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EdGEO

News from the National Workshop Program

EdGEO Looks Towards the Future

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EdGEO is coordinated by the Canadian Geoscience Education Network of the Canadian Federation of Earth Sciences

EdGEO had a great year in 2006, with seventeen workshops attended by three hundred and seventy seven teachers across Canada. Congratulations and thanks to all of the groups of teachers and geoscientists who have made these excellent workshops available to teachers in their communities. Thanks also to the organizations – CSPG, CAFÉ (formerly CGC), GAC and PAC-GAC, who provided financial support to EdGEO, enabling us to fund these teacher workshops.

As we get closer to the International Year of Planet Earth in 2008, in a world ever more in need of Earth science awareness, EdGEO would like to encourage even broader access to, and participation in Earth science workshops, by seeking opportunities associated with;

Teacher conferences and professional development events (national, regional and local) e.g. Catalyst, STAN etc.
Teachers, e-mail me at fkeller@uvic.ca if you would like to have an Earth science session at a meeting you are attending or organising.

Teacher education programs
EdGEO already supports several Earth science workshops specifically for student teachers, e.g. University of Victoria (since 2005), University of Regina (2007). Let's try to offer EdGEO workshops in all of our teacher training programs across Canada.

Related curriculum areas including Social studies, Biology, Chemistry, Physics and Outdoor education
Are there opportunities to provide Earth science workshops for teachers in any of these fields? Earth science often has a few lectures in many of these subjects. Why not offer to provide resources, hands-on activity ideas as well as ideas for fieldtrips to these subject teachers?

Finally, EdGEO is considering developing a set of **standardized curriculum-linked Earth science workshops**, which would be made available for any school, conference, professional development event etc, through trained volunteers, across Canada. This program would be intended to complement the current EdGEO workshops.

Let us know what you think. We will need a significant increase in funding to bring more workshops to our teachers and student teachers. If you know of anyone who would like to make an endowment or contribution to EdGEO, please contact us. Also, if you know of a great venue for an EdGEO workshop, or would like to have an EdGEO in your area, let's talk.

Have a great year.

Eileen

EdGEO Sponsors

Canadian Society of Petroleum Geologists

Canadian Federation of Earth Sciences

Mineralogical Association of Canada

Geological Association of Canada

Bow River Basin Waterscape Poster and Teacher Manuals

Godfrey Nowlan, Geological Survey of Canada, Natural Resources Canada, gnowlan@nrcan.gc.ca

The Bow River Basin Waterscape poster was published in 2005 as Geological Survey of Canada Miscellaneous Report 90. The development of the poster was assisted by many different agencies and groups, including elementary and secondary school teachers. While the poster was in its final stages of preparation, two teams of teachers (one Elementary, the other Junior High) were identified to develop hands-on activities for each panel of the poster. The activities were all to be closely tied to curriculum. The teachers were paid for their work during the summer of 2005 by the City of Calgary Water Services Department. The results of their work are published as two separate teacher guides to the Bow River Basin Waterscape poster: one for elementary teachers and one for Junior High teachers. The guides are in full colour and use images from the poster and consist of many activities. There are more than 15 activities in each volume dealing with all aspects of the poster: watersheds, water cycle, groundwater, climate change, water use, water conservation, and water quality. The teachers were given the directive that activities should require only the simplest and most inexpensive of materials, so that they can be done in classes where resources are minimal.

Art depicting the Bow River is used to provide introductory activities. Activities dealing with simplified contour maps and physical construction of models serve to answer the question: "what is a watershed?". One of the highlights is a model of a water cycle that requires three 2L pop bottles and some other basic materials: this model simulates the water cycle really well. Other activities support explanations of groundwater, and climate change and the river system. A significant proportion of the activities deal with how water is used in the basin, both in urban and rural areas, and how water quality can be maintained.

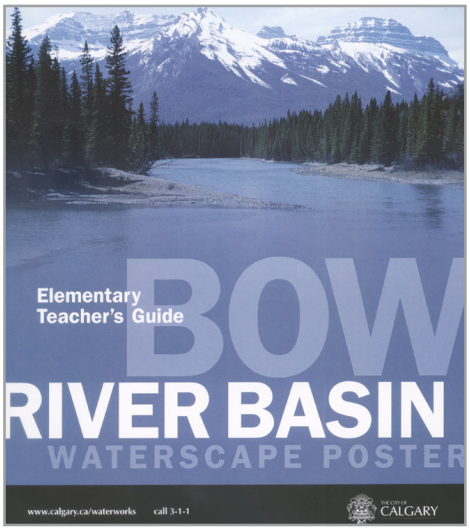
A particular strength of the development of these learning materials is that the teachers who developed them were also present at the discussion and debates that honed the content for the poster and provided feedback on curriculum, even at that early stage. They were able to try out early versions of the poster with their classes (see picture). Another strength is that current research is featured in the activities (especially in the junior high version) so that the material is really fresh and up-to-date.

Nearly 200 teachers in the Calgary area have taken workshops at which they have received binders that detail all of the activities and provide suggestions on how to investigate the many topics through the activities. Each activity includes background information, curriculum objectives, learner prompts, materials, procedures and extensions. They have been road-tested by experienced classroom teachers that were already using the draft version of the poster while it was in preparation. Although each of the activities in the guides can stand on its own as either a classroom demonstration or a student-centred learning experience, the waterscape poster provides an ideal tool to encourage a more comprehensive understanding. To this end, suggestions are made for inquiry-based investigation that will build greater knowledge and recognize vital interrelationships between all the different users of water in the Bow River Basin.

The workshops have been delivered by teams of teachers and scientists, typically one of each, so that the scientific background is well developed and the activities are put in a full curriculum and classroom context.

The images from the poster are available for download from the usual geoscape site: www.geoscpae.nrcan.gc.ca. The two curriculum guides are available for download from the City of Calgary web site: www.calgary.ca/waterservices - click on Youth Education in the left-hand menu and then on Teacher Guides to the Bow River Basin. Please feel free to download whatever you want. Most of the activities can be adapted to any area of Canada with a little forethought.

A teacher trying out the draft poster and activities in her classroom before the poster was final.



Model showing groundwater flow, including the flow of pollutants. A lot of cranberry juice was consumed in the development of this activity!

The water cycle in a bottle. You just need three pop bottles, some string, masking tape, potting soil, seeds and ice. Then just add water!

Greater Vancouver EdGEO Workshop

Erica Williams, Riverside Secondary School, Port Coquitlam, ewilliams@sd43.bc.ca

Riverside Secondary School in Port Coquitlam BC held the third Greater Vancouver EdGeo workshop for science educators, sponsored by the Cordilleran Section of the GAC, April 20th, 2006. The thirty-three educators were a mix of Sc 7 (25%) and Sc 10 (60%) teachers, with the rest teaching Socials 10, Geography 12, Earth Science 11 and Geology 12. After the introductions the day was organized into five themes – minerals, rocks, time, volcanoes, and earthquakes and tectonics. Pat Johnstone of CLN Lavelin started by introducing minerals and then giving the teacher groups some unknown minerals to identify. Brett Gilley of UBC then rearranged the groups for his session on rocks – the participants rotated through four stations representing the major rock families and the rock cycle. Robbie Dunlop of SFU challenged the teachers with geologic time and fossils using the resource kits that they were given. The highlight of this was to locate a fossil on a 25 m time line and surprise at how bunched up they were in the Proterozoic compared with Adria standing 23 m away at the origin of Earth. Adria Williams, a Maple Ridge educator, lead the teachers through volcanic activity including some hands-on experience with a variety of common lavas and pyroclastics. Erica Williams of Riverside used wooden blocks to model faults and slinkies and a short role-playing activity modeling P and S waves. A variety of short slide shows were used in between the activities to extend understanding. An excellent lunch was catered by the school chef. At the end of a hectic day the educators went home after an exciting day of learning carrying an armload of resources such as posters, books, rock, mineral and fossil samples and a CD of resources. For the first time in our short history we have a waiting list and are in the beginning stages of trying to organize another workshop in the fall

Robbie doing small group work

Adria running the draw for such prizes as books, fossils, large rocks and posters

BC Science Outreach Workshop

P. Jane Wynne, Geological Survey of Canada, Natural Resources Canada, jwynne@nrcan.gc.ca

In March 2007 I attended a workshop hosted by National Science and Engineering Research Council (NSERC). It was a gathering of everyone they could find who are involved in science outreach in the province - science centres, museums, educator associations (i.e. BC Science Teachers Association), volunteer organizations (e.g. Young Naturalists' Club of BC), There were about 70 people in total (organizers were hoping to attract 30 people) and it was one positive and energizing day. Here are four messages that I gleaned from the workshop that we can use in EdGEO:

Network - there are many agencies working to promote science literacy, we need to continue to work with others who share this passion so we can achieve common goals; Check out STAN - the Science and Technology Awareness Network (email address at end of document). It is an informal network formed to increase the profile of the S&T education and public awareness sector. Bonnie Schmidt (Let's Talk Science) made the point that the work we are involved in is important, but we have failed to coordinate our efforts in the way, say the Arts Community has, so our energy is dissipated instead of focussed on a common goal (like getting more $ for S&T Education and Outreach; or deciding on a common message).

Science Centres - there are opportunities for EdGEO especially in partnering with regional science centres - what programming are they offering that would accommodate or welcome a geoscience component? In BC, Science World's "Community Science Celebration" are happening around the province and there is potential there to insert an EdGEO workshop in each of these communities.

Funding - EdGEO has a few traditional funding sources that provide enough money to cover about 15 workshops a year. NSERC PromoScience and NSERC Discretionary Grand Fund, local Foundations (like the Vancouver Foundation) are other potential sources of money - the applications for funding need to be carefully prepared. Don't make it easy for the review committee to screen yours out! If you are applying for $ please let the National EdGEO Committee know so we aren't competing with each other!

Career - it is possible to have a whole career in S&T education and public awareness! In stead of it being "off the side of your desk" you could be intentional about it and make it the focus of your career.

To these messages I would add - if you hear about an NSERC sponsored Science Outreach workshop near you - attend. It will be well worth your time.

STAN website:
(www.scienceandtechnologynetwork,ca)

EdGEO Workshops 2006

Location	Grant Recipients	Focus/Highlights	# of Teachers
Edmonton AB January, 2006	Dixon Edwards	- Science Immersion Day for Elementary teachers, Edmonton Science Outreach Network - Rock and mineral workshop	25 teachers
Calgary AB February. 2006	Calgary Science Network	- Grade 3 Alberta Curriculum - Rocks and Minerals	30 teachers
Edmonton AB February, 2006	Dixon Edwards	- North Central Alberta Teachers Association Convention - Rock Walk	24 teachers
Yellowknife NWT February, 2006	GSC and NWT Geoscience No EdGEO funds requested	- Two day workshop - Grade 4 Rocks and Minerals and Grade 7 Planet Earth	29 teachers
Victoria BC February, 2006	Pacific Section GAC	- Field based 'On the Rocks' workshop - Rocks, glacial history, building stones, gravestone weathering	16 teachers
Vancouver BC April, 2006	Cordilleran Section GAC	- Grade 7 and 10 Earth Science - Plate tectonics, earthquakes,, geological time, minerals and rocks	30 teachers
Calgary AB April, 2006	Calgary Science Network	- Grade 3 Alberta Curriculum - Rocks and Minerals	23 teachers
Montreal Que May, 2006	AQUEST	- Two day workshop in association with the GAC-MAC conference - One field day and a day of introduction to geology - Secondary teachers	32 teachers
Ottawa ONT July, 2006	Dept of Earth Sciences, Carleton University	- A two week summer course - Grade 12 earth science curriculum - University credit	8 teachers
Regina SK July 2006	Science Teachers Summer Seminar	- Rocks, minerals and energy	22 teachers
Drumheller AB August, 2006	Royal Tyrrell Museum	- Field studies in paleontology and geology - Five day workshop - Late Cretaceous Alberta	7 teachers
Nova Scotia	Nova Scotia EdGEO Workshop Committee	- Two one-day fieldtrips - Geology of Nova Scotia	21 teachers
Whiteshell Provincial Park MAN September, 2006	University of Manitoba	- Four day field oriented workshop - Targetted towards the Grade 4 curriculum - Rocks, fossils, soils, landscapes and resources	11 teachers
Vancouver Island BC October, 2006	Canadian Council for Geographic Education – BC Branch	- 2 day workshop including a one day fieldtrip - Plate tectonics, earthquakes and volcanoes	23 teachers
Inuvik NWT October, 2006	GSC Calgary No EdGEO funds requested	- Grade 7, Planet Earth workshop	10 teachers
Victoria BC, UVIC Sept – Dec 2006	Pacific Section GAC	- Education Lab in EOS 120 for student teachers	19 student teachers
Victoria, UVIC	Pacific Section GAC	- Centre for Excellence in Teaching and Understanding Science, UVic - Two workshops for Education students – "Plate tectonics, earthquakes and volcanoes", and "Earth History, reading the rocks"	21 and 26 student teachers

EdGEO Workshops 2007 to Date

Approved and Funded as of May 14th, 2007

Location	Grant Recipients	Focus/Highlights	# of Teachers
Prince George BC February, 2007	The Exploration Place	- Prince George Geoscape - Half day field and hands-on activity based workshop	9 teachers
Calgary AB February, 2007	Calgary Science Network	- Planet Earth (Unit E) Alberta Curriculum - Grade 7	19 teachers
Victoria BC February, 2007	Funded by CRYSTAL Pacific	- Two workshops presented at "Learning Odyssey 2007" Saanich Teacher Professional Development Conference - "Plate Tectoncis, Earthquakes and Volcanoes" and " Earth History, Rocks and Fossils"	11 teachers
Vancouver BC February, 2007	CCGE (BC and Yukon Branch)	- One day workshop – three sessions, Glaciation, Plate tectonics and GSC resources	23 teachers
Regina SK April, 2007	Saskatchewan Geological Society	- Two workshops for third year Education students at University of Regina - "Science for Elementary Teachers" class	
Port Coquitlam BC April, 2007	Cordilleran Section - GAC	- Grade 7 and 10 Earth Science and Socials curriculum-linked workshop	
Greater Toronto Ont May, 2007	PDAC	- Geoscape Toronto Fieldtrip - One day, three locations – Milton, Brampton and Caledon	
Ottawa Ont May, 2005	Dept. of Earth Sciences, Carleton University	- Three day workshop - Grade 12 Earth Science Curriculum	

EdGEO 2006 Workshop Summary

	# of workshops	# of teachers	EdGEO cost/ teacher
Alberta	5	109	$75.28
BC	5	135	$66.47
NWT	2	39	$00.00
Quebec	1	32	$47.15
Ontario[1]	1	8	$184.66
Saskatchewan	1	22	$56.82
Nova Scotia	1	21	$6.60
Manitoba[2]	1	11	$272.73
Total	17	377	$24,553.11

[1] Two week workshop
[2] Four day workshop

University of Victoria Earth Science Labs for Pre-Education Students

Tania Demchuk, Univeristy of Victoria, Tania.Demchuk@gov.bc.ca

Although Earth Science is part of the BC K to 12 science curriculum it is often either taught directly from a text book, or not taught at all. Few teachers are equipped with the proper background or resources to teach their Earth Science units effectively and as a result they lack enthusiasm for the subject. Unfortunately this can leave students feeling unenthusiastic and with misconceptions about Earth Science topics. In an effort to better this situation the School of Earth and Ocean Science (SEOS), in collaboration with the Faculty of Education, at the University of Victoria, has introduced a new lab section for students planning to become teachers.

The Faculty of Education recommends that pre-education students take the first-year Introduction to Earth Systems courses offered by SEOS. As a result, approximately one quarter of the students registered in these courses aspire to be teachers. Working cooperatively with the Faculty of Education, SEOS has developed a special section of Earth Systems II (EOS 120) to better meet the needs of pre-education students. This lab section, which has been offered once a year since 2005 to 20 students, teaches the same content as the regular lab sections but uses activities and exercises designed to reflect teaching methods advocated by the Faculty of Education. In the process of completing each lab, students practice hands-on activities and demonstrations that they will be able to use in their future classrooms. They also receive a resource package containing mineral, rock, and fossil kits, colour overheads, posters, and earth science activity books, in addition to their lab manual, which links all the lab activities to the K to 12 BC science curriculum.

To assess the overall impact on students in the pre-education lab, compared to those in the regular labs, pre- and post-lab knowledge and attitude surveys were completed by all students registered in the course. Final course marks were also compared. The results of the first two years of this longitudinal study appear to be promising, however research is ongoing. Overall, students in the pre-education lab section, compared to those in the regular lab sections, demonstrate the largest gains in Earth Science literacy based on correct marks for survey questions addressing common misconceptions. These same students also show the greatest increase in overall interest in Earth Science. Students enrolled in the pre-education labs had concerns throughout the term that they were having "too much fun to be learning earth science." However, their lab marks averaged 5% higher in 2005 and 0.8% higher in 2006 compared to the regular lab sections. In general the course results and student feedback indicate that labs taught using interactive, exploration based activities create a more effective and engaging learning environment than those that use more traditional worksheet-based learning. Pre-education students finish this course with more positive attitudes and are "no longer afraid" of university science.

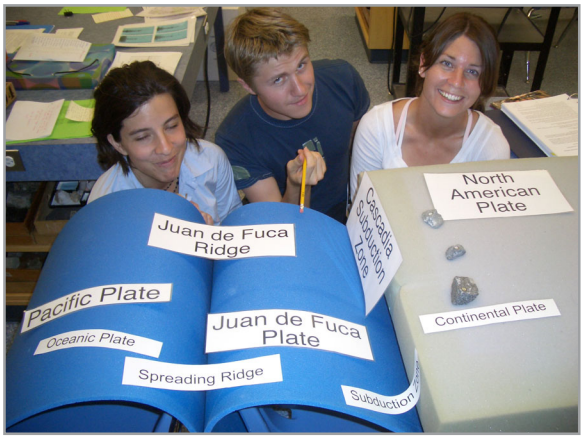
Feedback from pre-education section students:

"A fabulous way to present science to people who are interested in teaching."

"I've never had more fun in a lab science class before."

"I wish more programs would adopt this idea."

"It provided me with many good ideas and resources that will benefit me in my career."



"Let's make good teachers now as opposed to fixing them later"
Pre-education student comment, 2005