About MSTE

Mission:

The Mathematics, Science and Technology Education Group (MSTE) is a research and development team at the Faculty of Education, Queen’s University that is dedicated to improving teaching and learning in the mathematics, science, and technology fields in schools and in teacher education.

The MSTE Group promotes:

• greater awareness of the links that can be made between mathematics, science, and technology;

• the advancement of accessibility to these fields; and,

• education for social responsibility.

http://educ.queensu.ca/mste

The MSTE Group is supported by an endowment fund from the Royal Bank of Canada. It is also supported by Queen’s University, and has been supported by Imperial Oil.
I am very pleased to present this edition of the Mathematics, Science, and Technology Education Group e-zine. I have the privilege of being its editor-in-chief, and the current Coordinator of this research and curriculum development group.

Mathematics, science, and technology education can be viewed as separate entities, however, they can also be viewed as a seamlessly interconnected single entity. The stories and descriptions of the various MSTE member activities and events included in this e-zine provide insight into the many separate and interconnected ways mathematics, science, and technology education exist in our world.

The MSTE Group is committed to improving teaching and learning in schools and in teacher education. Inside this e-zine are stories about children’s learning and teacher candidates’ learning from science fairs to classroom visits, to the incorporation of the arts into mathematics, science, and technology education. Improving teaching and learning is really a focus on the learner. A balance of what the learner needs and wants; a balance of direct instruction, and guided exploration and discovery of the wonders of mathematics, science, and technology education that surround us every day.

Inspiring, insightful, involved, MSTE Group members’ work can be found inside these pages. From descriptions of work in the community and innovative projects, products, and knowledge creation, through to the various interactions with other MST minded people – both in house and in the outside world. MSTE efforts appear year-round in the news.

For those interested in the rich history of MSTE, past MSTE newsletters developed under the guidance of Ms. Diane Lawrence can still be read. MSTE Secretary Bonnie Knox can help you find them. I hope you enjoy your browse through these pages, and perhaps we will have the pleasure of your conversation. I look forward to hearing from you.

Yours truly,

Jamie S. Pyper, Ph.D., OCT,
pyperj@queensu.ca
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The MSTE 25th anniversary sculpture, called Volcanoes, created by George Hart (georgehart.com) and attendees of the anniversary conference, is currently being featured as a component of the Queen's University Creative Expressions exhibit!

"This month-long exhibit commemorates Queen's 175th anniversary and the Centre for Teaching and Learning's 25th anniversary. It displays and celebrates the creativity that teaching and learning at Queen's University evokes. These ‘creative expressions’ include course assignments, teaching aids, photos and a myriad of other ways Queen's alumni, students, faculty and staff represent the excitement, skill and energy of being a learner in this great community." (Creative Expressions of Teaching and Learning Program)

Volcanoes represents the natural interaction of elements that create an often complex structure of something powerful, beautiful, and engaging. As a metaphor for teaching and learning, it has interpretive opportunities as expressions of the relationships between teacher and learner, the learner and what is being learned, and (to use complexity theory) the dynamic and stable characteristics of learning environments/situations/contexts. The sculpture also expresses a sense of an underlying integration of mathematics, science, and technology education through an aesthetic lens.
Updating PASCO Science Equipment

On October 4th, an expert on PASCO equipment spent a day introducing the physics class to the many different ways in which the equipment we have can be used productively in science classrooms. The site licence to Capstone software is particularly valuable and the beauty of PASCO’s approach is that older equipment continues to function with improved software. Most of the day’s presentations were recorded in video so that future science classes will be able to experience a similar introduction to the equipment. One of the advantages of introducing the PASCO equipment and software early in the Fall-Winter classes is that our teacher candidates may continue to explore the potential of the equipment and software during the remainder of their curriculum courses in science.

45th Frontenac, Lennox and Addington Science Fair (FLASF)

On March 31 & April 1, 2016 the Frontenac, Lennox, and Addington Science Fair was hosted at Queen’s Faculty of Education with financial support from the MSTE Group. The 2016 Regional Science Fair was the largest science fair to be held in Kingston since the years surrounding the Canada-wide Science Fair close to 20 years ago. This year 280 students presented 241 projects from 26 area schools. While most projects were in Primary (grade 5-6) and Junior (grade 7-8) divisions, an increased number of Intermediate and Senior projects were welcomed this year. Open judging and special awards judging took place Thursday evening, and best of fair judging took place Friday morning. Science workshops were held Friday morning for participating science fair students as well as visiting groups of students from local classrooms. Five Best-of-Fair students were chosen to represent the region at the prestigious Canada-Wide Science Fair to be held in May 2016 in Montreal, Quebec. The theme this year was “Science and Engineering in our Lives.” Workshops were:

- “From Earth to Outer Space”
- “What is Wind Power and How do we Harness it?”
- “Tallest Towers”
- “Our Energy System”
- “Uncovering the Complexities of Cancer”

The keynote speaker, Dr. James Reynolds, gave the presentation “Did you know your brain never stops changing?” Student response was very positive, and the projects were spectacular!
The Canadian Mathematics Education Study Group returned to Queen’s University for its 40th Annual Meeting!

Between June 3 – 7, 2016 the Canadian Mathematics Education Study Group / Groupe Canadien D’étude En Didactique des Mathématiques (CMESG/GCEDM) celebrated its 40th Annual Meeting, hosted by Dr. Jamie Pyper and Dr. Peter Taylor at Queen’s University. This gathering of mathematics educators was the third Annual Meeting to take place in Kingston since the group’s inception at Queen’s in September 1977! Displaying a focus on conferring, numerous events took place during the meeting, including: three plenary sessions by founding members of CMESG, topic sessions, new PhD sessions, ad hoc discussions, and a gallery walk. The defining component of this and all CMESG meetings, however, was the working group sessions. These discussion-based sessions, occurring at the start of each full conference day, represent a time when CMESG members come together to discuss and develop new ways of knowing important topics in mathematics education.

With over 150 attendees this Annual Meeting of CMESG was the most highly attended in 40 years!

CMESG is a group of mathematicians and mathematics educators who meet annually to discuss mathematics education issues at all levels of learning. The aims of the Study Group are: (1) to study the theories and practices of the teaching of mathematics (2) to promote research in mathematics education (3) to exchange ideas and information about all aspects of mathematics education in Canada (4) to disseminate the results of its work.
On November 25th, 2015 the Director of Education for Evergreen, Cam Collyer, gave a presentation to approximately 150 teacher candidates from several concentrations about the importance of creating an environmental connection with their future students. This year, Cam had just returned from investigative and workshop experiences in the far east. He included these experiences in his talk to give his audience a wide range of understanding about what is happening world wide in playgrounds and urban parks. More important, however, was how he talked about the philosophy and rationale for such projects—the academic, physical, emotional and physiological benefits outdoor learning spaces can provide. He highlighted how, at long last, several organizations are now coming together (outdoor organizations like his own, Heart and Stroke organizations, Diabetes Foundations, ParticipAction, insurance companies, etc.) because all are impacted when the connection to Nature and the outdoors is diminished.

Cam has been instrumental in helping to organize, develop and disseminate information and expertise about community and school ground naturalization. Over the past several years, the Faculty of Education, including the MSTE Group, has supported efforts to bring Cam to campus to speak about his very important work at the Evergreen Foundation. As a Queen’s alumnus of the B.Ed. program, Cam’s visit is a wonderful opportunity for our teacher candidates to appreciate the variety of career options their B.Ed. degree can provide.
On June 27, 2016 Nick Song, the Special Education teacher and technology integration specialist at the Dr. Eric Jackman Institute of Child Study (JICS) at the University of Toronto, gave a presentation to B.Ed. students in the Educational Technology concentration (EDST218 & FOCI218). This concentration focuses on the use of technology in education as a design endeavour. Currently the use of design-oriented technologies (e.g. Arduino physical computing technology, 3D printers, laser cutters) is becoming increasingly prevalent in Ontario schools. At JICS Nick has been collaborating on the development of an approach to using Arduino technology in combination with the Stanford School’s design thinking process. In the summer, Nick is a lead instructor at the Digital Media Academy where he instructs children in programming, 3D design, and video editing. Nick is an avid practitioner of incorporating technology in the classroom and enjoys looking for new ways to ‘gamify’ learning. He has experience teaching with Scratch, JavaScript, and Arduino to a variety of age groups. Recently, he has piloted a technology club at the school which aims to bring together inquiry, technology, and design elements.

Nick’s presentation represented an excellent way to bring the design orientation of the concentration to closure around the emerging transformative use of educational technology. Nick’s presentation focused on the way children at JICS identified authentic problems at their school and then worked forward through the design thinking process (e.g., automatic bathroom in-use sign). Nick shared the iterative prototypes that were developed by the students using the Arduino technology and the various science & technology knowledge skills they advanced through the process (e.g. programming skills). Overall, this was an excellent opportunity for our B.Ed. students to experience a leading edge pedagogy that brings science, technology and computing together in the elementary context.
Integrating ICT in Elementary Science Education

In February 2016, Mistene S. Clapp and Joanne Borges, from the Limestone District School Board, facilitated several workshops for all eight sections of our PJ Teacher Candidates on the integration of ICT (Information and Communications Technology) in elementary science education. Mistene and Joanne discussed the important role teachers can play in facilitating students’ digital literacy, citizenship and fluency and emphasized the importance of thoughtfully integrating ICT in curriculum in a way that transforms students’ learning by enriching and deepening their capacity to engage with ideas and others. After modelling the use of several apps, Mistene and Joanne provided students with “hands-on time” to try them out themselves. To assist Teacher Candidates in their independent explorations, they were provided with a handout that listed each of the apps and how they can be purposefully integrated in the science classroom. Teacher candidates commented on how much they enjoyed and learned from these workshops:

“This was a very informative period. I learned a lot of cool, fun and effective ways to integrate technology into the classroom.”

“Loved the presentation! Was informative and very insightful. I look forward to implementing technology in my future classroom.”

“Fabulous! Loved being able to discuss and explore different resources and ideas for using technology in the classroom. Thanks so much!”

“So many useful apps and ideas for using tech in the classroom! Very practical and applicable. Thank you very much!”
Between April 11 – 15, 2016, a guest speaker, Melissa Buchan, took teacher candidates enrolled in Azza Sharkawy, and Diane Lawrence’s science and technology education courses on a PowerPoint tour of her play-based classroom. Teacher candidates were able to see how her classroom was organized in terms of the variety of materials and ‘centres’ available, and through discussion, understand how learning opportunities were infused.

Melissa helped teacher candidates see the “layers” needed in the development of a play based Kindergarten classroom, including: how motivation for learning was created through types of materials brought into the classroom; how inquiry was driven by student ideas and hands on exploration; and how observant, creative teachers could be ready to use this interest to further student development in literacy and other subject areas in an organic way. Teacher candidates then had the opportunity to explore hands on materials Melissa brought to class, and use them to create inquiry-based explorations appropriate for Kindergarten.

Teacher candidates practiced the shift from direct instruction to guided discovery learning based on student readiness. TCs had the opportunity to consider not only the physical layout of a Kindergarten classroom and appropriate materials within it, but also the flow of a daily routine and ultimately the practicalities of meeting and assessing Ministry of Education expectations. Several teacher candidates followed through on Melissa’s open invitation to visit her classroom.
The second annual MSTE Grade 9 Math.Mashup occurred during the April 2016 Alternative Practicum. Three intermediate/senior preservice mathematics teachers created the events, organized the day, and ran the event. This year the Alternative Practicum team consisted of Matt Harris, Jason Pires, and Amelia Zheng, under Dr. Jamie Pyper’s supervision. A group of senior-grade ‘mathletes’ from nearby secondary schools also came for the day and acted as event managers. They arrived earlier in the morning to receive training on the events before the grade 9 students arrived.

Three schools participated, sending approximately twenty students from their grade 9 applied math classes to the Faculty of Education on Thursday April 7. The theme of the Mashup was inspired by a current and popular movie, the Pirates of the Caribbean, the name of the event was the PI-rates of the Caribbean. Three rooms were designed with a particular event that when completed, would give the teams gold coins to use on the final event to answer the puzzle to where “x” marks the spot. The three rooms consisted of a) an obstacle course in which motion sensors and graphing calculators were used to find the total distance from start to end, b) a cipher that was solved by completing a matrix of problems, and c) a volume and balance scale task. The final task was a puzzle of letters and graphics that represented a phrase – however the puzzle was covered by panels. The gold coins earned from the three event rooms indicated how many panels could be uncovered.
It was a very successful event. The exit survey indicated an overwhelming positive response from the students. Often grade 9 students who struggle with mathematics do not have many opportunities to see how thinking mathematically can be a part of an exciting and fun set of tasks. They clearly told us that this was a worthwhile event.
The 19th annual grade 7 and 8 matholymPlcs event occurred on Tuesday April 19, 2016. This is a joint event between the MSTE Group and the Quinte St. Lawrence Mathematics Association (QSLMA), financially supported by event registration fees and the MSTE Group. Annually a B.Ed. Alternative Practicum team of preservice teachers creates the events, organizes the day, and runs the event. This year the Alternative Practicum team consisted of five Intermediate/Senior preservice teachers; Helen Chan, Jason Kim, Nathan Miller, Sara Stonehouse, Sarah Strong, Yi Zhang, under Dr. Jamie Pyper’s supervision.

This year twenty teams from the surrounding area participated. At registration, each team received a ‘Booklet of problems’ that was completed as a team throughout the day. A prize was awarded at the end of the day for the team who had the highest score from the Booklet problems. The day continued with three twenty-minute events, a pizza lunch, and then three thirty-minute events. Scores were tallied at the end and medals handed out to the top three teams; there was a trophy for the top school for the year.

This event required a lot of help and support. There were approximately 100 Primary/Junior preservice teachers and 30 Intermediate/Senior preservice teachers who volunteered for various tasks throughout the day. These tasks included set-up, registration, managing events, scoring, lunch, and clean up. Mrs. Joan McDuff was instrumental throughout the Alt Prac with materials and encouragement and advice support.

THE 2016 WINNING TEAMS WERE:

First Place
Loughborough Public School
Carter Mouncey
Chloe Cole
Ben McCrady
Lily Chubaty

Second Place
Module de l’Acadie
Mira Davis
Nathaniel de Groote
Olivia Onesi
Matthew North

Third Place
Brockville Collegiate Institute
Jacki Oliver
Cavan Ranger
Adam Kouri
Katie Wells

Honourable Mention (4th)
Brockville Collegiate Institute
(S Team 2)
Samantha Beauchamp
Cameron Karasiuk
Blythe Huang
Malcolm Tait

Booklet Winner
Module Vanier
Halil Kelebek
Ellie Smallman
Kibo Mulima
Priya Ramachandran
On Saturday February 6th, all eight sections of primary-junior teacher candidates enrolled in Azza Sharkawy, and Diane Lawrence’s science and technology education courses hosted the 26th annual Science Discovery Day at Queen’s Faculty of Education. The day is looked at as an opportunity for youngsters to explore a variety of science and technology centres in a hands on way, and more importantly, a time when teacher candidates can observe and experience how children of all ages interact with the learning materials they have set up at their activity centres.

Approximately 320 teacher candidates organized and facilitated 77 science activity centres for the hundreds of children and parents in attendance. All of the activity centres related to the Ontario ministry guidelines for grade one to six in science and technology.

In the debrief held in the science education class following the event, the participating teacher candidates spoke highly of the afternoon. They were astounded by the number of people at the event and the eagerness of the young children to participate in the activities they had planned. They also found the event an opportune time to practice their inquiry skills and their ability to “ask the right question at the right time.”
With more than 4220 visitors and 400 volunteers from Queen’s, The Royal Military College of Canada, St. Lawrence College and community STEM organizations, Kingston was home to Canada’s largest “pop-up” science centre: Science Rendezvous Kingston 2016. This public education event, aimed at celebrating STEM research, researchers and careers, filled the Rogers K-ROCK Centre and the Tragically Hip Way on Saturday May 7, 2016.

Many returning visitors were delighted by our annual Chemistry Magic Show, robotics activities, kinesthetic challenges, and clinical simulations. With more than 60 interactive stations, there were topics of interest to STEM enthusiasts of all ages.

New features at Science Rendezvous Kingston 2016 included The Math Midway (funded by NSERC PromoScience and NSERC Science Odyssey grants), presentations by the Canadian Raptor Conservancy, a Quarantine Tent (sponsored by The Faculty of Health Sciences at Queen’s and The Dalla Lana School of Public Health, University of Toronto) and a talk by Nobel Laureate, Dr. Art McDonald.

The Math Midway, based on challenges from A Day’s Adventure in Math Wonderland by Jin Akiyama and Mari-Jo Ruiz, featured square-wheeled tricycles, and large-scale tangram, pentomino and Tower of Hanoi puzzles. At pre-events to promote Science Rendezvous Kingston 2016 at Springer Marker Square and at the local Boys and Girls Club, more than 350 people rode the square-wheeled tricycles. At Science Rendezvous Kingston 2016, more than 750 people rode the trikes.
The large-scale puzzles continue to contribute to the development of mathematical curiosity and engagement as part of The Learning Lab at Kingston’s Pump House Steam Museum. The materials will be housed there until January 2017 as part of this interactive installation.
In recognition of Science Rendezvous Kingston’s long success and innovative activities, our Mathematics Midway was featured by NSERC at a day-long celebration at Confederation Square in Ottawa, on May 10, 2016.

Rogers Communication and the Rogers K-ROCK Centre have generously agreed to support **Science Rendezvous Kingston 2017**, our 7th annual event. Please join us on:

**Saturday, May 13th**
from 10:00 a.m. to 3:00 p.m. at

**The Rogers K-ROCK Centre**

To celebrate Queen’s 175th anniversary and to keep this popular event fresh and exciting, there are some exciting new features to attract even more visitors. These include an inflatable Planetarium, a “walk-in” dome where visitors can experience the stars and constellations surrounding them (on loan from the Royal Ontario Museum). Brock Fenton, Canada’s official Batman, and winner of the 2015 NSERC Award for Science Promotion, is hosting sessions called *Let’s Talk Bats* and teams of ENGSCI 100 students are building giant kaleidoscopes so that we can add a STEAM (arts-based STEM) feature to The Mathematics Midway. Not only will there be large-scale kaleidoscopes for exploration, there will be a kaleidoscope-building station. The Museum of Health Care is hosting a germ discovery tent and The Miller Museum of Geology will showcase its augmented reality sandbox. Other surprises will be announced closer to the date, so watch our local Science Rendezvous website, Twitter feed, Facebook Page and listen for public service announcements on local radio stations.
The Johnny Biosphere Environmental Education Fund was established through an initial gift of $10,000 made to Queen’s University by the family of Dr. Jack Vallentyne, B.A. 1949 (Queen’s), Ph.D. (Yale), a professor in the Faculty of Arts and Science, Department of Biology from 1952 to 1958. Dr. Vallentyne was also a prominent research scientist and environmental activist. In his persona of “Johnny Biosphere”, Dr. Vallentyne appeared before thousands of school children, teachers, and environmental groups all over the world. His message was simple and direct: What we do affects the Earth; what the Earth does affects us. This sentiment was reflected in the purpose of the fund as directed by the family: “to promote environmental awareness among children.”

The first academic year for awards given through the Johnny Biosphere Environmental Education Fund was 2008-09. Original funding was to last 5 years, and at the end of 2012-13 the MSTE Group was approached regarding the continuance of this worthwhile program. 2015-16 was the third year of a three-year pilot program implemented by the MSTE Group using the same criteria developed for the original program. Congratulations to the recipients of the fund for 2015-2016!
Kate Carr and Angellina Skoke-Burns used funds to support a composting initiative at St Martha Catholic School in Kingston Ontario. Three garden compost bins were purchased and installed near the newly created garden beds behind the school. Seven organic waste bins were also purchased for the primary classrooms at the school to collect organic waste and promote awareness and knowledge regarding composting. Students participated in multiple activities throughout the school year that assisted them in becoming more aware of their actions in regards to the environment.

Pat Healey worked with his associate teacher on a project to help technological education students understand that environmental issues can be tackled in a variety of ways. In his case, funds were used to CSA approve a wood stove pellet making machine. The goal was to show students that waste products found in the carpentry shop could be reused. Ultimately if successful the pellets could be sold for fund raising purposes to support other green initiatives.

Shilpa Sharma purchased a Sugar Maple tree with her Johnny Biosphere award in the hopes of not only involving students experientially in the planting process but teaching them about care of the environment. This was done ultimately in support of the development of an outdoor classroom on the school property. Shilpa organized a planting day with her grade 4 class as well as the school’s Eco Club, during her May practicum. During the school year Shilpa was also involved in fund raising to support the purchase of other trees and plants, and linked the entire process to the curriculum she taught while at the school.

James Mitchell and Nicholas Ormond applied and received funds to create two raised garden beds at their associate school. Wood, soil and seeds were purchased. The frames for the gardens were created by the recipients, and students at the school were involved in planting. Highlights of the project included partnering with the school’s Eco Team and Social Justice club to manage the garden; making contact with a local food support group to provide fresh donations of vegetables when in season; and creating a garden resource document for teachers at the school to support them as they bring food literacy into their curriculum.
MSTE Doctoral Fellow

To acknowledge the importance of encouraging doctoral scholars in the field, MSTE annually offers a scholarship to an outstanding research candidate. Congratulations to the 2016/2017 doctoral fellow Sana’a Abu Eid!

Sana’a (Queen’s, M.Ed.; University of Jordan, M.Sc.) has held positions as a university lecturer, a high school science teacher, the head of a science department and a Practical Chemistry GCE (A/As levels) Examiner.

During her M.Ed., Sana’a developed a chemistry unit about acids and bases that demonstrates how content, pedagogy, and technology can be integrated to encourage study and careers in STEM. The unit provides an implementable resource for teachers wanting to use inquiry-based activities in a high-tech environment. Currently, Sana’a’s research focuses on measuring the influence of merging advanced technology with science inquiry in the school setting on middle school students’ interest in STEM fields and STEM-related careers. Sana’a is grateful for the support provided by the MSTE group in creating impactful research.

MSTE Apprentice

To provide opportunities for graduate students to gain depth and breadth of experience in MSTE focused issues, MSTE offers a scholarship to promote leadership, organization, and professional community building in the MSTE context. The MSTE apprentice for 2016/2017 is Stephen MacGregor.

Stephen (Queen’s, B.Ed., B.Sc. Hons) is currently a Master of Education candidate researching pre-service mathematics teachers’ beliefs about problem solving. Since his time in undergraduate physics, Stephen has been fascinated by problem solving and how it is conceived and discussed. Working with the MSTE Group has afforded Stephen the opportunity to extend his thinking in problem solving through invaluable discussion with MSTE members and participation in numerous MSTE events. Stephen is deeply appreciative for the MSTE Group allowing him to function as the MSTE Apprentice, and excitedly anticipates future events hosted by the MSTE Group.

Upcoming Events

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<td>Frontenac, Lennox and Addington Science Fair</td>
<td>March 30 &amp; 31, 2017</td>
<td>McArthur Hall</td>
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<td>Grade 9 Math.Mashup</td>
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<td>McArthur Hall</td>
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<td>MSTE-QSLMA 7/8 Math Olympics</td>
<td>Friday, April 07, 2017</td>
<td>McArthur Hall</td>
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<td>Science Rendezvous</td>
<td>Saturday, May 13, 2017</td>
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MSTE Current Members

Executive

Jamie Pyper, Coordinator
Faculty Profile
Professional Profile (Teaching)

Joan McDuff, Executive
( Elementary Mathematics)
M.Ed. Queen’s, B.Ed. UManitoba, B.A. UManitoba
Faculty Profile

Richard Reeve, Executive
Computers in Education, Science
Ph.D. (OISE/Toronto), M.Ed., B.Ed.
( Queen’s), B.A.
Faculty Profile

Ann Marie Hill, Executive
Technology Education
(McGill)
Faculty Profile

Full Members

Peter Chin
Science, Chemistry
Ph.D. (British Columbia), M.Sc.
(Calgary), B.Ed., B.Sc. (Alberta)
Faculty Profile

Cathy Christie (Science)
Ph.D. (Queen’s), M.Sc., B.Ed., B.Sc.
Faculty Profile

Lynda Colgan
Mathematics
Ph.D. (Toronto), M.Ed. (OISE), B.Ed.
(Toronto), B.Sc.
Faculty Profile

Azza Sharkawy
Elementary Science
Ph.D. (OISE/UT), M.A., B.Ed. (McGill), B.ScH. (Toronto)
Faculty Profile

Diane Lawrence
Elementary Science
M.Ed. (Queen’s), B.Ed. (Western), B.Sc. (Hons) (McMaster)
Faculty Profile

Tom Russell
Science
Ph.D. (Toronto), M.A.T. (Harvard), A.B. (Cornell)
Faculty Profile

Peter Taylor
Cross-appointment, Department of
Mathematics and Statistics
Ph.D. Harvard, M.A. Queen’s, B.A. Queen’s
Faculty Profile

Associate Members

Wendy Powley, PhD, Adjunct Faculty, I/S computer science
Ena Holterman, Lecturer, Technology Education
Stephen Haberer, Adjunct Faculty, I/S Chemistry
James Chambers, Adjunct Faculty, Technology Education

Group Non-Academic Staff Members

Bonnie Knox, Secretary