

**Dedicated to Improving
Mathematics, Science and
Technology
Education through:**

Research

- Math, science and technology education
- Program evaluation

Development

- Curriculum
- Materials

Outreach

- Teachers
- Youth
- Community

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College Mathematics Project Receives Funding

We are pleased to report that the College Mathematics Project (CMP) received funding from the School/College/Work Initiative (SCWI) through the Connecting GTA Teachers Regional Planning team to continue the study into the causes of failure in first year college mathematics. This year's study will involve all six GTA area colleges: Centennial, George Brown, Georgian, Humber, Seneca and Sheridan and has been expanded to include all college programs requiring mathematics. The project is guided by a Steering Committee comprised of representatives from colleges, school boards, government and associations.

At present we are pulling together the program information for the qualitative aspect of the study and the colleges are forwarding their data to Seneca for analysis and subsequent interpretation by the CMP Project Team. We are also visiting each college to provide information on the project and to get feedback.

The draft report will be presented to the Steering Committee in June and a Forum event will be held in October to discuss the findings and to draft action plans to increase student success in first semester college math.

The CMP team released a research brief in February encouraging school boards and schools to offer the Grade 12 Mathematics for College Technology course and to encourage students who plan to enroll in a college applied science or engineering technology program to enroll in this course, as results from our previous study indicate that students who enter college technology programs with this mathematics course have a better chance of success than those

who enter with the Grade 12 Mathematics for College and Apprenticeship course. The College Math Project team would like to thank the partner colleges for their participation and commitment to increasing student success. For more information on the College Math Project contact Laurel Schollen at 416.491.5050 extension 3775 or laurel.schollen@senecac.on.ca

YSIMSTE Technology and Equity Conference - April 26, 2007

YSIMSTE will be presenting a conference on technology and equity, the first of its kind, entitled *Redefining the Possible: Breaking Barriers with Technology* on April 26 at the Stephen E. Quinlan Building, Seneca@York. The conference will bring together students, educators, scholars, technologists, policy-makers, and professionals who specialize in services and products aimed at enhancing the lives of people with disabilities. The conference will include presentations, demonstrations, and workshops on the latest enabling technologies. There will also be a panel discussion with experts debating current issues regarding equity, access, and quality of life for disabled persons.

Presentations and workshops will be on: principles of universal design as applied to schools, homes, workplaces, and transportation systems, accessible computer technologies, sound field technologies for the hard of hearing and cochlear implant technologies for the deaf, assistive technologies for the visually impaired, the latest in artificial limb technologies, and many more sessions on assistive devices in the areas of sports, the arts, education, and daily living.

The TechEquity Conference is being sponsored by Nelson Thomson Publishing, York University and Seneca College. We expect approximately 250 people at the conference and workshops will be set-up for 20-25 to maximize opportunities for hands-on activities and discussion. Attendees will be: Seneca College students, Faculty of Education teacher candidates, educators from GTA school boards, faculty members from York and Seneca, and members of the public.

Please visit www.ysimste.ca and click to get a brief description of the conference topics. Inquiries can be made to TechEquity@edu.yorku.ca

YSIMSTE Announcements, Upcoming Conferences and Seminars

Dr. Steve Alsop, Associate Professor, Faculty of Education, York University has been appointed YSIMSTE Co-Director for one year commencing July 1, 2007. Steve graciously agreed to step into the leadership role during Margaret Sinclair's sabbatical. We extend a warm welcome to Steve.

The **Ontario Association of Mathematics Education (OAME)** will hold its annual conference May 3-5 at Georgian College in Barrie. The theme of this year's conference is Building Bonds and will provide participants with an opportunity to explore mathematical connections across the curriculum.

STAO2007- The annual Science Teacher's Association of Ontario conference, "Making Connections for a Sustainable Future: The More We Know, The More They Grow" will be held on November 15-17, 2007 at the Doubletree International Plaza Hotel, Toronto. Information on the conference is available at www.stao.org

TSTOP program for Teachers: The Ministry of Research and Innovation recently posted information regarding its Teachers' Science and Technology Outreach Program (TSTOP) on its website. The objective of TSTOP is to advance teachers' scientific knowledge and understanding of research underway in Ontario, share the excitement of research with their students, and develop an ongoing relationship between the classroom and researchers.

Information on the program including program guidelines, application form and research placements (grouped by city) may be found at: <http://www.mri.gov.on.ca/english/programs/MRI.asp> In total, there are 23 TSTOP sites in 12 cities hosting 37 research placements. Please note that teachers are to send their applications to the Ministry, via email, by May 1, 2007.

YSIMSTE Math-Science and Technology Workshops

The Math, Science and Technology workshop series introduced in September 2006, has been a tremendous success. The scope and variety of workshop topics generated a great deal of interest; in fact, the response was so overwhelming we found it necessary to use an on line booking system. The 12 workshops presented thus far include have focused on: ethnocultural math, math stories, art in math, visual reasoning, census in the school, biotechnology, open source software, structures and design, planetary observations, hands-on minds-on science, martial arts for higher-order thinking, and climate change.

Both York and Seneca faculty and staff contributed their expertise and time. Other presenters came from Let's Talk Science, Statistics Canada, Association of Educational Resources of Canada, and teachers and consultants from the Toronto and York Region school boards. The workshop series is open to the YSIMSTE community. For information, please visit www.ysimste.ca. The following short articles were written by workshop participants.

Ethnocultural Mathematics Workshop

By Deanne Brandt

Deanne is a teacher candidate in the consecutive part time program and is a regular attendee of YSIMSTE workshops.

Anna Dufield's workshop on Ethnocultural Math presented in the fall of 2006 was a great source of inspiration for a packed room of teacher candidates. Her stories, enthusiasm and dedication to the needs of all students were inspiring and the many teaching ideas that she presented, helped me and many others to add a multi-cultural perspective to our mathematics teaching. Anna demonstrated through hands-on activities and a power-point presentation, many ways to empower children to learn abstract concepts using mathematical techniques from around the world.

We explored historical and modern day examples that ranged from examining the math used in Persian rugs to exploring the codes used in quilts in the Underground Railroad. These examples and the many resource books and web sites she listed on her handout, illustrated how we could extend mathematics across the curriculum. Although the hands-on activity of putting together the Drunkard's path quilt blocked proved challenging for some of us, it did reinforce how activities like this and other cultural games can teach a variety of basic mathematical concepts. I would highly recommend that this workshop be repeated. Anna Dutfield, a creative teacher, offered great ideas to stimulate inquiring minds and to make math a little more exciting, inclusive and meaningful for children and teacher candidates.



Figure 1: Participants get into Ethnocultural Math!

Martial Arts gave me the H.O.T.S.!

By Nina Dolgovykh

Nina is a teacher candidate in York University's Math, Science and Technology (MST) Education program.

The workshop "Martial Arts Can Give You the H.O.T.S. (higher order thinking skills)" was presented by Dave Doucette, a physics teacher at Dr. G. W. Williams S.S. in Aurora. Dave is an enthusiastic and innovative educator and a frequent presenter at STAO conferences and various Faculties of Education.

We had a unique opportunity to "walk in students' shoes". We were hooked by a great introduction about history of Martial Arts and a real-life performance conducted by Dave Doucette (Black belt, Dan six) and his students. After that, all the participants were divided into four groups. Each group conducted one physics-lab by ... striking a pad with a fist and foot, or by breaking a small board, and learning about different concepts (lever, the effort force, kinetic energy, work, impulse and momentum) which

can be applied to describe and explain the physics of Martial Arts. The students of each group also used *whiteboarding techniques* to summarize and present their findings to the other groups.

The main purpose of this presentation was to give us a model of a student-centered lesson and let us feel the role of a good co-operative learning activity in the process of learning.

We were inspired. Participation in this workshop turned on our “imagination generators”. We could hardly wait to apply some of the learned skills and techniques in the classroom.



Figure 2: Workshop participants demonstrate their H.O.T.S.

Biotechnology Workshop *by Terri Skinner*

Terri is a teacher candidate in the Math, Science and Technology teacher education program at York University. Terri plans to teach in the Junior-Intermediate division. In November, Dr. Alison Symington, assisted by Margot Wassenaar-Faber from Seneca College presented one of the most interesting seminars to date, a BioChem workshop. It was well attended, and the eager “learners” were put to work extracting DNA from the cells of ripe bananas. As a hands-on activity, it was delightfully engaging and created an unparalleled opportunity to experience this technique on a shoestring budget. The mucousy strands of genetic material were twirled around glass rods with all of the excitement of a CSI show. The methodology was simple enough. I replicated this activity for a Grade Five Science Club experiment in my host school. The students were thrilled. Alison and Margot, thank you for a wonderful evening of learning!

Open Source Workshop

By Lidia Labate

Lidia is a teacher candidate in the Math, Science and Technology (MST) teacher education program at York University. Lidia plans to teach in the Junior-Intermediate division.

The Open Source Workshop was held on Wednesday, February 14 and was presented by Seneca College School of Computer Studies faculty Dr. Allan Souder and Academic Computing System's Mohsen Rezayatmand.

All participants were invited to experiment and play with open source software that simulated chemistry labs or physics labs or provided opportunities to explore mathematical concepts. Linux fans will be happy to know that a larger percentage of open source software is designed for Linux operating systems. Even so, we found enough to keep us happy. Our workshop leaders provided participants with a list of websites on a variety of subjects: open source software articles, math/statistics, chemistry, natural science, physics, astronomy and some multi-discipline websites. This was a useful and informative workshop.

York/Seneca Summer Science and Technology Project (YSSSTP) 2007

We are gearing up for the 2007 YSSSTP program. Once again Rachel Kennedy will coordinate the program, which runs from July 3 to August 3, 2007. We have no shortage of enthusiastic students. We do, however, have a shortage of placements and so we are calling on faculty from Seneca College and York to provide these budding scientists and technologists with an "experience of a lifetime"!

The goal is for students to gain a deeper understanding of opportunities for participation in the science and technology fields, and to develop increased confidence and a sense of pride in their accomplishments. A number of in-class activities are planned to complement the laboratory experience.

YSIMSTE appreciates the support of the YSSSTP donors; this program could not be offered without their generosity and commitment to youth and science and technology education. Our sincerest thanks to the following donors:

- The Lloyd Carr-Harris Foundation
- Donner Canadian Foundation,
- S.M. Blair Family foundation
- The Acapella Foundation
- The McLean Foundation

We would like to acknowledge the efforts of the Office of Resource Development, Seneca College, which undertakes fundraising on behalf of the YSSSTP.

This project was made possible in 2006/2007 by a grant from the Ministry of Training, Colleges and Universities".

YSIMSTE Outreach Activities

Outreach Workshops at Seneca: A number of outreach workshops and activities were conducted during the February study week. Seneca's Faculty of Applied Science and Engineering Technology held a Science and Technology Week during the College's study week in February. Students in Grades 7 to 12 were treated to a variety of workshops in biotechnology, microbiology, electronics, environmental science, flight technology and skilled trades. Please visit www.ysimste.ca for a listing of our workshops and contacts, which can be booked throughout the year.

York Region Sci-Tech Fair 2007

Seneca College and the York/Seneca Institute for Mathematics, Science and Technology Education will host the York Region Sci-Tech Fair (YRSTF) on April 14 at Seneca's Seneca@York Campus. Parents, judges, guests and fellow participants from the York Region public, catholic and private schools will have an opportunity to view projects in the areas of Biotechnology, Earth & Environmental Science, Engineering, Life Sciences, Mathematics and Computer Science and Physical Science. Student participants will also have the opportunity to tour the campus and attend workshops in biotechnology, microbiology, mathematics and electronics offered by faculty in Seneca's Schools of Biological Science and Applied Chemistry and Electronics and Computer Engineering Technology. More than 120 students will showcase their work and compete for the opportunity to win a trip to the Canada Wide Science Fair, to be held in Truro, Nova Scotia May 13-20, 2007.

YRSTF 2007 is supported by Seneca College of Applied Arts and Technology, York Catholic District School Board, York Region District School Board, Ontario Federation of Independent Schools, Pfizer, Novopharm, ATI, Boreal, Can-Ar Coach, GFG Secure Transport Inc, York University Faculty of Science & Engineering, Sci-Tech Ontario, Township of King, Town of Richmond Hill, and the Town of East Gwillimbury.

Please visit <http://yrstf.senecac.on.ca> for details and a full description of the fair.

Seneca Hosts the York Region District School Board's Science Olympics

Seneca College was host to the 2007 "Super Hero Boot Camp" on Thursday March 1, 2007. Teams representing 25 YRDSB secondary schools came to out wit, out play, out last the boomer generation of villains and heroes. Junior teams [grade 9 & 10] were challenged in events such as 'The Nanohero! Smaller than DNA?', 'Periodic Pursuit – Superman Must Live!' and 'Escape the Static Trap'. Senior teams [grade 11 & 12] meet the challenges faced in events; 'Save the Citizen', 'Wind Warriors' and 'Smilex'. The 'Final Test', before the officials could bestow all with the prestigious Super Hero License, required schools to face a head to head competition identifying the powers of the heroes and super villains popularized by the animation industry. If this was not enough excitement, schools stepped up their creative talents and vocal ability with

colourful flags and enthusiastic, original cheers. The photos below show YRDSB Super Heroes in action!



Science Explorations Summer Science Camp Program offered by York University

Science Explorations is delivered and coordinated by undergraduate students and graduates of science and engineering. Our Science Instructors come together to represent a range of study in the pure, applied and life sciences to provide scientifically sound instruction on a variety of topics.



As a not-for-profit outreach program, the goal of this program is to increase scientific literacy and appreciation in our community. The curriculum offers fun, hands-on activities that engage and encourage youth to learn and explore topics in science and engineering. Offered this year for 6 weeks in July and August, campers will be introduced to a range of scientific inquiry, from DNA to Astronomy, Engineering principles to Computing and beyond!

Registration for our 2007 program is now open to children ages 7 to 12 (grades 2 to 7) of all backgrounds, interests and aspirations. This year's camp dates are July 9-13 (A1), July 16-20 (B1), July 23-27 (A2), July 30-August 3 (B2), August 13-17 (A3) and August 20-24 (B3).

For more information on the camp program, contact us:

Online: www.science.yorku.ca/explore

Phone: 416-736-2100 x22814

York University Engineering & Science Olympics

The 28th annual York University Engineering & Science Olympics (YES) for high school students will be held at the Keele Campus of York University on **Tuesday, May 15, 2007**.

The YES Olympics is a chance to experience the challenge and excitement of working against the clock on various science-related events. Six such events, organized like a track meet, are held throughout the day. At the end of the day prizes are awarded to the best three teams in each event and a trophy is presented to the school that obtains the highest number of points and is declared the overall championship school.

This year's Team Events:

Fermi Questions - Teams answer a series of questions by giving approximate answers. For example, 'How many roofing shingles are replaced annually in Canada?'

Future Fuel - Teams will develop a mixture of ingredients and organisms that maximizes BioFuel (ethanol) production, to be tested during 3-hour fermentation at room temperature.

Shuttle Launch - Students will design and build a small planetary lander. The team's lander will be launched from a predetermined height and must land on a pre-established runway.

Robocode III - Each team will submit one Robocode Robot to compete in a series of heats.

Hooke's Cannon - Teams will build a catapult device designed to launch a standard size tennis ball at a series of targets.

Stuck in Space - Teams will design glue made solely from edible products.

To register for this year's Engineering and Science Olympics or for more information, contact us:

Online: <http://www.science.yorku.ca/events>

Phone: (416) 736-2100 x22814

Email: olympics@yorku.ca

Educational Computing Organization of Ontario Programming Competition

The Department of Computer Science & Engineering at York University will welcome over 200 high school students from the Toronto District School Board, participating in their Board wide selection round of the Educational Computing Organization of Ontario Programming Competition.

On May 3, 140 students from all local Boards participating in the Central Ontario regional finals will compete. Then on May 22, York welcomes the top twenty teams from the Regional Contests, with 80 students from across the Province participating in the final programming contest.

For more information visit: <http://www.ecoo.org/ecooocs/Contests.html>