GEOGRAPHY BULLETIN

EDUCATION FOR SUSTAINABILITY

The Geography Teachers' Association of New South Wales Inc.

Volume 46 No 4 2014

In this issue:

PROJECTS • REPORTS • RESOURCES • ARTICLES • REVIEWS

GEOGRAPHY BULLETIN

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Front cover: Recycling depot
Back cover: Plastic bottle caps
Source: Wikimedia Commons

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.

GEOGRAPHY BULLETIN

The Geography Teachers' Association of New South Wales Inc.

Volume 46, No 4 2014

EDITOR: Lorraine Chaffer

CONTENTS

EDITORIAL

Lorraine Chaffer, Editor

The final GTA NSW bulletin for 2014 contains reports on the work of the Association during 2014. Reports include Geography's Big Week Out by Milton Brown who coordinated the event in both 2013 and 2014 as part of NSW's commitment to the Australian Geography Competition and follow up camp for winning members from each state. Milton recently received the Outstanding Professional Service Award from the Professional Teachers Council for his contribution to Geography education.

The President's report, by Susan Caldis, highlights a very busy and successful year in 2014 for GTANSW in which the association provided support for NSW teachers and students through activities such as the popular HSC review workshops, HSC student lectures, a regional mini conference in the Hunter Valley, and annual teachers' conference in Sydney.

The largely unknown meteotsunami is explained in a piece by Dr. Susan Bliss and makes interesting reading for teachers. A natural hazard caused by changing atmospheric conditions, meteotsunamis can be taught in the existing NSW Years 7–10 Geography Syllabus or the new NSW Geography Syllabus aligned to the *Australian Curriculum: Geography* to be introduced in the near future.

A collection of articles related to sustainability include a perspective from myself on progress in NSW schools from education about sustainability to education for sustainability, a process in which students are empowered to make decisions about matters and issues related to sustainability. Merewether High School's Green Day and a Cross Curriculum Sustainability Project run by Louise Swanson at Epping Boys High School form the content of the following articles.

I highly recommend teachers read **Sustainability in the *Australian Curriculum: Geography*** by Associate Professor Alaric Maude in Geographical Education the magazine of the Australian Geography Teachers Association at http://www.agta.asn.au/Resources/GeographicalEducation/geoged-v27-2014.php

NEXT EDITION

The next edition of the bulletin will contain a report on the Australian Geography Teachers' Conference held in Rotorua, New Zealand in January 2015. The conference, as well as pre and post conference tours, was attended by a number of NSW Geography teachers along with GTA NSW council members Susan Caldis, Nick Hutchinson, Grant Kleeman, Lorraine Chaffer and Louise Swanson. There will be reports from the four bursary winners whose expenses to attend the conference were paid by GTA NSW and links to exciting new resources for the current and upcoming NSW Geography syllabus.

NSW Geography teachers were among delegates visiting Hells Gate Geothermal Park at Rotorua.

Photo L Chaffer

The post conference delegates tour visited to Aoraki / Mount Cook National Park where they experienced the Tasman Glacier and encountered newly calved icebergs such as those seen in this image.

Photo. L Chaffer

GTA NSW PLANNED EVENTS 2015

Watch for flyers for each of these events throughout the year. Get in early so you do not miss out. Demand for places is increasing with accreditation and professional standards requirements.

For teachers

- HSC review – Sydney, Wollongong, Newcastle – February / March
- Dubbo Country Conference – Skill development for teachers new to Geography – March
- GTA NSW Annual Conference – Sustainability theme – August
- Journal – Four digital editions for GTA members

For students

- HSC Student lectures – June
- Arthur Phillip Fieldwork Awards – closing date November 29
- HSC Achievement awards for top 10 HSC results

Activities run by Australian Geography Teachers' Association for teachers and students Australia wide

- Australian Geography Competition for students
- Australian Curriculum Roadshow – various locations throughout each state including NSW
- Geographical Education Magazine
- Geographica Newsletter for AGTA members

Outstanding Professional Service Award 2014

Milton Brown
Geography Teachers' Association of New South Wales

Award citation

Milton Brown joined the Geography Teachers' Association NSW Council in 2010. He currently holds a Vice President role. Prior to joining the Association, Milton was extensively involved in environmental education as the NSW Department of Education and Communities, Regional Consultation for Environmental Education, particularly for the Northern Sydney region.

Retired from a school-based leadership role, Milton remains a highly regarded Geography, Economics and Business Studies educator and Head Teacher amongst the Human Society and Its Environment and Social Science teaching networks. Milton has always given generously of his time and expertise to support the activities of the GTA NSW. He not only works extensively behind the scenes to ensure the GTA NSW programmes are well run and supported; he also regularly volunteers to facilitate workshop sessions at conferences.

Milton's focus is on providing professional development for teachers, especially in the area of Aid Programmes. His commitment to the Surf Aid Non-Profit Organisation as Schools Program Manager and Education Director is exemplary, highlighting his strong commitment to improving awareness about the importance of global citizenship, sustainability and intercultural understanding.

Milton's thorough organisation of the Geography Big Week Out Programme for 2013 and 2014 is also testament to his commitment to GTANSW activities and passion for making geography education rigorous, meaningful and relevant to students not only from NSW but across Australia.

The 2014 PTC NSW Presentation Evening was held on Tuesday 25 November in the Gleeson Auditorium of the Australia Catholic University, Strathfield.

Photograph: Milton Brown receives his OPS Award from Tom Alegounarias, President of the Board of Studies, Teaching and Educational Standards (BOSTES).

The Geography Teachers' Association of New South Wales Inc.

Annual Report – December 2014

1. Membership

- As of 1 October 2014, membership was 428. This has steadily risen from 370 during May 2014. The GTANSW looks forward to continued growth during 2015.
- After the AGM on 15 October 2014, the Committee for 2014-2015 will be:

Executive Officers:

President:	Susan Caldis
Vice Presidents:	Milton Brown, Lorraine Chaffer, Grant Kleeman, Martin Pluss
Honarary Treasurer:	Grant Kleeman
Minutes Secretary:	Paul Alger
Secretary:	Martin Pluss
Immediate Past President:	Nick Hutchinson

Council Members:
Paula Cooper, Keith Hopkins, Brett Jackson, Grace Larobina, David Latimer, John Lewis, Sharon McLean, David Proctor, Louise Swanson, Darren Tayler, Steve Weingarth

Co-opted:
Karen Tuhan, Carol Pogson

The GTANSW Council would like to extend their sincere thanks and appreciation to Sarah Menassa-Rose for her work over many years as Secretary of GTANSW. Due to family and work commitments Sarah has decided to step down from the secretarial role but will remain as a Councillor, and we look forward to her continued involvement. For 2014 – 2015, the GTANSW Council welcomes two new Councillors: David Proctor (Menai High School) and Louise Swanson (Epping Boys High School). Finally, meeting space has been a concern for 2013 –2014 and the GTANSW Council would like to again extend their sincere thanks and appreciation to Steve Weingarth who was able to secure a suitably located venue for the Council to meet during 2014 at no cost to the Association.

2. Office

- The GTANSW Council greatly appreciates the sustained, efficient and quality work by key staff from the NSW Professional Teachers' Council - Kim Tsolakis, Shreela Pradhan, Mai Mai Lin, Jill Sillar and Bernadette Motulalo. They provide extensive support to the GTANSW through their ongoing work in administrative, financial, publishing and organizational tasks.

3. Professional development and student engagement

- There is no 'sub-committee' allocated to organise professional development and student engagement activities, instead, committee members volunteer to coordinate these events. Professional development and student engagement events for 2014 included the Arthur Phillip Awards, the HSC Exam Review series; a Hunter Valley Mini Conference; Global Education's Australia's Engagement with Asia: Indonesia; the HSC Geography student lecture series; the Annual Conference; and Geography's Big Week Out.

- **The agreed focus for our professional learning and student engagement program in 2014 was around Stage 5 and 6 Geography – skills, content, inquiry based learning and fieldwork; and in providing support for early career teachers and those new to teaching Geography**. These focus areas have also been reflected in many of the articles submitted for publication in the *Geography Bulletin*.
- **Thank you to Keith Hopkins for organising the 2014 HSC Review series**. They were held during March at two venues: Newcastle (Merewether High School) and Sydney (Loreto Kirribilli). Each one was well-attended, after school hours. The focus was to deconstruct the 2013 HSC Geography examination questions and to provide insight to the marking guidelines so that teachers could identify potential strengths and areas for improvement in their delivery of the HSC course and related assessment. The Council would like to sincerely thank Keith for his sustained contribution to this program over the last few years. We look forward to the continuation of this program in 2015 by David Latimer.
- **Thank you to Grace Larobina for coordinating the Arthur Phillip Awards; to Paul Alger and Brett Jackson for assisting with the marking process; and to Martin Pluss, John Lewis and Susan Caldis for their attendance and participation in the ceremony.** The Arthur Phillip Awards recognises outstanding achievement by students - and their teachers - in the HSC Geography exam from the previous year. There is also a marking and feedback process for students who submit fieldwork projects (often the Senior Geography Project or the Research Action Plan). Awards and prizes are presented at an awards evening with a guest speaker. This year, the event was held at ACU Strathfield on Friday 2 April 2014. The guest speaker was Professor Deirdre Dragovich from the Faculty of GeoSciences, University of Sydney. The Council would like to sincerely thank Grace for leading this program over the last couple of years and welcome her continued involvement with the Arthur Phillip Awards for 2015.
- **Thank you to Keith Hopkins, Sally Egan and Susan Caldis for hosting teacher professional learning around the Global Education Australia's Engagement with Asia: Indonesia resource.** These events were held at their schools on 9 September (Loreto Kirribilli), 11 September (Dubbo Distance Education facility) and 13 May (Castle Hill High School) respectively. There were 45 attendees registered for the May event and 17 registered for each of the September events. Feedback and evaluations indicated strong support for the locations, the quality of the presentation by Rod Yule and depth of information available as part of the teaching resource.
- **Thank you to Dr Grant Kleeman for organising the Hunter Valley Mini Conference; and to Susan Caldis, David Hamper, Nick Hutchinson and Dr Grant Kleeman for delivering the presentations.** This was held in mid-March 2014 at Crowne Plaza Hunter Valley. There were 98 attendees who traveled from regional NSW (such as, Grafton, Dubbo, Upper and Lower Hunter, Newcastle, Echuca) and also from Sydney. The focus of the conference was on Stage 6 Geography (HSC course and the Preliminary course Senior Geography Project). There was also a session devoted to discussing ways in which GTANSW can better engage with members and schools from regional NSW. Due to the success of this mini-conference program, the Council has decided to extend the program of regional mini-conferences for 2015.
- **Thank you to Susan Caldis for organising the Annual Conference**; **to Dr Grant Kleeman, Lorraine Chaffer and Nick Hutchinson for MC-ing the event; and to Milton Brown and Sharon McLean for delivering fieldwork opportunities in the afternoon.** The conference was held on 5 August 2014 at Rydges World Square. The theme was 'Liveability – Geography comes alive' and the day was organised around keynote sessions in the morning and fieldwork in the afternoon - a move away from recent annual conference structure. The conference theme represents key components of Urban Places (Stage 6); Issues in Australian Environments (Stage 5); and Changing Australian Communities (Stage 5) and will provide fieldwork and inquiry based learning opportunities that teachers could repeat with their students. Professor Phillip O'Neill, Foundation Director of the Urban Research Centre at UWS was the opening keynote speaker, followed by presentations by Mick Law from Contour Education; a representative from Barangaroo Delivery Authority; and Evelyn Ivinson from the NSW Department of Planning and Infrastructure.
- **Thank you to Dr Grant Kleeman for organising and delivering presentations for the HSC Lecture series for students**. Thank you also to David Hamper and Chris Tanna for delivering presentations as well. The lectures were held in Sydney City, Wollongong and Newcastle during Term 2 and based around Skills and each HSC topic: Ecosystems At Risk, Urban Places, and People and Economic Activity. Due to the increasing presence

of teachers attending these lectures without students, the GTANSW will work towards gaining accreditation for this event in 2015 to formalize teacher professional learning.

- **Thank you to Milton Brown for organising and conducting Geography's Big Week Out for 2013 and 2014. Thank you also to Brett Jackson, Steve Weingarth and Lorraine Chaffer for their involvement in the program during 2013; and to Steve and Susan Caldis for assisting in 2014. Thank you also to Kath Berg, Margaret McIvor, Rebecca Nicholas and Mick Law from RGSQ and GTAQ for working with Milton in delivering GBWO.** The top 16 students from the Australian Geography Competition completed a week of rigorous fieldwork activities around the Northern Beaches, culminating in the completion of an assessable, skills-focused, real world geographical problem task. The top 4 students will compete in the Olympiad later this year in Russia. Whilst GBWO has been a tremendous success in NSW, the agreement is that GBWO will rotate throughout states and territories every 2 years. For 2015-2016 GBWO will be hosted in Queensland.
- **Planning for professional development and student engagement for 2015 began in September 2014 and a planning day is scheduled for early January 2015 to finalise activities, dates and venues.** The agreed focus is to continue to explicitly provide support for early career teachers and those new to teaching Geography; and also to connect more directly with regional NSW teachers. Strategies such as greater provision of accredited workshops; greater incorporation of fieldwork, inquiry and skills based activities in to professional development; an improved presence in regional NSW; and a new meeting venue are proposed for helping achieve these focus areas and help raise the profile of Geography.

3. Publications and projects

- **Thank you to Dr Grant Kleeman and Lorraine Chaffer for their joint role as Editors of the *Geography Bulletin*.** There are 4 issues scheduled for 2014. The journal is now in electronic form accessed via a membership password. During 2014 the focus reflected our agreed position on encouraging best practice Geography methodology for the classroom, and geographical articles about New Zealand in preparation for the AGTA conference:

Volume 46 Number 1

Editorial – Dr Grant Kleeman
Senior Geography Project – making it count
Submission to the Review of the Australian Curriculum
PD Event – Australian Curriculum: Geography
Global Tourism Update
Las Vegas, USA
Global Cruise Industry
AGTA Conference 2015
Resources from the Global Education Project NSW
Benefits of GTANSW Membership
Advice to Contributors

Volume 46 Number 2

Editorial – Dr Grant Kleeman
Worldview: a heuristic device to inform the Australian Curriculum: Geography
Why students, particularly boys, could develop a deeper understanding of geography from outside the classroom
New Zealand – Pure Canterbury
New Zealand – A millennium ago
New Zealand – Perceptions of liveability in the Kauri Coast and the East Coast of the Far North District
New Zealand – A notional transect across the volcanic plateau from Tukorehe Scenic Reserve to Te Urewa National Park
New Zealand – Addressing some inquiry questions about South Island High Country
Global Education Study Tour – China

Benefits of GTANSW Membership
Advice to contributors

Volume 46 Number 3

Editorial – Dr Grant Kleeman
GTANSW submission to BOSTES around the draft K-10 Geography syllabus incorporating Australian Curriculum content
Desertification and environmental geography
Desertification: science, conservation, discourse, narratives, paradigms and visions
Desertification and the social sciences
Assessment for learning in a Geography classroom – can we bring about change to reflect evidence based practice?
Fastracking the future Education Program (resource around the North West Rail Link)
Arthur Phillip Awards
Benefits of GTANSW Membership
Advice to contributors

- **Thank you to Nick Hutchinson for his role as Editor of *Geographical Education* – a peer reviewed journal.** *Geographical Education* will be published during the last quarter of 2014 and includes contributions from the GTANSW Executive. This journal is also in electronic form and the 2014 edition will include the following articles:
  - Sustainability in the Australian Curriculum: Geography, by Alaric Maude, retired Associate Professor of Geography at Flinders University, Adelaide, South Australia.
  - Interested and influential: the role of a professional association in the development of the Foundation to Year 10 Australian Curriculum: Geography, by Susan Caldis, President GTANSW, Head Teacher HSIE, Castle Hill High School, NSW.
  - Investigating the impacts of global education curriculum on the values and attitudes of secondary students, by Dr John DeNobile, Dr Grant Kleeman, and Ms Anastasia Zarkos, School of Education, Macquarie University. Post-primary Education and Energy Literacy: An Analysis of the Potential for Geography curricula to contribute to Australian Students' Energy Literacy, by Brad Maddock and Jeana Kriewaldt, University of Melbourne.
- Thank you to Nick Hutchinson for his role as 2015 AGTA Conference Convenor and liaison with Group Events. The 2015 AGTA Conference will be held in New Zealand between 12 –16 January 2015. There are 86 registered attendees. Thank you also to Susan Caldis, Lorraine Chaffer and Dr Grant Kleeman for their commitment to the AGTA Conference and willingness to present workshops.

4. Action for promotion of Geography

- There is no 'sub-committee' to specifically organise events to promote Geography to students or teachers, instead Committee members volunteer to coordinate these activities and work closely with NSWPTC staff as appropriate.
- **Thank you to Lorraine Chaffer for preparing a collection of resources for ScoopIt.** These resources are accessible from the GTANSW website page under Resources.
- **Thank you to Martin Pluss for presenting lectures at the UWS HSC Enrichment Day.** This year the event was held on Friday 22 August at UWS Parramatta Campus
- **GTANSW continues to be approached by schools, organisations and businesses to assist with teacher professional learning and/or the development of geographical education resources.** Those who have approached the GTANSW include those such as Environmental Education Centres, Education diocese and sectors, Department of Planning and Environment, Barangaroo and Lend Lease. Thank you to all Council members involved in this work to ensure the delivery of quality, rigorous, user friendly geographical education resources.

- **Thank you to Milton Brown for his continued participation in the DET HSIE Cross-curriculum committee**.
- **Thank you to Martin Pluss for his continued liaison with the Geographical Society of NSW**.
- **GTANSW contributed to the AGTA Curriculum Review**. Thank you to Nick Hutchinson who compiled the AGTA submission. Thank you also to Dr Grant Kleeman who was invited to attend and participate in a roundtable discussion with Donnelly and Wiltshire as part of the Australian Curriculum Review in March 2014.
- **GTANSW contributed extensively to the development of and consultation on the draft K-10 Geography syllabus incorporating Australian Curriculum content**. Thank you to Lorraine Chaffer for her participation on the syllabus writing team. Thank you to David Latimer for officially representing GTANSW as part of the NSWBOSTES reference group. Thank you to Susan Caldis, Nick Hutchinson, Martin Pluss and Steve Weingarth for officially representing the GTANSW upon invitation to a BOSTES targeted focus group in early August. Thank you to all Council members who attended and contributed to the consultation feedback meetings around Sydney during August and September. Thank you to Susan Caldis who compiled and submitted a formal GTANSW response on behalf of GTANSW Council to NSW BOSTES around the draft K-10 Geography syllabus incorporating Australian Curriculum content. This response was published in Issue 3 of the ***Geography Bulletin.*** The proposed timeframe for implementation of the NSWBOSTES K-***10 Geography syllabus incorporating Australian Curriculum content*** means that NSW is now significantly behind the majority of other states and territories. Many teachers have expressed disappointment at the delayed timeline. The GTANSW has requested, and will continue to request that.
- **Thank you to Rob Berry for working with NSWPTC staff in maintaining and updating the GTANSW website as required.**
- **The distribution of emails to members by NSWPTC staff, maintenance of the GTANSW website, and publication of the *Geography Bulletin* are effective in providing geographical education information to members and in advertising events**. Thank you to Shreela Pradhan, Jill Sillar, Rob Berry, Grant Kleeman, Lorraine Chaffer and Susan Caldis for their work across these areas of promotion.

5. Council

- **Thank you to all Council members for their support of and participation in GTANSW activities throughout the year.** Particular thanks to our Immediate Past President, Nick Hutchinson; and the Vice Presidents, Dr Grant Kleeman, Lorraine Chaffer, Milton Brown and Martin Pluss for their continued support, generosity of time and expertise, and willingness to take on additional and/or multiple roles within the Association, often at short notice.

6. Awards

- **Brock Rowe Award 2014**
  This year, the process has been slightly amended to also include nominations for the award from GTANSW members. The winner of this award is yet to be determined.
- **Geoff Connolly Award 2014** – The winner of this award is yet to be determined.
- **PTC NSW Outstanding Professional Service Award 2014** – Milton Brown was nominated and received this award in November 2014.

Overall, 2013-2014 was a busy, productive and successful year for the GTANSW, achieved through the enthusiasm and commitment from Council members; the interest and support from association members; and the efficient, ongoing administrative support from the NSWPTC office. We aim to bring Geography to life for all through the provision of quality professional learning opportunities and continued recognition of student and teacher achievement in geographical education. I look forward to working with all of you in 2015 as we continue promote the uniqueness, relevance and rigour of Geography.

Susan Caldis, GTANSW President, HT HSIE Castle Hill High School

Geography's Big Week Out 2014

Milton Brown

The 2014 Big Week Out was held on Sydney's Northern Beaches from 28 September to 3 October. The 16 student participants were the highest-scoring male and female Year 10/11 students from each state and the combined territories, plus two other high-scoring students, based on the 2014 Australian Geography Competition.

2014 Big Day Out participants at America Bay, Kuringai NP

Following the pattern of previous Big Week Outs, the activities were largely the same as the previous year. The unifying theme of the activities was the impact of human development on catchment areas. The main focus was Narrabeen lagoon but students also carried out studies along Careel Creek in Avalon and America Bay in the Kuringai National Park. The surrounding areas of Ingleside and the Warriewood Valley all impact on Narrabeen lagoon and the feeder creeks and bushland areas are being affected by urban development. Water Quality analysis, flora and fauna studies, urban planning and environmental protection strategies were examined with the aim of equipping students to apply their knowledge to a culminating exam task. The main studies were lead by staff from the Coastal Environment Centre, Pittwater Council. A new activity for 2014 – looking at environmental change at Narrabeen Lagoon through the analysis of sediment cores, was led by Dr Tim Ralph from Macquarie University, the Competition's NSW sponsor. Mick Law and Rebecca Nicholas provided expert guidance in the practical use of Geospatial technologies.

Based on assessment completed during Big Week Out, the following four students have been selected to represent Australia at the International Geography Olympiad to be held in Tver, Russia, from 11 to 17 August 2015. They will be accompanied by Kath Berg and myself..

Sam Dixon-South,
Ballajura Community College, Perth.WA

Canada Gavin,
Kinross Wolaroi School, Orange. NSW

Esrom Leaman,
Pembroke School, Adelaide. SA

Giselle Pickering,
Wavell State High School, Brisbane. QLD.

The 2014 Big Week Out was another outstanding success and I thank the following teachers from GTAQ and GTANSW for their support over the two years:

Kath Berg
Mick Law
Rebecca Nicholas
Lorraine Chaffer (2013)
Kerry McEwan (2013)
Susan Caldis
Margaret McIvor
Steve Wiengarth
Brett Jackson (2013)

Core sample sediment data.

Right: Warriewood Valley urban growth

Surfing lessons

Play the blues – harmonica lessons

Leaf litter

STUDENT LIST

James Abel, Shore School, Sydney
Emily Alder, Canberra Girls Grammar School
Jarrod Allen, Ormiston College, Brisbane
Catriona Calantzis,
Danebank Anglican School For Girls, Sydney
Gigi Dadds, Pembroke School, Adelaide
Miles Davis, Canberra Grammar School
Samantha Dixon-South,
Ballajura Community College, Perth
Canada Gavin, Kinross Wolaroi School, Orange
Jessie Horder-Geraghty,
Launceston Church Grammar School
Abraham Lawson, Ballarat and Clarendon College
Esrom Leaman, Pembroke School, Adelaide
Jason Michael, Perth Modern School
Christine Nguyen,
Loreto Mandeville Hall Toorak, Melbourne
Samson O'Donahue-Summers,
Marist Regional College, Burnie
Giselle Pickering,
Wavell State High School, Brisbane
Keita Richardson,
Normanhurst Boys' High School, Sydney

STUDENT FEEDBACK

I learnt so much both in terms of content but also generally how broad Geography can be and how applicable it is to so many things. I have a far better appreciation of what a good subject it is now than I ever did just through school. I also enjoyed everything so much and I know a lot of that was down to your careful and considered planning. I think it was also down to your enthusiasm and passion in everything we did. I don't think I've ever seen a better example of what teaching should really be all about. Keita Richardson

Photo Credits: Kath Berg, Margaret McIvor and Bernard Fitzpatrick

Big Week Out Competition –http://www.geographycompetition.org.au/geography%E2%80%99s-big-week-out

Australian Geography Competition 2015

International team selection

Australian team members to the 2016 International Geography Olympiad in Beijing will be chosen from 16 to 18 year old students who excel in the 2015 Competition and via Geography's Big Week Out.

Who can enter?

Students taking Geography, or an integrated social science which includes Geography, may enter. Students are graded at three levels depending on their age on 31 August 2015 – junior for students 13 and under; intermediate for students 14 and 15 years old; senior for students 16 to 18 years old.

When do the important components happen during 2015?

Friday 27 February	**Entry deadline**
Monday 23 March – Wednesday 1 April	**Competition in schools**
Thursday 2 April	**Deadline to post answers**
Mid May	**Prizewinners notified**
Early June	**Results returned**
Sunday 27 September – Friday 2 October	**Geography's Big Week Out**

METEOTSUNAMIS FROM THE SKY

Dr Susan Bliss

Source: http://www.meteoweb.eu/wp-content/uploads/2013/03/mareggiata05.jpg

Australian Curriculum – Content Descriptions

Year 7 Unit 1: The **causes, impacts** and **responses** to an **atmospheric** or hydrological **hazard** (ACHGK042)

Year 8 Unit 1: The geomorphic processes that produce landforms, including a case study of at least one landform (ACHGK050) e.g. **Coastal Landforms**

Year 10 Unit 1: Select ONE of the following types of environments as the context for study: land, inland water, **coast,** marine or urban. A comparative study of examples selected from Australia and at least one other country should be included.

- The application of human-environment systems thinking to understanding the **causes** and likely **consequences** of the environmental change being investigated (ACHGK073)
- The application of geographical concepts and methods to the **management** of the environmental change being investigated (ACHGK074)

'Earthquake-generated tsunamis account for approximately 85% of tsunamis. However, the National Oceanic and Atmospheric Administration (NOAA) says that meteorologically-generated tsunami type waves known as meteotsunamis may pose a greater threat to more people. This is because they are not driven by geological forces that only exist in certain locations, but rather by geographical and meteorological forces that can happen in far greater places.'

Source: http://meteotsunami.weebly.com/

Australia and Brazil 2014

In February 2014 a weather induced **meteotsunami** or **meteorological tsunami** caused waves to spill over Cassino Beach in Brazil where parked cars were tossed around. In August 2014 large ocean waves created a meteotsunami at Freemantle port, Western Australia. As a result a cargo vessel broke its moorings and a ship's rope snapped causing it to swing into the bridge and damage a pier.

Meteotsunami or a weather induced tsunami is associated with a sudden change in air pressure over the surface of the ocean's water such as a storm, fast moving front, squall or train of atmospheric gravity waves. At Freemantle the two **hectopascal** (hPa) change in the air pressure created a wave about half a metre high. When the wave entered the harbour there was an increase in the water level and as a result a ship moved over the sandbar and hit the bridge.

What is a meteotsunami?

A meteorological tsunami or meteotsunami resembles a seismic tsunami as it has similar wave formations, physical characteristics, and its destructive waves erode coastlines. However the source of their power differs:

- **geological-seismic tsunami** is generally triggered from the bottom of the ocean such as from earthquakes, landslides and volcanoes.
- **meteotsunami** is generated from the top caused by atmospheric processes.

When the two types of tsunamis strike the coast they appear similar. The difference is in their source. Japan experiences both types of tsunamis on its east coast:

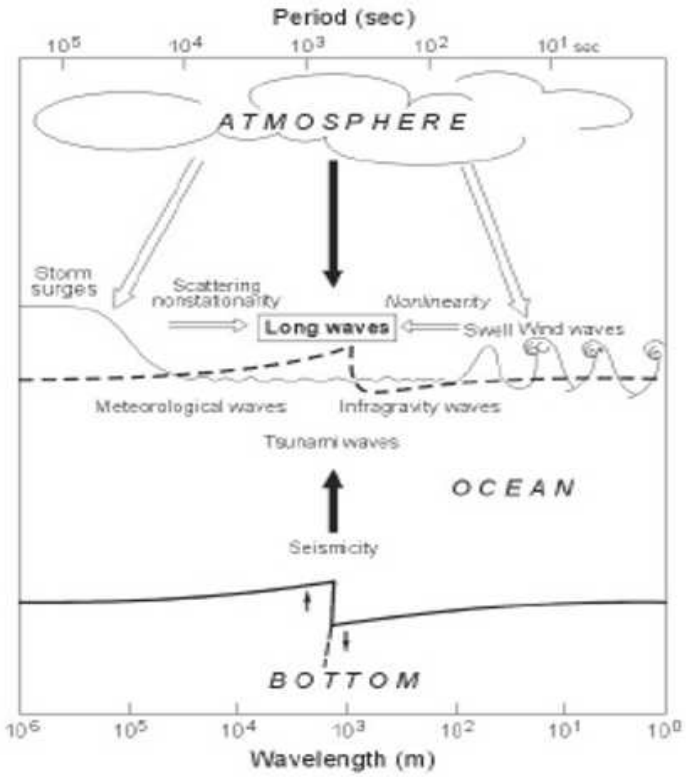
- 2011 an undersea earthquake off the Pacific Coast caused a seismic tsunami that reached 40.5 metres in Miyako.
- 1979 a four metre meteotsunami struck Nagasaki Bay.

Are you still pondering what a meteotsunami is? Here is a description from UNESCO site (http://unesdoc.unesco.org/images/0018/001882/188226e.pdf):

> *"Tsunami-like phenomena generated by meteorological or atmospheric disturbances. These waves can be produced by atmospheric gravity waves, pressure jumps, frontal passages, squalls, gales, typhoons, hurricanes and other atmospheric sources."*
>
> *"Meteotsunamis have the same temporal and spatial scales as tsunami waves and can similarly devastate coastal areas, especially in bays and inlets with strong amplification and well-defined resonant properties."*

Lake Superior storm, November 27, 2002.
Source: http://www.glerl.noaa.gov/seagrant/glwlphotos/Superior/images/MNSG/CarlWaves3.jpg

Figure 1: Comparing source of atmospheric (meteotsunami) and seismic tsunamis



Source: www.electricyouniverse.com/eye/?level=picture&id=1073

Causes of meteotsunamis

The wave only turns into a tsunami if the wave is travelling at the same speed as the weather front, storm or squall. This is referred to as resonance. The wave may be a few centimetres high in the deep ocean but can rapidly grow to 6 metres high when the water enters a narrow bay or 'V' shaped harbour. This is called amplification.

In Japan meteotsunamis frequently occur along the west coast of Kyushu during winter and early spring. In 2009 at Urauchi Bay a destructive meteotsunami reached 3.1 metres caused capsizing of boats and flooding of houses. The long elongated inlet with a narrow mouth provides calm water conditions for boats and the aquaculture industry. However when a meteotsunami reaches the narrow bay waves increase in height. Forecasting a meteotsunami is important for the local community. As a result researchers are investigating the process of a meteotsunami event and the links between offshore generation (air pressure changes), resonance while it propagates, and finally amplification in the bay.

Figure 2: Mechanisms, causes and impacts of meteotsunamis

Main mechanisms	Causes and impacts
Meteorological disturbance	*Atmospheric gravity waves* – energy and air pressure changes are translated to water surfaces. *Sharp air pressure jumps (hPa)* or the differences in air pressure over a short period of time. This frequently occurs during thunderstorms. In June 2014 the meteotsunami along the Adriatic coast at Croatia rose 4 hPa in 20 minutes. *Squalls* – wind gusts of over 25mph for over a minute but nor sustained for over 10 minutes. These winds create wave trains.
Resonance	*Meteorologic disturbance* (e.g. storm or front) must travel at the same speed as the wave speed. In the Western Atlantic, a meteotsunami's deep water speed reached 732 km/h.
Harbour – inundation	*Amplification* of the tsunami waves depends on the shape of the harbour. Greatest amplification occurs in V shaped harbours where a large percentage of damage occurs. The narrow harbours of Spain's Majorca Island and Croatian coast, along the Adriatic Sea, are prone to meteotsunamis.

Figure 3: Formation of a meteotsunami

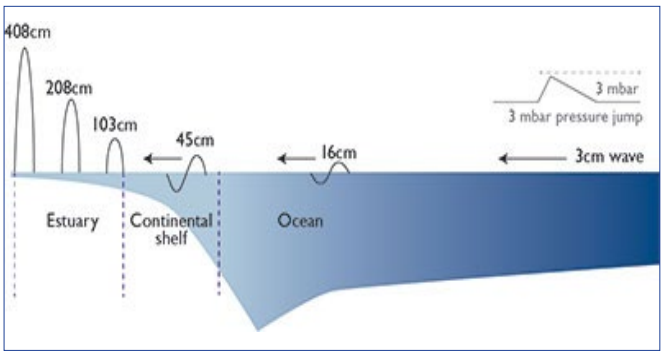


Image source: http://planetearth.nerc.ac.uk/images/uploaded/custom/Figure-1-tsunami.jpg

This Figure 3 diagram illustrates how a meteotsunami is formed from a 3 millibar pressure jump over the ocean. It then causes the movement of a 3cm wave. As the wave travels across the ocean it increases in height (16cm) until it reaches 408cm at the end of a narrow elongated estuary (inlet, bay or river mouth).

Image source: http://meteotsunami.weebly.com/meteotsunamis.html

Similarities and differences of tsunamis

A seismic tsunami and a meteotsunami affects coastal environments in similar ways. These hazardous incidents can cause destructive waves resulting in coastal erosion, loss of lives and damage to property. However, seismic tsunamis and meteotsunamis differ in the quantity of energy involved, wave height and the extent of the hazard.

Figure 4: Differences between seismic tsunami and meteotsunami

	Seismic tsunamis	Meteotsunami
Energy	Larger energy input from the initial disturbance	Requires continued energy input from the atmosphere for it to propagate
Amplitude or wave height	Waves tend to be higher	Waves tend to be lower, with the largest waves reaching generally no more than 6 metres
Extent	Can have a global reach such as the 2004 Indian Ocean tsunami and 2011 Japanese Pacific Ocean tsunami	Usually a local phenomenon such as a storm

Spatial distribution of meteotsunamis

Major geophysical tsunamis and meteotsunamis occur infrequently. Despite their rarity small meteotsunamis are so common in some countries they have special names for these freak waves such as ***abiki*** (Japan) and ***šćiga*** (Croatia).

- **Japan**: Nagasaki Bay in Japan lies at the head of a long bay which forms a perfect natural harbour

on the island of Kyūshū. Abiki waves often reach 2 metres and in 1979 they reached 4.78 metres.

- **Croatia:** Along the coast of Croatia, on the Adriatic Sea, a meteotsunami reached 6 metres in 1978 and in 2003.

Amplitudes of meteotsunmis are generally small in Chinese coastal waters with the exception of Longkou Harbour which experiences about six events per year with average duration from 2 hours to 4 hours.

Figure 5: Selection of locations exposed to meteotsunamis

Area	Country	Height metres
Nagasaki Bay	Japan	4.8
Pohang Harbour	Korea	0.8
Longkou Harbour	China	3.0
Ciutadella Harbour	Spain	4.0
Gulf of Trieste	Italy	1.5
West Sicily	Italy	1.5
Malta	Malta	1.0

Source: http://en.wikipedia.org/wiki/Meteotsunami

Figure 6: Meteotsunamis with wave heights above 3 metres

Source: http://jadran.izor.hr/tmews/kickoff/Sepic%20-%20adriatic_%20meteotsunamis.pdf, page 2

Sćiga along the Adriatic Coast

The Croatian Adriatic Coast is vulnerable to numerous meteotsunamis. For example:

- 21 June 1978 waves reached 6 metres.
- 15 June 2006 waves damaged more than 40 boats and cost tens of millions of dollars in Ciutadella Harbour (Menorca Island).
- 25 June 2014 at Vela Luka (Korčula) atmospheric pressure rose 4hPa in 20 minutes. The sea level rose quickly to 1.5 metres and lasted about three hours.

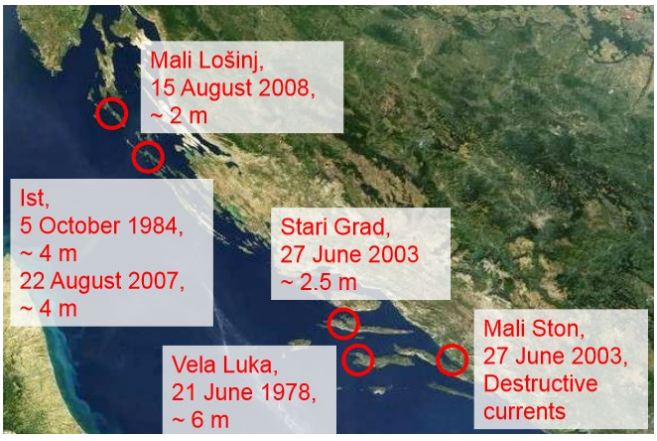
The main characteristics of Adriatic meteotsunamis are:

- Air pressure disturbances. Sharp change in hPa over a period of ten minutes
- Wave direction generally south to west
- Wave heights over two metres
- Occurs at elongated shallow bays

Figure 7: Meteotsunami hits the Adriatic Coast at Vela Luka (Korčula) in June 2014

Source: http://thewatchers.adorraeli.com/2014/06/25/meteo-tsunami-hits-several-cites-along-adriatic-coast-croatia/

Figure 8: Significant Adriatic meteotsunamis



Source: http://jadran.izor.hr/tmews/kickoff/Sepic%20-%20adriatic_%20meteotsunamis.pdf

Figure 9: Long narrow inlet of Stari Grad is affected by meteotsunamis (Amplification)

Source: http://www.chorvatsko.cz/stdalos/pict/stari_grad_13.jpg

Figure 10: On 15 August 2008 a sea wave flooded the harbour of Mali Lošinj on the island Lošinj in the northern Adriatic. The flood was 50cm-80cm high above the ground and wave height (trough-to-crest) of more than 2 metres.

Source: http://www.zamg.ac.at/etrainwiki/doku.php?id=15_august_2008_-_meteorological_perspective_of_a_meteotsunami_on_island_losinj_in_the_adriatic_sea

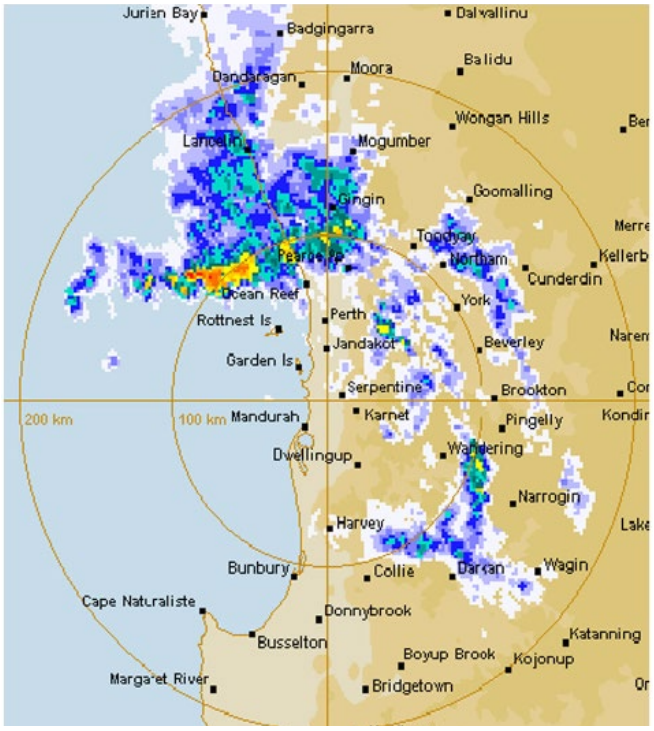
Aerial view of Fremantle – http://en.wikipedia.org/wiki/Fremantle

Western Australia hit by meteotsunamis

Meteotsunamis along the south-west Australian coast were found to coincide with thunderstorms in summer and the path of low-pressure systems during winter. Meteotsunamis are common around Perth and in 2012 a meteotsunami contributed to the highest water levels recorded at Fremantle in 115 years.

In 2013 a thunderstorm affected an area of over 500km from Bunbury to Geraldton. Two pressure jumps of 4 hPa were recorded and waves reached 0.48 metres at Freemantle. Recent modelling has been undertaken for areas considered vulnerable, such as Port Geographe and Bunbury, which have the potential for major inundation. Port Geographe is a low lying marina and residential canal estate development.

Figure 11: Radar rainfall 6am on 7 January 2013 showing the squall line in the Perth region. Warmer colour reflect higher rainfall rates.



Source: http://download.springer.com/static/pdf/100/art%253A10.1007%252Fs11069-014-1263-8.pdf?auth66=1410566662_d690490baaa35f94b4043e4fa66f9b66&ext=.pdf, page 19

Marina, Ciutadella Harbour Spain. Source: Wikimedia Commons

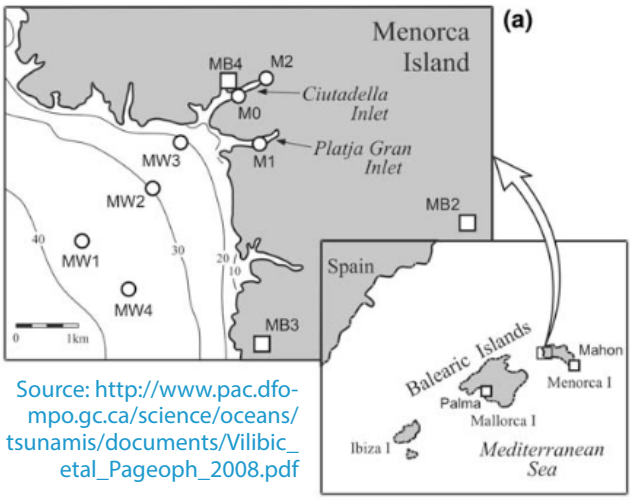
Rissaga in Ciutadella Harbour Spain

Ciutadella is located on the island of Menorca in Spain. The natural elongated inlet is about 1 kilometres long, 100 metres wide and 5 metres deep. The harbour is located at the head of the inlet. Rissaga waves are high and occur more frequently than other places along the coast. Rissaga waves over 2 metres usually occur once in every 5-6 years and heights 3–4 metres once in 15–20 years. These destructive waves cause damage to harbour facilities.

'Rissaga is the local name for sea level oscillations characterised by their large amplitude (1 m, in usual cases) and short period (around 10 min) observed in Ciutadella harbour. Rissaga events typically occur several times a year (mainly in summer) and they usually produce only minor problems to the harbour functionality. A rissaga event is very similar to a tsunami: there are one or two large sea level oscillations, but they are accompanied, before and after, by smaller amplitude oscillations. The total duration of an event can range between a few hours and a couple of days.'

http://www.kweather.ph/#!meteotsunami/c4nb

Figure 12: Map of the Balearic Islands showing the Ciutadella inlet



Source: http://www.pac.dfo-mpo.gc.ca/science/oceans/tsunamis/documents/Vilibic_etal_Pageoph_2008.pdf

Figure 13: Ciutadella Harbour – before and after a meteotsunami photo sequence.

On the 15 June 2006 in the port of Ciutadella on the island of Menorca in Spain, the water level suddenly dropped four metres. The mooring lines of almost all the boats snapped. The normal tide difference in the port is around 20cm. Some minutes later the vessels fell prey to te returning water, which came in three metres higher than before. More than forty boats were sunk or seriously damaged.

Source: http://www.afloat.com.au/images/magazine-articles/MAGAZINE/2010/0210/0210p59-port-of-Ciutadella-water-drop.jpg

Right: Puert de Ciutadella. Source: Wikimedia Commons

Yealm River inlet, Devon UK Source: Wikimedia Commons

Britain experiences meteotsunamis

On 27 June 2011 a meteotsunami struck SW England between Penzance and Portsmouth; approximately 320 kilometres of coastline were affected. The meteotsunami was caused by a summer storm in the Bay of Biscay more than 480 km away from Yealm River estuary. The storm moved into the English Channel at a time when tides were higher.

'On June 27, 2011 – a sunny day – the normally placid estuary at the mouth of the Yealm River in southwest England reported waves up to 0.8 m high. On the tidal island of St. Michael's Mount in Cornwall, people crossing the causeway connecting the island to the mainland quickly found themselves knee-deep in water.'

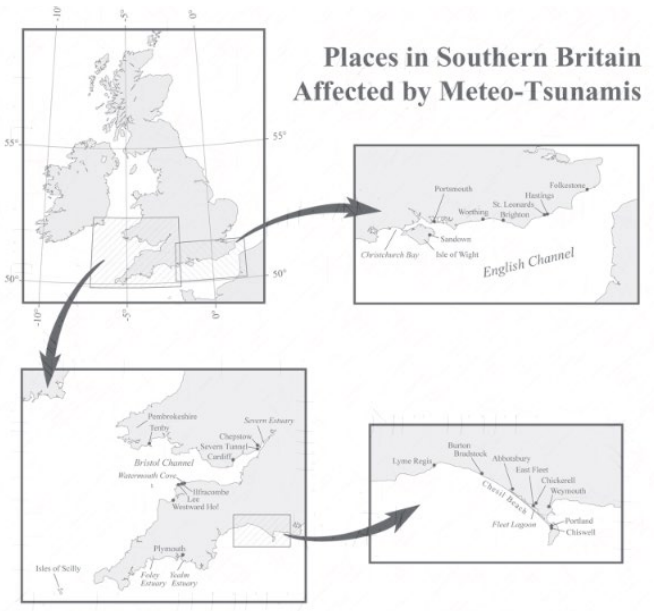
Source: http://news.discovery.com/earth/weather-extreme-events/uk-tsunami-caused-by-storm-130806.htm

St Michael's Mount causeway Source: Wikimedia Commons

'UK tide gauges take measurements every15 minutes, compared to the continuous recording of our nearest European neighbours. The UK also has highly-developed operational models to forecast storm surges and tides, but we need to link them to high-resolution weather forecast models. All possible; it just costs money. If meteotsunamis are going become more common, and perhaps more damaging, this could be money well spent.'

Source: http://planetearth.nerc.ac.uk/features/story.aspx?id=1537

Figure 14: Places in southern Britain affected by meteotsunamis at a variety of scales



Source: http://jadran.izor.hr/~vilibic/meteotsunami/Haslett_Bryant_GeoRev_2009.pdf, page 3

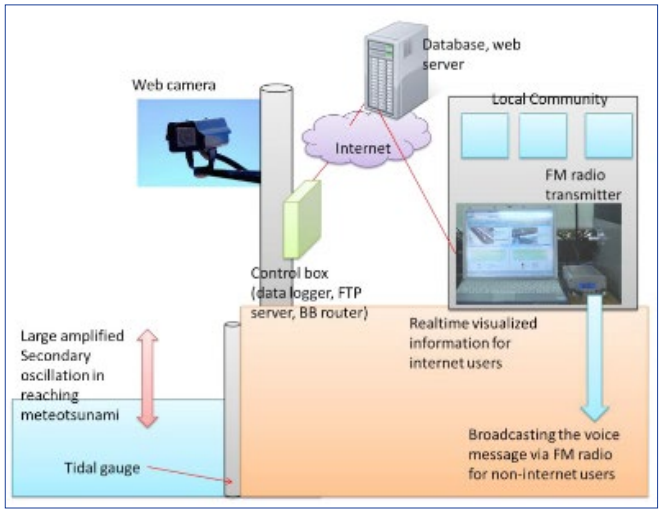
Yealm Estuary from Warren Pt, Devon UK
Source: Wikimedia Commons

Response – management

Despite their worldwide occurrence, the phenomenon is not well known. Awareness of meteotsunamis has risen recently says Paul Whitmore, director of the National Tsunami Warning Centre in Palmer, Alaska. He stated that '*while there is great interest in predicting meteotsunamis before they strike, the interplay between the atmosphere, the ocean and the shape of a harbour makes it difficult to accurately estimate a wave's size at present.*'

To understand the process of the formation of a meteotsunami and to prepare warnings prior to the event, requires a combination of meteorological and oceanographic data such as synoptic maps and the Global Spectral Model.

Figure 15: Sketch of the monitoring and information systems for harbour oscillation due to meteotsunamis.



Source: http://www.iiirr.ucalgary.ca/files/iiirr/A7-4_.pdf, page 7

Geofacts

- Large meteotsunamis have wave heights over 0.4 metres.
- A meteotsunami differs from other types of sea level oscillations of meteorological origin such as storm surges.
- Rogue waves are large meteorological waves infamous for sinking ships in the deep ocean. This differs from a tsunami which are of low amplitude in the open sea.
- The abiki phenomenon in Japan often occurs during days experiencing mild weather in winter.

Geolinks

- Freemantle 2014 – http://www.abc.net.au/news/2014-09-06/ship-hits-fremantle-bridgejpg/5724662
- Meteotsunamis – http://meteotsunami.weebly.com/
- Meteotsunami Panama City Beach Florida March 29, 2014 and video – http://www.extremestorms.com/meteo_tsunami.htm
- Formation of Abiki waves – http://www.electricyouniverse.com/eye/?level=picture&id=1062
- Global Spectral Modelling.– http://www.springer.com/earth+sciences+and+geography/atmospheric+sciences/book/978-0-387-30254-6
- University paper on tsunamis. – http://www.theplasmaverse.com/pdfs/meteorological-tsunamis-destructive-atmosphere-induced-waves-observed-in-the-worlds-oceans-seas-seiches-abiki-milghuba.pdf

Video

- Storm causes container ship to break its moorings and crash into Freemantle rail bridge – http://www.abc.net.au/news/2014-09-06/meteo-tsunami-caused-ship-crash-into-fremantle-bridge/5724654
- Rissaga Al Port De Ciutadella (2006) –h ttp://www.youtube.com/watch?v=7pBMbNGSQn4

Geoactivities

Knowledge and Understanding

1. Define what is meant by a meteotsunami.
2. Research the meaning of the following terms: air pressure, hectopascals, atmospheric gravity waves and amplification.
3. Answer True or False to the following questions:
   a. Meteotsunamis account for approximately 15% of all tsunamis.
   b. Meteotsunami are also called meteorological tsunamis.
   c. Special names for meteotsunamis include abiki (Japan).
   d. Meteotsunamis are not common around Perth.
   e. To sustain a meteotsunami a storm needs to move at the same speed as the movement of the water wave.
   f. The largest meteotsunamis occur where the water is funnelled into narrow bays.

g. Japan experiences both types of tsunamis.

h. A rogue wave is the same as a tsunami.

i. Narrow harbours found around Spain's Majorca Island and Croatia's Adriatic Sea, are prone to meteotsunamis.

j. Sharp air pressure jumps (hPa) is the differences in the air pressure over a short period of time.

k. A meteotsunami is a long-period wave that possesses tsunami like properties but is meteorological in origin.

l. The maximum period for a meteotsunami does not exceed several hours, while a storm surge may last several days.

Inquiry and skills

4. Refer to Figure 1: Describe the links between the atmosphere and the ocean.

5. Refer to Figure 2: List the main causes of a meteotsunami as an oral report.

6. Refer to Figure 3: Explain how a small change in air pressure generates large waves.

7. Refer to Figure 4: A small tsunami that struck the south coast of England on 27 June 2011 was most likely caused by weather conditions and not a submarine landslide or earthquake. Distinguish between the two types of tsunamis.

8. Refer to Figure 5:
   a. Using the internet name the places experiencing meteotsunamis above 3 metres.
   b. Research one place in Asia. Include cause and impacts of meteotsunamis.

9. Refer to Figure 6: Locate these ten places on a world map and the name of the surrounding oceans or seas that influence the meteotsunami.

10. Refer to Figures 7 and 8:
    a. Where is Vela Luka (Korčula) located?
    b. Describe the impacts of a meteotsunami in Vela Luka (Korčula).
    c. In groups discuss the main characteristics of meteotsunamis along the Croatia's Adriatic Coast

11. Refer to Figures 9 and 10: In groups investigate the meteotsunami in June 2003 in Stari Grad or August 2008 in Mali Lošinj. Include causes and impacts. Include maps and photographs http://jadran.izor.hr/tmews/kickoff/Sepic%20-%20adriatic_%20meteotsunamis.pdf; http://www.zamg.ac.at/etrainwiki/doku.php?id=15_august_2008_-_meteorological_perspective_of_a_meteotsunami_on_island_losinj_in_the_adriatic_sea

Meteotsunami, Florida March 2014.
Source http://www.extremestorms.com/meteo_tsunami.htm

12. Refer to Figure 11: Describe the meteotsunami incident in the Freemantle port in 2014. Suggest strategies to reduce the adverse impacts of meteotsunamis on the port and its residents.

13. Refer to Figured 12 and 13: Refer to the internet and YouTube and explain the changes to Ciutadella Harbour and its impacts on the coastal community.

14. Refer to Figure 14: List the places in southern Britain that are more vulnerable to meteotsunamis.

15. Refer to Figure 15: Describe the monitoring and information systems used to measure harbour oscillations due to meteotsunamis.

16. Research what is meant by the following tsunamis: meteorological, local, microtsunami, ocean-wide tsunami, paleotsunami and regional.

17. Explain how a meteotsunami is an underrated hazard.

18. In groups research one of the following acronyms and how they aim to reduce the adverse impacts of tsunamis on environments and people. GLOSS, GOOS, ICG, GTS, ICG/CARIBE-EWS, ICG/IOTWS, ICG/PTWS, IOC, ICG/ITSU, ITIC, ICG/NEAMTWS, IUGG, JMA, PTWC, WCATWC, RTSP, TBB, TER, TNC, TWFP. TWP, WDS AND MGDC. This website will help http://unesdoc.unesco.org/images/0018/001882/188226e.pdf

19. List the differences between a storm surge and a meteotsunami and present findings as a two column table http://www.kweather.ph/#!meteotsunami/c4nb

20. Discuss the causes, impacts and responses to meteotsunamis using Web 2.0 tools. Include photographs, satellite images, diagrams and statistics.

EDUCATION FOR SUSTAINABILITY:

A brief look at policy and practice

Lorraine Chaffer, GTA NSW Vice President
Geography education consultant and author

'Sustainability Education should occur as part of everyday lessons for the purpose of developing knowledge, skills and positive environmental attitudes and values, that build the capacity of students to live more sustainably in their school and community'

'Critical review of current practice and research of environmental education and education for sustainability for Kindergarten to Year 12 from 1990' – K. Skamp, Southern Cross University, April 2010 – as referred to in Sustainability Education PPT[1]

Since the introduction of the NSW Environmental Education Policy (2001) and the Sustainable Schools NSW program, schools across NSW have become more sustainable places of work and learning as well as places of education for sustainability. Recycling schemes, school gardens, water fountains, waste audits, the installation of solar panels and water tanks, environmental clean-up days and paperless administration are some of the ways schools have promoted sustainability and developed partnerships between students, school management and school communities. Education about sustainability is clearly taking place, however education for sustainability, in which students are empowered to make decisions (Figure 1) and take action is less well developed across the curriculum.

Figure 1: Student learning for Sustainability in NSW schools

"Learning for sustainability seeks to enable and empower students to make decisions and take actions that contribute to creating a sustainable society and ecosystem. Sustainability action is both a preferred pedagogical approach for teaching sustainability and an essential set of knowledge and skills for students to learn.

This learning is best delivered through a wide range of teaching and learning activities utilising all of the Key Learning Areas. Students will develop strong environmental knowledge, awareness and capacity for positive environmental change when it is contextualised or taught using real examples, problem solving and with active student participation."

http://www.curriculumsupport.education.nsw.gov.au/env_ed/teaching/index.htm

1. Sustainability Education PowerPoint Presentation – http://www.curriculumsupport.education.nsw.gov.au/env_ed/assets/powerpt/sustainabilityeducation.ppt

Despite the documentation and resources provided to support NSW schools in implementing education for sustainability across all KLA's many initiatives remain school rather than classroom based programs, often involving only a small number of students. This is particularly the case in high schools. The responsibility for developing student conceptual understanding and the application of sustainability principles to real world problems has principally fallen on Geography (HSIE or Social Science) Science and D & T teachers where sustainability is integral to subject knowledge, understanding and skill development.

Australian Curriculum: Sustainability is a LAC priority

The Australian Curriculum emphasises the importance of learning for sustainability with the inclusion of sustainability as a Learning Across the Curriculum (LAC) priority[2]. The expectation is that education for sustainability will be incorporated in varying degrees and where relevant within all subject areas. To assist schools implement LAC priority areas into each subject an explanation and set of organising ideas outlining essential knowledge, understandings and skills for each priority is provided on the Australian Curriculum website.

Figure 2: Australian Curriculum Cross Curriculum Priority: Sustainability

"Sustainability addresses the ongoing capacity of Earth to maintain all life.

Sustainable patterns of living meet the needs of the present without compromising the ability of future generations to meet their needs. Actions to improve sustainability are both individual and collective endeavours shared across local and global communities. They necessitate a renewed and balanced approach to the way humans interact with each other and the environment.

2 The Australian Curriculum: Cross Curriculum Priority –http://www.australiancurriculum.edu.au/CrossCurriculumPriorities/Sustainability

Education for sustainability develops the knowledge, skills, values and worldviews necessary for people to act in ways that contribute to more sustainable patterns of living. It enables individuals and communities to reflect on ways of interpreting and engaging with the world. Sustainability education is futures-oriented, focusing on protecting environments and creating a more ecologically and socially just world through informed action. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural and economic systems and their interdependence."

http://www.australiancurriculum.edu.au/CrossCurriculumPriorities/Sustainability

Produce vendors, Varanasi. Source: J. Curtis

Figure 3: Organising ideas: Sustainability[3]

Code	Organising ideas
Systems	
OI.1	The biosphere is a dynamic system providing conditions that sustain life on Earth.
OI.2	All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.
OI.3	Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.
World Views	
OI.4	World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice are essential for achieving sustainability.
OI.5	World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability.
Futures	
OI.6	The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future.
OI.7	Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.
OI.8	Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgments based on projected future economic, social and environmental impacts.
OI.9	Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments.

3. Organising ideas: Sustainability – http://www.australiancurriculum.edu.au/CrossCurriculumPriorities/Sustainability

The emphasis on education for sustainability at state and national levels, and the impending implementation of the Australian Curriculum from 2011 led to the development of a national organisational framework. The framework was designed to assist syllabus developers at national and state levels to incorporate education for sustainability across all levels and subjects.

The *Sustainability Curriculum Framework* document (Figure 5) developed for the Australian Government supports problem-based learning about sustainability across the curriculum through the ***Sustainability Action Process*** (SAP) (Figure 6). The framework emphasises the importance of developing student capabilities in decision making and taking action on matters related to sustainability. (Figure 4) The SAP illustrates how education for sustainability can be incorporated into the curriculum of all subjects and at all stages using a 5-step scaffold (A example of the application of SAP to a sustainability issue is provided in Figure 5).

- Making a case for change
- Developing the scope
- Defining the proposal
- Implementing
- Evaluating and reflecting

Figure 4: The importance of education for sustainability

"Education for sustainability is both present- and future-oriented. It's about learning to design and implement actions for the present, in the knowledge that the impact of these actions will be experienced in the future. In this way it leads to students developing an overall capacity to contribute to "a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations".

http://www.environment.gov.au/system/files/resources/9b2e74ca-c909-4d57-bae3-c515c20957de/files/curriculum-framework.pdf

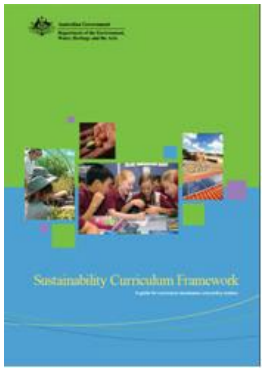
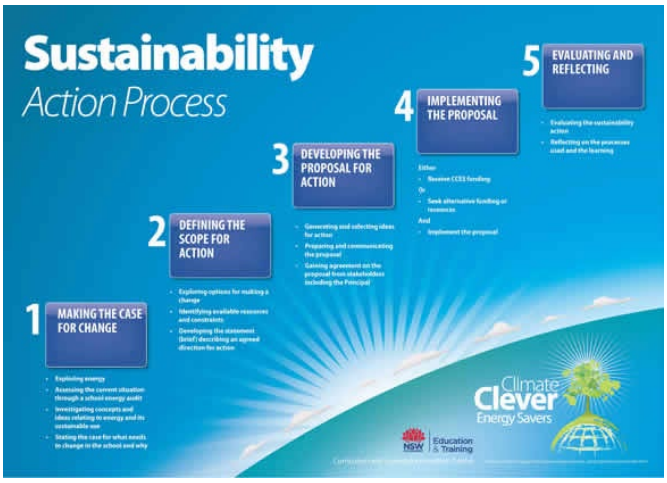


Figure 5: Sustainability Curriculum Framework[4]

[4] Sustainability Curriculum Framework – http://www.environment.gov.au/sustainability/education/publications/sustainability-curriculum-framework-guide

Figure 6 Applying the Sustainability Action Process[5]

The SAP scaffold can be used to develop student capability to implement sustainability action as illustrated by the Clever Climate Energy Savers Project.



Beyond the Geography classroom

Geography lends itself to education for sustainability in subject matter and skill development within the existing NSW Geography Syllabus and the yet to be published syllabus for NSW based on the Australian Curriculum. There are clear links between the ***Geographical Inquiry Process*** of the Australian Curriculum (in which students develop questions, conduct inquiry, propose actions and to take action if appropriate) and the ***Sustainability Action Process*** (which requires the identification of a need for action, the development of proposals to address issues related to sustainability, the implementation of proposals and an evaluation of completed projects). The current ***Stage 5 Research Action Plan*** and ***Senior Geography Project*** have similar connections.

At a whole school level Geographers can play a leadership role in developing programs within their school that incorporate education for sustainability across subject areas. Examples include

- Curriculum mapping to determine the scope and depth of education for sustainability across the curriculum as the Australian Curriculum is implemented.
- Professional development of school staff in sustainability issues, teaching strategies and resource development (to develop consistent approaches and avoid repetition).

[5] Sustainability Action Process – http://www.curriculumsupport.education.nsw.gov.au/env_ed/teaching/index.htm

- Assisting individual faculties with programming ideas.
- Broadening the scope of new or current Geography or HSIE programs to include whole school involvement eg. **Merewether High School Green Day** (See next article).
- Developing a cross curriculum sustainability project involving a whole year cohort eg **Epping Boys High School Cross Curriculum Sustainability Project** (See following article).

Integrating education for sustainability in NSW schools, as an Australian Curriculum Learning Across the Curriculum (LAC) priority is best served with a whole school approach to ensure that

- learning about sustainability has coherence, sequence and balance;
- the development of student capabilities for taking action on sustainability is consistent, incremental and stage appropriate; and
- repetition of sustainability issues in different subject areas and across year cohorts is avoided (after all we don't want other subjects teaching our best topics).

While NSW Geographers eagerly await the new NSW Australian Curriculum for Geography might I suggest that this is an ideal time to examine the teaching programs of subjects that have implemented their NSW (Australian) Curriculum syllabuses (English, Maths, Science, History) to assess the extent that teaching for sustainability has been incorporated. This approach will save time and angst when the time comes to program and teach the new NSW Geography syllabus.

References

Sustainability Education PPT (NSW DEC 2011) http://www.curriculumsupport.education.nsw.gov.au/env_ed/assets/powerpt/sustainabilityeducation.ppt

Sustainability Curriculum Framework website http://www.curriculumsupport.education.nsw.gov.au/env_ed/teaching/framework/index.htm

Sustainability Curriculum Framework document http://www.environment.gov.au/education/publications/curriculum-framework.html

Sustainability Curriculum Framework http://www.environment.gov.au/sustainability/education/publications/sustainability-curriculum-framework-guide

Environmental Education in the curriculum (NSW) http://www.curriculumsupport.education.nsw.gov.au/env_ed/teaching/kla_sup/index.htm

Australian Curriculum: Cross Curriculum Priorities: Sustainability – http://www.australiancurriculum.edu.au/CrossCurriculumPriorities/Sustainability

Sustainability Action Process – http://www.curriculumsupport.education.nsw.gov.au/env_ed/teaching/index.htm

The Geography Teachers' Association of New South Wales Inc.

THE 2014 HSC EXAMINATION REVIEW

Afternoon workshops will focus on investigating, reflecting on and preparing for the 2015 HSC Geography examinations. Experienced presenters have all marked the recent HSC paper and will share their comments about the HSC Geography Examination.

LOCATIONS AND DATES:

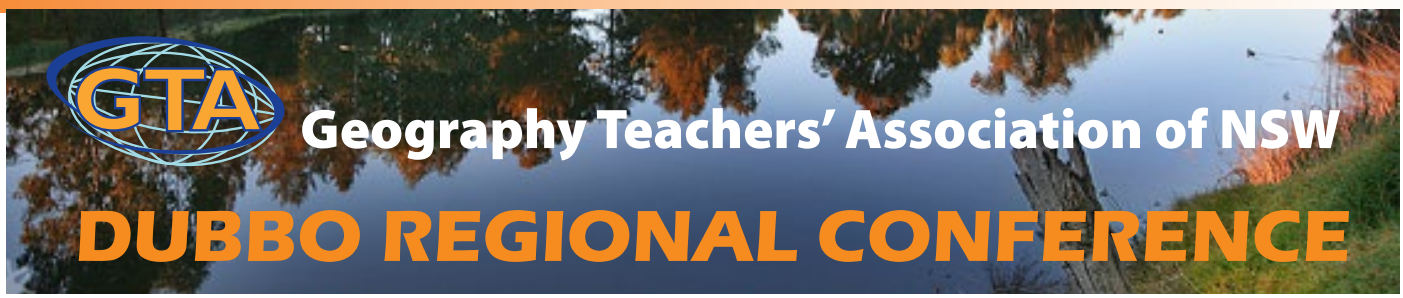
Five Dock – Wednesday 18 February
Venue: Rosebank College

Newcastle – Wednesday 25 February
Venue: Merewether High School

Wollongong – Wednesday 4 March
Venue: St Marys Star of the Sea

REGISTRATION CLOSES:

One week prior to each event. Information will be sent to all schools and online registration will be available on the GTA NSW website – www.gtansw.org.au



Geography: From the Ground Up

Date: Thursday, 5 March and Friday, 6 March 2015

Venue: Dubbo RSL, Corner Brisbane & Wingewarra Streets Dubbo

Focus: This conference is designed to assist those teaching Geography for the first time or returning to Geography teaching. Teachers will be engaged in Geographic Skills workshops that will be utilised in the classroom. Geographic skills are essential in engaging students in critical thinking about the world in which they live. Presentations and workshops on Geographic Information Systems will provide attendees with a range of ICT strategies that will be used to engage students in Geography learning experiences.

Each attendee will receive 15 stimulus booklets based on the Dubbo region, with questions and answers that can be utilised in class.

Bring your own device, wifi access will be provided. You may elect to choose either Thursday or Friday or attend both days.

PROGRAMME

Thursday, 5 March	Activity	Presenter
3:30pm	Registration	
SESSION 1 4:00 – 6:00pm	Geographical Information Systems for the classroom	Mick Law, Contour Education
6:30pm	Dinner: Sticks and Stones Restaurant	
Friday, 6 March		
SESSION 2 8:45 – 10:45am	Geography Skills Workshops Incorporating Dubbo Stimulus material OR Fieldwork skills at the Macquarie River and GIS	Lorraine Chaffer and Grant Kleeman Mick Law, Contour Education
10:45 – 11:00am	Morning tea	
SESSION 3 11:00 – 1:00pm	Geography Skills Workshops – Incorporating Dubbo Stimulus material OR GIS Workshop	Grant Kleeman and Lorraine Chaffer Mick Law, Contour Education
1:00 – 1:30pm	Lunch	
SESSION 4 1:30 – 3:00pm	Setting an exam	Sharon McLean

For further information and registration, go to –

SUSTAINABILITY CROSS CURRICULUM PROJECT

Louise Swanson, Head Teacher Teaching and Learning, Epping Boys High School

The Sustainability Cross Curriculum Project was a compulsory task for all students in Year 7 at Epping Boys High School in Term 2014. It was facilitated by project lessons once a fortnight as well as several days of activities supporting learning about sustainability and the technology tools that would help students to complete the project. The project was completed in small groups of between 3 and 5.

Students had a choice of how to present their projects. These choices are outlined below.

- Design a city or town showing how you could incorporate a range of different sustainable technologies and techniques that would maintain a growing population for 50 years.
- Create a 5 minute video about sustainability in the Epping community.
- Create an app to teach the community about sustainable practices they can implement in their home.
- Create a multi-level game that explores the consequences of not using sustainable practices in the Epping community.
- Develop a visual representation of a sustainable design using a graphics program. Import the graphic into augmented reality software to represent the design in a suitable location, or to augment the information in certain contexts.

A project website was designed to provide students with additional resources and explanations and links to tutorials.

Projects skills development: Academic Principles, Collaborative Learning, Thinking and Research skills

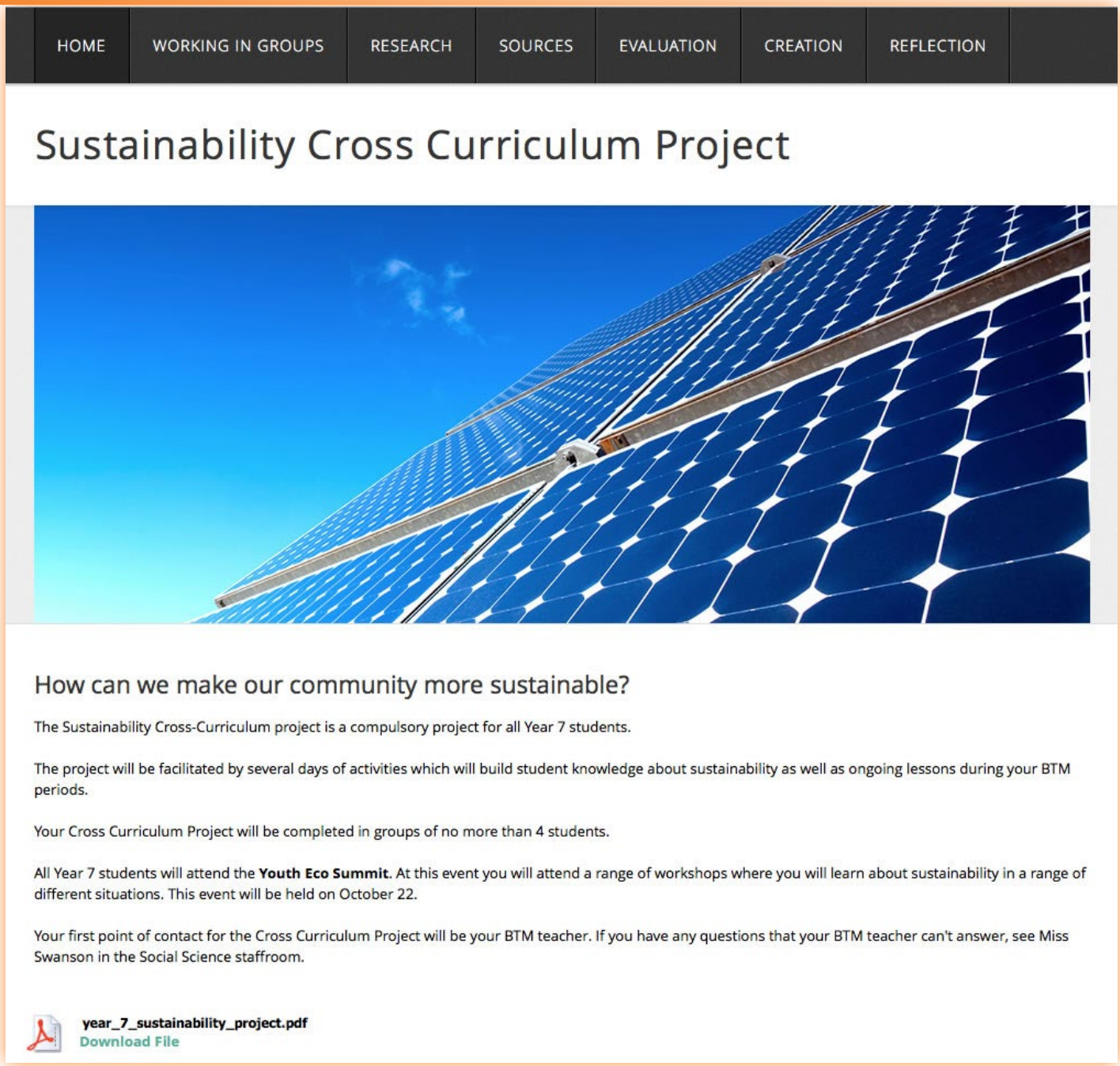
Students began the project by discussing the importance of being a good group member. The group structure was a valuable aspect of the project and supported the school's student welfare program. Boys were encouraged to work collaboratively with their peers, participate fully in group discussions and practice conflict resolution techniques in managing their group. Creative thinking skills were modeled in the whole class setting, and in the presentation of the project to students, by way of using different techniques to brainstorm ideas, categorise and present information. Research techniques were examined including how to source quality information, use different search engines and summarise information. Students were provided with research scaffolds to begin recording information from their reading about their chosen topic. Referencing, citing sources and plagiarism were discussed and students were given access to referencing guides, videos and referencing scaffolds to support their project. After the students were taught each section of relevant information they were asked to apply their knowledge to the development of the project. In doing so, they gradually developed their project throughout the term in an academically rigorous, but supported way.

Students examining a display at the Youth Eco Summit.

Youth Eco Summit

Students attended the Youth Eco Summit, an annual event organised by Sydney Olympic Park, the Department of Education and Communities and the University of Western Sydney. The timing of the Sustainability Project in Term 4 was intended to take advantage of this event. The festival-style event provided students with the opportunity to attend workshops, engage with interactive displays, participate in seminars and watch student presentations. All of the activities focused on environmental, cultural and economic sustainability. The event included video conferencing opportunities for remote schools. It also used this technology to provide students with access to experts from around the globe through interviews and web chats.

Environmental Education Centres, universities and community organisations ran stalls and workshops on topics such as solar cars, bicycle power generation, composting and waste management. The day was organised to allow groups to attend up to three pre-booked workshops. This allowed flexibility and choice



Screenshot of the Sustainability Project website home page. (http://sustainabilityccp-ebhs.weebly.com/)

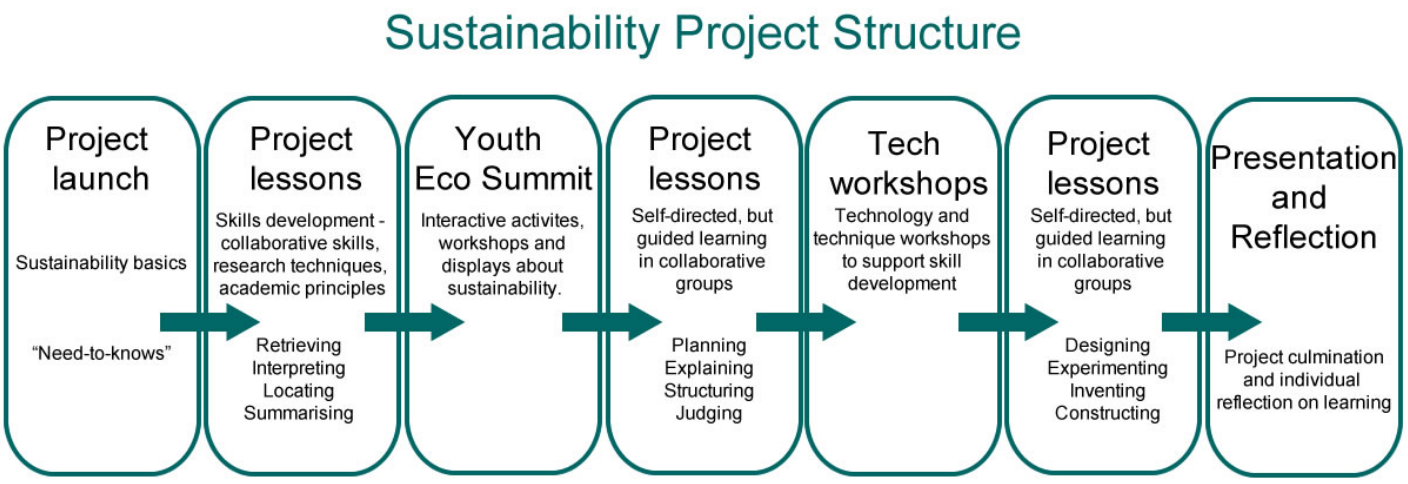
for groups to explore the myriad activities that were scheduled across the venue. The workshops engaged the students in hands-on, interactive activities, and emphasised the real world, practical application of student learning about sustainability.

In the lead up to the Youth Eco Summit professional learning sessions were run at Sydney Olympic Park to increase teacher capacity in delivering content related to sustainability.

Project development: Scaffolding the project creation process

A project creation process was replicated across each of the five project options to ensure that students developed their ideas in a logical sequence. Students examined and reviewed existing examples of their chosen end-product, for example existing games or videos about sustainability. They then brainstormed their own ideas for the creation of an original product. Students were provided with basic scaffolds to plan the creation of the project including relevant subject content. Links to relevant tutorials, videos and online resources were provided to allow students to further develop their skills and knowledge.

See examples of research scaffolds provided to students on pages 32 and 33. Examples of scaffolds to assist the creation stage of the project provided on pages 34 and 35.



The project process for the Sustainability Project.

Technology and technique workshops

Students spent a day attending technology and technique workshops to provide them with some of the technical skills to be able to complete their project. Staff from a variety of faculties volunteered their time to run the workshops. The technology sessions included Adobe Photoshop, Adobe Premiere and app design. A group of Year 10 students also led the students through the use of digital game design using Kudo with the assistance of a teacher. Technique workshops included sessions on dramatic techniques and model building. These sessions were important to develop essential skills in students to become, "…creative and productive users of technology, especially ICT…",(p8, MCEETYA, 2008), and to ensure that any existing deficiencies in technology would not hinder the creation of the project.

Presentation and reflection

Students presented their projects in front of a class of their peers in the school auditorium. Students used websites such as appmakr.com, appypie.com and iBuildapp to create app prototypes. Many of the students used the skills they had developed in the technology workshops to create sustainability games in kodu. SketchUp was most commonly used to create a city model. Several groups created high quality videos. Interestingly, none of the groups chose to present their project as augmented reality. Augmented reality is where a student is able to present a computer-generated image so that it appears to be placed in the real world. This is usually done using apps such as Aurasma. This may reflect the need for additional support in understanding and mastering augmented reality apps.

Above: An app icon created as part a sustainability app.

Students were required to present a written report to make a judgement on how sustainable their community is at present, and how their project would contribute to its sustainability into the future. It was in this section of the project that evidence of cross curriculum thinking was most evident. Students were expected to explicitly state the links between their chosen subjects, sustainability and their project end-products. Students chose to present their evaluations in a variety of forms such as Prezi, PowerPoint, oral presentations and written report.

Students were given a set of questions to guide a reflection on their learning. Many students described issues with working within a group structure, time management and workload. They also indicated a deep understanding of the concept of sustainability and its relevance in a range of contexts.

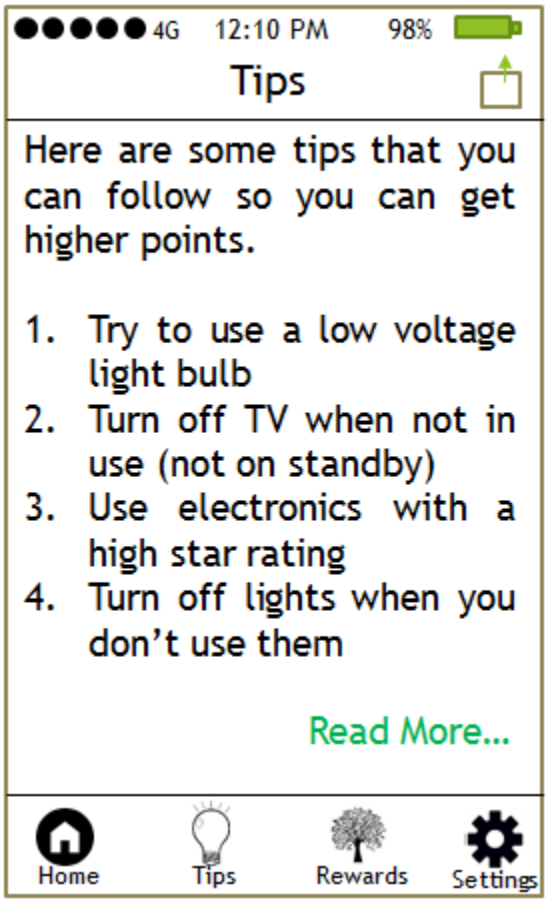
Project rationale

The rationale for the project was to provide an alternative methodology to the traditional secondary pedagogic model, where concepts are taught in subjects often with limited connections to other fields of study. In line with the Melbourne Declaration on Educational Goals for Young Australians (MCEETYA, 2008) and the Department of Education and Communities' Middle Years Transition Matrix there was a desire to develop cross curricular thinking and an ability to solve problems by drawing on a range of disciplines. It is also a way of meaningfully incorporating principles of 21st century learning, and facilitating professional dialogue across faculties about the Australian Curriculum's Cross Curriculum Priorities. This project aimed to foster collaborative and inquiry-based learning, to encourage social activity and cohesion between classes, and to give students the opportunity to extend themselves and explore their own interests. The project was the first implementation of this concept across a whole year group at Epping Boys High School.

Why Sustainability?

The topic of the project was selected from the Cross Curriculum Priorities developed by ACARA for the Australian Curriculum and adopted by the BOSTES in the new NSW syllabuses. For 2014 the topic of sustainability needed to be incorporated into all the Phase 1 subjects for implementation (Math, English, History and Science). As the new syllabuses are released for the Phase 2 and 3 subjects, sustainability will also need to be incorporated. The Department of Education and Communities' NSW Policy, ***Implementing the Environmental Education Policy in your schools (2001)*** has previously provided a framework for and specified methods of integrating environmental sustainability in teaching across the curriculum. For this project the subjects that are addressed are Science, Geography, Timber, Metal, Drama and Technology.

The topic of sustainability provided a great platform for a project to have real world application. The main inquiry question for the Sustainability Project was "How can we make our community more sustainable?". This enabled students to engage with issues and developments at a range of scales from their immediate community to national and global contexts. It also provided a pathway for students to become more informed citizens who are actively engaged with their community.



A screenshot from a sustainability app.

Students powering the Take 3 workshop using cycle power.

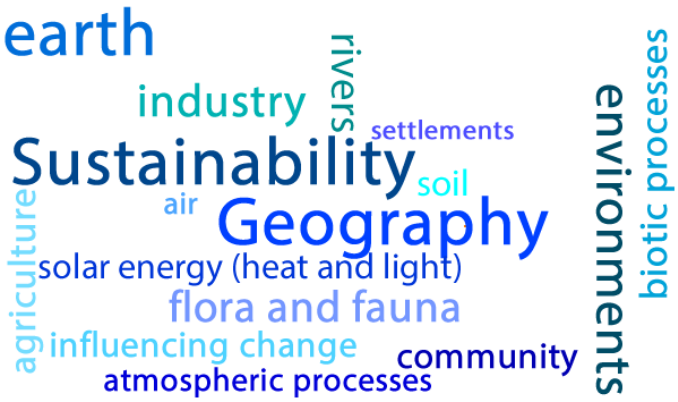
Why implement a Cross Curriculum Project?

The Melbourne Declaration on Educational Goals for Young Australians determines a nationally consistent direction for Australian schools and provides guiding principles to shape future planning. One of the key ideas of the declaration is enhancing middle years development by giving students the opportunity to move across subject areas in the development of new expertise and the ability to solve problems that draw upon a range of learning areas and disciplines (MCEETYA, 2008). The Sustainability Project incorporated subject content and skills from a range of Key Learning Areas as well as several of the General Capabilities identified by ACARA and adopted by BOSTES. Students were asked to explicitly integrate content from two subjects chosen from TAS, Geography and Science, however depending on choice end-products also incorporated Technology and Drama. Students were required to demonstrate literacy skills in the two pieces of written work to accompany the project.

Students were provided with a Wordle (examples are provided next to each subject) and a list of modified, relevant syllabus content for each subject (TAS, Geography and Science) from Stage 4 syllabuses. This was a means to spark student thinking, to encourage connections between subjects and to provide the opportunity for students to choose topics of most interest. For Science, the new BOSTES syllabus incorporating the Australian Curriculum was used. In Geography content was drawn from the existing BOSTES syllabus, but some content from the draft new BOSTES syllabus was also used. For TAS, the existing

BOSTES syllabus was used. The implication of this is that if the project is to be used again in the future it will need to evolve to transition to all new syllabuses as they are released.

The suggested content related to Geography includes introductory concepts related to sustainability such as the importance of physical environments (air, flora and fauna, soils, solar energy and water), the operation of ecosystems, and renewable, non-renewable and continuous resources. Content from the existing Geography syllabus includes the interaction between human and physical environments, and the way humans, including indigenous groups, interact with the environment. Content that has been incorporated from the draft BOSTES Geography syllabus includes the availability of fresh water resources, potential sources of freshwater, and the environmental, social and economic effects of water movement as it connects places.



A Geography Wordle was included with relevant subject content.

Possible Science content includes how people use a variety of natural and made resources, rating strategies used by people to conserve and manage non-renewable resources, and evaluating different viewpoints people may have in making decisions about the use of a major non-renewable source found in Australia.

The TAS (Metal and Timber) courses mirror each other in the way they deal with sustainability. Relevant content includes issues related to sustainability in the metal/

A Science Wordle was included with relevant subject content.

A TAS Wordle was included with relevant subject content.

timber industry, examples of renewable and non-renewable resources in the timber/metal industry, the role of recycling in metal/timber industries, and the effects of the metal/timber industry on the environment.

The project incorporates several of the General Capabilities developed by ACARA and adopted by BOSTES including critical and creative thinking, ethical understanding, information and communication technology (ICT) capability, literacy and personal and social capability. The project requires students to critically analyse and draw conclusions about the sustainability of their community and evaluate how their project contributes to sustainability. Students employed creative thinking by generating original ways to encourage or address sustainability, refining their ideas, and producing end-products in a variety of formats such as video, digital games, augmented reality, models or apps. The topic of sustainability inherently requires students to undertake ethical judgments regarding issues of resource allocation, fairness, equity and the actions of individuals and groups. The project structure also incorporated ethical understanding related to academic principles and research techniques. Collaborative use of ICT was used for the purpose of creating and presenting solutions to complex problems. A formal literacy activity was included as one of the supporting documents to be handed in with the project. This was scaffolded and explicitly explained to provide support for students requiring learning support including EAL/D students. Personal and social capability was addressed by the project in the fact that students had to work in groups and manage themselves and their relationships with their peers to bring the project to fruition. Students needed to communicate, collaborate and negotiate in order to navigate the project.

Teachers led a class of approximately 30 students, or seven groups. The teachers were selected to provide a range of cross-disciplinary expertise and as such came from a range of faculties. Additional teachers provided

support through the provision of technology and technique workshops. Throughout the various stages of the project faculties represented included Social Science, Science, CAPA, TAS, PDHPE, and Math.

Student grouping

Epping Boys High School has classes in Year 7 roughly streamed. One class is selected by way of the submission of a portfolio and is intended for students who are gifted and talented across a range of areas. One class is selected based on academic performance only and four classes are generally mixed. One of the mixed classes has a small number of students requiring learning and support and another has students requiring EAL/D support. There are also a small number of Year 7 students in the school's Autism unit who took part in the program.

The Melbourne Declaration provides guidance on the types of learning to be encouraged, and the skills to be developed in students. It outlines that students should develop the ability to plan activities independently, collaborate in teams, and develop the capacity to work with others (MCEETYA, 2008). For the Sustainability Cross Curriculum Project students were grouped heterogeneously, including students from a range of classes and with a variety of abilities and skills. The intention behind this was to best support the learning and social development of all students (Hayes Jacobs, 2010) and to vary the loose ability groupings to address any "…negative social-emotional impacts…" (p143, Whitten et al, 2009) of the current class structures. Each group contained a student from one of the gifted and talented classes. These students had completed a Cross Curriculum Project of their own choice earlier in the year and had been involved in programs specifically designed to foster critical and creative thinking and problem solving skills. These students acted as group mentors and leaders.

The study of sustainability requires students to actively engage in real world problems, is futures focused, and inspires students to find ecologically and socially just solutions. As such it is an inherently positive learning experience, empowering students with the knowledge of how to shape their community.

References

Australian Curriculum, Assessment and Reporting Authority (2013) Foundation to Year 10 Australian Curriculum: Geography

Australian Curriculum, Assessment and Reporting Authority (2013) General Capabilities in the Australian Curriculum: Literacy. Retrieved from http://www.australiancurriculum.edu.au/GeneralCapabilities/Pdf/Literacy, December 9, 2013.

Australian Curriculum, Assessment and Reporting Authority (2013) General Capabilities in the Australian Curriculum: Information and communication technology (ICT) capability. Retrieved from http://www.australiancurriculum.edu.au/GeneralCapabilities/Pdf/ICT, December 9, 2013.

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Australian Curriculum, Assessment and Reporting Authority (2013) General Capabilities in the Australian Curriculum: Critical and creative thinking. Retrieved from http://www.australiancurriculum.edu.au/GeneralCapabilities/Pdf/Critical-and-creative-thinking, December 9, 2013.

Australian Curriculum, Assessment and Reporting Authority (2013) General Capabilities in the Australian Curriculum: Personal and social capability. Retrieved from http://www.australiancurriculum.edu.au/GeneralCapabilities/Pdf/Personal-and-social-capability, December 9, 2013.

Hayes Jacobs, H. (2010), ***Curriculum 21: essential education for a changing world***, Moorabbin, Hawker Brownlow

Ministerial Council for Education, Employment 2008, Training and Youth Affairs, ***Melbourne declaration on educational goals for young Australians***, Melbourne. Retrieved from: http://www.curriculum.edu.au/verve/_resources/national_declaration_on_the_educational_goals_for_young_australians.pdf December 9, 2013.

Professional Support and Curriculum Directorate (2001), ***Implementing the Environmental Education Policy in your school***, Bankstown, NSW Department of Education and Training. Retrieved from: http://www.curriculumsupport.education.nsw.gov.au/env_ed/assets/pdf/eeimplementdoc.pdf, December 10, 2013.

Whitten, E., Esteeves, K., Woodrow, A. (2009), ***RTI Success***, Minneapolis, Free Spirit Publishing

Research Scaffold

Before you can become too involved in your project you need to read widely. Each person in your group needs to read five articles that relate to the topic of sustainability. You will be required to take notes about the article. You will use your notes later in the project. You should record the site that you visited, the date you viewed the site and a series of summary dot points.

Title	Date accessed	Summary dot points

Working in groups

Who are the members of your group?
Write down the names and email address of each of your group members.

……
……
……
……

How can you be a good group member?

- put forward ideas and explain them clearly
- listen to other peoples' point of view
- express how you feel but don't attack others
- ask questions to find out more about other's ideas and encourage others to express their feelings
- maintain a positive attitude and encourage your other group members to do the same
- be sensitive to other peoples' feelings

Will you be a good group member?
What skills and characteristics do you have which will make you a good group member? Create a list.

……
……
……
……

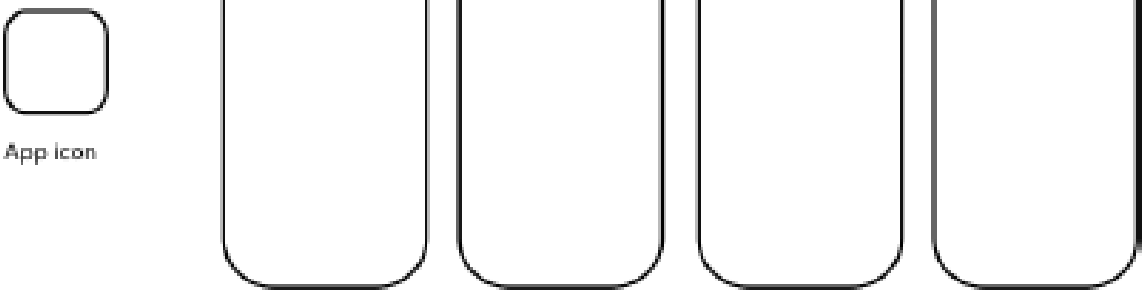
Working effectively in your group
To ensure that your group is productive you must maintain a good group dynamic. To do this you need to have a number of important skills within your group.

Solve common group work problems: Before you begin your group work, create a set of group rules. These may include things like: everyone must contribute, listen to each other, and show group members respect. It is up to you what your group rules are, but if you take some time to develop a good set of group rules you group work should be more effective over the course of the project.

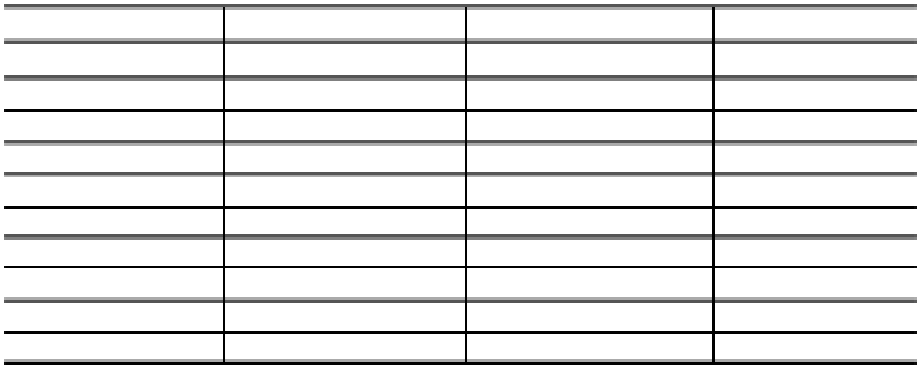
Learn how to provide constructive feedback: Don't make comments about another person, rather make comments that relate to the task that they are working on. For example, don't say, "You are lazy", instead say "We really need the piece of writing you are working on". Provide feedback early so that the person doesn't feel like they have wasted a lot of time. Try to give positive feedback as well as negative feedback.

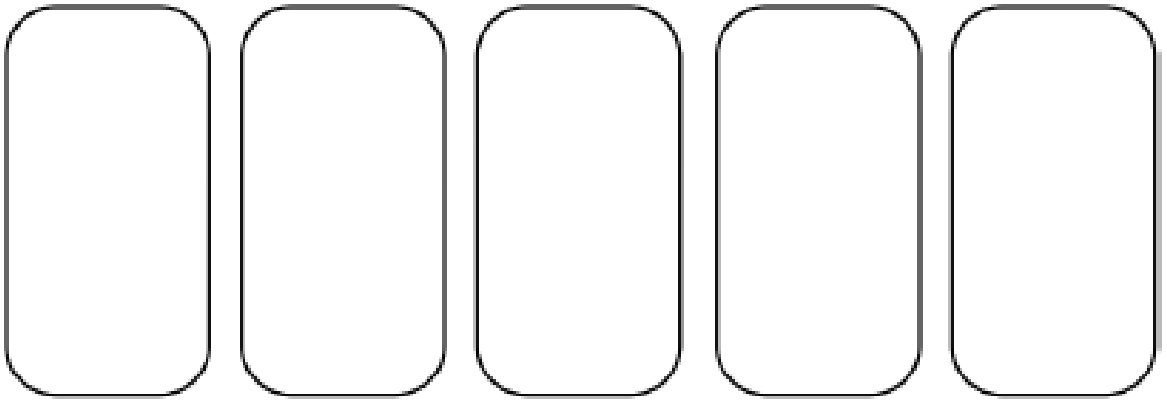
App scaffold

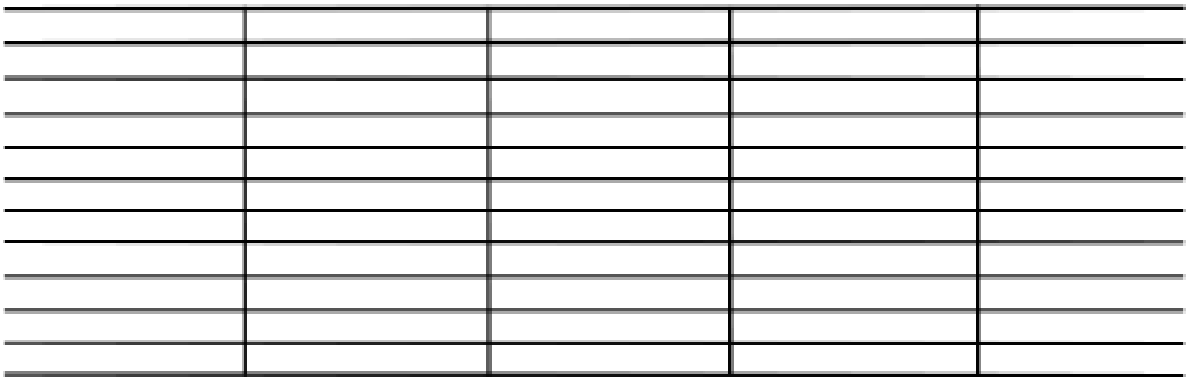
Use this planning sheet to help you come up with the initial designs for your app. Use the lined spaces to write the basic content (text) for each screen. You can download extra handouts if you make a mistake or want to use more screens.



App icon







Video scaffold

Use this planning sheet to help you come up with the initial plans for each scene. Use the lined spaces to write the basic content (text) for your script. You can download extra handouts if you make a mistake or want to use more filmstrips..

Green Day: Enhancing sustainability education at Merewether High School

Lorraine Chaffer, GTA NSW Vice President
Geography Education Consultant and author

Merewether High School is an academically selective high school located in Newcastle, NSW. The school actively promotes sustainable use of school resources and caring for the environment in the " Going Green" section of the school website.

"Students and staff manage, observe and monitor our school's resources, waste and physical surroundings, then take on activities to protect and improve our school and the local environment." Your child will develop an understanding about:

- *the relationship between human activities and natural systems*
- *sustainable management of the earth's resources*
- *the inter-related nature of processes in the natural environment*

We encourage you to support your child's 'going green' activities, and to help them to learn to care for the environment as part of their everyday lives "

http://www.merewether-h.schools.nsw.edu.au/our-school/going-green

Many students at Merewether High are involved in activities related to sustainability such as energy, water and waste audits, recycling, tree planting and enrichment activities such as visits to environmental education centres and guest speakers from environmental organisations promoting sustainability.

Until Green Day was implemented in 2013 by the Social Science faculty there was no coordinated whole school activity providing sustainability education for all students and linking knowledge about sustainability to local organisations and the real world.

Green Day

The Green Day initiative saw sustainability education at Merewether High embedded in whole school practice through a range of fun and interesting activities during different time periods on a single day of the year. The activities are aimed at increasing student conceptual knowledge about sustainability, increasing awareness of how local organisations promote and enhance sustainability in their community and providing ideas for students to take action on sustainability issues.

Right: Electric bike demonstration by Hunter TAFE

Hamilton Public School garden produce stall

Features of Green Day include:

- *An Environmental Expo* organised by senior Geography students who emailed 30 local environmental groups / organisations inviting them to operate information and /or demonstration stands. Organisations involved in 2013 and / or 2014 included

  Hunter Water[1] – sustainable, clean water for Newcastle

  Conservation Volunteers[2] – recruits volunteers for environmental and wildlife conservation projects

  Transition Newcastle[3] – promoting local sustainability

  Take3[4] – protecting beaches from plastic waste

  Tom Farrell Institute Newcastle University[5] – environmental projects

  City of Newcastle – Climate Cam and Waste management

  Wetlands Environmental Education Centre

  Hunter Region Botanic Gardens – water saving native plant display

  Australian Youth Climate Coalition

  LandCare

  Native Animal Trust – wildlife rescue service

  National Parks and Wildlife – biodiversity and habitat protection

  Youth Leading the World – social justice

  Smart Grid Smart City – sustainable energy production

  RSPCA – humane chicken farming

  Feedback – recycling waste

  SD Environmental Management – solutions for businesses

RSPCA representatives present information on sustainable and humane chicken farming

RSPCA information on sustainable and humane chicken farming

1 Hunter Water – http://www.hunterwater.com.au

2 Conservation volunteers – http://www.conservationvolunteers.com.au

3 Transition Newcastle – http://www.transitionnewcastle.org.au

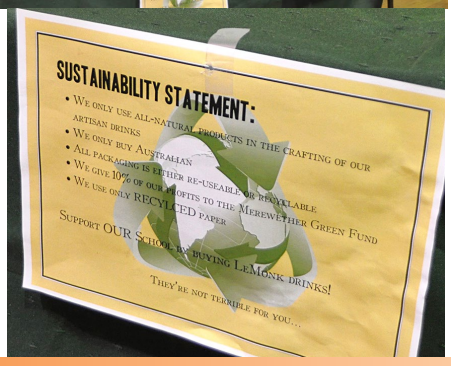
4 Take 3 – http://www.take3.org.au

5 Tom Farrell Institute – http://www.newcastle.edu.au/about-uon/our-university/sustainability/environmental-projects-at-tom-farrell-institute

Green Day: Enhancing sustainability education at Merewether High School

Signing up to participate in action for sustainability.

- ***Other local schools*** with a commitment to sustainability participated in the expo. Hamilton Public School students displayed and sold produce from their Blue Gate Garden and Lambton High School students displayed a range of sustainability programs running at their school eg. Climate cam and Green concert.
- ***Green stalls*** – Commerce students developed environmentally friendly businesses selling products such as cakes, drinks, fudge and pizza to students and other visitors on Green Day. Each enterprise required a sustainability statement for display on their stall. A percentage of profits go to the Merewether High School Environment Fund.



Business sustainability statement (right) for the Lemonk enterprise stand

- ***Dressing green*** – all students were encouraged to dress in green or clothing that demonstrated sustainable fibre and / or clothing production. Selected students participated in a sustainability fashion show.

Students engage with community organisations such as wildlife rescue

Learning about native plants from Hunter Region Botanic Gardens

- ***School Environment Fund*** – receives fund raising from the day. A suggestion board involves students in proposing ideas to increase sustainability at MHS.
- ***Clean Up Australia Day*** and ***Tree Planting activities*** in the grounds of MHS.

The day ran successfully in 2013 and 2014 and is now an annual event on the school calendar, successfully immersing students in informative and practical sustainability education in a day of learning while having fun.

Green Day: Enhancing sustainability education at Merewether High School

Learning about Hunter Water

Demonstrating cycle power

Left: Suggestion board for use of MHS Environment Funds

While environmental sustainability forms the focus of Merewether High School's Green Day, students are also presented with thought provoking issues related to environmental, economic and social sustainability such as such as animal cruelty in farming, volunteering, environmental responsibility and social justice.

Typical organisation for Green Day

Time	Activity
Period 1	Collection of gold coin donation for Green Day dress
Period 2	Commerce businesses set-up
Period 3	Set up Sustainability Expo
Period 4 & 5 and lunch	Businesses commence trading.
Period 4 & 5 and lunch	Sustainability Expo.
Lunch	Fashion Parade
Period 6	Pack –up Businesses & Sustainability Expo
Period 6	Clean up Australia Day activity for Year 7
Period 6	Tree Planting: Seniors

BENEFITS OF GTA NSW MEMBERSHIP

The Geography Teachers' Association of New South Wales (GTA) 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 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 GTA NSW activities and events go to: www.gtansw.org.au

The Geography Teachers' Association of New South Wales Inc.

MEMBERSHIP RENEWAL/APPLICATION FORM 2015

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: .....

Surame: ..... Given Name(s): .....

Home address: ..... Postcode: .....

Phone: ..... (Mob) ..... (Home) ..... (Work)

Fax: ..... Email: .....

☐ **Corporate membership $180.00**

Title – please tick: ☐ Head of HSIE ☐ Head Teacher of Social Science ☐ Head Teacher of Geography ☐ Co-ordinator of Geography ☐ Senior Geography Teacher ☐ Librarian

School: .....

School address: ..... Postcode: .....

School phone: ..... School fax: .....

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

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

Surame: ..... Given Name(s): .....

Home address: ..... Postcode: .....

Phone: ..... (Mob) ..... (Home) ..... (Work)

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

Card Number: ..... /..... /..... /..... Expiry: ..... /.....

Name on card: ..... Signature:.....

Post this form and your payment to: GTA NSW, PO Box 577 Leichhardt, NSW 2040

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 Review Editor,
The GTA NSW Office
PO Box 577
Leichhardt NSW 2040

Deadlines for articles and advertising

Issue 1 – 1 December
Issue 2 – 1 March
Issue 3 – 1 May
Issue 4 – 1 August

Notice to Advertisers

'Geography Bulletin' welcomes advertisements concerning publications, resources, workshops, etc. relevant to geography education.

FULL PAGE (26 x 18cm) – $368.50
Special issues $649.00

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INSERTS (A4 supplied) – $374.00
All prices include GST

Advertising bookings should be directed to:

GTA NSW Office
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Fax: (02) 9564 2342
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The Geography Teachers' Association of New South Wales Inc.