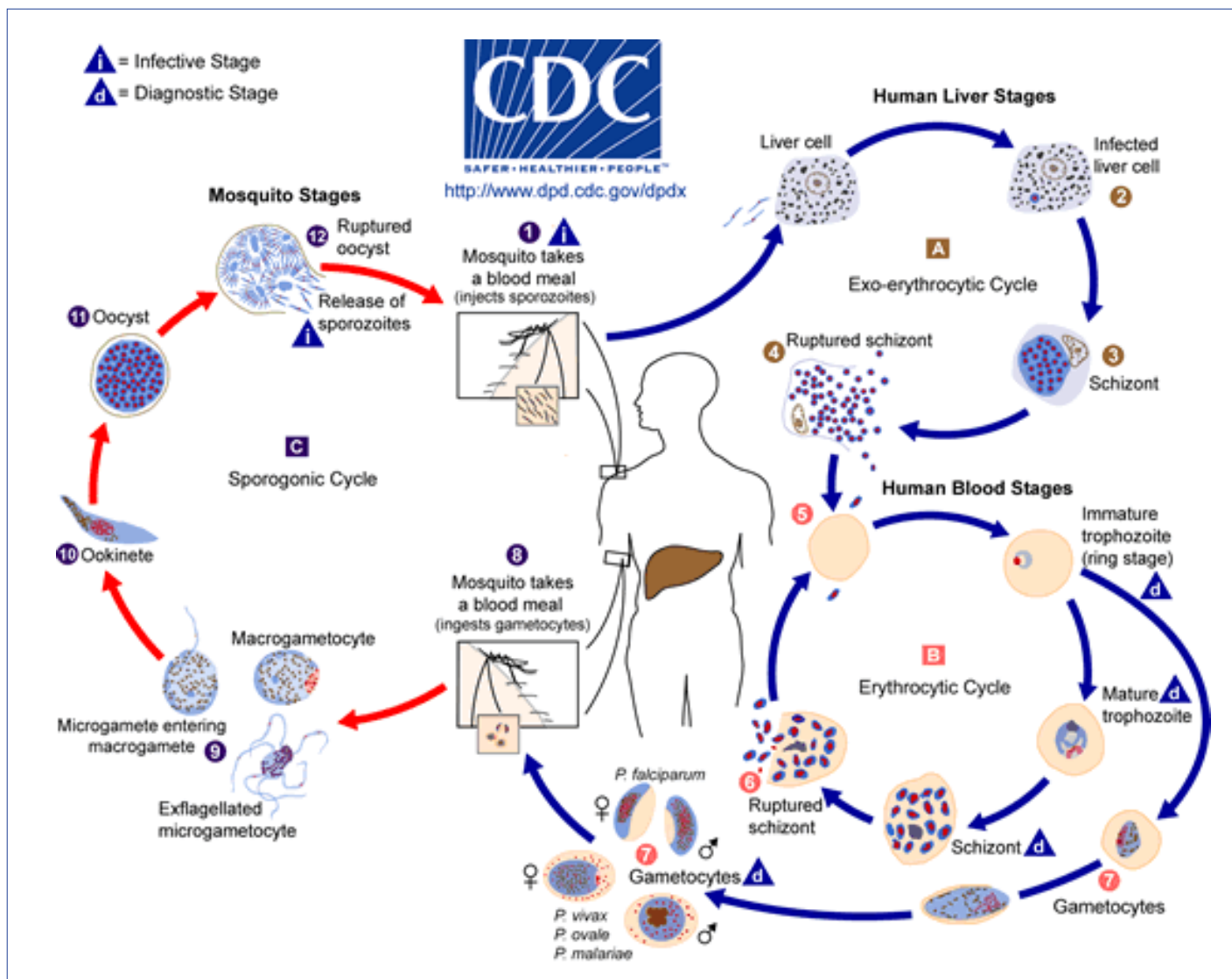


Figure 1: Malarial Life Cycle (Centres for Disease Control and Prevention 2010) – <http://www.cdc.gov/malaria/about/biology/>

Once bitten by an infected mosquito, sporozoites enter the host's liver where they undergo a cellular division into numerous merozoites cells. When the merozoites mature, they enter into the human bloodstream and invade the circulating red blood cells. The parasite grows within the blood cell, eventually producing daughter cells, which burst from the blood cell and invade other red blood cells, repeating the reproduction cycle. Gametocytes (male and female forms of the merozoite cells) circulate in the blood stream (but not inside red blood cells). The female Anopheles mosquito will ingest these gametocytes during their blood meals, which completes the reproduction stage of the parasite and produce fresh sporozoites, which enter the salivary glands of the mosquito. When the mosquito bites a human, the saliva infects the human, and the malaria life cycle recommences (Packard 2007).

According to Nagle (1998), the conditions for malaria to develop are still water in which the mosquitoes lay

their eggs; and temperatures greater than 16°C for the parasite to develop inside the mosquito, but lower than 32°C, as a large number of the parasites die. Figure 2 below illustrates the geographical distribution of malaria.

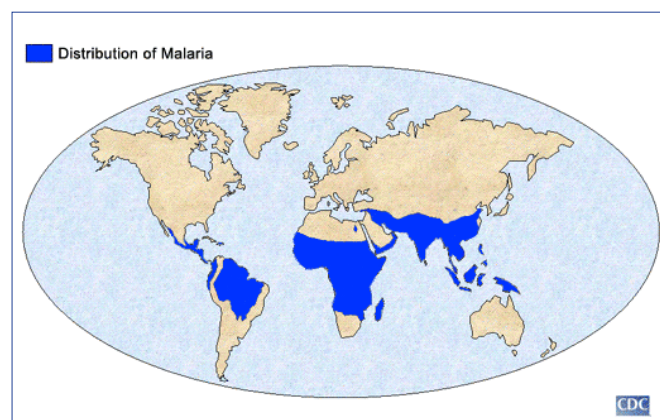


Figure 2: Geographical Distribution of Malaria (Centres for Disease Control and Prevention 2010) – <http://www.cdc.gov/malaria/about/distribution.html>



Natural wetlands of northern Vietnam. Source: <https://www.flickr.com/photos/dfataustralianaid/10695647683/in/photostream/>

Human impacts on the hazard

Malaria – although occurring naturally within the lifecycle of the mosquito – can be propagated by human actions and activities. Quite often, these human activities do not take into account any impacts they could have on the spread of malaria. Nagle (1998) states that the disease is affecting new victims because of increased trade and travel transporting the parasite across borders to areas which have never had the disease and infecting people who do not have immunity, and the expansion of agricultural schemes which incorporate irrigation techniques which promote the stagnation of water. Packard (2007) expands on this by offering examples of such cases in which the malaria parasite has been propagated by human activities. Urbanisation (especially in the tropics) has played a vital role, with mosquitoes being able to breed in rain barrels, drainage ditches, discarded canisters and discarded tyres taking advantage of poorly housed, highly concentrated populations. Packard (2007) also makes mention of specific human projects which have contributed to the spread of malaria. Poorly farmed cotton plantations in the United States of America and rice farmers in Northern Italy were particularly at risk due to the irrigation systems put in place.

Another way in which humans are impacting on malaria is through a very gradual climatic transition. Anthropogenic climate change is causing the heating of areas that were once too cold for the malaria parasite to survive. Warmer weather has not only quickened the pace of mosquito-borne infections such as malaria, but it has also expanded their 'hunting grounds' (Nikiforuk 2007). As rainfall increases, the mosquitoes that carry the parasite will spread and lengthen the malarial

season, thus leading to the proliferation of the disease (Flannery 2008). Flannery (2008) states that due to the globe warming, even by a degree or two, the incidence of humans exposed to the malaria parasite will rise from 45% to 60%.

Impact of the hazard on humans

There are two forms of transmission: 'unstable' is where transmission rates are low and immunity does not develop, meaning epidemics and deaths occur in all age groups; 'stable' is where children are repeatedly infected, with those surviving acquiring immunity, meaning that they are less likely to die from the disease as adults, however, may still suffer from mild symptoms (ed. Lomborg 2006). Honigsbaum (2002) claims that it is also possible for people to have a natural immunity to malaria through genetic traits that have evolved in response to long exposure to the disease. Malaria is a cause of anaemia, contributes to low birth weight when contracted during pregnancy and is also believed to have a significant negative impact on intellectual development (ed. Lomborg 2006).

The symptoms associated with malaria, and affecting the physical health of the infected person are chills, followed by a dramatic rise in temperature. Soon after, the person will have a raging thirst and headache, followed by delirium. When the headache and temperature subside, there will then be a stage of profuse perspiration. This cycle of chills to perspiration continues as more and more red blood cells are infected by the parasite. This cycle does in many cases result in the death of the person (Honigsbaum 2002). It is estimated that approximately 300–500 million people suffer from malaria each year, with almost 2 million

Biophysical interactions: Malaria

dying (mostly children under 5 years of age). Sub-Saharan Africa accounts for 90% of these cases (Garg et al. 2009). The aspect of health is not the only impact that the malaria hazard has on humans.

The impact of the hazard on the economy must also be taken into account. Between 1965 and 1990, countries with a large percentage of the population infected with malaria grew by 1.3% less per year than unaffected countries. This results in 33% lower income. It is also claimed that a 10% reduction in malaria would bring about a 0.3% increase in annual GDP growth (ed. Lomborg 2002). The impacts of malaria fall heaviest on the poor, with treatments representing anywhere from 7% to 18% of income (ed. Lomborg 2002). Malaria also impacts on the economy through absenteeism from school and work and reduces productivity. According to Sachs (2005), there is a direct correlation between poverty and malaria. This means that the regions most affected by malaria not only suffer from widespread health implications, but also economic ones.

Community vulnerability in the case of malaria can be considered in two streams: susceptibility and resilience. The susceptibility (the fact of being exposed) of people who are in malaria infected areas is quite high, especially as most of these areas lack strong economic backgrounds to provide people with basic health services or gain access to simple preventative items (such as anti-malarial bed nets). Malnourished people (meaning, most regions in Africa, Asia and Northern South America) are also at higher risk of being infected. Therefore, there is a high level of susceptibility as people come into direct contact with the disease-carrying mosquito and live amongst the breeding sites.

The resilience (the capacity to adapt and recover) of people is also quite low as most people who are infected include young children (having weak immune systems) and the poor (as they lack the resources to access suitable treatment or migrate to non-infected regions). The working days missed and the absences from school cause a reduction in production and



Mosquito, *Anopheles minimus*. Source: https://upload.wikimedia.org/wikipedia/commons/d/da/Anopheles_minimus.jpg

income. Thus, the ability to recover from the illness is also economic. It may be difficult to recover from this loss in income, making it harder for the household to purchase vital necessities. It is difficult to adapt without significant financial backing, and only with a suitable management strategy can both the susceptibility and resilience be improved, thus reducing the vulnerability. Therefore, malaria poses both a natural risk and causes the community to be vulnerable as the people in the regions affected have both a high level of susceptibility and a low level of resilience.

Current and future management strategies

While malaria can be treated, such treatment can be costly, time consuming, and not fully effective. This, however, should not be an excuse for inaction. While there are treatments for malaria, namely Quinine (Honigsbaum 2002), there is no known fully effective vaccine (one which counters all stages of the parasite cycle and strains). The most effective way to counter malaria is to prevent it from happening, rather than to cure it (a form of loss avoidance). This can be done in a number of ways.

The use of insecticide treated bed nets (ITNs) is a viable option, as it stops the spread of malaria when people are most vulnerable. The most efficient way to rapidly increase ITN coverage is through a free distribution campaign (Yukich et al. 2008). According to Sachs (2008), it is possible to provide ITNs in Africa that last for up to five years at close to minimal costs. With new technologies increasing the development of better ITNs, a net costs \$5 and on average, three nets are required to protect five people in the household. With three hundred million sleeping sites to be covered in Africa, a program of ITN coverage that lasts for five years will cost approximately \$1.5 billion (the same as one day's budget for the 'Pentagon') (Sachs 2008). In order to



Left: Angolan children with bednets. Source: https://upload.wikimedia.org/wikipedia/commons/5/54/Angolan_children_with_bednets_%285686769577%29.jpg



Stagnating floodwater Manila, Philippines 2012 Source: <https://www.flickr.com/photos/dfataustraliaid/10695594406/in/photostream/>

provide for all the measures needed to control malaria in all of sub-Saharan Africa (ITNs, medicines, community health workers, indoor residual spraying and education) would require around \$3 billion (Sachs 2008).

Another option available for reducing the malaria risk is the use of DDT (Sachs 2005). It will not eliminate transmission entirely; however, when sprayed in mosquito breeding sites, it can significantly reduce the mosquito population. When this is used in conjunction with medicines, ITNs and artemisinin therapies, it can significantly reduce the burden of malaria (Sachs 2005). Honigsbaum (2002) also makes mention that effective ways of preventing malaria is through the draining of swamps and marshes and filling in drainage areas which are open to the surface. The removal of stagnant water sources means that the mosquito no longer has a place to breed.

The use of ITNs is the most effective way of controlling the risk of malaria, and is vital to lower the susceptibility of people in the malaria-affected regions of the world. When this is coupled with effective campaigns to prevent it from spreading through chemicals and supported with medicines to alleviate symptoms and prevent deaths, malaria can be effectively and efficiently controlled. Vaccine development has been occurring for years; however, they can be far too costly for those living in the malaria-affected regions. New vaccines are also constantly being researched and developed. A total of 2007 publications scattered over 352 journal titles originating from 40 different countries were published on the topic of malaria vaccine (Garg et al. 2009).

Management strategies for malaria include: the use of highly effective ITNs, indoor residual spraying, the use of chemicals to control mosquito breeding sites, medical treatments, the removal of stagnant water sources and suitable education. It is impossible to alter the weather conditions in the regions affected by malaria; therefore, it is vital to take those preventative steps to alleviate the vulnerability in some way. These management strategies can occur at any time along the hazard management timeline, and are critical to controlling the malaria risk.



2011 Malaria Survey, Solomon Islands. Source: <https://www.flickr.com/photos/dfataustraliaid/10695013835/in/photostream/>



Mosquito fogging. Source: https://upload.wikimedia.org/wikipedia/commons/9/9a/Mosquito_fogging.jpg

Conclusion

Malaria is a natural hazard as it poses a direct threat to communities, leaving them vulnerable in terms of susceptibility and resilience. There are, however, suitable management options, which can, and must be utilised in order for the vulnerability to be reduced, and thus reduce the risk posed by malaria. In order for these strategies to be properly implemented, a global campaign (such as The Global Fund to Fight AIDS, TB and Malaria) is necessary to bring to light the issues and options available to rid the world of malaria (as was done in Western Europe and North America).

Suggested Teaching Strategies

Mapping skills are, first and foremost, the most present when dealing with malaria as a hazard.

- Latitude and Longitude: students can identify the latitudes that malaria has 'traditionally' been located in (as derived from Figure 2 above), and make predictions about how climate change will affect its spatial distribution.
- Choropleth mapping: students can construct choropleth maps illustrating the distribution of malaria within a given area.
- The use of photographs that show changes in landscapes due to climate change can also be used, leading to higher-order extension work, such as writing a persuasive text to world leaders calling for action on the underlying causes of malaria.
- There is also an opportunity to integrate the Problem-Based Learning, asking students to work either collaboratively or individually to mitigate malaria as a hazard.

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ATTENTION – ALL GEOGRAPHY TEACHERS



Geography Teachers' Association of NSW **ARTHUR PHILLIP AWARDS**

TIME TO PREPARE FOR THE 2016 GEOGRAPHY FIELDWORK COMPETITION

The Geography Teachers' Association of NSW (GTANSW) organises an annual competition for students and schools to foster an enthusiasm for Geography through engagement and rewards. The emphasis of the competition is fieldwork and the gathering of primary data as part of authentic research in geography.

The competition is open to all primary and secondary schools, both members and non-members of GTANSW.

All categories of the competition are based on the research action plan outlined on page 17 of the Years 7–10 Geography syllabus. The steps of this research plan have also been applied to the senior Geography course for the purposes of this competition and fit neatly with the Senior Geography Project.

COMPETITION ENTRIES CLOSE FRIDAY 25 NOVEMBER 2016

COMPETITION CATEGORIES:

1. The GTA Fieldwork and Visual Presentation Competition for Years K–9
Sub-categories: Primary – Stage ES1-1 (Years K, 1 & 2), Stage 2 (Years 3 & 4), Stage 3 (Years 5 & 6). Secondary – Stage 4 (Years 7 & 8), Stage 5 (Year 9 only)
2. The Global Education Research (Fieldwork) Competition for Years 7–12
Three categories: Stage 4, Stage 5, Stage 6
3. The Dr Don Biddle Issues in Australian Environments Fieldwork Competition for Year 10 only
4. The Brock Rowe Senior Geography Project Fieldwork Competition for Year 11 only

2016 Arthur Phillip Geography Fieldwork Competition information and student entry forms are available for download from:

www.gtansw.org.au

BENEFITS OF GTANSW MEMBERSHIP

The Geography Teachers' Association of New South Wales (GTANSW) is a not-for-profit, incorporated body that represents the professional interests of Geography teachers in NSW and Geographical Education more generally. The objectives of the Association are to promote the study and teaching of geography in primary and secondary schools by:

- providing professional learning opportunities for teachers of Geography;
- advocating the interests of Geography teachers on matters in the State and National interest;
- providing forums where teachers of Geography and the wider community can exchange views;
- supporting Geographical Education through the development and dissemination of geographical resources; and
- promoting geographical research and fieldwork.

The GTA seeks to address its objectives via a yearly program of activities and events, which include:

- online publication of the quarterly Geography Bulletin a quality, peer-reviewed journal designed to serve the contemporary interests of Geography teachers and students.
- delivering Teacher Professional Learning Workshops and in metropolitan and regional locations, focussing on current issues, including in Global Education, the use of technology in the classroom, research and fieldwork skills.
- conducting an Annual Conference with keynote addresses from leading geographers on contemporary and emerging geographical issues as well as more practical sessions by geographical practitioners.
- hosting School Certificate and Higher School Certificate Reviews for teachers of Geography. These reviews are held in a number of regional areas across the state.

For further information about GTANSW activities and events go to: www.gtansw.org.au



MEMBERSHIP RENEWAL/APPLICATION FORM 2016

ABN 59 246 850 128 – This form will become a tax invoice when completed, GST included.

*Please select **ONE** of the following membership options and complete the details*

☐ **Personal membership \$90.00**

Title – please tick: ☐ Dr ☐ Mr ☐ Mrs ☐ Ms ☐ Miss Other:

Surname: Given Name(s):

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☐ **Corporate membership \$180.00**

Title – please tick: ☐ Head of HSIE ☐ Head Teacher of Social Science ☐ Head Teacher of Geography
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School address: Postcode:

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☐ **Concessional membership \$40.00** ☐ Retiree ☐ Part-time teacher ☐ Student (verification required)

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Surname: Given Name(s):

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Fax: Email:

School:

PAYMENT:

Membership is for twelve months commencing in January. If payment is made later in the year all back copies of *Geography Bulletin* will be forwarded. A membership reminder will be sent in December.

Please make cheques payable to: Geography Teachers' Association of NSW Inc

OR

Charge \$..... to my credit card: ☐ Mastercard ☐ Visa

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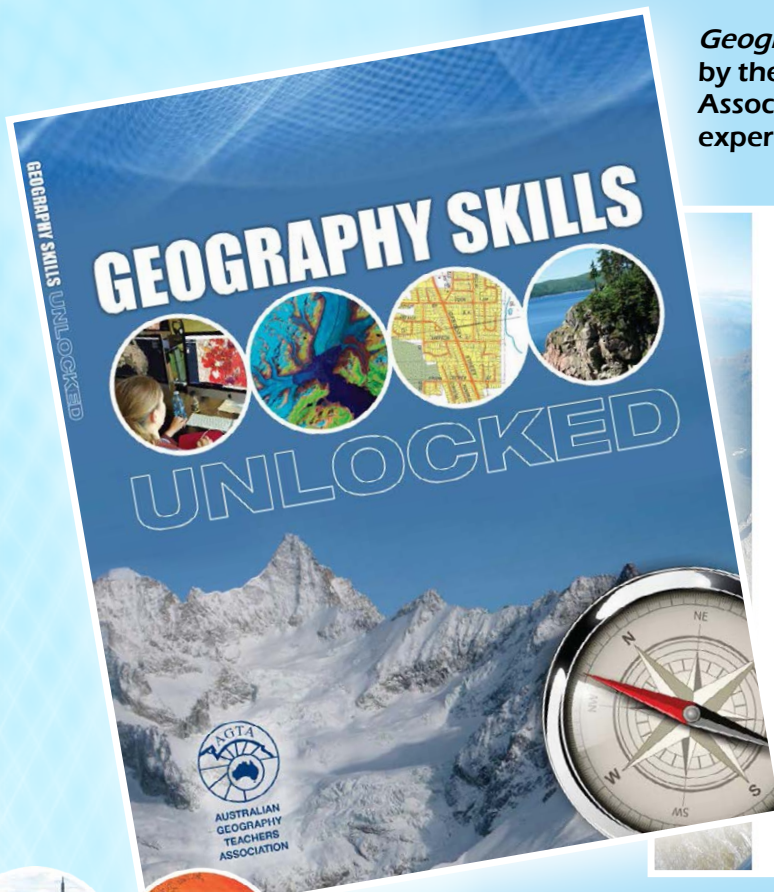
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Post this form and your payment to: GTA NSW, PO Box 699 Lidcombe, NSW 1825

AGTA ANNOUNCES AN ESSENTIAL NEW GEOGRAPHY RESOURCE

Geography Skills Unlocked is an exciting new skills book for Australian secondary schools

Geography Skills Unlocked is published by the Australian Geography Teachers Association and written by a team of experienced Geography teachers.



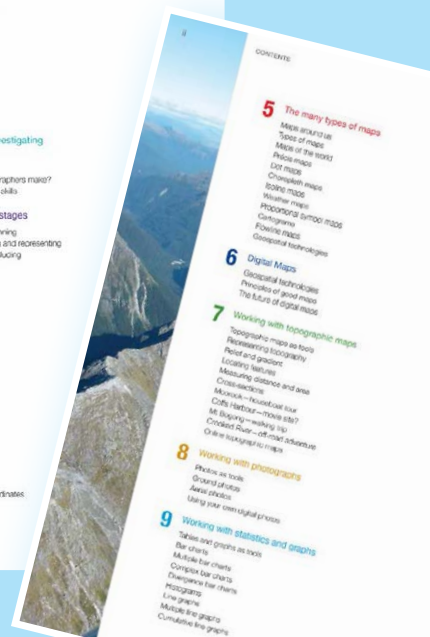
Contents

Preface

- 1 Inquiring, questioning, investigating**
Inquiring
Investigating in geography
What kinds of inquiries do geographers make?
The links between inquiries and skills
- 2 Geographic inquiry – the stages**
Observing, questioning and planning
Collecting, recording, evaluating and representing
Interpreting, analysing and concluding
Communicating
Reflecting and responding
Organising data in an inquiry
Mind mapping
Concept diagrams
- 3 Thinking Skills**
A list of thinking skills
A classification of skills
A hierarchy of thinking skills
Creative thinking
Problem solving
Thinking skills in inquiry
- 4 The elements of maps**
Map symbols
Direction and bearings
Scale
Distance
Locating features with grid coordinates
Latitude and longitude
Time zones

KEY FEATURES:

- ➔ Contents aligned to the inquiry and skills-based requirements of *Australian Curriculum: Geography*
- ➔ An engaging, easy to navigate design
- ➔ A student friendly approach with step-by-step explanations, descriptions and worked examples
- ➔ A focus on emerging technologies used to gather, analyse and present geographical data
- ➔ *GeoSkills* and *GeoInquiry* activities that scaffold student learning
- ➔ A wealth of stimulus material including a diverse range of maps, graphs, aerial photographs, satellite images, diagrams and photographs
- ➔ Examples drawn from each Australian state and territory with additional international material
- ➔ Key terms explained in embedded glossary boxes



Geography Skills Unlocked will be published mid 2016 and will be available for purchase via the AGTA website: www.agta.asn.au/Products

ADVICE TO CONTRIBUTORS

Editorial policy attempts to:

- promote material which will assist the study and teaching of geography
- encourage teachers to share their ideas on teaching geography
- provide a means by which teachers can publish articles
- inform readers of developments in geographical education

Articles are sought reflecting research and innovations in teaching practices in schools. From time to time issues of the Bulletin address specific themes.

Refereeing

All suitable manuscripts submitted to the Geography Bulletin are subject to the process of review. The authors and contributors alone are responsible for the opinions expressed in their articles and while reasonable checks are made to ensure the accuracy of all statements, neither the editor nor the Geography Teachers' Association of New South Wales Inc accepts responsibility for statements or opinions expressed herein.

Books for review should be sent to:

The GTA NSW Council
PO Box 699
Lidcombe NSW 1825

Editions

There are four bulletins each year – two published each semester.

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1. **Objective:** The Geography Bulletin is the quarterly journal of the New South Wales Geography Teachers' Association, Inc. The role of the Geography Bulletin is to disseminate up-to-date geographical information and to widen access to new geographic teaching ideas and methods. Articles of interest to teachers and students of geography in both secondary and tertiary institutions are invited, and contributions of factually correct, informed analyses, and case studies suitable for use in secondary schools are particularly welcomed.
2. **Content:** Articles, not normally exceeding 5000 words (no minimum specification), should be submitted to the GTANSW Office gta.admin@ptc.nsw.edu.au or by mail to: **PO Box 699, Lidcombe, NSW 1825** who will forward to the editor/s:
Submissions can also be sent directly to the editor: Lorraine Chaffer (lchaffer@tpg.com.au) or
Articles are welcomed from tertiary and secondary teachers, students, business and government representatives. Articles may also be solicited from time to time. Articles submitted will be evaluated according to their ability to meet the objectives outlined above.
3. **Format:** Digital submission in Word format. Tables should be on separate pages, one per page, and figures should be clearly drawn, one per page, in black on opaque paper suitable for reproduction. Photographs should be in high resolution digital format. An indication should be given in the text of approximate location of tables, figures and photographs. Every illustration needs a caption. Photographs, tables and illustrations sourced from the internet must acknowledge the source and have a URL link to the original context.
4. **Title:** The title should be short, yet clear and descriptive. The author's name should appear in full, together with a full title of position held and location of employment.
5. **Covering Letter:** As email with submitted articles. If the manuscript has been submitted to another journal, this should be stated clearly.
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Abbott, B. K. (1980) *The Historical and Geographical Development of Muswellbrook* Newcastle: Hunter Valley Press.
Harrison, T. L. (1973a) *Railway to Jugiong* Adelaide: The Rosebud Press. (2nd Ed.)
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