

Math in *Motion*

A K–12 newsletter for system leaders

Issue #5 • May 2014

New Professional Learning Opportunities Summer 2014

The Ministry of Education is delighted to announce a number of new professional learning opportunities for teachers and school leaders in mathematics and mathematics education. In partnership with Ontario's teacher federations and principal councils, we are providing funding for Additional Qualifications (AQ) courses in mathematics and summer institutes. Here are some of the highlights:

AQ Courses and Summer Institutes for Teachers

- The Ministry of Education is providing the Ontario Teachers' Federation (OTF) and its affiliates with funding to subsidize the delivery of math AQ courses and summer learning institutes.
- The primary purpose of subsidizing both the math AQ courses and the summer learning institutes for teachers is to enhance their math content knowledge and pedagogical expertise in the area of mathematics.
- The OTF will administer subsidies of \$450 to members of its affiliates who complete math prerequisites or math AQ courses.
- OTF will offer three-day learning institutes on mathematics in at least 8–10 geographic locations across the province during the summer of 2014. This learning will be supported by webinars and interactive sessions guided by teacher leaders with expertise in mathematics throughout the year. While most of these institutes will be offered in small groupings consisting of a maximum

20–25 participants, OTF is also offering a limited number of larger-group sessions.

For members of the Ontario Secondary School Teachers' Federation (OSSTF) and the Elementary Teachers' Federation of Ontario (ETFO) click here for more information www.otffeo.on.ca/en/

For members of OECTA click here www.oecta.on.ca

Supporting Principal Leadership in Mathematics

- The Catholic Principals' Council of Ontario (CPCO), the Ontario Principals' Council (OPC) and the Association des directions et direction adjointes des écoles franco-ontariennes (ADFO) are hosting a summer institute for principals and vice-principals. Register at no cost for either the July 8–10 session in Cornwall or the August 12–14 session in Niagara-on-the-Lake.
- A Fall Institute (one follow-up day) is being planned for November 2014.

For more information contact Sarah Russell at srussell@cpco.on.ca or Lise Kingsbury lise@adfo.org

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Math in Motion is published monthly except during the summer. For more information or to make a comment, email cristina.dasilva@ontario.ca

One Board's Story

Report on the Middle Years Collaborative Inquiry

In 2011, the Ministry of Education invited eight school boards to participate in the Middle Years Collaborative Inquiry (MYCI). In addition to generating knowledge about effective mathematics practice in middle years classrooms, the inquiry was intended to build capacity in collaborative inquiry skills and strengthen connections among middle years educators in order to improve mathematics instruction across the grades.

In many ways, the Middle Years Collaborative Inquiry is testament to the research literature on effective professional learning. Teachers were engaged in choosing the inquiry question and determining their professional learning needs. Administration supported the inquiry whenever possible and principals were active learners along with teachers. The consultants and learning partners were knowledgeable, not only about mathematics across the panels, but also about pedagogical strategies, child and adolescent development, adult learning and the change process.

The Ottawa Catholic School Board, featured here, is organized by hubs or families of schools (each consisting of one high school with several feeder schools). In their participation in the MYCI project, the board selected three hubs to conduct a cross panel, in-depth mathematics inquiry for teachers in Grade 6 to 10.

Ottawa Catholic's family of schools inquiries were conducted independently since each had specific needs to address. At a concluding session, the project members shared findings, stories and, where applicable, resources. The key learnings from these inquiries are summarized below.

Key Learnings from Ottawa Catholic

Learning takes time ...

- Teachers appreciated being given the time for learning. They also appreciated the expertise of the facilitators who were part of the initiative.
- The role of administrators was acknowledged as extremely important, though complicated by demands on their time.

Beliefs are not immutable ...

- Participants observed that beliefs were not immutable but some ideas were harder to change than others (e.g., all students can learn mathematics, all students can benefit from inquiry learning).
- The initiative did increase teacher efficacy in the use of evidence-based strategies.

Teacher practice varies ...

- There was considerable variability in teacher practice, both within and across the panels.
- However, the more open teachers were initially to participating in the project, the more likely they were to continue embracing ideas and strategies learned during the process.
- While teacher-led instruction followed by independent student practice remained the prevailing pedagogy, teachers indicated they would like to move to more student learning through inquiry.

Teacher reflections ...

- Application of strategies learned in the MYCI project led to greater opportunities for students to succeed.
- Teachers emphasized that their comfort level and ability to make quick decisions and react to student questions, learning and misconceptions was an integral component of the lesson's success. In other words, the planning of a lesson alone did not guarantee "success."

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Groupings are key to student success ...

- The way a class was structured allowed students with Individual Education Plans and English language learners to be successful.
- Students' understanding of concepts appeared stronger when teachers used purposeful grouping as opposed to allowing students to choose their own group or partner.

Ongoing challenges ...

- While content knowledge within grade levels was strengthened, understanding how mathematical concepts develop across grade levels remains a challenge.
- Assessment *for* and *as* learning remain a challenge for many teachers.

- Teachers need strategies and skills on how to give and receive feedback.
- Establishing success criteria is a relatively new approach in high school and, to a lesser extent, intermediate classes.
- Seamless transition for students from Grades 6 to 7 and 8 to 9 remains elusive. Differences in approaches are minimized when transition takes place within a single building.
- Developing multiple entry points for students to engage in mathematical lessons remains a challenge.

The Middle Years Collaborative Inquiry will continue into 2014–15 with a fourth year of support.

DID YOU KNOW? ... Canadian students scored well above OECD average in problem-solving skills

Canadian 15-year-olds scored well above the OECD average for problem-solving skills on the PISA 2012 assessment; almost 20% of Ontario students scored at the top two proficiency levels (5 and 6).

On April 1, 2014, the Organisation for Economic Cooperation and Development (OECD) released a report entitled "PISA 2012 Results: Creative Problem Solving: Students' skills in tackling real-life problems." General PISA 2012 results were released in December 2013, but since then, the OECD has released several companion reports focused on specific aspects of the results. The PISA 2012 assessment of problem solving was administered, on computer, to about 85,000 students in 44 countries and economies. There is some provincial level data available in the report. The OECD explains the importance of assessing problem-solving skills this way.

For example, the new Survey of Adult Skills finds one in 10 workers are confronted every day with complex problems that require at least 30 minutes to solve. Complex problem-solving skills are particularly in demand in fast-growing, highly

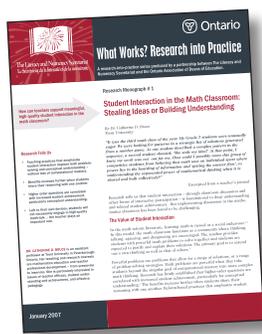
skilled managerial, professional and technical occupations (OECD, 2014).

Other Findings

1. Compared with students in other OECD countries, students in Ireland, Korea, Brazil, USA, Portugal, Singapore, Japan and Canada were more successful on "interactive tasks" than expected, given their overall performance. Interactive tasks are described as those where all the information is not given; rather, students have to uncover additional relevant material before they can solve the problem (as opposed to 'static' tasks, where all the needed information is provided).
2. Canadian students were stronger than expected on "representing and formulating" processes, as were students in China, Korea, Singapore, Hong Kong, Italy, Japan, France, Australia and Belgium.
3. Canadian (and Ontarian) boys performed better than girls on problem-solving tasks, though the score-point difference was less than the OECD average of 7 points.

For the full report: <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-V.pdf>

Resource Round-up



Revisiting *What Works?*

Research Monograph # 1

Student Interaction in the Math Classroom: Stealing Ideas or Building Understanding

By Dr. Catherine D. Bruce,
Trent University

What Works? Research into Practice is a peer reviewed series published by the ministry in partnership with the Ontario Association of Deans of Education. Ongoing since 2007, the series offers teachers and others working in education a bird's eye view of a wide range of research studies.

This very first *What Works?*, written by Dr. Catherine Bruce, explores teaching practices that emphasize student interaction and improve both problem-solving and conceptual understanding – without loss of computational mastery. Dr. Bruce emphasizes that benefits increase further when students share their reasoning with one another.

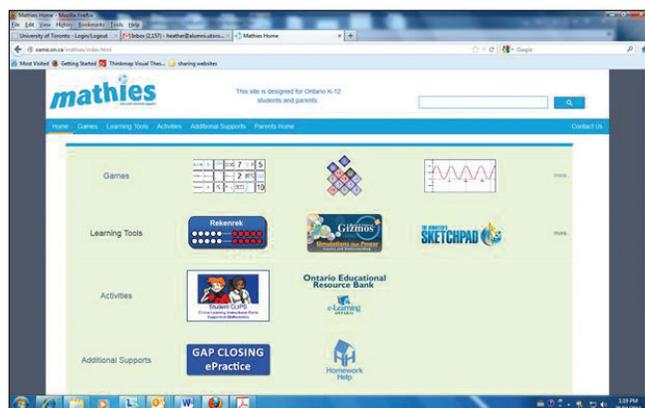
Five strategies for encouraging high-quality student interaction are discussed:

1. the use of rich math tasks
2. justification of solutions
3. students questioning one another
4. use of wait time
5. use of guidelines for math-talk

“The teacher clearly plays a pivotal role,” Dr. Bruce writes, “in shaping the learning environment. By providing students with a framework for interaction, students can be guided effectively towards working as a learning community in which sharing math power extends understanding and leads to higher levels of achievement.”

To read this *What Works?* edition click [here](#).

New Web-based Tools



Two new web-based tools have been launched by the Ontario Association for Mathematics Educators (OAME) as part of the Critical Learning Instructional Paths Supports (CLIPS) series – Whole Number Comparison Tool and Pouring Containers Fraction Resource <http://oame.on.ca/mathies/learningTools.php>

The **Whole Number Comparison Tool** resource provides students with a work space where they can explore how one whole number compares with another. This comparison can be portrayed in word, symbolic and graphical representation.

The **Pouring Containers Fraction Tool** helps students deepen their understanding of fractional concepts in the context of volume through the use of interactive illustrations. It provides students with a work space where they can digitally fill containers with liquid to explore equivalent fractions or divide fractional wholes into parts.

Looking for school newsletter or website ideas?

Practical tips, activities and resources about how parents and guardians can support their child's learning of mathematics are now available on EduGAINS. Click [here](#) to access.